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**PASMINCO EXPLORATION**

**EL 2/90 Boco**

**EL 8/90 North Pinnacles**

**EXPLORATION REPORT**

**FOR THE PERIOD**

**11 October 1990 - 29 February 1992**

volume 1 of 2

TCR 92-3343

| MINES                         |                 |
|-------------------------------|-----------------|
| File No.                      | EL2/90 & EL8/90 |
| covering letter on both EL'S. |                 |

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**DATE:** March 1992

**REPORT No:** T92-3

**SUBMITTED TO:** Regional Exploration Manager - Tasmania

**DISTRIBUTION:** Department of Mines - Hobart

Pasminco Exploration - Burnie

- Melbourne

Billiton Australia

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*[Signature]*

Burnie  
March 1992

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## 1. SUMMARY

Exploration undertaken by Pasminco on EL's 2/90 and 8/90 since entering a Joint Venture with Shell (the Boco JV) has included a number of regional data gathering programmes, as well as specific prospect-scale studies at **Animal Creek**, **Boco Siding**, **Silver Falls** and **North Pinnacles**. The culmination of work at Animal Creek was the completion of one diamond drill hole, **AK1** of 553.7m depth.

Regional studies undertaken that covered the whole Boco JV area include aerial photography, photogrammetric map production, high-resolution aeromagnetics and geological mapping. Approximately half of the JV area was covered by gravity surveys.

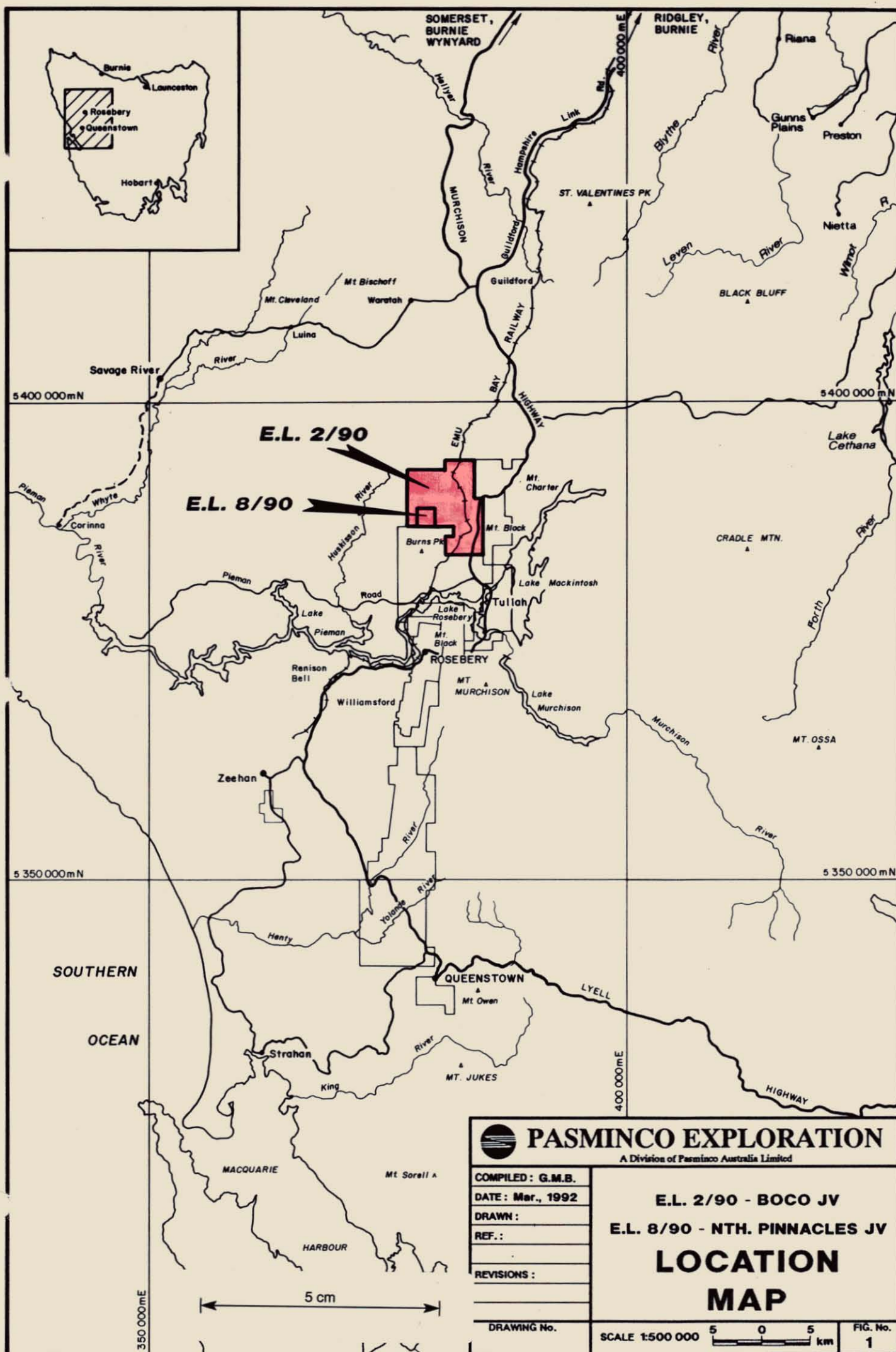
Geophysical and geological studies of the eastern side of the JV area led to the definition of an untested extension of the Boco Alteration Zone under glacial cover 2km to the NNE, near **Animal Creek**. This was tested by drill hole AK1 and was found to consist of weak to moderate sericite-pyrite-silica alteration with no base metal mineralisation. The prospectivity of this zone is now considered to be poor.

Geological and geochemical studies indicate significant potential for zinc-dominated base metal mineralisation near **Silver Falls**. Further work on the geological and structural setting of this area, and the **North Pinnacles** area further south, is recommended, as well as undertaking deep-seeking EM and further geochemical analyses on the Silver Falls prospect.

Definition of diamond drill targets at or near Silver Falls should be the highest priority within the JV area.

The structural understanding of the eastern half of the licences has progressed significantly with discovery of a number of previously unrecognised faults, using a combination of geology and geophysics. The significance of these faults for base metal mineralisation is still being assessed.

A continuation of programmes already commenced by Pasminco Exploration is recommended for the coming year.



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## 2. INTRODUCTION

This report documents work undertaken on Exploration Licences 2/90 Boco and 8/90 North Pinnacles Western Tasmania, covering the period 11 October 1990, when Pasminco Exploration took over management of the licences from Billiton Australia, to February 1992. The proposed work program for the year March 1992 to February 1993 is also outlined.

The two licences reported here are held under the same terms and conditions and are subject to the one joint venture agreement, between licensee, the Shell Company of Australia Limited, and manager/operator, Pasminco Exploration, a division of Pasminco Australia Limited. The licences form one geographically and geologically coherent block, thus an amalgamated report is clearly the most effective method of data presentation and technical discussion. The licence renewal dates remain separate (Boco EL 2/90: 20 April 1992; North Pinnacles EL 8/90: 8 June 1992), as do budgets and expenditure on the respective licences.

EL 2/90 (55km<sup>2</sup>) and EL 8/90 (4km<sup>2</sup>) jointly cover 59km<sup>2</sup> of Cambrian Mt Read Volcanics and are centred 17km NNE of Rosebery and 16km SW of the Hellyer Mine on Tasmania's West Coast (figure 1). The principal targets of exploration on the EL's are auriferous base metal massive sulphide bodies similar to those at Rosebery and Hercules.

The EL's include old workings at Boco Creek (Samuel Smith's Lode), with the Silver Falls lead workings occurring immediately outside the licences' western boundary. Advanced exploration throughout the past 20 years, principally over the **North Pinnacles**, **Silver Falls** and **Boco Siding** prospects, (figure 4) has left a legacy of good access tracks and grid lines on the southern half of the EL's, with access in the east and northeast along the Murchison Highway and Emu Bay Railway. The northwest corner of the EL's is relatively inaccessible, except along the Que River when low. Planned improvement of access to the northwest area by joining the Sawmill Creek and Silver Falls tracks was abandoned during the year due to the route cutting directly through a stand of rainforest timber.

During the period covered by this report, exploration has progressed from initial regional data gathering and interpretation programs including geological mapping, aeromagnetism and gravity surveying to prospect scale studies at **Boco**, **Animal Creek**, **North Pinnacles** and **Silver Falls** culminating in the drilling of one diamond drill hole at **Animal Creek**.

### 3. TENURE

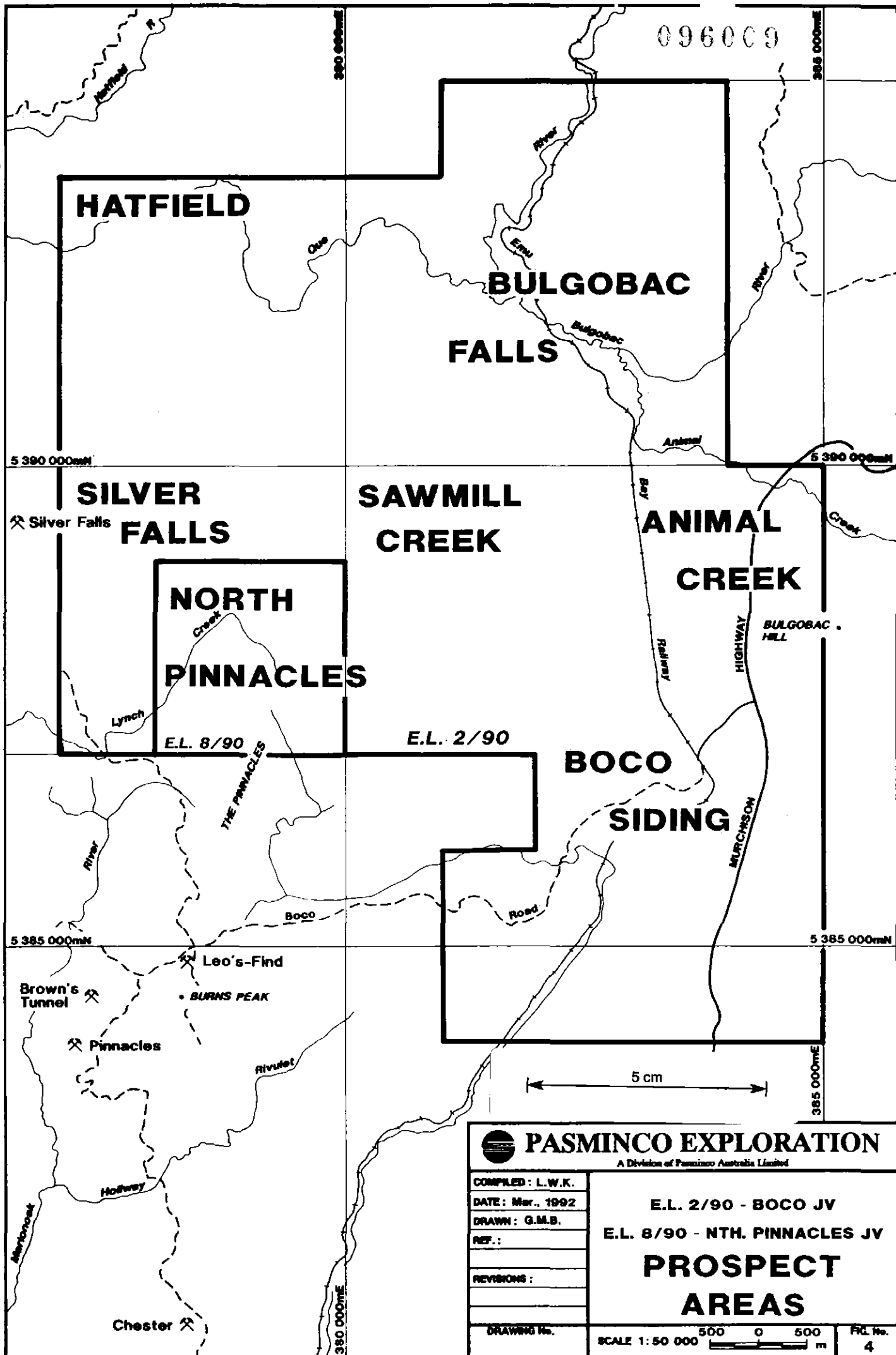
Exploration Licences 2/90 (Boco) and 8/90 (North Pinnacles) of 55km<sup>2</sup> and 4km<sup>2</sup> respectively were granted to the Shell Company of Australia Limited on 20 April 1990 and 8 June 1990 respectively, each for a period of 10 years, renewable every 12 months. This followed Shell's successful tenders through the Tasmanian Department of Mines tender system.

Billiton Australia, the metals division of the Shell Company of Australia, were sole managers and operators of both EL 2/90 and EL 8/90 from their dates of inception until 12 October 1990 when a heads of agreement to form a joint venture between the Shell Company of Australia Limited and Pasminco Australia Limited was signed. This Joint Venture agreement allows Pasminco to earn a 60% interest in the two licences by spending a combined total of \$500 000 over 4 years from the date of inception of the Joint Venture. Pasminco Exploration manage and operate all exploration on EL 2/90 and EL 8/90 on behalf of the Joint Venture.

Both EL 2/90 and EL 8/90 were renewed in 1991 and a further one year renewal of each licence is being sought.

This report covers exploration activities on the two licences ("the Boco Joint Venture") from 11 October 1990, when Pasminco took over management until 29 February 1992, immediately prior to Boco EL 2/90 falling due for renewal.

EL 2/90 excludes lands vested in the HEC, 0.2km<sup>2</sup> covering the Murchison Highway state reserve and 0.5km<sup>2</sup> of mine leases. The remainder of EL 2/90 and all of EL 8/90 are unallocated Crown Land (figure 2).



096010



# PASMINCO EXPLORATION

A Division of Pasma Australia Limited

COMPILED :  
DATE :  
DRAWN : G.M.B.  
REF :  
REVISIONS :

E.L. 2/90 - BOCO JV  
E.L. 8/90 - NTH. PINNACLES JV  
**REGIONAL GEOLOGY**  
FROM MAP 6 OF THE  
MT. READ VOLCANICS PROJECT

DRAWING No.

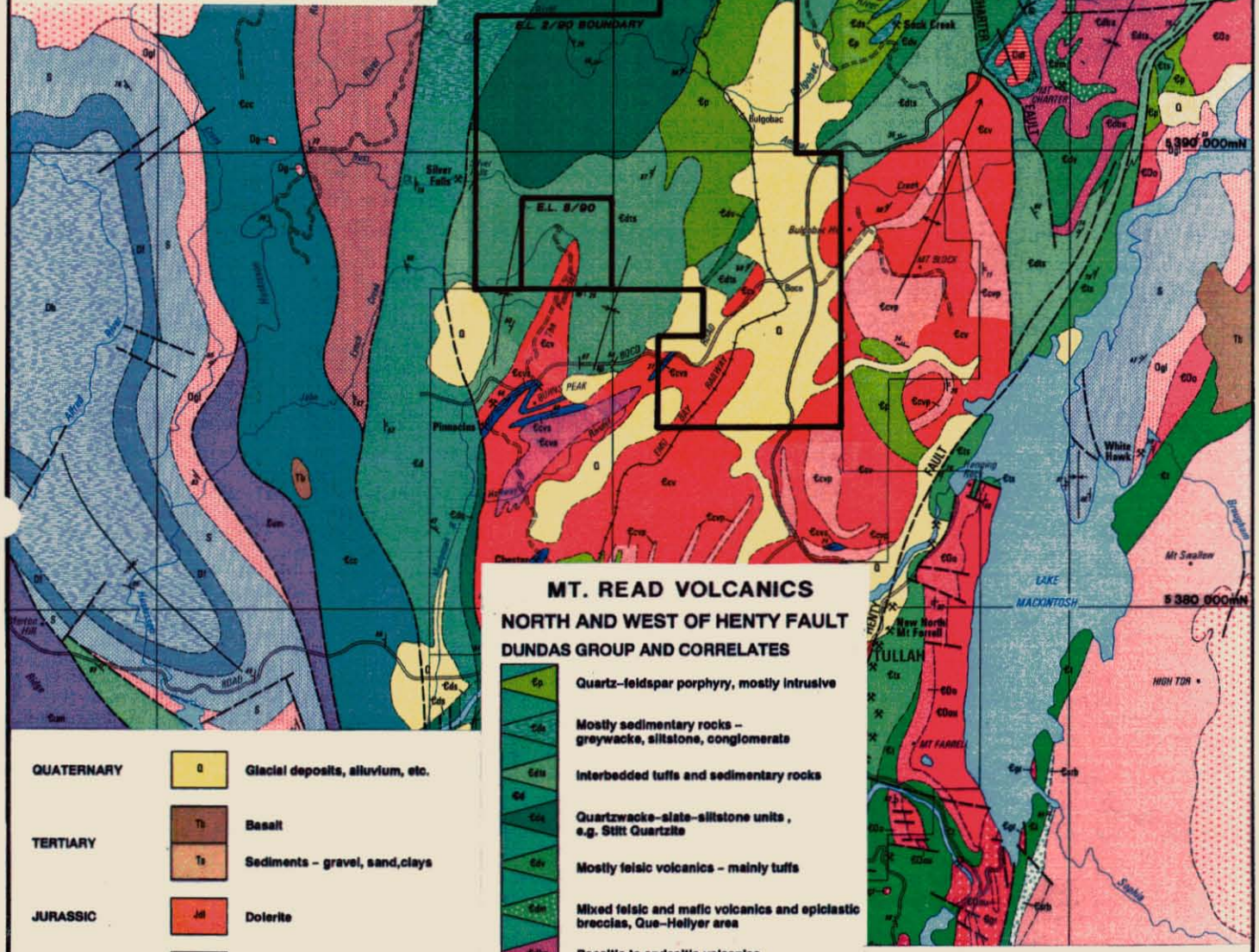
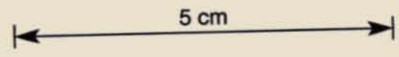


FIG. No. 3

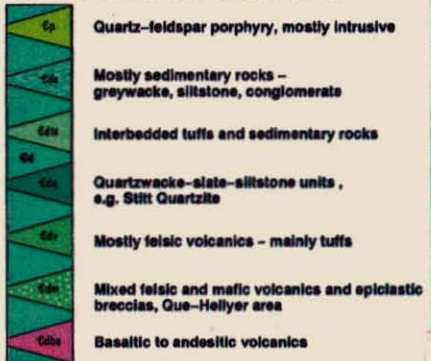
## ACKNOWLEDGEMENT:

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



## MT. READ VOLCANICS NORTH AND WEST OF HENTY FAULT DUNDAS GROUP AND CORRELATES

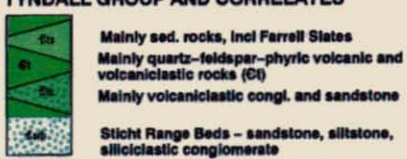


|                                  |     |                                                                                                     |
|----------------------------------|-----|-----------------------------------------------------------------------------------------------------|
| QUATERNARY                       | Q   | Glacial deposits, alluvium, etc.                                                                    |
| TERTIARY                         | Tb  | Basalt                                                                                              |
|                                  | Ts  | Sediments - gravel, sand, clays                                                                     |
| JURASSIC                         | Jd  | Dolerite                                                                                            |
| PERMIAN - CARBONIFEROUS          | P   | Undifferentiated                                                                                    |
| DEVONIAN                         | Dd  | Dolerite                                                                                            |
|                                  | Dp  | Granite                                                                                             |
| DEVONIAN - SILURIAN              | S-S | Bell Shale                                                                                          |
|                                  | Di  | Florence Sandstone                                                                                  |
|                                  | S   | Silurian                                                                                            |
| ORDOVICIAN                       | Og  | GORDON GROUP limestone                                                                              |
| EARLY ORDOVICIAN - LATE CAMBRIAN | COu | Upper sandstone sequence including Pioneer Beds (COu)                                               |
|                                  | COo | Undifferentiated conglomerate and sandstone (COo)                                                   |
|                                  | COm | Newton Creek Sandstone (COm) - interbedded sandstone siltstone and conglomerate with marine fossils |

## CENTRAL VOLCANIC COMPLEX



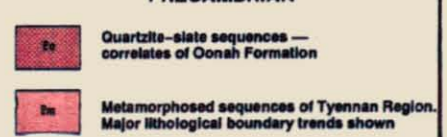
## SOUTH AND EAST OF HENTY FAULT TYNDALL GROUP AND CORRELATES



## CAMBRIAN INTRUSIVE ROCKS



## PRECAMBRIAN



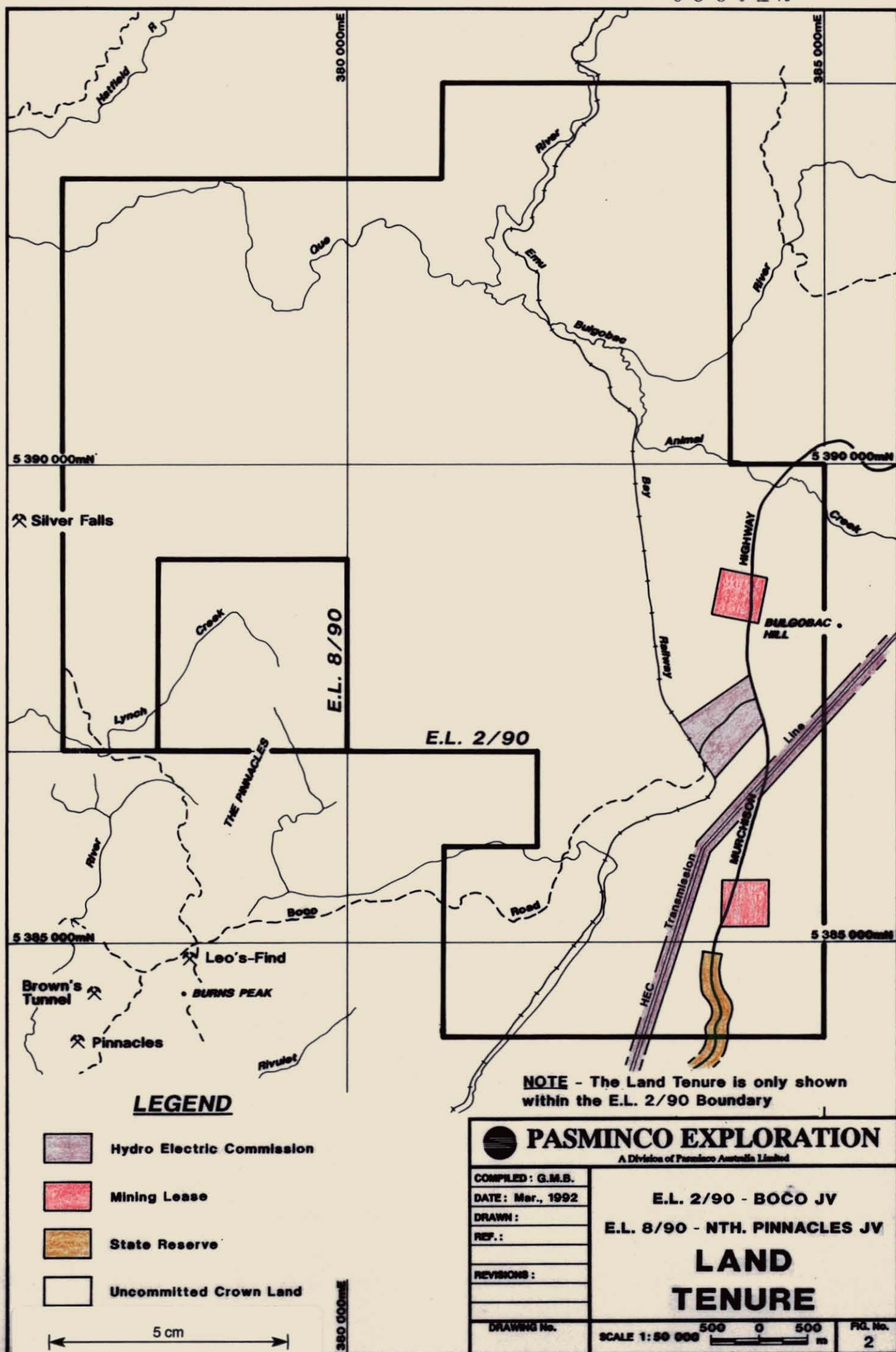
#### 4. REGIONAL GEOLOGY

The Boco and North Pinnacles EL's (the Boco JV) cover a large section of the Cambrian Mt Read Volcanics in Western Tasmania. Most of the units exposed at the surface are included in either the Central Volcanic Sequence (CVS) (25%), consisting of rhyolitic to dacitic lavas and associated volcanoclastic rocks, cross-cut by mafic dykes and sills, or the Dundas Group (75%) which comprises fine to coarse grained turbidites with variable volcanoclastic content, intruded by quartz and feldspar - bearing porphyries (Corbett and McNeill, 1986; figure 3). The southeastern portion of the area (>20km<sup>2</sup>) is almost entirely covered by Quaternary glacial till up to 100m thick, limiting geological information to that gained by sub-surface drilling.

The contact between the CVS and Dundas Group in the east is of unresolved nature, but may be in part fault controlled. Extant surface exposure is insufficient to resolve this question. The contact between the North Pinnacles Rhyolite and Dundas sediments at North Pinnacles is reported to be conformable, but this is based on limited evidence and is at best questionable. The Rhyolite itself also has a number of complexities and the folded solution presented by Corbett and McNeill (1986) (figure 3) in their regional geology maps is less than ideal. Possible alternative solutions to some of these problems are developed elsewhere in this report.

A structure, believed to be a splay off the Rosebery Fault, striking north-south, lies outside (to the west) of the licence boundary. Here, it is much steeper than further south and occurs wholly within Dundas Group rocks.

The Boco Alteration Zone, the North Pinnacles gold anomalies and most of the Silver Falls base metals soil anomaly are located within the licence boundaries, and have been the main focus of exploration by previous explorers. These areas form the basis from which Pasminco's exploration effort on the licences has been developed.



## 5. PREVIOUS EXPLORATION

The area covered by the Boco JV was held by Comstaff from 1963-1972 but most of the detailed exploration has been carried out since that date.

EL 12/72 of 49km<sup>2</sup> was granted to the Electrolytic Zinc Co. in 1972 and since that date has been the subject of three joint venture agreements; viz

1976 - Getty Oil Development Co., EZ manager,

1985 - CSR Ltd., CSR manager of the EZ-Getty-CSR JV. Getty later sold their Australian equity to Little River Goldfields.

1986 – Pancontinental Mining, Pancon. manager of the EZ-LRG-Pancon JV.

The licence expired on 25 December 1987 after which Samisen Ltd successfully tendered for part of the area as EL 17/88. The North Pinnacles block was retained by the EZ-JV for an additional 2 years, before final relinquishment.

Samisen subsequently relinquished their tenement in 1989 and the whole licence area reverted to open tender.

The Shell Company of Australia successfully tendered for the area currently held as EL 2/90 and EL 8/90 in early 1990. They entered the Boco JV with Pasminco Australia Limited in October 1990, the date which work reported herein was commenced.

Reviews of previous exploration appear in reports by CSR Ltd. (Williams, 1985), Pancontinental (Taylor, 1987) and Billiton Australia (Randell, 1991a & b).

The exploration history is summarised below (After Randell, 1991a)

**Pre-1963:** Prospector workings (Samuel Smith's Lode) known at Boco Creek.

1963-1972: Comstaff - regional stream sediments  
- 2 lines IP at Boco

|            |       |   |                              |
|------------|-------|---|------------------------------|
| 1972-1976: | EZ Co | - | mapping                      |
|            |       | - | airborne magnetics           |
|            |       | - | INPUT EM (flown by Comstaff) |

- 1976-1979: EZ Co (Boco) - airborne EM  
 - gridding  
 - gradient array IP  
 - ground magnetics  
 - soil sampling  
 - 3 DDH's (BBP 207-209) of IP targets  
 - dipole-dipole IP
- 1976-1979: EZ Co (Silver Falls, North Pinnacles, Northern Area)  
 - gridding  
 - INPUT follow up  
 - 3 DDH's (NPP 213-315)  
 - stream sediments
- 1979-1984: EZ Co (Boco) - review geophysics  
 - gridding  
 - soil sampling  
 - dipole-dipole IP  
 - mapping  
 - 12 percussion holes  
 - 8 DDH's (BBP 242, 246-248, 250-251, 253, 254).  
 - UTEM (immediate Boco area)  
 - down hole Sirotem
- 1985: CSR (Boco) - mapping  
 - alteration studies  
 - S isotopes  
 - 3 DDH's (BBP 278-280)
- 1986-1987: Pancontinental (Boco)  
 - gridding  
 - UTEM (in loop, strike extensions of Boco).  
 - recompilation
- 1988-1989: Samisen (Boco)- RRMIP  
 - test gravity
- 1990: Billiton - Lithogeochemistry

## **6. WORK UNDERTAKEN – 11 OCTOBER 1990 TO 29 FEBRUARY 1992**

### **6.1 General**

#### **6.1.1 PHOTOGRAMMETRY**

In December 1990 a new high-level aerial photographic survey (black & white) was flown by the Lands Department to provide a basis for photogrammetric map production by the HEC. This was part of a larger survey covering all of Pasminco Exploration's tenements in Western Tasmania. In January 1991 colour 1:10 000 aerial photography was flown by the Lands Department to provide up-to-date photographs for mapping and access (figure 6). New 1:10 000, 1:5 000 and 1:2 500 scale base plans have been produced by the HEC (figure 5). The contoured data has been acquired on computer disk via North West CAD Centre for use on Autocad, and up-graded base plans have been produced from this (see figures 11 to 17).

#### **6.1.5 COMPUTERISATION OF DRILLING DATA**

The acquisition of Techbase software at Pasminco Exploration's Burnie office has facilitated computer generation of drill sections and plans, amongst other operations. This has meant that historic drill hole data in the form of collar coordinates and down-hole surveys has been transferred manually to the Techbase system's main data base for generation of drill hole plots. The process of entering this data is complete, and results can be seen on plans at the back of this report (figures 13 to 17) and the drill sections for AK1 (figures 18 & 19). Down-hole geochemical data remains to be entered.

### **6.2 Geophysics**

#### **6.2.1 AEROMAGNETIC SURVEY**

A new, high-resolution helicopter-borne aeromagnetic and radiometric survey was undertaken during February 1991 by Geoinstruments Pty Ltd for Pasminco Exploration over the area covered by the Boco JV. Survey specifications were for east-west flight lines at 100metres spacing, north-south tie lines every 1 000 metres, a nominal terrain clearance of 80 metres, with sampling intervals less than 10m at a <0.1nT magnetometer sensitivity. An acquisition report (Leaman, 1991a) discussing the details of this survey and presenting a preliminary interpretation of data is included as Appendix 3.

Initially, data was presented as filtered and corrected magnetic contour plans supplied by the contractors, Geoinstruments. While these plans were visually easy to use, some

360 000mE

# SHEET LAYOUT

- 1:10,000
- 1:5,000
- 1:2500

5 380 000mN

5 cm

NORTH  
PRINCIPLES

5 394 000mN

5 390 000mN

5 386 000mN

5 382 000mN

5 378 000mN

5 374 000mN

5 372 000mN

5 370 000mN

5 368 000mN

5 366 000mN

5 364 000mN

Zeehan

OCEANA

32

11

34

13

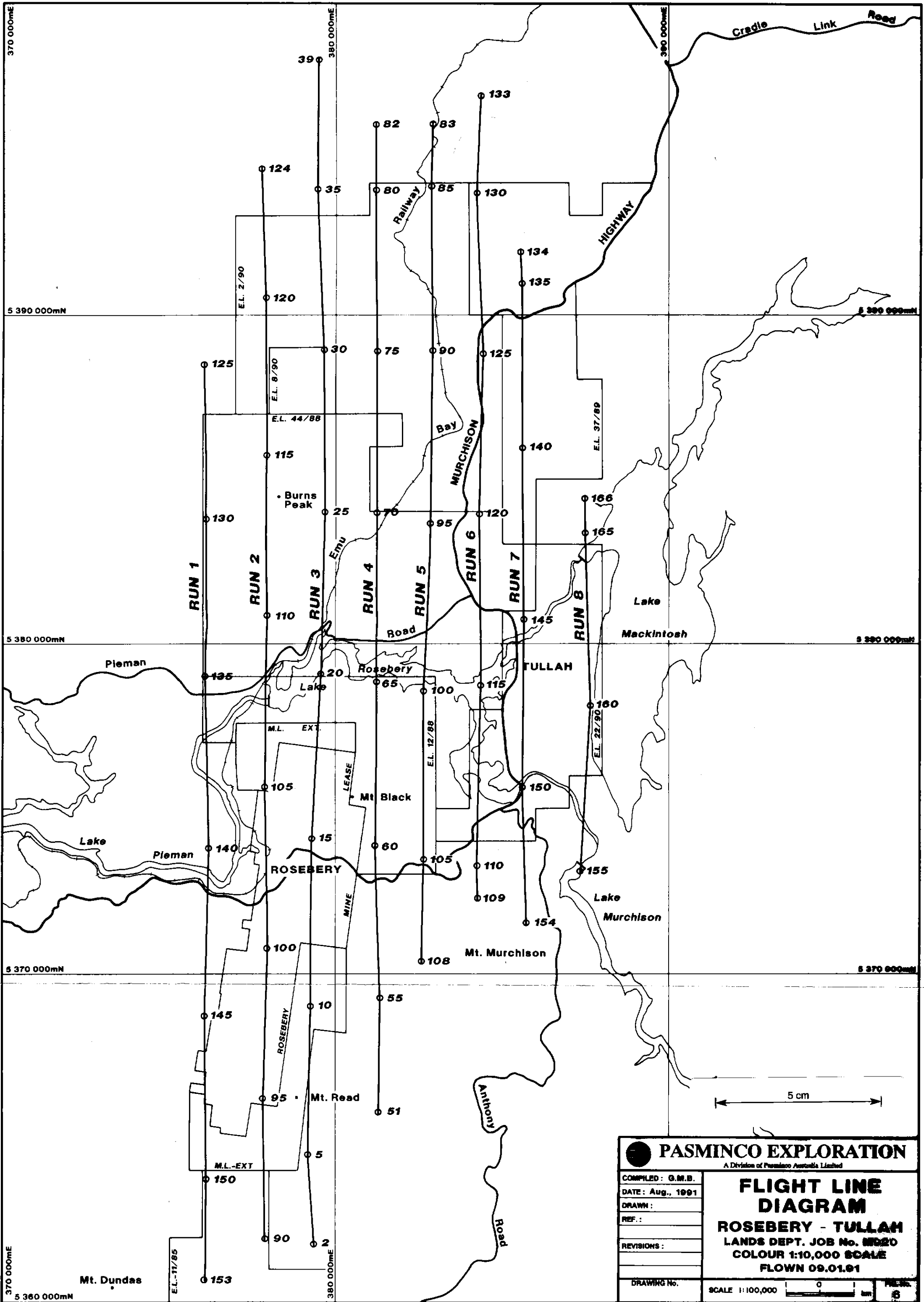
PASMINCO EXPLORATION

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# SHEET LAYOUT

SCALE 1:200,000

Figure 5



03001

important magnetic character was demonstrably obscured during the filtering process. Later in 1991 the raw, unfiltered data was processed and re-presented using 120m terrain clearance to overcome variations in the actual survey height. This was patched into adjacent Pasminco Exploration aeromagnetic surveys to give high-quality, accurate data covering all of Pasminco's Western Tasmania tenements at 1:10 000 and 1:25 000 scale. Upward continued magnetic contour plans at 1:25 000 scale were also prepared using 1300 metres above sea level as the common datum height (to clear local topography). These new magnetic plans were prepared for Pasminco Exploration by the DMMR under the guidance of Dr RG Richardson and have further aided the interpretation of sub-surface geology.

Sections of these re-processed aeromagnetic plans are included as the base sheet for Leaman's (1991a) interpretation (Figure 20) and as Pasminco's standard 1:10 000 sheet 3 (figure 22<sup>4</sup>). Further discussion incorporating the use of magnetic contour plans is presented in following sections dealing with specific prospect areas, and in Appendices 3, 4 and 5 (Leaman 1991a, b & c). In addition, image processed colour magnetic images will soon be available through use of Pasminco's ER-Mapper software.

#### 6.2.2 GRAVITY SURVEYS

Gravity survey coverage on the Boco JV area was limited to Department of Mines regional, kilometre-spaced stations, apart from a small, 20m-spaced survey near Boco Siding prior to Pasminco's involvement in the Boco JV. This existing data was insufficient to produce any meaningful interpretation of sub-surface geology using a two-dimensional method of integration of gravity and magnetic data. This method of integration, developed by Leaman Geophysics, has been most beneficial in unravelling subsurface structural geology, when done in conjunction with known geology elsewhere on Pasminco's Western Tasmania tenements.

Initial plans to cover the whole of the Boco JV area with 400 to 500 metre spaced gravity stations during 1991 (up to 400 new stations would be required) were deferred in favour of closer-spaced coverage over areas of particular interest.

Two separate surveys were completed between August and December 1991 by the Tasmanian Division of Mines and Mineral Resources under contract to Pasminco

Exploration. The first survey extended over the mostly glacial-covered eastern area, between Animal Creek in the north and the boundary of EL 2/90 in the south (figure 4). 407 stations were read at an average spacing of 225m, in a 20km<sup>2</sup> area to unravel the complexities of glacial depth, structures in the underlying bedrock and the presence of untested alteration distinct from, or as extensions to the previously drilled Boco Alteration Zone. An acquisition report for this survey, including integration with the aeromagnetics, interpretation and modelling of the geology prepared by Leaman Geophysics is included as Appendix 5 (Leaman, 1991c).

The second survey was conducted on the western side of the JV area, covering the North Pinnacles and Silver Falls prospects (figure 4). A total of 108 stations were read, giving an average spacing of 400m over a 20km<sup>2</sup> area. This survey has not yet been integrated with the aeromagnetics or modelled, taking into account known geology. However, an acquisition report is presented as Appendix 6 (Leaman, 1992) including some preliminary comment on the local gravity field.

### **6.3 Geological Studies - Regional**

During early 1991, Terry Lees (Pasminco Exploration) and international consultant John Wright conducted a base metals regional study of Western Tasmania, which was based on 8 regional traverses plus specific ore-body studies over a six-week period (Wright et al., 1991). The conclusions of that study are far reaching and no attempt will be made here to summarise that work.

As a more specific follow-up to the regional study (above), Angela Lorrigan conducted a mapping programme over Pasminco's northern licences, including EL's 44/88 - Burns Peak, 37/89 - Bulgobac Hill, 2/90 - Boco and 8/90 - North Pinnacles. The work is reported in Lorrigan (1992), and some discussion of the major conclusions is presented below.

Figures 7 to 9 and 20 to 21 in this report are produced from figures in the aforementioned regional study (Lorrigan, 1992).

### 6.3.1 MAPPING

The study took the form of detailed mapping traverses along the major access tracks, railway lines, rivers and creeks (figure 7) with three main purposes:

1. To obtain an overview of the geology of the area.
2. To investigate theories arising from interpretation of aeromagnetic and gravity data.
3. To visit sites identified as prospective by Wright et al. (1991).

A 1:25 000 map produced following the mapping forms the basis for discussion of the regional geology (figure 9 is part of that map). The format of the map is such that specific rock types are only shown where they can be identified in outcrop or where their presence is strongly implied by information obtained from drilling. To enable a regional geological interpretation to be made, Lorrigan has bulked rock types together into major groups. These form the major rock type divisions on the map (figure 9).

Lorrigan draws a number of conclusions from the mapping, which are discussed in the text of her report, and are summarised below:

### 6.3.2 STRATIGRAPHY & STRUCTURE

The contact between Precambrian and Cambrian rocks is faulted, often forming a wide shear zone in the west, but it is unclear whether these faults are thrusts.

The oldest Cambrian unit is the massive andesite and dacite lava unit with rare sediment lenses (designated  $\epsilon I$ ) which has no identifiable stratigraphic layering and is variably hematite/albite (pink) altered and chlorite (dark green) altered. These form much of the CVC of Corbett & McNeill (1986).

Interpreted to be overlying the felspathic lavas is a package characterised by sediments and volcanics of diverse composition occurring within a relatively thin layer of stratigraphy (designated  $\epsilon II$ ). Lorrigan calls these the Transition Rocks, as they represent the transition zone between feldspar-dominated volcanics and quartz-dominated sediments. They consistently occur beneath  $\epsilon III$  rocks, and often overlie  $\epsilon I$  lavas. Characteristics of  $\epsilon II$  rocks are lavas and intrusions of rhyolitic to andesitic composition intercalated with sediments composed of varying amounts of volcanic detritus. Peperitic contacts are common, and rhyolites appear towards the top of the sequence.

Dundas Group sediments with a strong porphyry association characterise the EIII division. Large volumes of feldspar and quartz-rich sediments occur spatially and compositionally close to massive quartz-feldspar porphyries. Intercalated with these rocks are bedded black and grey mudstones and some well sorted quartz-feldspar siltstones. The contact between EII and EIII is often marked by the appearance of black mudstone.

Conformably overlying EIII is a package of Dundas turbidites with no porphyry association (EIV). These are characterised by increased volumes of often micaceous sandstone and mudstone at the expense of quartz and feldspar crystal-rich rocks.

The appearance of conglomerate beds in the sedimentary package marks the start of group EV. Lorrigan believes they conformably overlie EIV and indicate a shallower water depth.

Dolomitic siltstones, coarse conglomerates and re-worked quartz-sandstones characterise group VI. These occur mostly on the western side of the Rosebery Fault, thus their relationship with the other Dundas Sediments (EIII to EV) is unclear. However one location where a possible conformable relationship between EV and EVI occurs is just north of the EBR-Que River crossing. The contact here suggests that the depositional environment was changing to shallower water as group EVI sediments formed.

The Rosebery Fault juxtaposes EIII to EV with EVI rocks, and movement on this thrust fault appears to diminish to the north.

The temporal relationships between the various rock groups described above are illustrated in figure 8, which is the geological legend accompanying the 1:25 000 map. Spatial relationships in the area covered by the Boco JV are illustrated in figure 9, which is part of the 1:25 000 geological map.

Lorrigan demonstrates that the Dundas Group rocks are folded, but have at least one less period of deformation recorded in them than do the Precambrian rocks. Stereoplots indicate the nature of folding and thus the shape of the unit boundaries between EIII, EIV and EV (figure 9).

### 6.3.3 ALTERATION & MINERALISATION

Lorrigan investigated sites of intense alteration and sulphide or gold mineralisation during mapping. A number of these occur within the areas of interest of the Boco JV.

Lead mineralisation at Silver Falls was sampled during mapping. Transition rocks (€II) occur here alongside the Rosebery Fault and are intensely altered. Lorrigan believes potential exists for significant mineralisation here, and devoted Appendix 3 of her report (Lorrigan, 1992) to further investigation of the Silver Falls geology. (This area is discussed in the text of this report, section 6.5 below).

The western contact between massive feldspar volcanics (€I) and transition rocks (€II) between Animal Creek and Boco Siding is faulted where visible, but Lorrigan believes that mineralisation would be located some distance away from the contact. This zone was drilled recently by Pasminco (AK1) and is discussed below (section 6.4).

Previously unknown areas of alteration were located within and along the margins of the porphyries along the Sawmill Creek Track, Bulgobac Falls Road and Bulgobac River (figure 9). The alteration is siliceous and sericitic and associated with strong cleavage development, but only locally slightly elevated in zinc (sample 30537; Appendix 2).

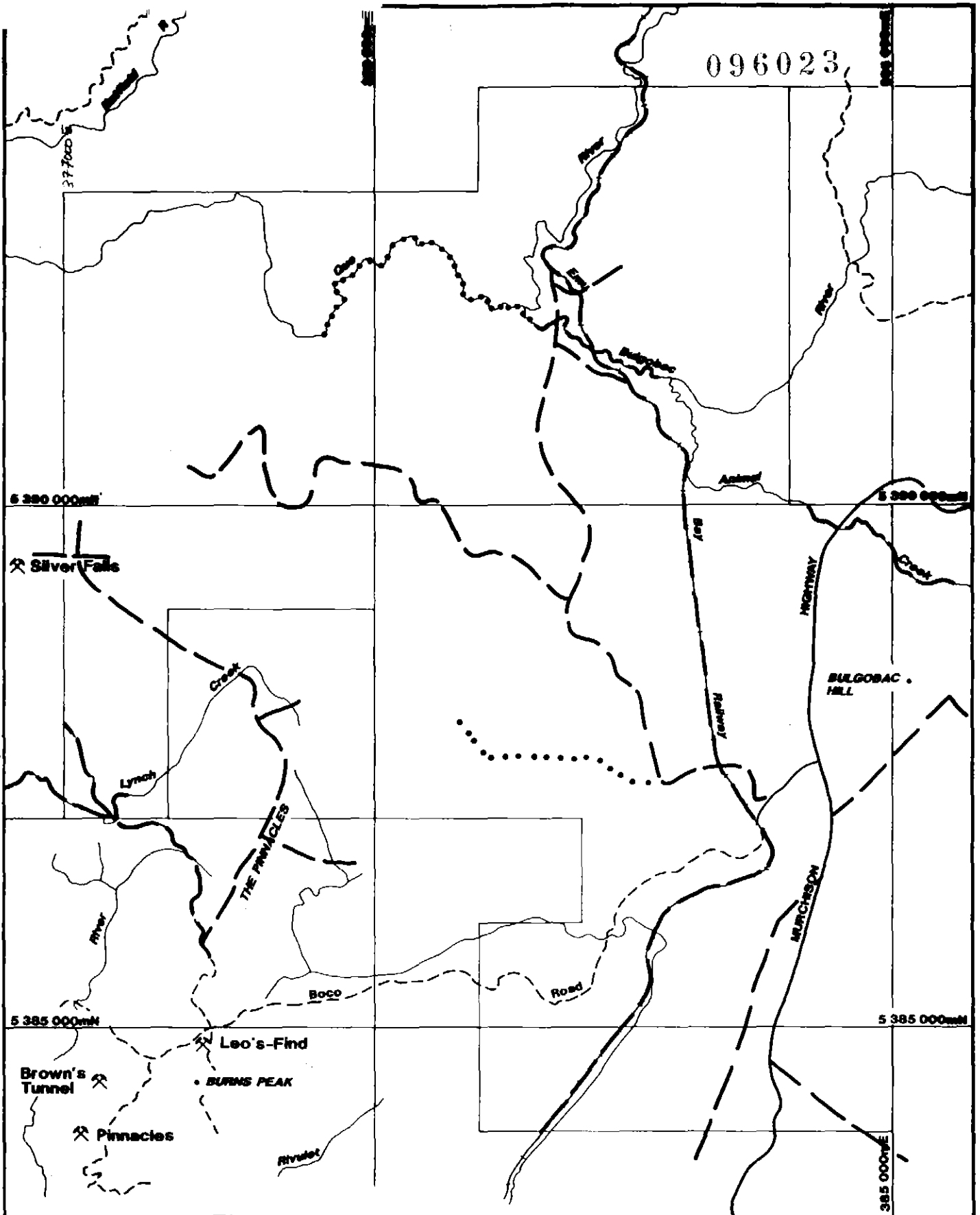
Lorrigan believes that the Transition Rocks (€II) are the most prospective within the map area, considering the location of known mineral prospects. They are also the most likely to exhibit hydrothermal alteration. The change in volcanic composition that they represent has been observed world wide to accompany base metal mineralisation (eg. Hellyer, Kuroko, Noranda). Ore bodies in the Mt Read Volcanics are also most likely to occur alongside major structures (eg. Hercules–Rosebery–Chester–Pinnacles Line).

Lorrigan concludes that three under explored areas stand out for immediate attention:

1. Sock Creek
2. Hollway Andesite
3. Silver Falls

of which Silver Falls lies in the zone of interest of the Boco JV.

In addition, an interpretive geological cross section from Silver Falls in the west, to



### LEGEND

— 1991 traverses(A.N.L.)

..... 1981 EZ

5 cm



**PASMINCO EXPLORATION**

A Division of Pasma Australia Limited

COMPILED: L.W.K.

DATE: Mar., 1992

DRAWN: G.M.B.

REF.:

REVISIONS:

DRAWING No.

E.L. 2/90 - BOCO JV

E.L. 8/90 - NTH. PINNACLES JV

**MAPPING  
TRAVERSES  
1991**

SCALE 1: 50 000

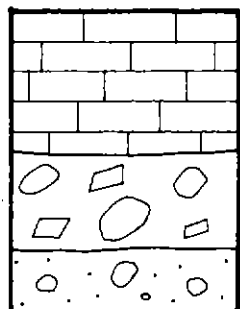
500 0 500 m

Fig. No.

7

096024

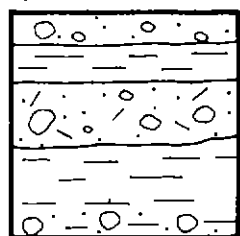
West of Rosebery Fault



e VI

Dundas Sediments  
Shallow water  
Conglomerate-Dolomitic Siltstone

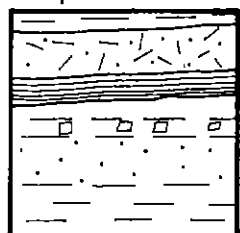
Que River



e V

Dundas Sediments  
Shallowing water  
Conglomerate beds

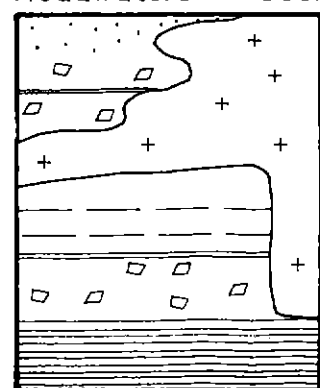
Surprise Creek



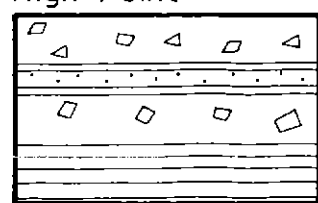
e IV

Dundas Turbidites  
No porphyry or lava association  
Minimal volcanic quartz-bearing sediments

Headwaters - Sock Creek



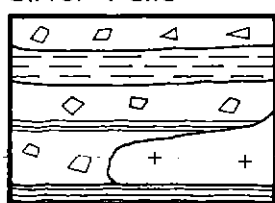
High Point



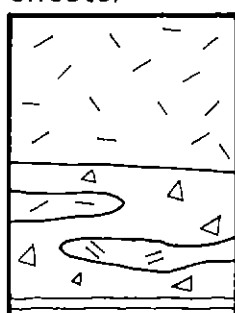
e III

Dundas Sediments  
Black shale - porphyry association  
Coarse volcanic quartz in sediments  
No other volcanics

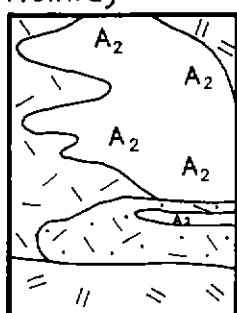
Thomas Tunnel - Silver Falls



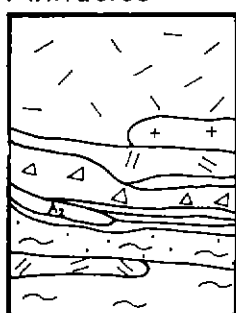
Chester



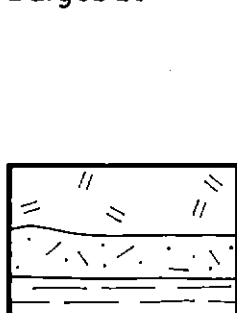
Hollway



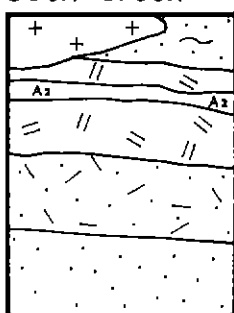
Pinnacles



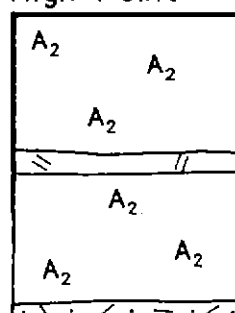
Bulgobac



Sock Creek



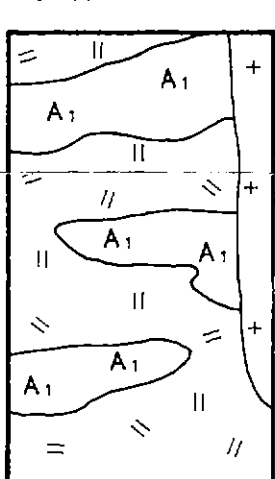
High Point



e II Transition Rocks

Mixed lava and sediment package occupies the volume between feldspar volcanics & quartz dominated sediments and porphyries

Mt. Kershaw - Mt. Charter Fault



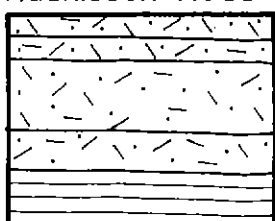
e I

Massive, feldspar phyric volcanic (lavas/intrusions)

5 cm

NOTE : Approximate relative thickness shown

Huskisson Road



p e

Pre-Cambrian Sediments

| PASMINGO EXPLORATION<br>A Division of Pasmingo Australia Limited |                                                                       |               |
|------------------------------------------------------------------|-----------------------------------------------------------------------|---------------|
| COMPILED : A.N.L.                                                | NORTHERN LEASES<br>MAJOR ROCK GROUPINGS<br>LEGEND FOR<br>1:25,000 MAP | FIG. No.<br>8 |
| DATE : March, 1992                                               |                                                                       |               |
| DRAWN : G.M.B.                                                   |                                                                       |               |
| REFERENCE :                                                      |                                                                       |               |
| REVISIONS :                                                      |                                                                       |               |
| DRAWING No.                                                      | SCALE As shown                                                        |               |

Tullabardine Dam in the east is included (figure 10). This section is not part of the Lorrigan (1992) report and was produced in mid-1991. It shows some of the relationships between rock units that were behind the stratigraphic divisions described above, and requires some revision to be fully consistent with the more recent work. It does, however, show some of the progression in thinking and modelling of the difficult geological problems associated with the area of Pasminco's Western Tasmania tenements. A letter and reply by Lorrigan and Leaman (Appendix 4) further discusses this cross section and the context of its production.

#### **6.4 Geology-Eastern Sector-Animal Creek to Southern Boundary**

##### **6.4.1 PROGRAMME COMPLETED-OCTOBER 1990 TO FEBRUARY 1992**

The programme of work completed on the eastern side of the Boco JV, from Animal Creek to the southern licence boundary is summarised below. Included in this summary are the regional surveys applicable to the area (described above, sections 6.2 & 6.3):

1. Aeromagnetic and radiometric survey & interpretation (Leaman, 1991a; Appendix 3)
2. Regional mapping and sampling (Appendix 2) (section 6.3 above; Lorrigan, 1992)
3. Data review and compilation (of previous exploration reports)
4. Re-logging of three diamond drill holes (BBP 246, 250 and 254; Appendix 1)
5. Gravity survey and integration with magnetics (Leaman, 1991c; Appendix 5)
6. Mapping of existing outcrop where glacial cover permits (figure 12)
7. Preparation of a drilling proposal, leading to diamond drill hole AK1 (553.7m, completed 27 February, 1992)

##### **6.4.2 RESULTS OF WORK**

Following the comprehensive review of existing data for the Boco Alteration Zone and surrounding area, and incorporation of Pasminco's recent gravity, aeromagnetic and mapping results, diamond drill hole **AK1** was proposed and drilled. This hole was sited

about 700m south of **Animal Creek**, 200m to the east of the Murchison Highway (AMG 384429.6mE 5388950.4mN) and collared at an angle of  $-60^\circ$  and azimuth of  $125^\circ$  AMG. Total depth was 553.7m. The hole was designed to test a magnetic low, believed to indicate alteration of equivalent intensity to that previously drilled at Boco Siding, over 2 km to the SSW. The position of AK1 coincides with a location favoured for base metal mineralisation by Billiton in their regional lithogeochemical sampling program (see discussion in Randell, 1991a) and an area highlighted during Pasminco's in-house regional study of structure and mineralisation in the Mt Read Volcanics (Wright et al., 1991).

The drill hole was designed to intersect rocks of the Dundas Group immediately below about 20m of Quaternary glacial till, before passing into the Central Volcanic Sequence (of Corbett & McNeill, 1986) where alteration was expected to be most intense. The contact between the Dundas Group and CVS is reportedly faulted at surface further north (Corbett & McNeill, 1986), but recent Pasminco mapping has failed to locate any evidence for this (Purvis, 1992). It was hoped that AK1 would resolve the nature of this contact.

The interpretation of the geology on the eastern side of the Boco JV relies heavily on geophysics, due to the glacial cover, which is in places at least 100m thick. To this end, interpretation of aeromagnetic and gravity data in conjunction with known geology was relied upon when generating the drill target. Consultant Dr DE Leaman carried out much of the geophysical modelling for Pasminco, and his work is reported and discussed in Appendices 3 to 5.

Leaman interprets a major NNE trending structure from Chester 8km SSW, along the EBR and Boco Creek, through Boco Siding and up to Animal Creek as a fault and alteration axis, mappable magnetically. The full extent of this alteration axis was only discovered after Pasminco's 1991 aeromagnetic survey was interpreted by Leaman in conjunction with Pasminco geologists. This NNE axis appears to overlie an old basin margin structure. A kink occurs in this axis at Boco Siding where it crosses an ENE trending structure. This ENE structure is inferred to be Cambrian in age. The NNE structure and associated effects are presumed to be an early Devonian rejuvenation of the underlying older basin margin. The volcanics hosting these structures are inferred to have been thrust from the east along an east-soling detachment, exposed at or to the west of the mapped limit of the

volcanics. This theory is as yet unproven. Leaman proposed a series of potentially mineralised sites following his structural interpretation of the area. Leaman's interpretation, superimposed on the gravity field is presented in figure 23. His previous trend summary of the aeromagnetics is presented in figure 22. One of Leaman's proposed mineralisation sites, the magnetic low, near the position of AK1 (marked as a\* in figure 23) is the strike extension of the drilled Boco Zone structures, two kilometres from the nearest drill hole.

Further to Leamans model, this position was favoured because (1) the magnetic signature indicated massive alteration, necessary for major base metal accumulation, (2) it was near a second kink in the NNE trend to a more ENE trend, possibly indicating creation of "space" for mineralisation to concentrate, and (3) a major sub-E-W structure, with possible Cambrian origin truncates the alteration signature just north of the AK1 site. Additionally, (possibly irrelevantly?) the relationship between the alteration and proposed Dundas/CVS contact near Animal Creek is the same as the relationship between alteration and the Rosebery Fault at Rosebery.

It was decided that this position was the most favoured for base metal mineralisation on the eastern side of the licence for the above reasons, and AK1 was collared on 21 January 1992. Leaman's other favoured sites for mineralisation (figure 23) are still under assessment.

Drill hole AK1 was drilled from the western side of the alteration signature, as surface indications were for a steep west-dipping sequence. The hole was collared as shallowly as practical while keeping the hole steep enough not to collapse in the glacial till, and shallow enough to gain lateral coverage across the alteration zone and the inferred dip of stratigraphy.

The results of drilling AK1 are summarised below. The full log is included in Appendix 1, with drill sections as figures 18 and 19.

#### **AK1 - RESULTS**

1. No significant base metal mineralisation was intersected.
2. Alteration was moderate to strong silicification with weak to moderate sericitisation

384 400mE

384 500mE 5 388 900mN

384 600mE 5 388 800mN

400mR.L.

400mR.L.

200mR.L.

200mR.L.

00mR.L.

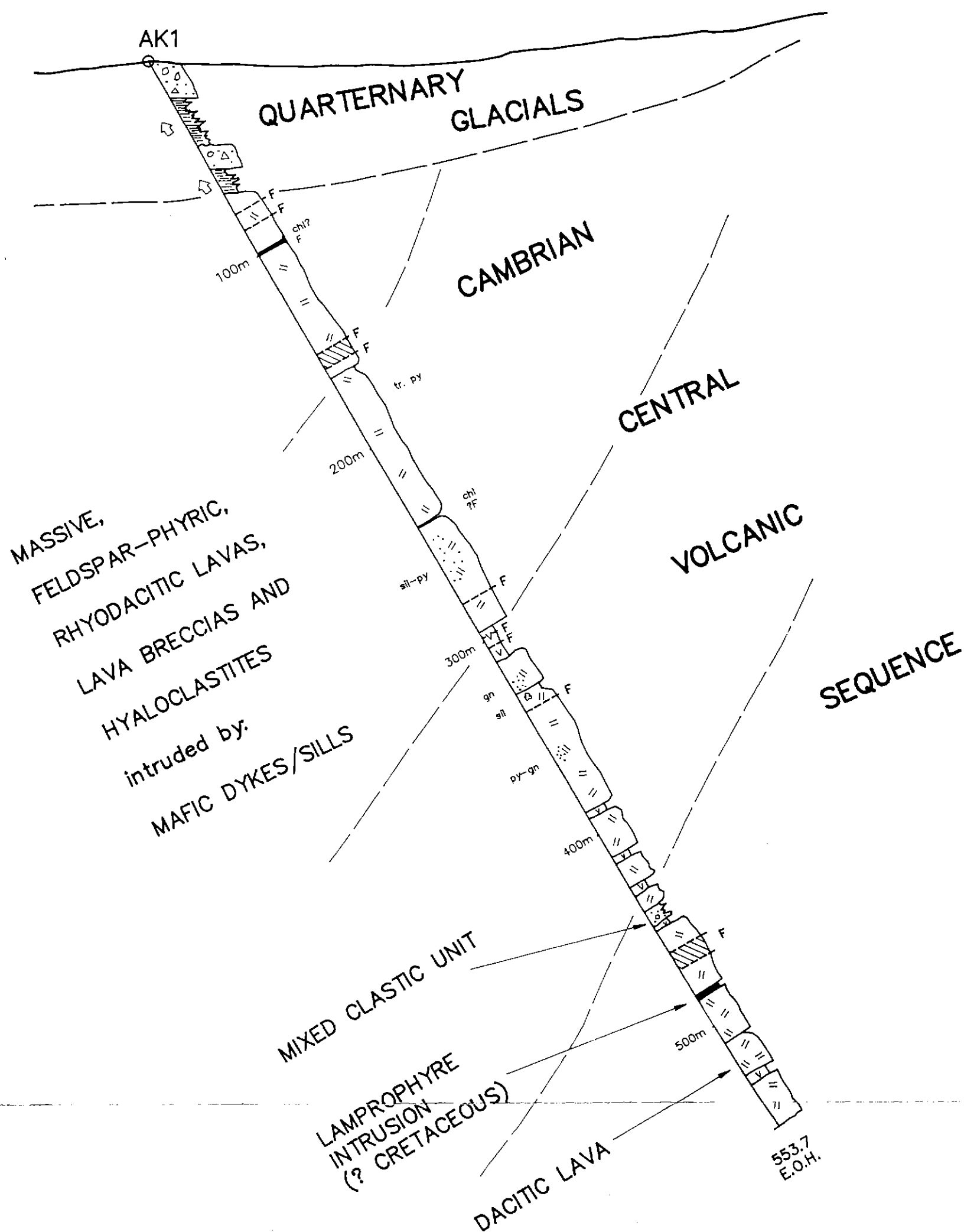
00mR.L.

-200mR.L.

384 400mE

384 500mE 5 388 900mN

384 600mE



5 388 800mN

5 cm

**PASMINCO EXPLORATION**

A Division of Pasma Australia Limited

COMPILED : L.W.K.

DATE : March 1992

DRAWN : G.M.B.

REFERENCE :

REVISIONS :

DRAWING No.

SCALE 1:2000

20 0 20 m

FIG. No.

18

E.L. 2/90 - BOCO JV

ANIMAL CREEK

**SUMMARY DRILL SECTION****AK1**

and pyritisation, strongest between 200 and 400m, and decreasing in intensity down-hole (similar in style to Boco, 2km SSW).

3. No Dundas Group rocks were intersected, putting their contact with CVS further west than previously thought. The hole was drilled wholly within CVS lavas and associated volcanoclastics.
4. Down-hole thickness of glacial till and varved clays was 69.6m (deeper than expected) but they were semi-consolidated and drilled relatively easily by conventional HQ coring, over just three eight-hour shifts. This is significantly quicker than any of the previous 14 diamond holes and 12 percussion holes drilled elsewhere on the Boco plains. Additionally, about 50% recovery was achieved within the glacials. (This zone has since been studied by surficial geology researchers from the University of Tasmania – Launceston).

#### 6.4.3 DISCUSSION

The implications of the drilling results from AK1 are important on both a local and a more regional scale. Locally, the strike extent of the alteration zone north of Boco Siding can be assumed to have been tested. AK1 was ended past the centre of the magnetic low with no hint of improving alteration. This result poses the question of whether any part of the NNE trending structure that extends from Chester to Animal Creek holds potential for base metal mineralisation. All known alteration along it is barren sericite-silica-pyrite with unfavourable isotopic signatures (both O & S). Modelling of recent gravity and magnetics implies that the NNE structure is of early Devonian age, and is thus an unfavourable target for Cambrian age mineralisation.

Another implication of the results from drill hole AK1 is the position of the Dundas Group – CVS contact. Corbett and McNeill (1986) in their 1:25 000 regional maps show the contact trending NE–SW and disappearing for part of its length under glacial cover. They do not imply that it continues without offset under the glacial cover, but this is the simplest solution. Drilling of AK1 seems to have dismissed this possibility, as the volcanoclastics adjacent to the contact, within the CVS further to the NE (Purvis, 1992; Corbett & McNeill, 1986) were not intersected in AK1, as they would have, had they remained on a NE–SW trend. An alternative solution, in the light of the AK1 result, and some good ground work in

the less well explored Bulgobac Falls area (figure 9) by Lorrigan (1992) has implied a NW-SE trending, strike slip fault with a dextral sense of offset running parallel to Animal Creek. This fault moves the Dundas - CVS contact up to 1km to the west of the AK1 collar position. The gravity and magnetic fields in this area also favour a NW trending structure in this position (figures 22 and 23). Corbett and McNeill (1986) truncate a number of volcanoclastic units in the CVS, east of the Boco JV boundary, in the inferred position of this fault, adding further evidence for the fault being a significant structure.

Overall, the geological interpretation of the eastern side of the Boco JV area has advanced significantly in the period covered by this report. A number of questions do, however arise:

1. Are there any untested, potentially mineralised sites under the glacial cover on the eastern side of the Boco JV?
2. What is the full extent and implications for mineralisation of the NW trending dextral fault through Animal Creek?
3. What is the nature and position of the Dundas - CVS contact under the glacial cover?

An answer to question 1 will require further work, but recognition of Cambrian age cross-structures may hold the key. Their presence will be further investigated.

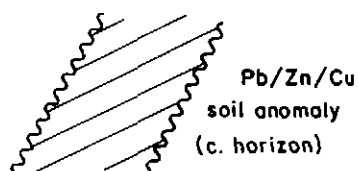
Question 2 may be resolved by field checking and structural modelling incorporating the gravity and magnetic data.

Question 3 requires further drilling to be properly answered. Its answer may hold the key to the nature of emplacement of the volcanic sequence and structural architecture in this part of the Mt Read Volcanics.

## **6.5 Geology Western Sector - Silver Falls to Sawmill Creek**

### **6.5.1 PROGRAMME COMPLETED - OCTOBER 1990 TO FEBRUARY 1992**

The area extending from Silver Falls northwest to the Sawmill Creek Track was studied as a separate entity during the period. Work entailed a review of previous exploration,

**LEGEND**

Lithological  
boundary

Costean

Vehicle track

Creek

EL Boundary

NB. - Rock type legend to be  
found on cross-section  
C-D sheet.

5 391 000m.N.

(R.G.C.)  
EL 15/90  
EL 2/90 Boco  
(Pasmaico)

5 390 000m.N.

II  
DUNDAS  
SEDIMENTS  
III

IV  
DUNDAS  
TURBIDITES

SILVER FALLS  
WORKINGS

CREEK

ROSS

VI  
DUNDAS  
SEDIMENTS

ROSEBURY  
FAULT

55

75

56

5 389 000m.N.

377 000m.E.

5 cm



**PASMINCO EXPLORATION**

A Division of Pasmaico Australia Limited

COMPILED: A.N.L.

DATE: JAN. '92

DRAWN: L.W.K.

REF.:

REVISIONS:

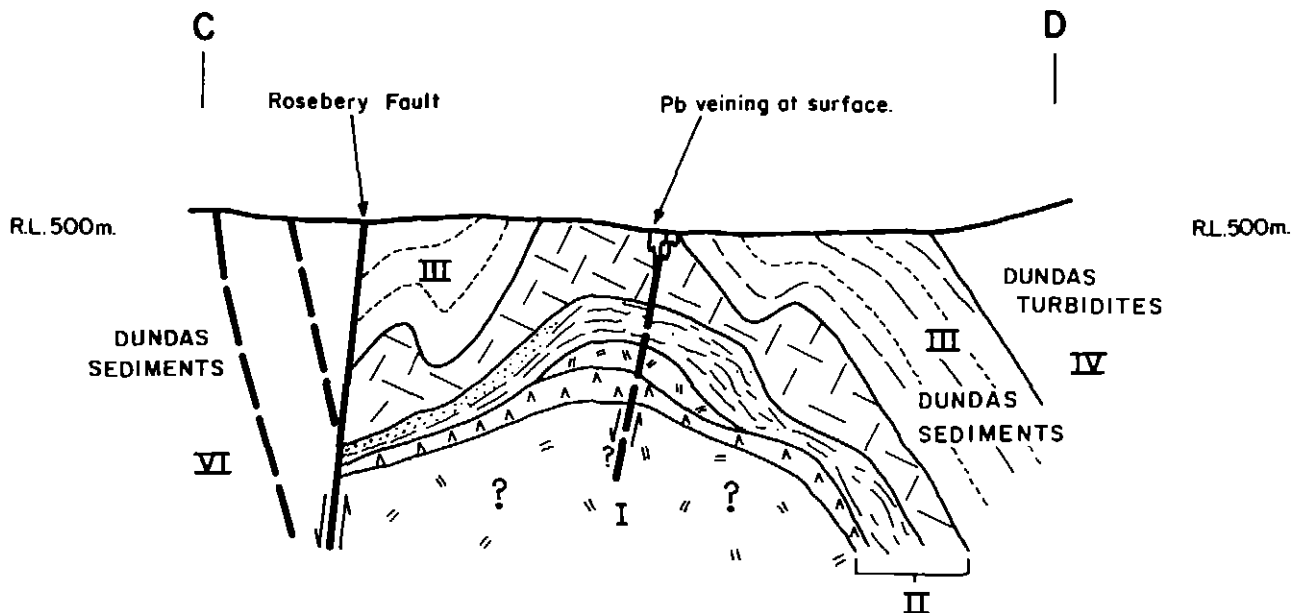
DRAWING No.

**E.L. 2/90 - BOCO JV  
SILVER FALLS PROSPECT  
OUTCROP AND  
INTERPRETED  
GEOLOGY PLAN**

SCALE 1:10,000 0 200m.

FIG. No.  
20

036002



## LEGEND

### Non-stratigraphic

|  |                                                                                         |
|--|-----------------------------------------------------------------------------------------|
|  | Detrital quartz and feldspar sandstone.                                                 |
|  | Conglomerate volcanic quartz and mudstone matrix. Volcanic and rare sedimentary clasts. |
|  | Volcanic quartz sandstone. Often black mud matrix.                                      |
|  | Quartz-feldspar rhyolite lava.                                                          |
|  | Feldspar dacite.                                                                        |
|  | Siltstone, grey mudstone.                                                               |
|  | Micaceous sandstone.                                                                    |
|  | Dark grey andesite. Feldspar and pyroxene.                                              |

### Major Rock Groupings- Stratigraphic

- VI** - Dundas sediments-shallow water conglomerate-dolomite siltstone. (West of Rosebery Fault).
- V** - Dundas sediments-shallowing water, conglomerate beds.
- IV** - Dundas turbidites. No porphyry or lava association. Minimal volcanic quartz.
- III** - Dundas sediments. Black shale-porphry association. Volcanic quartz.
- II** - Transition Rocks. Lava, sediments etc. "HOST PACKAGE".
- I** - Massive, feldspar-phyric volcanics.

5 cm



**PASMINCO EXPLORATION**

A Division of Pasminco Australia Limited

COMPILED: A.N.L.

DATE: JAN. '92.

DRAWN: L.W.K.

REF.:

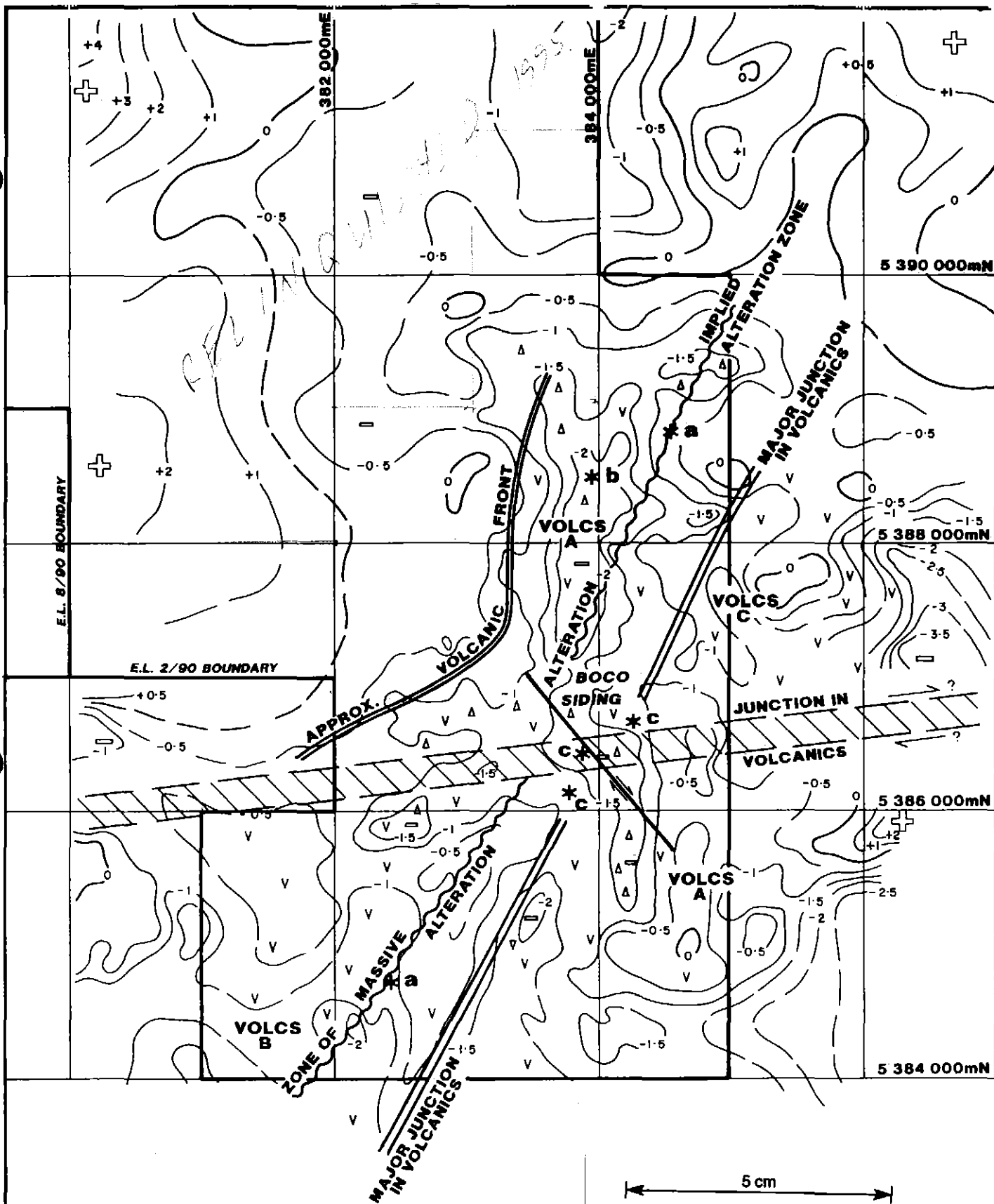
REVISIONS:

DRAWING No.

**E.L. 2/90 - BOCO JV  
SILVER FALLS PROSPECT  
INTERPRETED  
GEOLOGICAL  
CROSS SECTION**

SCALE 1:10,000 0 200m.

FIG. No.  
21



### LEGEND

- Δ Δ Glacials
- V V Volcanic rocks
- \* Suggested drill test positions  
(various reasons - see text,  
APPENDIX 5)



**PASMINCO EXPLORATION**

A Division of Pasma Australia Limited

COMPILED: D.L.

DATE: Dec., 1991

DRAWN: G.M.B.

REF.:

REVISIONS:

DRAWING No.

E.L. 2/90 - BOCO JV

## RESIDUAL BOUGER ANOMALY AND SYNTHESIS OF INTERPRETATION

SCALE 1:40,000



FIG. No.  
23

mapping traverses along the major access routes, part of the North Pinnacles – Silver Falls gravity survey (Appendix 6; section 6.2.2, above), part of the Boco JV aeromagnetic survey (Appendix 3) and geological interpretation as part of Lorrigan's (1992) regional mapping report. The interpreted geology for Silver Falls is reproduced as figures 20 and 21 in this report in plan and cross section from Lorrigan (1992). These are derived from the regional map (figure 9) and are an updated interpretation of the local geology, completed after the regional cross-section was drawn (figure 10).

#### 6.5.2 RESULTS OF WORK & DISCUSSION

Interest in the Silver Falls area was rekindled after examination of previous exploration results, principally the poorly-explained base metal soil anomalies, which peak at over 1 000ppm Zn, 500ppm Pb & 100ppm Cu, two or more kilometres NE of the exposed lead-dominated vein mineralisation in the Silver Falls workings. Rock-chip sampling of the workings gave assays of 125ppm Zn 7034ppm Pb and 24ppm Cu (Appendix 2, sample number 30562), clearly different in style and metal ratios to the soil base metals values. EZ costean sampling on line 5390300N (near the peak soil survey values) in 1980/81 (Mill, 1981) gave a peak lead value of 1.08% with associated zinc values never exceeding 305ppm in galena-quartz veined volcanics. Again, these results are not consistent with the zinc-rich mineralisation style needed to produce the values recorded in soil samples. The EZ conclusion, that all mineralisation near Silver Falls is vein related (Mill, 1981) appears to be somewhat hasty.

Conclusions reached by Lorrigan (1992) support the theory that the Silver Falls area is highly prospective for a significant volume of base metal mineralisation (see section 6.3 above) and her interpretation of the geology is included as figures 20 and 21. This interpretation requires follow-up mapping, further geochemical sampling, and integration with the recently acquired gravity data and aeromagnetics. This will clarify the structural setting and distribution of rock units, before diamond drill targets can be identified.

The area between Silver Falls and the Sawmill Creek Track is considered the most prospective area so far identified within the boundaries of the Boco JV and should be followed up vigorously.

## 6.6 North Pinnacles – EL 2/90

### 6.6.1 PROGRAMME COMPLETED

The North Pinnacles licence was included in the broader exploration framework of the Boco JV (EL 2/90 and EL 8/90 together). The 1991 aeromagnetic survey (Appendix 3), the North Pinnacles – Silver Falls gravity survey (Appendix 6) and the regional mapping programme (Lorrigan, 1992) all included North Pinnacles as part of wider studies. In addition, reviews of exploration data, the initial phase of prospect-scale mapping and re-examination of drill core were begun during the report period.

### 6.6.2 RESULTS AND DISCUSSION

Results to date include the interpretation of the aeromagnetic survey by Leaman Geophysics (Appendix 3 & figure 22), the acquisition and preliminary comments on the gravity survey (Appendix 6) and some tentative conclusions regarding the nature of the contact between the Pinnacles (Burns Peak) Rhyolite and Dundas Group Sediments on the western side of the North Pinnacles Ridge.

Previous workers (Mollison, 1980) stated that the conformable contact between Dundas Sediments and "Rhyolitic Pyroclastics of the Burns Peak Rhyolite" in drill hole NPP 214 showed that the Pinnacles Rhyolite and Dundas Group have a conformable western contact. Re-examination of the core strongly implies an alternative solution. The unit at the bottom of NPP214 is indeed volcanoclastic (and possibly pyroclastic, but more likely epiclastic), is packed with feldspar and quartz crystals and fragments and may have a rhyolitic geochemistry. It is not, however, the Pinnacles Rhyolite. The Pinnacles Rhyolite elsewhere is a massive feldspar and quartz-porphyritic intrusive or lava, not a volcanoclastic. It is the opinion of the author that the western margin of the Rhyolite is to the east of where NPP214 was terminated, and that the volcanoclastic in which the hole finished is part of the Dundas Group. The contact is currently poorly exposed on tracks and has not been drilled elsewhere at North Pinnacles, and is thus of unknown nature. Evidence from drilling on the Burns Peak EL 44/88, 3km south indicate that the contact is faulted. Its nature is important with respect to structural interpretation of the western side of the Boco JV, and should be further investigated. The eastern contact of the Pinnacles Rhyolite is also of unknown nature, and should be investigated.

Alteration and mineralisation within the North Pinnacles licence is not encouraging for any volume of base metal mineralisation near surface, as comprehensive IP, soil and rock chip surveys (carried out previously) indicate. Billiton Australia (Randell, 1991b) states that a subtle EM anomaly, along with "base/precious metal anomalism and lithogeochemical characteristics (within EL 8/90) are all favourable indicators of mineralisation" and that a large polymetallic massive sulphide deposit may occur beneath or flanking the North Pinnacles ridge at a depth of up to 1000 metres. The conclusions and recommendations of Randell (1991a) should be followed up, but priority should be given to unravelling the structural setting of the Pinnacles Rhyolite, before targeting a deep diamond drill hole in the area.

## 7. REHABILITATION

The programme of monitoring drill sites near Boco Siding that were rehabilitated by previous licence holder Electrolytic Zinc Co. (Geopeko were exploration managers) has continued, and the photographic record of regrowth kept up to date. All sites and tracks that were recontoured by replacing topsoil are progressing slowly, but satisfactorily, despite a temporary setback in the form of fire, when AFH-Burnie conducted a fuel reduction burn on the buttongrass plains on 28 and 29 October 1991.

## 8. EXPENDITURE SUMMARY

### 8.1 Boco EL 2/90

Billiton - 20 April 1990 to 10 October 1990

|              |              |
|--------------|--------------|
| <b>Total</b> | <b>4 736</b> |
|--------------|--------------|

Pasminco - 11 October 1990 to 29 February 1992:

|                                              |                |
|----------------------------------------------|----------------|
| <b>Expenditure</b>                           | <b>\$</b>      |
| Personnel costs                              | 30 520         |
| Travel & accommodation                       | 1 635          |
| Geophysical consultants                      | 9 441          |
| Geochemical consultants                      | 108            |
| Track cutting, gridding                      | 1 625          |
| Geophysical surveys (Aeromagnetics, Gravity) | 79 905         |
| Earthmoving                                  | 2 150          |
| Other Consultants & contractors              | 1 066          |
| Photogrammetry                               | 25 958         |
| Surveying                                    | 21 526         |
| Drilling                                     | 34 578         |
| Stores & supplies                            | 1 705          |
| Vehicles, plant & equipment                  | 3 750          |
| Tenement Costs                               | 1 125          |
| Computing                                    | 1 266          |
| Office costs                                 | 8 112          |
| Administration fee                           | 22 446         |
| <b>Total</b>                                 | <b>246 916</b> |

|                                                   |                |
|---------------------------------------------------|----------------|
| <b>Cumulative Expenditure to 29 February 1992</b> | <b>251 652</b> |
|---------------------------------------------------|----------------|

**8.2 North Pinnacles EL 8/90**

Billiton – 8 June 1990 to 10 October 1990:

|              |            |
|--------------|------------|
| <b>Total</b> | <b>295</b> |
|--------------|------------|

|                    |           |
|--------------------|-----------|
| <b>Expenditure</b> | <b>\$</b> |
|--------------------|-----------|

Pasminco – 11 October 1990 to 29 February 1992:

|                                              |               |
|----------------------------------------------|---------------|
| Personnel costs                              | 3 587         |
| Travel & accommodation                       | 137           |
| Geophysical consultants                      | 708           |
| Geophysical surveys (Aeromagnetics, Gravity) | 19 059        |
| Earthmoving                                  | 2 010         |
| Other Consultants & contractors              | 22            |
| Photogrammetry                               | 912           |
| Surveying                                    | 808           |
| Drilling                                     | 323           |
| Store & supplies                             | 133           |
| Vehicles, plant & equipment                  | 247           |
| Tenement Costs                               | 360           |
| Computing                                    | 211           |
| Office costs                                 | 716           |
| Administration fee                           | 2 923         |
| <b>Total</b>                                 | <b>32 156</b> |

|                                                    |                 |
|----------------------------------------------------|-----------------|
| <b>Cumulative Expenditure to 29 February 1992:</b> | <b>\$32 451</b> |
|----------------------------------------------------|-----------------|

## 9. CONCLUSIONS & RECOMMENDATIONS

Although no significant mineralisation was intersected in drill hole AK1, some important and encouraging exploration results were achieved during the first seventeen months of Pasminco's involvement with the Boco JV. These results are summarised below:

Large advances were made in understanding the structural architecture of the JV area, particularly the significance of the barren NNE trending structure, extending from Chester through to **Animal Creek**, which may down-grade prospectivity on the eastern, glacial covered sector of the licence. Other important structures were also recognised, including a NW-trending fault with dextral-offset near Animal Creek, and the possibility of faults bounding the Pinnacles Rhyolite, upgrading the chances of defining which structures in the area were mineralisation conduits.

Untested potential for significant zinc-rich mineralisation in the **Silver Falls - Sawmill Creek** area was recognised. This prospect should be accorded the highest priority within the Boco JV area.

A high-quality comprehensive data, base forming a framework from which advanced exploration can continue, was set up. Aeromagnetic, gravity, geological and geochemical data are so far included in this database.

Recommendations for further work are:

1. To following up the zinc-dominated soil anomaly at **Silver Falls** with geological mapping, structural studies, further geochemical characterisation of units and mineralisation style and possibly a deep-seeking EM survey.
2. Continue with examination of the structural setting of key areas within the JV, to give a better understanding of which structures carried mineralising fluids to potential deposition sites. Particularly important for this is the resolution of the nature of the Dundas Group's contacts with both the CVS in the east and the Pinnacles Rhyolite in the west. To this end, structural mapping, aided by some shallow backhoe trenching across critical contacts should be carried out. Gravity surveying, with station spacing reduced to 400m covering the remainder of the JV

should be completed to aid the sub-surface structural modelling of the area.

3. Old IP surveys should be digitised and imaged to aid the understanding of the distribution of subsurface lithologies and potentially mineralised units.
4. The underexplored northern half of the licence should be mapped in more detail and have its potential for hosting significant mineralisation thoroughly reviewed.

## 10. PROPOSED EXPLORATION PROGRAMME – MARCH 1992 TO FEBRUARY 1993

Based on the results of exploration on the Boco JV to date, the following programme is proposed for the coming year.

### GEOLOGY:

A continuation of specific prospect mapping programmes with an emphasis on structural geology is planned. Results of mapping will be integrated with geophysical models.

### GRAVITY:

Interpretation and integration of the North Pinnacles–Silver Falls gravity data with aeromagnetics and geology will be undertaken. The remainder of the licence will be covered by closer-spaced gravity stations than is currently the case to complement aeromagnetic structural analysis of the licence.

### TEM:

Deep seeking TEM surveys may be undertaken over specific areas highlighted by other avenues of investigation.

### LITHOGEOCHEMISTRY:

Further sampling as part of the on-going lithogeochemical characterisation programme will be completed. Soil geochemical surveys will be undertaken on specific prospects.

### DRILLING:

Provision is made for **1 000 metres of diamond drilling.**

### BUDGET:

The proposed budget for the coming year is:

|                         |                  |
|-------------------------|------------------|
| EL 2/91 Boco            | \$250 000        |
| EL 8/90 North Pinnacles | \$40 000         |
| <b>TOTAL:</b>           | <b>\$290 000</b> |

## 11. REFERENCES

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## 12 KEYWORDS AND LOCALITY

### KEYWORDS

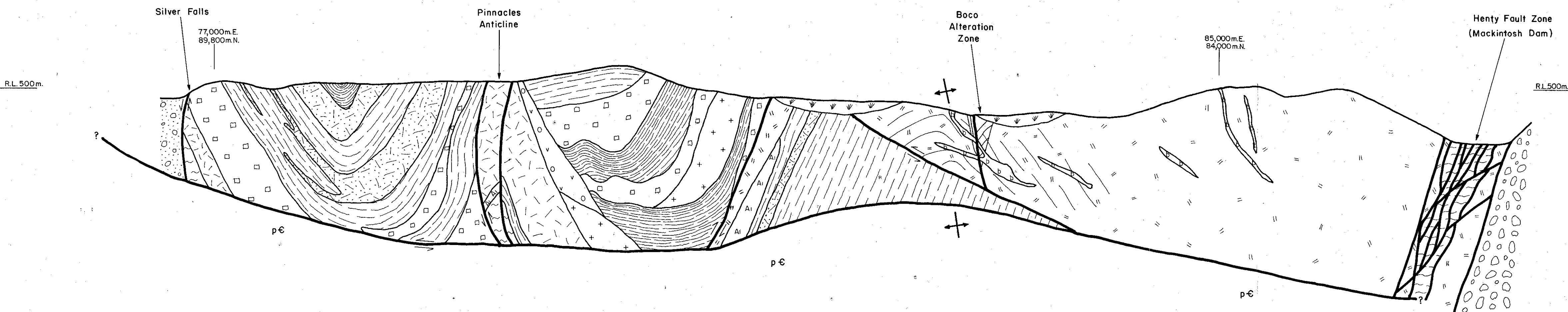
LEAD, ZINC, MASSIVE SULPHIDE, MT READ VOLCANICS, CENTRAL VOLCANIC SEQUENCE, DUNDAS GROUP, STRUCTURE, GEOLOGY, AEROMAGNETICS, GRAVITY, SILVER FALLS, BOCO, NORTH PINNACLES, CAMBRIAN.

### LOCALITY

|        |           |            |
|--------|-----------|------------|
| SOPHIA | 1:100 000 | SHEET 8014 |
| BURNIE | 1:250 000 | SHEET SK55 |

A

B



LEGEND

- |                                                                                                                    |                                                                                                                                         |                                                                                                                                                   |                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
|  Fluvio glacials.               |  Bedded sediments.<br>Shale, siltstone, sandstone. |  Black shale.                                                |  Feldspar-phyric lavas (Rhyodacitic).          |
|  Conglomerate (Owen).           |  Quartz-feldspar porphyry.                         |  Quartz-mica sandstone.                                      |  Conglomerate (Upper Dundas).                  |
|  Andesite (green, feldspathic). |  Rhyolite lava.                                    |  Quartz-mica sandstone, with<br>large fragments of Rhyolite. |  Pre-Cambrian basement.                        |
|  Basaltic dykes.                |  Massive, pumiceous rocks.                         |  Quartz crystal sandstone.                                   |  Fault with direction of<br>relative movement. |

5 cm

|                                                                                                                                                                              |                                                                                   |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------|
|  <b>PASMINCO EXPLORATION</b><br><small>A Division of Pasminco Australia Limited</small> |                                                                                   |                |
| COMPILED: A.N.L.                                                                                                                                                             | <b>NORTHERN LEASES<br/>INTERPRETED<br/>GEOLOGY<br/>REGIONAL<br/>CROSS SECTION</b> |                |
| DATE: JULY '91                                                                                                                                                               |                                                                                   |                |
| DRAWN: N.W.D.S.                                                                                                                                                              |                                                                                   |                |
| REF.:                                                                                                                                                                        |                                                                                   |                |
| REVISIONS: L.W.K.<br>NOV. '91                                                                                                                                                |                                                                                   |                |
| DRAWING No.                                                                                                                                                                  | SCALE 1:25,000                                                                    | FIG. No.<br>10 |

## **APPENDICES**

**APPENDIX 1**

**Log of Drillhole AK1, Animal Creek**

**Summary Logs of:**

**BBP246**

**BBP250**

**BBP254**



# PASMINCO EXPLORATION DIAMOND DRILL CORE RECORD

HOLE No. AK1

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|                                  |                     |                                                                                                                                                                                                                                                                                                                                                                    |                                               |      |                                           |  |  |                                   |           |                |                |               |       |        |
|----------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------|-------------------------------------------|--|--|-----------------------------------|-----------|----------------|----------------|---------------|-------|--------|
| LOCATION                         | TASMANIA            | <b>OBJECTIVE</b><br><br>* To test NE end of NNE trending alteration zone identified in magnetics, near E/W trending cross structure.<br><br>* To intersect Dundas Group/CVS contact under glacial cover.<br><br>* To gain geological and structural information in unknown/covered area.                                                                           |                                               |      |                                           |  |  | <b>LOCATION/SURVEY DATA (AMG)</b> |           |                |                |               |       |        |
| PROJECT                          | BOCO EL 2/90        |                                                                                                                                                                                                                                                                                                                                                                    |                                               |      |                                           |  |  | Grid                              | AMG       |                | RL Collar m    |               | 417.3 |        |
| PROSPECT                         | ANIMAL CREEK        |                                                                                                                                                                                                                                                                                                                                                                    |                                               |      |                                           |  |  | Northing m                        | 5388950.4 |                | Bearing Collar |               | 125   |        |
| DESIGNED BY                      | LW KIRSNER          |                                                                                                                                                                                                                                                                                                                                                                    |                                               |      |                                           |  |  | Easting m                         | 384429.6  |                | Dip Collar     |               | -60   |        |
| LOGGED BY                        | LW KIRSNER          |                                                                                                                                                                                                                                                                                                                                                                    |                                               |      |                                           |  |  | DH Survey Type                    |           | EASTMAN CAMERA |                | Length Hole m |       | 553.7m |
| RELOGGED                         |                     | <b>RESULT</b><br><br>* 70m of lake-deposited varve & conglomeratic glacial till, overlying massive rhyodacitic to dacitic lavas, lava breccias, hyaloclastites and minor volcaniclastics of the Central Volcanic Sequence. Dundas Group rocks were not encountered.<br><br>* Alteration was weak to moderate, patchy sericite-silica-pyrite, decreasing down hole. |                                               |      |                                           |  |  | Depth m                           | Bearing   | Dip            | Depth m        | Bearing       | Dip   |        |
| COMMENCED                        | 21 JANUARY 1992     |                                                                                                                                                                                                                                                                                                                                                                    |                                               |      |                                           |  |  | 25                                | 125       | -61            |                |               |       |        |
| COMPLETED                        | 27 FEBRUARY 1992    |                                                                                                                                                                                                                                                                                                                                                                    |                                               |      |                                           |  |  | 50                                | 126       | -61            |                |               |       |        |
| DRILLED BY                       | EAST COAST DRILLING |                                                                                                                                                                                                                                                                                                                                                                    |                                               |      |                                           |  |  | 100                               | 125       | -60            |                |               |       |        |
| DRILL RIG                        | LONGYEAR 38         |                                                                                                                                                                                                                                                                                                                                                                    |                                               |      |                                           |  |  | 150                               | 127       | -60            |                |               |       |        |
| <b>SIGNIFICANT INTERSECTIONS</b> |                     |                                                                                                                                                                                                                                                                                                                                                                    |                                               |      |                                           |  |  | 200                               | 127       | -60            |                |               |       |        |
| From m                           | To m                | Interval m                                                                                                                                                                                                                                                                                                                                                         |                                               |      |                                           |  |  | 250                               | 129       | -60            |                |               |       |        |
|                                  |                     |                                                                                                                                                                                                                                                                                                                                                                    |                                               |      |                                           |  |  | 300                               | 129       | -59.5          |                |               |       |        |
|                                  |                     |                                                                                                                                                                                                                                                                                                                                                                    |                                               |      |                                           |  |  | 350                               | 131       | -59.5          |                |               |       |        |
|                                  |                     |                                                                                                                                                                                                                                                                                                                                                                    |                                               |      |                                           |  |  | 400                               | 132       | -59.5          |                |               |       |        |
|                                  |                     |                                                                                                                                                                                                                                                                                                                                                                    |                                               |      |                                           |  |  | 450                               | 133       | -59            |                |               |       |        |
|                                  |                     |                                                                                                                                                                                                                                                                                                                                                                    |                                               |      |                                           |  |  | 500                               | 135       | -58            |                |               |       |        |
| <b>SIGNIFICANT CORE LOSS</b>     |                     |                                                                                                                                                                                                                                                                                                                                                                    | <b>POOR GROUND CONDITION ZONES</b>            |      |                                           |  |  | 550                               | 137       | -56            |                |               |       |        |
| From m                           | To m                | % Lost                                                                                                                                                                                                                                                                                                                                                             | From m                                        | To m | Condition                                 |  |  | EDH                               |           |                |                |               |       |        |
| 0.0                              | 69.9                | -50%                                                                                                                                                                                                                                                                                                                                                               | 0.0                                           | 69.2 | Semi-consolidated glacial gravels & clays |  |  |                                   |           |                |                |               |       |        |
| 150.2                            | 151.7               | -47%                                                                                                                                                                                                                                                                                                                                                               | 89.2                                          | -    | 100% water loss                           |  |  |                                   |           |                |                |               |       |        |
| <b>HOLE SIZE</b>                 |                     | <b>HOLE CONDITIONS AFTER COMPLETION</b>                                                                                                                                                                                                                                                                                                                            |                                               |      |                                           |  |  |                                   |           |                |                |               |       |        |
| Size                             | Depth m             | Collar                                                                                                                                                                                                                                                                                                                                                             | * PVC Casing to 2.8m                          |      |                                           |  |  |                                   |           |                |                |               |       |        |
| HQ                               | 0-84.0              | Steel Casing                                                                                                                                                                                                                                                                                                                                                       | * HQ casing 51-84m (33m)                      |      |                                           |  |  |                                   |           |                |                |               |       |        |
| NQ                               | 84.0-553.7          | PVC Casing                                                                                                                                                                                                                                                                                                                                                         | * Class 18, 32mm (NOMINAL): 0-553.7m for DHEM |      |                                           |  |  |                                   |           |                |                |               |       |        |
|                                  |                     | Ground Water                                                                                                                                                                                                                                                                                                                                                       | * Nil                                         |      |                                           |  |  |                                   |           |                |                |               |       |        |
|                                  |                     | Wedge                                                                                                                                                                                                                                                                                                                                                              |                                               |      |                                           |  |  |                                   |           |                |                |               |       |        |
|                                  |                     | Drill Pad                                                                                                                                                                                                                                                                                                                                                          |                                               |      |                                           |  |  |                                   |           |                |                |               |       |        |

000000

# PASMINCO EXPLORATION SUMMARY DIAMOND DRILL CORE LOG

HOLE No. AK 1

PROJECT: BOLO - ANIMAL CREEK

Graphic Scale 1:2000

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| From<br>m | Interval<br>m | Code | Description                                                                                                                                                                                                              | Depth | Graphic | From<br>m | Interval<br>m | Code | Description                                                             | Depth | Graphic |
|-----------|---------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------|-----------|---------------|------|-------------------------------------------------------------------------|-------|---------|
| 0.0       | 69.6          |      | • GLACIAL TILL & VARIED CLAYS                                                                                                                                                                                            |       |         |           |               |      | crystal-rich volcanic sandstone.                                        |       |         |
| 69.6      | 225.8         |      | • RHYODACITIC LAVAS, Flow Breccias & HYALOCLASTITES.<br>- variably sericite-silica-pyrite altered, flow-banded, brecciated & fragmented, feldspar phytic. Minor carbonate veinlets. Pyrite up to 5% locally; average 1%. |       |         | 449.7     | 0.6           |      | • MAFIC INTRUSIVE                                                       | 500   |         |
|           |               |      |                                                                                                                                                                                                                          |       |         | 450.3     | 36.0          |      | • RHYODACITIC LAVA                                                      | 553.7 | EOH     |
|           |               |      |                                                                                                                                                                                                                          |       |         | 486.3     | 0.9           |      | • LAMPROPHYRE INTRUSION (? CRETACEOUS).                                 |       |         |
|           |               |      |                                                                                                                                                                                                                          |       |         | 487.2     | 23.3          |      | • RHYODACITIC LAVA.                                                     |       |         |
| 295.4     | 14.7          |      | • MAFIC INTRUSIVE<br>- faulted & veined with carbonate.                                                                                                                                                                  |       |         | 510.5     | 18.2          |      | • ? DACITIC LAVA.<br>- darker & more feldspathic (upto 20%) than usual. |       |         |
| 310.7     | 78.8          |      | • RHYODACITIC LAVAS & BRECCIAS.<br>- including carbonate veinlets containing galena.                                                                                                                                     |       |         | 528.7     | 3.5           |      | • MAFIC INTRUSIVE                                                       |       |         |
| 389.5     | 3.1           |      | • AMYGDALOIDAL MAFIC INTRUSIVE.                                                                                                                                                                                          |       |         | 532.2     | 21.5          |      | • RHYODACITIC LAVA.                                                     |       |         |
| 392.6     | 20.4          |      | • RHYODACITIC LAVAS & BRECCIAS.                                                                                                                                                                                          |       |         | 553.7     | -             |      | • END OF HOLE.                                                          |       |         |
| 413.0     | 3.0           |      | • MAFIC INTRUSIVE.                                                                                                                                                                                                       |       |         |           |               |      |                                                                         |       |         |
| 416.0     | 12.4          |      | • RHYODACITIC LAVA.                                                                                                                                                                                                      |       |         |           |               |      |                                                                         |       |         |
| 428.4     | 5.0           |      | • MAFIC INTRUSIVE.                                                                                                                                                                                                       |       |         |           |               |      |                                                                         |       |         |
| 433.4     | 8.2           |      | • RHYODACITIC LAVA.                                                                                                                                                                                                      |       |         |           |               |      |                                                                         |       |         |
| 441.6     | 8.1           |      | • MIXED CLASTIC SEQUENCE.<br>- bedded siliceous ash layers in feldspar                                                                                                                                                   |       |         |           |               |      |                                                                         |       |         |

096053

5 cm

# PASMINCO EXPLORATION DIAMOND DRILL CORE LOG

HOLE No. AK1

PROJECT: Boco EL 2/90 - ANIMAL CREEK

Graphic Scale 1: 200

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| CORE RECOVERY |               |   |     | DESCRIPTION |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            | CODES                        |         |                |       |        |      |     |  |
|---------------|---------------|---|-----|-------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------|---------|----------------|-------|--------|------|-----|--|
| From<br>m     | Interval<br>m | % | RQD | From<br>m   | Interval<br>m | ( incl. LITHOLOGY, STRUCTURE & ALTERATION )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Depth                      | Grain size (mm)<br>Lithology | Struct. | MINERALISATION | LITHO | STRUCT | ALTW | MIN |  |
|               |               |   |     | 0.0         | 19.3          | <u>GLACIAL TILL &amp; VARVED CLAYS.</u><br>(A) <u>POLYMIT CONGLOMERATE</u> :- GLACIAL TILL<br>• generally semi-consolidated<br>• clast size: < 1/8 mm up to > 30 cm, average 1 to 3 cm across.<br>• angular, poorly sorted, matrix supported<br>• clast compositions: - Rhyodacitic, massive, feldspar phyric volcanics (? lavas)<br>- quartz (white & grey)<br>- chloritic & hematitic acid volcanics<br>- conglomeratic (OWEN?)<br>- hydrothermally brecciated volcanics<br>• interval also includes minor zones of unconsolidated, well rounded river pebbles with a clay matrix (core loss high in these zones)        | 0.0<br>19.3                |                              |         |                |       |        |      |     |  |
|               |               |   |     | 19.3        | 25.9          | (B) <u>VARVED CLAYS</u><br>• semi-consolidated, ochre-brown coloured, laminated siltstones, sandstones and minor intercalated conglomerate beds.<br>• randomly distributed clasts > 6mm across occur, within the clays, making up 1% locally - these clasts comprise: - white vein quartz.<br>- poorly sorted coarse sandstone clasts<br>• fine silt laminations between coarser sandstone beds typify this unit, of generally soft, clayey broken core.<br>• Soft-sediment deformation spectacularly developed: eg: folds; flames; dismembering; loading structures (transition zone from (B) to (C) from 44.5m to 45.2m) | 19.3<br>25.9<br>40<br>45.2 |                              |         |                |       |        |      |     |  |

SEE SUPPLEMENTARY DATA SHEETS AT THE BACK OF THIS LOG (pages 15-17)

SEE SUPPLEMENTARY DATA SHEETS AT THE BACK OF THIS LOG (pages 15-17)

096054

5 cm

# PASMINCO EXPLORATION DIAMOND DRILL CORE LOG

HOLE No. AK1

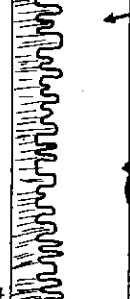
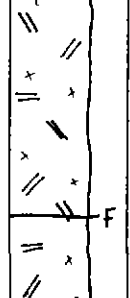
PROJECT: Boco EL 2/90

Graphic Scale 1: 200

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096055

5 cm

| CORE RECOVERY |               |   |     | DESCRIPTION |               |                                                                                                                                                                                                                                                                                                                   |       |                                                                                       |                    |                 | CODES                                |        |      |     |  |
|---------------|---------------|---|-----|-------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------------------------------------------------------------------------|--------------------|-----------------|--------------------------------------|--------|------|-----|--|
| From<br>m     | Interval<br>m | % | RQD | From<br>m   | Interval<br>m | ( incl. LITHOLOGY, STRUCTURE & ALTERATION )                                                                                                                                                                                                                                                                       | Depth | Graphic<br>Lithology                                                                  | Struc.             | MINERALISATION  | LITHO                                | STRUCT | ALTN | MIN |  |
|               |               |   |     | 45.2        | 10.5          | ③ <u>POLYMICT CONGLOMERATE</u> - GLACIAL TILL<br>• interval as above in ①<br>• includes - chloritised, soft, weathered ? basaltic boulder 40cm long, in a generally coarser conglomerate.<br>• <u>elast</u> supported, ~ 20cm average clast size.<br>• poorly sorted, moderately rounded, with a silt/sand matrix | 55.7  |    | UNIT ③ (continued) |                 |                                      |        |      |     |  |
|               |               |   |     | 55.7        | 13.0          | ④ <u>VARVED CLAYS</u><br>• interval as above in ③<br>• intercalated minor sand & conglomerate beds.<br>• much soft sediment deformation<br>• Bedding averages ~ 60° to core<br>• generally semi-consolidated                                                                                                      | 68.7  |    | UNIT ④             | 60°<br>bedding  | (PLEISTOCENE)<br>GLACIALS            |        |      |     |  |
|               |               |   |     | 68.7        | 0.9           | ⑤ <u>SANDY GRAVEL</u><br>• brown, gravelly layer directly above bedrock with a narrow (10cm thick) basal clay layer.<br>• polyinct, but generally "bedrock"-derived clasts of local origin: - silicic clasts with a silt-sand matrix                                                                              | 69.6  |   | UNIT ⑤             | 69.6m           | CENTRAL VOLCANIC SEQUENCE (CAMBRIAN) |        |      |     |  |
|               |               |   |     | 69.6        | 6.5           | ⑥ <u>RHYODACITIC LAVA</u> . (CENTRAL VOLCANIC SEQ.)<br>• Broken, strongly weathered, variably hydrothermally brecciated, bleached ? acid lava with chloritised fractures.<br>• Pale grey to white colour with brown iron oxide staining.                                                                          | 76.1  |  | UNIT ⑥             | pyrite up to 5% |                                      |        |      |     |  |
|               |               |   |     | 76.1        | 3.4           | <u>RHYODACITIC LAVA</u> - unweathered.<br>• grey to pink, uncleaned, hydrothermally brecciated (cris crossed with chloritic veinlets), sericitic matrix between "clasts" of feldspathic massive ? lava. Some zones less brecciated (eg. 780-792)<br>• quartz veinlets at ~ 35° to core. Traces of division spite. | 79.5  |  | UNIT ⑦             |                 |                                      |        |      |     |  |

# PASMINCO EXPLORATION DIAMOND DRILL CORE LOG

HOLE No. AK 1

PROJECT: Boco

Graphic Scale 1: 200

Page 5 of 17

| CORE RECOVERY |               |   |     | DESCRIPTION |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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-------------------------------------------------------------------------------------------------------------------|---------|----------------|-------|--------|------|-----|
| From<br>m     | Interval<br>m | % | ROD | From<br>m   | Interval<br>m | ( incl. LITHOLOGY, STRUCTURE & ALTERATION )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Depth                                    | Graphic<br>Lithology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Struct. | MINERALISATION | LITHO | STRUCT | ALTN | MIN |
|               |               |   |     | 79.5        | 17.7          | * 79.5 • Fault (river) in broken core.<br>• <u>RHYODACITIC LAVA</u> .<br>• silica flooded, hydrothermally in-situ brecciated (jigsaw fit) silicified, sericitic, feldspar phytic, massive.<br>• pyrite 1 → 2% average; locally up to 5%, on breccia-clast boundaries & quartz vein edges. Traces of fine grained disseminated pyrite throughout matrix<br>• fine quartz veinlets and coarser quartz-tourmaline veins cross-cut all other features → late-formed (? Tabberness)<br>• pink colouration/albitisation dominates in the interval from 89.2 to 97.2 m.<br>• 89.2m BRITTLE FAULT (100% Water Loss)<br><u>ALTERED MASSIVE VOLCANIC</u> . (? INTRUSIVE)<br>• Dark grey to black, sericitic, pyritic (up to 5%), brecciated, ? "biotitic", v. strongly altered & detextured volcanic.<br>• Contains discontinuous, fine carbonate veinlets & apparent hydrothermal jigsaw breccia appearance. ? sphalerite traces<br>98.5 - <u>CONTACT</u> (? INTRUSIVE)<br>• sharp contact, enhanced by alteration. Selective pyritic replacement on lower side of contact to a distance of ~ 10cm.<br>98.5-161.3 <u>RHYODACITIC LAVA</u> . (single flow)<br>• Variably silicified, sericitic, flow-banded, feldspar-phytic rhyodacitic lava. Contains traces of fine-grained disseminated pyrite.<br>• Some lava breccia zones and ? volcanoclastic lenses | 97.2<br>98.5<br>100<br>110<br>120<br>130 | 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096056

5 cm

## HOLE No. AK 1

Graphic Scale 1: 200

Page 6 of 17

| CORE RECOVERY |            |   |     | DESCRIPTION |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |           |                 |                | CODES |        |      |     |
|---------------|------------|---|-----|-------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|-----------------|----------------|-------|--------|------|-----|
| From m        | Interval m | % | RQD | From m      | Interval m | ( incl. LITHOLOGY, STRUCTURE & ALTERATION )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Depth | Lithology | Graphic Struct. | MINERALISATION | LITHO | STRUCT | ALTN | MIN |
|               |            |   |     |             |            | Alternates between pale grey <sup>dettexured</sup> , extremely hard silicified intervals and pale pink to yellowish-green softer, less silicified zones with more primary features preserved.<br>eg: in-situ "crackle breccia" (? Hyaloclastic) with jigsaw fit flow banding (sericitised).<br>• Variable amounts of carbonate veinlets developed throughout.<br>• Includes: 149.0 - 160.2 m - FAULT ZONE.<br>• broken core, in medium grey, silica-sericite altered lava. Traces of fine grained pyrite & galena. "Scapy" sericitic appearance.                                                                                                                                                                                                                                                                                                                                        | 140   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 150   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 160   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 161.3 |           |                 |                |       |        |      |     |
|               |            |   |     | 161.3       | 80.1       | <u>161.3-214.6 RHYODACITIC LAVAS &amp; HYALOCLASTITE.</u><br>• 161.3 - 161.6 - brecciated contact / flow margin.<br>• 161.6 - 295.4 - Variably silicified & sericite altered rhyodacite lavas, lava breccias & hyaloclastite, with traces of pyrite throughout.<br>• Interval includes:-<br>175.8 - 185.8 - grey, silicified, extremely hard massive dettextured lava.<br>185.8 - 189.4 - less altered, minor sericite. Much flow-banding, in a randomly oriented clasts of hyaloclastic, feldspar phric lava.<br>189.4 - 191.3 - grey & strongly silicified.<br>191.3 - 195.3 - weakly altered, displaying flowbanding & hyaloclastic breccia textures.<br>195.3 - 202.9 - variably silicified, siliceous lava, with traces of disseminated pyrite and sericitisation.<br>202.9 - 214.6 - grey/pink/yellowish green, sericitic, feldspar phric, variably silicified, poritic (tr) with | 160   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 170   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 180   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 190   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 200   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 210   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 220   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 230   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 240   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 250   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 260   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 270   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 280   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 290   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 300   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 310   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 320   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 330   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 340   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 350   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 360   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 370   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 380   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 390   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 400   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 410   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 420   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 430   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 440   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 450   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 460   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 470   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 480   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 490   |           |                 |                |       |        |      |     |
|               |            |   |     |             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 500   |           |                 |                |       |        |      |     |

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# PASMINCO EXPLORATION DIAMOND DRILL CORE LOG

HOLE No. AK1

PROJECT: Boco

Graphic Scale 1: 200

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| CORE RECOVERY |               |   |     | DESCRIPTION |               |                                                                                                                                                                                                                                                                                                                                                               |       |                      |                            |                              |       |        |     | CODES |  |  |  |
|---------------|---------------|---|-----|-------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------|----------------------------|------------------------------|-------|--------|-----|-------|--|--|--|
| From<br>m     | Interval<br>m | % | RCD | From<br>m   | Interval<br>m | ( incl. LITHOLOGY, STRUCTURE & ALTERATION )                                                                                                                                                                                                                                                                                                                   | Depth | Graphic<br>Lithology | Struc.                     | MINERALISATION               | LITHO | STRUCT | ALT | MIN   |  |  |  |
|               |               |   |     |             |               | zones of ? alteration enhanced primary brecciation.<br>Flow-banded in pale green/yellow (less silicified) zones.<br>Pyrite ≈ 1-3%. Blotchy dark green chloritic alteration in<br>more tectonically brecciated zones.<br>Minor Fault at 50° to core at 207.1m.                                                                                                 | 190   |                      | fb clasts<br>(hyaloclast.) |                              |       |        |     |       |  |  |  |
|               |               |   |     |             |               | 214.6-218.4 - very silicified. Includes sericite in a<br>silicified hydrothermal breccia, with cross-cutting pyrite-bearing<br>carbonate veinlets (at 214.9m).                                                                                                                                                                                                |       |                      | hyaloc.                    | traces py 195-245            |       |        |     |       |  |  |  |
|               |               |   |     |             |               | 218.4-220.0 - Hyaloclastic lava breccia. Randomly<br>oriented flow-banded clasts (Similar to 186-189m).                                                                                                                                                                                                                                                       | 200   |                      |                            |                              |       |        |     |       |  |  |  |
|               |               |   |     |             |               | 220.0-237.5 - Lava breccia / flow top breccia? As above<br>with varied silica-sericite alteration and patchy chlorite-<br>(biotite) alteration. Feldspar-phyric, some flow banding,<br>flow breccia & carbonate veinlets. Pyrite < 1%.<br>Minor hydrothermal "crackles" breccia. Joints, fractures<br>and carbonate veinlets variably pyrite rich (eg. 238.6) | 210   |                      | fb.                        | py locally up to 3%          |       |        |     |       |  |  |  |
|               |               |   |     | 241.4       | 0.3           | <u>HYDROTHERMAL BRECCIA (EARLY FAULT?)</u><br>primary hydrothermal breccia with "flow"<br>preserved in chloritic matrix around silicified<br>clasts. Possibly an early fault or major<br>fluid channel through the volcanic pile...                                                                                                                           | 220   |                      | silicified<br>hyaloc.      | py on cb veinlets (eg 214.9) |       |        |     |       |  |  |  |
|               |               |   |     | 241.7       | 53.7          | <u>RYHODACITIC LAVAS &amp; HYALOCLASTITE.</u><br>Variably sericite-silica altered, flow-banded, feldspar<br>phyric rhyodacitic lavas and hyaloclastic breccias.<br>Generally pink/green-yellow colour with some cream to<br>white "bleached" zones. Carbonate veins with                                                                                      | 230   |                      | breccia                    |                              |       |        |     |       |  |  |  |

096038

5cm

## HOLE No. AK 1

Graphic Scale 1: 200

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| CORE RECOVERY |               |   |     | DESCRIPTION |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |                                                                                                                                                             |                    |                | CODES |        |      |     |
|---------------|---------------|---|-----|-------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------|-------|--------|------|-----|
| From<br>m     | Interval<br>m | % | RQD | From<br>m   | Interval<br>m | ( Incl. LITHOLOGY, STRUCTURE & ALTERATION )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Depth                 | Lithology                                                                                                                                                   | Graphic<br>Struct. | MINERALISATION | LITHO | STRUCT | ALTN | MNR |
|               |               |   |     |             |               | pyrite developed on them, generally at 30° to core.<br>• Minor zones of dark chlorite - biotite alteration<br>and pale, bleached grey silicified zones.<br>• 259.4-260.0 - Strong flow banding with consistent<br>orientation at 30° to core.<br>271.2 - flowbands at 25° to core<br>272.2-275.1 - Pale grey siliceous zone with sericite -<br>pyrite veins at 15° to core<br>277.6 - carbonate-chlorite vein at 25° to core.<br>278.0-279.5 - Zone of stronger pyrite/carbonate<br>veining with vughs developed along them. Pyrite<br>up to 5% of vein fill. Crystalline pyrite ≠ carbonate<br>in vughs.<br>283.2 - silica alteration front with pyrite/<br>carbonate vein on it at 30° to core.<br>284.5-285.9 - Broken core. Variably grey<br>to pale cream blotchy alteration. ? FAULT ZONE (late<br>and brittle).<br>291.0-295.4 - darker coloured, feldspar phytic<br>dacitic lava, nearing the intrusive contact<br>(? effect produced by heating during intrusion?) | 280<br>291.4<br>291.7 | "<br>+ "<br>"<br>=<br>"<br>"<br>+ "<br>"<br>F (NW) F HTM Bx?<br>"<br>"<br>=<br>"<br>"<br>=<br>"<br>"<br>=<br>"<br>"<br>=<br>"<br>"<br>=<br>"<br>"<br>=<br>" |                    |                |       |        |      |     |
|               |               |   |     | 295.4       | -             | <u>INTRUSIVE CONTACT</u><br>- irregular shape (non-planar) at ~ 10° to LCA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 270                   | "                                                                                                                                                           | "                  |                |       |        |      |     |
|               |               |   |     | 295.4       | 15.3          | <u>MAFIC INTRUSIVE</u><br>• fine-grained, dark grey, mafic dyke or sill, massive<br>Contains two minor faults /at 299.5 and                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       | "<br>sil.<br>"                                                                                                                                              |                    | • py on veins. |       |        |      |     |

05055

113 cm

# FASMINCO EXPLORATION DIAMOND DRILL CORE LOG

HOLE No. AK 1

PROJECT: Boco

Graphic Scale 1: 200

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| CORE RECOVERY |               |   |     | DESCRIPTION |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                      |         |                                | CODES |        |       |     |
|---------------|---------------|---|-----|-------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------|---------|--------------------------------|-------|--------|-------|-----|
| From<br>m     | Interval<br>m | % | RCD | From<br>m   | Interval<br>m | ( incl. LITHOLOGY, STRUCTURE & ALTERATION )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Depth | Graphic<br>Lithology | Struct. | MINERALISATION                 | LITHO | STRUCT | ALTER | MIN |
|               |               |   |     |             |               | 306.7m) with carbonate veining along them, at 15° to core. Bleaching extends from the veins into the otherwise dark coloured rock for ~20cm either side.                                                                                                                                                                                                                                                                                                                                                                                                                           | 290   | "                    |         | py-cb veining                  |       |        |       |     |
|               |               |   |     | 310.7       | -             | <u>INTRUSIVE CONTACT.</u><br>- at 20° to core.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 295.9 | "                    |         |                                |       |        |       |     |
|               |               |   |     | 310.7       | 16.8          | <u>RHYODACITIC LAVA.</u><br>· pale pink, grey or cream, siliceous, feldspar phyric rhyodacitic lava. Variable sericitisation & "late" sericite/talc? developed on joints (esp: 314.0-316.7) with pyrite also developed on some.<br>· 326.2 - carbonate vein with galena spots in it, at 20° to core.                                                                                                                                                                                                                                                                               | 290   | "                    |         |                                |       |        |       |     |
|               |               |   |     |             |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 295.4 | "                    |         | intrusive contact @ 10° to LCA |       |        |       |     |
|               |               |   |     | 327.5       | 62.0          | <u>RHYODACITIC LAVA - SEPARATE FLOW.</u><br>· 327.5-327.7 - chloritic alteration in flow top breccia.<br>· 327.7-329.5 - feldspar-phyric, massive, variably altered (sericite-chlorite). Quartz-carbonate veined, (especially 331.0-331.6).<br>· Many overprinting alteration fronts in the interval, creating apparent variability in a generally monotonous, feldspar phyric lava.<br>· Minor carbonate veinlets & sericite "flecks" throughout.<br>· Some zone of alteration-derived "pseudo-clastic" texture.<br>· Feldspars often silicified, but no primary quartz observed. | 300   | "                    |         | faults & cb vms @ 15° to LCA   |       |        |       |     |
|               |               |   |     |             |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 306.7 | "                    |         |                                |       |        |       |     |
|               |               |   |     |             |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 310   | "                    |         | intrusive contact @ 20° to LCA |       |        |       |     |
|               |               |   |     |             |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 320   | "                    |         |                                |       |        |       |     |

096060

5 cm

# PASMINCO EXPLORATION DIAMOND DRILL CORE LOG

HOLE No. AK1

PROJECT: Boco

Graphic Scale 1: 200

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| CORE RECOVERY |               |   |     | DESCRIPTION |               |                                                                                                                                                                                   |       |           |                    |                |       |        |      | CODES |  |  |  |
|---------------|---------------|---|-----|-------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------|--------------------|----------------|-------|--------|------|-------|--|--|--|
| From<br>m     | Interval<br>m | % | ROD | From<br>m   | Interval<br>m | ( Incl. LITHOLOGY, STRUCTURE & ALTERATION )                                                                                                                                       | Depth | Lithology | Graphic<br>Struct. | MINERALISATION | LITHO | STRUCT | ALTN | MIN   |  |  |  |
|               |               |   |     |             |               | bleaching of core often strong around carbonate veins (eg. 351.2 - 352.1), with pyrite & galena developed in these veins. Tectonic brecciation in the vicinity of the veins also. | 326.2 |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     |             |               | • 331.6 - Minor fault with soft altered rock below it (grey clay)                                                                                                                 | 327.5 |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     |             |               | • 333.2 - 334.1 - blotchy silica alteration.                                                                                                                                      | 330   |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     |             |               | • 354.5 - veined breccia zone                                                                                                                                                     | 333.2 |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     |             |               | • 354.9 - vein containing broken away country rock fragments at 30° to core.                                                                                                      | 334.1 |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     |             |               | • 357.8 - quartz vein at 70° to core, with bleaching for 10cm each side.                                                                                                          | 340   |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     |             |               | • 361.2 - flow banding at 35° to 40° to core                                                                                                                                      |       |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     | 389.5       | 3.1           | <u>AMYGDALOIDAL MAFIC INTRUSIVE.</u>                                                                                                                                              |       |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     |             |               | • Intrusive contact at 389.5 is obscured by alteration                                                                                                                            | 350   |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     |             |               | • Dark grey, fine-grained, feldspar-bearing, with spherical quartz amygdales (up to 3mm across).                                                                                  | 351.2 |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     |             |               | • Pyrite on and near contacts of intrusion.                                                                                                                                       | 352.1 |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     |             |               | • Lower contact (intrusive) at 10° to core at 392.6.                                                                                                                              | 354.9 |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     | 392.6       | 20.4          | <u>RHYODACITIC LAVA.</u>                                                                                                                                                          |       |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     |             |               | • Variably silica-sericite-chlorite/albite altered, feldspar-phyric (up to 15%) massive lava                                                                                      | 360   |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     | 413.0       | 3.0           | <u>MAFIC INTRUSIVE.</u>                                                                                                                                                           | 361.2 |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     |             |               | • Irregular intrusive contacts at 413.0 & 416.0.                                                                                                                                  |       |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     |             |               | • Non-amygdaloidal                                                                                                                                                                |       |           |                    |                |       |        |      |       |  |  |  |
|               |               |   |     |             |               | • Contains part of a xenolith of country rock at 413.7-413.9                                                                                                                      |       |           |                    |                |       |        |      |       |  |  |  |

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5 cm

HOLE No. AK 1

Graphic Scale 1: 200

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| CORE RECOVERY |               |   |     | DESCRIPTION |               |                                             |       |                      |         |                | CODES |        |      |     |
|---------------|---------------|---|-----|-------------|---------------|---------------------------------------------|-------|----------------------|---------|----------------|-------|--------|------|-----|
| From<br>m     | Interval<br>m | % | RQD | From<br>m   | Interval<br>m | ( Incl. LITHOLOGY, STRUCTURE & ALTERATION ) | Depth | Graphic<br>Lithology | Struct. | MINERALISATION | LITHO | STRUCT | ALTN | MIN |
|               |               |   |     |             |               |                                             | 370   | //                   |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             |       | //                   |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             |       | =                    |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             |       | //                   |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             |       | =                    |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             | 380   | //                   |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             |       | //                   |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             |       | =                    |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             |       | //                   |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             |       | =                    |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             | 387.5 | //                   |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             | 390   | V                    |         | I              |       |        |      |     |
|               |               |   |     |             |               |                                             | 392.6 | V                    |         | I              |       |        |      |     |
|               |               |   |     |             |               |                                             |       | //                   |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             |       | =                    |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             | 400   | //                   |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             |       | =                    |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             |       | //                   |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             |       | =                    |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             |       | //                   |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             | 410   | //                   |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             | 413.0 | //                   |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             |       | V                    |         |                |       |        |      |     |
|               |               |   |     |             |               |                                             |       | V                    |         |                |       |        |      |     |

056062

HOLE No. AK 1

Graphic Scale 1:200

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| CORE RECOVERY |               |   |     | DESCRIPTION |               |                                                                                                                                                                                              |                                       |                                                             |                    |                | CODES |        |       |     |
|---------------|---------------|---|-----|-------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------|--------------------|----------------|-------|--------|-------|-----|
| From<br>m     | Interval<br>m | % | RCD | From<br>m   | Interval<br>m | ( Incl. LITHOLOGY, STRUCTURE & ALTERATION )                                                                                                                                                  | Depth                                 | Lithology                                                   | Graphic<br>Struct. | MINERALISATION | LITHO | STRUCT | ALTER | MEN |
|               |               |   |     | 416.0       | 12.4          | <u>RHYODACITIC LAVA.</u><br>flow banded, feldspar phytic, variable sericite-silica-chlorite alteration.<br>417.7 - flow bands sub-parallel to core                                           | 416.0<br><br>420                      | V <sub>1/2</sub> ls in q-<br>V<br>=   <br>=   <br>=   <br>= | I                  |                |       |        |       |     |
|               |               |   |     | 428.4       | 5.0           | <u>MAFIC INTRUSIVE.</u><br>Incorporating "fingers" or xenoliths of country rock                                                                                                              |                                       | =   <br>=   <br>=                                           |                    |                |       |        |       |     |
|               |               |   |     | 433.4       | 8.2           | <u>RHYODACITIC LAVA.</u><br>feldspar phytic, flowbanded, variable alteration (weak)                                                                                                          | 428.4<br>430                          | V<br>V<br>V<br>V                                            | I                  |                |       |        |       |     |
|               |               |   |     | 441.6       | -             | <u>CONTACT (? CONFORMABLE ?)</u>                                                                                                                                                             | 433.4                                 | =   <br>=   <br>=                                           | I                  |                |       |        |       |     |
|               |               |   |     | 441.6       | 8.1           | <u>MIXED CLASTIC SEQUENCE</u><br>interbedded siliceous grey ash layers in feldspar crystal-rich volcanidlastic sandstone, with sericitic alteration.                                         | 440<br>441.6                          | =   <br>=   <br>=                                           |                    |                |       |        |       |     |
|               |               |   |     | 449.7       | 0.6           | <u>MAFIC INTRUSIVE (minor)</u>                                                                                                                                                               |                                       | V A<br>VT 1.0<br>D Q B<br>SV                                |                    |                |       |        |       |     |
|               |               |   |     | 450.3       | 36.0          | <u>RHYODACITIC LAVA</u><br>includes: 453.9 - 462.7 - broken core & pug in a broad FAULTED ZONE - bleached core, de textured, sericitic, carbonate veins<br>generally: feldspar phytic lavas. | 449.7<br>450<br>450.3<br>453.9<br>460 | V V<br>=   <br>=   <br>=   <br>=                            | I<br><br>F         |                |       |        |       |     |

000000

5 cm

HOLE No. AK 1

Graphic Scale 1: 200

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| CORE RECOVERY |               |   |     | DESCRIPTION |               |                                                                                                                                                                                                                                                                                                                                                                                                   |                |                      |         |                          | CODES |        |      |     |
|---------------|---------------|---|-----|-------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------|---------|--------------------------|-------|--------|------|-----|
| From<br>m     | Interval<br>m | % | ROD | From<br>m   | Interval<br>m | ( incl. LITHOLOGY, STRUCTURE & ALTERATION )                                                                                                                                                                                                                                                                                                                                                       | Depth          | Graphic<br>Lithology | Struct. | MINERALISATION           | LITHO | STRUCT | ALTN | MIN |
|               |               |   |     |             |               |                                                                                                                                                                                                                                                                                                                                                                                                   | 462.7          |                      |         |                          |       |        |      |     |
|               |               |   |     |             |               |                                                                                                                                                                                                                                                                                                                                                                                                   | 470            |                      |         |                          |       |        |      |     |
|               |               |   |     |             |               |                                                                                                                                                                                                                                                                                                                                                                                                   | 480            |                      |         |                          |       |        |      |     |
|               |               |   |     | 486.3       | 0.9           | ? CRETACEOUS <u>LAMPROPHYRE</u> INTRUSION.<br>• black, fine-grained, massive, unaltered,<br>undeformed, minor feldspar crystals, Mafic intrusion.<br>• Intrusive contacts at 486.3 & 487.2                                                                                                                                                                                                        | 486.3<br>487.2 |                      | I<br>I  | ? LAMPROPHYRIC INTRUSION |       |        |      |     |
|               |               |   |     | 487.2       | 23.3          | <u>RHYODACITIC LAVA.</u><br>• massive, detextured, fine-grained, pale green-yellow,<br>with chlorite veinlets cross-crossing, some carbonate<br>veinlets and traces of disseminated pyrite.<br>• Detexturing has wiped out all but a few traces<br>of feldspar phenocrysts.<br>• Unit grades into a less detextured version of<br>the same rock at 506.6m. Feldspar crystals<br>become prominent. | 490<br>500     |                      |         |                          |       |        |      |     |

67-098

HOLE No. AK 1

Graphic Scale 1: 200

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| CORE RECOVERY |               |   |     | DESCRIPTION |               |                                                                                                                                                                                                   |              |                      |         |                | CODES |        |      |     |
|---------------|---------------|---|-----|-------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------------------|---------|----------------|-------|--------|------|-----|
| From<br>m     | Interval<br>m | % | RQD | From<br>m   | Interval<br>m | ( Incl. LITHOLOGY, STRUCTURE & ALTERATION )                                                                                                                                                       | Depth        | Graphic<br>Lithology | Struct. | MINERALISATION | LITHO | STRUCT | ALTR | MIN |
|               |               |   |     | 510.5       | 18.2          | <u>DACITIC LAVA.</u><br>• darker, more feldspar crystal-rich massive lava.<br>• up to 20% feldspar. Contains minor carbonate veinlets. Slightly bleached near lower contact with mafic intrusive. | 510<br>510.5 |                      |         |                |       |        |      |     |
|               |               |   |     | 528.7       | 3.5           | <u>MAFIC INTRUSIVE.</u><br>• Irregular intrusive contacts at 528.7 & 532.2 bound this fine grained, grey, massive, non-porphyritic body.                                                          | 528.7<br>530 |                      | I       |                |       |        |      |     |
|               |               |   |     | 532.2       | 21.5          | <u>RHYODACITIC LAVA.</u><br>• variably silicified, feldspar-phyric (crystals up to 3mm across), grey to pink, massive lava....                                                                    | 532.2        |                      | I       |                |       |        |      |     |
|               |               |   |     | 553.7       | -             | <u>END OF HOLE</u>                                                                                                                                                                                | 550<br>553.7 |                      | EOH     |                |       |        |      |     |

656

5 cm

# PASMINCO EXPLORATION

HOLE No. AK 1

PROJECT: Boco - ANIMAL CREEK DIAMOND DRILL HOLE SUPPLEMENTARY DATA

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| CORE RECOVERY |      |     |        | M.SUS |       | S.G   |        |     |      |
|---------------|------|-----|--------|-------|-------|-------|--------|-----|------|
| FROM          | TO   | REC | %REC   | DEPTH | M.SUS | DEPTH | WEIGHT | VOL | S.G  |
| 0             | 3    | 0.1 | 3.33   | 3     | 0.38  |       |        |     |      |
| 3             | 5.1  | 0.9 | 42.86  | 6     | 0.49  |       |        |     |      |
| 6.8           | 7.5  | 0.6 | 85.71  | 9     | 0.3   |       |        |     |      |
| 7.5           | 8.1  | 0.6 | 100.00 | 12    | 9.01  |       |        |     |      |
| 8.1           | 9.9  | 1.7 | 94.44  | 15    | 0.6   |       |        |     |      |
| 9.9           | 12.6 | 2.5 | 92.59  | 18    | 0.05  |       |        |     |      |
| 12.6          | 13.4 | 0.7 | 87.50  | 32    | 0.29  |       |        |     |      |
| 13.4          | 14   | 0.6 | 100.00 | 35    | 0.05  |       |        |     |      |
| 14            | 14.9 | 0.7 | 77.78  | 38    | 0.24  |       |        |     |      |
| 14.9          | 15.4 | 0.3 | 60.00  | 41    | 0.3   |       |        |     |      |
| 15.4          | 15.9 | 0.5 | 100.00 | 44.5  | 0.33  |       |        |     |      |
| 15.9          | 16.1 | 0.2 | 100.00 | 46.6  | 1.35  |       |        |     |      |
| 16.1          | 19.3 | 0.2 | 6.25   | 50.3  | 3.32  |       |        |     |      |
| 19.3          | 21.2 | 0.2 | 10.53  | 52    | 0.35  |       |        |     |      |
| 21.2          | 23.7 | 0.1 | 4.00   | 60    | 0.23  |       |        |     |      |
| 23.7          | 27.7 | 0.2 | 5.00   | 68    | 0.11  |       |        |     |      |
| 27.7          | 31.7 | 1   | 25.00  | 69    | 0.07  |       |        |     |      |
| 31.7          | 33.2 | 1.4 | 93.33  | 71    | 0.08  |       |        |     |      |
| 33.2          | 34.7 | 0.7 | 46.67  | 74    | 0.18  |       |        |     |      |
| 34.7          | 35.9 | 1   | 83.33  | 77    | 0.13  |       |        |     |      |
| 35.9          | 37.7 | 0.9 | 50.00  | 80    | 0.2   |       |        |     |      |
| 37.7          | 38.8 | 0.8 | 72.73  | 83    | 0.28  |       |        |     |      |
| 38.8          | 40.7 | 0.9 | 47.37  | 86    | 0.09  |       |        |     |      |
| 40.7          | 43.7 | 0.9 | 30.00  | 89    | 0.13  |       |        |     |      |
| 43.7          | 44.9 | 1   | 83.33  | 92    | 0.14  |       |        |     |      |
| 44.9          | 46.7 | 1.8 | 100.00 | 95    | 0.14  |       |        |     |      |
| 46.7          | 49.7 | 2.9 | 96.67  | 98    | 0.15  |       |        |     |      |
| 49.7          | 52.4 | 2.3 | 85.19  | 101   | 0.12  |       |        |     |      |
| 52.4          | 52.8 | 0.3 | 75.00  | 104   | 0.09  |       |        |     |      |
| 52.8          | 53.4 | 0.4 | 66.67  | 107   | 0.16  |       |        |     |      |
| 53.4          | 55.7 | 0.7 | 30.43  | 110   | 0.11  |       |        |     |      |
| 55.7          | 58.7 | 1   | 33.33  | 113   | 0.11  |       |        |     |      |
| 58.7          | 61.7 | 1.2 | 40.00  | 116   | 0.11  |       |        |     |      |
| 61.7          | 63.7 | 0.8 | 40.00  | 119   | 0.12  |       |        |     |      |
| 63.7          | 64.3 | 0.5 | 83.33  | 122   | 0.11  |       |        |     |      |
| 64.3          | 67.5 | 1.2 | 37.50  | 125   | 0.14  |       |        |     |      |
| 67.5          | 69.2 | 1.7 | 100.00 | 128   | 0.09  |       |        |     |      |
| 69.2          | 70.7 | 1.3 | 86.67  | 131   | 0.08  |       |        |     |      |
| 70.7          | 71.4 | 0.7 | 100.00 | 134   | 0.04  |       |        |     |      |
| 71.4          | 73.5 | 1.6 | 76.19  | 137   | 0.12  |       |        |     |      |
| 73.5          | 74.9 | 1.4 | 100.00 | 140   | 0.09  |       |        |     |      |
| 74.9          | 76.1 | 1.1 | 91.67  | 143   | 0.07  |       |        |     |      |
| 76.1          | 78.4 | 2.3 | 100.00 | 146   | 0.04  |       |        |     |      |
| 78.4          | 79.1 | 0.6 | 85.71  | 149   | 0.04  |       |        |     |      |
| 79.1          | 79.5 | 0.3 | 75.00  | 152   | 0.05  |       |        |     |      |
| 79.5          | 81.2 | 1.6 | 94.12  | 155   | 0.02  | 80    | 462    | 166 | 2.78 |
| 81.2          | 82.7 | 1.5 | 100.00 | 158   | 0.03  |       |        |     |      |
| 82.7          | 84   | 1.4 | 107.69 | 161   | 0.06  |       |        |     |      |
| 84            | 85.7 | 1.4 | 82.35  | 164   | 0.05  |       |        |     |      |
| 85.7          | 88.7 | 2.9 | 96.67  | 167   | 0.12  |       |        |     |      |
| 88.7          | 89.2 | 0.5 | 100.00 | 170   | 0.11  |       |        |     |      |
| 89.2          | 91.7 | 2.5 | 100.00 | 173   | 0.11  |       |        |     |      |

| CORE RECOVERY |       |     |        | M.SUS |       | S.G   |        |     |      |
|---------------|-------|-----|--------|-------|-------|-------|--------|-----|------|
| FROM          | TO    | REC | %REC   | DEPTH | M.SUS | DEPTH | WEIGHT | VOL | S.G  |
| 91.7          | 94.7  | 3   | 100.00 | 176   | 0.04  |       |        |     |      |
| 94.7          | 97.7  | 3   | 100.00 | 179   | 0.04  |       |        |     |      |
| 97.7          | 99.2  | 1.4 | 93.33  | 182   | 0.06  |       |        |     |      |
| 99.2          | 100.7 | 1.5 | 100.00 | 185   | 0.03  |       |        |     |      |
| 100.7         | 103.7 | 3   | 100.00 | 188   | 0.09  |       |        |     |      |
| 103.7         | 106.1 | 2.4 | 100.00 | 191   | 0.03  |       |        |     |      |
| 106.1         | 106.7 | 0.6 | 100.00 | 194   | 0.11  |       |        |     |      |
| 106.7         | 109.7 | 3   | 100.00 | 197   | 0.03  |       |        |     |      |
| 109.7         | 112.7 | 3   | 100.00 | 200   | 0.08  | 110   | 313    | 113 | 2.77 |
| 112.7         | 115.7 | 3   | 100.00 | 203   | 0.04  |       |        |     |      |
| 115.7         | 118.7 | 3   | 100.00 | 206   | 0.06  |       |        |     |      |
| 118.7         | 121.7 | 3   | 100.00 | 209   | 0.1   |       |        |     |      |
| 121.7         | 124.7 | 2.9 | 96.67  | 212   | 0.08  |       |        |     |      |
| 124.7         | 127.7 | 3   | 100.00 | 215   | 0.05  |       |        |     |      |
| 127.7         | 130.7 | 3   | 100.00 | 218   | 0     |       |        |     |      |
| 130.7         | 133.7 | 3   | 100.00 | 221   | 0.04  |       |        |     |      |
| 133.7         | 136.7 | 2.9 | 96.67  | 224   | 0.04  |       |        |     |      |
| 136.7         | 137.6 | 0.9 | 100.00 | 227   | 0.01  |       |        |     |      |
| 137.6         | 139.7 | 2.1 | 100.00 | 230   | 0.07  |       |        |     |      |
| 139.7         | 142.7 | 3   | 100.00 | 233   | 0.11  | 140   | 328    | 122 | 2.69 |
| 142.7         | 145.7 | 2.8 | 93.33  | 236   | 0.06  |       |        |     |      |
| 145.7         | 148.7 | 2.9 | 96.67  | 239   | 0.16  |       |        |     |      |
| 148.7         | 150.2 | 1.4 | 93.33  | 242   | 0.04  |       |        |     |      |
| 150.2         | 150.6 | 0.2 | 50.00  | 245   | 0.15  |       |        |     |      |
| 150.6         | 151.7 | 0.6 | 54.55  | 248   | 0.21  |       |        |     |      |
| 151.7         | 152.2 | 0.5 | 100.00 | 251   | 0.12  |       |        |     |      |
| 152.2         | 154.7 | 2.5 | 100.00 | 254   | 0     |       |        |     |      |
| 154.7         | 156.1 | 1.3 | 92.86  | 257   | 0.19  |       |        |     |      |
| 156.1         | 157.7 | 1.5 | 93.75  | 260   | 0.1   |       |        |     |      |
| 157.7         | 159.3 | 1.6 | 100.00 | 263   | 0.12  |       |        |     |      |
| 159.3         | 160.7 | 1.2 | 85.71  | 266   | 0.08  |       |        |     |      |
| 160.7         | 161.2 | 0.6 | 120.00 | 269   | 0.11  |       |        |     |      |
| 161.2         | 163.7 | 2.4 | 96.00  | 272   | 0.12  |       |        |     |      |
| 163.7         | 165.1 | 1.4 | 100.00 | 275   | 0.03  |       |        |     |      |
| 165.1         | 166.7 | 1.6 | 100.00 | 278   | 0.15  |       |        |     |      |
| 166.7         | 169.7 | 3   | 100.00 | 281   | 0.1   |       |        |     |      |
| 169.7         | 172.7 | 3   | 100.00 | 284   | 0.13  | 170   | 545    | 204 | 2.67 |
| 172.7         | 175.7 | 3   | 100.00 | 287   | 0.05  |       |        |     |      |
| 175.7         | 178.7 | 2.9 | 96.67  | 290   | 0.14  |       |        |     |      |
| 178.7         | 181.7 | 3   | 100.00 | 293   | 0.26  |       |        |     |      |
| 181.7         | 184.7 | 3   | 100.00 | 295   | 0.87  |       |        |     |      |
| 184.7         | 187.7 | 3   | 100.00 | 295.5 | 18.5  |       |        |     |      |
| 187.7         | 188.4 | 0.7 | 100.00 | 296   | 7.96  |       |        |     |      |
| 188.4         | 190.7 | 3   | 130.43 | 296.5 | 3.56  |       |        |     |      |
| 190.7         | 193.7 | 3   | 100.00 | 297   | 0.59  |       |        |     |      |
| 193.7         | 196.1 | 2.3 | 95.83  | 299   | 0.44  |       |        |     |      |
| 196.1         | 199.1 | 3   | 100.00 | 302   | 0.4   |       |        |     |      |
| 199.1         | 202.1 | 3   | 100.00 | 305   | 0.45  | 200   | 632    | 241 | 2.62 |
| 202.1         | 202.7 | 0.6 | 100.00 | 308   | 0.46  |       |        |     |      |
| 202.7         | 204.9 | 2.2 | 100.00 | 311   | 0.3   |       |        |     |      |

006066

HOLE No. AK 1

PROJECT: Boco

# PASMINCO EXPLORATION DIAMOND DRILL HOLE SUPPLEMENTARY DATA

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| CORE RECOVERY |    |     |      | M.SUS |       | S.G   |        |     |     |
|---------------|----|-----|------|-------|-------|-------|--------|-----|-----|
| FROM          | TO | REC | %REC | DEPTH | M.SUS | DEPTH | WEIGHT | VOL | S.G |

|       |       |     |        |       |      |     |     |     |      |
|-------|-------|-----|--------|-------|------|-----|-----|-----|------|
| 204.9 | 205.7 | 0.6 | 75.00  | 314   | 0.12 |     |     |     |      |
| 205.7 | 207   | 1.3 | 100.00 | 317   | 0.19 |     |     |     |      |
| 207   | 208.7 | 1.7 | 100.00 | 320   | 0.13 |     |     |     |      |
| 208.7 | 211.7 | 3   | 100.00 | 323   | 0.07 |     |     |     |      |
| 211.7 | 214.7 | 2.9 | 96.67  | 326   | 0.22 |     |     |     |      |
| 214.7 | 217.7 | 3   | 100.00 | 329   | 0.04 |     |     |     |      |
| 217.7 | 220.7 | 3   | 100.00 | 332   | 0.08 |     |     |     |      |
| 220.7 | 223.7 | 3   | 100.00 | 335   | 0.22 |     |     |     |      |
| 223.7 | 226.7 | 3   | 100.00 | 338   | 0.18 |     |     |     |      |
| 226.7 | 229.7 | 3   | 100.00 | 341   | 0.21 |     |     |     |      |
| 229.7 | 232.7 | 3   | 100.00 | 344   | 0.22 | 230 | 596 | 225 | 2.65 |
| 232.7 | 235.7 | 3   | 100.00 | 347   | 0.13 |     |     |     |      |
| 235.7 | 238.7 | 3   | 100.00 | 350   | 0.2  |     |     |     |      |
| 238.7 | 241.7 | 2.8 | 93.33  | 353   | 0.19 |     |     |     |      |
| 241.7 | 244.6 | 3.1 | 106.90 | 356   | 0.09 |     |     |     |      |
| 244.6 | 247.7 | 3.1 | 100.00 | 359   | 0.22 |     |     |     |      |
| 247.7 | 250.7 | 3   | 100.00 | 362   | 0.18 |     |     |     |      |
| 250.7 | 253.7 | 3   | 100.00 | 365   | 0.39 |     |     |     |      |
| 253.7 | 256.7 | 3   | 100.00 | 368   | 0.2  |     |     |     |      |
| 256.7 | 259.7 | 3   | 100.00 | 371   | 0.21 |     |     |     |      |
| 259.7 | 262.7 | 3   | 100.00 | 374   | 0.11 | 260 | 399 | 153 | 2.61 |
| 262.7 | 265.7 | 2.9 | 96.67  | 377   | 0.16 |     |     |     |      |
| 265.7 | 268.7 | 3   | 100.00 | 380   | 0.2  |     |     |     |      |
| 268.7 | 271.7 | 3.1 | 103.33 | 383   | 0.26 |     |     |     |      |
| 271.7 | 274.7 | 3   | 100.00 | 386   | 0.28 |     |     |     |      |
| 274.7 | 277.7 | 3   | 100.00 | 389   | 0.32 |     |     |     |      |
| 277.7 | 280.7 | 3   | 100.00 | 390   | 0.46 |     |     |     |      |
| 280.7 | 283.7 | 3   | 100.00 | 390.5 | 2.54 |     |     |     |      |
| 283.7 | 286.7 | 3   | 100.00 | 391   | 10.2 |     |     |     |      |
| 286.7 | 289.7 | 3.1 | 103.33 | 391.5 | 8.35 |     |     |     |      |
| 289.7 | 292.7 | 3   | 100.00 | 392   | 12.1 | 290 | 572 | 211 | 2.71 |
| 292.7 | 295.7 | 3   | 100.00 | 392.5 | 0.41 |     |     |     |      |
| 295.7 | 298.7 | 3   | 100.00 | 395   | 0.18 |     |     |     |      |
| 298.7 | 301.7 | 3   | 100.00 | 398   | 0.16 |     |     |     |      |
| 301.7 | 304.7 | 3   | 100.00 | 401   | 0.14 |     |     |     |      |
| 304.7 | 307.7 | 3   | 100.00 | 404   | 0.13 |     |     |     |      |
| 307.7 | 310.7 | 3   | 100.00 | 407   | 0.18 | 310 | 425 | 153 | 2.78 |
| 313.7 | 316.7 | 3   | 100.00 | 410   | 0.17 |     |     |     |      |
| 316.7 | 317.7 | 1   | 100.00 | 413   | 0.23 |     |     |     |      |
| 317.7 | 319.7 | 2   | 100.00 | 416   | 0.45 |     |     |     |      |
| 319.7 | 321   | 1.3 | 100.00 | 419   | 0.18 |     |     |     |      |
| 321   | 322.7 | 1.7 | 100.00 | 422   | 0.29 |     |     |     |      |
| 322.7 | 325.7 | 3.1 | 103.33 | 425   | 0.16 |     |     |     |      |
| 325.7 | 328.7 | 2.9 | 96.67  | 428   | 0.19 |     |     |     |      |
| 328.7 | 331.7 | 3   | 100.00 | 431   | 0.5  |     |     |     |      |
| 331.7 | 334.7 | 3   | 100.00 | 434   | 0.31 |     |     |     |      |
| 334.7 | 337.7 | 3   | 100.00 | 437   | 0.17 |     |     |     |      |
| 337.7 | 340.7 | 3   | 100.00 | 440   | 0.19 |     |     |     |      |
| 340.7 | 343.7 | 3   | 100.00 | 443   | 0.19 | 340 | 465 | 171 | 2.72 |
| 343.7 | 346.7 | 3   | 100.00 | 446   | 0.32 |     |     |     |      |

| CORE RECOVERY |    |     |      | M.SUS |       | S.G   |        |     |     |
|---------------|----|-----|------|-------|-------|-------|--------|-----|-----|
| FROM          | TO | REC | %REC | DEPTH | M.SUS | DEPTH | WEIGHT | VOL | S.G |

|       |       |     |        |     |      |       |     |     |      |
|-------|-------|-----|--------|-----|------|-------|-----|-----|------|
| 346.7 | 349.7 | 3.1 | 103.33 | 449 | 0.26 |       |     |     |      |
| 349.7 | 352.7 | 2.9 | 96.67  | 452 | 0.13 |       |     |     |      |
| 352.7 | 355.7 | 3   | 100.00 | 455 | 0.37 |       |     |     |      |
| 355.7 | 358.7 | 3   | 100.00 | 458 | 0.19 |       |     |     |      |
| 358.7 | 361.7 | 3   | 100.00 | 461 | 0.27 |       |     |     |      |
| 361.7 | 364.7 | 3   | 100.00 | 464 | 0.13 |       |     |     |      |
| 364.7 | 367.7 | 3   | 100.00 | 467 | 0.11 |       |     |     |      |
| 367.7 | 370.7 | 3   | 100.00 | 470 | 0.06 | 370   | 449 | 163 | 2.75 |
| 370.7 | 373.7 | 3.1 | 103.33 | 473 | 0.08 |       |     |     |      |
| 373.7 | 376.7 | 3   | 100.00 | 476 | 0    |       |     |     |      |
| 376.7 | 379.7 | 3   | 100.00 | 479 | 0.07 |       |     |     |      |
| 379.7 | 382.7 | 2.9 | 96.67  | 482 | 0.1  |       |     |     |      |
| 382.7 | 385.7 | 3   | 100.00 | 485 | 0.19 |       |     |     |      |
| 385.7 | 388.7 | 3   | 100.00 | 487 | 3.67 |       |     |     |      |
| 388.7 | 391.7 | 3   | 100.00 | 490 | 0.12 |       |     |     |      |
| 391.7 | 394.7 | 3   | 100.00 | 493 | 0.07 |       |     |     |      |
| 394.7 | 397.7 | 3   | 100.00 | 496 | 0.11 |       |     |     |      |
| 397.7 | 400.7 | 3   | 100.00 | 499 | 0.05 | 400   | 272 | 99  | 2.75 |
| 400.7 | 403.7 | 3   | 100.00 | 502 | 0.04 |       |     |     |      |
| 403.7 | 406.7 | 3   | 100.00 | 505 | 0.03 |       |     |     |      |
| 406.7 | 409.7 | 3   | 100.00 | 508 | 0.1  |       |     |     |      |
| 409.7 | 412.7 | 3   | 100.00 | 511 | 0.16 |       |     |     |      |
| 412.7 | 415.7 | 3   | 100.00 | 514 | 0.17 |       |     |     |      |
| 415.7 | 418.7 | 3   | 100.00 | 517 | 0.2  |       |     |     |      |
| 418.7 | 421.7 | 3   | 100.00 | 520 | 0.16 |       |     |     |      |
| 421.7 | 424.7 | 3   | 100.00 | 523 | 0.2  |       |     |     |      |
| 424.7 | 427.7 | 3   | 100.00 | 526 | 0.32 |       |     |     |      |
| 427.7 | 430.7 | 3   | 100.00 | 529 | 13.6 | 430   | 461 | 172 | 2.68 |
| 430.7 | 433.7 | 3   | 100.00 | 532 | 13.9 |       |     |     |      |
| 433.7 | 436.7 | 3   | 100.00 | 535 | 0.28 |       |     |     |      |
| 436.7 | 439.7 | 3   | 100.00 | 538 | 0.19 |       |     |     |      |
| 439.7 | 442.7 | 3   | 100.00 | 541 | 0.18 |       |     |     |      |
| 442.7 | 445.7 | 3   | 100.00 | 544 | 0.06 |       |     |     |      |
| 445.7 | 448.7 | 3   | 100.00 | 547 | 0.07 |       |     |     |      |
| 448.7 | 451.7 | 3   | 100.00 | 550 | 0.18 |       |     |     |      |
| 451.7 | 454.7 | 3   | 100.00 | 553 | 0.13 |       |     |     |      |
| 454.7 | 457.1 | 2.4 | 100.00 |     |      |       |     |     |      |
| 457.1 | 460.1 | 3   | 100.00 |     |      | 458.5 | 447 | 166 | 2.69 |
| 460.1 | 461.9 | 1.8 | 100.00 |     |      |       |     |     |      |
| 461.9 | 463.7 | 1.8 | 100.00 |     |      |       |     |     |      |
| 463.7 | 466.7 | 2.9 | 96.67  |     |      |       |     |     |      |
| 466.7 | 469.7 | 3   | 100.00 |     |      |       |     |     |      |
| 469.7 | 472.7 | 3   | 100.00 |     |      |       |     |     |      |
| 472.7 | 475.3 | 2.5 | 96.15  |     |      |       |     |     |      |
| 475.3 | 478.4 | 3.1 | 100.00 |     |      |       |     |     |      |
| 478.4 | 481.5 | 3.1 | 100.00 |     |      |       |     |     |      |
| 481.5 | 484.6 | 3.1 | 100.00 |     |      |       |     |     |      |
| 484.6 | 486.1 | 1.5 | 100.00 |     |      |       |     |     |      |
| 486.1 | 487.7 | 1.5 | 93.75  |     |      | 486.3 | 130 | 55  | 2.36 |
| 487.7 | 490.6 | 2.9 | 100.00 |     |      | 490   | 352 | 132 | 2.67 |

096067

PROJECT: Boco

PASMINCO EXPLORATION  
DIAMOND DRILL HOLE SUPPLEMENTARY DATA

HOLE No. AK 1

Page 17 of 17

| CORE RECOVERY |       |     |        | M.SUS |       | S.G   |        |     |      |
|---------------|-------|-----|--------|-------|-------|-------|--------|-----|------|
| FROM          | TO    | REC | %REC   | DEPTH | M.SUS | DEPTH | WEIGHT | VOL | S.G  |
| 490.6         | 493.7 | 3.1 | 100.00 |       |       |       |        |     |      |
| 493.7         | 496.7 | 3   | 100.00 |       |       |       |        |     |      |
| 496.7         | 499.7 | 3   | 100.00 |       |       |       |        |     |      |
| 499.7         | 502.7 | 3   | 100.00 |       |       |       |        |     |      |
| 502.7         | 505.7 | 3   | 100.00 |       |       |       |        |     |      |
| 505.7         | 508.7 | 3   | 100.00 |       |       |       |        |     |      |
| 508.7         | 511.7 | 3   | 100.00 |       |       |       |        |     |      |
| 511.7         | 514.7 | 3   | 100.00 |       |       |       |        |     |      |
| 514.7         | 517.7 | 3   | 100.00 |       |       |       |        |     |      |
| 517.7         | 520.7 | 3   | 100.00 |       |       | 520   | 341    | 127 | 2.69 |
| 520.7         | 523.7 | 3   | 100.00 |       |       |       |        |     |      |
| 523.7         | 526.7 | 3   | 100.00 |       |       |       |        |     |      |
| 526.7         | 529.7 | 3   | 100.00 |       |       |       |        |     |      |
| 529.7         | 532.7 | 3   | 100.00 |       |       |       |        |     |      |
| 532.7         | 535.7 | 3   | 100.00 |       |       |       |        |     |      |
| 535.7         | 538.7 | 3   | 100.00 |       |       |       |        |     |      |
| 538.7         | 541.7 | 3   | 100.00 |       |       |       |        |     |      |
| 541.7         | 544.7 | 3   | 100.00 |       |       |       |        |     |      |
| 544.7         | 547.7 | 3   | 100.00 |       |       |       |        |     |      |
| 547.7         | 550.7 | 3   | 100.00 |       |       | 550   | 375    | 140 | 2.68 |
| 550.7         | 553.7 | 3   | 100.00 |       |       |       |        |     |      |
| EOH           | EOH   | EOH |        | EOH   | EOH   | EOH   | EOH    | EOH |      |

890960

PASMINCO EXPLORATION  
DIAMOND DRILL HOLE PLOT

HOLE No. AK1

Page of

SCALE 1:2000



metres

384 400mE

384 500mE 5 388 900mN

384 600mE 5 388 800mN

400mR.L.

400mR.L

AK1

QUARTERNARY  
GLACIALS

**CAMBRIAN**

**CENTRAL**

**VOLCANIC**

SEQUENCE

MASSIVE,  
FELDSPAR-PHYRIC,  
RHYODACITIC LAVAS,  
LAVA BRECCIAS AND  
HYALOCLASTITES  
intruded by:  
MAFIC DYKES/SILLS

MIXED CLASTIC UNIT

LAMPROPHYRE  
INTRUSION  
(? CRETACEOUS)

DACITIC LAVA

553.7  
F.O.Y.

200mR.L.

200mR.L.

00mR.L

00mR.L.

384 400mE

384 500mE 5 388 900mN

384 600mE 5 388 800mN

5 cm

# PASMINGO EXPLORATION SUMMARY DIAMOND DRILL CORE LOG

HOLE No. BBP 246

PROJECT: Boco EL 2/90

RE BY:  
LW Kishner  
August 1991

Graphic Scale 1: 1000

Page 1 of 2

| From<br>m           | Interval<br>m | Code | Description                                                                                                                                                                                                                                                                                                                                                                                  | Depth | Graphic | From<br>m            | Interval<br>m | Code | Description                                                                                                                                      | Depth | Graphic |
|---------------------|---------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------|----------------------|---------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------|
| 0.0                 | 36.5          |      | No CORE (Glacial Cover)                                                                                                                                                                                                                                                                                                                                                                      |       |         | 259.0                | 12.0          |      | - MAFIC INTRUSION - faulted (gouge/breccia) at:<br>262.6 and 265.0-266.0.                                                                        | 250   |         |
| 36.5<br>to<br>302.7 | 2.662         |      | - RHYODACITIC LAVAS & LAVA BRECCIAS.<br>- pale pink to green, fine-grained, variably brecciated,<br>flow banded, feldspar-phryic, silicified.<br><u>incorporating:-</u>                                                                                                                                                                                                                      |       |         | 271.5                | -             |      | - Breccia zone at base of intrusion.                                                                                                             |       |         |
| 36.5                | 2.0           |      | - MAFIC INTRUSIVE                                                                                                                                                                                                                                                                                                                                                                            |       |         | 271.7                | 31.0          |      | - ACID LAVA - variably albitised, pale pink with<br>minor qtz - carbonate veining.                                                               |       |         |
| 119.75              | 5.25          |      | - ? HYALOCLASTITE - flow margin breccia with jigsaw-fit<br>texture. Strongly chlorite-sericite altered in patches.                                                                                                                                                                                                                                                                           | 50    |         |                      |               |      | 283.6 - breccia zone - 15 cm long<br>290.3 - breccia zone - 20 cm.                                                                               |       |         |
| 136.7               | 0.8           |      | - FAULT ZONE (minor) - tectonic disturbance - brittle faults<br>filled with fg? chloritic dark grey material.                                                                                                                                                                                                                                                                                |       |         | 302.7<br>to<br>471.5 | 168.8         |      | - STRONG ALTERATION - IN ACID LAVAS<br>- pyrite - sericite - silica hydrothermal alteration<br>dominates the interval.<br><u>incorporating:-</u> | 300   |         |
| 148.0               | 7.0           |      | - zone of strong deformation, strong silicification,<br>veining, faulting, brecciation, adjacent to<br>mafic intrusion                                                                                                                                                                                                                                                                       | 100   |         | 306.6                | 3.4           |      | - MAFIC INTRUSION - fine grained, dark green, black<br>phenocrysts (hbl?). unaltered.                                                            |       |         |
| 155.0               | 33.0          |      | - MAFIC INTRUSIVE - extensively quartz veined &<br>carbonate veined, some small zones of intense hydrothermal<br>alteration (structural controlled).<br>155.8 - intense brecciation within the intrusive, filled<br>with blocky crystalline? calcite.<br>174.0 - faulted offset qtz vein, with multiple generations<br>of quartz growth.<br>181.0 - minor shearing/faulting with alteration. | 150   |         | 310.0                | 0.7           |      | - FAULT - breccia/veined/faulted zone                                                                                                            | 350   |         |
| 195.0               | -             |      | - Zone of pink silica/albite alteration in fg, dark<br>unaltered(?) feldspar phryic lava. Veined & faulted.                                                                                                                                                                                                                                                                                  |       |         | 315.8                | 0.4           |      | - brecciated quartz veins                                                                                                                        |       |         |
| 208.3               | 0.2           |      | - Chlorite ± fuchsite - altered breccia in narrow<br>zone (? fluid conduit due to permeable nature of breccia)                                                                                                                                                                                                                                                                               | 200   |         | 357.0                | 6.0           |      | - LAVA - variably silicified, mottled/domed,<br>less pyritic dacite(?) lava.                                                                     | 400   |         |
| 229.0               | 11.0          |      | - Strongly deformed, faulted, veined, silicified,<br>brecciated zones, through to totally unconsolidated<br>(? sheared) messed-up rock! - FAULT ZONE -                                                                                                                                                                                                                                       |       |         | 378.0                | 5.2           |      | - strongly sericitic, pervasively altered "pseudo-<br>breccia" in acid lava.                                                                     |       |         |
| 254.5               | -             |      | - FAULTED -                                                                                                                                                                                                                                                                                                                                                                                  |       |         | 385.9                | -             |      | - massive pyrite veins in sil-ser altered lavas.                                                                                                 |       |         |
|                     |               |      |                                                                                                                                                                                                                                                                                                                                                                                              |       |         | 395.8                | 5.6           |      | - BRECCIA - blocky, angular primary volcanic<br>? flow breccia zone.                                                                             |       |         |
|                     |               |      |                                                                                                                                                                                                                                                                                                                                                                                              |       |         | 418.7                | 0.3           |      | - MAFIC INTRUSION - fine-grained, dark green, unaltered.                                                                                         |       |         |
|                     |               |      |                                                                                                                                                                                                                                                                                                                                                                                              |       |         | 420.0                | -             |      | - spectacular tectonic breccia of carbonate in a<br>dark grey, fine grained Matrix                                                               |       |         |
|                     |               |      |                                                                                                                                                                                                                                                                                                                                                                                              |       |         | 427.0                | 2.0           |      | - Hydrothermal? tectonic breccia. Pink-grey, silica-<br>sericite altered.                                                                        |       |         |
|                     |               |      |                                                                                                                                                                                                                                                                                                                                                                                              |       |         | 431.7                | 4.1           |      | - LAVA - unaltered, fine grained, but brecciated<br>in place. Dark green to grey colour.                                                         |       |         |

006020

5 cm

HOLE No. BBP 246

RE-LOG:  
- L W Kinyar  
- August 1991

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100

# PASMINCO EXPLORATION SUMMARY DIAMOND DRILL CORE LOG

HOLE No. BBP 250

PROJECT: Boco 2/90

15-104: L.W. Kirsner  
August 1991

Graphic Scale 1: 1,000

Page 1 of 1

| From<br>m   | Interval<br>m | Code  | Description                                                                                                                                                                   | Depth | Graphic | From<br>m   | Interval<br>m | Code | Description                                                                                  | Depth | Graphic |
|-------------|---------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------|-------------|---------------|------|----------------------------------------------------------------------------------------------|-------|---------|
| 0.0         | - 47.0        | 47.0  | No Core (Glacial Cover)                                                                                                                                                       |       |         | 208.5-210.0 | 2.5           |      | - Silicified grey acid lava. Brecciated. Strongly iron stained.                              | 250   | " "     |
| 47.0        | - 47.5        | 0.5   | FLUVIOGLACIAL BOULDER?                                                                                                                                                        |       |         | 250.0-277.7 | 2.7           |      | - Sheared acid lava. Strong foliation at 55° to core. Anastomosing pattern. Minor qtz veins. |       | " "     |
| 47.5        | - 300.0       | 252.5 | <u>DACITIC LAVAS &amp; LAVA BRECCIAS.</u><br>- silicified, sericitic, pyritic glassy dacitic lavas & lava breccias. Upper part (47.5-100m) is leached/chalky.<br>* INCLUDES * | 50    |         | 227.7       | -             |      | - fault in broken core.                                                                      |       | " "     |
| 91.0-920    |               |       | - pale gray, fragmental/clastic appearance: ie: not lava. chloritic & sericitic - ? low top breccia.                                                                          |       |         | 239.0       | 0.7           |      | - Dolomite intrusive.                                                                        |       | " "     |
| 106.0-109.0 | 3.0           |       | - fault zone. Brecciated/broken ground; some pug. Rock frags. are lava.                                                                                                       | 100   |         | 259.6-280.0 | 3.4           |      | - Strongly sheared rock. Anastomosing pattern. Foliation at 60° to core.                     |       | " "     |
| 114.0       | -             |       | - fault pug - sheared rock, broken ground.                                                                                                                                    |       |         | 280.0-285.0 | 2.5           |      | - Dolomite intrusion.                                                                        |       | " "     |
| 131.7-132.0 | 0.3           |       | - less altered lava fragmental. Silicified. Little sericite or pyrite.                                                                                                        |       |         | 278.5       | -             |      | - Fault zone, 20 cm wide. Broken core.                                                       |       | " "     |
| 147.0       | -             |       | - Silicified lava fragmental                                                                                                                                                  |       |         | 293.0       | -             |      | - Fault pug. Pale grey - coloured; fine grained.                                             |       | " "     |
| 157.3       | -             |       | - Pinkish-grey, poorly altered lava. Silicified.                                                                                                                              |       |         | 298.4       | -             |      | - Fault pug. cream coloured, fine grained.                                                   |       | " "     |
| 170.0-173.0 | 3.0           |       | - Broken ground - fault zone.                                                                                                                                                 |       |         | 300.0       | -             |      | <u>PALE PINK SILICIFIED LAVAS.</u>                                                           |       | " "     |
| 174.5-177.0 | 2.5           |       | - lava fragmental. sericite-silica altered.                                                                                                                                   |       |         | 301-305     | 4.0           |      | - less altered than above 300.0                                                              |       | " "     |
| 180.2-187.0 | 6.8           |       | - fault zone                                                                                                                                                                  |       |         | 304.5       | -             |      | - Broken up lava breccia. Iron stained.                                                      |       | " "     |
| 195.3       |               |       | - Altered fragmental/clastic - ? possible apiclastic. Sericitised.                                                                                                            |       |         | 328.0       | -             |      | - Base of alteration.                                                                        |       | " "     |
|             |               |       |                                                                                                                                                                               |       |         | 337.7       | -             |      | - Broken ground/fault                                                                        |       | " "     |
|             |               |       |                                                                                                                                                                               |       |         | 358.0       | -             |      | - Fault                                                                                      |       | " "     |
|             |               |       |                                                                                                                                                                               |       |         | 358.0       | -             |      | - End of Hole.                                                                               |       | " "     |

5 cm

226022

# PASMINCO EXPLORATION

HOLE No. BSP 254

PROJECT: BOCO EL2/90

REF Log: LW Kirsner  
August 1991.

## SUMMARY DIAMOND DRILL CORE LOG

Graphic Scale 1: 1000

Page 1 of 1

| From<br>m            | Interval<br>m | Code | Description                                                           | Depth | Graphic | From<br>m | Interval<br>m | Code | Description                                                         | Depth | Graphic |
|----------------------|---------------|------|-----------------------------------------------------------------------|-------|---------|-----------|---------------|------|---------------------------------------------------------------------|-------|---------|
| 0.0                  | 117.0         |      | No CORE (Glacial Cover)                                               |       |         | 208.3     | 6.9           |      | LAVA - ser-py-sil altered. Anastomosing pattern of ser wisps.       |       |         |
| 117.0<br>to<br>436.4 | 329.4         |      | <u>DACITIC LAVAS &amp; LAVA FRAGMENTALS</u>                           |       |         | 215.2     | 0.2           |      | - breccia/cataclasite? with dark brown vein/fracture fill (v. hard) |       |         |
| 117.0                | 1.0           |      | - strongly sil-ser-py altered (to 316.4m). feldspathic.               |       |         | 215.4     | 23.9          |      | - gray, ser-py altered, some brecciation                            |       |         |
| 118.0                | 22.0          |      | - fragmented, weathered, iron stained, SILICIFIED LAVA (fsp)          |       |         | 239.3     | 2.4           |      | - LAVA? DYKE? - pale grey, unaltered, hard (?silicified),           |       |         |
|                      |               |      | - grey to bluish-grey, glassy, silicified, pyritic, fg feldspar,      |       |         |           |               |      | white feldspar (extn, crystalline?) (metagranitic appearance)       |       |         |
|                      |               |      | wispy sericite alteration, some flow breccia & flow bands             | 50    |         | 241.7     | 18.8          |      | - LAVA? - strong sericite-dominated anastomosing alter-             |       |         |
| 140.0                | 0.8           |      | - FAULT PUG. unconsolidated & broken core                             |       |         |           |               |      | pattern, with strong preferred orientation at 40° to core           |       |         |
| 140.8                | 3.7           |      | - LAVA - massive, weakly ser/py altered, feldspar phyc                |       |         | 260.5     | 1.0           |      | - LAVA & BRECCIA - ser + py                                         |       |         |
| 144.5                | 2.1           |      | - FLOW TOP BRECCIA. Contains rounded to subrounded                    |       |         | 261.5     | 0.1           |      | - MINOR FAULT ZONE / pig.                                           |       |         |
|                      |               |      | siliceous fine-grained clasts, in ser/py matrix. Much                 |       |         | 261.6     | 11.4          |      | - LAVA & BRECCIA - ser + py                                         |       |         |
|                      |               |      | detrital qtz & fsp in matrix (up to 2mm across)                       |       |         | 273.0     | 1.0           |      | - breccia/cataclasite; dark brown, hard vein in fill (=Z15)         |       |         |
| 146.6                | 3.9           |      | - LAVA - fine grained, weakly altered, py + ser.                      | 100   |         | 274.0     | 35.4          |      | - LAVA - grey, glassy, strongly altered, with anastom.              |       |         |
| 150.5                | 1.0           |      | - FAULT ZONE. broken ground. some pug/clay.                           |       |         |           |               |      | pattern of wispy yellow sericite + pyrite. Some br.                 |       |         |
| 151.5                | 6.2           |      | - moderately altered, ser + py, some brecciation                      |       |         |           |               |      | 288.0 - 290.0 - grey, unaltered lava with brown (?MAFIC) veins.     |       |         |
| 157.7                | 0.9           |      | - FAULT ZONE. broken ground. some mylonitic fraction + clay           |       |         |           |               |      | 294.9 - 298.9 - brown veining in breccia/cataclasite.               |       |         |
| 158.6                | 12.4          |      | - LAVA - fine grained, sil-ser-py altered, feldspathic. Minor breccia |       |         | 309.4     | 0.4           |      | - FAULT - broken ground with fragments of lava.                     |       |         |
| 171.0                | 0.2           |      | - FAULT - fine-grained, sheared & broken material                     |       |         | 309.8     | 6.6           |      | - LAVAS - ser + py altered                                          |       |         |
| 171.2                | 5.2           |      | - LAVA - variably altered & fragmented.                               | 150   |         | 316.4     | 13.7          |      | (BASE OF ALTERATION) Unaltered, dk grey, feldspar-phyc glassy       |       |         |
| 176.4                | 0.8           |      | - FAULT ZONE - more intense than previous two                         |       |         | 330.1     | 5.2           |      | - LAVA - with pink feldspar phenos. & minor ser.                    |       |         |
| 177.2                | 7.4           |      | - LAVA - var. altered, ser-sil-py ± feldspar x'ls.                    |       |         | 335.3     | 13.7          |      | - unaltered dark green feldspar phyc lava (some pink zones)         |       |         |
| 184.6                | 2.6           |      | - Broken ground, fault pug & clay zones.                              |       |         | 349.0     | 0.4           |      | - LAVA BRECCIA (?flow top) - breccia ± minor lithic component       |       |         |
| 187.2                | 5.3           |      | - LAVA - ser-sil-py.                                                  |       |         |           |               |      | feldspathic, with possible epiclastic component.                    |       |         |
| 192.5                | 0.3           |      | - Soft, fg ?carbonate. Chalky, pale grey, veined.                     |       |         | 349.4     | 45.3          |      | - LAVA - unaltered, dominantly pink/dark green,                     |       |         |
| 192.8                | 1.7           |      | - FAULT - broken ground, minor fine grained fault pug.                |       |         |           |               |      | feldspar-phyc, with minor vfg patchy ser.                           |       |         |
| 194.5                | 9.3           |      | - LAVA & FRAGMENTALS/BRECCIA - variable sil-py-ser altered.           |       |         | 394.7     | 41.7          |      | - LAVA - variably feldspar-phyc, some ser                           |       |         |
| 203.8                | 0.1           |      | - Fault? broken ground.                                               |       |         |           |               |      | patches, glassy, with some silicification & brecciation             |       |         |
| 203.9                | 2.6           |      | - variably broken core, mostly pervasively altered lava.              |       |         |           |               |      | 398.6 - breccia/flow top. Large frags. of glassy lava.              |       |         |
| 206.5                | 1.8           |      | - FAULT - more major, cataclastic, moderate mylon-                    |       |         | 436.4     | 3.1           |      | <u>MAFIC INTRUSIVE.</u>                                             |       |         |
|                      |               |      | itisation, some seg of clay-rich zones                                |       |         | 439.5     | -             |      | - END OF HOLE -                                                     |       |         |

006073

5 cm

# PASMINGO EXPLORATION

## STANDARD LEGEND FOR SUMMARY DIAMOND DRILL CORE LOG

Graphic Scale 1:

| From<br>m | Interval<br>m | Code | Description                                                      | Depth | Graphic | From<br>m | Interval<br>m | Code | Description                    | Depth | Graphic |
|-----------|---------------|------|------------------------------------------------------------------|-------|---------|-----------|---------------|------|--------------------------------|-------|---------|
|           |               |      | Massive Siliceous Lavas                                          |       |         |           |               |      |                                |       |         |
|           |               |      | vague contact                                                    |       |         |           |               |      | break in<br>logged interval    |       |         |
|           |               |      | Massive Banded Chloritic Lavas                                   |       |         |           |               |      | augen textured                 |       |         |
|           |               |      | spherulites or lithophysal<br>hyaloclastite breccia              |       |         |           |               |      | alteration with<br>skarna      | sk    |         |
|           |               |      | Shales laminated or massive                                      |       |         |           |               |      |                                |       |         |
|           |               |      | Black Shale/Slate                                                |       |         |           |               |      |                                |       |         |
|           |               |      | Volcaniclastic Graded                                            |       |         |           |               |      |                                |       |         |
|           |               |      | arrow shows<br>way up<br>evidence                                |       |         |           |               |      |                                |       |         |
|           |               |      | cloudy silica altn.                                              |       |         |           |               |      | cleavage                       |       |         |
|           |               |      | rafts of shale<br>mylonitic contact                              |       |         |           |               |      | joints                         |       |         |
|           |               |      | Sericite Schist/Shear Zone                                       |       |         |           |               |      | intrusive contact              |       |         |
|           |               |      | Crystal-Rich Volcaniclastic                                      |       |         |           |               |      | mafic dyke/sill                |       |         |
|           |               |      | feldspar crystals                                                |       |         |           |               |      |                                |       |         |
|           |               |      | quartz crystals                                                  |       |         |           |               |      | fault zone<br>(in broken core) |       |         |
|           |               |      | Graded Sandstone                                                 |       |         |           |               |      |                                |       |         |
|           |               |      | internal brecciation                                             |       |         |           |               |      |                                |       |         |
|           |               |      | chloritic stylolites                                             |       |         |           |               |      |                                |       |         |
|           |               |      | tube pumice                                                      |       |         |           |               |      |                                |       |         |
|           |               |      | disseminated sulphides                                           |       |         |           |               |      |                                |       |         |
|           |               |      | Black bars down left side of<br>log denote mineralised intervals |       |         |           |               |      |                                |       |         |
|           |               |      | unconformable contact                                            |       |         |           |               |      |                                |       |         |
|           |               |      | Reverse Graded Unit                                              |       |         |           |               |      |                                |       |         |
|           |               |      | porphyritic clasts and<br>illitic clasts                         |       |         |           |               |      |                                |       |         |
|           |               |      | brittle fault contact                                            |       |         |           |               |      |                                |       |         |
|           |               |      | cherty altn. with<br>augen texture                               |       |         |           |               |      |                                |       |         |

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**APPENDIX 2**

**Sample Ledger & Geochemical Analyses Record**



# PASMINCO EXPLORATION GEOCHEMICAL ANALYSES RECORD

PAGE 1  
1992

Sample Type Rock Chip

PROSPECT \_\_\_\_\_  
PROJECT Boco EL 2/90

| Sample No. | MAP SHEET | Location                | AMG COORDINATES (APPROX) |         | METAL CONTENT (ppm unless specified) |     |     |      |        |  |  |  |  |  | DATE       | SAMPLER | MAG SUS | DESCRIPTION                                                                                  |
|------------|-----------|-------------------------|--------------------------|---------|--------------------------------------|-----|-----|------|--------|--|--|--|--|--|------------|---------|---------|----------------------------------------------------------------------------------------------|
|            |           |                         | N                        | E       | Cu                                   | Pb  | Zn  | Ag   | Au     |  |  |  |  |  |            |         |         |                                                                                              |
| 30521      | 3D        | Track to J. Lynch Creek | 5386 810                 | 376 00  |                                      |     |     |      |        |  |  |  |  |  | April 1991 | ANL     | 0.19    | small, buff coloured crystals, scattered through a hard, dark grey groundmass??              |
| 30535      | 3B        | Bulgobac Falls Road     | 5390 852                 | 381 942 | 3                                    | 29  | 24  | <1.0 | <0.008 |  |  |  |  |  | "          | "       | 0.02    | - QUARTZ - FELDSPAR PORPHYRY - strongly cleaved, sericite & silica altered.                  |
| 30536      | 3B        | "                       | 5390 836                 | 381 915 |                                      |     |     |      |        |  |  |  |  |  | "          | "       | -       | - QFP - fine, hard, siliceous, with some qtz phenocrysts. Silica flooded.                    |
| 30537      | 3C        | "                       | 5389 985                 | 381 995 | 7                                    | 164 | 445 | <1.0 | <0.008 |  |  |  |  |  | "          | "       | -       | - QFP - deformed & altered - dark green & cleaved, Fe Oxides (ex-sulphide?)                  |
| 30538      | 3C        | "                       | 5389 965                 | 382 005 | 17                                   | 63  | 66  | <1.0 | <0.008 |  |  |  |  |  | "          | "       | 0.10    | - QFP - qtz & fsp phytic rock & sericitic groundmass.                                        |
| 30539      | 3C        | "                       | 5389 150                 | 381 775 |                                      |     |     |      |        |  |  |  |  |  | "          | "       | 0.00    | (30539) SANDSTONE - bedded, fine grained, feldspar-quartz - ? sericite                       |
| 30540      | 3C        | "                       | 5389 092                 | 381 752 |                                      |     |     |      |        |  |  |  |  |  | "          | "       | -       | - ANDESITE LAVA - fine, massive groundmass chl. qtz & silica amygdalae. Rare fsp. phenos.    |
| 30541      | 3C        | EBR, Nth Boco Siding    | 5388 168                 | 383 250 |                                      |     |     |      |        |  |  |  |  |  | "          | "       | -       | - BEDDED BLACK SHALE                                                                         |
| 30543      | 3B        | Bulgobac Falls Road     | 5392 437                 | 381 555 |                                      |     |     |      |        |  |  |  |  |  | "          | "       | 0.16    | - QFP - large qtz & fsp phenos (upto 5mm) in sil-ser groundmass.                             |
| 30544      | 3B        | "                       | 5391 703                 | 381 616 | 4                                    | 104 | 68  | <1.0 | <0.008 |  |  |  |  |  | "          | "       | 0.03    | - QFP -                                                                                      |
| 30545      | 3B        | "                       | 5391 250                 | 381 904 |                                      |     |     |      |        |  |  |  |  |  | "          | "       | -       | - BEDDED BLACK SHALE                                                                         |
| 30546      | 3B        | "                       | 5391 680                 | 381 626 |                                      |     |     |      |        |  |  |  |  |  | "          | "       | 0.34    | - SHALE / QFP CONTACT - QFP is sil-ser altered. Shale contains feldspars.                    |
| 30547      | 3B        | Bulgobac River          | 5391 715                 | 381 678 |                                      |     |     |      |        |  |  |  |  |  | "          | "       | 0.03    | - QFP - brecciated & weakly sericitic                                                        |
| 30548      | 3B        | "                       | 5391 564                 | 382 032 |                                      |     |     |      |        |  |  |  |  |  | "          | "       | -       | - MUDSTONE - deformed & carbonate altered.                                                   |
| 30549      | 3B        | Bulgobac Falls Road     | 5391 690                 | 381 620 |                                      |     |     |      |        |  |  |  |  |  | "          | "       | -       | - VOLCANICLASTIC SST WITH MUD MATRIX - mudst & bands of fine sst. Incl. frags of qtz & x'ls. |
| 30550      | 3C        | Sawmill Creek Track     | 5388 486                 | 382 272 |                                      |     |     |      |        |  |  |  |  |  | "          | "       | 0.05    | - QFP - qtz & felds. x'ls in sericite & fractured siliceous matrix. Fe Ox on felds.          |
| 30557      | 3B        | EBR - Nth Boco Siding   | 5391 540                 | 382 100 |                                      |     |     |      |        |  |  |  |  |  | "          | "       | -       |                                                                                              |

096026



# PASMINCO EXPLORATION GEOCHEMICAL ANALYSES RECORD

PAGE 2  
1992

Sample Type Rock Chip

PROSPECT                       
PROJECT Boco EL 2/90

| Sample No. | MAP SHEET | Location                       | AMG COORDINATES |         | METAL CONTENT (ppm unless specified) |      |     |     |        |  |  |  | DATE       | SAMPLER | MAG SUS | DESCRIPTION.                                                                                                        |
|------------|-----------|--------------------------------|-----------------|---------|--------------------------------------|------|-----|-----|--------|--|--|--|------------|---------|---------|---------------------------------------------------------------------------------------------------------------------|
|            |           |                                | N               | E       | Cu                                   | Pb   | Zn  | Ag  | Au     |  |  |  |            |         |         |                                                                                                                     |
| 30558      | 3B        | EBR, Nth. Bulgoback River      | 5392 200        | 381 835 |                                      |      |     |     |        |  |  |  | April 1991 | ANL     | 0-27    | - MICACEOUS SILTSTONE - red, weathered, qtz & volcanic lithics, in muddy micaceous matrix.                          |
| 30561      | 3D        | Silver Falls Road              | 5388 840        | 377 385 |                                      |      |     |     |        |  |  |  | "          | "       | 0-16    | - MICACEOUS SANDSTONE - as above, but with coarser lithics.                                                         |
| 30562      | 3D        | Silver Falls Adits             | 5389 390        | 376 890 | 24                                   | 7034 | 125 | 1.4 | <0.008 |  |  |  | "          | "       | 0-11    | - SANDSTONE + qtz + feld - Mineraloid & altered. Siliceous; blocky streaks of sand. & coarse & silica stringers.    |
| 30563      | 3D        | Downstream Silver Falls        | 5389 398        | 376 875 |                                      |      |     |     |        |  |  |  | "          | "       | 0-21    | - CONGLOMERATE - qtz matrix; clast-supported; green, black & buff-colored siliceous sand. clasts + v. mafic clasts. |
| 30564      | 3C        | Sawmill Creek Track            | 5389 655        | 381 370 |                                      |      |     |     |        |  |  |  | "          | "       | -       | - QFP - deformed; pervasive silicified & traces of pyrite.                                                          |
| 30565      | 3C        | "                              | 5389 635        | 381 144 |                                      |      |     |     |        |  |  |  | "          | "       | -       | - VOLCANICLASTIC SST + qtz + fsp crystals - fine gr. lithics, in chl. dk. mat. matrix. Tr. py.                      |
| 30566      | 3A        | "                              | 5390 414        | 379 835 |                                      |      |     |     |        |  |  |  | "          | "       | 0-38    | - MICACEOUS SST - brown, med. grained matrix qtz & chl. & volcanic clasts in gr/bn micaceous.                       |
| 30567      | 3A        | "                              | 5390 084        | 379 008 |                                      |      |     |     |        |  |  |  | "          | "       | -       | - CONGLOMERATE - green/grey; coarse med gr. clasts of qtz, fsp & lithics. Red silt in chl. med. matrix.             |
| 30568      | 3A        | "                              | 5390 709        | 378 529 |                                      |      |     |     |        |  |  |  | "          | "       | 4-64    | - CONGLOMERATE - as above (30567)                                                                                   |
| 30583      | 3B        | Que River / EBR Crossing       | 5392 605        | 381 955 |                                      |      |     |     |        |  |  |  | "          | "       | -       | - CONGLOMERATE - rounded sediment & volcanic clasts + qtz + fsp silt, in brown/gm matrix.                           |
| 30584      | (1C)      | "                              | 5394 035        | 382 630 |                                      |      |     |     |        |  |  |  | "          | "       | 0-32    | - VOLCANICLASTIC SANDSTONE - as above (30583) with smaller lithics.                                                 |
| 30585      | (1C)      | "                              | 5394 500        | 382 650 |                                      |      |     |     |        |  |  |  | "          | "       | -       | - CONGLOMERATE - Red, hard, cherty clasts, v. mafic clasts, in green qtz-rich matrix.                               |
| 31710      | 5B        | EBR - 394m Sth. of old Boco Rd | 5385 560        | 382 643 |                                      |      |     |     |        |  |  |  | 25.4.91    | LWK     |         | DALITE LAVA - grey/cream blotchy, very fine grained, massive, very hard (? HORNFELSIC)                              |
| 31711      | 5B        | EBR - 392m Sth. of old Boco Rd | 5385 465        | 382 666 |                                      |      |     |     |        |  |  |  | 25.4.91    | LWK     |         | DALITE SLOWLY INTRUSIVE? - dark green/grey, feldspar-phyric, massive, chloritic, med grained                        |
| 31712      | 5B        | EBR - 468m Sth. of old Rd.     | 5385 380        | 382 660 |                                      |      |     |     |        |  |  |  | 25.4.91    | LWK     |         | DALITE LAVA - dk, pyritic (<1%), massive, chlorite, similar to 31710.                                               |
| 31713      | 5B        | EBR - 563m Sth. of old Rd      | 5385 315        | 582 655 |                                      |      |     |     |        |  |  |  | 25.4.91    | LWK     |         | DALITE? - pink, silicified, randomly qtz veined - ? fluid conduit / fault zone?                                     |

## PASMINGO EXPLORATION GEOCHEMICAL ANALYSES RECORD

PAGE 3  
1992

Sample Type Rock CHIP

PROSPECT \_\_\_\_\_  
PROJECT Boco EL 2/90

| Sample No. | MAP SHEET | Location                                      | AMG COORDINATES (Approx) |         | METAL CONTENT (ppm unless specified) |    |    |    |    |  |  |  | DATE     | SAMPLED | MAG. SUS | DESCRIPTION                                                                                             |
|------------|-----------|-----------------------------------------------|--------------------------|---------|--------------------------------------|----|----|----|----|--|--|--|----------|---------|----------|---------------------------------------------------------------------------------------------------------|
|            |           |                                               | N                        | E       | Cu                                   | Pb | Zn | Ag | Au |  |  |  |          |         |          |                                                                                                         |
| 31714      | 3C        | Adjacent to old Boca Rd.<br>(1km west of Hwy) | 5386135                  | 383 340 |                                      |    |    |    |    |  |  |  | 30-4-91  | LWK     |          | - Boca <del>Antisocial</del> ZONE - float - silicified; massive; pyritic (locally >50%); some foliation |
| 31719      | 5B        | EBR - 182m sth of '94 post                    | 5384871                  | 382 295 |                                      |    |    |    |    |  |  |  | 16-5-91  | "       |          | - DACITE LAVA - massive, pink-green/grey, chl + alb a'd.                                                |
| 31722      | 3C        | Boca ROAD                                     | 5387075                  | 383 250 |                                      |    |    |    |    |  |  |  | 24-5-91  | "       |          | - VOLCANICLASTIC? - crudely banded? pumiceous (tubular nips...)                                         |
| 31723      | 3C        | Boca ROAD                                     | 5386625                  | 382 925 |                                      |    |    |    |    |  |  |  | 24-5-91  | "       |          | - HYALOCLASTITE - breccia & jigsaw fit, pink-cream clasts, angular, fg chl matrix.                      |
| 31785      | 5B        | ALTIN ZONE OUTCROP - STH OF OLD BOCA RD.      | 5385960                  | 383 325 |                                      |    |    |    |    |  |  |  | 12-12-91 | "       | 3rd left | - silicified, pyritic, acid LAVA. (massive).<br>→ (1.52; 0.82; 2.80; 6.41; 0.39; 0.40)                  |
| 31786      | 5B        | Grid Line - E of Hwy.<br>(NEAR GRN. STN 6599) | 5385435                  | 384 585 |                                      |    |    |    |    |  |  |  | 12-12-91 | "       |          | - ?DACITE-ANDESITE - cream feldspars + hornblende? chloritic.                                           |
| 31787      | 5B        | Grid Line - E of Hwy.<br>(NEAR GRN. STN 6599) | 5385425                  | 384 680 |                                      |    |    |    |    |  |  |  | 12-12-91 | "       | 0.15     | - DACITE-ANDESITE (as above) = 31786                                                                    |
| 31788      | 5B        | Grid Line - 75m E of Hwy                      | 5385010                  | 383 940 |                                      |    |    |    |    |  |  |  | 12-12-91 | "       | 0.12     | - DACITE LAVA - feldspar-phyrlic; devitrified, massive.                                                 |
| 31789      | 5B        | Grid Line - 950m E of Hwy                     | 5385005                  | 384 815 |                                      |    |    |    |    |  |  |  | 12-12-91 | "       | 0.56     | - DACITE LAVA? - dark, massive, finegr.                                                                 |

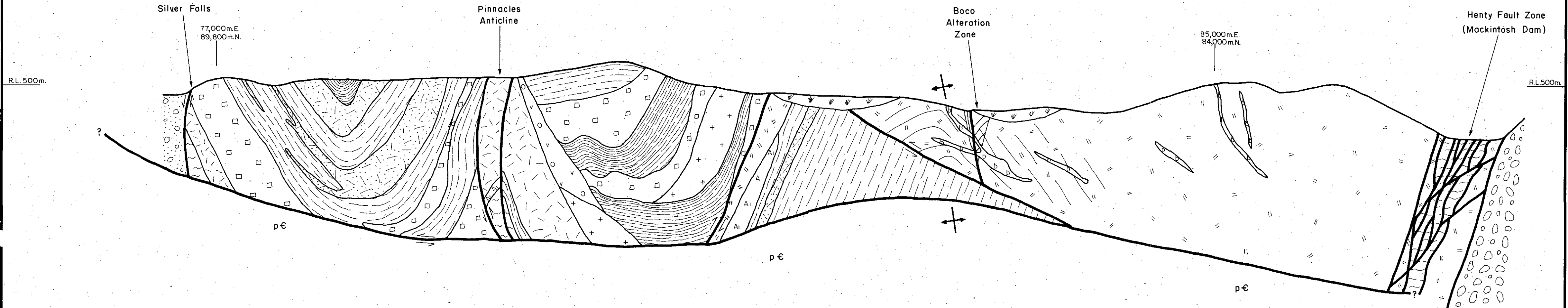
PROSPECT \_\_\_\_\_  
PROJECT NORTH PINNACLES EL 8/90

[illegible]

6  
7  
8  
9  
10  
11

A

B



LEGEND

|  |                                |  |                                                   |  |                                                             |  |                                               |
|--|--------------------------------|--|---------------------------------------------------|--|-------------------------------------------------------------|--|-----------------------------------------------|
|  | Fluvio glacials.               |  | Bedded sediments.<br>Shale, siltstone, sandstone. |  | Black shale.                                                |  | Feldspar-phyric lavas (Rhyodacitic).          |
|  | Conglomerate (Owen).           |  | Quartz-feldspar porphyry.                         |  | Quartz-mica sandstone.                                      |  | Conglomerate (Upper Dundas).                  |
|  | Andesite (green, feldspathic). |  | Rhyolite lava.                                    |  | Quartz-mica sandstone, with<br>large fragments of Rhyolite. |  | Pre-Cambrian basement.                        |
|  | Basaltic dykes.                |  | Massive, pumiceous rocks.                         |  | Quartz crystal sandstone.                                   |  | Fault with direction of<br>relative movement. |

5 cm

|                                                                                 |                                                                                   |          |
|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------|
| PASMINCO EXPLORATION<br><small>A Division of Pasminco Australia Limited</small> |                                                                                   |          |
| COMPILED: A.N.L.                                                                | <b>NORTHERN LEASES<br/>INTERPRETED<br/>GEOLOGY<br/>REGIONAL<br/>CROSS SECTION</b> |          |
| DATE: JULY '91                                                                  |                                                                                   |          |
| DRAWN: N.W.D.S.                                                                 |                                                                                   |          |
| REF.:                                                                           |                                                                                   |          |
| REVISIONS: L.W.K.                                                               | SCALE 1:25,000                                                                    | FIG. No. |
| NOV. '91                                                                        |                                                                                   |          |
| DRAWING No.                                                                     |                                                                                   |          |

**APPENDIX 3**

**Aeromagnetic Survey, EL 2/90, Boco Area:  
Acquisition Report (Including preliminary interpretation)  
Leaman Geophysics, June 1991**

# LEAMAN GEOPHYSICS

Survey Review, Specification, Reduction, Interpretation  
Gravity, Magnetic and Seismic Methods  
Structure and Prospect Evaluation

096082

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AEROMAGNETIC SURVEY  
EL 2/90 - BOCO AREA

ACQUISITION REPORT  
(INCLUDING PRELIMINARY INTERPRETATION)  
for  
PASMINCO EXPLORATION

by  
Dr. D.E. Leaman

June 1991

BOCOMAG

App 3  
TCR 92-7343

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## Maps in folders

- 1 Flight location including fiducial references
  2. Stacked profiles of magnetic field.
  3. Contours of residual magnetic field.
- Each map is in two parts, north and south

## SUMMARY

A new high resolution helicopter aeromagnetic survey of the Bulgobac - Boco region between Burns Peak and Que River in western Tasmania has revealed dissimilar terranes and suggested explanations for many aspects of the structure.

This report describes specification and acquisition of the survey. It also includes a preliminary discussion of possible implications but further interpretation requires some re-examination of specific features observed at, or near, known mineralised sites such as Boco or which affect significant volumes of the Mt Read Volcanics such as west of Mt Block. Any further examination must use observed rather than processed contour data and fully compensate for terrain effects due to the subtlety of many responses.

The most obvious features of the magnetic field trend NE-SW. These clearly reflect compositional variations within the volcanic piles in the eastern part of the area but no obvious explanation is available for the large response in the west of the area. Extant surface mapping does not provide any realistic clues.

Other trends and lineaments can be recognised. These display NW-SE, N-S and sub E-W orientations approximately. It is not yet possible to define the relative significance of these features. Such features probably represent transverse or conjugate fracture sets and some clearly truncate shallow source texture. The large E-W effects have been noted regionally and are associated with mineralisation. Features associated with the Mt Read Volcanics can not generally be traced into Dundas Group rocks.

The largest anomaly observed in the survey area can be associated with mafic members of the Cambrian sequence on the basis of inferred properties and ultramafic rocks are presumed. The source appears to be localised, roughly tabular and very deep (3 to 6 km). Much more work is necessary to resolve the nature and implications of such a feature.

The Dundas Group rocks, including the mafic source at depth, are structurally overlain by slabs of the Mt Read Volcanics and the whole folded. Volcanic members dip steeply and several magnetic units may be inferred. Structural patterns or lineaments within the volcanics contrast with those inferred within the Dundas Group below.

This review has considered the possible origin of the anomaly patterns observed in the west of the area as well as within the volcanics. Mapped sedimentary rocks west of Bulgobac do not appear to explain the magnetic field and some review mapping and property studies are essential.

Mineralisation at Boco is associated with a N-S to NNE trending arc of negative anomaly consistent with alteration of the volcanics. It is terminated south of Boco by a major E-W feature.

Mineralisation at Silver Falls is marginal to the regional magnetic feature in the west of the area and may be linked with major fractures.

## INTRODUCTION

EL 2/90, Bulgobac, is located north and east of Pinnacles in western Tasmania (Figure 1). Boco Siding is in the south east of the area. It includes the northern exposures of the Central Volcanic Sequence of the Mt Read Volcanics and includes mineralisation in the Boco area.

Gravity and magnetic data in the area have only been reviewed in regional terms previously (Leaman, 1986a, b; 1988). Results indicated that these data sets could reveal much information about structural setting and control within the area and further analysis was recommended. The regional data available were shown, however, to lack resolution due to line spacing or terrain clearance excesses.

This report describes a detailed aeromagnetic survey undertaken to upgrade the regional data base. The principal aims of this survey were to

- a) define alteration within the volcanics,
- b) assess structural controls,
- c) aid mapping and subdivision of the volcanics and
- d) identify any mineralisation signatures present.
- e) review anomalous character within the Dundas Group rocks.

A detailed, high resolution survey was specified.

This report outlines survey specification, presents the results of survey and provides a preliminary outline of implications and interpretation.

The report forms a basis for idea generation and testing with suggestions for further analysis.

## MAGNETIC SURVEY

## SPECIFICATION

Specifications for the survey were determined by the previous experience provided by the Mines Department survey (Leaman, 1986a), other recent (1990) surveys for Pasminco Exploration, and the need to resolve possible alteration features, subtle trends, and the contribution due to various parts of the Cambrian volcanic pile. Leaman (1986) has established the general viability of magnetic methods for assessment of alteration and mineralised sites in areas free of strong interference effects such as introduced by Tertiary basalt or Cambrian ultramafics.

Many of the features sought are known to be subtle and all previous regional data has lacked the necessary data resolution - in terms of low clearance, close sampling and line density. Detail, once lost due to variable or excessive clearances, is not recoverable. Since the reliability of the regional data set was not known, and there is limited information available on the variability of contrasts within the volcanics it was important to ensure that a fair and substantial trial of the application was permitted. The best practicable specification was defined.

Line spacing: 100 metres E-W  
Tie line spacing: 1000 metres N-S  
Nominal terrain clearance: 80m.  
Sample interval: < 10 m.  
Magnetometer sensitivity: < 0.1 nT.

The line balance and orientation reflects a general compromise in order to obtain cost effective coverage, the general form of the terrain and the need to define sub E-W or NW-SE and SW-NE trends as suggested by regional analysis of the Mines Department survey. Rigorous draping necessitated use of a helicopter. Use of fixed wing aircraft, a higher nominal clearance and general wide variation in that clearance effectively destroyed the resolving power of the Mines Department survey across the important, relatively low relief magnetic field environment associated with Cambrian volcanics and adjacent Dundas Group. Only high relief features were defined by that survey in this area.

Multichannel radiometric data were also specified but no commitment was made toward processing of that data pending inspection of the raw data.

(This data has not yet been fully processed and it is possible that no further analysis will be undertaken).

## SURVEY

The survey was flown between February 1 and 8, 1991 by Geo Instruments Pty Ltd under the supervision of Zoltan Beldi using a G833 helium vapour magnetometer in a towed bird and a Geometrics GR800 spectrometer. The survey was flown using an Aerospatiale Squirrel helicopter.

An equivalent magnetometer was used as base station and the survey was completed over several days.

Survey tracking was visual supported by colour video using topographic basemaps and aerial photographs with a recovery scale of 1: 10000. Data pickup was undertaken by D. Morrison.

Total line coverage was about 700 km. Line recovery and line location details are presented in Map 1 (folder).

## PROCESSING

Flight path digitising, processing, gridding and mapping were performed by Kevron Geophysics and D. Morrison.

IGRF 1990 updated to 1991.3 was removed from the data and a scalar of 62000 nT added to residual data.

The stability of gridding and acquisition was tested and the many cross ties generated by this survey were adjusted by spline interpolations in both directions.

A contour interval of 2 nT was selected for the primary presentation (Map 3 - folder). Stacked profiles are presented in Map 2.

Radiometric data have not been corrected, levelled or compiled.

## DATA PRESENTATION

Maps 1, 2 and 3 (folders) provide detailed presentation of the survey coverage, observed profiles and contours of the magnetic field at 1: 10000 scale.

Maps used as bases have been derived from Corbett & McNeill (1986). See Figure 4A.

The specifications were closely approximated for this survey. The effective terrain clearance was 80-100 m for the entire area and the line coverage, including tie line intersections, was satisfactory. The 0.01 nT precision, 0.2 second sampling, or spacing of about 7m, exceeded these conditions. Note that the map legends indicate a tie line spacing of 2000 m; 1000 m was observed (Map 1).

## COMPARISON WITH PREVIOUS DATA

The previous regional survey described by Corbett et al (1982) and Leaman (1986a) has been reproduced as Figure 2 and may be compared with the new survey (Figure 3). Contour intervals are 2 nT for the new survey and 5 or 10 for the old.

The regional survey can be seen to provide a reasonably reliable view of the magnetic field in terms of the location and identification of all significant responses but there was clearly considerable loss of resolution and definition in many areas. Specific examples relate to the western exposures of the volcanics, the shoulder and compound detail on large anomalies and the differentiation of responses in the anomalies in the west of the area.

The lower clearance, higher resolution and better constrained flight path with closer line spacings has considerably improved feature recognition and location. The significance of some of this detail is discussed below.

Character correlation of the older data was used to suggest possible sub E-W alteration corridors (approx 5386 000 and 5394 000 mN) and many NE-SW and NW-SE fractures generally (see Leaman, 1987). The validity of many of these was unknown. Alteration responses had not been recognised previously.

The large sub-circular anomaly in the centre of the survey (and central to Figure 2) was described by Leaman (1986a) and associated with a slice of ultramafics trapped in fault surfaces which may dip east at some depth. Regional magnetic modelling of this region suggested conflicting dip arrangements for possible sources and no conclusions about the source was offered.

Other features, such as the belt of anomalies in the western part of the area, the low amplitude variations on the main anomaly and the diverse character of responses associated with volcanics in the south eastern part of the area have not been examined previously in any detail.

## INTERPRETIVE COMMENTS

The following comments outline possible correlations and implications within, and of, the data set with respect to exposed geology and mineralised sites.

The principal object of this discussion has been to assess observed features and possible identification of patterns and relationships which may lead to explanation of known sites and prediction of possible targets for follow-up study.

## FEATURES OF THE MAGNETIC FIELD

The features and elements of the magnetic field are best displayed in Figure 3D.

Three principal characteristics are evident. These include a large central anomaly and superimposed character; some of which is very subtle and some which reflects rocks of moderate magnetisation.

The very large anomaly centred just west of the surveyed area dominates the magnetic field. The pervasive influence of the source extends across a radius of at least 6 km and normal gradients are evident to north and east. Some truncation is evident along its SE aspect, however. The scale of the effect and the magnitude and consistency of the observed gradients imply that the source is deep and of high contrast. (It would be possible to explain it with a huge, low contrast, shallow source and this presently seems unlikely. Proper assessment of this feature would require 3D evaluation).

Relatively shallow-sourced effects are clearly superimposed. Such sources are aligned NE-SW, ENE or NW-SE where substantial relief is generated but gradients are present which suggest some additional orientations within the central zone above the primary anomaly. This zone is associated with exposed sedimentary members of the Dundas Group and a mass of quartz porphyry.

The major belts of anomaly, in the east near Mt Block and to the west of Bulgobac, are simply higher relief elements of the same style. This is more clearly recognised in regional coverage (Figure 2) than in the detailed survey fragment described in this report.

The anomalies south and east of Boco are clearly associated with Mt Read Volcanics but no such association can be suggested for the western anomalies on the basis of extant mapping. Each belt displays similar anomaly relief and character. Many elements of the trend patterns are comparable in each zone and each presents a similar regional signature.

There are contrasting trend and orientation patterns in each zone and it is rarely possible to trace features across the entire surveyed area.

Trends are suggested in Figure 5. Many subtler features will be identified after image processing but some have been suggested.

The patterns and relationships suggest distinct geological regimes, or terranes and a primary structural or stratigraphic displacement. One key boundary can be correlated with the NW face of the Mt Read Volcanics (Figure 4A).

The lack of structural continuity, as illustrated by character north of this contact, between regions (non volcanic, volcanic) suggests that the fracture(?) systems mapped north of the Mt Read Volcanics are either older than, or buried beneath, structurally emplaced volcanic masses. Corbett and McNeill (1986) do indicate faulted margins for these volcanic blocks north of Bulgobac Hill.

Similar comments might be made for the block of anomalies extending SW to 387 000 mE, 5387 000 mN in the west of the area. This feature is bounded by abrupt gradients and, although the western face is complex and disrupted, the eastern face is quite sharp and could well be fault defined. It may be noted that the ragged western side to this belt of anomalies is comparable to that associated with the limit of the volcanics west of Mt Block. Since this boundary also appears to be a faulted or structural limit it is therefore possible that both sides of the western anomaly is also fault bounded.

Consideration of available surface mapping (Burns et al, 1966) which indicates predominantly sedimentary sequences in this area and minimal faulting does not resolve the issues posed by these observations. The widespread occurrence of quartz porphyries in the area does not account for it, or the large central anomaly, which occupies the same general area.

If this anomaly is unrelated to shallow mafic or intermediate rocks then the sources must lie within the sedimentary rocks and would imply substantial proportions of magnetic minerals or remanent magnetisation.

The southern closure of the anomaly parallels horizons mapped by Corbett & McNeill (1988) which suggests that the source is either a sedimentary unit or a concordantly folded igneous unit, perhaps similar to the basalts exposed near Que River and Hellyer.

Trends evident in the region S of Mt Block and E of Boco, as displayed by high frequency volcanic sources at surface, appear to fan or cross over within the area SW of Boco Siding. Regional data, although of lower resolution (Figure 2) indicate a continuity of these trends SW toward Chester from this focus.

The Dundas Group variations mapped across the central axis where the main circular effect is evident, and porphyries, do not obviously disturb the magnetic field. This indicates a uniform magnetisation (possibly zero).

These properties and correlations demonstrate two things; the large anomaly is not related to any exposed materials and there is a physical uniformity within these materials.

Some isolated responses are, however, present. The largest of these are located near 379 500 mE, 5388 000 mN, 382 500, 5389 000 and 382 500, 5391 500. Extant mapping associates these with porphyries.

Review of the noisier magnetic fields, in the east and west of the survey, suggests that the sources are exposed or occur at very shallow depth. This is an acceptable conclusion for the volcanics near Boco and Mt Block.

The only mapping available for the western anomalies (Burns et al, 1966 - the Mackintosh sheet) suggests that only Cambrian sedimentary rocks are present in this area. Approximate correlations indicates that the anomaly pattern correlates with the sequence which is composed primarily of mudstone and greywacke. There is clearly a need to inspect these rocks and check their magnetic properties but, if the response is directly related to them, then the magnetic field should be generated by low contrasts at very shallow depth.

The description of features and nominal relationships given above shows that the magnetic data can be used to upgrade mapping and unit definition in the area. Some features are obvious, others require some analysis in order to precisely define boundaries or offsets.

The boundary between the Mt Read Volcanics and the Dundas Group is evident but the continuity of underlying Dundas Group is implied by the large overprinted anomaly centred to the west of the surveyed area.

Repetition of lithologies within the volcanics, whether stratigraphic or structural, is apparent. The gross pattern implies folding. The high frequency character of many responses shows that the sources are shallow and of limited depth range as well.

Several of the elements of this qualitative interpretation have been reviewed quantitatively.

## MODELLED SECTIONS

Seven sections have been modelled in order to provide a preliminary assessment of the interaction of various elements of the magnetic field and the likely general solution for the observed patterns. The profiles examined sample all principal elements described above.

The modelling described is of simple assumption preliminary nature and designed only to provide some indication of source styles and relationships. Some elements would require extended three dimensional analysis supported by a rock property survey for full appraisal.

PROFILE 1: 379 500 mE, 5327 000 mN - 384 000, 5392 500 (Figure 6)

This north south profile was designed to test the possible source options for the regional effect observed in the area of exposed Dundas Group rocks. The large anomaly hump is clearly seen. Note that its relief is barely 100 nT and that gradients, although three dimensional, only imply source depths of perhaps 3 to 4 km to its upper surface. (3D implications may show it to be a little less but localised)

This profile has been used to assess equivalent source characteristics which might account for the effect. This means that any model offered for the regional effect is not necessarily correct or even appropriate in style but that it does satisfy the magnetic field requirements. This is done in order to examine the low relief, near surface responses more reliably.

Various model types have been tried but the regional effect is best satisfied by a dipping tabular body which dips to the south west and which extends from depths of about 7 km to about 2.5 km. The precise characteristics depend on the properties assumed. Some limits can be placed upon these and values of 0.01 to 0.03 cgs are implied. This would indicate that the source is mafic or ultramafic. It must be noted that the contrast value employed does affect the inferred source shape deduced, and its depth, and the variable shift parameters noted in the profile set reflect both different contrasts for the regional source and its three dimensional character.

This is, therefore, a deficient interpretation. It is incorrect in terms of description of the regional source but the required analysis has been beyond the scope of this preliminary review.

The aim has been to find some explanation for regional effects and to use this to enhance local effects. While deficiencies in the regional forms may well affect analysis of local forms it is not believed to be a serious problem at this early stage in interpretation but the risk of error should not be allowed to persist into refinements after property studies and surface checking has been completed.

Given these comments we may examine profile 1.

The crest of the anomaly is eroded and "flatter" than would be expected from the regional source. Porphyries are exposed in this zone and these clearly modify the magnetic field.

The model presented is not satisfactory, perhaps because the regional effect was imposed at an elevated level, but the general humpiness due to an irregular but thin porphyry mass has been reproduced. These are of very low contrast with the Dundas Group rocks. This type of effect accounts for the local spikiness observed in the central part of the survey.

The issue of where to fit the regional effect, and the reason it must be properly determined by 3D analysis, is shown in this section at 1000 m and in most other sections.

Near 1000 m a small spike anomaly appears to possess a strong negative effect on its eastern and northern side. Possible positions for the regional zero or base line have been marked. The upper line would imply that there are anomalous negative property contrasts on either side of the spike while the lower line much as modelled, would indicate a subtle positive at 1400 m. The latter is more likely, but the former would be important in exploration terms since it would suggest alteration. This can only be determined when a single source shape has been created which satisfies ALL profiles at the same curve fitting shift parameters. This has not yet been done, and cannot be, with simple methods.

A similar issue of this type occurs at the northern end of the profile where there is another strong and anomalous negative gradient.

PROFILE 2: 377 000 mE, 5390 000 mN - 385 000, 5384 000 (Figure 7).

The regional effect is not as obvious at the general northing of this profile due to an approximately E-W gradient which is only disturbed within the volcanics zone near Mt Block. The reality of the primary gradient is indicated in Figure 6 by the relative positions of the dip lines modelled.

The volcanics generate the largest responses and imply modest contrasts and depth ranges. Note that if the contrast is reduced and the depth range increased to generate the anomaly magnitudes observed then the gradients observed cannot be recovered. This suggests that the general contrasts employed in all models is of the right order, or is the minimum reasonable value in bulk, and that the volcanic sources are relatively thin, no more than 1000 to 1500 m thick. They also dip steeply and some indication of attitude is given.

The magnetic material in the west of the area contains one source with a contrast equivalent to the volcanics and the remainder is much less magnetic but more magnetic than normal Dundas Group. This material is also of limited depth range, and the source extends from surface. It must be exposed.

PROFILE 3: 377 000 mE, 5391 000 mN - 385 000, 5385 000 (Figure 8)

This important profile crosses the Boco zone and stresses the importance of regional assumptions. It uses fit assumptions which are consistent with most profiles (not the N-S link, however).

Accepting the regional assumptions made which provide generally compatible fits for the entire profile the following comments may be made.

Good correlations from all sources are possible for the zone up to the volcanic contact at about 7000 m.

The magnetic anomalies in the west of the area are clearly satisfied by shallow, dipping sources of moderate contrast. There is a consistent symmetry in magnetic profiles drawn across this western zone which indicates a folded body. The present profile would suggest an antiform with the limbs faulted but other explanations are possible. The extreme spikiness of the eastern anomaly, which may be traced from several kilometres and forms the sharp edge of the anomaly pattern, indicates the existence of locally higher contrasts. These bodies are depth limited and perhaps stratigraphic. They are exposed and would appear therefore to be sedimentary in origin, given present mapping information.

The porphyries of the central part of the profile similarly corrode the peak of the anomaly with a crestal peak to the east. This type of pattern can be used to suggest that these materials are thin, or largely reversely magnetised - albeit with a low contrast, with thickening to the east (about 5500 m). An alternate view, depending on the regional conditions is to argue that the regional fit is too high and should be much lower (broken line). This then implies that magnetic sources extend as far east as the volcanic contact and that the porphyries are both more extensive and normally magnetised.

However the regional effect is fitted the anomalous character of the Boco area cannot be disguised. A key element here is the negative effect to the west of the main feature. It cannot be explained by any normal source in the volcanics and implies loss of contrast or alteration and correlates directly with known alteration. The effect to the east of the anomaly may be of similar type but regional and geometric effects must be properly assessed before this can be asserted.

Any sources in the volcanics must also be relatively thin, no more than 2000 m in extent and steeply dipping. Most must be shallower but virtually all are exposed.

PROFILE 4 377 000 mE, 5392 000 mN - 385 000, 5386 000 (Figure 9)

The regional character of this line appears to make good sense. Note that there is a 15 nT differential between this line fit and those of Figure 8 which is consistent with the lower line in that diagram. All sources are depth limited, extend from surface and have moderate contrasts.

Most of the units in the western source pattern are slightly magnetic but only particular members of the volcanics in the east are magnetic. The properties are comparable.

The pattern of sources in the volcanics suggests a termination of the volcanics by a low angle surface which dips east and extends to depths of about 2000 m near Mt Block. The models suggest that the

solution offered represents a property-geometry compromise and that some sources, at the contrast used, extend too deep.

The Boco zone is not definitively recognised in this profile and examination of the contours maps shows why this is so. The effect is locally closed off (see also Figure 13).

These sections show that the volcanics do not extend west of their mapped limit at any depth.

PROFILE 5: 377 000 mE, 5393 000 mN - 385 000, 5387 000 (Figure 10)

This profile re-inforces these conclusions although using slightly different regional assumptions.

As in previous profiles the eastern part of the western anomaly belt is seen to be strongly magnetised. Sources extending from surface to shallow depths with moderate dips are implied. Faulted folds are suggested.

The volcanic sources are isolated but indicate easterly dips at this northing. All must be depth limited or returned to surface.

This model suggests that the eastern part of the porphyry is comparably magnetised and dips in a similar sense.

PROFILE 6 377 000 mE, 5394 000 mN - 385 000, 5388 000 (Figure 11)

This section stresses the regional problem and samples the main body of porphyry.

The interpretation depends on the identification of the magnetic base levels and these are not obvious. Review suggests that the profile west of 2000 m and at about 8000 m represents base level. The model assumes this and achieves a curve fit balance which lies intermediate between fits for profiles 2 and 3 to 5. It does then require, however, that a large block of porphyry is present with modest contrast.

The model requirements for the western anomalies is consistent with other profiles with the eastern face being most strongly magnetised. The western margin of the volcanics is similarly marked, but by a strong negative effect. In no case, however, do any of the sources extend to great depths. All are localised.

PROFILE 7 377 000 mE, 5395 000 mN - 385 000, 5389 000 (Figure 12)

This profile confirms the implication of profile 6 and shows that the block of porphyry thins northward, as it also does to the south, but less rapidly.

The volcanics occurs east of this profile and their effect is just seen. The western anomaly belt is also sampled, but its character is reversed at this northing. This indicates that a fold solution may be realistic for this source, the magnetic limb having been thinned or terminated to the east by cross structures (see Figure 5).

## MINERALISATION

No major mineralised sites have yet been found in the area covered by this licence but mineralisation is known to exist. The principal examples are at Boco and Silver Falls.

Pyritisation and alteration have been established near Boco and Figure 13 suggests some of the information known about this site. Anomalous magnetic responses have been recognised in the Boco zone and the negative pattern correlates absolutely with the drilling-controlled zone of "strong alteration" projected in the old plan south of 5387 000 mN. Even the pinch point near BBP 248 can be identified.

The magnetic survey suggests, however, that this zone of alteration does not extend much further south than UTEM anomaly A. More analysis is required but the feature is truncated or controlled by a transverse structure a little south of 5386 000 mN.

Similar disturbance can be seen a little north of 5387 000 mN (near holes 9, 12 and 10)(profile 4) but the feature is re-asserted to the north east and the zones in which the response appears to occur are hatched. The largest area occurs NE of 5388 000 mN. This poses a question; what is exposed near the highway and what other information was used to make the projection in this 1984 diagram?

More recent drilling (holes 278-280) would appear to be beyond the zone of interest.

The patchiness of this zone must be noted. It also appears to lie between two magnetic volcanic units.

The other mineralisation occurs at Silver Falls in the far west of the area. Little is known about it and it appears to lie on the faulted contact of the magnetic units in this region.

The magnetic uniformity within the Dundas Group, zone is not especially encouraging for base metals unless an alternate concept relating porphyries can be developed - assuming the mapping of these is correct. Alteration character is not readily detected when most units are similar in character - although this has not been attempted here. This review has been based on contour and raw profile data and the actual data would need to be examined to assess such subtle character. It is clear that significant structures are present, and that some magnetic variations are present at moderate depth, since small step anomalies are evident. Changed magnetic character can be associated with these and some of it may represent alteration. This judgment must await some rock property studies and detailed evaluation. These structures must be ground traced and checked geochemically.

The potential of the volcanics within the eastern part of the EL is not immediately apparent. No substantial mineralised sites are known (with the exception of Boco) and the reason for this is now evident. The volcanic pile is contorted and sliced with little evidence of mass alteration. Most of the pile, being strongly magnetised, is not consistent with this. The non magnetic elements must, however, be

further reviewed for abnormal character.

#### TREND IMPLICATIONS

Several trend or lineament systems have been identified in this small survey area. There is clear evidence of lack of continuity and conflicting trends in different parts of the area. While part of these differences can be assigned to structural overlays there are some wider issues relevant to the tracing of mineralised sites - assuming these have any association with major crustal structures and their high level incarnations.

Trends have been summarised in Figure 5. The Boco alteration axis is indicated and it is extensive. The relative economic significance of other features is not known.

Acute trends within the western anomaly field indicate disruptive structures if it is assumed that the main body of anomaly is due to sedimentary or stratigraphically concordant units. These should be inspected. The most obvious of these trend NE-SW.

This study has identified the issues and the preliminary work is sufficient to show that magnetic methods can be used to unravel the issues once further ground and property control is available.

Gravity data can be used to resolve some of these issues. Regional gravity data in the region of the corridor fragment discussed here have been inspected. Although station coverage is coarse (1 km spacing) the gravity field has considerable relief and can be expected to define major structures, important trends and unit relationships.

Conclusions drawn from the above discussion and its modelling basis have been summarised in Figure 14. Although areas of specific interest have been suggested it should be noted that further work using the actual observations, fully corrected for all influences, is advised.

## CONCLUSIONS AND RECOMMENDATIONS

The new high resolution survey of the Bulgobac - Boco area will be able to resolve many geological issues. Although the present work has been restricted and preliminary in terms of data use it has been possible to consider many issues relevant to subsequent analysis.

The volcanics of the area are structured and particular units can be recognised and traced. All yield systematic dip patterns but are depth limited, indicating the presence of detachments or limited volumes.

The survey has revealed a large structural feature centred near Bulgobac; it is believed to be a slice of ultramafic-mafic rocks at considerable depth.

Magnetic texture comparable to that observed across the Mt Read Volcanics has been observed in the west of the area. This appears to be associated with particular sedimentary units within the Dundas Group and are magnetically distinct from other rocks of the group. These materials should be inspected. The magnetic survey enables structural definition in this relatively inaccessible area. The sources for these anomalies are exposed or nearly exposed and are also depth limited, probably folded and fault bounded. structural texture within the northern

The survey has also demonstrated that trends and structures are rarely continuous across the area even though some orientations, such as NE-SW, E-W or NW-SE, are common.

Mineralisation at Boco can be associated with an anomalous alteration effect within the volcanics and the survey demonstrates the minimum extent of this zone. Anomaly swells should be investigated since these may reflect enlargements of altered volumes.

The magnetic data should be used to check indications of concentrated alteration and to further support mapping and structural appraisal. More sophisticated modelling will be required. The feasibility of both applications has already been demonstrated.

Magnetic analysis might be productively supported by gravity survey. General infill of the regional data base is suggested.

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Program      : asectape
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Deck         : /PRJ6/J1120/PAR/1dt.par-
Listings     : /PRJ6/J1120/1dt.LST

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 With a blocking factor of 50, each record is 6500  
 characters.

One logical record = DATA(A4),  
 Line number & date as a\*B, followed by :  
 fiducial  
 easting  
 northings  
 mas\_sammas  
 diurnal\_sammas  
 mas\_level  
 rad\_alt  
 baro\_alt  
 total\_count  
 k40  
 bi214  
 t1208  
 time\_hh\_dddd

, written under format 2A4,2A4,f12.1,f12.1,f12.1,f9.2,f9.2,f9.2,f7.2,f7.2,f6.0,f6.0,f6.0,f6.0,f9.5  
 Line information on ASCII file,lin.all  
 Line info will be read under format (1x,2a4,2(1x,f15.2),1x,2a4)

Line 10011 Samples 50 Tape required 0.29 Tape used 49.01 feet

|                           |     |              |           |            |            |                |     |  |
|---------------------------|-----|--------------|-----------|------------|------------|----------------|-----|--|
| line 10011                | had | 246 samples  |           |            |            |                |     |  |
| VARIABLE                  |     | Data Ranges: | Min       | Max        | Mean       | Std Dev        | SUS |  |
| fiducial                  |     |              | 6131.00   | 6180.00    | 6155.50    | +/- 14.23      | 0   |  |
| easting                   |     |              | -99999.00 | 379129.19  | 339435.86  | +/- 130991.28  | 0   |  |
| northings                 |     |              | -99999.00 | 5340059.00 | 4897764.75 | +/- 1489776.13 | 0   |  |
| mas_sammas                |     |              | 62293.37  | 62330.24   | 62309.57   | +/- 11.65      | 0   |  |
| <del>diurnal_sammas</del> |     |              | 62297.29  | 62298.04   | 62297.67   | +/- 0.22       | 0   |  |
| mas_level                 |     |              | -99999.00 | -22.13     | -8157.24   | +/- 27376.98   | 0   |  |
| rad_alt                   |     |              | 235.00    | 407.00     | 270.16     | +/- 29.29      | 0   |  |
| baro_alt                  |     |              | 1145.00   | 1295.00    | 1203.48    | +/- 34.60      | 0   |  |
| total_count               |     |              | 646.00    | 1018.00    | 843.62     | +/- 96.54      | 0   |  |
| k40                       |     |              | 25.00     | 57.00      | 38.84      | +/- 6.90       | 0   |  |
| bi214                     |     |              |           |            |            |                |     |  |

096100

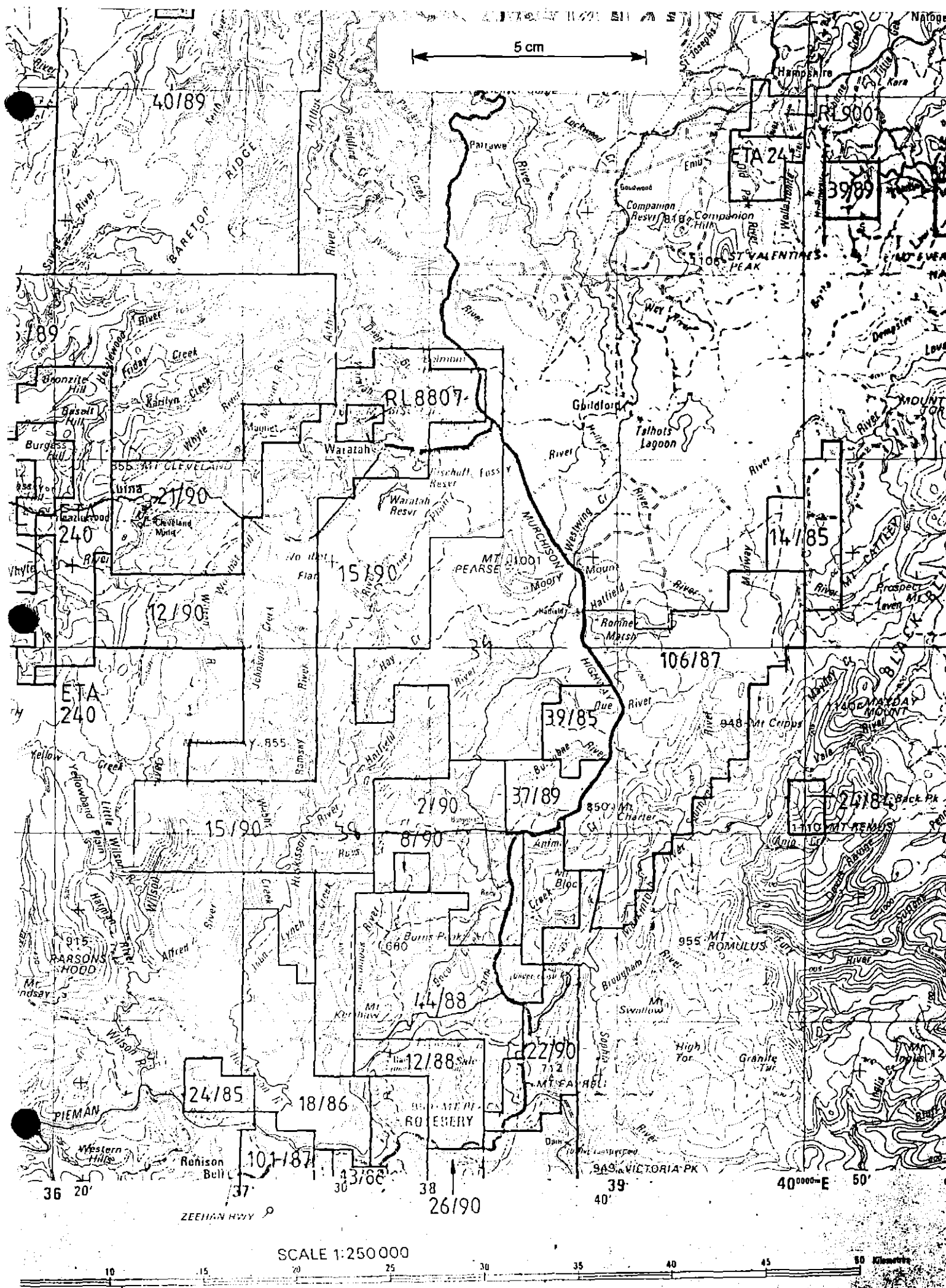
Report submitted on behalf of Leaman Geophysics

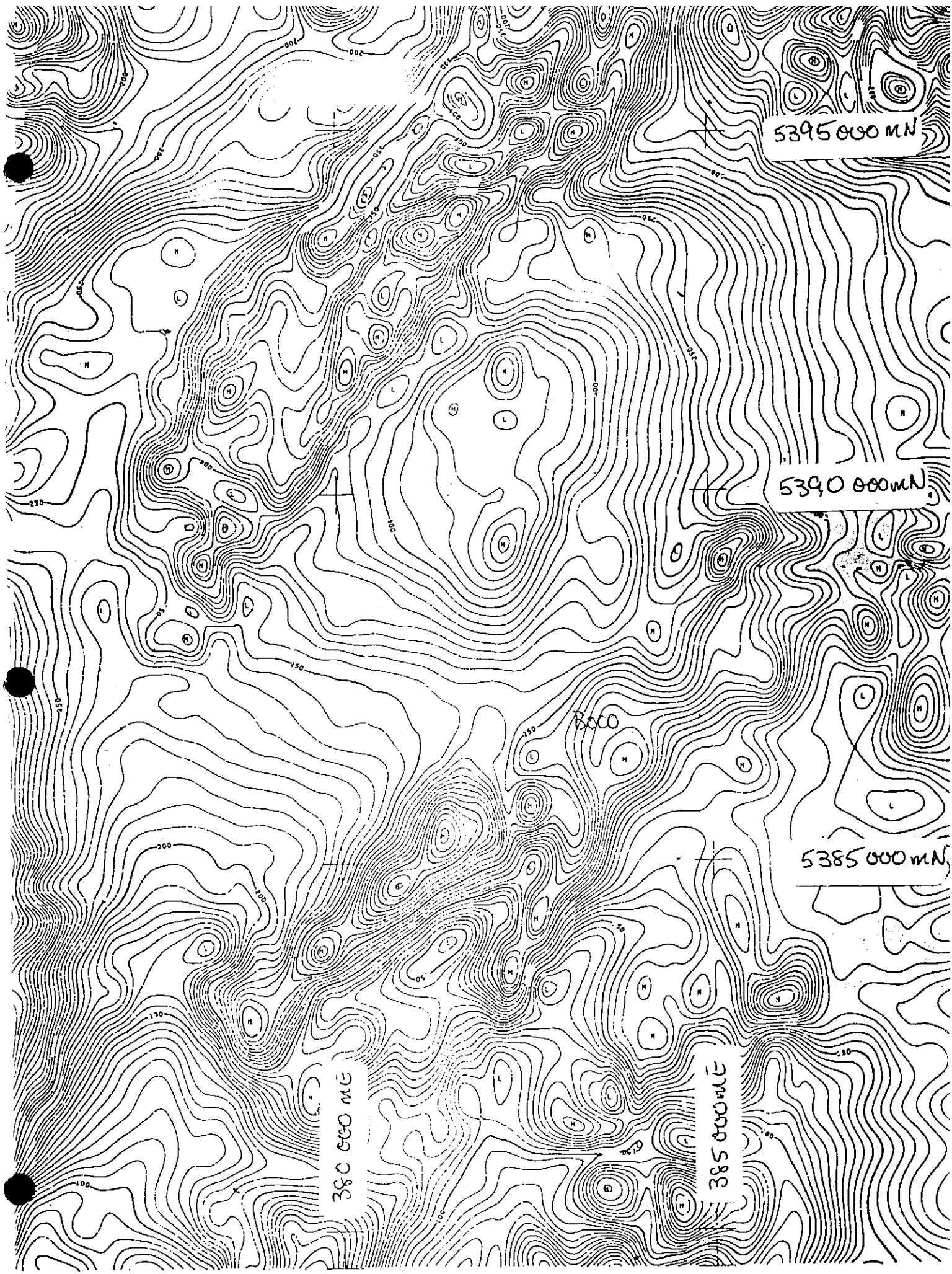
by

A handwritten signature in cursive script, appearing to read 'D. Leaman'.

Dr. D. E. Leaman, B.Sc., Ph.D.,  
F. Aus. I.M.M., M.M.I.C.A.

Date: 1-7-91

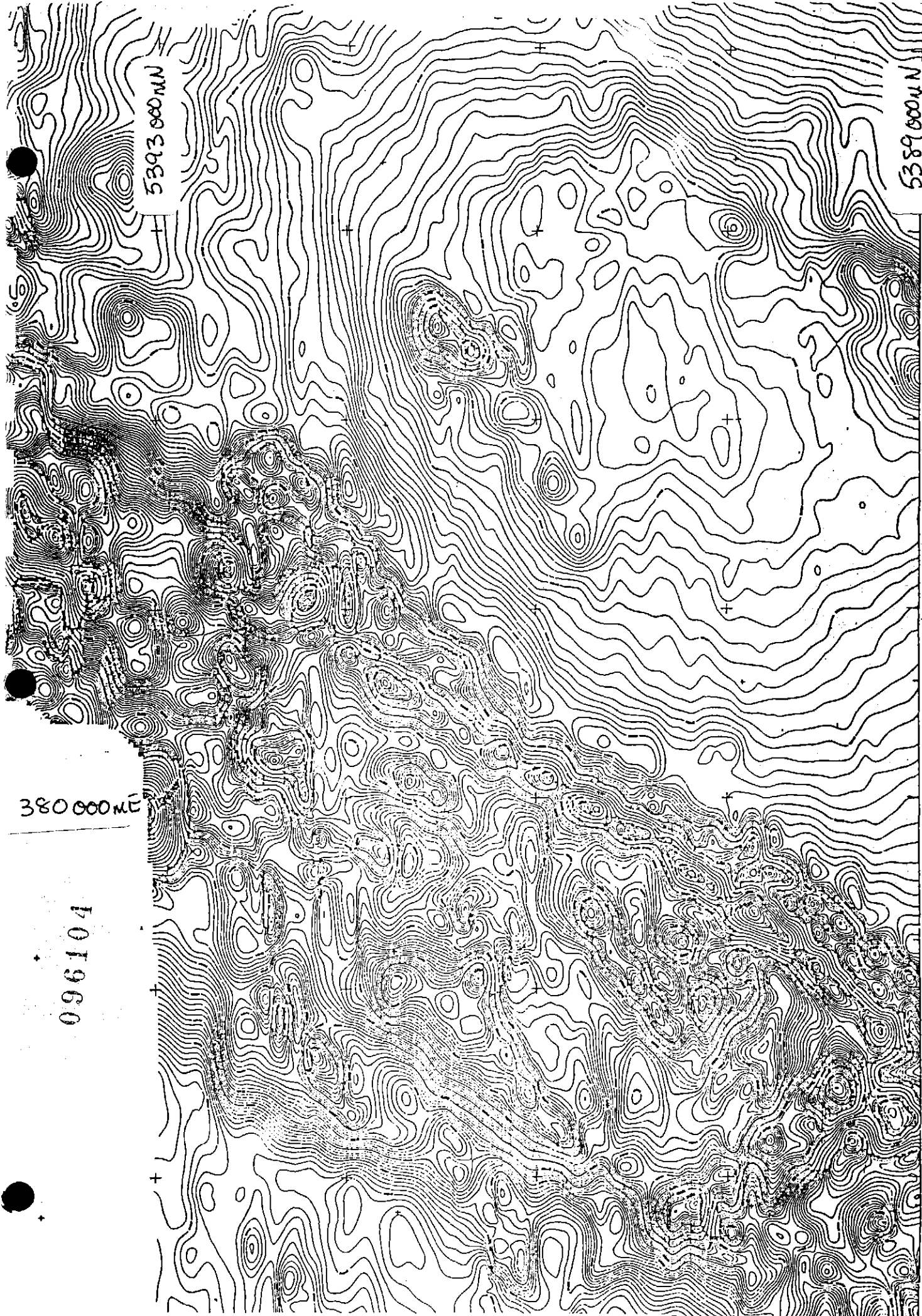




096103

EXTRACT OF 1981 MINES DEPARTMENT REGIONAL SURVEY IN BULGOBAC AREA

FIGURE 2



5393 000 N

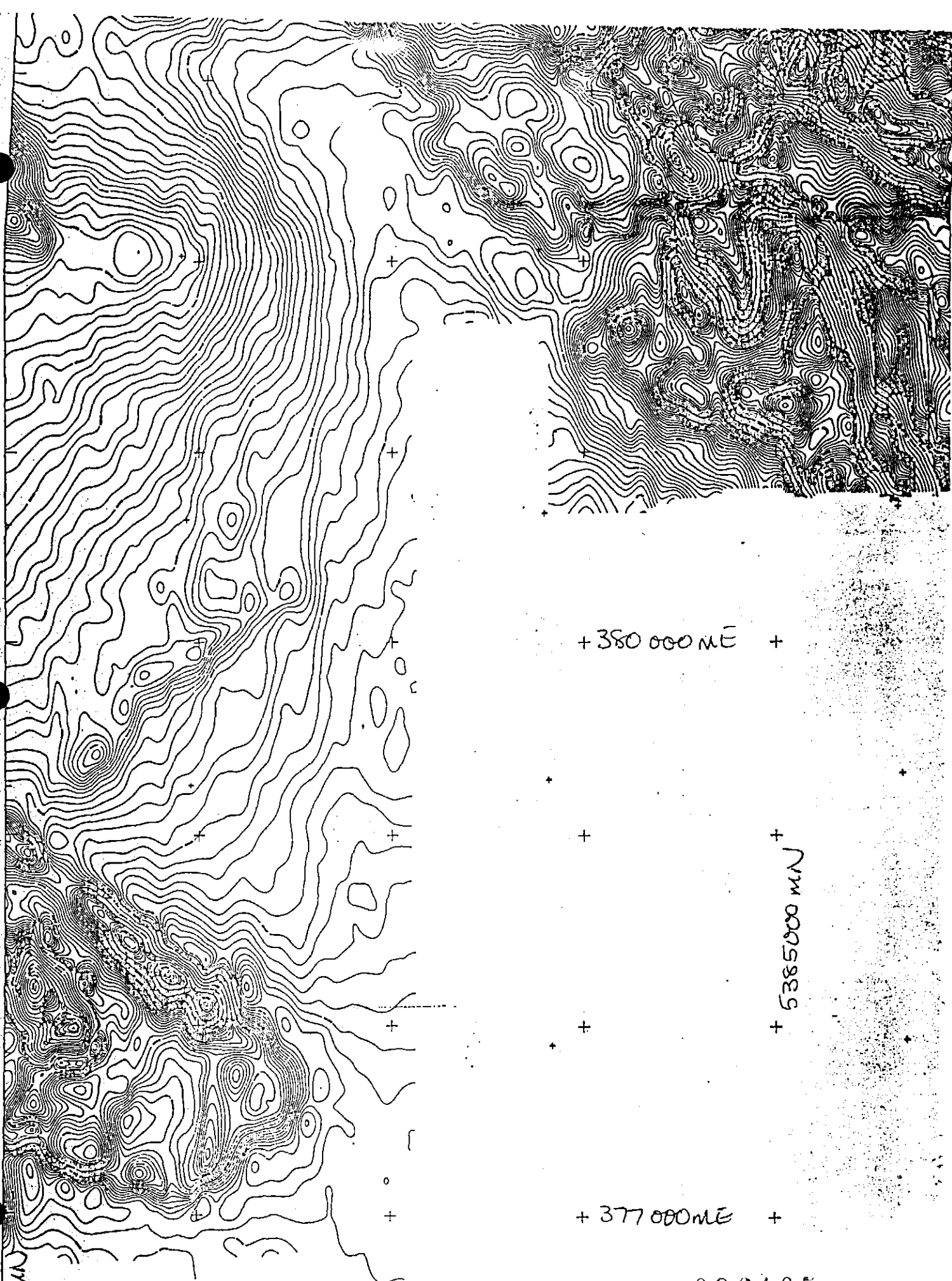
5389 000 N

380 000 mE

096104

CONTOURS OF RESIDUAL MAGNETIC FIELD EL. 2/90 NORTH  
(contour interval 2 nT) See also map 3

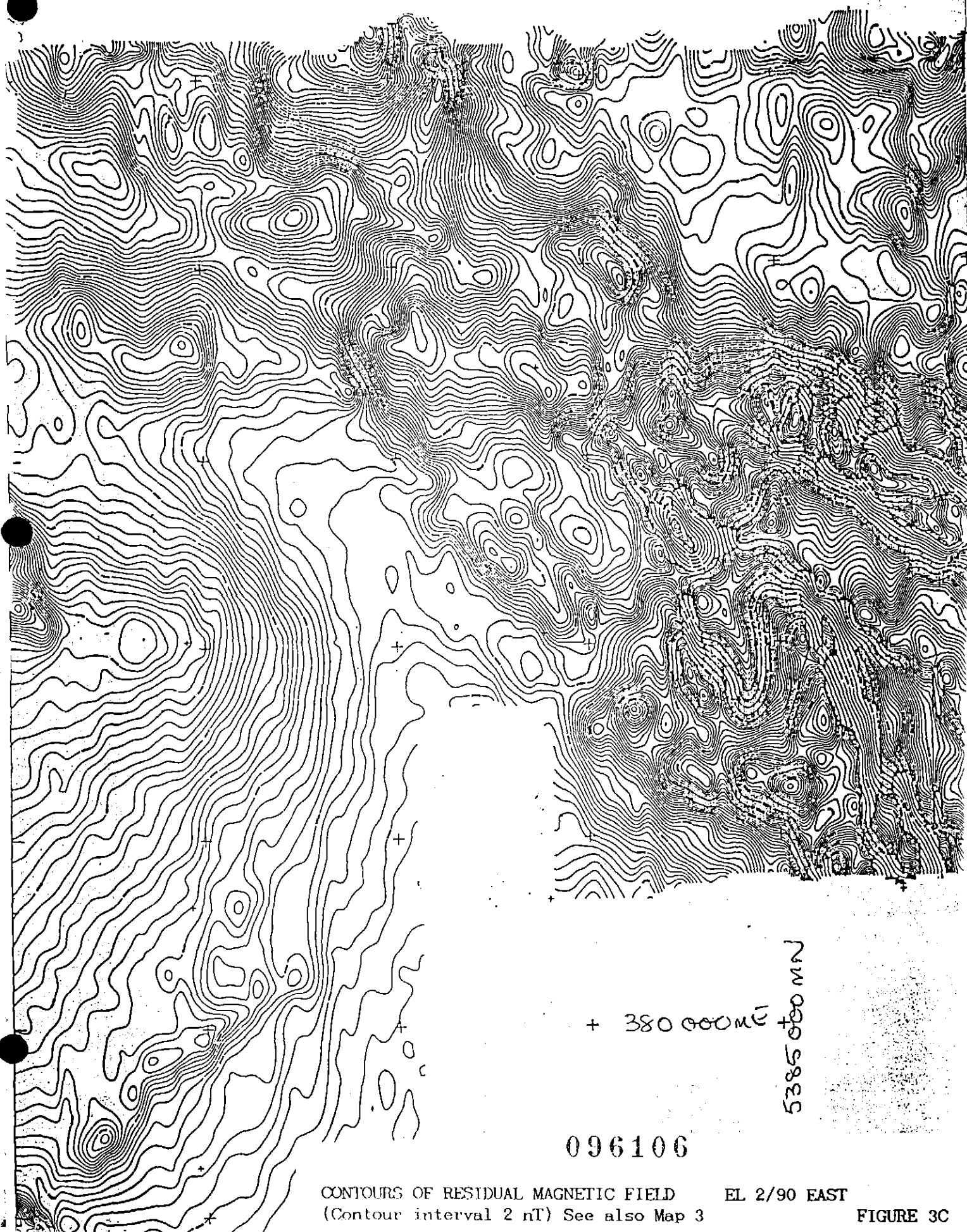
FIGURE 3A



CONTOURS OF RESIDUAL MAGNETIC FIELD  
(Contour interval 2nT) See also Map 3

EL 2/90 SOUTH

FIGURE 3B



+ 380 000 mT

5385 000 mN

096106

CONTOURS OF RESIDUAL MAGNETIC FIELD  
(Contour interval 2 nT) See also Map 3

EL 2/90 EAST

FIGURE 3C

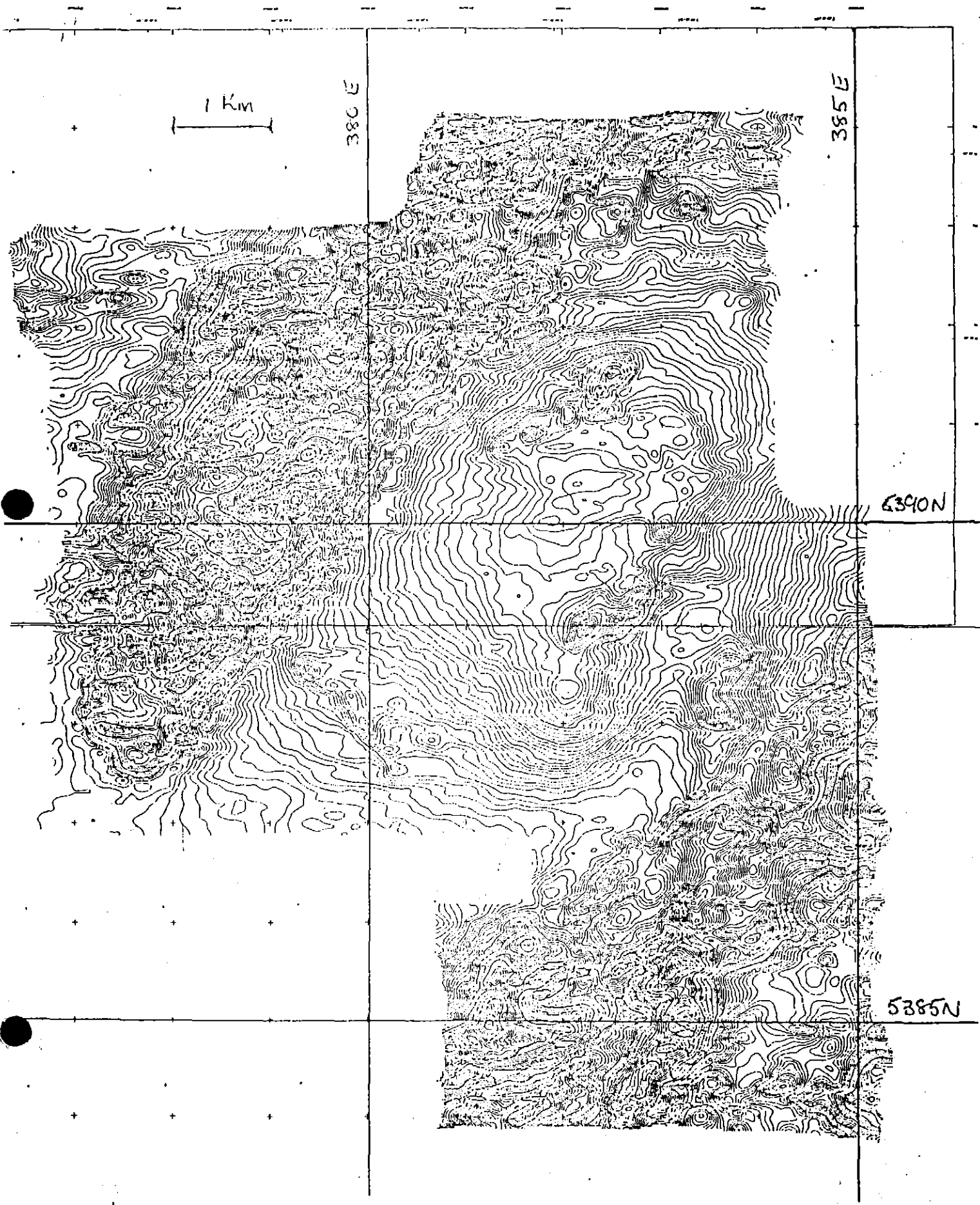
5 cm

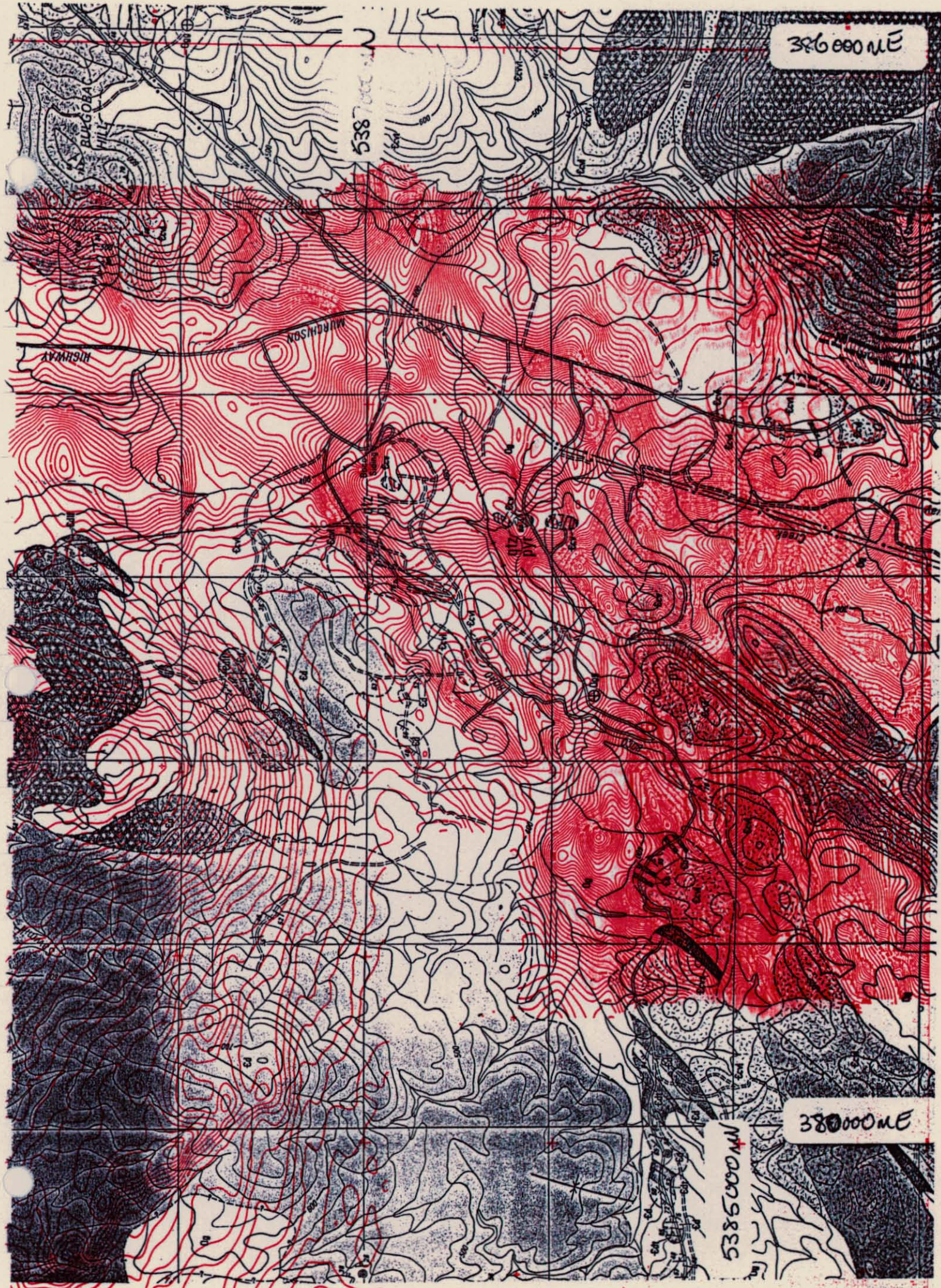
CONTOURS OF RESIDUAL MAGNETIC FIELD

EL 2/90

FIGURE 3D

096107





CONTOURS OF MAGNETIC FIELD EL 2/90 SOUTH  
Baseman after Corbett & McNeill (1986)

096108

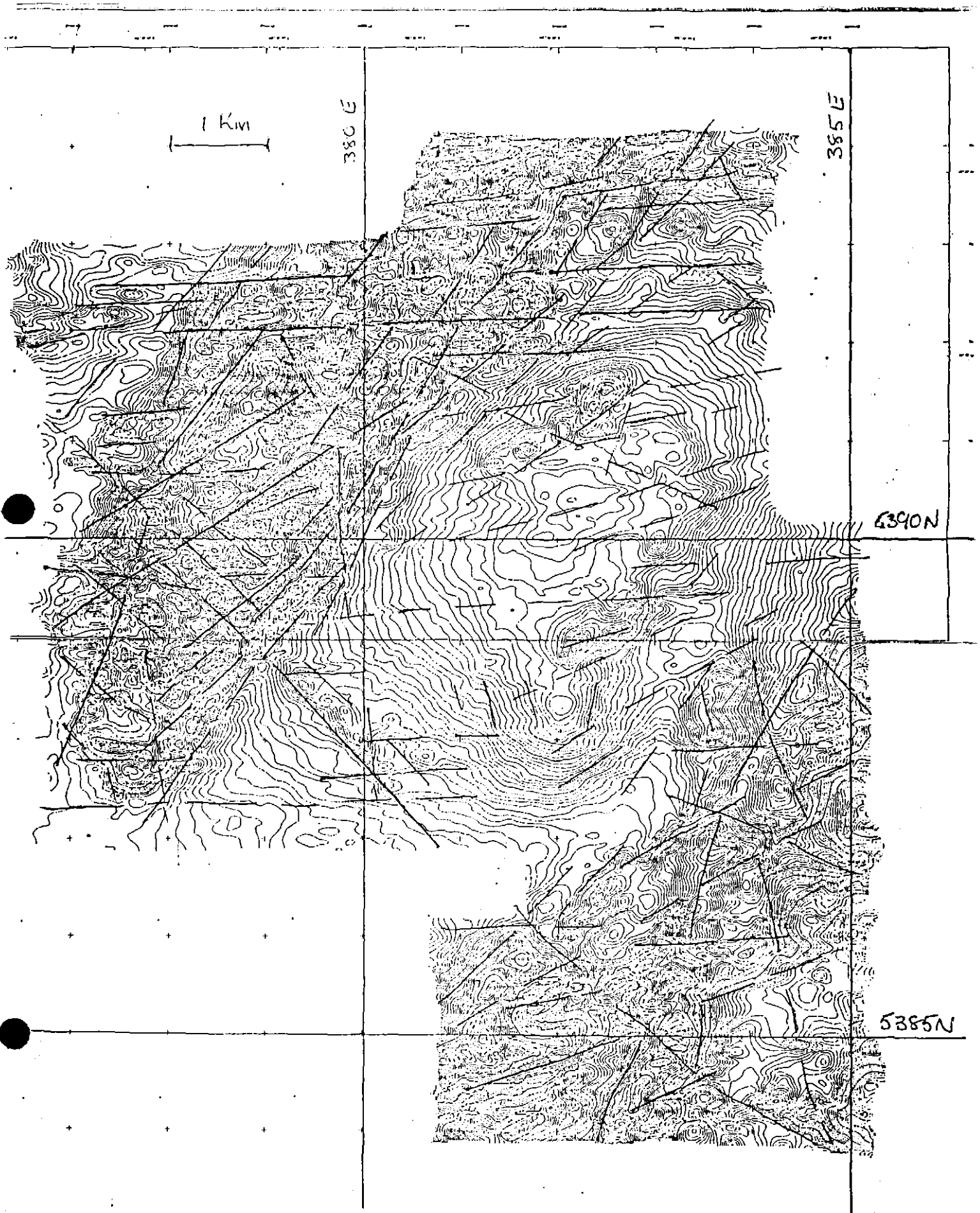
FIGURE 4A

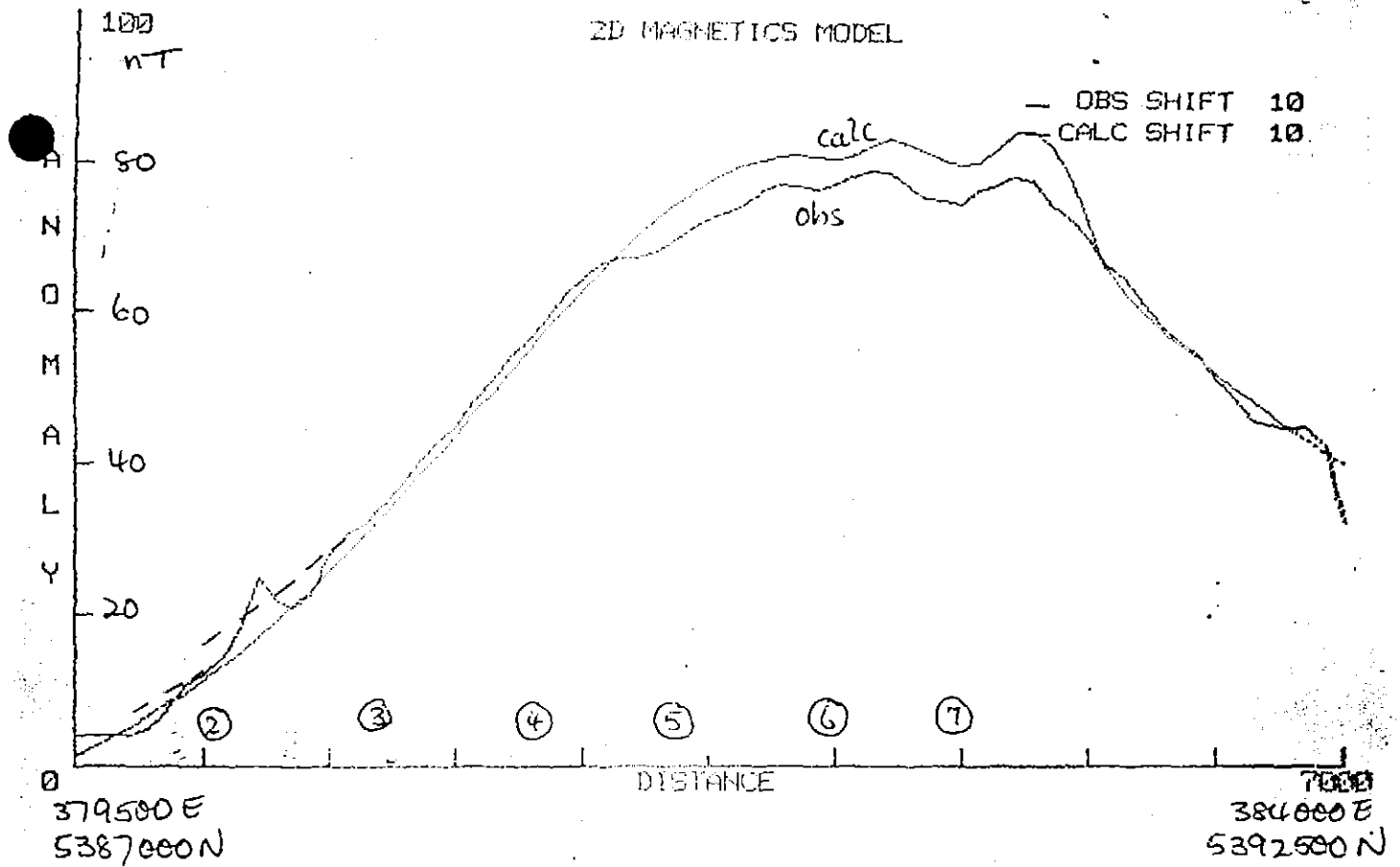
5 cm

TRENDS INFERRED FROM MAGNETIC DATA

EL 2/90

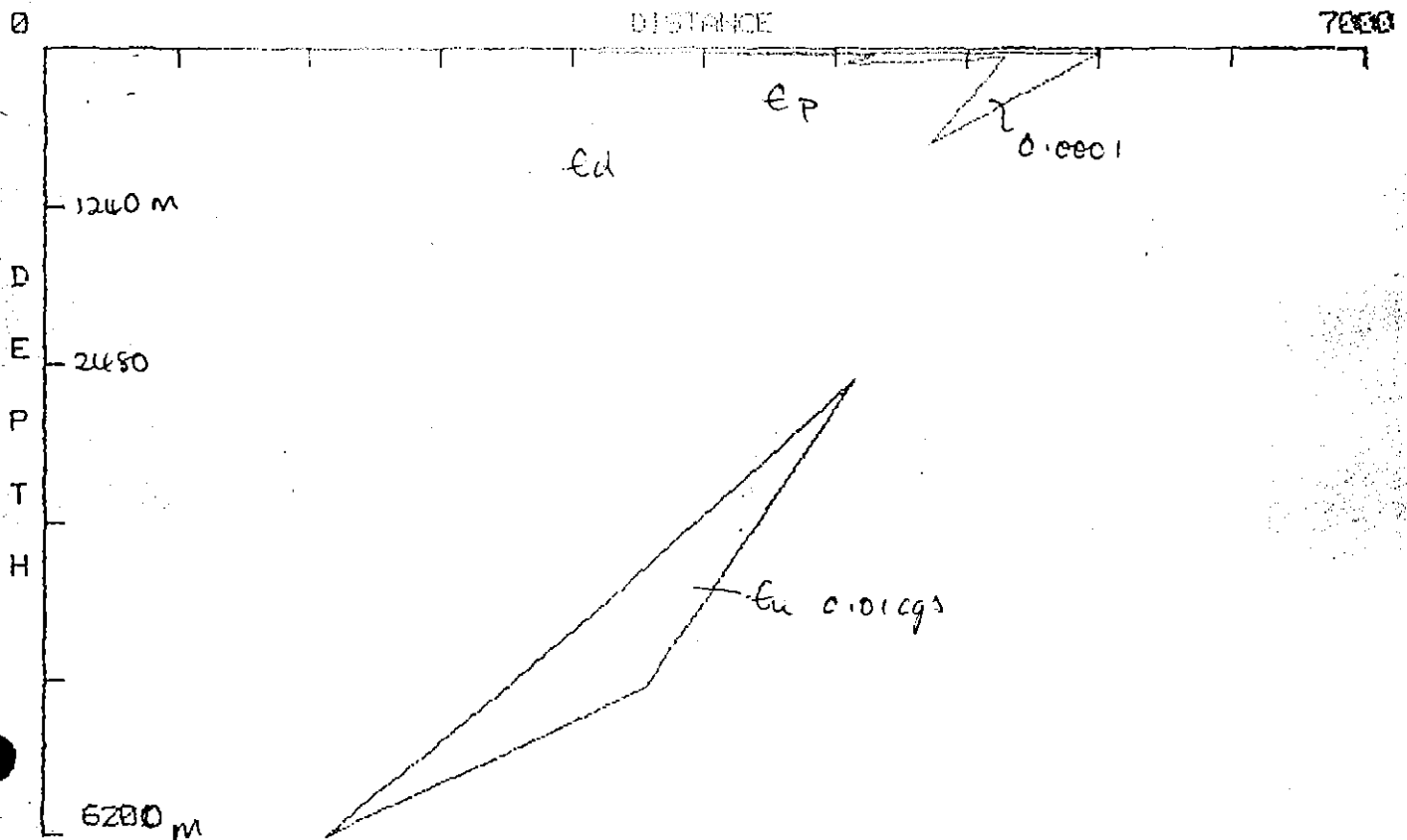
FIGURE 5





ROCO 1,373500/5357000-324000/5392500

2



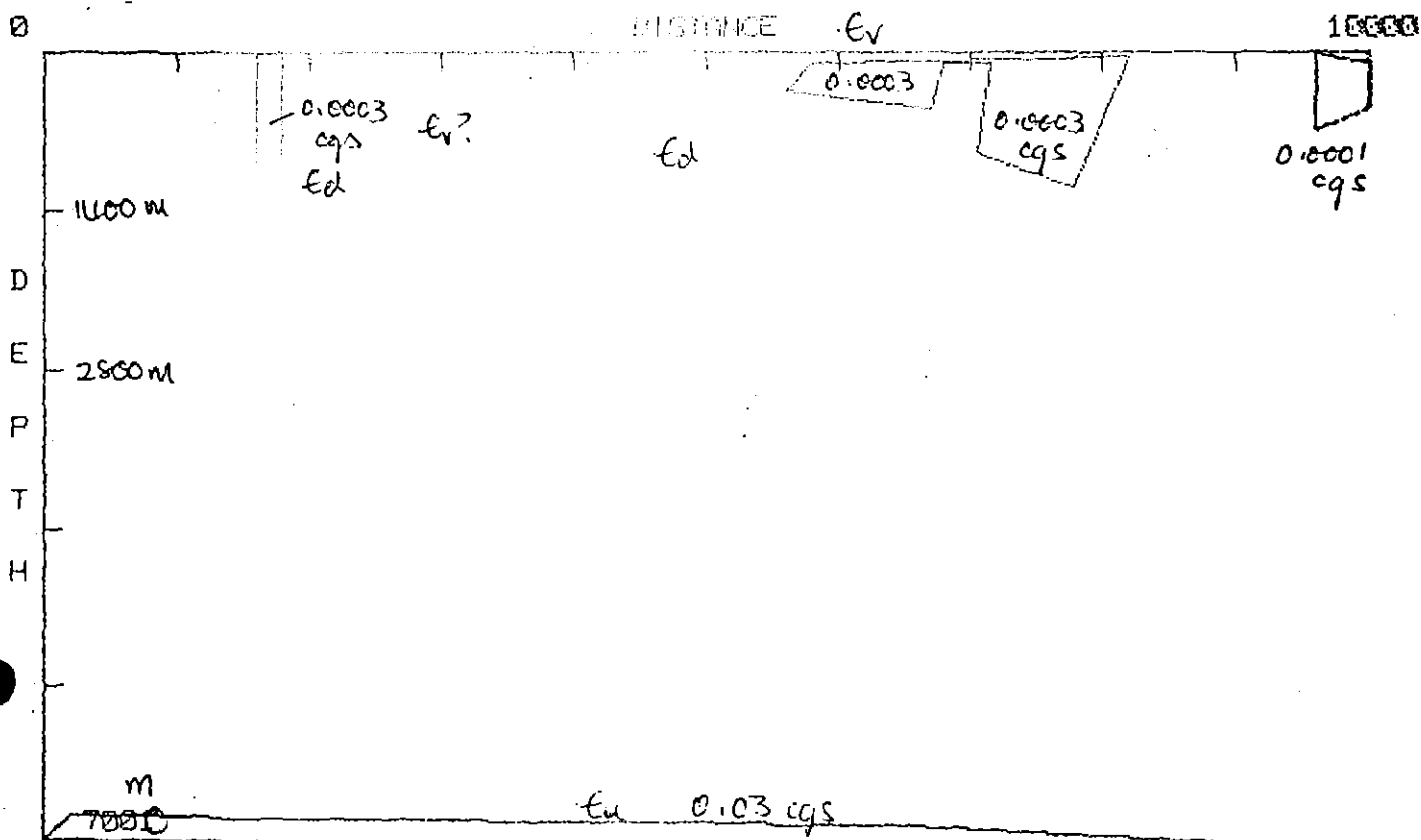
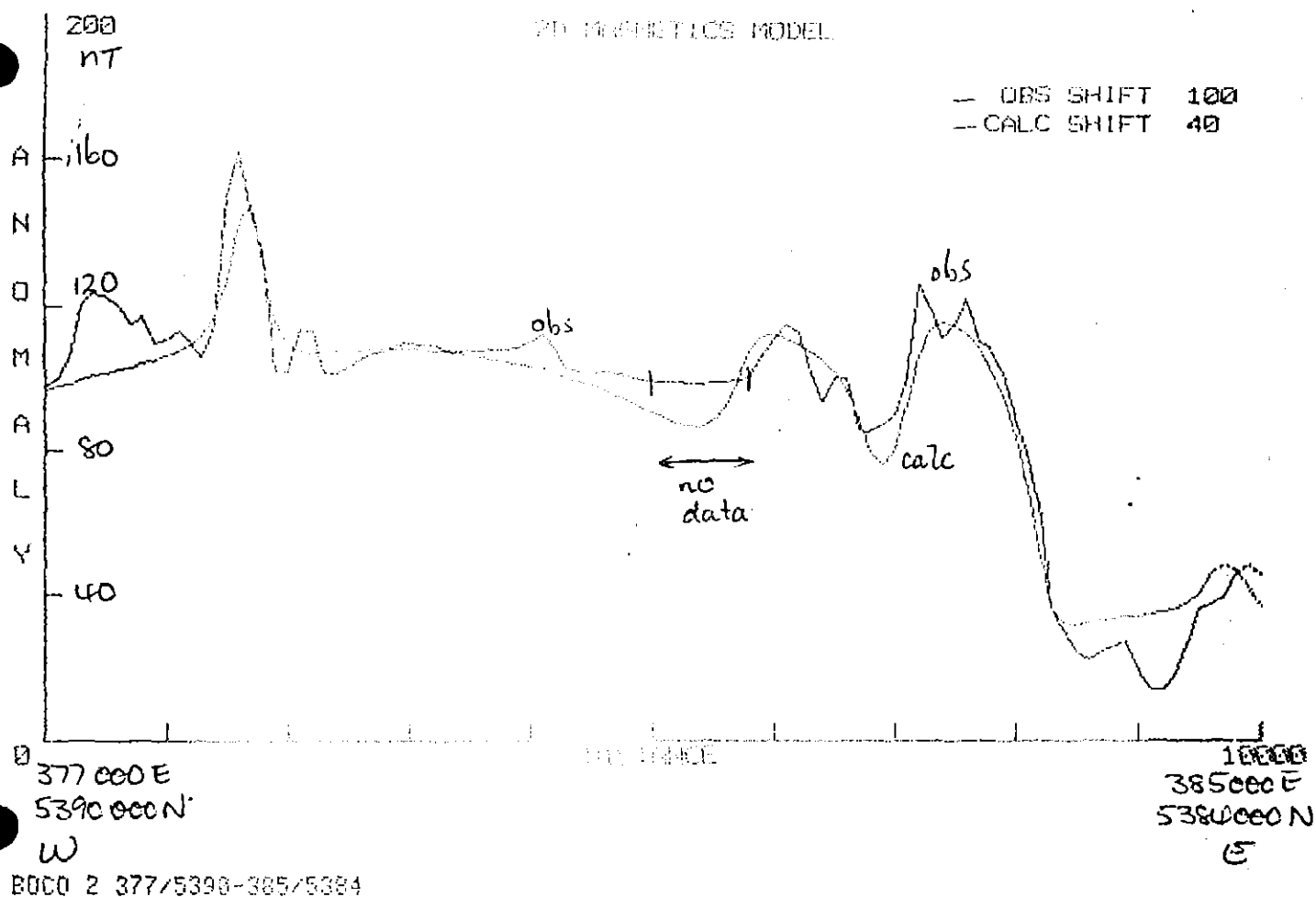
PROFILE 1. 379 500, 5387 000 - 384 000, 5392 500

FIGURE 6

INTENSITY INCLINATION DECLINATION OBS LEVEL LINE DIRECTION  
 62000.0 -72.0 13.0 100.0 130.0

096111

LINE PARAMETERS - ORIGIN, LIMIT, INCR : 0 10000 100



PROFILE 2. 377 000, 5390 000 - 385 000, 5384 000

FIGURE 7

62000.0

-12.0

13.0

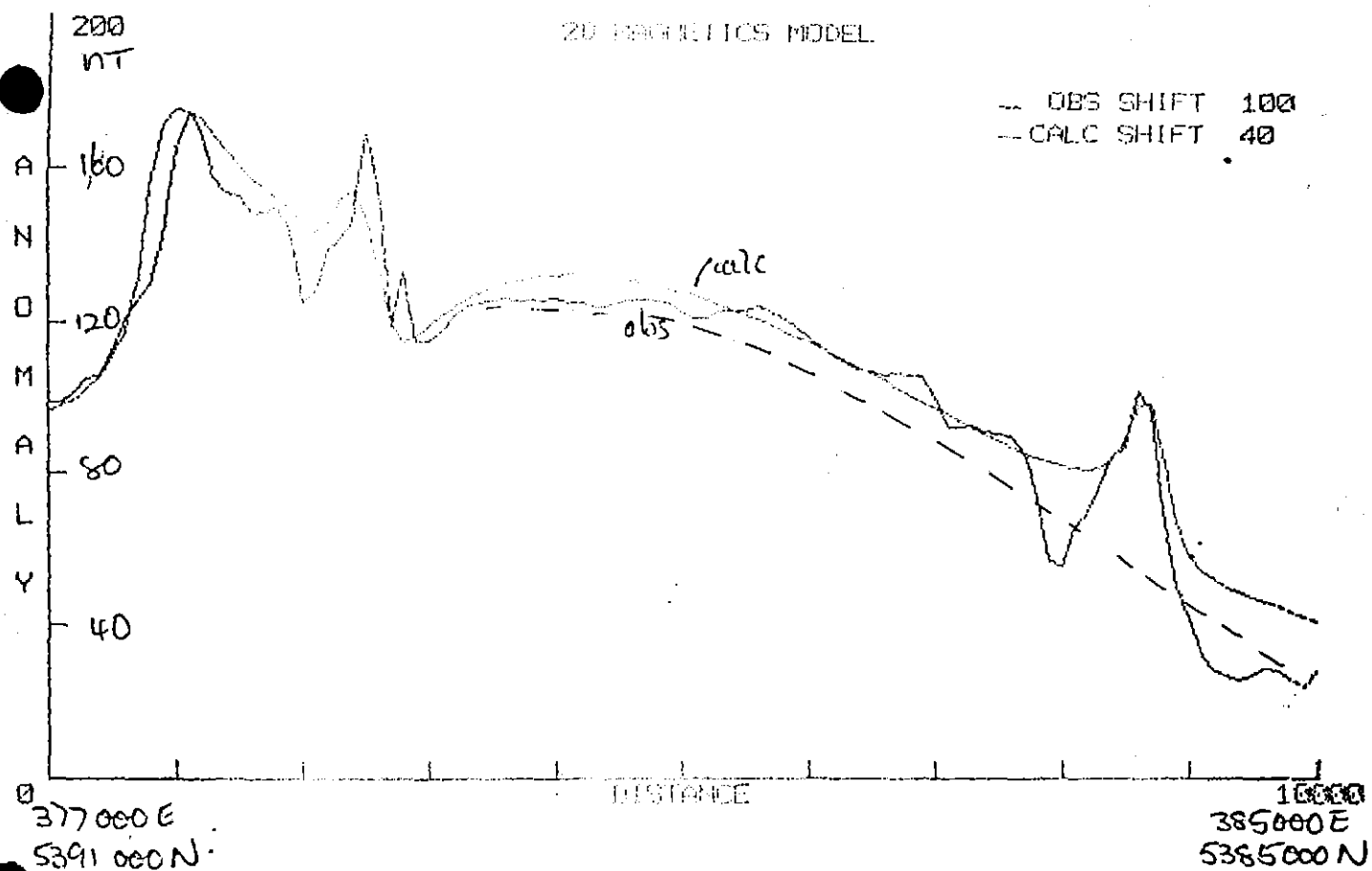
100.0

130.0

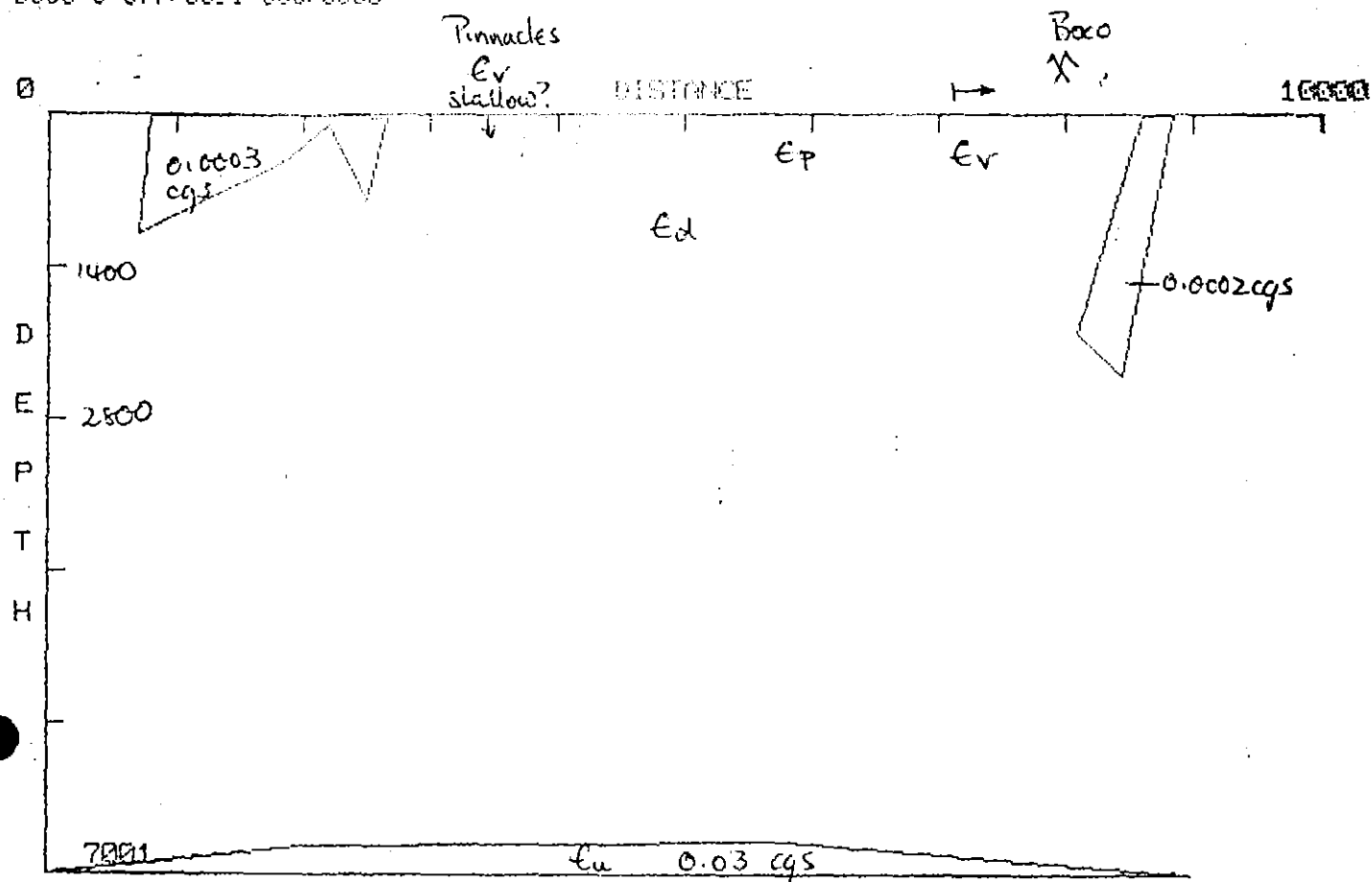
096112

LINE PARAMETERS - ORIGIN, LIMIT, INCR : 0 10000 100

2D MAGNETICS MODEL



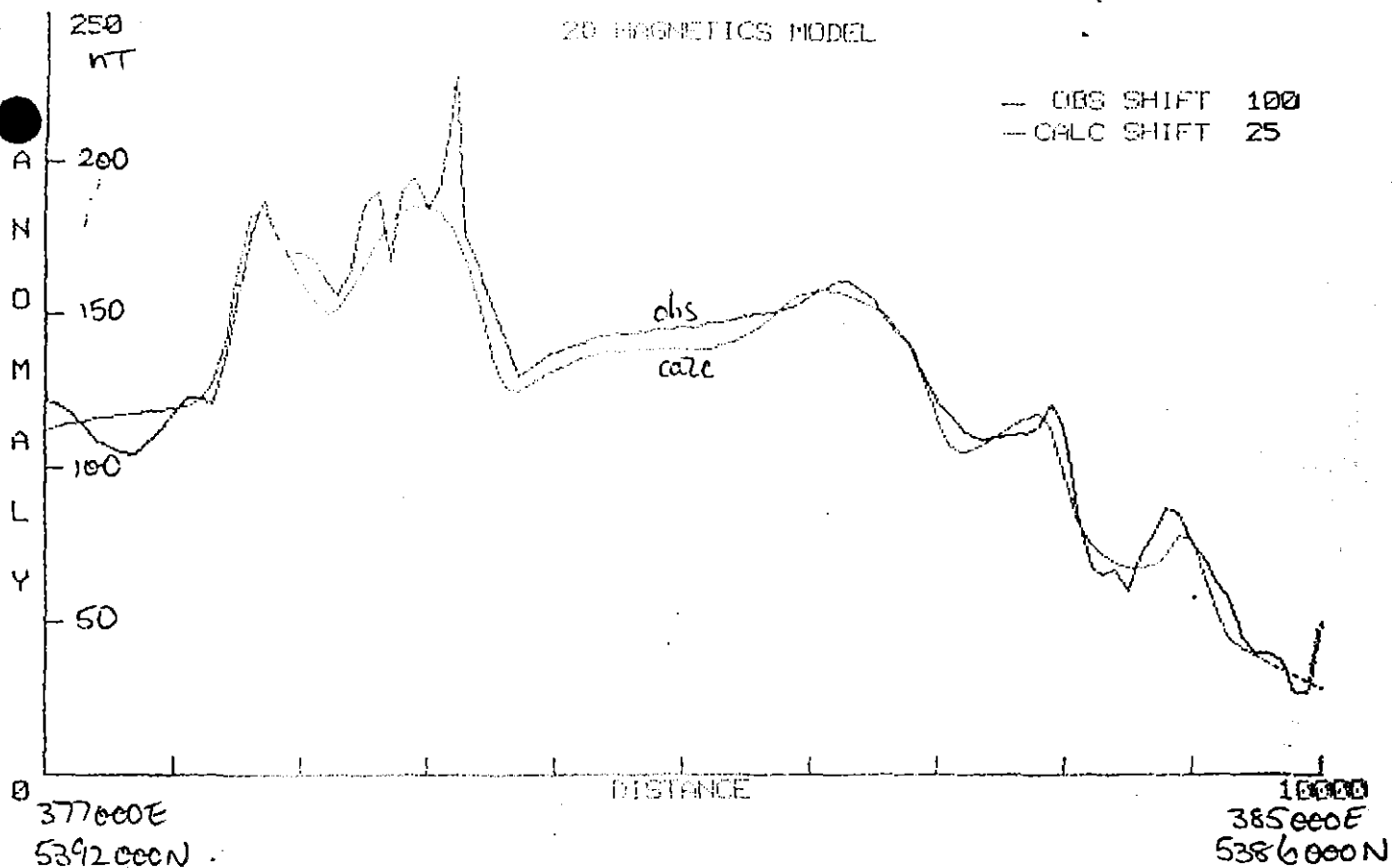
B000 3 377/5391-385/5385



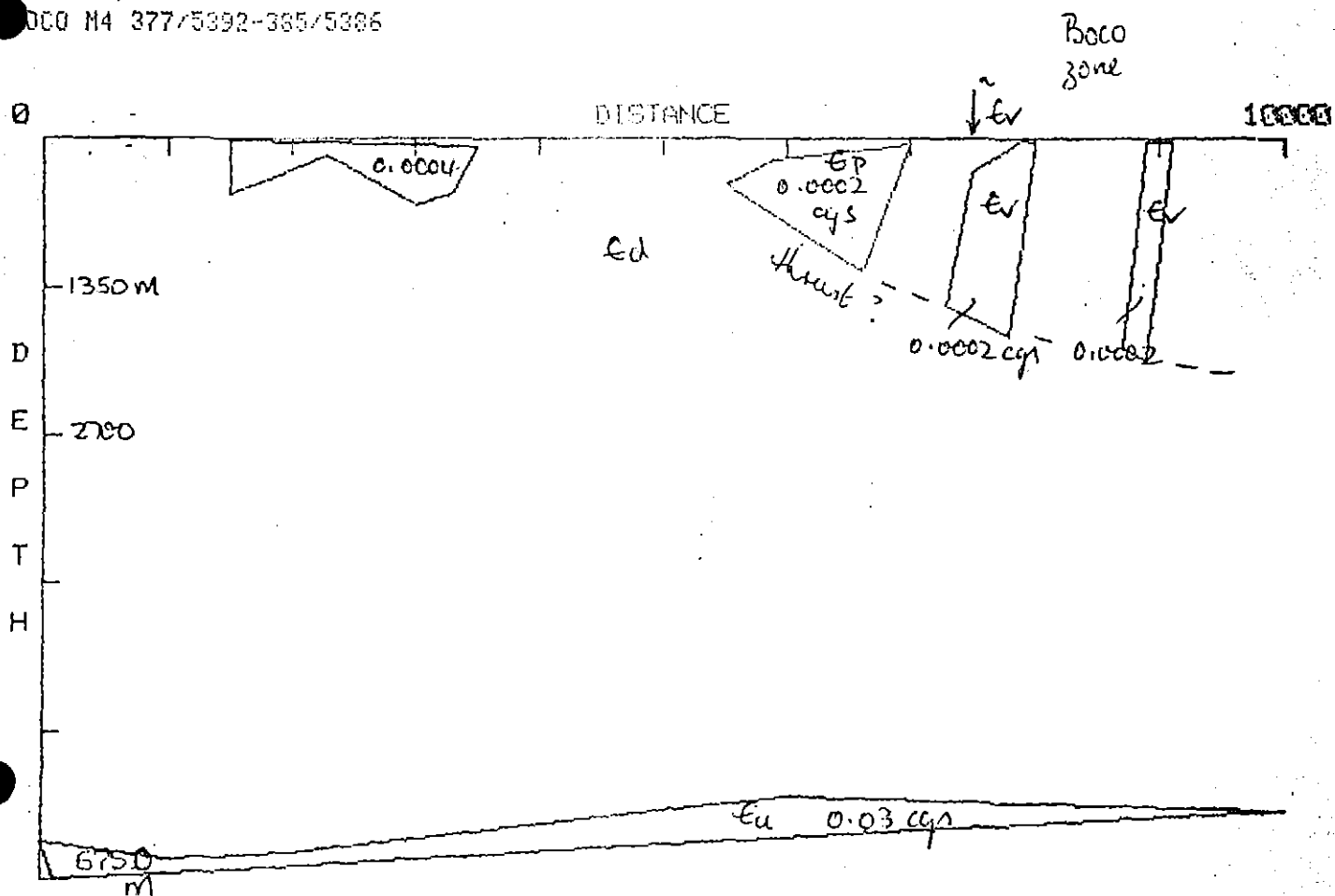
PROFILE 3. 377 000, 5391 000 - 385 000, 5385 000

FIGURE 8

2D MAGNETICS MODEL



000 M4 377/5392-385/5386



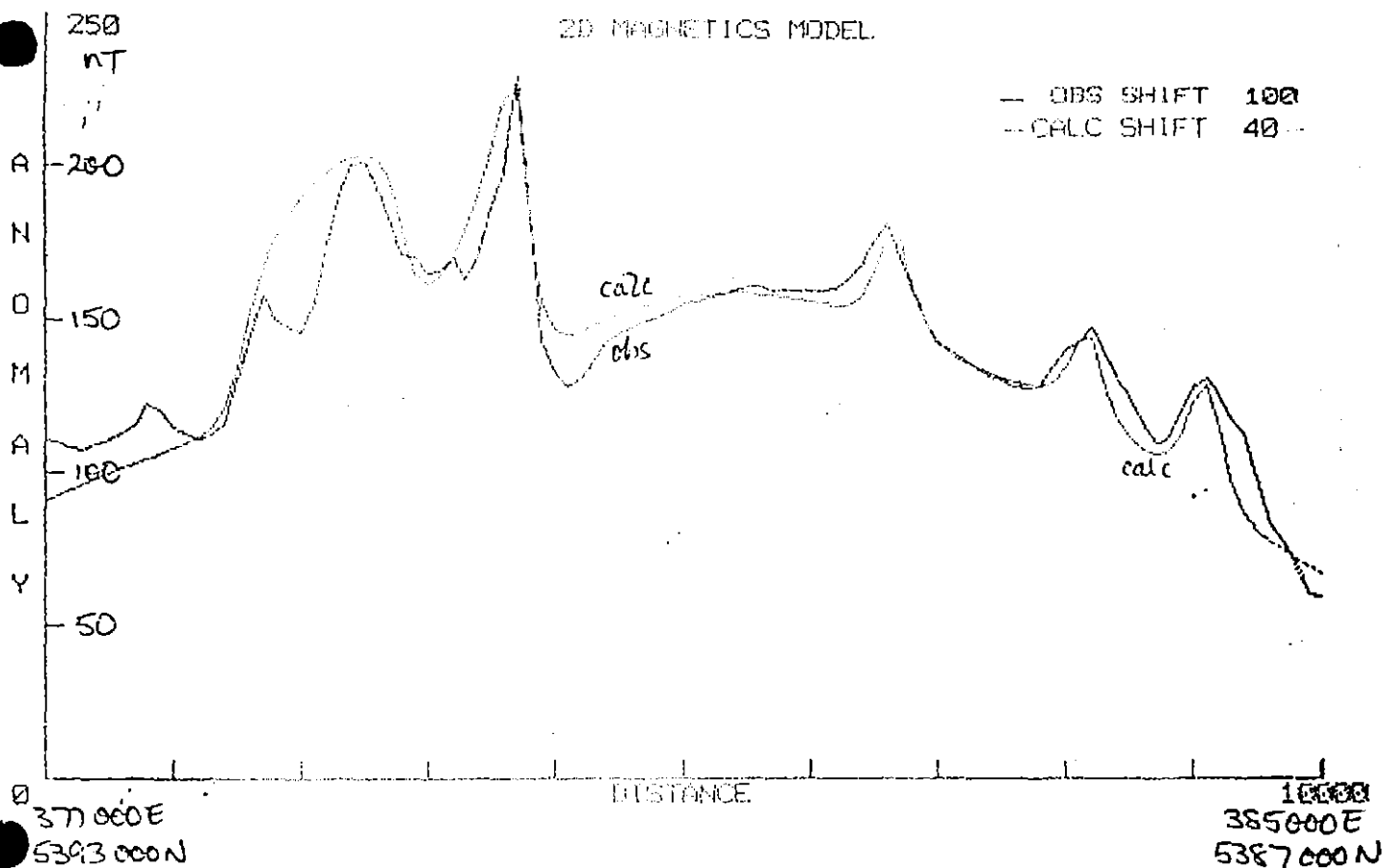
PROFILE 4. 377 000, 5392 000 - 385 000, 5386 000

FIGURE 9

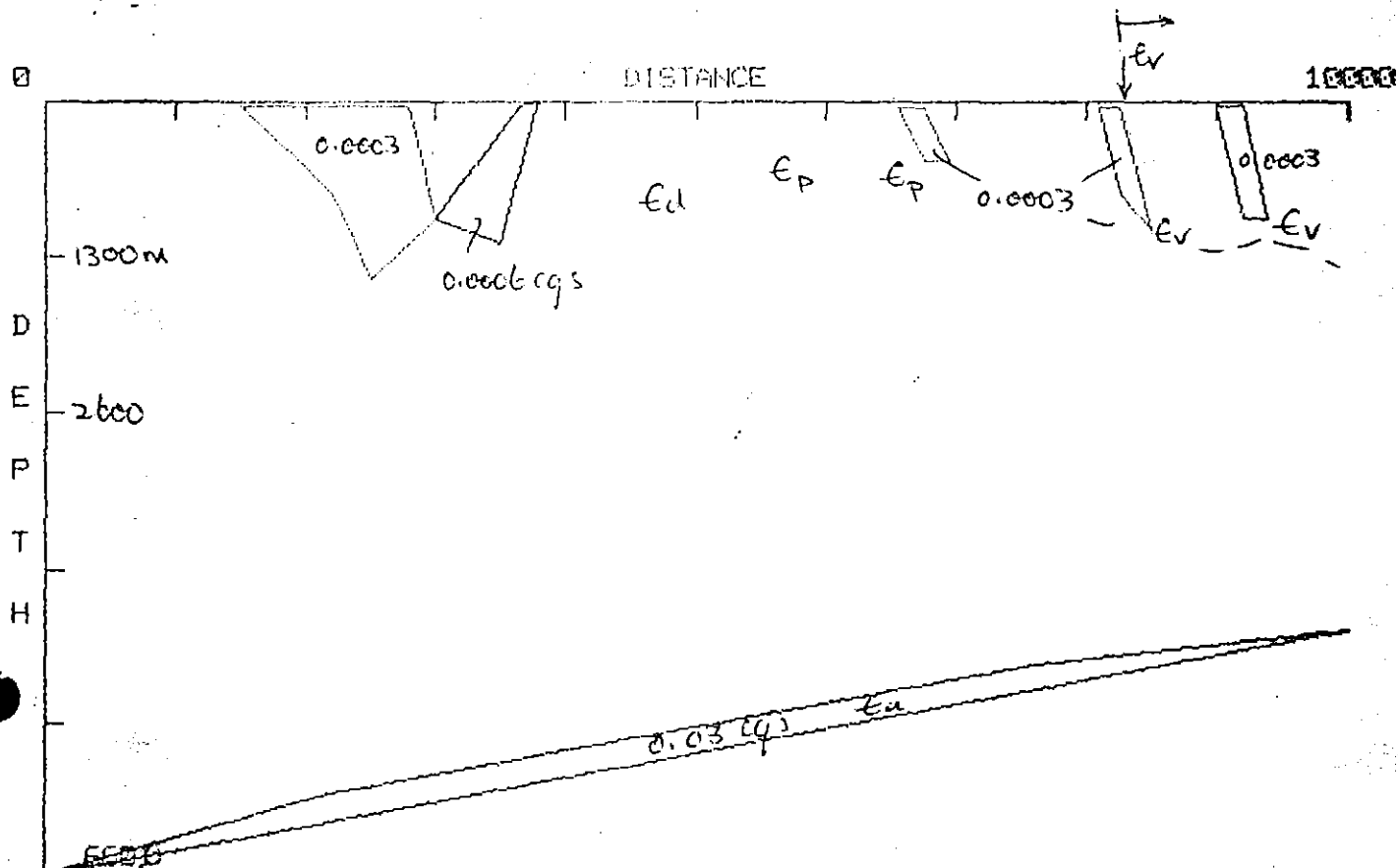
INTENSITY INCLINATION DECLINATION OBS LEVEL LINE DIRECTION  
 62000.0 -72.0 13.0 100.0 130.0

096114

LINE PARAMETERS - ORIGIN, LIMIT, INCR : 0 10000 100



B000 5 377/5393-385/5387



PROFILE 5. 377 000, 5393 000 - 385 000, 5387 000

FIGURE 10

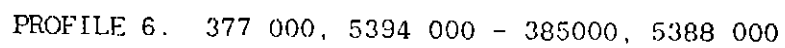
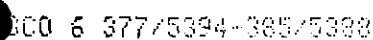
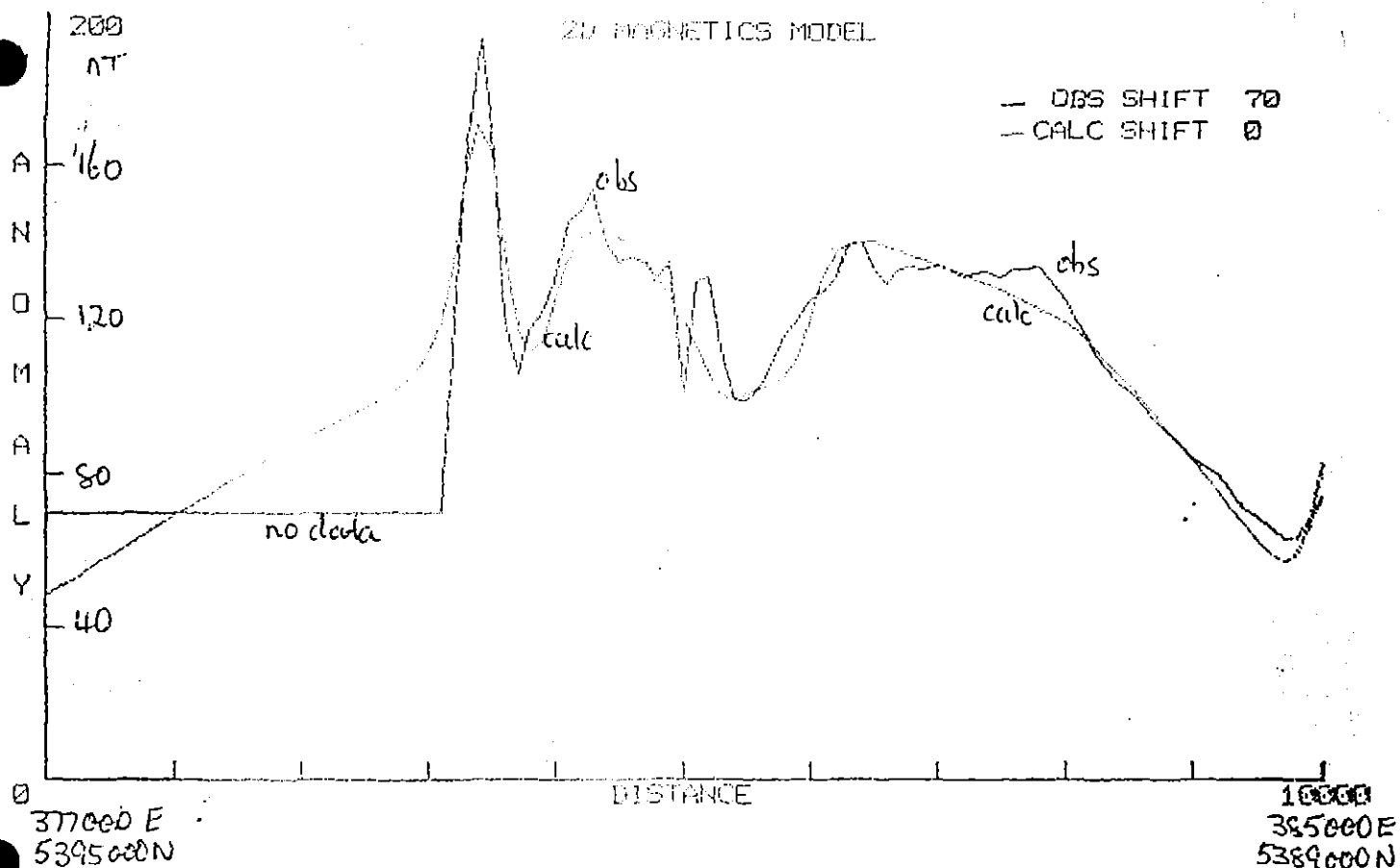


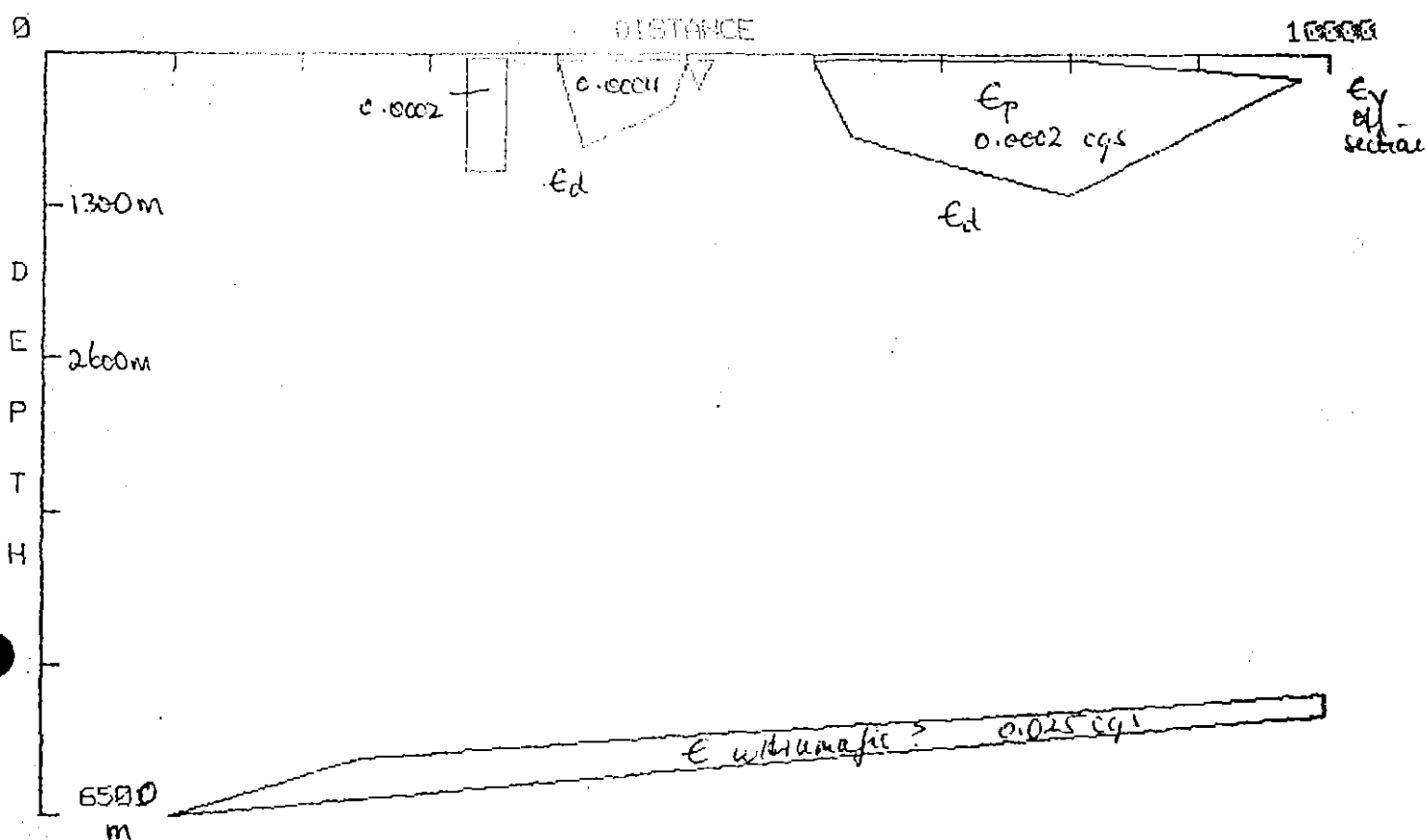
FIGURE 11

INTENSITY 62000.0 INCLINATION -72.0 DECLINATION 13.0 OBS LEVEL 100.0 LINE DIRECTION 130.0  
 096116

LINE PARAMETERS - ORIGIN, LIMIT, INC: 0 10000 100



8000 7 377/5395-385/5389



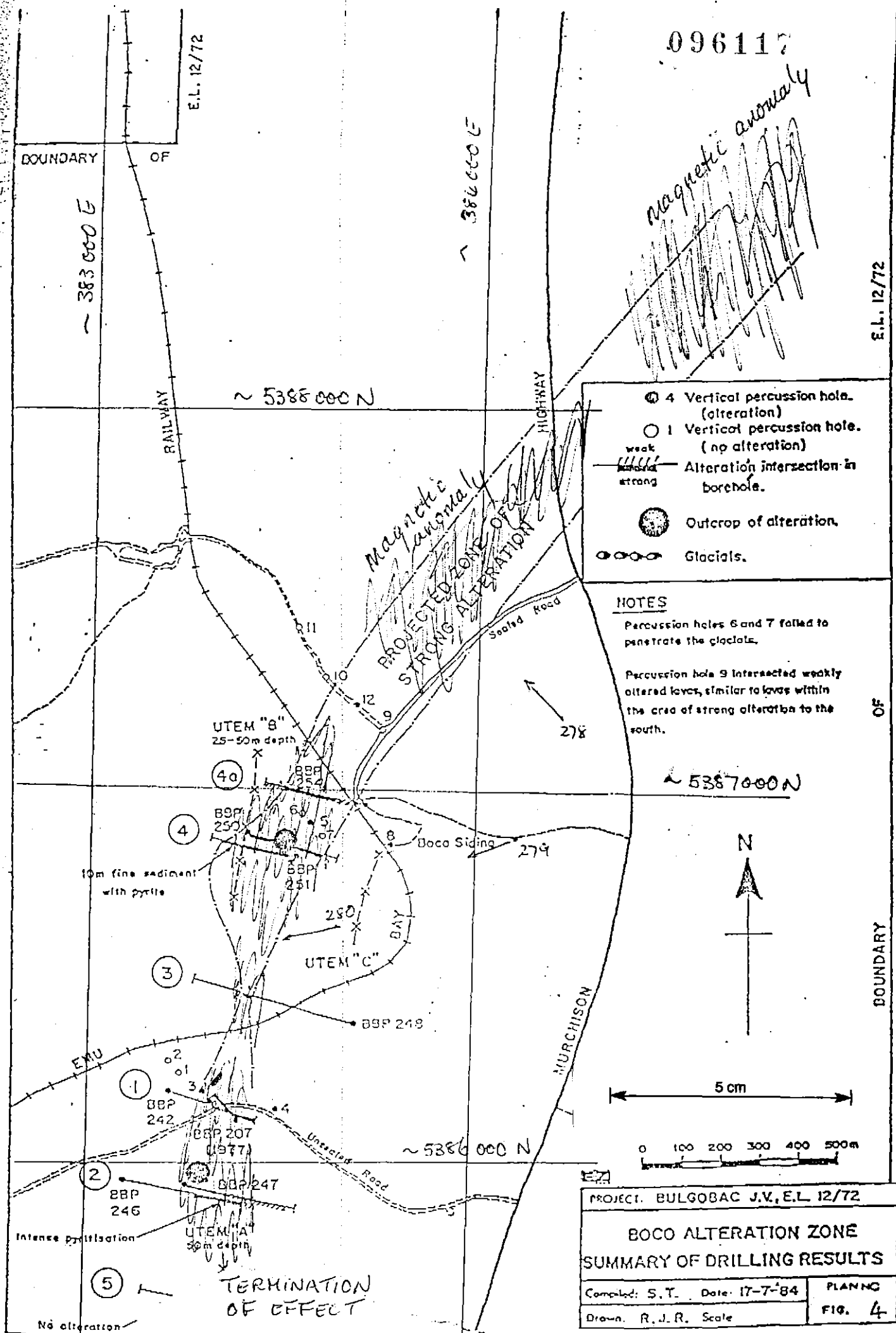
PROFILE 7. 377 000, 5395 000 - 385 000, 5389 000

FIGURE 12

096117

Magnetic anomaly

E.L. 12/72



BOCO MINERALISED ZONE AND INFERRED MAGNETIC ALTERATION FIGURE 13

1 Km

WESTERN ANCHOVY BLOCK

sources shallow sedimentary? properties equiv Ev

faulted margins?

380 E

high contrast units (III)

Ed

CENTRAL QUIET ZONE

Edondas gp + porphyry

Ed

5340 N

Alteration zone

probable deep tabular source

Ed

385 E

5385 N

Eastern ANCHOVY BLOCK

Ev

Limit of volcanics

deep source: 3-6 Km

MAFIC dip SW

gross fold?

Ed

Subtle anomalies require further review after upgrade of surface mapping

Subtle anomalies  
require further review after  
upgrade of surface mapping

EASTERN ANCHALY BLOCK  
€v

# LEAMAN GEOPHYSICS

Survey Review, Specification, Reduction, Interpretation  
Gravity, Magnetic and Seismic Methods  
Structure and Prospect Evaluation

096119

Registered office:

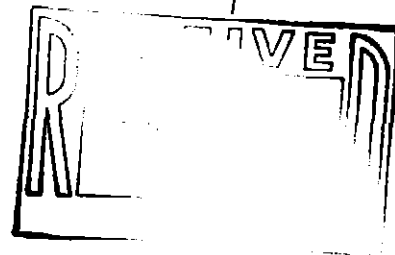
3 MALUKA STREET, BELLERIVE, TAS. 7018

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Telephone: (002) 44 1233

Fax: (002) 44 6674



August 1, 1991

Mr. F. Fitzgerald,  
Pasminco Exploration,  
PO Box 886,  
BURNIE TAS 7320

Attention: Angela

Dear Fergus,

Herewith my comments (and response) to Angela's sectional compilation across Boco, from Silver Falls, to the Henty Fault.

Re the assumptions of the section:

As you will see I have been able to find a little more space and have put the pE a little deeper; but not much under Mt Block.

Your two low angle faults have to be correct; the evidence for one near Boco is overwhelming (being overthrust helps) since things can be seen beneath it (below).

Otherwise I have accepted your conjectures as starting points.

The faulting at Pinnacles is evident and it involves everything.

Be ye not so concerned about the scatter in rocks properties - all will clarify with statistically valid numbers of results. Many things can affect an SG, ranging from weathering, porosity, bubbling and size of sample etc. Only the asymptotic upper values are significant but this is apparent only when values are plotted and there are enough of them. I therefore look to the general level of upper results provided there is no obvious mineralisation. Same applies to susceptibilities. Families of results are needed. Arithmetic averages will never give the right result for rocks in the ground. For example your bedded sediments with a range of 2.39 to 2.94 and average of 2.69 tells you that the real number is higher than 2.69 and probably approaching 2.80 (call that local knowledge based on rocks nearer Que River).

About the queries:

1. The sharp edges of the feature with Silver Falls on one side is almost certainly the result of faulted folding. At least one of the units (a shale judging from your section) is abnormally magnetic.
2. The basaltic dykes are of no consequence. How about that for an arrogant statement! They are volumetrically insignificant and I could find no correlations to account for, or include them, in any model.
3. The Boco glacials will kill most methods (sometimes the drill as well). But fear not, magnetics is totally unaffected and gravity, given the regional cover has also been unaffected - 100 m thicknesses notwithstanding.
4. I have made you some more space by increasing the depth of the pE. This view is consistent with the evolving pattern beneath the axis of the volcanic piles and it may well be that the accumulations of volcanics occur near the floor of grabens and have basement close by. Outside this axis subsequent developments have led to thick deposits of other materials. I do not, however, resile from the need to thrust the stuff out of place and across the trough of sediments.

And how has this sleight of hand been achieved? Simply by using all the available data, linking the data sets and taking on board the accumulating property data.

Re your PS. I really do believe that the Henty Fault is a tangled mess.

Now for the next chapter:

My new sections are attached. The reference level is 800 m asl. I have taken my old line 2 (Boco report) and extended it to match your section. The labelling is the same as yours.

I then pulled out the best gravity data I have and converted it to residuals. Both sets were reviewed against your proposed section. Not bad. I have seen lots worse. In fact you will recognise the upper part of your section in both models. I have found it necessary to round out the folds etc.

You will note in the gravity model that sequence densities of up to 2.80 are required (indirect confirmation of my comments above). The volcanics are less dense. The model includes the effect of the Granite Tor Granite even though it nowhere appears on the section. The belt marked E? was originally slop in which one can manipulate the junction between E and pE depending on assumptions in this single profile.

It turned out to be important.

The magnetics model is wholly consistent (thank heavens) and allowed me to place the limit of magnetic E (nearly all of it is slightly magnetic) about where my gravity balance indicated. I could only do this and account for the step in the profile a little east of Boco by filling much of the gap with basalts. This step bears no relation to the surface geology and represents a change in the underlying sequence (you simply show bedded sediments). I propose Que River Shale, basalts and correlates in this position. The model would leave little doubt that these are basal. The basalts do not need to be very thick and I have used modest contrasts for them. Variations on this theme presumably occurs across the area and the magnetics should reveal a lot about them. There is not yet enough gravity data to assist any detailing.

The sections really stress three things.

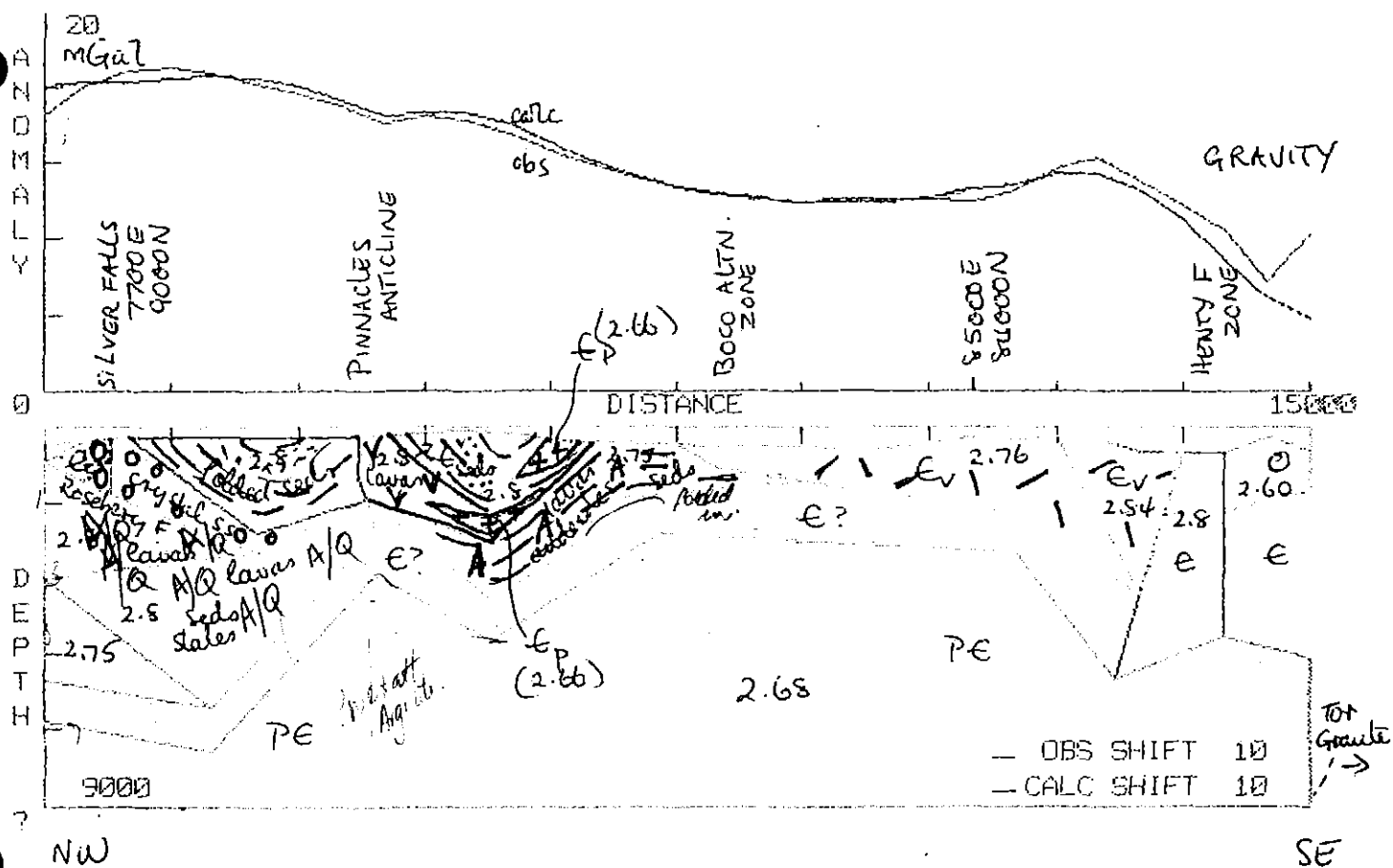
1. The abnormality of the Pinnacles zone extended.
2. The shelving of basement and placing of the volcanic piles and overthrusting of the piles.
3. Probable concealed extensions of the northern (Que-Charter) units.

I also noted that the magnetic response at 5 km is due to the terrain and not structure. Another warning concerning unbridled use of this data.

I hope this is all of some help and fuels the fire of inspiration, if not perspiration.

Regards  
David

Some interesting implications?



**APPENDIX 4**

**Cross section and accompanying letter to Dr DE Leaman.**

**AN Lorrigan, 25 July 1991**

**Reply to letter of 25 July 1991**

**Leaman Geophysics, 1 August 1991**



**PASMINCO  
EXPLORATION**

A Division of Pasmaenco Australia Limited,  
(Incorporated in Victoria)

Old Burnie Railway Station,  
(off Marine Terrace)  
Postal Address:  
P.O. Box 886, Burnie  
Tasmania, Australia, 7320  
A.C.N. 004074962

25 July 1991

Dr D Leaman  
GPO Box 320D  
BELLERIVE TAS 7001

Dear David,

The accompanying section is for the Boco - North Pinnacles EL interpretation or refinement thereof. The section corresponds to your "PROFILE 2", but is extended out to the Henty Fault.

The top 10m of the section is accurate, since I have walked nearly all of it. Beyond that I have interpreted using the following assumptions:

1. This one affects the entire section. I have restricted the depth of the Mt Read Volcanics/Dundas Group to that suggested by your earlier interpretation especially from gravity work. I have not allowed the pre-Cambrian to be greater than about 1.5km below surface.

I have trouble with this one, mainly because, at this northing, I have not observed low angle faults on the surface. The two I have on the section are possible (and there are faults there) but I do not know the dip angles. The low angle of the Rosebery Fault to the south gives some comfort!

2. That the rhyolite at Silver Falls is the same as the Pinnacles Rhyolite and that it may therefore have pumiceous volcanoclastic beneath it. The Rhyolite only has been observed, the pumiceous rocks are conjecture.
3. That the rocks interested in drill holes below the Pinnacles Rhyolite, 2.5km to the south, plunge at about 10° N and are therefore present below the Rhyolite further

North.

4. That the Western boundary of the Pinnacles Rhyolite is faulted against the sediments. This fault is observed as a low angle thrust in BPD63, 3.5km to the south.
5. That the Eastern boundary of the Rhyolite cannot be faulted. Rhyolite clasts are found in the sediments adjacent to the Rhyolite and are found nowhere else.
6. That basaltic dykes occur all through the CVC volcanics and many affect the magnetics. I have tried to reflect the proportion of dykes/CVC that occur in the field. (It should be noted however, that North, at Mt Block, the CVC's themselves are more magnetic).

The magnetic susceptibility and specific gravity readings I have put alongside the rock types were made on field specimens and on correlates in drill holes to the south.

I am unsure of the units for the magnetic susceptibility readings, the meter simply says S.I. units. Allowances have been made for odd shapes and sizes in these measurements. For most of these there are 3-4 readings each.

I was rather alarmed at the spread in s.g. readings. Our technique for measuring is as follows:

- a. soak rock overnight
- b. weight rock wet
- c. weigh rock suspended in a beaker of water
- d. weigh beaker of water alone
- e. difference between c. and d. is the volume of water displaced by rock, therefore the volume of the rock
- f. divide weight of rock by volume

The thing that worries me most is the spread in values, not the actual values. Can we improve our technique?

Because of this spread, the values I have given you include maximum and minimum values (I have eliminated any really wild looking numbers), the total numbers of readings for each rock type and an arithmetic average I hope you can make some sense of this.

The main queries I have are:

1. Could the sharp eastern boundary on that N-E trending feature be caused by the occurrence of rhyolite and porphyries east of this line but not west of it (until Silver Falls where the magnetic character falls off again).
2. Would the dykes make a difference to the magnetic character of the CVC? They seem to occur more in these rocks than in the sediments.
3. Do the Boco glacials influence the gravity or magnetics? They are up to 100m thick at least.
4. Is it possible to push the PC down a bit to have it maybe sawtoothed, so that I can accommodate these steep faults?

Hope you can set us thinking again.

Cheers Angela

Angela N Lorrigan (geologist)

P.S. The Henty Fault really looks like that, at the surface at least. I have been able to map some brilliant exposure since the Mackintosh Dam has been down - also found a lot of old fishing lures !

096122

**APPENDIX 5**

**EL 2/90 Boco Area Update Interpretation  
Gravity and Magnetics (including Gravity Acquisition)  
Leaman Geophysics, December 1991**

# LEAMAN GEOPHYSICS

Survey Review, Specification, Reduction, Interpretation  
Gravity, Magnetic and Seismic Methods  
Structure and Prospect Evaluation

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096123

EL 2/90 BULGOBAC  
BOCO AREA UPDATE INTERPRETATION  
GRAVITY AND MAGNETICS  
(Including gravity acquisition)  
for  
PASMINCO EXPLORATION  
by  
Dr. D.E. Leaman

December 1991

BOCOUP1

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17. 385500 mN
18. 384500 mN
- 19A. Synthesis (without gravity field, 19B)
- 19B.

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MAP 1 : in folder: Residual Bouguer anomalies

Comprehensive infill of the gravity data base in the Boco area followed by an integrated gravity - magnetic interpretation has suggested a definite structural setting for the Boco mineralisation and alteration.

Boco is clearly a critical site when seen in context.

It lies adjacent to a major E-ENE - trending structure which has offset and controlled volcanism as marked by primary variations in composition and structure N and S of it. This feature is inferred to possess Cambrian control.

The site lies along a NNE-SSW - trending alteration axis, mappable magnetically, which overlies an older basin margin structure. The extension of this axis, presenting massive alteration, extends along the valley used by the railway. Boco Creek, the known alteration and the inferred extension to the north lie along a single structure with a kink near Boco Siding where it crosses the ENE feature. The structure and associated effects are presumed to be an early Devonian rejuvenation.

Local NW-SE dextral disruption is impressed at Boco where the above structures intersect and this also offsets N-S structures later engraved by the glacial activity. These NW and N-S sets must be younger (late Devonian?).

This sequence of events inferred from the geophysical and structural patterns could imply that the known alteration and sulphides (predominantly pyrite) are associated with Devonian activity and fluids and disruption of volcanics possibly emplaced on an east soling detachment overlying an old margin. The detachment would be exposed at or west of the mapped limit of volcanics.

This concept would restrict prospectivity since the base metals sought are volcanogenic and any deposit in volcanics as a result of the above process would not be primary.

A Cambrian structure is present, however, near 386500 mN. Any Cambrian mineralisation must lie near this axis, wherever it is now. The zone in which three volcanic compositional patterns merge is the most likely target site. This occurs near 384 000 mE, 5386-5387 000 mN and does not appear to have been tested.

Gravity data in this region, although rendered ambiguous by loss of cover control, do indicate an anomalous bedrock.

Further exploration in this area must test the following.

1. The base metal content of the NNE structure away from the Boco complex. Single holes to north and south of Boco (near 384500, 389000; 382200, 384500; see \* Figure 19B) would establish the uniformity or otherwise of this zone. No change from Boco would mean no further interest is justifiable.
2. The structure glacially etched should also be checked in case it represents an old carrier. It should be drilled well clear of the alteration axis or the structures at 386500 mN. A site such as 384000, 388500 is suggested. If the feature is barren then it can be considered tested.

Both 1 and 2 come together at Boco and work at Boco is not able to discriminate them.

3. The anomalous area east of Boco must also be tested. Suggested positions lie between 383800, 386000 and 384400, 387000. If this zone also proves barren then it may be concluded that any material at Boco is due to a transfer, redeposition or a barren Devonian system and the site may be relinquished since any worthwhile targets are likely to lie at depths of up to 2 km near the base of the detachments in the primary basin structures.

Seismic traverses near 386500 mN or shallow percussion drilling may provide the most cost effective means of assessing the third option. Glacial thicknesses may be recycled into the gravity models of the zone and the implications for the underlying units re-assessed.

## INTRODUCTION

Preliminary interpretation of detailed aeromagnetic data acquired earlier this year (see Leaman, 1991) in the Boco area (Figure 1) indicated that the magnetic properties of the central volcanic sequence of the Mt Read Volcanics were variable and that the units possessed finite thicknesses. This was consistent with previous regional findings which implied the presence of detachments.

The preliminary work work also showed that the known alteration and barren sulphides in the vicinity of Boco Siding were aligned along the axis of an extensive negative anomaly. It was inferred that this might mean more extensive alteration and consequently further possible sites for mineralisation.

Since the implied variations in the volcanics were difficult to recognise in field conditions, or to confirm, and appraisal of the structural setting of the alteration forms an important element in evaluation of prospectivity for base metals of Cambrian age an additional method of survey was required. The key question was, is the alteration part of a Cambrian system or simply some Devonian fluid pass in a rejuvenated structure?

The gravity method was employed in order to provide semi-regional coverage and the survey and acquisition details are described in this report.

The two structural-geophysical data sets have been combined to provide an assessment of the structural setting of the Boco site and particular features near it.

## GRAVITY SURVEY

Regional gravity coverage, with nominal stations spacings of about 1000 m, was provided by the Department of Mines and Mineral Resources as part of the Mt Read Volcanics Project (see Richardson & Leaman, 1987). A more detailed survey was undertaken at Boco Siding as part of a method evaluation trial for resolution of glacial thickness. The gravity method was shown to be almost as effective as seismic methods and about as cost effective overall. A density contrast of about  $-0.7 \text{ t/m}^3$  was indicated between glacials and volcanics.

The data available was unable to define relative trends or provide useful correlations with magnetic data. The latter present an array of unexpected elements and orientations when compared with extant mapping (Corbett & McNeill, 1986)(Fig 2).

The regional data have been infilled by Pasminco Exploration in the Boco region. The coverage now available is shown in Figure 3 and this can be related to known geology. Much of the region is blanketed by glacial and other Recent deposits and previous drilling has shown this to be up to 97 m thick, with local and abrupt variations in thickness.

In order to be able to assess, and if necessary remove, the effects of glacial cover several detailed profiles were inset within the general coverage. These were designed to provide estimates of gradients and glacial effects while the station spread was to provide general definition of the gravity field and any primary trends. The five E-W line segments observed are evident in Figure 3.

The survey was undertaken by Dr. R. Richardson of the DMMR under a contract arrangement with Pasminco Exploration with terrain correction, data checking and compilation by Leaman Geophysics.

The general reproducibility of observed gravity is about 0.02 mGal and elevations were determined using a pressure tube. No significant errors have been introduced as a result of acquisition methods. Terrain corrections vary from 0.4 to 3 mGal in the area and the maximum probable error (as an underestimate from the real value) is likely to be about 0.15 mGal. For most stations it is, within the station description and other detailed limitations, estimated at about 0.02 to 0.05 mGal. The RMS error in the survey is considered less than 0.1 mGal.

The compilation shown in Figure 3 includes several generations of surveys; some with very different elevation precision. Results have been shown to be generally consistent and within about 0.3 mGal overall but a few older stations have been identified as suspect and have yet to be confirmed (by the DMMR). These may ultimately be corrected or deleted from the data base but do not bias or compromise the present report or its conclusions.

The Bouguer anomaly was derived using the 1930 ellipsoid (standard for Tasmania), with ties to the state network, and a density of  $2.67 \text{ t/m}^3$ . It has been converted directly to residual values using the method of Leaman & Richardson (1989) and the updated regional model, prepared by Leaman Geophysics for the procedure, known as MANTLE91.

The resultant residual values are presented in Figure 4 and Map 1. Figure 4B overprints the residual field on the geological basemap.

The long line regional modes shown in Figures 8 and 10 use data in this form.

The detailed models of the Boco area use more specific data compensation.

Note that most of the residual values in the area are negative. This should not happen when the rocks of the area are known to be denser than the Bouguer density and occur from sea level to elevations of some 600 m. All values should be positive. The negative values are produced by the interference effects of granites to the northwest, northeast and south (Meredith, Dolcoath extended, Tor-Heemskirk). The effect of these bodies at Boco (using the current 3D model for them developed by Leaman Geophysics) is about  $-7.5 \text{ mGal}$ . This means that residuals due to local rocks in the Boco area are really about  $+6$  to  $+10 \text{ mGal}$ .

Each profile modelled has been individually corrected for granite effects so as to allow amplification and examination of purely local sources.

Thus all primary regional sources (mantle, oceans, granites etc) have been removed for profile analysis. Any errors induced by this processing, given the small dimensions of the area compensated, will be less than the RMS error in the data.

## DISCUSSION

## PREVIOUS WORK

Previous analytical work involving gravity and magnetic data has been presented in Leaman (1991) with other regional variations noted by memo. Relevant diagrams from this documentation have been reproduced here (Figures 8 to 10).

All previous work has focussed on the dominant magnetic feature NW of Boco, and which influences the the field across a 20 km diameter. Its source is believed to be a pod of massive ultramafics at moderate depths (>2.5 km). The pod is thought to have a westerly dip but no 3D modelling has yet been undertaken to confirm this.

Superimposed effects are sourced within the volcanics but Dundas Group rocks are generally non magnetic. The contrasts presented by the volcanics, and confirmed by most observations to date, are relatively low (0.00005 - 0.0004 cgs), but significant in local terms. The variations, some of which may be reversed magnetisations (no information is available on either remanence or Koenigsburger ratio), provide some definition of structural or lithological changes. All calculation undertaken to date suggests either depth limitation of these volcanic sources or loss of contrast with depth. Detachment has been implied.

More regional studies, as reproduced in Figures 8 and 10, put the gross features in perspective.

The models shown in these figures represent an evolution within a six month period. Figure 9 shows the location of the profiles. Each samples the Boco zone and reveals a relatively thin Cambrian section (maximum 4 km) at and east of the easting of Boco although this may be locally increased near Tullah. Each also demonstrates a thickening of section to 6 or 8 km in the west of the region but the details of this zone have only been approximated and much of the thickness could involve part of the Oonah Formation.

Both sections fully account for the large gravity and magnetic responses in the region and show that the accounting requires the presence of Crimson Creek Formation and ultramafics. A separate additional strongly magnetic source is required near Tullah - Murchison Granite. No other rocks, known or inferred, in this region can contribute to the magnetic field in any substantial way - and more than 200 nT is required over a large area - in order to produce the large steps evident in the regional profiles.

The curve fit parameter shown as +60 nT is critical to consistent and realistic modelling of structure and units. This was defined by locking the interpretation to Tyennan "basement" in the east where zero levels are more readily recognised. Work elsewhere in western Tasmania with this data set confirms that a shift of 50 to 60 nT is required for the magnetic data but that the gravity set is nearly neutral (zero shift).

These parameters must, therefore, be used in any detailed analyses.

Improvements in data, changes in concept, and further work developed the section shown in Figure 10 from that of Figure 8. It suggests the presence of older basins, terminations of mafic/ultramafic structural markers and lateral or marginal basin redevelopment.

An older primary basin margin is inferred to lie near the easting of Boco Siding but it is now concealed by a slab of volcanics. If the dips and depth ranges implied in earlier work are accepted then this volcanic cover is not simply unconformable but probably detached. The models have not been sufficiently detailed nor resolving to be able to suggest the nature of the necessary relationships and it is possible that a mixture of sedimentological and structural relationships are present.

The regional assessment suggests the setting for the alteration and any possible mineralisation at Boco and poses some important questions.

Is the Boco alteration zone - as indicated by magnetics and shown in Figure 6 (see feature in Figure 5) - simply the late Devonian expression of the underlying margin after westward dislocation of the volcanics?

Crucial to any answer is a decision about the volcanics. Are they in place?

#### BOCO INTERPRETATION

Each of the detailed gravity profiles (Figure 3) was examined and correlated as a group with the available drilling results for the thickness of glacials in the area. This was done in order to provide a valid general estimate of till density and contrast and to assess the nature of possible contributions to the gravity field. It was found that a density contrast of about  $-0.7 \text{ t/m}^3$  explained all elements and profiles except those on line 386500 N (see discussion below). This value, implying a bulk till density (matrix and contents) of about  $2.0 \text{ t/m}^3$ , was also derived from a more restricted gravity-seismic study at Boco Siding (Richardson, 1986).

With a firm estimate of surficial contributions in hand, each profile was then evaluated using both gravity and magnetic data sets.

Local regional effects, based on the concepts of Figures 8 and 10, were assessed first.

The results are shown in Figures 11 and 12. There are many consistent aspects of the alternatives shown but the shift parameters determine that those of Figure 11 CANNOT be true.

The essential difference lies in the addition of ultramafics to provide the field intensities and spread required. These have been inserted as a basal slab in Figure 12 but this cannot be their structural position (see Figure 10). They have been used merely to generate the shift and match required. Since they are unlikely to reach depths less than 2.5 km - to be used for detailed study - their actual position is not particularly critical or relevant to this report and time was not spent attempting to fully define them. A full

regional perspective is required to determine and properly related their true position and scale.

Other local sections (below) do not attempt this and simply carry an insertion of material - as an EQUIVALENT SOURCE, not a real source distribution - merely to provide now established regional base levels.

An equivalent source is not necessarily a real option in geological terms - and is not meant as such. It is intended to provide an identical field response to the real condition, were it to be defined. The real condition cannot be established with short, local 2D sections and, in any event, is not relevant to near surface exploration in this area provided the likely effects are recognised and removed. This at least has been done and the modelling has then focussed on relatively shallow effects.

This process clearly includes some assumptions and risks but pending full appraisal of the deep magnetic units is the best that can be done.

Figure 12 shows that the magnetic source distribution is gravimetrically consistent and does implicate the Crimson Creek Formation since a strong magnetic response is required with little or no bulk density change. Thick mafic rocks could not achieve this. As noted above the Cambrian ultramafics could, and in geological terms should, be placed away from the base of the section.

The gravity and magnetic compilations; the magnetics for a terrain clearance of about 120 m, are superimposed in Figure 5B. All trends which are readily discernible have been summarised in Figure 7. It will be observed that the different quality of the two data sets leads to some differentiation but there is a striking commonality. Each set defines some unique features and the two together clearly approach all the structural elements of the area.

The diagram also suggests the shallowest expression of the deep mafic source. This has been estimated from the gradients (first derivative) of a high level continuation of the magnetic data which has removed the shallow effects. The boundary patterned may represent an ultimate limit of the material or limits of primary large scale downfaulting. Its position is approximate and consideration of more detailed elements suggests how it might be re-located near 384 000 mE. The differences in trend patterns observed in the northern and southern parts of the area are obvious and two particular zones and trends emerge (NNE and ENE).

#### Modelling.

It would be reasonable to review profiles commencing at Boco where most of the apparent control is available. Line 386500 mN, however, is anomalous, and in order to understand why and how this was deduced it is necessary to consider the profiles as a set starting with the regional link line at 391000 mN (Figures 11 and 12).

Line 891 has been described above in terms of its regional place and

full section implications as a link to the entire structure and data set. But it also reveals that the gravity and magnetic fields are relatively quiet away from those parts of the volcanics which are here till covered.

This pattern is emphasized by lines 885 and 875 (Figures 13 and 14) where the magnetic field varies gently in association with exposed porphyry NW of Boco or some volcanics east of Boco. The gravity field responds to the volume of porphyry or till and the glacial channel is easily recognised. The known controls comfortably fit the field. Removal of glacial effects indicates that the porphyry (if that is indeed what it is) is of limited extent and volume and that the volcanics and Dundas Group materials elsewhere are relatively uniform in mass terms. The thickest development of the porphyry may well correspond to the structural control which has influenced deposition or downfaulting of the Dundas Group.

No mass anomalies are obvious north of Boco. The inferred alteration effect (Figure 6) is seen in perspective as a relatively minor change in volcanics near the glacially etched zone.

Only in the west, where Dundas Group rocks are abundant and perhaps of different composition as well as thickness, is there any change (see also regional lines in Figures 8, 10).

Line 865 (Figures 15, 16) cannot be resolved or explained in this way. The magnetic character is more variable and parts of the volcanics have been altered, or reversed (magnetically or structurally). Review of Figures 4, 5 and 7 shows that much happens near the northing of this profile in terms of fracture grain and the profile reflects some of this information.

More crucial is the effect on the residual anomalies. Figure 15 suggests what would happen if the character established to the north were extended past Boco using the same contrasts and the known till thicknesses!

This suggests that either the properties of the till change markedly locally (to one third of normal) or that there is an underlying mass change. The primary suspects for the latter, the only realistic option, are indicated by the magnetic changes in the volcanics.

Figure 16 confirms this. But anomalies remain. The fit offered requires a considerable and careful balancing of both volcanic units and cover, and control is lost near 383700 to 384000 mE. It is this zone which requires either substantial changes in till cover or extra and localised mass beneath.

Line 855 (Figure 17) represents a partial return to the normalcy of the northern profiles. The complex and variable volcanic units are west of Boco and the magnetic field is stable to the east - while the gravity field is not - showing that cover may be involved.

Line 845 (Figure 18) develops these concepts by contrasting the volcanics to east and west of 383 000 mE. To the east the structural and contrast style is very much like that inferred north of Boco (line 865). A similar change occurs to the north but the contrasts

are reduced (Figure 19B). Glacial effects on line 845 are much less and the underlying variations in the volcanics are dominant.

The profiles show that a major change occurs near 386500 mN and the regional data (Figures 4 and 5) confirm this. Note especially the field pattern evident in Figure 4 where the gravity field west of Boco is positive north of this northing but negative south of it; a situation which is reversed east of Boco. The largest systematic changes in the field take place across this northing (6 mGal).

The position of glacial channels is shown in Figure 19. These generally bear only modest correlation with major lithological or other trends and yet major weaknesses must have been excised. Only SE of Boco is there any clear association between glacials, etching and gross structure. A small (?) dextral shear is indicated. The glacial channel south of it is much narrower, but probably of the same depth.

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Report submitted on behalf of Leaman Geophysics

by



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Date: 16/12/91

Tabulation of all gravity data as used in construction of Figures 3 and 4.

The columns define

station number (year code, source code, station)  
coordinates (AMG east and north)  
elevation (metres)  
observed gravity  
theoretical gravity (1930 ellipsoid)  
terrain correction  
Bouguer anomaly (2.67 density)

|           |          |          |        |            |            |      |             |
|-----------|----------|----------|--------|------------|------------|------|-------------|
| 7303.1042 | 381018.0 | 390671.9 | 456.46 | 980.220820 | 980.325646 | 0.27 | -14.76*BMR7 |
| 6750.2176 | 383910.8 | 384407.6 | 284.59 | 980.256000 | 980.330739 | 0.37 | -18.39**MD6 |
| 6750.2177 | 384279.5 | 389077.9 | 404.90 | 980.228560 | 980.326975 | 0.80 | -17.97**MD6 |
| 9052.3015 | 380254.0 | 385252.0 | 432.94 | 980.229539 | 980.330009 | 0.44 | -14.87PEK06 |
| 9052.3016 | 380283.0 | 385135.0 | 443.31 | 980.227448 | 980.330103 | 0.46 | -14.99PEK06 |
| 9052.3017 | 380223.0 | 384982.0 | 454.09 | 980.225419 | 980.330226 | 0.37 | -15.11PEK06 |
| 9052.3018 | 380243.0 | 384842.0 | 458.85 | 980.224746 | 980.330339 | 0.36 | -14.97PEK06 |
| 9052.3019 | 380077.0 | 384677.0 | 480.48 | 980.220177 | 980.330470 | 0.32 | -15.45PEK06 |
| 9052.3044 | 380078.0 | 382240.0 | 234.61 | 980.264975 | 980.332437 | 2.47 | -18.84PEK06 |
| 9052.3086 | 383112.0 | 382519.0 | 275.50 | 980.257480 | 980.332252 | 1.81 | -18.77PEK06 |
| 9052.3091 | 380037.0 | 386345.0 | 485.07 | 980.217944 | 980.329124 | 0.51 | -15.25PEK06 |
| 9052.3092 | 380078.0 | 386531.0 | 502.85 | 980.213967 | 980.328974 | 0.46 | -15.63PEK06 |
| 9052.3093 | 380119.0 | 386710.0 | 490.34 | 980.216465 | 980.328830 | 0.48 | -15.43PEK06 |
| 9052.3094 | 380157.0 | 386891.0 | 552.67 | 980.204330 | 980.328685 | 0.67 | -13.78PEK06 |
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| 9052.3099 | 383027.0 | 383637.0 | 322.29 | 980.248424 | 980.331349 | 0.62 | -18.91PEK06 |
| 9052.3100 | 382915.0 | 383480.0 | 314.76 | 980.250372 | 980.331474 | 0.86 | -18.33PEK06 |
| 9052.3101 | 382442.0 | 383600.0 | 341.79 | 980.246028 | 980.331371 | 1.10 | -17.01PEK06 |
| 9052.3102 | 382727.0 | 382816.0 | 356.82 | 980.241725 | 980.332007 | 1.78 | -18.31PEK06 |
| 9052.3103 | 382455.0 | 382352.0 | 442.27 | 980.223971 | 980.332378 | 2.17 | -19.24PEK06 |
| 9052.3104 | 382257.0 | 382198.0 | 441.43 | 980.224522 | 980.332500 | 2.24 | -18.90PEK06 |
| 9052.3111 | 383228.0 | 384462.0 | 284.03 | 980.256175 | 980.330686 | 0.35 | -18.29PEK06 |
| 9052.3112 | 383361.0 | 384882.0 | 299.12 | 980.253024 | 980.330348 | 0.39 | -18.10PEK06 |
| 9052.3113 | 383473.0 | 385228.0 | 320.00 | 980.248333 | 980.330071 | 0.41 | -18.38PEK06 |
| 9052.3166 | 380123.0 | 383266.0 | 488.49 | 980.218903 | 980.331609 | 0.86 | -15.75PEK06 |
| 9052.3171 | 380553.0 | 385093.0 | 436.11 | 980.228886 | 980.330141 | 0.46 | -15.01PEK06 |
| 9052.3172 | 380454.0 | 384956.0 | 451.64 | 980.225847 | 980.330250 | 0.40 | -15.16PEK06 |
| 9052.3173 | 380539.0 | 384803.0 | 476.21 | 980.220443 | 980.330375 | 0.38 | -15.87PEK06 |
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| 9052.3178 | 380996.0 | 383921.0 | 498.71 | 980.215201 | 980.331093 | 0.85 | -16.94PEK06 |
| 9052.3179 | 381206.0 | 383811.0 | 424.75 | 980.229151 | 980.331184 | 1.25 | -17.23PEK06 |
| 9052.3180 | 380577.0 | 383503.0 | 471.68 | 980.219708 | 980.331424 | 2.71 | -16.22PEK06 |
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| 9052.3217 | 383518.0 | 384427.0 | 295.11 | 980.253921 | 980.330718 | 0.36 | -18.39PEK06 |
| 9052.3218 | 383848.0 | 384454.0 | 308.30 | 980.251280 | 980.330700 | 0.39 | -18.39PEK06 |
| 9052.3219 | 383720.0 | 383738.0 | 268.17 | 980.258602 | 980.331276 | 0.46 | -19.47PEK06 |
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| 9052.3221 | 381059.0 | 385376.0 | 427.39 | 980.229641 | 980.329919 | 0.47 | -15.74PEK06 |
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| 9052.3223 | 381634.0 | 385270.0 | 422.12 | 980.230334 | 980.330013 | 0.55 | -16.09PEK06 |
| 9052.3224 | 380797.0 | 385555.0 | 406.31 | 980.233975 | 980.329771 | 0.50 | -15.37PEK06 |
| 9052.3248 | 384111.0 | 382684.0 | 315.75 | 980.249030 | 980.332132 | 1.26 | -19.73PEK05 |
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| 9052.3250 | 381652.0 | 382015.0 | 397.52 | 980.235613 | 980.332640 | 1.77 | -17.06PEK05 |
| 9052.3251 | 382055.0 | 383690.0 | 441.00 | 980.225815 | 980.331293 | 1.48 | -17.25PEK05 |
| 9052.3262 | 382096.0 | 385376.0 | 399.34 | 980.234318 | 980.329933 | 0.60 | -16.46PEK05 |
| 9052.3263 | 382361.0 | 385806.0 | 386.42 | 980.235562 | 980.329590 | 0.61 | -17.41PEK05 |
| 9052.3264 | 382686.0 | 385839.0 | 355.43 | 980.241627 | 980.329567 | 0.42 | -17.60PEK05 |
| 9052.3265 | 382475.0 | 386642.0 | 476.36 | 980.216850 | 980.328917 | 0.88 | -17.48PEK05 |
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| 9052.3267 | 382097.0 | 386738.0 | 463.11 | 980.221014 | 980.328834 | 0.85 | -15.87PEK05 |
| 9052.3268 | 381676.0 | 386355.0 | 444.80 | 980.224921 | 980.329138 | 0.82 | -15.90PEK05 |
| 9052.3281 | 381290.0 | 382470.0 | 439.00 | 980.226936 | 980.332268 | 1.41 | -17.56PEK05 |
| 9052.3282 | 381030.0 | 382795.0 | 393.00 | 980.234071 | 980.332002 | 1.53 | -19.09PEK05 |
| 9052.3283 | 382115.0 | 382609.0 | 499.88 | 980.213180 | 980.332166 | 2.40 | -18.25PEK05 |
| 9052.3284 | 381835.0 | 382705.0 | 471.00 | 980.219338 | 980.332085 | 2.81 | -17.28PEK05 |
| 9052.3294 | 383947.0 | 382113.0 | 231.15 | 980.265798 | 980.332591 | 0.91 | -20.42PEK05 |
| 9052.3298 | 385275.0 | 382162.0 | 495.52 | 980.211206 | 980.332569 | 3.25 | -20.64PEK05 |
| 9052.3299 | 385293.0 | 382480.0 | 489.64 | 980.211576 | 980.332312 | 3.91 | -20.51PEK05 |
| 8651.7023 | 383740.0 | 383870.0 | 299.00 | 980.252921 | 980.331170 | 0.49 | -18.94*MRD9 |

|           |          |          |        |            |            |      |             |
|-----------|----------|----------|--------|------------|------------|------|-------------|
| 8651.7024 | 383140.0 | 383950.0 | 306.00 | 980.251953 | 980.331098 | 0.58 | -18.37*MRD9 |
| 8651.7025 | 382930.0 | 383180.0 | 272.00 | 980.259595 | 980.331716 | 0.92 | -17.70*MRD9 |
| 8651.7031 | 382890.0 | 382020.0 | 267.00 | 980.259313 | 980.332652 | 1.03 | -19.79*MRD9 |
| 8651.7034 | 383910.0 | 383030.0 | 314.00 | 980.250045 | 980.331850 | 1.31 | -18.73*MRD9 |
| 8651.7035 | 381940.0 | 382880.0 | 546.00 | 980.203261 | 980.331945 | 2.82 | -18.45*MRD9 |
| 8651.7036 | 384060.0 | 385910.0 | 362.00 | 980.239874 | 980.329528 | 0.53 | -17.92*MRD9 |
| 8651.7037 | 384150.0 | 384970.0 | 366.00 | 980.240081 | 980.330288 | 1.55 | -16.66*MRD9 |
| 8651.7040 | 383020.0 | 384880.0 | 299.00 | 980.254632 | 980.330346 | 0.52 | -16.38*MRD9 |
| 8651.7042 | 385900.0 | 383120.0 | 531.00 | 980.206072 | 980.331803 | 5.00 | -16.27*MRD9 |
| 8651.7043 | 385880.0 | 383970.0 | 590.00 | 980.194895 | 980.331117 | 5.25 | -14.91*MRD9 |
| 8651.7044 | 385070.0 | 385980.0 | 397.00 | 980.232871 | 980.329485 | 2.15 | -16.37*MRD9 |
| 8651.7045 | 384760.0 | 384900.0 | 299.00 | 980.250167 | 980.330352 | 2.08 | -19.29*MRD9 |
| 8651.7046 | 385160.0 | 385180.0 | 330.00 | 980.244123 | 980.330131 | 3.68 | -17.42*MRD9 |
| 8651.7047 | 385870.0 | 385250.0 | 355.00 | 980.236800 | 980.330084 | 3.20 | -20.25*MRD9 |
| 8651.7048 | 386080.0 | 385850.0 | 541.00 | 980.203374 | 980.329603 | 4.40 | -15.40*MRD9 |
| 8651.7049 | 383720.0 | 387000.0 | 397.00 | 980.232033 | 980.328644 | 0.80 | -17.70*MRD9 |
| 8651.7050 | 384050.0 | 387970.0 | 412.00 | 980.228218 | 980.327866 | 0.90 | -17.70*MRD9 |
| 8651.7051 | 384070.0 | 389000.0 | 393.00 | 980.231104 | 980.327035 | 0.67 | -17.95*MRD9 |
| 8651.7052 | 384140.0 | 390020.0 | 399.00 | 980.231132 | 980.326213 | 0.53 | -16.06*MRD9 |
| 8651.7053 | 383070.0 | 387930.0 | 402.00 | 980.232016 | 980.327885 | 0.62 | -16.17*MRD9 |
| 8651.7054 | 382860.0 | 387200.0 | 492.00 | 980.215039 | 980.328471 | 1.20 | -15.45*MRD9 |
| 8651.7055 | 381930.0 | 388850.0 | 523.00 | 980.207266 | 980.327128 | 0.72 | -16.26*MRD9 |
| 8651.7056 | 381990.0 | 390010.0 | 455.00 | 980.220275 | 980.326193 | 0.33 | -16.08*MRD9 |
| 8651.7057 | 383130.0 | 388950.0 | 391.00 | 980.232561 | 980.327063 | 0.60 | -16.99*MRD9 |
| 8651.7058 | 383000.0 | 389980.0 | 394.00 | 980.232016 | 980.326230 | 0.68 | -16.03*MRD9 |
| 8651.7059 | 381930.0 | 386730.0 | 439.00 | 980.226272 | 980.328838 | 0.80 | -15.41*MRD9 |
| 8651.8155 | 382160.0 | 388000.0 | 449.00 | 980.223697 | 980.327817 | 0.46 | -15.34*MRD9 |
| 8651.8156 | 381380.0 | 386920.0 | 502.00 | 980.214325 | 980.328678 | 0.74 | -14.86*MRD9 |
| 8651.8158 | 380340.0 | 390080.0 | 438.00 | 980.225492 | 980.326114 | 0.33 | -14.13*MRD9 |
| 8651.8160 | 380770.0 | 389000.0 | 610.00 | 980.193927 | 980.326991 | 0.37 | -12.69*MRD9 |
| 8651.8161 | 386920.0 | 389020.0 | 520.00 | 980.206072 | 980.327055 | 0.81 | -17.88*MRD9 |
| 8651.8157 | 381110.0 | 387860.0 | 543.00 | 980.206955 | 980.327916 | 0.60 | -13.54*MRD9 |
| 8651.8159 | 380950.0 | 389920.0 | 524.00 | 980.209315 | 980.326251 | 0.29 | -13.57*MRD9 |
| 8651.7093 | 380100.0 | 385730.0 | 461.00 | 980.224468 | 980.329621 | 0.55 | -13.92*MRD9 |
| 8651.8081 | 381140.0 | 383140.0 | 259.00 | 980.259648 | 980.331725 | 2.80 | -18.33*MRD5 |
| 8651.8089 | 380180.0 | 385090.0 | 430.00 | 980.230410 | 980.330138 | 0.33 | -14.81*MRD5 |
| 8651.8090 | 380920.0 | 385200.0 | 499.00 | 980.214586 | 980.330059 | 0.49 | -16.82*MRD5 |
| 8651.8091 | 383120.0 | 386020.0 | 356.00 | 980.241943 | 980.329427 | 0.38 | -17.08*MRD5 |
| 8651.8092 | 382220.0 | 385850.0 | 372.00 | 980.238816 | 980.329552 | 0.60 | -16.96*MRD5 |
| 8651.8093 | 382250.0 | 385140.0 | 458.00 | 980.219937 | 980.330126 | 0.76 | -19.33*MRD5 |
| 8651.8094 | 381070.0 | 385880.0 | 386.00 | 980.237849 | 980.329513 | 0.73 | -15.00*MRD5 |
| 8651.8096 | 381860.0 | 384180.0 | 291.00 | 980.254982 | 980.330895 | 2.10 | -16.57*MRD5 |
| 8651.8101 | 385000.0 | 382000.0 | 467.00 | 980.218150 | 980.332696 | 3.20 | -19.48*MRD5 |
| 8651.8102 | 385000.0 | 383000.0 | 522.00 | 980.207635 | 980.331889 | 3.61 | -17.96*MRD5 |
| 8651.8103 | 385080.0 | 384000.0 | 567.00 | 980.197515 | 980.331083 | 3.48 | -18.55*MRD5 |
| 8651.8104 | 386000.0 | 382250.0 | 508.00 | 980.208529 | 980.332507 | 4.11 | -19.94*MRD5 |
| 8651.8145 | 385000.0 | 387030.0 | 412.00 | 980.228239 | 980.328636 | 1.88 | -17.47*MRD5 |
| 8651.8146 | 385020.0 | 388220.0 | 601.00 | 980.189307 | 980.327676 | 2.65 | -17.49*MRD5 |
| 8651.8147 | 386140.0 | 387950.0 | 683.00 | 980.171842 | 980.327909 | 2.25 | -19.45*MRD5 |
| 8651.8148 | 386070.0 | 387090.0 | 692.00 | 980.171208 | 980.328602 | 1.62 | -19.64*MRD5 |
| 8651.8149 | 387000.0 | 387130.0 | 730.00 | 980.162283 | 980.328581 | 2.27 | -20.41*MRD5 |
| 8651.8150 | 385030.0 | 389950.0 | 404.00 | 980.229142 | 980.326281 | 1.07 | -16.60*MRD5 |
| 8651.8151 | 385950.0 | 390070.0 | 539.00 | 980.202461 | 980.326196 | 0.73 | -16.97*MRD5 |
| 8651.8153 | 385070.0 | 389180.0 | 446.00 | 980.220675 | 980.326903 | 1.57 | -16.92*MRD5 |
| 8651.8154 | 386070.0 | 388900.0 | 492.00 | 980.211428 | 980.327141 | 0.77 | -18.16*MRD5 |
| 8651.8193 | 386410.0 | 391190.0 | 591.00 | 980.190146 | 980.325298 | 0.88 | -18.01*MRD5 |
| 8651.3039 | 383808.0 | 387150.0 | 401.10 | 980.230867 | 980.328524 | 0.67 | -18.09BOCO1 |
| 8651.3040 | 383830.0 | 387129.0 | 400.80 | 980.230887 | 980.328541 | 0.67 | -18.14BOCO1 |
| 8651.3041 | 383852.0 | 387109.0 | 400.70 | 980.230937 | 980.328558 | 0.69 | -18.11BOCO1 |
| 8651.3042 | 383874.0 | 387089.0 | 400.40 | 980.230957 | 980.328574 | 0.69 | -18.16BOCO1 |
| 8651.3043 | 383896.0 | 387068.0 | 399.80 | 980.231216 | 980.328591 | 0.68 | -18.05BOCO1 |
| 8651.3044 | 383918.0 | 387048.0 | 399.20 | 980.231366 | 980.328608 | 0.67 | -18.05BOCO1 |
| 8651.3045 | 383941.0 | 387028.0 | 398.80 | 980.231665 | 980.328624 | 0.66 | -17.85BOCO1 |
| 8651.3046 | 383963.0 | 387007.0 | 398.50 | 980.231586 | 980.328642 | 0.65 | -18.02BOCO1 |

|           |          |          |        |            |            |      |             |
|-----------|----------|----------|--------|------------|------------|------|-------------|
| 8651.3047 | 383985.0 | 386987.0 | 398.30 | 980.231775 | 980.328658 | 0.64 | -17.89BOC01 |
| 8651.3048 | 384007.0 | 386967.0 | 397.80 | 980.231945 | 980.328674 | 0.66 | -17.82BOC01 |
| 8651.3049 | 384029.0 | 386946.0 | 397.50 | 980.232035 | 980.328692 | 0.70 | -17.76BOC01 |
| 8651.3050 | 384051.0 | 386926.0 | 397.40 | 980.232195 | 980.328708 | 0.74 | -17.60BOC01 |
| 8651.3051 | 384073.0 | 386906.0 | 397.30 | 980.232215 | 980.328724 | 0.84 | -17.52BOC01 |
| 8651.3052 | 383787.0 | 387168.0 | 400.10 | 980.230937 | 980.328509 | 0.66 | -18.21BOC01 |
| 8651.3053 | 383764.0 | 387187.0 | 400.40 | 980.230807 | 980.328494 | 0.64 | -18.28BOC01 |
| 8651.3054 | 383741.0 | 387207.0 | 399.90 | 980.230887 | 980.328477 | 0.65 | -18.28BOC01 |
| 8651.3055 | 383717.0 | 387224.0 | 399.90 | 980.230807 | 980.328463 | 0.64 | -18.35BOC01 |
| 8651.3056 | 383696.0 | 387245.0 | 399.30 | 980.231007 | 980.328446 | 0.65 | -18.24BOC01 |
| 8651.3057 | 383673.0 | 387264.0 | 399.50 | 980.231007 | 980.328430 | 0.66 | -18.18BOC01 |
| 8651.3058 | 383653.0 | 387286.0 | 399.70 | 980.230997 | 980.328412 | 0.67 | -18.12BOC01 |
| 8651.3059 | 383630.0 | 387305.0 | 400.60 | 980.230837 | 980.328397 | 0.66 | -18.10BOC01 |
| 8651.3060 | 383607.0 | 387325.0 | 399.90 | 980.231116 | 980.328380 | 0.65 | -17.95BOC01 |
| 8651.3061 | 383584.0 | 387345.0 | 399.10 | 980.231386 | 980.328364 | 0.66 | -17.81BOC01 |
| 8651.3062 | 383562.0 | 387364.0 | 398.40 | 980.231486 | 980.328348 | 0.63 | -17.86BOC01 |
| 8651.3063 | 383626.0 | 387337.0 | 399.60 | 980.231076 | 980.328371 | 0.64 | -18.05BOC01 |
| 8651.3064 | 383616.0 | 387364.0 | 399.70 | 980.231246 | 980.328349 | 0.62 | -17.86BOC01 |
| 8651.3065 | 383605.0 | 387392.0 | 399.90 | 980.231226 | 980.328326 | 0.62 | -17.82BOC01 |
| 8651.3066 | 383591.0 | 387418.0 | 398.80 | 980.231186 | 980.328305 | 0.59 | -18.08BOC01 |
| 8651.3067 | 383579.0 | 387446.0 | 398.80 | 980.231256 | 980.328282 | 0.57 | -18.01BOC01 |
| 8651.3068 | 383566.0 | 387472.0 | 398.30 | 980.231346 | 980.328261 | 0.59 | -17.98BOC01 |
| 8651.3069 | 383554.0 | 387500.0 | 398.90 | 980.231526 | 980.328238 | 0.57 | -17.67BOC01 |
| 8651.3070 | 383542.0 | 387526.0 | 398.10 | 980.231466 | 980.328217 | 0.57 | -17.87BOC01 |
| 8651.3071 | 383529.0 | 387553.0 | 398.10 | 980.231566 | 980.328195 | 0.58 | -17.74BOC01 |
| 8651.3072 | 383516.0 | 387580.0 | 397.80 | 980.231646 | 980.328173 | 0.57 | -17.71BOC01 |
| 8651.3073 | 383504.0 | 387606.0 | 397.50 | 980.231765 | 980.328152 | 0.56 | -17.63BOC01 |
| 8651.3074 | 383489.0 | 387633.0 | 397.00 | 980.231925 | 980.328130 | 0.56 | -17.55BOC01 |
| 8851.6719 | 383291.0 | 387149.0 | 399.00 | 980.232554 | 980.328518 | 0.71 | -16.77BOC09 |
| 8851.6720 | 383319.0 | 387159.0 | 394.80 | 980.233233 | 980.328510 | 0.69 | -16.93BOC09 |
| 8851.6721 | 383347.0 | 387169.0 | 395.10 | 980.233367 | 980.328503 | 0.67 | -16.75BOC09 |
| 8851.6722 | 383375.0 | 387179.0 | 395.20 | 980.233300 | 980.328495 | 0.65 | -16.81BOC09 |
| 8851.6723 | 383404.0 | 387188.0 | 395.70 | 980.233156 | 980.328488 | 0.64 | -16.85BOC09 |
| 8851.6724 | 383433.0 | 387198.0 | 395.60 | 980.233156 | 980.328480 | 0.65 | -16.86BOC09 |
| 8851.6725 | 383461.0 | 387209.0 | 395.40 | 980.232850 | 980.328472 | 0.64 | -17.20BOC09 |
| 8851.6726 | 383489.0 | 387219.0 | 395.20 | 980.232717 | 980.328464 | 0.64 | -17.37BOC09 |
| 8851.6727 | 383517.0 | 387230.0 | 394.40 | 980.232325 | 980.328456 | 0.65 | -17.90BOC09 |
| 8851.6728 | 383546.0 | 387239.0 | 396.00 | 980.232267 | 980.328449 | 0.65 | -17.63BOC09 |
| 8851.6729 | 383575.0 | 387249.0 | 397.20 | 980.232086 | 980.328441 | 0.66 | -17.56BOC09 |
| 8851.6730 | 383603.0 | 387259.0 | 397.90 | 980.231770 | 980.328433 | 0.66 | -17.73BOC09 |
| 8851.6731 | 383631.0 | 387269.0 | 398.60 | 980.231455 | 980.328426 | 0.66 | -17.90BOC09 |
| 8851.6732 | 383660.0 | 387280.0 | 400.40 | 980.231101 | 980.328417 | 0.67 | -17.88BOC09 |
| 8851.6733 | 383688.0 | 387289.0 | 399.60 | 980.231101 | 980.328410 | 0.67 | -18.03BOC09 |
| 8851.6734 | 383717.0 | 387300.0 | 399.60 | 980.230920 | 980.328402 | 0.67 | -18.21BOC09 |
| 8851.6735 | 383745.0 | 387310.0 | 400.00 | 980.230843 | 980.328394 | 0.68 | -18.19BOC09 |
| 8851.6736 | 383773.0 | 387320.0 | 399.40 | 980.230948 | 980.328386 | 0.68 | -18.19BOC09 |
| 8851.6737 | 383802.0 | 387331.0 | 399.30 | 980.230891 | 980.328378 | 0.68 | -18.26BOC09 |
| 8851.6738 | 383831.0 | 387341.0 | 399.40 | 980.230795 | 980.328370 | 0.69 | -18.32BOC09 |
| 8851.6739 | 383859.0 | 387351.0 | 400.90 | 980.230279 | 980.328363 | 0.69 | -18.53BOC09 |
| 8851.6740 | 383888.0 | 387359.0 | 402.80 | 980.230050 | 980.328357 | 0.70 | -18.37BOC09 |
| 8851.6741 | 383915.0 | 387369.0 | 403.30 | 980.229993 | 980.328349 | 0.70 | -18.32BOC09 |
| 8851.6742 | 383946.0 | 387377.0 | 405.40 | 980.229524 | 980.328343 | 0.71 | -18.36BOC09 |
| 8851.6743 | 383976.0 | 387384.0 | 404.40 | 980.229782 | 980.328337 | 0.72 | -18.29BOC09 |
| 8851.6744 | 384004.0 | 387392.0 | 404.90 | 980.229763 | 980.328331 | 0.73 | -18.19BOC09 |
| 8851.6745 | 384033.0 | 387400.0 | 405.40 | 980.229715 | 980.328325 | 0.75 | -18.11BOC09 |
| 8851.6746 | 384064.0 | 387408.0 | 405.70 | 980.229811 | 980.328319 | 0.77 | -17.93BOC09 |
| 8851.6747 | 384093.0 | 387415.0 | 406.30 | 980.229534 | 980.328314 | 0.79 | -18.07BOC09 |
| 8851.6748 | 384123.0 | 387423.0 | 406.30 | 980.229553 | 980.328308 | 0.80 | -18.03BOC09 |
| 8851.6749 | 384150.0 | 387431.0 | 406.10 | 980.229658 | 980.328302 | 0.81 | -17.95BOC09 |
| 8851.6750 | 384180.0 | 387439.0 | 406.50 | 980.229658 | 980.328296 | 0.82 | -17.85BOC09 |
| 8851.6751 | 384209.0 | 387447.0 | 406.70 | 980.229706 | 980.328290 | 0.83 | -17.75BOC09 |
| 8851.6752 | 384238.0 | 387454.0 | 407.40 | 980.229572 | 980.328284 | 0.84 | -17.73BOC09 |
| 8851.6753 | 384268.0 | 387463.0 | 407.70 | 980.229438 | 980.328278 | 0.86 | -17.78BOC09 |
| 8851.6754 | 384297.0 | 387470.0 | 407.50 | 980.229496 | 980.328272 | 0.89 | -17.73BOC09 |

|           |          |          |        |            |            |      |              |
|-----------|----------|----------|--------|------------|------------|------|--------------|
| 8 51.6755 | 383793.0 | 386837.0 | 393.30 | 980.232717 | 980.328776 | 0.63 | -18.06BOC091 |
| 8 51.6756 | 383764.0 | 386825.0 | 393.60 | 980.232659 | 980.328786 | 0.64 | -18.06BOC091 |
| 8851.6757 | 383735.0 | 386816.0 | 394.00 | 980.232621 | 980.328793 | 0.64 | -18.03BOC091 |
| 8 51.6758 | 383707.0 | 386809.0 | 394.60 | 980.232439 | 980.328798 | 0.63 | -18.11BOC091 |
| 8 51.6759 | 383677.0 | 386800.0 | 396.60 | 980.232267 | 980.328805 | 0.63 | -17.89BOC091 |
| 8851.6760 | 383650.0 | 386792.0 | 396.50 | 980.232325 | 980.328811 | 0.62 | -17.87BOC091 |
| 8851.6761 | 383620.0 | 386783.0 | 397.50 | 980.232315 | 980.328818 | 0.61 | -17.70BOC091 |
| 8 51.6762 | 383591.0 | 386775.0 | 399.40 | 980.231942 | 980.328824 | 0.61 | -17.71BOC091 |
| 8 51.6763 | 383563.0 | 386767.0 | 400.10 | 980.231990 | 980.328830 | 0.62 | -17.52BOC091 |
| 8851.6764 | 383535.0 | 386758.0 | 401.00 | 980.231981 | 980.328837 | 0.62 | -17.36BOC091 |
| 8 51.6765 | 383506.0 | 386751.0 | 399.20 | 980.232277 | 980.328842 | 0.63 | -17.41BOC091 |
| 8 51.6766 | 383478.0 | 386742.0 | 399.20 | 980.232315 | 980.328849 | 0.63 | -17.38BOC091 |
| 8851.6767 | 383407.0 | 386855.0 | 393.20 | 980.232697 | 980.328762 | 0.64 | -18.08BOC091 |
| 8 51.6768 | 383832.0 | 386867.0 | 393.20 | 980.232669 | 980.328753 | 0.64 | -18.10BOC091 |
| 8 51.6769 | 383854.0 | 386885.0 | 393.50 | 980.232631 | 980.328739 | 0.65 | -18.05BOC091 |
| 8851.6770 | 383877.0 | 386900.0 | 394.60 | 980.232401 | 980.328727 | 0.66 | -18.04BOC091 |
| 8851.6771 | 383901.0 | 386913.0 | 395.70 | 980.232258 | 980.328717 | 0.68 | -17.94BOC091 |
| 8 51.6772 | 383927.0 | 386925.0 | 397.20 | 980.231961 | 980.328707 | 0.68 | -17.93BOC091 |
| 8 51.6773 | 383955.0 | 386921.0 | 397.40 | 980.231885 | 980.328711 | 0.70 | -17.95BOC091 |
| 8851.6774 | 383983.0 | 386911.0 | 397.00 | 980.232000 | 980.328719 | 0.71 | -17.92BOC091 |
| 8 51.6775 | 384010.0 | 386901.0 | 396.80 | 980.232095 | 980.328728 | 0.72 | -17.86BOC091 |
| 8 51.6776 | 384037.0 | 386897.0 | 396.40 | 980.232172 | 980.328731 | 0.73 | -17.85BOC091 |
| 8851.6777 | 384062.0 | 386889.0 | 396.60 | 980.232220 | 980.328738 | 0.75 | -17.75BOC091 |
| 8 51.6778 | 384091.0 | 386883.0 | 396.40 | 980.232325 | 980.328743 | 0.76 | -17.68BOC091 |
| 8 51.7542 | 381180.0 | 390980.0 | 440.00 | 980.223998 | 980.325399 | 0.41 | -14.44*MRD91 |
| 8 51.7543 | 381130.0 | 391940.0 | 338.00 | 980.242722 | 980.324624 | 0.82 | -14.59*MRD91 |
| 8 51.7544 | 384100.0 | 391900.0 | 390.00 | 980.229591 | 980.324695 | 0.44 | -17.95*MRD91 |
| 8 51.8247 | 384950.0 | 391790.0 | 449.00 | 980.219854 | 980.324795 | 0.90 | -15.72*MRD59 |
| 8 51.8249 | 384920.0 | 390890.0 | 406.00 | 980.229433 | 980.325521 | 0.93 | -15.29*MRD59 |
| 8 51.8250 | 384200.0 | 390970.0 | 398.00 | 980.229755 | 980.325447 | 0.50 | -16.90*MRD59 |
| 8 51.8628 | 380170.0 | 391810.0 | 488.00 | 980.217662 | 980.324716 | 1.00 | -10.06*MRD59 |
| 8 51.8629 | 381950.0 | 390950.0 | 462.00 | 980.218295 | 980.325434 | 0.62 | -15.64*MRD59 |
| 8 51.8630 | 382010.0 | 391890.0 | 401.00 | 980.230358 | 980.324676 | 0.47 | -14.97*MRD59 |
| 8 51.8634 | 382720.0 | 391020.0 | 392.00 | 980.231719 | 980.325387 | 0.56 | -16.00*MRD59 |
| 9151.6177 | 384444.0 | 389710.0 | 398.78 | 980.230636 | 980.326467 | 0.51 | -16.88*PAS91 |
| 9151.6178 | 384919.0 | 390174.0 | 449.22 | 980.220495 | 980.326099 | 0.80 | -16.44*PAS91 |
| 9151.6179 | 385356.0 | 390128.0 | 472.24 | 980.215688 | 980.326141 | 0.83 | -16.73*PAS91 |
| 9151.6180 | 385699.0 | 389885.0 | 515.77 | 980.206799 | 980.326342 | 1.00 | -17.08*PAS91 |
| 9151.6181 | 385987.0 | 390058.0 | 537.66 | 980.202278 | 980.326206 | 0.78 | -17.38*PAS91 |
| 9151.6182 | 386523.0 | 390263.0 | 564.83 | 980.196811 | 980.326047 | 0.68 | -17.44*PAS91 |
| 9151.6183 | 386760.0 | 390298.0 | 583.24 | 980.192825 | 980.326022 | 0.77 | -17.69*PAS91 |
| 9151.6184 | 386966.0 | 390372.0 | 594.18 | 980.190330 | 980.325965 | 0.81 | -17.93*PAS91 |
| 9151.6199 | 383750.0 | 382031.0 | 209.93 | 980.270465 | 980.332654 | 0.55 | -20.35*PAS91 |
| 9151.6200 | 383465.0 | 383323.0 | 227.54 | 980.266345 | 980.331608 | 0.99 | -19.52*PAS91 |
| 9151.6201 | 383942.0 | 384291.0 | 304.69 | 980.251750 | 980.330833 | 0.71 | -18.44*PAS91 |
| 9151.6202 | 383838.0 | 384924.0 | 307.49 | 980.251588 | 980.330321 | 0.47 | -17.78*PAS91 |
| 9151.6203 | 383892.0 | 385151.0 | 316.84 | 980.249905 | 980.330138 | 0.45 | -17.46*PAS91 |
| 9151.6204 | 384015.0 | 385388.0 | 339.62 | 980.244849 | 980.329949 | 0.56 | -17.73*PAS91 |
| 9151.6205 | 384164.0 | 385883.0 | 365.85 | 980.238837 | 980.329551 | 0.47 | -18.28*PAS91 |
| 9151.6206 | 384260.0 | 386158.0 | 383.72 | 980.235253 | 980.329331 | 0.56 | -18.04*PAS91 |
| 9151.6207 | 384413.0 | 386876.0 | 401.34 | 980.231793 | 980.328753 | 0.53 | -17.48*PAS91 |
| 9151.6208 | 384279.0 | 387558.0 | 408.98 | 980.229585 | 980.328201 | 0.55 | -17.62*PAS91 |
| 9151.6246 | 380078.0 | 382240.0 | 234.61 | 980.265447 | 980.332437 | 2.75 | -18.09*PAS91 |
| 9151.6247 | 380117.0 | 382434.0 | 239.37 | 980.265017 | 980.332281 | 2.87 | -17.31*PAS91 |
| 9151.6248 | 380141.0 | 382708.0 | 246.58 | 980.262484 | 980.332060 | 3.33 | -17.74*PAS91 |
| 9151.6249 | 380279.0 | 382872.0 | 251.72 | 980.262006 | 980.331930 | 3.36 | -17.05*PAS91 |
| 9151.6250 | 380465.0 | 383049.0 | 258.79 | 980.260668 | 980.331789 | 3.80 | -16.42*PAS91 |
| 9151.6251 | 380665.0 | 383112.0 | 264.24 | 980.259463 | 980.331717 | 3.40 | -16.88*PAS91 |
| 9151.6252 | 380956.0 | 383111.0 | 272.23 | 980.258211 | 980.331746 | 3.13 | -16.86*PAS91 |
| 9151.6253 | 381128.0 | 383250.0 | 278.03 | 980.257112 | 980.331636 | 2.87 | -16.96*PAS91 |
| 9151.6254 | 381276.0 | 383409.0 | 283.79 | 980.255497 | 980.331510 | 3.27 | -16.92*PAS91 |
| 9151.6255 | 381366.0 | 383623.0 | 289.40 | 980.253690 | 980.331338 | 3.53 | -17.19*PAS91 |
| 9151.6256 | 381539.0 | 383858.0 | 297.02 | 980.251941 | 980.331151 | 3.77 | -17.01*PAS91 |
| 9151.6257 | 381674.0 | 384048.0 | 303.09 | 980.251167 | 980.330999 | 3.60 | -16.61*PAS91 |

|           |          |          |        |            |            |      |             |
|-----------|----------|----------|--------|------------|------------|------|-------------|
| 9151.6258 | 381812.0 | 384203.0 | 308.24 | 980.250211 | 980.330876 | 2.27 | -17.76*PAS9 |
| 9151.6292 | 384454.0 | 386743.0 | 398.65 | 980.232596 | 980.328861 | 0.67 | -17.18*PAS9 |
| 9151.6293 | 384649.0 | 387093.0 | 411.11 | 980.229442 | 980.328581 | 0.87 | -17.40*PAS9 |
| 9151.6294 | 384984.0 | 387252.0 | 440.46 | 980.222617 | 980.328457 | 1.43 | -17.77*PAS9 |
| 9151.6295 | 385234.0 | 387604.0 | 508.23 | 980.209102 | 980.328176 | 2.23 | -16.87*PAS9 |
| 9151.6296 | 385586.0 | 387800.0 | 577.34 | 980.195224 | 980.328023 | 2.29 | -16.93*PAS9 |
| 9151.6297 | 385786.0 | 388180.0 | 608.14 | 980.188782 | 980.327719 | 1.92 | -17.38*PAS9 |
| 9151.6298 | 385554.0 | 388496.0 | 590.68 | 980.192089 | 980.327461 | 2.04 | -17.13*PAS9 |
| 9151.6299 | 385577.0 | 388710.0 | 596.68 | 980.190111 | 980.327288 | 2.53 | -17.27*PAS9 |
| 9151.6300 | 385806.0 | 388247.0 | 598.18 | 980.190808 | 980.327665 | 1.89 | -17.29*PAS9 |
| 9151.6301 | 385887.0 | 388379.0 | 565.16 | 980.197375 | 980.327559 | 1.96 | -17.05*PAS9 |
| 9151.6302 | 386254.0 | 388741.0 | 552.59 | 980.199583 | 980.327272 | 1.23 | -17.75*PAS9 |
| 9151.6303 | 386486.0 | 388949.0 | 492.13 | 980.211301 | 980.327107 | 1.13 | -17.87*PAS9 |
| 9151.6304 | 386133.0 | 387948.0 | 683.37 | 980.172189 | 980.327910 | 1.73 | -19.55*PAS9 |
| 9151.6305 | 386244.0 | 388012.0 | 682.10 | 980.172342 | 980.327860 | 2.20 | -19.13*PAS9 |
| 9151.6306 | 386349.0 | 388344.0 | 600.58 | 980.189700 | 980.327593 | 2.05 | -17.70*PAS9 |
| 9151.6307 | 386089.0 | 387713.0 | 678.68 | 980.173126 | 980.328099 | 2.87 | -18.59*PAS9 |
| 9151.6308 | 386238.0 | 387213.0 | 727.53 | 980.162450 | 980.328505 | 1.84 | -21.09*PAS9 |
| 9151.6309 | 386734.0 | 387198.0 | 725.04 | 980.162689 | 980.328523 | 2.07 | -21.12*PAS9 |
| 9151.6315 | 386967.0 | 389949.0 | 629.58 | 980.183802 | 980.326306 | 1.11 | -17.54*PAS9 |
| 9151.6316 | 386757.0 | 389581.0 | 603.40 | 980.188992 | 980.326601 | 1.52 | -17.38*PAS9 |
| 9151.6317 | 386676.0 | 389265.0 | 537.50 | 980.202335 | 980.326855 | 1.73 | -17.05*PAS9 |
| 9151.6320 | 386970.0 | 391405.0 | 618.00 | 980.186326 | 980.325132 | 0.99 | -16.24*PAS9 |
| 9151.6321 | 386460.0 | 391570.0 | 607.00 | 980.188677 | 980.324992 | 0.87 | -16.03*PAS9 |
| 9151.6322 | 386280.0 | 390425.0 | 528.00 | 980.204333 | 980.325914 | 0.87 | -16.84*PAS9 |
| 9151.6323 | 385980.0 | 390690.0 | 555.00 | 980.198732 | 980.325696 | 0.95 | -16.83*PAS9 |
| 9151.6324 | 385765.0 | 390890.0 | 484.00 | 980.212323 | 980.325532 | 1.05 | -16.95*PAS9 |
| 9151.6325 | 385615.0 | 391020.0 | 432.00 | 980.222331 | 980.325425 | 1.03 | -17.08*PAS9 |
| 9151.6326 | 385465.0 | 391160.0 | 460.00 | 980.217494 | 980.325310 | 1.27 | -16.06*PAS9 |
| 9151.6327 | 385240.0 | 391360.0 | 496.00 | 980.210507 | 980.325146 | 1.11 | -15.96*PAS9 |
| 9151.6328 | 386845.0 | 390990.0 | 619.00 | 980.186144 | 980.325465 | 0.73 | -16.82*PAS9 |
| 9151.6329 | 386510.0 | 390910.0 | 584.00 | 980.193494 | 980.325525 | 0.84 | -16.30*PAS9 |
| 9151.6330 | 386360.0 | 390650.0 | 580.00 | 980.194211 | 980.325733 | 0.80 | -16.62*PAS9 |
| 9151.6336 | 385676.0 | 391988.0 | 571.69 | 980.195358 | 980.324645 | 0.72 | -16.10*PAS9 |
| 9151.6337 | 385136.0 | 391818.0 | 477.19 | 980.213614 | 980.324775 | 1.50 | -15.79*PAS9 |
| 9151.6338 | 385084.0 | 391529.0 | 512.74 | 980.206684 | 980.325007 | 1.01 | -16.45*PAS9 |
| 9151.6339 | 384812.0 | 391803.0 | 425.64 | 980.224242 | 980.324783 | 0.76 | -16.05*PAS9 |
| 9151.6340 | 384623.0 | 391315.0 | 406.52 | 980.228639 | 980.325174 | 0.64 | -15.93*PAS9 |
| 9151.6341 | 384389.0 | 390943.0 | 398.86 | 980.229881 | 980.325471 | 0.44 | -16.69*PAS9 |
| 9151.6342 | 384173.0 | 390542.0 | 394.48 | 980.230426 | 980.325792 | 0.37 | -17.40*PAS9 |
| 9151.6344 | 384610.0 | 389225.0 | 420.30 | 980.225532 | 980.326860 | 0.76 | -17.89*PAS9 |
| 9151.6345 | 384820.0 | 389240.0 | 436.10 | 980.222397 | 980.326851 | 0.72 | -17.95*PAS9 |
| 9151.6346 | 384960.0 | 389260.0 | 453.90 | 980.218421 | 980.326837 | 0.89 | -18.24*PAS9 |
| 9151.6347 | 384755.0 | 389390.0 | 429.50 | 980.223334 | 980.326729 | 0.76 | -18.15*PAS9 |
| 9151.6348 | 384840.0 | 389520.0 | 409.20 | 980.227463 | 980.326625 | 0.73 | -17.94*PAS9 |
| 9151.6349 | 384860.0 | 389650.0 | 402.70 | 980.229098 | 980.326521 | 0.65 | -17.56*PAS9 |
| 9151.6350 | 384845.0 | 389690.0 | 402.10 | 980.229317 | 980.326488 | 0.60 | -17.47*PAS9 |
| 9151.6351 | 384650.0 | 389520.0 | 400.00 | 980.229461 | 980.326623 | 0.79 | -17.69*PAS9 |
| 9151.6352 | 384340.0 | 389540.0 | 399.60 | 980.230159 | 980.326603 | 0.64 | -17.20*PAS9 |
| 9151.6353 | 384310.0 | 389275.0 | 398.70 | 980.229910 | 980.326816 | 0.75 | -17.73*PAS9 |
| 9151.6354 | 384470.0 | 389275.0 | 410.60 | 980.227339 | 980.326818 | 0.79 | -17.92*PAS9 |
| 9151.6355 | 384213.0 | 389700.0 | 395.80 | 980.231315 | 980.326472 | 0.69 | -16.61*PAS9 |
| 9151.6356 | 383992.0 | 389700.0 | 393.30 | 980.231822 | 980.326469 | 0.57 | -16.71*PAS9 |
| 9151.6357 | 383996.0 | 389502.0 | 393.10 | 980.231573 | 980.326629 | 0.58 | -17.15*PAS9 |
| 9151.6358 | 383740.0 | 389252.0 | 391.60 | 980.231525 | 980.326827 | 0.55 | -17.72*PAS9 |
| 9151.6359 | 383991.0 | 389263.0 | 393.60 | 980.231325 | 980.326822 | 0.56 | -17.51*PAS9 |
| 9151.6360 | 384580.0 | 388990.0 | 423.40 | 980.225810 | 980.327049 | 0.89 | -17.06*PAS9 |
| 9151.6361 | 384845.0 | 388870.0 | 476.70 | 980.215153 | 980.327150 | 1.19 | -17.03*PAS9 |
| 9151.6362 | 384965.0 | 388750.0 | 516.10 | 980.207238 | 980.327248 | 1.33 | -17.15*PAS9 |
| 9151.6363 | 383998.0 | 388991.0 | 392.80 | 980.231583 | 980.327041 | 0.55 | -17.64*PAS9 |
| 9151.6364 | 383744.0 | 388966.0 | 392.20 | 980.231764 | 980.327058 | 0.49 | -17.65*PAS9 |
| 9151.6365 | 383487.0 | 388951.0 | 394.60 | 980.231669 | 980.327067 | 0.53 | -17.25*PAS9 |
| 9151.6366 | 383240.0 | 388695.0 | 394.20 | 980.232844 | 980.327270 | 0.60 | -16.28*PAS9 |
| 9151.6367 | 383490.0 | 388715.0 | 394.20 | 980.231927 | 980.327257 | 0.52 | -17.27*PAS9 |

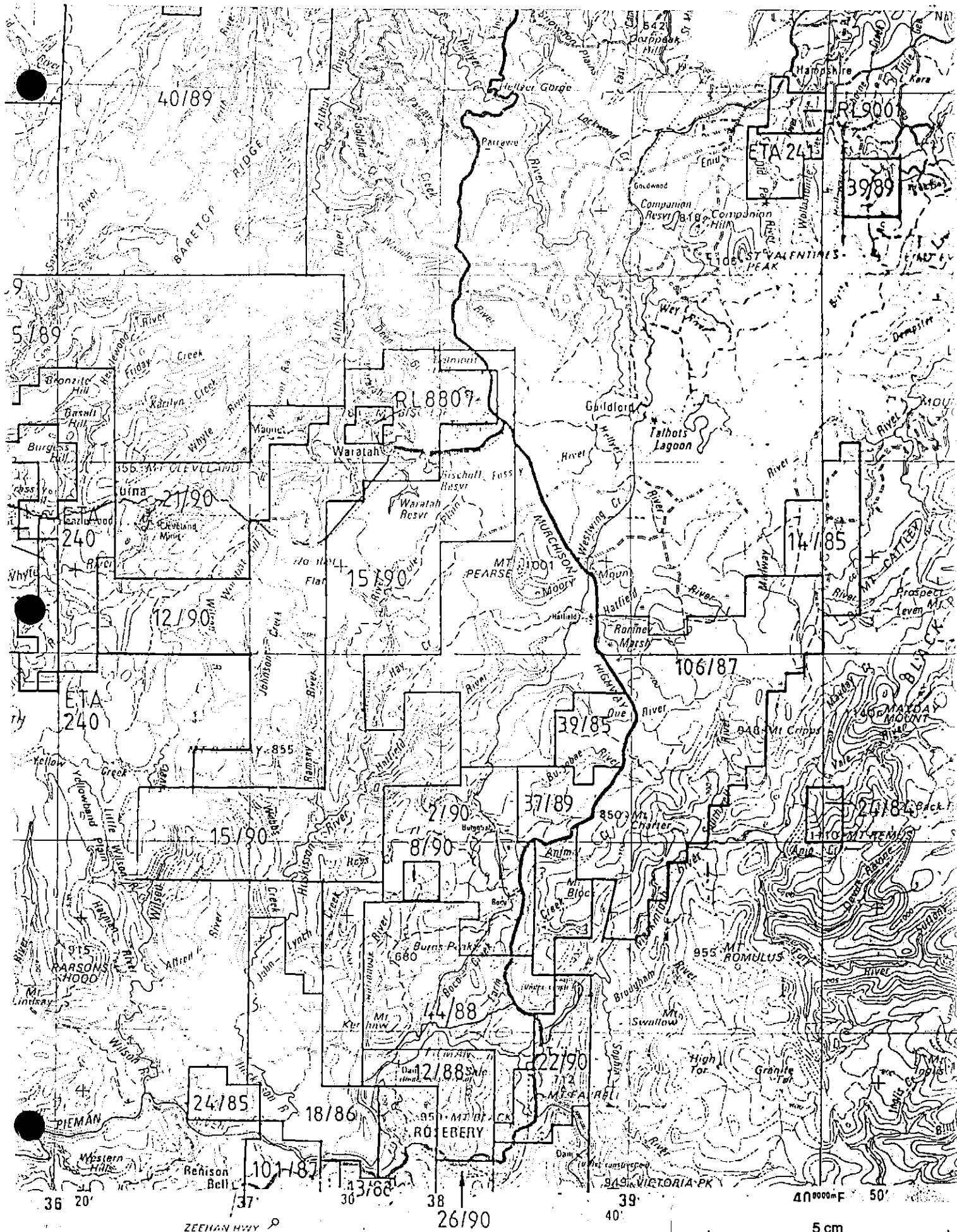
|           |          |          |        |            |            |      |             |
|-----------|----------|----------|--------|------------|------------|------|-------------|
| 9151.6368 | 383745.0 | 388719.0 | 394.10 | 980.231430 | 980.327257 | 0.49 | -17.81*PAS9 |
| 9151.6369 | 384000.0 | 388735.0 | 392.90 | 980.231277 | 980.327248 | 0.57 | -18.11*PAS9 |
| 9151.6370 | 384140.0 | 388740.0 | 402.50 | 980.229040 | 980.327245 | 0.67 | -18.36*PAS9 |
| 9151.6371 | 384127.0 | 388484.0 | 404.50 | 980.229002 | 980.327452 | 0.68 | -18.20*PAS9 |
| 9151.6372 | 383990.0 | 388480.0 | 397.60 | 980.230398 | 980.327453 | 0.61 | -18.23*PAS9 |
| 9151.6373 | 383869.0 | 388478.0 | 393.80 | 980.231286 | 980.327453 | 0.55 | -18.15*PAS9 |
| 9151.6374 | 383745.0 | 388482.0 | 394.20 | 980.231707 | 980.327448 | 0.51 | -17.69*PAS9 |
| 9151.6375 | 383494.0 | 388485.0 | 395.30 | 980.232472 | 980.327443 | 0.52 | -16.69*PAS9 |
| 9151.6376 | 383233.0 | 388483.0 | 396.00 | 980.232739 | 980.327441 | 0.75 | -16.05*PAS9 |
| 9151.6377 | 383262.0 | 388242.0 | 397.20 | 980.232969 | 980.327636 | 0.56 | -15.97*PAS9 |
| 9151.6378 | 383511.0 | 388240.0 | 395.80 | 980.232338 | 980.327641 | 0.51 | -16.94*PAS9 |
| 9151.6379 | 383765.0 | 388244.0 | 394.80 | 980.231344 | 980.327641 | 0.51 | -18.13*PAS9 |
| 9151.6380 | 384000.0 | 388250.0 | 397.30 | 980.230493 | 980.327639 | 0.63 | -18.36*PAS9 |
| 9151.6381 | 384150.0 | 388250.0 | 397.40 | 980.230388 | 980.327641 | 0.73 | -18.35*PAS9 |
| 9151.6382 | 384240.0 | 388620.0 | 403.60 | 980.229002 | 980.327344 | 0.65 | -18.30*PAS9 |
| 9151.6383 | 384109.0 | 388621.0 | 403.60 | 980.229021 | 980.327341 | 0.59 | -18.34*PAS9 |
| 9151.6384 | 383995.0 | 388620.0 | 393.10 | 980.231286 | 980.327340 | 0.56 | -18.17*PAS9 |
| 9151.6385 | 383876.0 | 388632.0 | 393.20 | 980.231286 | 980.327329 | 0.49 | -18.21*PAS9 |
| 9151.6386 | 384250.0 | 388375.0 | 405.10 | 980.228849 | 980.327541 | 0.68 | -18.32*PAS9 |
| 9151.6387 | 384105.0 | 388362.0 | 403.40 | 980.229241 | 980.327550 | 0.61 | -18.35*PAS9 |
| 9151.6388 | 383998.0 | 388378.0 | 401.60 | 980.229642 | 980.327536 | 0.59 | -18.30*PAS9 |
| 9151.6389 | 383875.0 | 388385.0 | 394.00 | 980.231181 | 980.327528 | 0.55 | -18.29*PAS9 |
| 9151.6390 | 384294.0 | 388983.0 | 399.85 | 980.230015 | 980.327051 | 0.77 | -17.61*PAS9 |
| 9151.6391 | 384228.0 | 388752.0 | 400.43 | 980.229891 | 980.327237 | 0.73 | -17.85*PAS9 |
| 9151.6392 | 384212.0 | 388166.0 | 401.27 | 980.229843 | 980.327710 | 0.72 | -18.21*PAS9 |
| 9151.6393 | 383641.0 | 388490.0 | 394.70 | 980.232223 | 980.327441 | 0.45 | -17.13*PAS9 |
| 9151.6394 | 383541.0 | 388479.0 | 395.20 | 980.232510 | 980.327448 | 0.48 | -16.72*PAS9 |
| 9151.6395 | 383433.0 | 388495.0 | 395.20 | 980.232625 | 980.327434 | 0.53 | -16.54*PAS9 |
| 9151.6396 | 383335.0 | 388484.0 | 395.30 | 980.232777 | 980.327442 | 0.57 | -16.33*PAS9 |
| 9151.6397 | 383125.0 | 388500.0 | 410.20 | 980.230073 | 980.327426 | 0.68 | -15.98*PAS9 |
| 9151.6398 | 383055.0 | 388515.0 | 425.10 | 980.227262 | 980.327413 | 0.80 | -15.73*PAS9 |
| 9151.6399 | 384215.0 | 388000.0 | 403.90 | 980.229528 | 980.327844 | 0.65 | -18.21*PAS9 |
| 9151.6400 | 384000.0 | 388000.0 | 409.30 | 980.228180 | 980.327841 | 0.55 | -18.60*PAS9 |
| 9151.6401 | 383750.0 | 388000.0 | 400.00 | 980.230464 | 980.327837 | 0.44 | -18.25*PAS9 |
| 9151.6402 | 383500.0 | 388005.0 | 399.50 | 980.231745 | 980.327830 | 0.44 | -17.06*PAS9 |
| 9151.6403 | 383250.0 | 388010.0 | 399.40 | 980.232300 | 980.327823 | 0.56 | -16.40*PAS9 |
| 9151.6404 | 383000.0 | 388010.0 | 403.30 | 980.231812 | 980.327820 | 0.81 | -15.86*PAS9 |
| 9151.6405 | 384235.0 | 387750.0 | 409.90 | 980.228954 | 980.328046 | 0.61 | -17.85*PAS9 |
| 9151.6406 | 384000.0 | 387750.0 | 409.40 | 980.228591 | 980.328042 | 0.49 | -18.43*PAS9 |
| 9151.6407 | 383750.0 | 387740.0 | 408.30 | 980.229050 | 980.328047 | 0.45 | -18.23*PAS9 |
| 9151.6408 | 383500.0 | 387725.0 | 398.60 | 980.231946 | 980.328056 | 0.45 | -17.25*PAS9 |
| 9151.6409 | 383250.0 | 387735.0 | 399.80 | 980.231879 | 980.328045 | 0.60 | -16.92*PAS9 |
| 9151.6410 | 383000.0 | 387735.0 | 402.10 | 980.231946 | 980.328041 | 0.76 | -16.24*PAS9 |
| 9151.6411 | 382745.0 | 387510.0 | 409.10 | 980.230981 | 980.328220 | 0.97 | -15.79*PAS9 |
| 9151.6412 | 383000.0 | 387515.0 | 420.40 | 980.228610 | 980.328219 | 0.83 | -16.08*PAS9 |
| 9151.6413 | 383100.0 | 387500.0 | 432.10 | 980.226068 | 980.328232 | 0.84 | -16.33*PAS9 |
| 9151.6414 | 383200.0 | 387500.0 | 423.60 | 980.227521 | 980.328234 | 0.81 | -16.58*PAS9 |
| 9151.6415 | 383300.0 | 387500.0 | 399.00 | 980.232452 | 980.328235 | 0.76 | -16.54*PAS9 |
| 9151.6416 | 383400.0 | 387500.0 | 398.40 | 980.232185 | 980.328236 | 0.61 | -17.07*PAS9 |
| 9151.6417 | 383500.0 | 387500.0 | 398.70 | 980.231755 | 980.328238 | 0.52 | -17.53*PAS9 |
| 9151.6418 | 383610.0 | 387500.0 | 400.60 | 980.231105 | 980.328239 | 0.49 | -17.84*PAS9 |
| 9151.6419 | 383720.0 | 387500.0 | 400.30 | 980.230780 | 980.328241 | 0.47 | -18.25*PAS9 |
| 9151.6420 | 383800.0 | 387490.0 | 406.40 | 980.229442 | 980.328250 | 0.47 | -18.39*PAS9 |
| 9151.6421 | 383900.0 | 387500.0 | 407.00 | 980.229327 | 980.328243 | 0.46 | -18.39*PAS9 |
| 9151.6422 | 384004.0 | 387503.0 | 407.10 | 980.229308 | 980.328242 | 0.47 | -18.38*PAS9 |
| 9151.6423 | 384100.0 | 387500.0 | 410.80 | 980.228706 | 980.328246 | 0.49 | -18.24*PAS9 |
| 9151.6424 | 384205.0 | 387500.0 | 408.00 | 980.229719 | 980.328247 | 0.52 | -17.75*PAS9 |
| 9151.6425 | 384305.0 | 387500.0 | 408.00 | 980.229700 | 980.328248 | 0.56 | -17.73*PAS9 |
| 9151.6426 | 384258.0 | 387250.0 | 407.00 | 980.230187 | 980.328449 | 0.48 | -17.72*PAS9 |
| 9151.6427 | 384000.0 | 387250.0 | 402.40 | 980.230837 | 980.328446 | 0.47 | -17.98*PAS9 |
| 9151.6428 | 383750.0 | 387250.0 | 401.20 | 980.230828 | 980.328443 | 0.49 | -18.20*PAS9 |
| 9151.6429 | 383720.0 | 387000.0 | 396.40 | 980.232309 | 980.328644 | 0.51 | -17.85*PAS9 |
| 9151.6430 | 384000.0 | 387000.0 | 399.50 | 980.231793 | 980.328648 | 0.49 | -17.78*PAS9 |
| 9151.6431 | 384250.0 | 387000.0 | 402.10 | 980.231497 | 980.328651 | 0.51 | -17.55*PAS9 |

|           |          |          |        |            |            |      |             |
|-----------|----------|----------|--------|------------|------------|------|-------------|
| 9151.6432 | 383495.0 | 387250.0 | 396.50 | 980.232500 | 980.328439 | 0.59 | -17.35*PAS9 |
| 9151.6433 | 383255.0 | 387250.0 | 413.50 | 980.229595 | 980.328436 | 1.00 | -16.50*PAS9 |
| 9151.6434 | 382940.0 | 387250.0 | 479.70 | 980.216366 | 980.328432 | 1.03 | -16.67*PAS9 |
| 9151.6435 | 382980.0 | 386980.0 | 435.10 | 980.225599 | 980.328650 | 0.65 | -16.81*PAS9 |
| 9151.6436 | 382740.0 | 387195.0 | 485.40 | 980.215908 | 980.328474 | 0.75 | -16.33*PAS9 |
| 9151.6437 | 382480.0 | 386990.0 | 490.90 | 980.215153 | 980.328636 | 0.59 | -16.33*PAS9 |
| 9151.6438 | 382740.0 | 386920.0 | 479.90 | 980.217007 | 980.328696 | 0.95 | -16.33*PAS9 |
| 9151.6439 | 383485.0 | 387000.0 | 395.30 | 980.233217 | 980.328641 | 0.41 | -17.25*PAS9 |
| 9151.6440 | 383245.0 | 387015.0 | 404.30 | 980.231908 | 980.328626 | 0.76 | -16.43*PAS9 |
| 9151.6446 | 384504.0 | 388746.0 | 428.10 | 980.224854 | 980.327245 | 1.04 | -17.14*PAS9 |
| 9151.6447 | 384750.0 | 388750.0 | 452.50 | 980.220094 | 980.327245 | 1.44 | -16.70*PAS9 |
| 9151.6448 | 384970.0 | 388480.0 | 533.20 | 980.203951 | 980.327466 | 2.16 | -16.46*PAS9 |
| 9151.6449 | 384850.0 | 388510.0 | 509.30 | 980.208806 | 980.327440 | 2.00 | -16.45*PAS9 |
| 9151.6450 | 384750.0 | 388510.0 | 489.70 | 980.212400 | 980.327439 | 2.09 | -16.62*PAS9 |
| 9151.6451 | 384643.0 | 388517.0 | 445.30 | 980.221289 | 980.327432 | 1.45 | -17.10*PAS9 |
| 9151.6452 | 384553.0 | 388518.0 | 425.00 | 980.225332 | 980.327430 | 1.85 | -16.65*PAS9 |
| 9151.6453 | 384443.0 | 388521.0 | 406.80 | 980.228715 | 980.327426 | 1.39 | -17.30*PAS9 |
| 9151.6454 | 384328.0 | 388524.0 | 406.30 | 980.228754 | 980.327422 | 1.04 | -17.71*PAS9 |
| 9151.6455 | 384245.0 | 388520.0 | 404.10 | 980.229212 | 980.327424 | 0.95 | -17.77*PAS9 |
| 9151.6456 | 384765.0 | 388370.0 | 492.30 | 980.211387 | 980.327552 | 1.99 | -17.33*PAS9 |
| 9151.6457 | 384950.0 | 388245.0 | 568.50 | 980.195559 | 980.327655 | 2.17 | -18.09*PAS9 |
| 9151.6458 | 384785.0 | 388120.0 | 543.30 | 980.200538 | 980.327754 | 1.79 | -18.55*PAS9 |
| 9151.6459 | 384620.0 | 388240.0 | 450.40 | 980.219607 | 980.327655 | 1.48 | -17.97*PAS9 |
| 9151.6460 | 384461.0 | 388362.0 | 408.70 | 980.228218 | 980.327555 | 1.19 | -17.75*PAS9 |
| 9151.6461 | 384230.0 | 388300.0 | 403.60 | 980.229212 | 980.327602 | 0.61 | -18.39*PAS9 |
| 9151.6462 | 384340.0 | 388205.0 | 407.30 | 980.228648 | 980.327680 | 0.77 | -18.14*PAS9 |
| 9151.6463 | 384500.0 | 388080.0 | 415.90 | 980.227004 | 980.327783 | 1.29 | -17.68*PAS9 |
| 9151.6464 | 384655.0 | 387950.0 | 475.70 | 980.214914 | 980.327890 | 1.85 | -17.55*PAS9 |
| 9151.6465 | 384800.0 | 387830.0 | 490.60 | 980.212342 | 980.327988 | 1.53 | -17.61*PAS9 |
| 9151.6466 | 384950.0 | 387720.0 | 500.90 | 980.210068 | 980.328079 | 1.20 | -18.28*PAS9 |
| 9151.6467 | 384560.0 | 387790.0 | 449.40 | 980.221088 | 980.328017 | 1.19 | -17.34*PAS9 |
| 9151.6468 | 384690.0 | 387660.0 | 439.20 | 980.223000 | 980.328124 | 1.28 | -17.45*PAS9 |
| 9151.6469 | 384390.0 | 387915.0 | 406.10 | 980.229757 | 980.327914 | 0.93 | -17.34*PAS9 |
| 9151.6470 | 384401.0 | 387490.0 | 408.80 | 980.229384 | 980.328257 | 0.67 | -17.79*PAS9 |
| 9151.6471 | 384500.0 | 387503.0 | 409.40 | 980.229375 | 980.328248 | 0.77 | -17.57*PAS9 |
| 9151.6472 | 384594.0 | 387511.0 | 410.40 | 980.229212 | 980.328243 | 0.83 | -17.47*PAS9 |
| 9151.6473 | 384700.0 | 387510.0 | 425.50 | 980.225934 | 980.328245 | 0.96 | -17.65*PAS9 |
| 9151.6474 | 384814.0 | 387505.0 | 453.00 | 980.220113 | 980.328251 | 1.40 | -17.63*PAS9 |
| 9151.6475 | 384910.0 | 387490.0 | 429.80 | 980.224682 | 980.328264 | 1.05 | -17.99*PAS9 |
| 9151.6476 | 384960.0 | 387490.0 | 432.40 | 980.224280 | 980.328265 | 1.01 | -17.92*PAS9 |
| 9151.6477 | 384750.0 | 387250.0 | 414.30 | 980.228610 | 980.328456 | 0.67 | -17.68*PAS9 |
| 9151.6478 | 384500.0 | 387245.0 | 410.50 | 980.229432 | 980.328456 | 0.63 | -17.64*PAS9 |
| 9151.6479 | 384510.0 | 387000.0 | 407.40 | 980.230340 | 980.328654 | 0.51 | -17.66*PAS9 |
| 9151.6480 | 384710.0 | 386990.0 | 410.80 | 980.229346 | 980.328665 | 0.57 | -17.94*PAS9 |
| 9151.6481 | 384990.0 | 386740.0 | 428.80 | 980.225695 | 980.328870 | 0.68 | -18.15*PAS9 |
| 9151.6482 | 384895.0 | 387000.0 | 415.00 | 980.228381 | 980.328659 | 0.61 | -18.03*PAS9 |
| 9151.6483 | 384705.0 | 386770.0 | 407.20 | 980.230656 | 980.328842 | 0.56 | -17.53*PAS9 |
| 9151.6484 | 384400.0 | 386485.0 | 385.50 | 980.235186 | 980.329068 | 0.49 | -17.56*PAS9 |
| 9151.6485 | 384500.0 | 386490.0 | 388.50 | 980.234957 | 980.329066 | 0.50 | -17.19*PAS9 |
| 9151.6486 | 384605.0 | 386480.0 | 391.60 | 980.234335 | 980.329075 | 0.53 | -17.18*PAS9 |
| 9151.6487 | 384725.0 | 386490.0 | 393.30 | 980.234135 | 980.329069 | 0.59 | -16.98*PAS9 |
| 9151.6488 | 384800.0 | 386515.0 | 403.80 | 980.231717 | 980.329049 | 0.68 | -17.22*PAS9 |
| 9151.6489 | 384990.0 | 386365.0 | 394.70 | 980.232883 | 980.329173 | 0.73 | -17.92*PAS9 |
| 9151.6490 | 384915.0 | 386265.0 | 389.20 | 980.234288 | 980.329253 | 0.56 | -17.85*PAS9 |
| 9151.6491 | 384805.0 | 386190.0 | 392.60 | 980.234173 | 980.329312 | 0.63 | -17.28*PAS9 |
| 9151.6492 | 384700.0 | 386060.0 | 410.10 | 980.230856 | 980.329415 | 0.59 | -17.30*PAS9 |
| 9151.6493 | 384920.0 | 386125.0 | 388.90 | 980.234651 | 980.329366 | 0.59 | -17.62*PAS9 |
| 9151.6494 | 384465.0 | 386005.0 | 390.60 | 980.234507 | 980.329457 | 0.56 | -17.55*PAS9 |
| 9151.6495 | 384500.0 | 386270.0 | 385.40 | 980.235368 | 980.329243 | 0.60 | -17.46*PAS9 |
| 9151.6496 | 384300.0 | 386500.0 | 383.10 | 980.235196 | 980.329055 | 0.49 | -18.01*PAS9 |
| 9151.6497 | 384198.0 | 386493.0 | 381.70 | 980.235473 | 980.329059 | 0.50 | -18.00*PAS9 |
| 9151.6498 | 384097.0 | 386489.0 | 380.30 | 980.235693 | 980.329061 | 0.51 | -18.05*PAS9 |
| 9151.6499 | 384000.0 | 386503.0 | 378.70 | 980.236123 | 980.329049 | 0.51 | -17.92*PAS9 |
| 9151.6500 | 383895.0 | 386500.0 | 377.70 | 980.236371 | 980.329050 | 0.52 | -17.86*PAS9 |

|           |          |          |        |            |            |      |             |
|-----------|----------|----------|--------|------------|------------|------|-------------|
| 9151.6501 | 383800.0 | 386505.0 | 383.20 | 980.235186 | 980.329044 | 0.53 | -17.95*PAS9 |
| 9151.6502 | 383990.0 | 386756.0 | 392.20 | 980.233418 | 980.328844 | 0.51 | -17.77*PAS9 |
| 9151.6503 | 384255.0 | 386750.0 | 395.50 | 980.232863 | 980.328853 | 0.49 | -17.70*PAS9 |
| 9151.6504 | 382900.0 | 386500.0 | 403.60 | 980.232462 | 980.329037 | 0.65 | -16.53*PAS9 |
| 9151.6505 | 383008.0 | 386504.0 | 402.20 | 980.232462 | 980.329035 | 0.67 | -16.79*PAS9 |
| 9151.6506 | 383110.0 | 386505.0 | 395.10 | 980.233810 | 980.329035 | 0.61 | -16.90*PAS9 |
| 9151.6507 | 383213.0 | 386507.0 | 391.30 | 980.234345 | 980.329035 | 0.59 | -17.13*PAS9 |
| 9151.6508 | 383312.0 | 386497.0 | 387.60 | 980.235062 | 980.329045 | 0.60 | -17.14*PAS9 |
| 9151.6509 | 383408.0 | 386493.0 | 393.80 | 980.233619 | 980.329049 | 0.63 | -17.34*PAS9 |
| 9151.6510 | 383510.0 | 386497.0 | 396.40 | 980.232949 | 980.329047 | 0.57 | -17.55*PAS9 |
| 9151.6511 | 383610.0 | 386500.0 | 394.10 | 980.233083 | 980.329046 | 0.56 | -17.88*PAS9 |
| 9151.6512 | 383709.0 | 386497.0 | 390.50 | 980.233542 | 980.329050 | 0.55 | -18.14*PAS9 |
| 9151.6513 | 383747.0 | 386742.0 | 397.30 | 980.232080 | 980.328853 | 0.59 | -18.03*PAS9 |
| 9151.6514 | 383500.0 | 386740.0 | 400.60 | 980.232061 | 980.328851 | 0.51 | -17.48*PAS9 |
| 9151.6515 | 383243.0 | 386742.0 | 394.30 | 980.233685 | 980.328846 | 0.63 | -16.97*PAS9 |
| 9151.6516 | 383000.0 | 386750.0 | 435.20 | 980.225255 | 980.328836 | 0.76 | -17.21*PAS9 |
| 9151.6517 | 382660.0 | 386710.0 | 458.60 | 980.220849 | 980.328864 | 1.03 | -16.77*PAS9 |
| 9151.6518 | 382460.0 | 386750.0 | 485.30 | 980.216003 | 980.328829 | 1.11 | -16.25*PAS9 |
| 9151.6519 | 382480.0 | 386505.0 | 439.90 | 980.225064 | 980.329027 | 0.93 | -16.50*PAS9 |
| 9151.6520 | 382225.0 | 386495.0 | 457.50 | 980.221834 | 980.329032 | 0.92 | -16.28*PAS9 |
| 9151.6521 | 382600.0 | 386460.0 | 412.90 | 980.230159 | 980.329065 | 0.85 | -16.83*PAS9 |
| 9151.6522 | 382700.0 | 386490.0 | 409.60 | 980.231028 | 980.329042 | 0.83 | -16.61*PAS9 |
| 9151.6523 | 382800.0 | 386500.0 | 405.80 | 980.231793 | 980.329035 | 0.71 | -16.71*PAS9 |
| 9151.6524 | 382480.0 | 386250.0 | 401.80 | 980.233007 | 980.329233 | 0.76 | -16.43*PAS9 |
| 9151.6525 | 382750.0 | 386250.0 | 393.00 | 980.234316 | 980.329236 | 0.73 | -16.88*PAS9 |
| 9151.6526 | 382990.0 | 386245.0 | 368.60 | 980.238703 | 980.329244 | 0.77 | -17.26*PAS9 |
| 9151.6527 | 382755.0 | 386010.0 | 359.00 | 980.241064 | 980.329430 | 0.65 | -17.10*PAS9 |
| 9151.6528 | 382505.0 | 385960.0 | 384.80 | 980.235893 | 980.329467 | 0.67 | -17.21*PAS9 |
| 9151.6529 | 382320.0 | 386010.0 | 391.90 | 980.234785 | 980.329424 | 0.81 | -16.74*PAS9 |
| 9151.6530 | 381950.0 | 386000.0 | 401.00 | 980.233762 | 980.329428 | 0.80 | -15.98*PAS9 |
| 9151.6531 | 382270.0 | 386280.0 | 426.90 | 980.228065 | 980.329206 | 0.97 | -16.19*PAS9 |
| 9151.6532 | 384240.0 | 386240.0 | 384.60 | 980.235090 | 980.329264 | 0.51 | -18.01*PAS9 |
| 9151.6533 | 384010.0 | 386275.0 | 384.70 | 980.234909 | 980.329233 | 0.55 | -18.10*PAS9 |
| 9151.6534 | 383755.0 | 386200.0 | 362.90 | 980.239841 | 980.329290 | 0.54 | -17.52*PAS9 |
| 9151.6535 | 383510.0 | 386240.0 | 362.20 | 980.240118 | 980.329255 | 0.53 | -17.36*PAS9 |
| 9151.6536 | 383260.0 | 386255.0 | 360.80 | 980.240367 | 980.329239 | 0.56 | -17.34*PAS9 |
| 9151.6537 | 383000.0 | 385980.0 | 356.00 | 980.241781 | 980.329458 | 0.64 | -17.01*PAS9 |
| 9151.6538 | 383250.0 | 386025.0 | 359.60 | 980.241246 | 980.329425 | 0.57 | -16.87*PAS9 |
| 9151.6539 | 383535.0 | 386010.0 | 354.30 | 980.241991 | 980.329440 | 0.63 | -17.13*PAS9 |
| 9151.6540 | 383740.0 | 385980.0 | 363.40 | 980.239793 | 980.329467 | 0.68 | -17.51*PAS9 |
| 9151.6541 | 383990.0 | 385975.0 | 363.50 | 980.239420 | 980.329475 | 0.60 | -17.95*PAS9 |
| 9151.6542 | 384250.0 | 386000.0 | 380.50 | 980.235874 | 980.329458 | 0.61 | -18.13*PAS9 |
| 9151.6543 | 383990.0 | 385485.0 | 338.80 | 980.245021 | 980.329870 | 0.63 | -17.57*PAS9 |
| 9151.6544 | 383900.0 | 385485.0 | 327.60 | 980.247392 | 980.329869 | 0.56 | -17.48*PAS9 |
| 9151.6545 | 383790.0 | 385490.0 | 318.90 | 980.248959 | 980.329863 | 0.55 | -17.63*PAS9 |
| 9151.6546 | 383690.0 | 385490.0 | 317.10 | 980.249408 | 980.329862 | 0.52 | -17.56*PAS9 |
| 9151.6547 | 383600.0 | 385490.0 | 317.10 | 980.249169 | 980.329861 | 0.52 | -17.80*PAS9 |
| 9151.6548 | 383500.0 | 385500.0 | 313.10 | 980.250077 | 980.329852 | 0.53 | -17.66*PAS9 |
| 9151.6549 | 383400.0 | 385500.0 | 307.70 | 980.251177 | 980.329850 | 0.55 | -17.60*PAS9 |
| 9151.6550 | 383305.0 | 385505.0 | 307.50 | 980.251492 | 980.329845 | 0.61 | -17.26*PAS9 |
| 9151.6551 | 383210.0 | 385505.0 | 314.10 | 980.250412 | 980.329844 | 0.87 | -16.78*PAS9 |
| 9151.6552 | 383105.0 | 385510.0 | 343.00 | 980.245059 | 980.329838 | 1.01 | -16.30*PAS9 |
| 9151.6553 | 383005.0 | 385525.0 | 360.80 | 980.241724 | 980.329825 | 0.99 | -16.14*PAS9 |
| 9151.6554 | 382910.0 | 385515.0 | 384.60 | 980.237107 | 980.329832 | 0.96 | -16.11*PAS9 |
| 9151.6555 | 382820.0 | 385510.0 | 376.70 | 980.238426 | 980.329835 | 1.00 | -16.31*PAS9 |
| 9151.6556 | 382735.0 | 385505.0 | 347.50 | 980.244333 | 980.329837 | 1.03 | -16.12*PAS9 |
| 9151.6557 | 382670.0 | 385450.0 | 346.92 | 980.244295 | 980.329881 | 1.21 | -16.13*PAS9 |
| 9151.6558 | 382630.0 | 385675.0 | 350.63 | 980.243530 | 980.329699 | 0.81 | -16.39*PAS9 |
| 9151.6559 | 383920.0 | 384470.0 | 330.30 | 980.247315 | 980.330688 | 0.90 | -17.50*PAS9 |
| 9151.6560 | 384020.0 | 384470.0 | 320.70 | 980.248787 | 980.330690 | 1.08 | -17.74*PAS9 |
| 9151.6561 | 384125.0 | 384470.0 | 292.50 | 980.253882 | 980.330691 | 0.97 | -18.30*PAS9 |
| 9151.6562 | 384030.0 | 384700.0 | 327.70 | 980.248137 | 980.330504 | 0.77 | -17.14*PAS9 |
| 9151.6563 | 383800.0 | 384750.0 | 308.00 | 980.251970 | 980.330461 | 0.72 | -17.19*PAS9 |
| 9151.6564 | 383920.0 | 385735.0 | 348.30 | 980.242746 | 980.329667 | 0.76 | -17.65*PAS9 |

|           |          |          |        |            |            |      |              |
|-----------|----------|----------|--------|------------|------------|------|--------------|
| 9151.6565 | 383680.0 | 385785.0 | 348.30 | 980.242680 | 980.329624 | 0.84 | -17.59*PAS91 |
| 9151.6566 | 383500.0 | 385740.0 | 339.60 | 980.244916 | 980.329658 | 0.87 | -17.07*PAS91 |
| 9151.6567 | 383255.0 | 385760.0 | 375.30 | 980.238331 | 980.329639 | 0.85 | -16.63*PAS91 |
| 9151.6568 | 383785.0 | 384440.0 | 316.60 | 980.250049 | 980.330711 | 0.69 | -17.70*PAS91 |
| 9151.6569 | 383690.0 | 384460.0 | 308.30 | 980.251855 | 980.330693 | 0.64 | -17.55*PAS91 |
| 9151.6570 | 383587.0 | 384452.0 | 304.30 | 980.252610 | 980.330698 | 0.59 | -17.64*PAS91 |
| 9151.6571 | 383506.0 | 384446.0 | 294.90 | 980.254302 | 980.330702 | 0.55 | -17.84*PAS91 |
| 9151.6572 | 383400.0 | 384445.0 | 284.70 | 980.256567 | 980.330702 | 0.52 | -17.61*PAS91 |
| 9151.6573 | 383303.0 | 384442.0 | 281.80 | 980.256797 | 980.330703 | 0.55 | -17.93*PAS91 |
| 9151.6574 | 383197.0 | 384445.0 | 283.70 | 980.256902 | 980.330699 | 0.44 | -17.55*PAS91 |
| 9151.6575 | 383100.0 | 384450.0 | 282.90 | 980.256902 | 980.330694 | 0.45 | -17.69*PAS91 |
| 9151.6576 | 383000.0 | 384450.0 | 284.90 | 980.256720 | 980.330692 | 0.49 | -17.44*PAS91 |
| 9151.6577 | 382895.0 | 384445.0 | 295.40 | 980.255067 | 980.330695 | 0.53 | -16.99*PAS91 |
| 9151.6578 | 382780.0 | 384440.0 | 307.90 | 980.252801 | 980.330698 | 0.53 | -16.80*PAS91 |
| 9151.6579 | 382690.0 | 384440.0 | 310.70 | 980.252333 | 980.330696 | 0.63 | -16.62*PAS91 |
| 9151.6580 | 382596.0 | 384435.0 | 306.80 | 980.252859 | 980.330699 | 0.77 | -16.72*PAS91 |
| 9151.6581 | 383017.0 | 385740.0 | 377.70 | 980.238627 | 980.329652 | 0.61 | -16.12*PAS91 |
| 9151.6582 | 382500.0 | 384440.0 | 321.60 | 980.249542 | 980.330694 | 0.85 | -17.04*PAS91 |
| 9151.6583 | 382405.0 | 384450.0 | 354.80 | 980.242813 | 980.330684 | 1.01 | -17.07*PAS91 |
| 9151.6584 | 382305.0 | 384455.0 | 385.20 | 980.236276 | 980.330679 | 1.15 | -17.48*PAS91 |
| 9151.6585 | 382210.0 | 384460.0 | 358.10 | 980.242230 | 980.330674 | 1.28 | -16.72*PAS91 |
| 9151.6586 | 382110.0 | 384465.0 | 305.80 | 980.251578 | 980.330668 | 1.24 | -17.70*PAS91 |
| 9151.6587 | 381980.0 | 384465.0 | 315.60 | 980.249819 | 980.330667 | 1.67 | -17.10*PAS91 |
| 9151.6588 | 382115.0 | 384650.0 | 321.20 | 980.248844 | 980.330519 | 1.72 | -16.77*PAS91 |
| 9151.6589 | 382235.0 | 384765.0 | 326.55 | 980.247459 | 980.330428 | 1.84 | -16.90*PAS91 |
| 9151.6590 | 382405.0 | 385010.0 | 334.10 | 980.245547 | 980.330233 | 2.27 | -16.70*PAS91 |
| 9151.6591 | 382570.0 | 385215.0 | 339.39 | 980.244543 | 980.330069 | 2.00 | -16.77*PAS91 |
| 9151.6592 | 382750.0 | 385775.0 | 350.50 | 980.243224 | 980.329620 | 0.76 | -16.69*PAS91 |
| 9151.6593 | 384090.0 | 385480.0 | 360.40 | 980.240433 | 980.329875 | 0.69 | -17.86*PAS91 |
| 9151.6594 | 384190.0 | 385470.0 | 367.70 | 980.238178 | 980.329885 | 0.60 | -18.78*PAS91 |
| 9151.6595 | 384285.0 | 385460.0 | 374.60 | 980.237862 | 980.329894 | 0.57 | -17.77*PAS91 |
| 9151.6596 | 384380.0 | 385450.0 | 376.30 | 980.237537 | 980.329903 | 0.65 | -17.69*PAS91 |
| 9151.6597 | 384475.0 | 385440.0 | 381.50 | 980.236582 | 980.329913 | 0.75 | -17.54*PAS91 |
| 9151.6598 | 384575.0 | 385435.0 | 387.20 | 980.235588 | 980.329918 | 1.08 | -17.08*PAS91 |
| 9151.6599 | 384680.0 | 385425.0 | 429.60 | 980.226851 | 980.329927 | 1.39 | -17.18*PAS91 |
| 9151.6600 | 384760.0 | 385420.0 | 448.80 | 980.223162 | 980.329933 | 1.23 | -17.26*PAS91 |
| 9151.6601 | 384870.0 | 385425.0 | 455.50 | 980.221604 | 980.329930 | 1.24 | -17.48*PAS91 |
| 9151.6602 | 384950.0 | 385390.0 | 483.50 | 980.214350 | 980.329959 | 2.53 | -17.97*PAS91 |
| 9151.6603 | 383170.0 | 384210.0 | 282.39 | 980.257103 | 980.330888 | 0.57 | -17.67*PAS91 |
| 9151.6604 | 383325.0 | 384140.0 | 283.60 | 980.256548 | 980.330947 | 0.61 | -18.00*PAS91 |
| 9151.6605 | 383430.0 | 384290.0 | 280.10 | 980.257179 | 980.330827 | 0.57 | -17.98*PAS91 |
| 9151.6606 | 383090.0 | 384750.0 | 290.00 | 980.255382 | 980.330451 | 0.60 | -17.43*PAS91 |
| 9151.6607 | 383130.0 | 385000.0 | 300.00 | 980.253365 | 980.330250 | 0.59 | -17.28*PAS91 |
| 9151.6608 | 383175.0 | 385280.0 | 289.80 | 980.250689 | 980.330025 | 0.71 | -21.62*PAS91 |
| 9151.6609 | 383660.0 | 387025.0 | 396.06 | 980.232376 | 980.328623 | 0.52 | -17.82*PAS91 |
| 9151.6610 | 383810.0 | 386795.0 | 395.46 | 980.232510 | 980.328811 | 0.53 | -17.98*PAS91 |
| 9151.6611 | 383850.0 | 386705.0 | 395.06 | 980.232644 | 980.328884 | 0.53 | -18.00*PAS91 |
| 9151.6612 | 383780.0 | 386530.0 | 389.02 | 980.234001 | 980.329024 | 0.57 | -17.93*PAS91 |
| 9151.6613 | 383515.0 | 386405.0 | 382.30 | 980.235788 | 980.329121 | 0.59 | -17.54*PAS91 |
| 9151.6614 | 383280.0 | 386355.0 | 376.57 | 980.237365 | 980.329159 | 0.52 | -17.20*PAS91 |
| 9151.6615 | 383115.0 | 386295.0 | 371.55 | 980.238130 | 980.329205 | 0.56 | -17.43*PAS91 |
| 9151.6616 | 382885.0 | 386170.0 | 366.01 | 980.239382 | 980.329303 | 0.75 | -17.17*PAS91 |
| 9151.6617 | 381750.0 | 385510.0 | 403.40 | 980.234192 | 980.329820 | 0.73 | -15.55*PAS91 |
| 9151.6618 | 381950.0 | 385535.0 | 408.20 | 980.232921 | 980.329803 | 0.67 | -15.91*PAS91 |
| 9151.6619 | 382010.0 | 385740.0 | 395.30 | 980.235186 | 980.329638 | 0.79 | -15.90*PAS91 |
| 9151.6620 | 381985.0 | 385235.0 | 404.40 | 980.234096 | 980.330045 | 0.69 | -15.71*PAS91 |
| 9151.6621 | 381380.0 | 385540.0 | 408.71 | 980.233389 | 980.329791 | 0.80 | -15.20*PAS91 |
| 9151.6622 | 381630.0 | 385280.0 | 422.11 | 980.230636 | 980.330004 | 0.77 | -15.56*PAS91 |
| 9151.6623 | 382095.0 | 385385.0 | 399.34 | 980.234641 | 980.329926 | 0.68 | -16.05*PAS91 |
| 9151.6624 | 382355.0 | 385810.0 | 386.42 | 980.235932 | 980.329586 | 0.69 | -16.95*PAS91 |
| 9151.6625 | 382170.0 | 385640.0 | 385.72 | 980.236935 | 980.329721 | 0.73 | -16.18*PAS91 |
| 9151.6626 | 383400.0 | 387416.0 | 398.15 | 980.232366 | 980.328304 | 0.68 | -16.94*PAS91 |
| 9151.6627 | 383290.0 | 387663.0 | 400.60 | 980.231879 | 980.328103 | 0.67 | -16.75*PAS91 |
| 9151.6628 | 383265.0 | 387882.0 | 399.62 | 980.231803 | 980.327926 | 0.59 | -16.92*PAS91 |

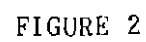
|           |          |          |        |            |            |      |              |
|-----------|----------|----------|--------|------------|------------|------|--------------|
| 9151.6629 | 383240.0 | 388086.0 | 398.87 | 980.232634 | 980.327761 | 0.63 | -16.04*PAS91 |
| 9151.6630 | 383210.0 | 388342.0 | 398.23 | 980.232529 | 980.327554 | 0.69 | -16.00*PAS91 |
| 9151.6631 | 383180.0 | 388579.0 | 400.32 | 980.231917 | 980.327363 | 0.91 | -15.79*PAS91 |
| 9151.6632 | 383155.0 | 388807.0 | 395.17 | 980.232806 | 980.327179 | 0.68 | -15.96*PAS91 |
| 9151.6633 | 383130.0 | 389036.0 | 393.57 | 980.232701 | 980.326993 | 0.72 | -16.15*PAS91 |
| 9151.6634 | 383100.0 | 389285.0 | 392.13 | 980.232433 | 980.326792 | 0.63 | -16.59*PAS91 |
| 9151.6635 | 383065.0 | 389556.0 | 392.11 | 980.231707 | 980.326573 | 0.67 | -17.06*PAS91 |
| 9151.6636 | 383040.0 | 389778.0 | 393.62 | 980.232500 | 980.326394 | 0.83 | -15.63*PAS91 |
| 9151.6637 | 382995.0 | 390026.0 | 396.64 | 980.231544 | 980.326193 | 0.87 | -15.76*PAS91 |
| 9151.6638 | 383790.Q | 387175.0 | 401.45 | 980.230875 | 980.328504 | 0.48 | -18.18*PAS91 |
| 9151.6639 | 383875.0 | 383965.0 | 286.00 | 980.255822 | 980.331095 | 1.16 | -17.86*PAS91 |
| 9151.6640 | 383865.0 | 385015.0 | 311.60 | 980.250890 | 980.330248 | 0.63 | -17.43*PAS91 |
| 9151.6641 | 384055.0 | 385015.0 | 330.90 | 980.247334 | 980.330250 | 0.88 | -16.95*PAS91 |
| 9151.6642 | 384250.0 | 385015.0 | 360.10 | 980.241647 | 980.330253 | 1.03 | -16.74*PAS91 |
| 9151.6643 | 384445.0 | 385015.0 | 369.00 | 980.239478 | 980.330255 | 1.11 | -17.08*PAS91 |
| 9151.6644 | 384640.0 | 385010.0 | 368.90 | 980.239726 | 980.330262 | 1.20 | -16.77*PAS91 |
| 9151.6645 | 384840.0 | 385005.0 | 337.20 | 980.244132 | 980.330268 | 2.26 | -17.55*PAS91 |
| 9151.6646 | 385045.0 | 385130.0 | 323.50 | 980.245671 | 980.330170 | 2.89 | -17.98*PAS91 |
| 9151.6647 | 385180.0 | 385220.0 | 332.80 | 980.243779 | 980.330099 | 3.80 | -17.06*PAS91 |
| 9151.6648 | 385310.0 | 385320.0 | 338.70 | 980.242259 | 980.330020 | 2.88 | -18.26*PAS91 |
| 9151.6649 | 385430.0 | 385435.0 | 342.90 | 980.241456 | 980.329929 | 3.23 | -17.79*PAS91 |
| 9151.6650 | 385550.0 | 385580.0 | 416.20 | 980.227912 | 980.329814 | 2.31 | -17.72*PAS91 |
| 9151.6651 | 385660.0 | 385740.0 | 462.40 | 980.219731 | 980.329686 | 1.82 | -17.17*PAS91 |
| 9151.6652 | 385680.0 | 385910.0 | 445.40 | 980.222675 | 980.329549 | 1.73 | -17.53*PAS91 |
| 9151.6653 | 385780.0 | 385995.0 | 474.50 | 980.216796 | 980.329482 | 1.91 | -17.43*PAS91 |
| 9151.6654 | 385115.0 | 386143.0 | 408.10 | 980.230474 | 980.329354 | 0.91 | -17.69*PAS91 |
| 9151.6655 | 385191.0 | 385873.0 | 388.80 | 980.234030 | 980.329573 | 1.00 | -18.06*PAS91 |
| 9151.6656 | 385176.0 | 385748.0 | 382.00 | 980.235473 | 980.329673 | 1.13 | -17.93*PAS91 |
| 9151.6657 | 385259.0 | 385613.0 | 383.40 | 980.234641 | 980.329783 | 1.19 | -18.53*PAS91 |
| 9151.6658 | 385375.0 | 385506.0 | 383.10 | 980.233858 | 980.329871 | 2.21 | -18.44*PAS91 |
| 9151.6659 | 385662.0 | 385470.0 | 384.20 | 980.232959 | 980.329904 | 2.80 | -18.57*PAS91 |
| 9151.6660 | 385859.0 | 385328.0 | 386.30 | 980.231095 | 980.330021 | 2.87 | -20.07*PAS91 |
| 9151.6669 | 386970.0 | 385450.0 | 321.00 | 980.242135 | 980.329937 | 3.86 | -20.80*PAS91 |
| 9151.6670 | 386800.0 | 385325.0 | 318.00 | 980.242058 | 980.330035 | 4.17 | -21.26*PAS91 |
| 9151.6671 | 386620.0 | 385280.0 | 319.40 | 980.241858 | 980.330069 | 3.85 | -21.53*PAS91 |
| 9151.6672 | 386424.0 | 385221.0 | 323.30 | 980.241026 | 980.330115 | 3.49 | -22.00*PAS91 |
| 9151.6673 | 386052.0 | 385194.0 | 344.20 | 980.238312 | 980.330132 | 3.53 | -20.58*PAS91 |
| 9151.6674 | 385956.0 | 385203.0 | 346.20 | 980.238025 | 980.330123 | 3.67 | -20.33*PAS91 |
| 9151.6675 | 385845.0 | 385257.0 | 357.90 | 980.236811 | 980.330078 | 3.13 | -19.74*PAS91 |
| 9151.6676 | 386315.0 | 385172.0 | 334.40 | 980.239573 | 980.330153 | 3.76 | -21.04*PAS91 |
| 9151.6685 | 380160.0 | 386910.0 | 569.00 | 980.203377 | 980.328669 | 1.00 | -12.36*PAS91 |
| 9151.6697 | 380130.0 | 387460.0 | 690.00 | 980.175707 | 980.328225 | 1.71 | -15.06*PAS91 |
| 9151.6698 | 380270.0 | 387460.0 | 692.00 | 980.175401 | 980.328227 | 1.66 | -15.03*PAS91 |
| 9151.6699 | 380410.0 | 387470.0 | 702.00 | 980.173050 | 980.328221 | 2.28 | -14.79*PAS91 |
| 9151.6700 | 380565.0 | 387450.0 | 684.00 | 980.176557 | 980.328239 | 2.51 | -14.61*PAS91 |
| 9151.6711 | 380100.0 | 388130.0 | 640.00 | 980.188992 | 980.327684 | 1.01 | -11.78*PAS91 |
| 9151.6712 | 380290.0 | 388130.0 | 652.00 | 980.186182 | 980.327687 | 0.89 | -12.35*PAS91 |
| 9151.6719 | 380005.0 | 388340.0 | 613.00 | 980.194096 | 980.327513 | 0.84 | -11.98*PAS91 |
| 9151.6720 | 380200.0 | 388340.0 | 636.00 | 980.188992 | 980.327516 | 0.99 | -12.42*PAS91 |
| 9151.6721 | 380290.0 | 388345.0 | 645.00 | 980.186861 | 980.327513 | 0.83 | -12.93*PAS91 |
| 9151.6722 | 380400.0 | 388360.0 | 656.00 | 980.184165 | 980.327503 | 1.08 | -13.20*PAS91 |
| 9151.6739 | 384950.0 | 384995.0 | 324.80 | 980.244897 | 980.330278 | 2.07 | -19.42*PAS91 |
| 9151.6740 | 384960.0 | 384795.0 | 413.30 | 980.228601 | 980.330440 | 3.06 | -17.48*PAS91 |
| 9151.6741 | 384965.0 | 384600.0 | 475.90 | 980.217160 | 980.330597 | 3.33 | -16.49*PAS91 |
| 9151.6742 | 384970.0 | 384405.0 | 481.50 | 980.216252 | 980.330754 | 2.80 | -16.98*PAS91 |
| 9151.6743 | 384970.0 | 384205.0 | 516.80 | 980.208882 | 980.330916 | 2.93 | -17.44*PAS91 |
| 9151.6744 | 384950.0 | 384000.0 | 539.40 | 980.203587 | 980.331081 | 3.20 | -18.18*PAS91 |



SCALE 1:250 000

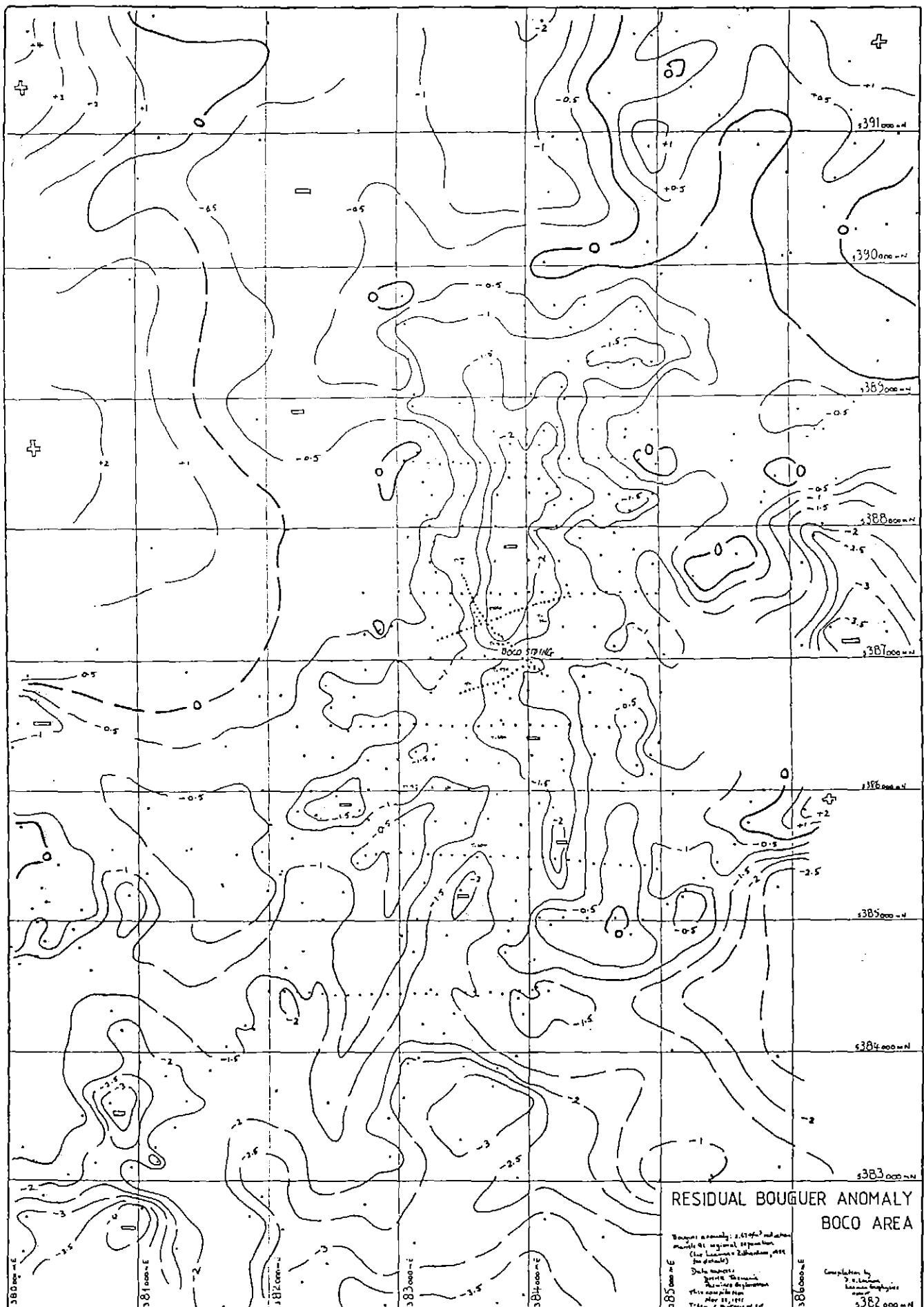
5 cm

10 15 20 25 30 35 40 45 50 Kilometres





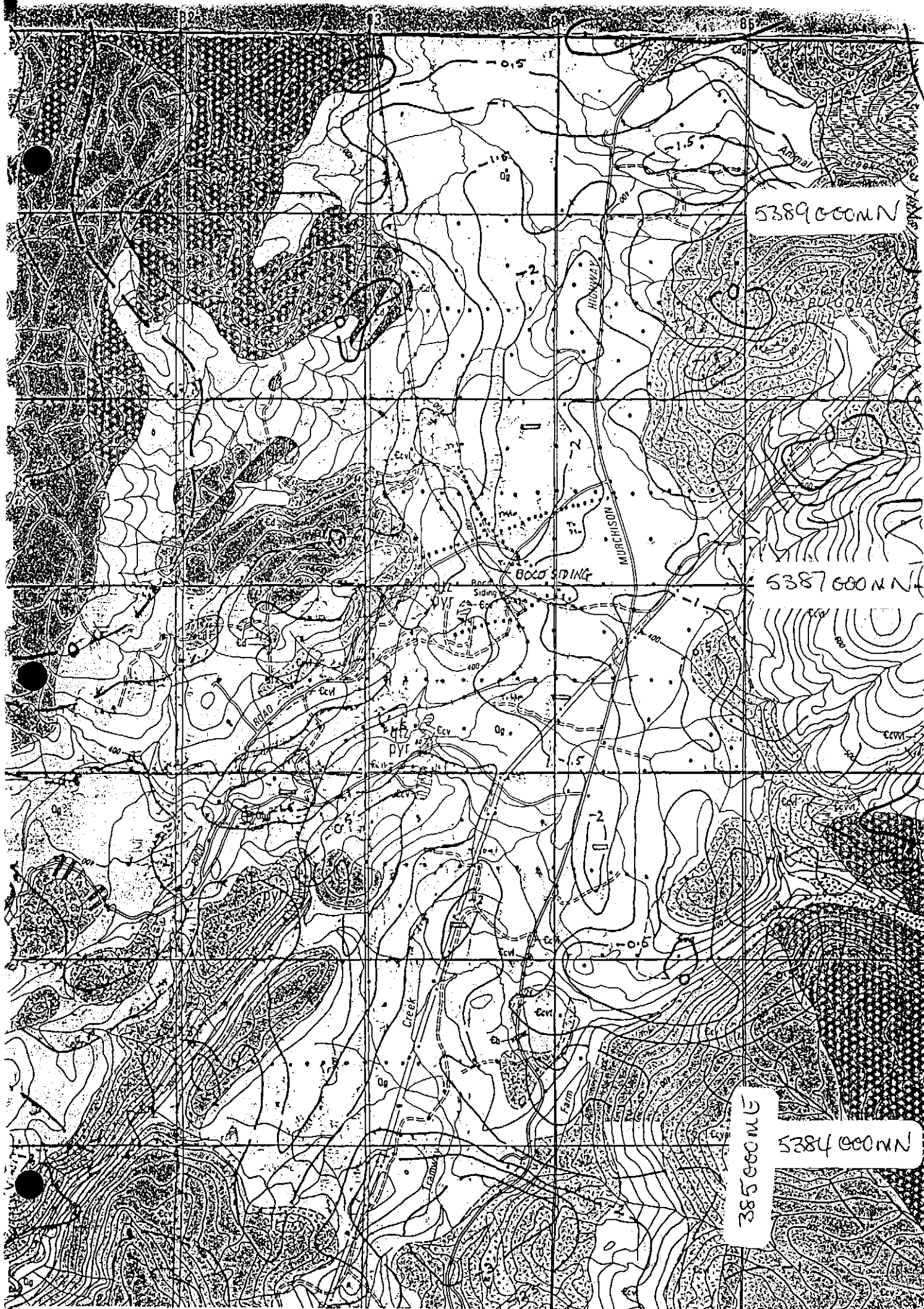
096150



RESIDUAL BOUGUER ANOMALY

Processing using MANTLE91 (see Leaman &amp; Richardson, 1989 for method)

FIGURE 4A

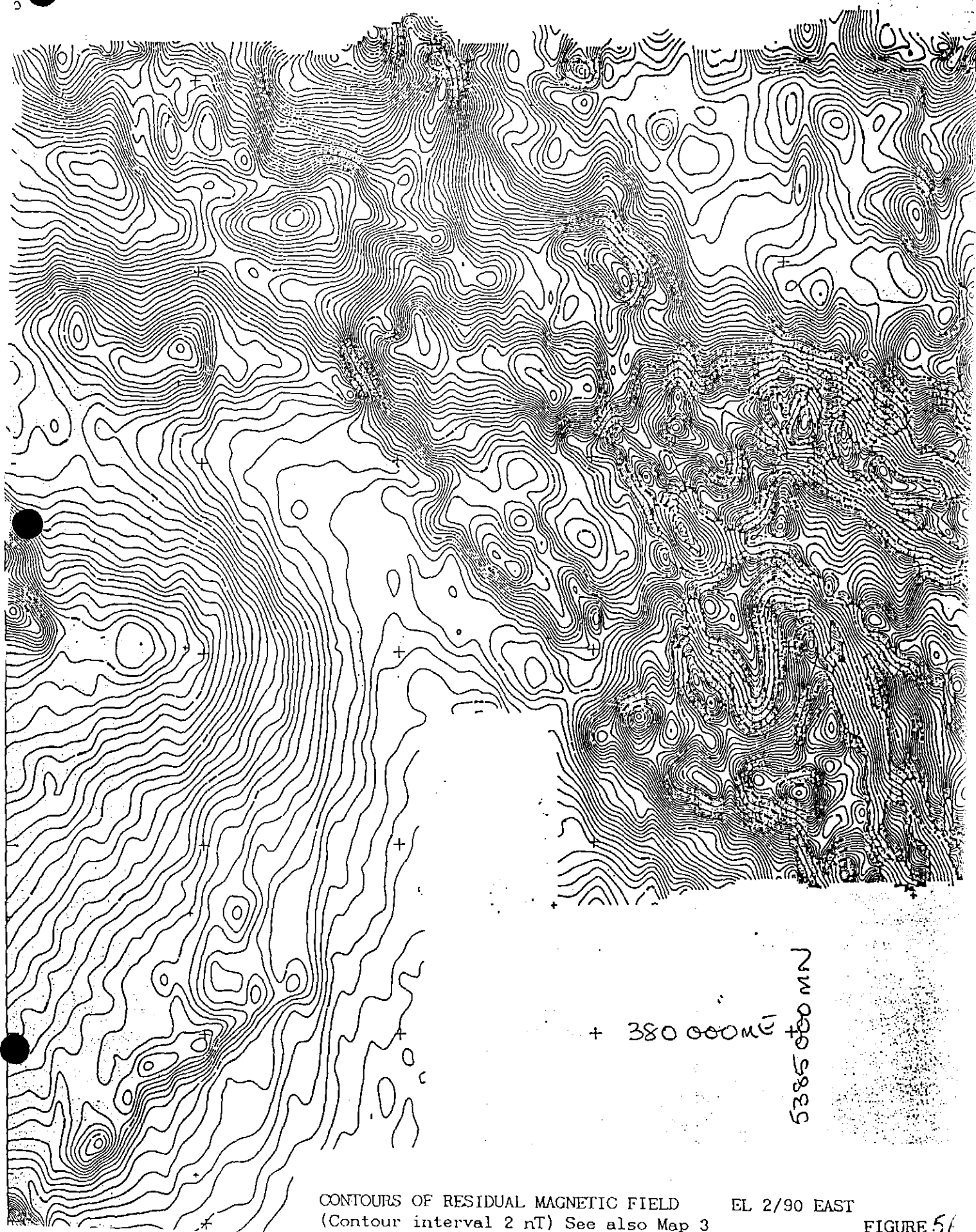


RESIDUAL BOUGUER ANOMALY AND GEOLOGY

FIGURE 4B

096151

096152

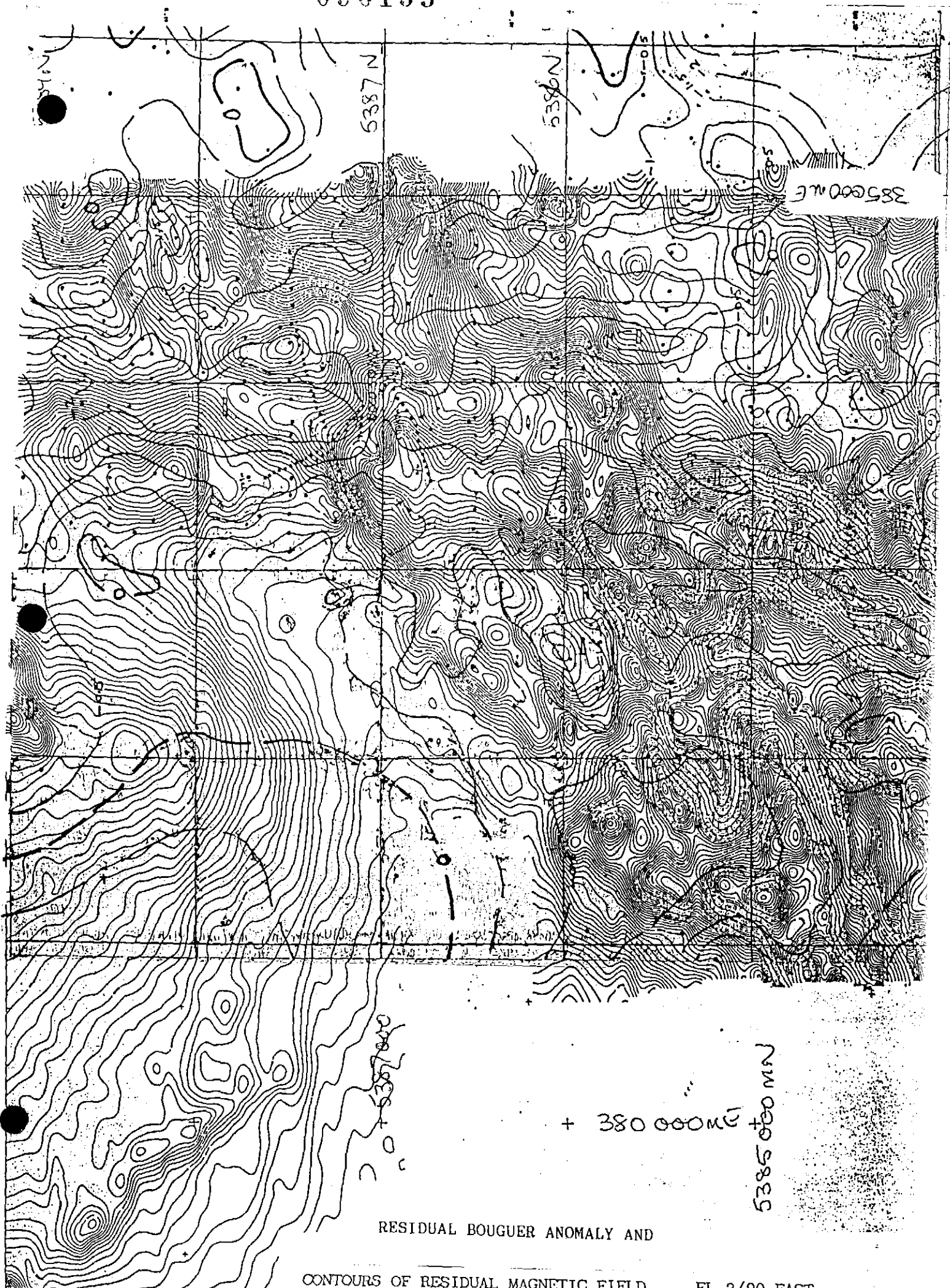


CONTOURS OF RESIDUAL MAGNETIC FIELD  
(Contour interval 2 nT) See also Map 3

EL 2/90 EAST

FIGURE 5/

096153

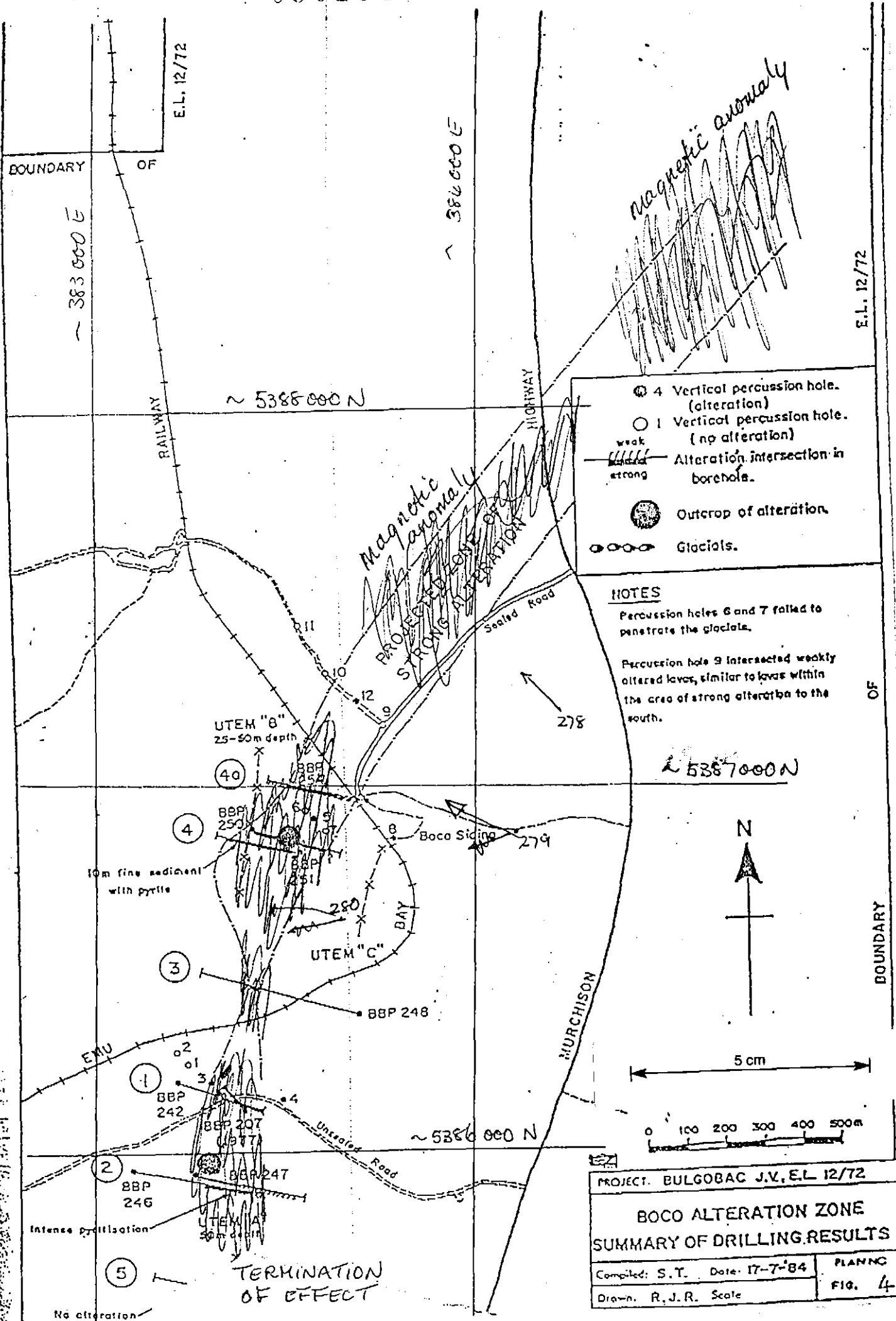


RESIDUAL BOUGUER ANOMALY AND

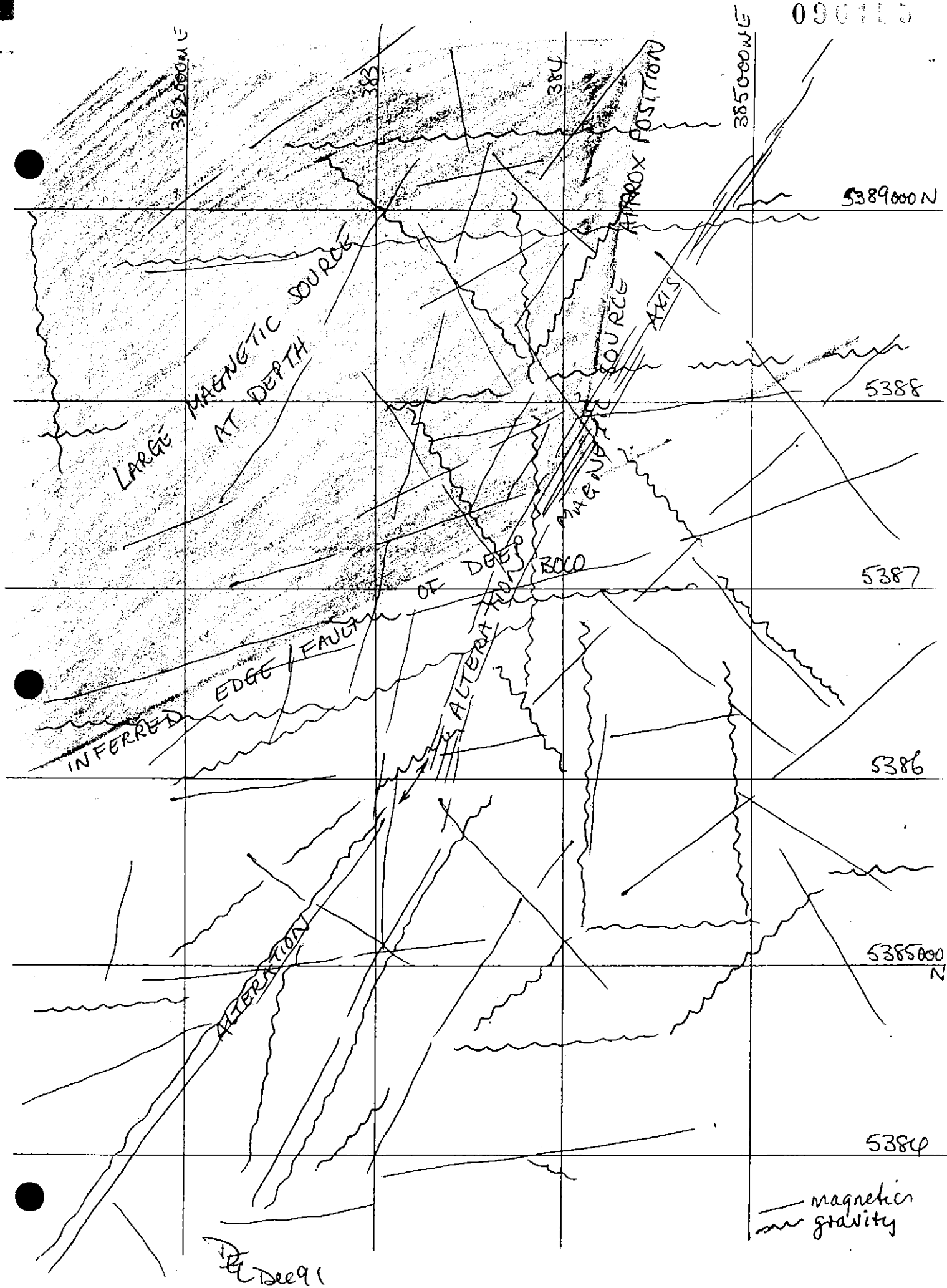
CONTOURS OF RESIDUAL MAGNETIC FIELD  
(Contour interval 2 nT) See also Map 3

EL 2/90 EAST

FIGURE 5E

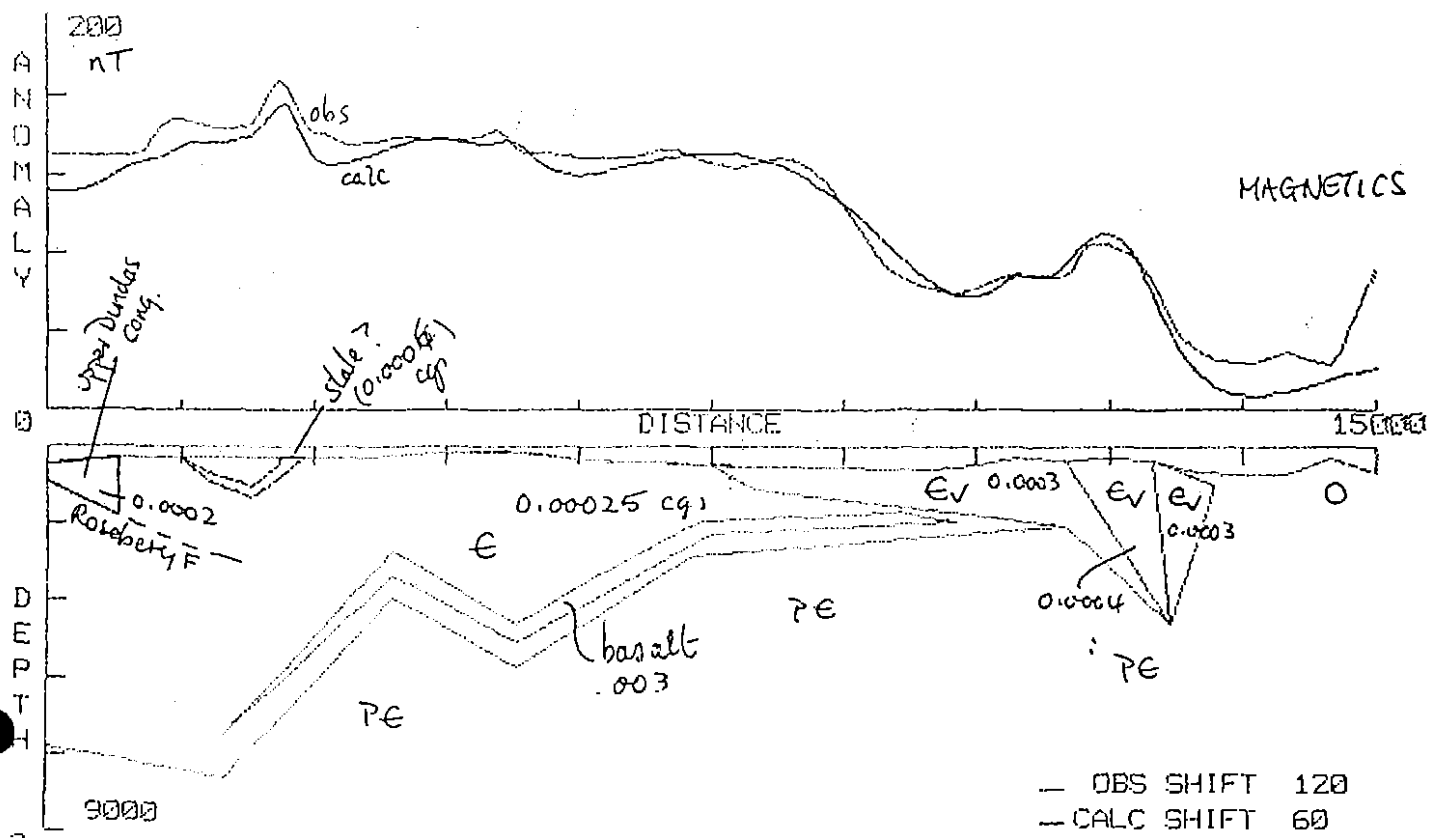
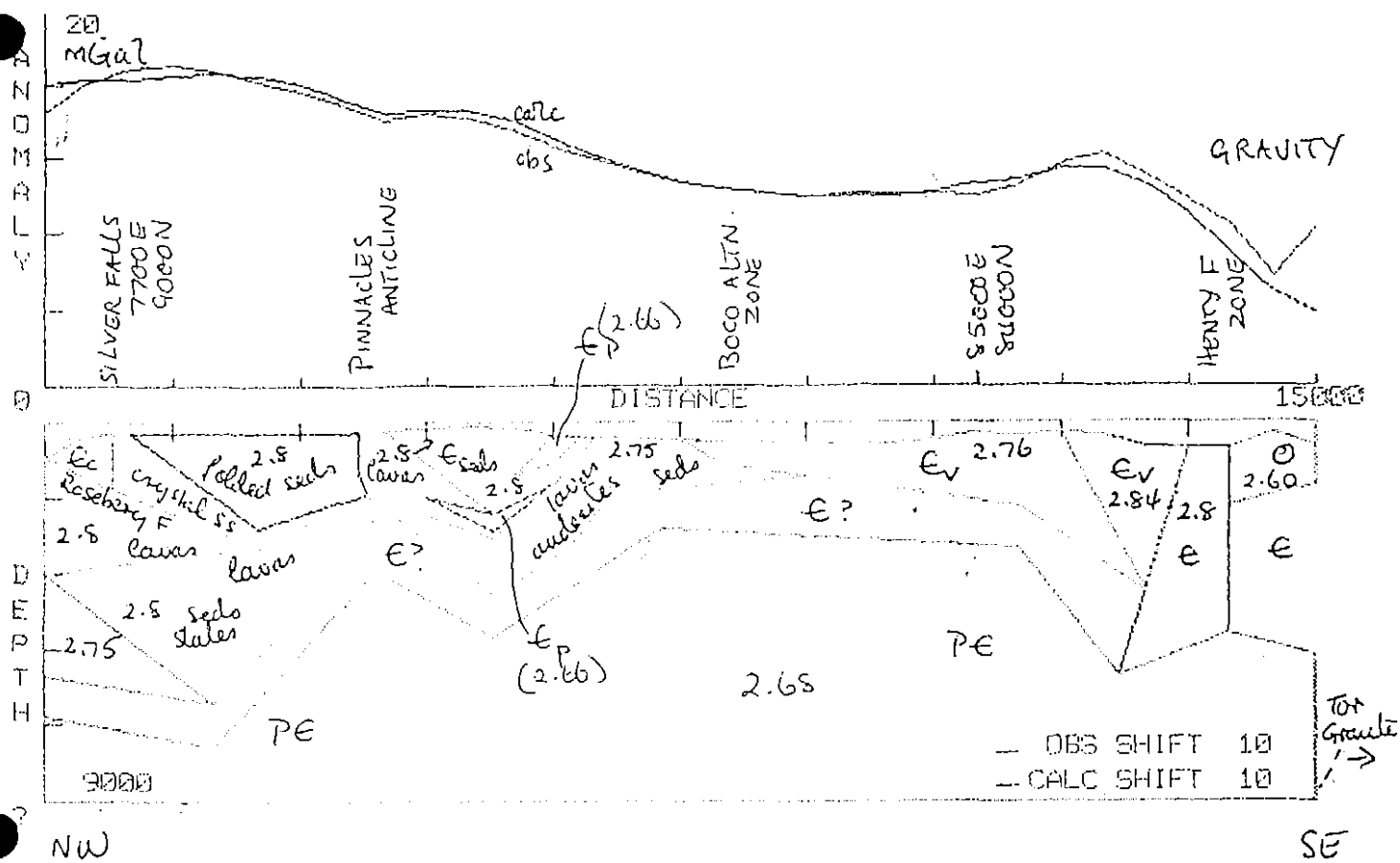


BOCO MINERALISED ZONE AND INFERRED MAGNETIC ALTERATION FIGURE 6



TRENDS INFERRED FROM GRAVITY AND MAGNETIC DATA BOCO AREA

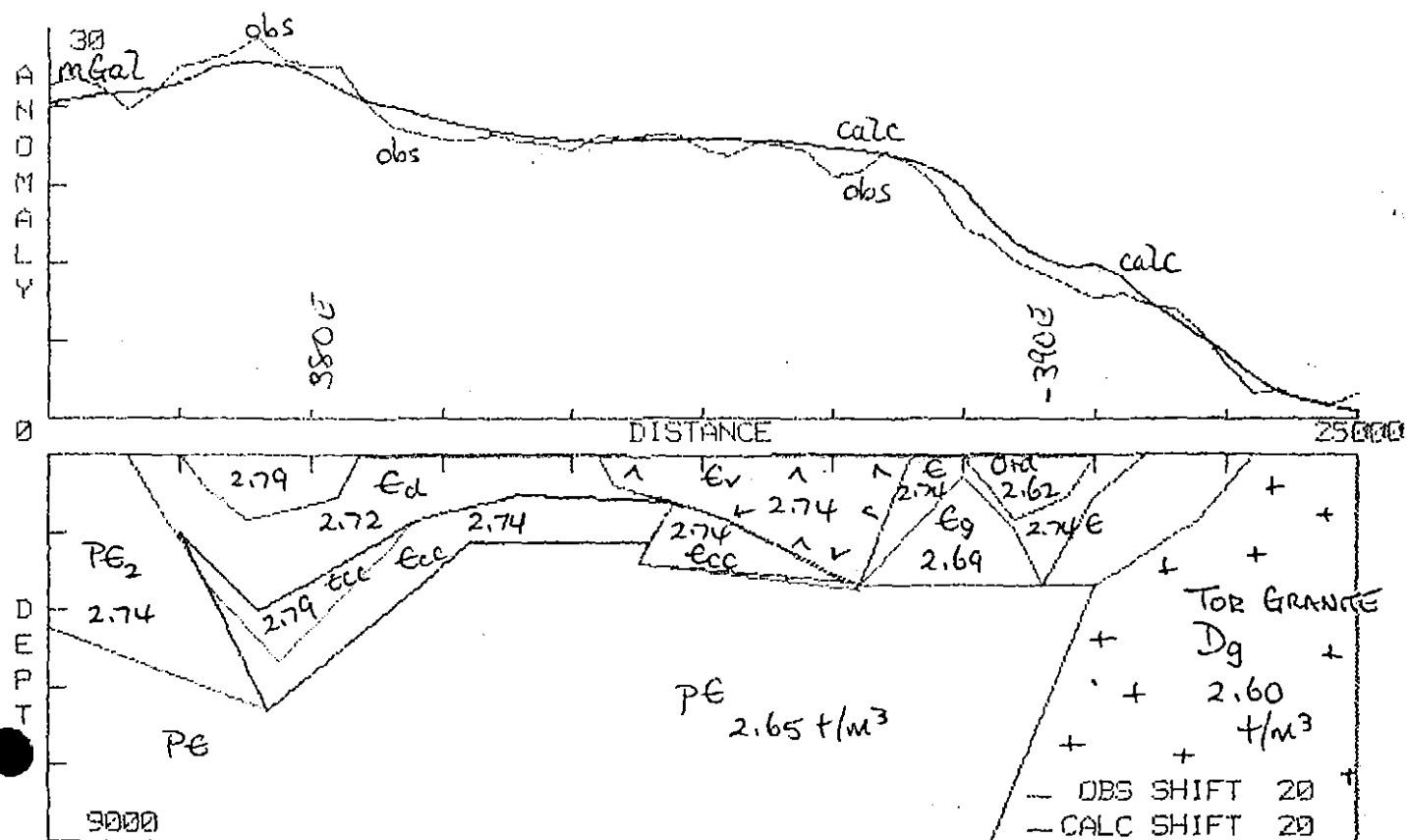
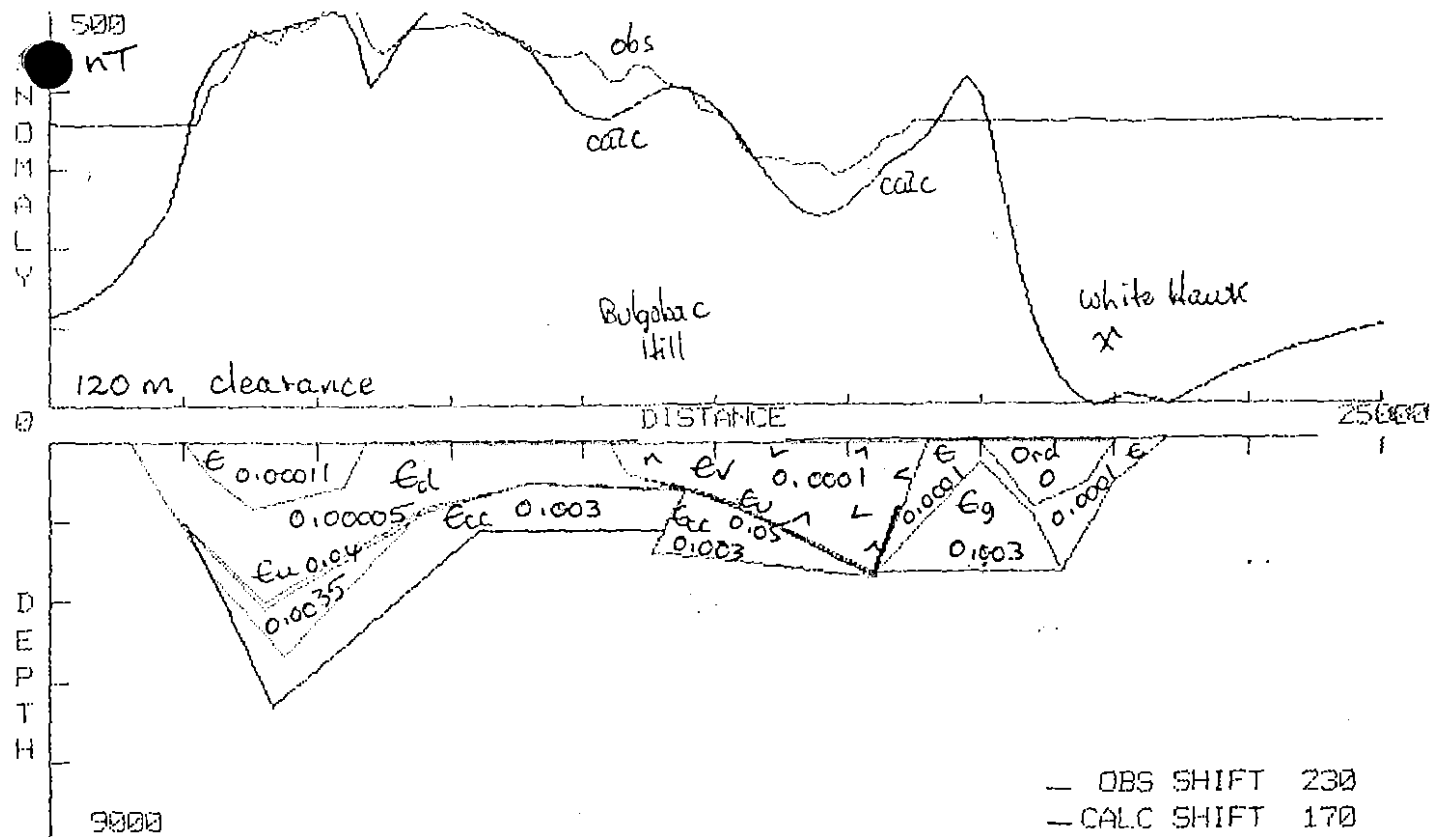
FIGURE 7



Dates for a lot location

Aug 91


$$\Gamma_{\Delta} \cap \Gamma_{\Delta'} = \emptyset$$



? Refer Fig 9 for location

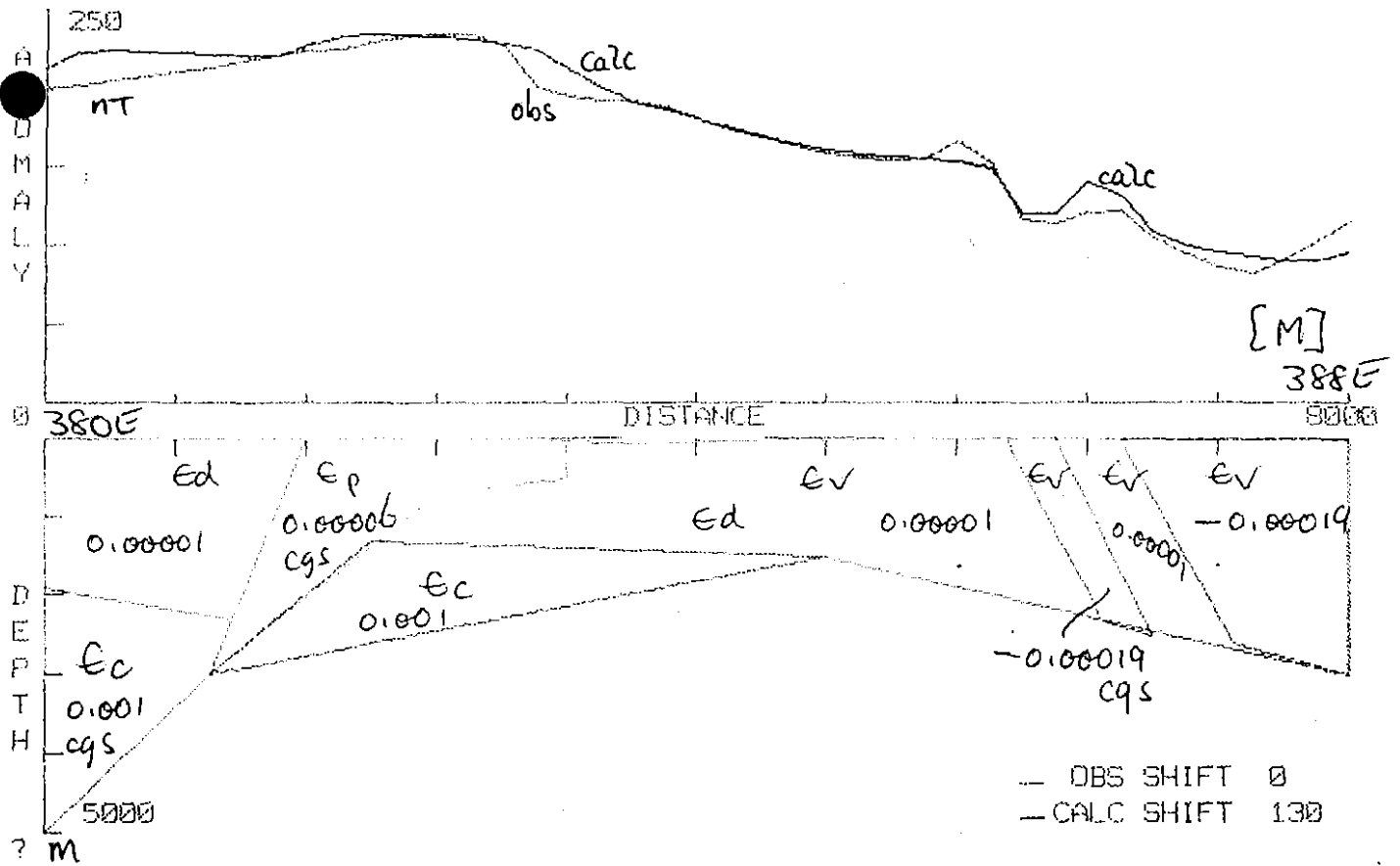
14 Oct 91

REGIONAL SECTION

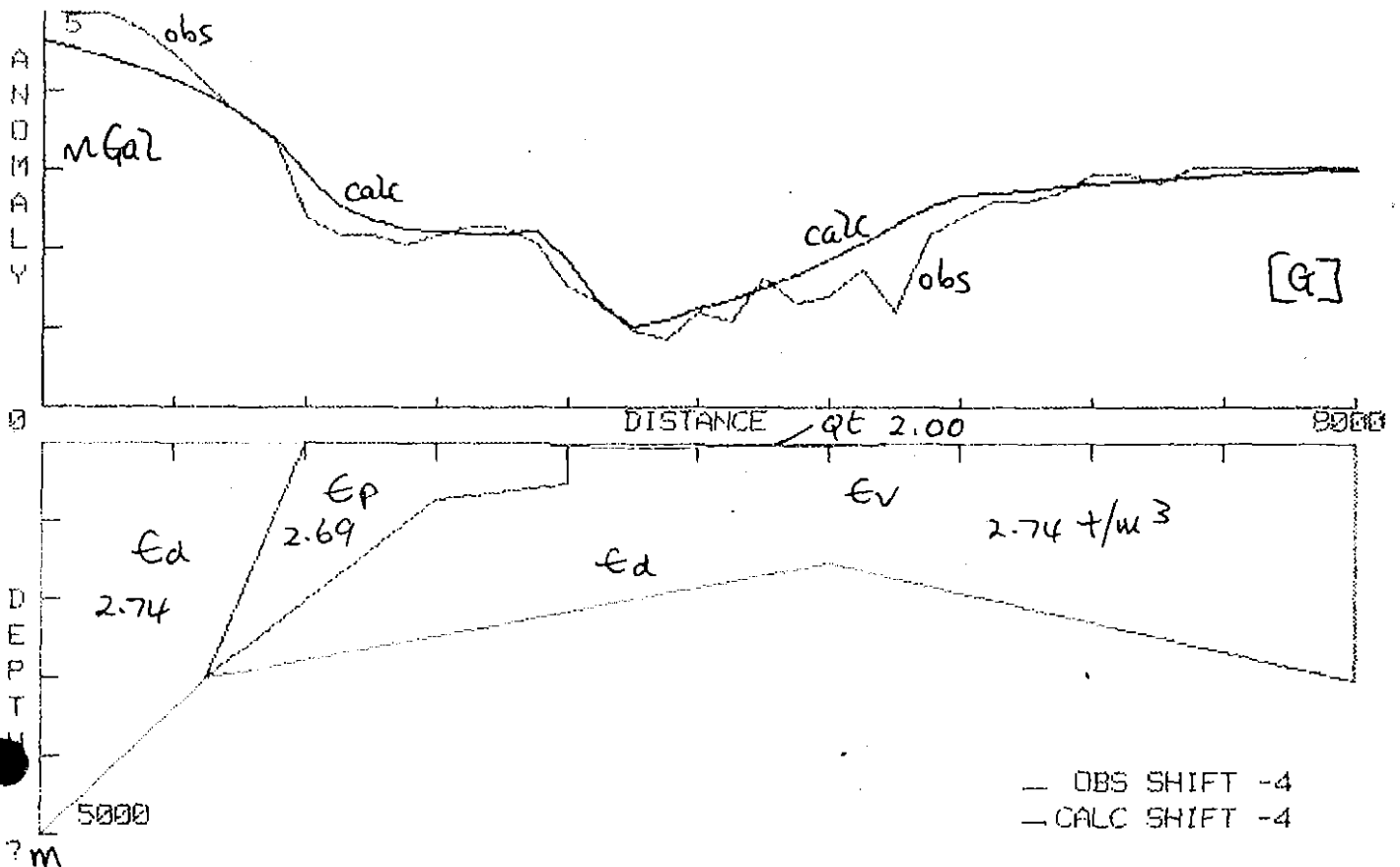
FIGURE 10

096159

891(b)



5389100 N



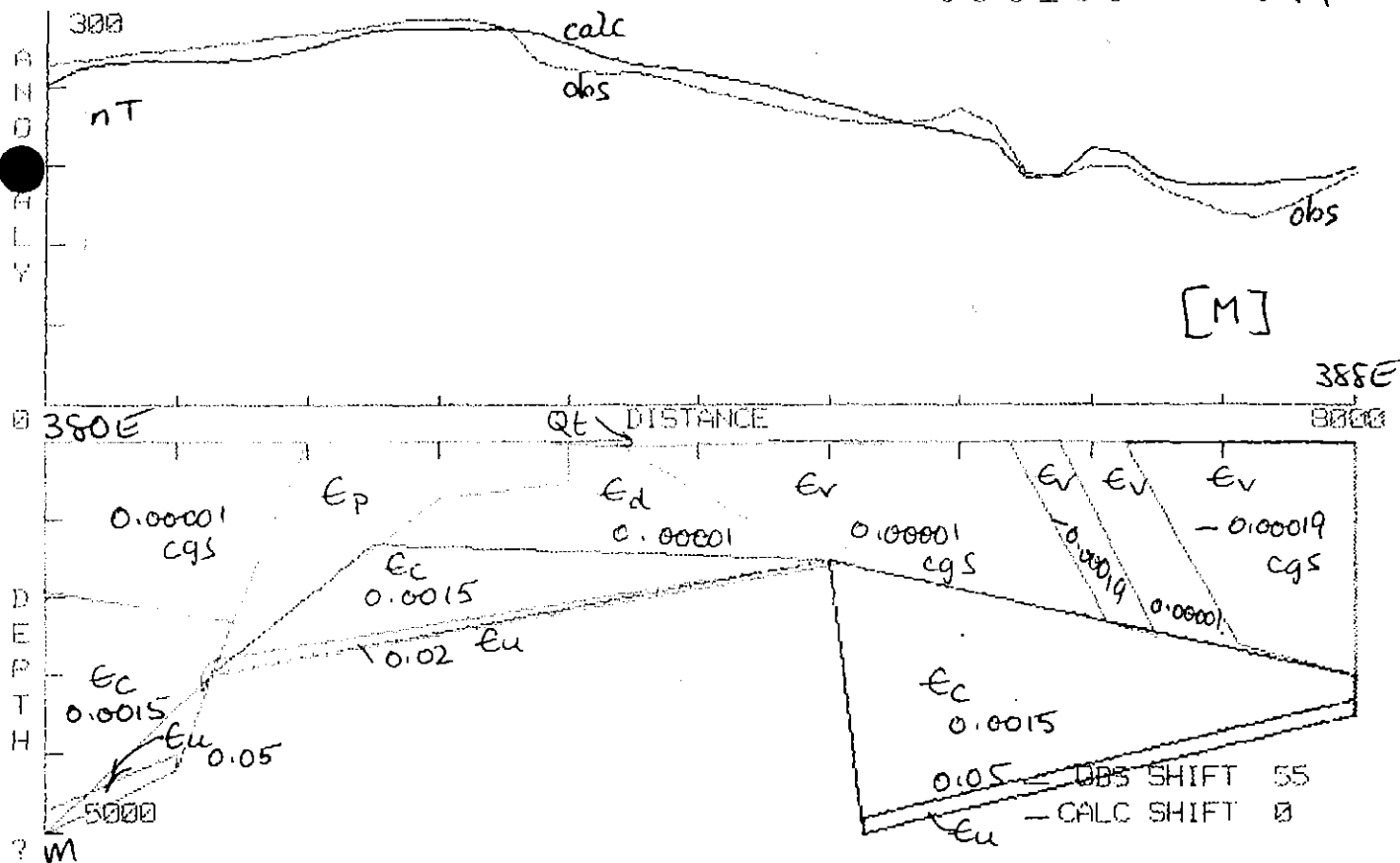
B00891 M, G  
 891 H02, M01  
 891 H2, G1

GRAVITY AND MAGNETIC INTERPRETATION 5389100 MN OPTION 1 FIGURE 11

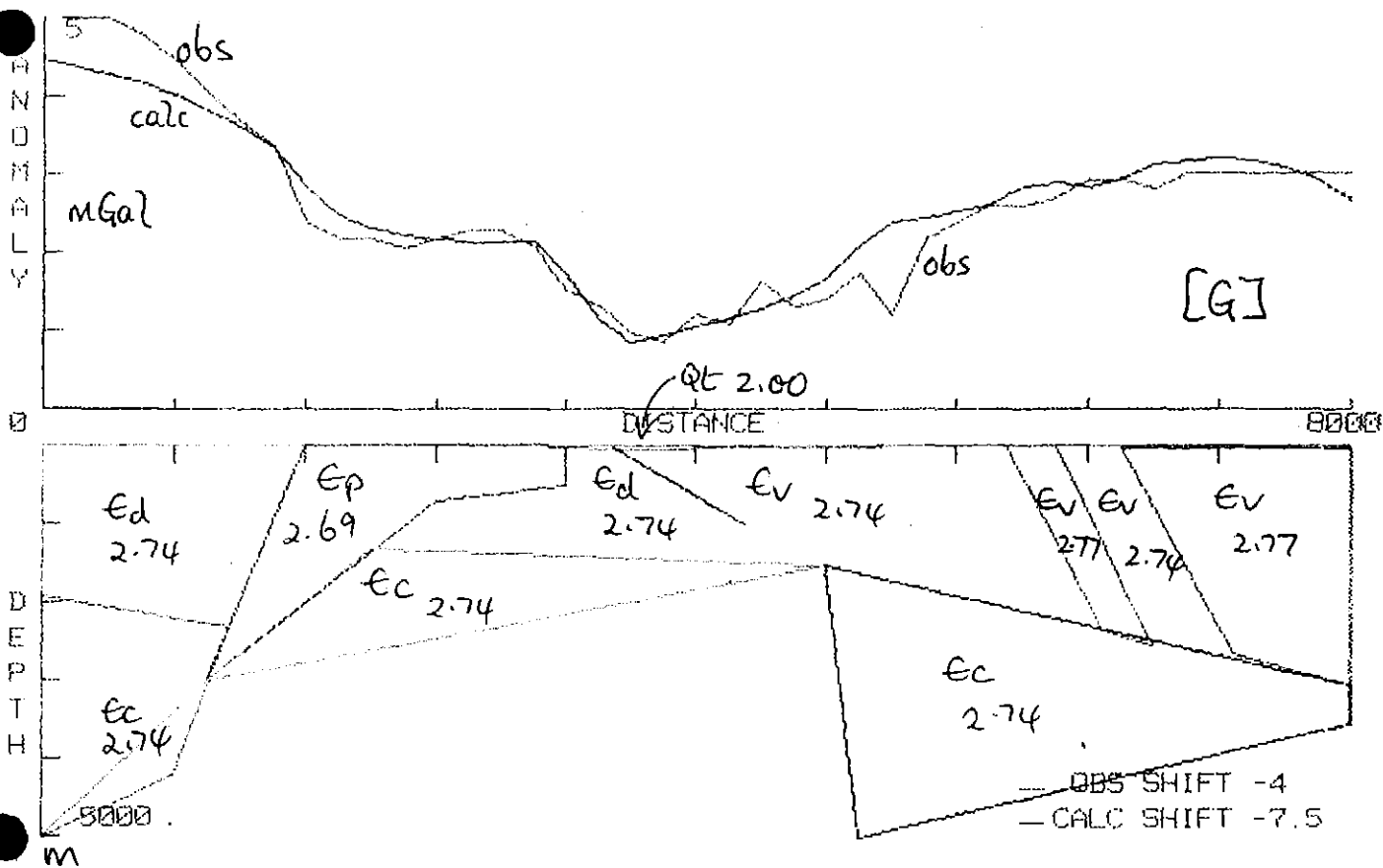
D  
 U L n o m i

096160

891



5389100N



B000891M, G  
891M03  
891M3, G3

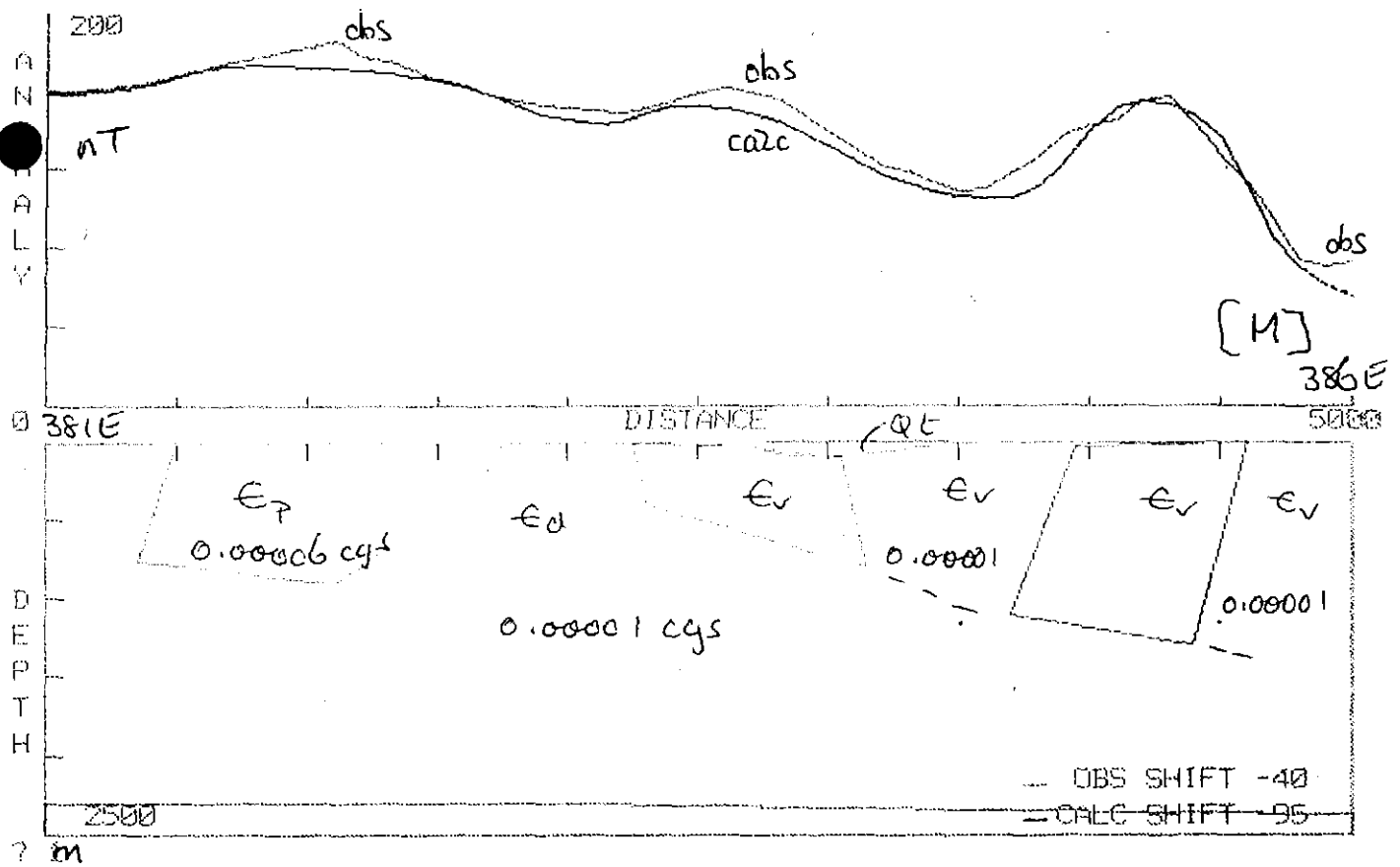
GRAVITY AND MAGNETIC INTERPRETATION 5389100 MN OPTION 2

FIGURE 12

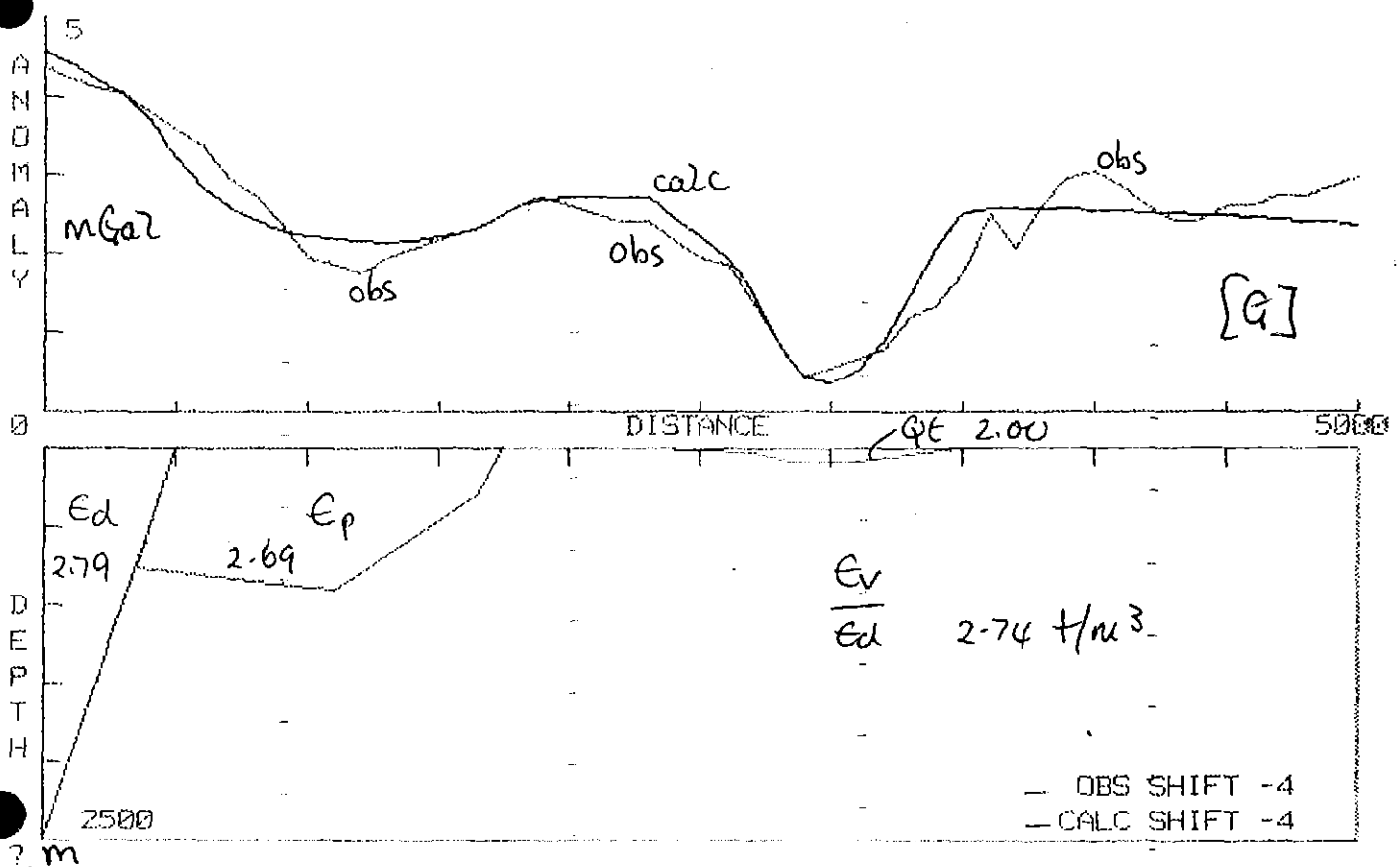
Dec 91

096161

885



5388500N



B000885M, 4  
MDI  
M1, 51

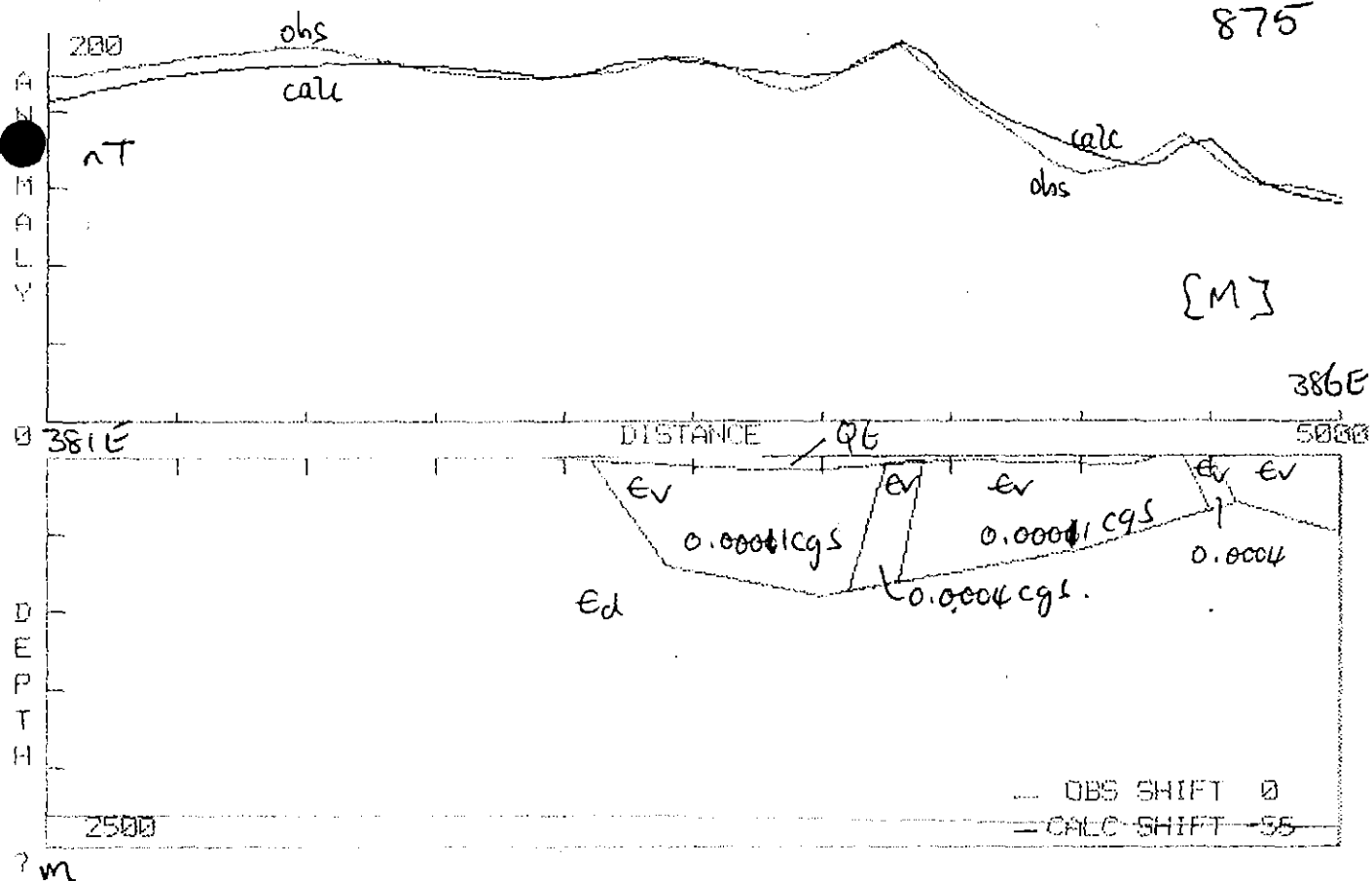
GRAVITY AND MAGNETIC INTERPRETATION 5388500 MN

FIGURE 13

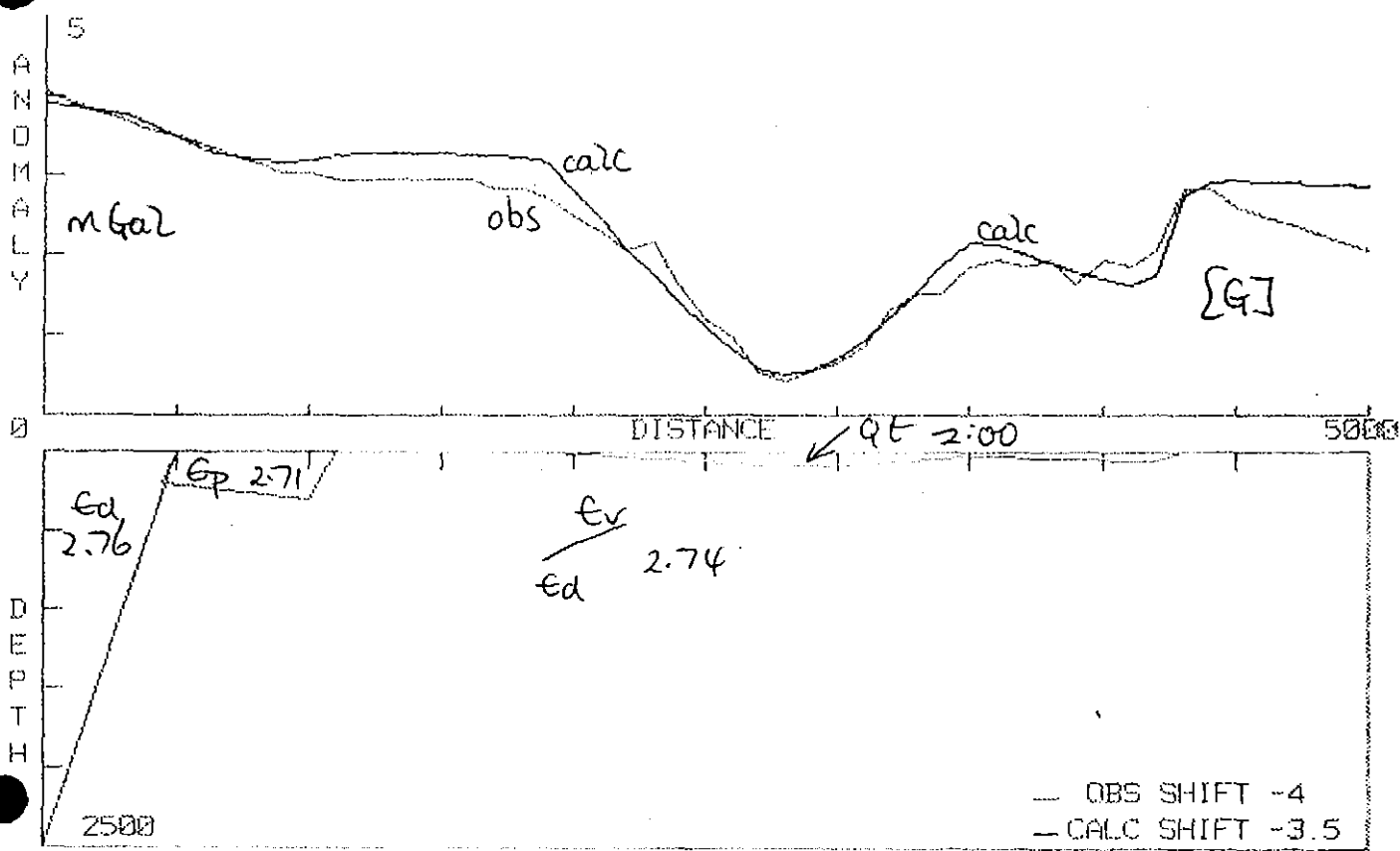
Dec 91

096162

875



5387500 N



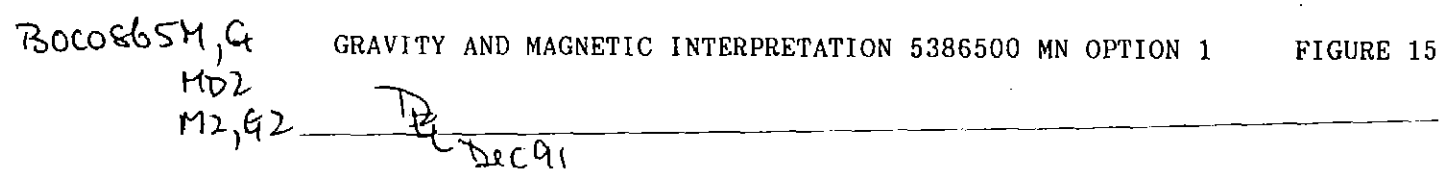
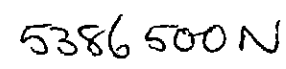
3000875M, G  
MDI  
MI, G1

GRAVITY AND MAGNETIC INTERPRETATION 5387500 MN

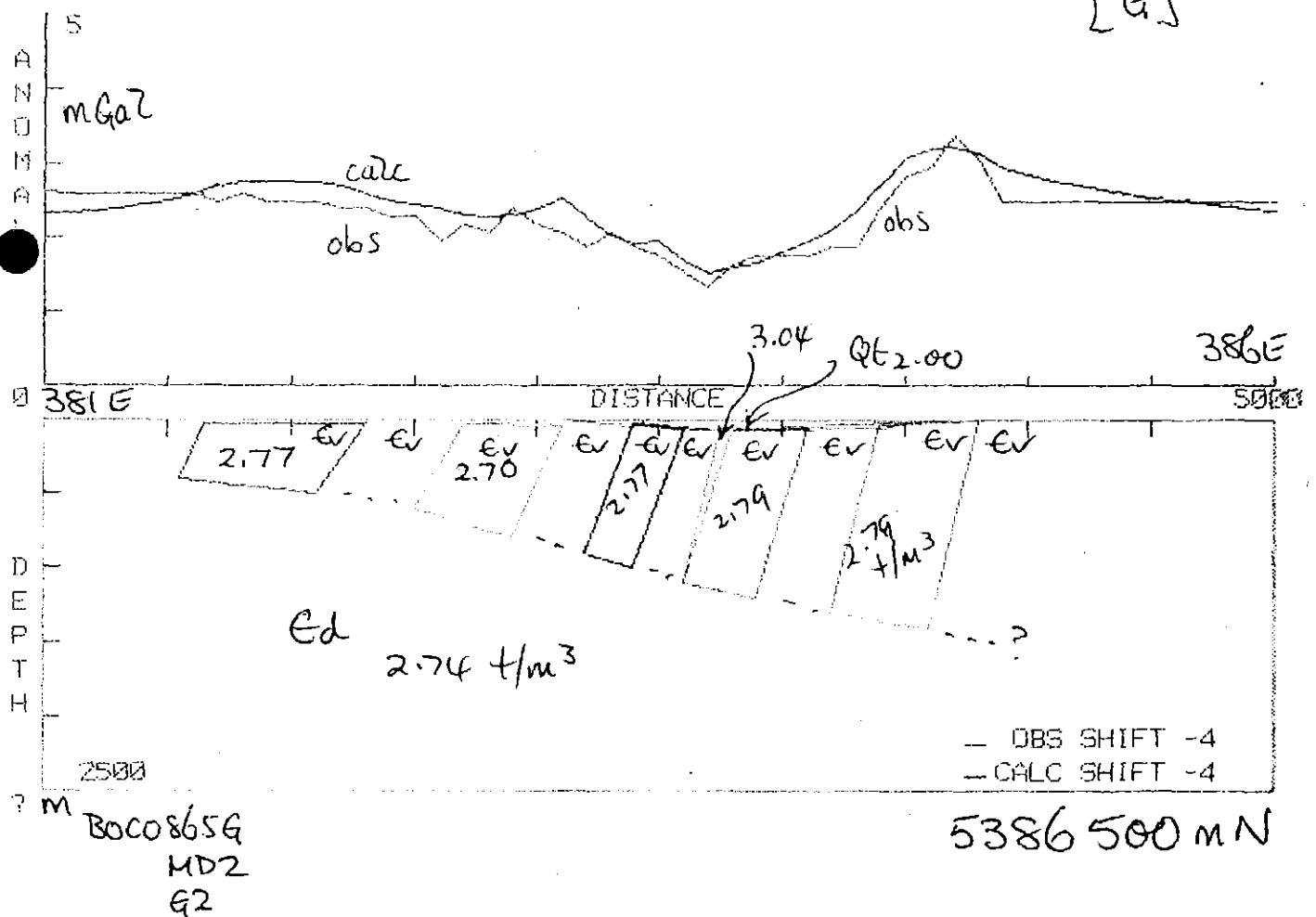
FIGURE 14

Dec 91

865



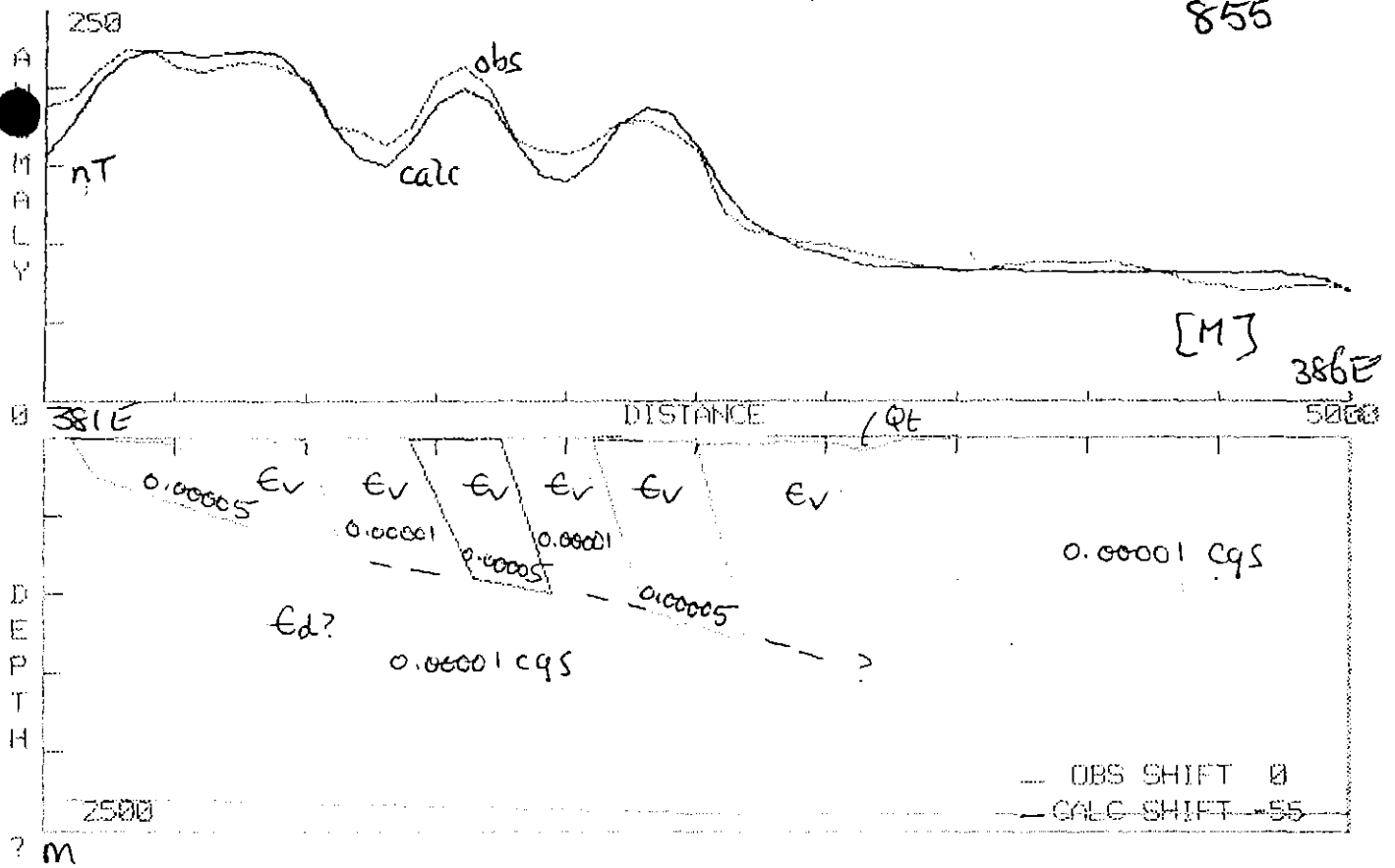
[G]



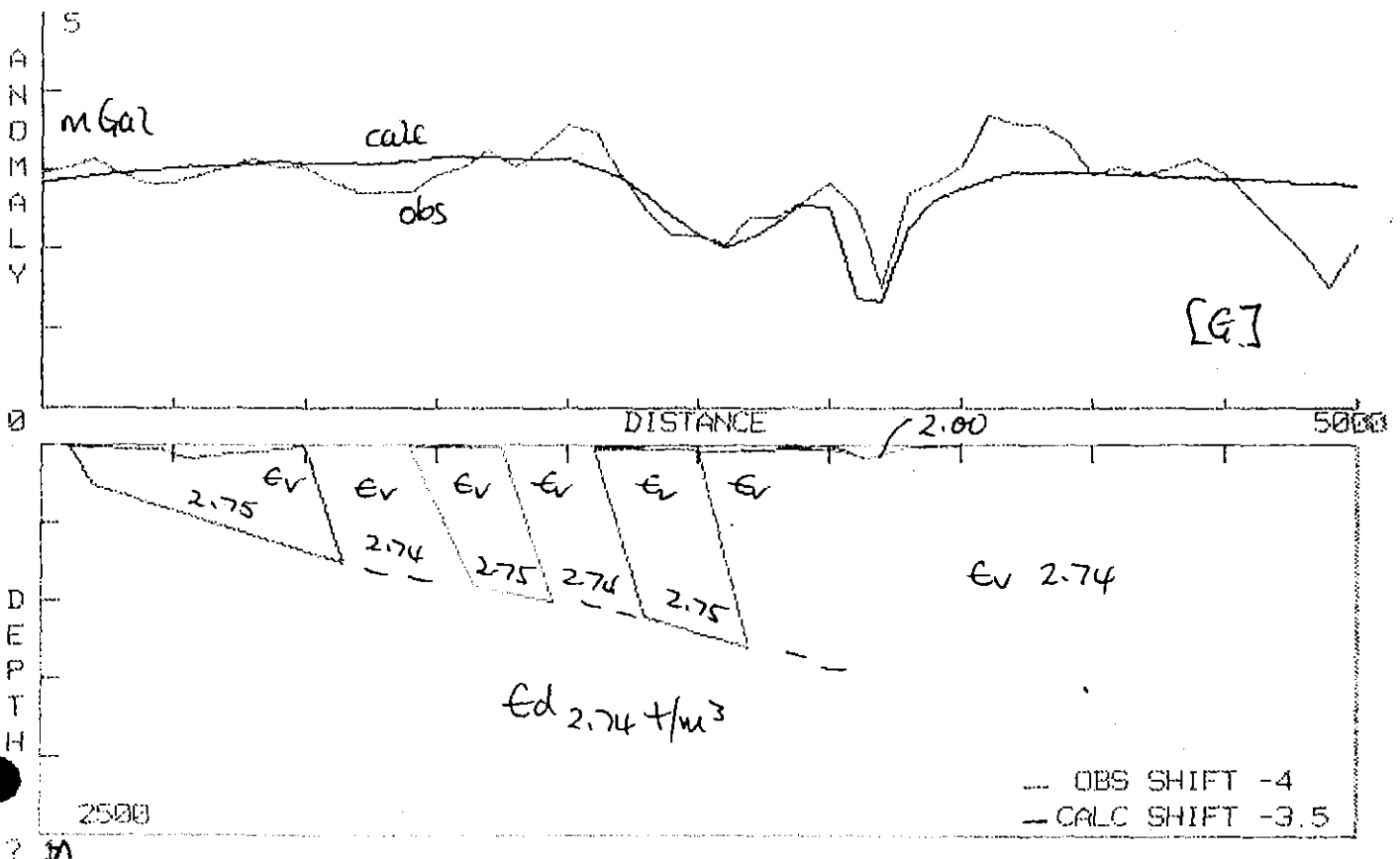
12 Dec 91

096165

855



5385500N



BOC0855M,G  
MDI  
M',G1

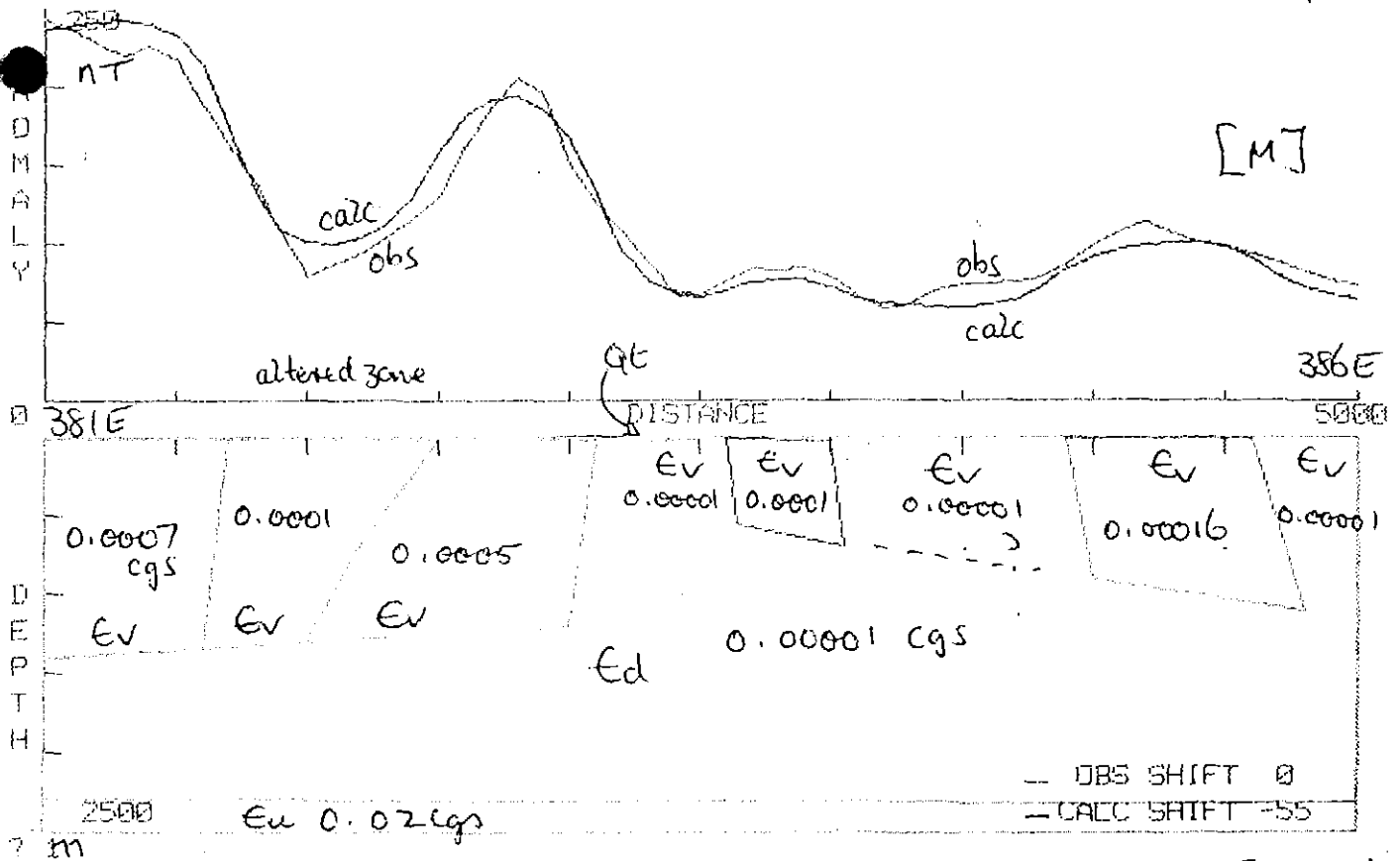
GRAVITY AND MAGNETIC INTERPRETATION 5385500 MN

FIGURE 17

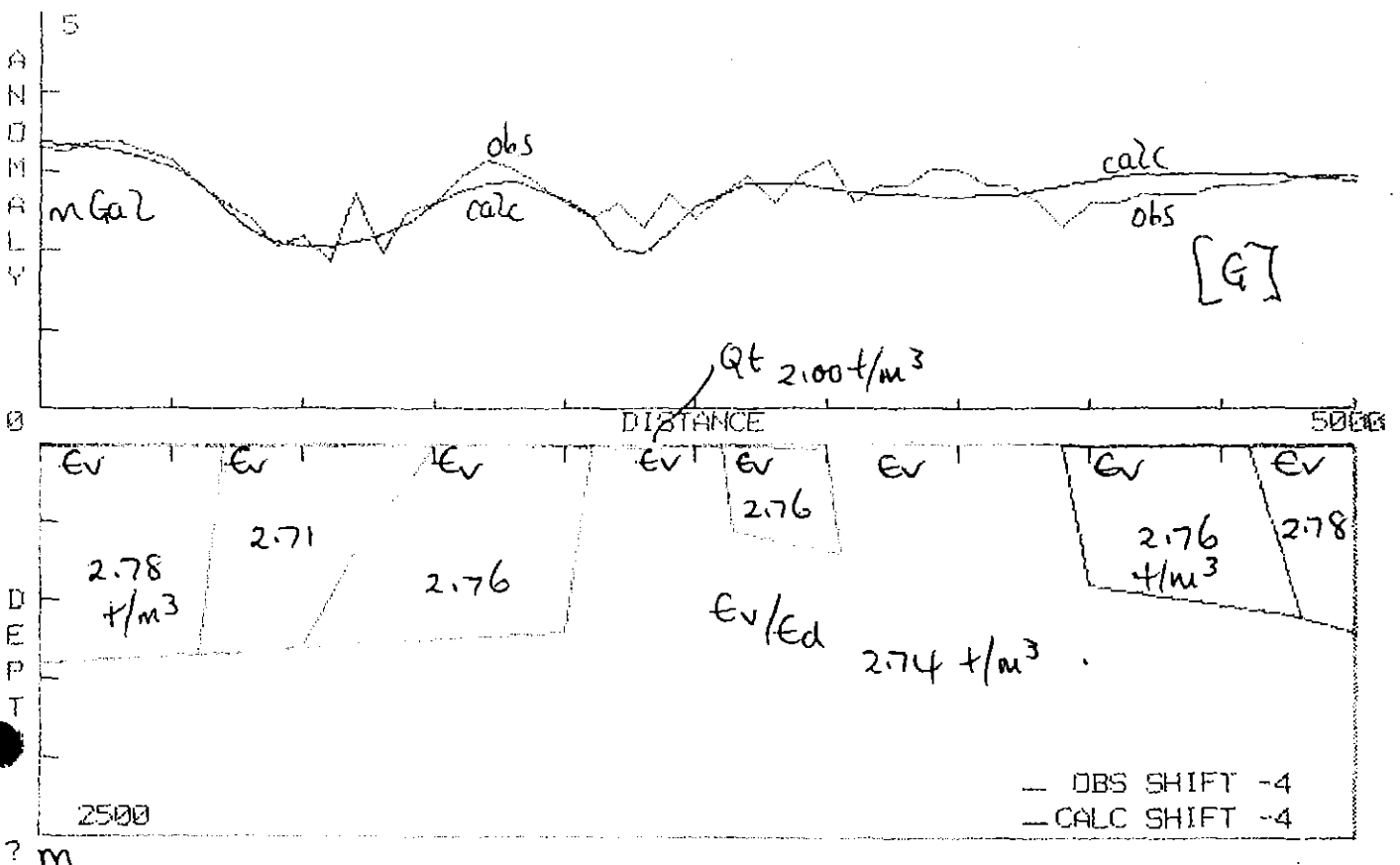
TR Dec. 91

096166

845



5384500 MN



BOCO84SH, G  
MD2  
M2, G2

GRAVITY AND MAGNETIC INTERPRETATION 5384500 MN

FIGURE 18

Dec 91

**RESIDUAL BOUGUER ANOMALY  
BOCO AREA**

Map scale: 1:50,000  
 Date: 1961  
 Compiled by: J. C. [illegible]  
 1962

RESIDUAL BOUGUER ANOMALY  
BOCO AREA

085000-6

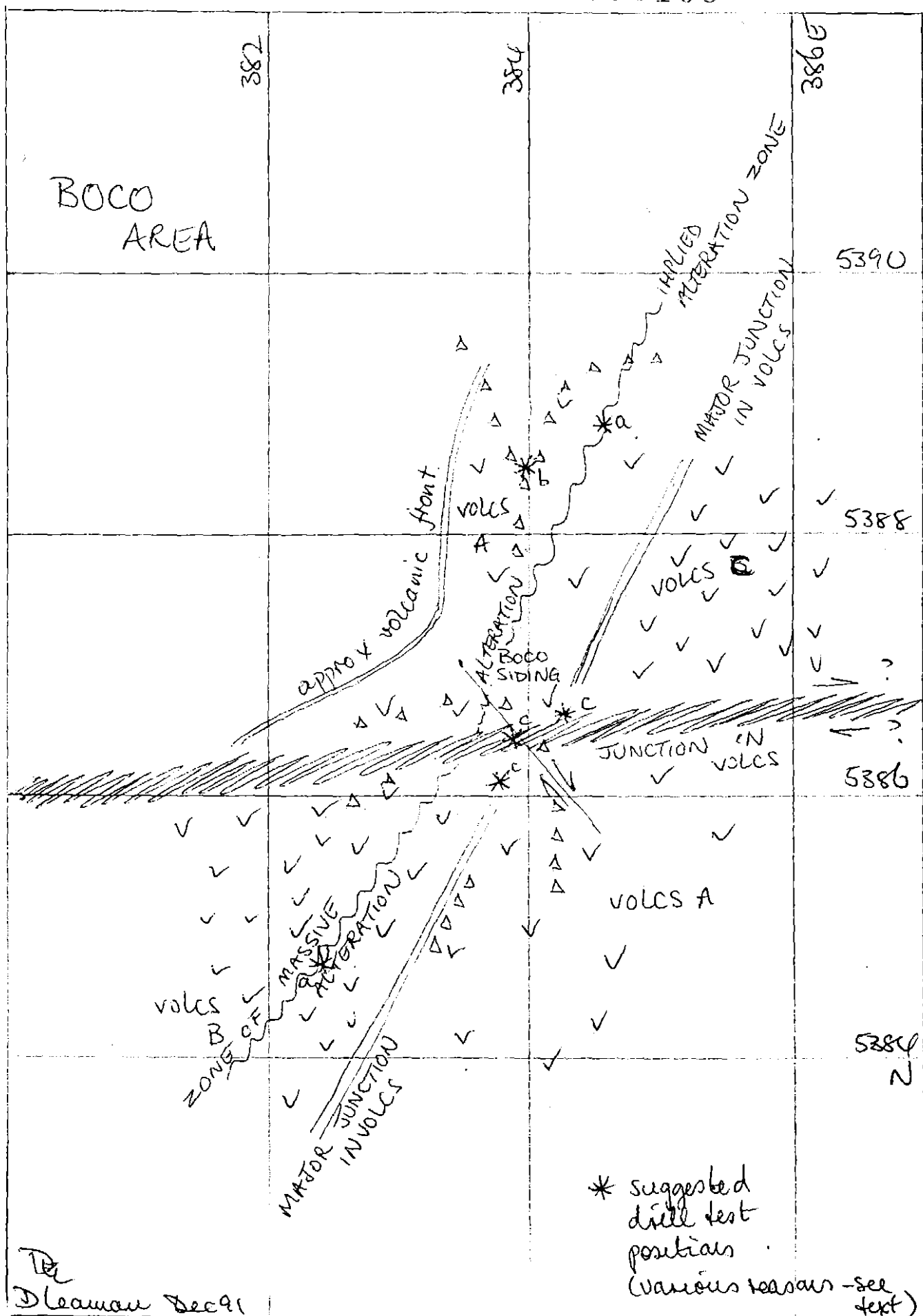
Bureau: normally, 0.67 of 2nd and 3rd  
panels: 41 negative responses  
(the Bureau's 2nd panel, 419  
for details)

Date received:  
From: 2nd Bureau  
Reference: 2nd Bureau  
This compilation  
Nov 28, 1941  
Reference: 2nd Bureau

Compilation by  
J. E. Lamm  
James H. Lamm  
1938

SYNTHESIS OF INTERPRETATION SHOWING MAJOR FEATURES SUPERIMPOSED ON  
RESIDUAL BOUGUER ANOMALIES. FIGURE 19A

096168



**APPENDIX 6**

**EL's 8/90 and 2/90**

**North Pinnacles Area Gravity Survey Acquisition Report  
Leaman Geophysics, March 1992**

# LEAMAN GEOPHYSICS

Survey Review, Specification, Reduction, Interpretation  
Gravity, Magnetic and Seismic Methods  
Structure and Prospect Evaluation

Registered office:

3 MALUKA STREET, BELLERIVE, TAS. 7018

All correspondence to:

GPO BOX 320 D, HOBART, TAS. 7001

Telephone: (002) 44 1233

Fax: (002) 44 6674

NORTH PINNACLES AREA  
WESTERN TASMANIA  
1991-2 GRAVITY SURVEYS  
ACQUISITION REPORT  
for  
PASMINCO EXPLORATION  
by  
Dr. D.E. Leaman

March 1992

NPINA

## INTRODUCTION

The North Pinnacles area has been defined as the region between 376 and 380 000 mE and 5385 to 5391 000 mN. The topography and geology of the area is indicated in the base maps for Figures 3 and 4 but it lies immediately north of Burns Peak in western Tasmania. This is about 10 km north of Rosebery and about 5 km north of Lake Rosebery.

For the purposes of this report, and to clarify some of the characteristics of the observed gravity field, the area has been slightly enlarged to include an additional marginal zone 1 km wide around the perimeter.

Gravity coverage in this region prior to 1991 was extremely patchy; most stations were located south and east of the Burns Peak - Pinnacles ridge although one traverse had been completed along the ridge. Most of the stations in the area had been acquired by Geopeko as part of its Burns Peak coverage. This data has been reported previously (Leaman, 1990).

Other stations in the area were observed as part of very regional or Mt Read Volcanics Project surveys and form the basis of the Tasmanian gravity data base. Regional stations are irregularly spaced, but rare, while the Mt Read coverage has a nominal spacing of 1 km. This spacing was not achieved in this area due to negligible easy helicopter access and difficult ground access. Large gaps were present in the coverage.

The few stations present in the area implied that some major changes in the gravity field occurred in this area. These did not appear to correlate with any known geology but lack of detail and possible variations in precision may have affected results. All older (pre Geopeko) surveys depended on barometric elevation determinations and judged positioning in difficult terrain. Some stations had been considered possibly errant almost from initial reduction but in absence of sufficient coverage and detail these suspicions (by Dr R.G. Richardson as observation and reduction supervisor, and myself as corrector and validation checker) could be neither confirmed nor denied and the stations were retained in the data base pending infill and correlation.

Work in this area, and adjacent areas, by Pasminco Exploration during 1990 and 1991 indicated that some re appraisal of the geological and structural content of the region was justified. Gravity data was to form various litmus tests of evolving ideas (in company with magnetic data) but coverage had to be improved to effect this objective.

## ACQUISITION

Gravity survey infills in the North Pinnacles area were undertaken on behalf of Pasminco Exploration by teams from the Department of Mines led and supervised by Dr. R.G. Richardson. Proposals for traverses and specifications were coordinated between Pasminco staff and myself and all observations were terrain corrected and vetted by me.

Work in the area was undertaken at different times during late 1991 and early 1992 as relatively low priority surveys within a much larger programme.

All stations acquired during this period, with station codes 9151 and 9251, have been tabulated in Appendix 1 and were reduced, by the contractor, using a density of  $2.67 \text{ t/m}^3$  and terrain corrected to a radius of 22 km by me. The terrain estimates were based on supplied station positions and near meter landform notes provided by observers. All data were then check plotted, reviewed and compared with any pre-existing data.

Most elevations are barometric estimates calculated from available tie points and derived by tight looping techniques. While these appear to be valid within about 2 m some ill defined, but not necessarily incorrect, values exist. This type of uncertainty may or may not be serious but cannot be evaluated where loop times are occasionally very long due to access problems and the station density is low.

The nominal precision of the data is determined by estimates of elevation reliability since possible errors in position and observed gravity are generally less than 0.03 mGal. The reproducibility of the terrain corrections in this area, with supplied details, is generally better than 0.1 mGal. The nominal survey precision is inferred at about 0.5 to 0.6 mGal and this is consistent with recent surveys of the same type.

Spotty infill needs and difficult or limited access forced use of barometric methods in this area since slower and more expensive methods are not yet justified by available results and indications. The survey is more than adequate for regional and structural indications. Large gaps remain in the gravity coverage of this area.

The current coverage is shown in Figure 1 which presents the located position of stations of different vintages, their number and the observed Bouguer anomaly.

It will be noted that there is a systematic gradient across the area with values at least 5 to 7 mGal lower to the east.

## DISCUSSION

In order to provide a rapid qualitative correlation of the upgraded gravity coverage with extant geological base maps the raw Bouguer data have been filtered using the crustal filter known as MANTLE91 (for method see Leaman and Richardson, 1989). This process removes the gross continental and oceanic effects and provides a true residual presentation free of normal filter blemishes. The residual Bouguer anomalies are shown in Figure 2.

Figure 2 may be compared with the compilations given in Leaman (1990) and shown to contain primary similarities but differences in detail. This is to be expected. The gross characteristics of the gravity field have been confirmed. The region west of the Pinnacles ridge has been demonstrated to be anomalously positive and that the positive effect does extend to the west with negligible correlation - within the detail afforded by current coverage - with surface geological data.

Some differences between this and previous compilations are evident. These related particularly to the location and extent of the primary trend at about 378 000 mE and the implied forms and amplitudes in the west of the area presented. The changes in inferred trend position north of 5388 000 mN reflect the much improved coverage near 5390 000 mN while the patchy improvements in the west have led to review or modification of the form of the field.

This raises some important issues for all explorers using data of this type. Gravity survey coverage is rarely adequately detailed or universal and may represent an integration or compilation of many surveys. These may be based on different acquisition methods, correction requirements or specifications and while any incorporation is feasible and valid some distortions may result where widely spaced surveys are used. Especially if these have used old base maps or barometric levelling. Such sites are not immediately obvious even in the current compilation and can only be identified after consideration of the survey code, and the methodology and crew employed. Problems generated, or rather randomly inserted into a data base, in this way are sometimes major but rarely limit the use of the data for primary regional purposes. Even an error of 2 or 3 mGal may be tolerated, or not even recognised due to large or irregular station separation, and not be an issue in such terms. Large variations in Bouguer anomaly may well be real; how real can not be assessed until other stations have been acquired in the same area, or the geological patterns are better understood. Single stations may be

affected by very local features - such as placement on abnormal till or alluvial pods - due to location or observer convenience which is always the prime consideration in initial, coarsely-spaced regional surveys.

Truly representative and detailed views of the gravity field may only emerge with complete infilling. It is only after this is done that features recognised should be accepted as a basis for detailed exploration. This does not deny any regional implications which may lead to the appropriate detailed work - which will inevitably lead to some review of previous compilations. It would be strange if this were not so.

Gravity data bases can never be regarded in the same way as a magnetic data base which will usually be the result of a massive, comprehensive data acquisition based on a line spacing of a few hundred metres at most and, in modern cases, a sample interval of less than 10 metres. And flaws can occur, and be recognised, and removed in such sets.

There should be no concern that a gravity data base is flawed or suspect beyond use - provided that the use is consistent with the nature of the data set.

The present data set has been closely examined by Dr. Richardson (as trustee of the state data base) and myself (as representative of Pasminco) in order to ensure that any compilation is not biased by possible flaws where coverage affords no tests and that other problems have been identified where different data sets overlap. These very occasional difficulties usually lead to either rejection or correction of offending stations depending on the nature of the problem and archived observation notes. Some corrections can be based on improved estimates of terrain correction using better positioning or newer or more detailed maps, better base ties, or better near station descriptions. Some commercial contractors whose data now forms part of the data base did not provide detailed near meter descriptions, for example, even though this may have been specified and any resulting deficiency is now irrecoverable.

Some stations, in the west of the area, while generally of the right magnitude, may disguise local problems and no great weight should be placed on any feature based on points in gappy coverage unless the feature or trend is supported in areas of better coverage.

The residual map (Figure 2) reveals a general NNE trending feature which presents a step anomaly with an amplitude of about 5 mGal. Offsets of this trend, which lies along the western side of the volcanics forming the

Burns-Pinnacles ridge can be correlated with zones of disturbed field observed to the west - even though such disturbances may not be accurately defined at present.

Figures 3 and 4 present the residual field overlain on available base maps; that produced by Corbett & McNeill (1986) and a more recent provisional compilation by Pasminco Exploration.

These diagrams show that the main step anomaly follows the western edge of the volcanic spine north of 5385 000 mN but lies within the volcanics-covered area south of this northing in the region between "Brown's Tunnel" and "Leo's Find". Its truncation at the northern exposure of the volcanics shows that the feature is not associated with any exposed feature, unit or lithology. This truncation is also interesting in that the gradient is offset and also becomes more diffuse - implying a change in source depth. A similar disruption is evident in the region of "Silver Falls" several kilometres to the WNW.

The inferred position of the Rosebery Fault may mark a zone of disturbed field (to the west) from a stabler field to the east. There is insufficient data to confirm this. Certainly the Silver Falls area appears more erratic and anomalous in gross terms and the deviations are supported by data of different vintages.

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- Leaman, D.E., 1990. Gravity survey, EL 44/88 Burns Peak. Acquisition report (including preliminary interpretation) for Pasminco Mining (Geopeko).
- Leaman, D.E., & Richardson, R.G., 1989. Production of a residual gravity map for Tasmania and some implications. Exploration Geophysics, 20, 181-184.

Report submitted on behalf of Leaman Geophysics  
by

D.E. Leaman

*D. Leaman*  
12-3-92

## APPENDIX ONE

TABULATION OF GRAVITY STATIONS ACQUIRED IN THE NORTH  
PINNACLES AREA DURING 1991-2 BY PASMINCO EXPLORATION

The table quotes

Station code (year, surveyor and number)

AMG easting and northing (without leading 5)

Height in metres

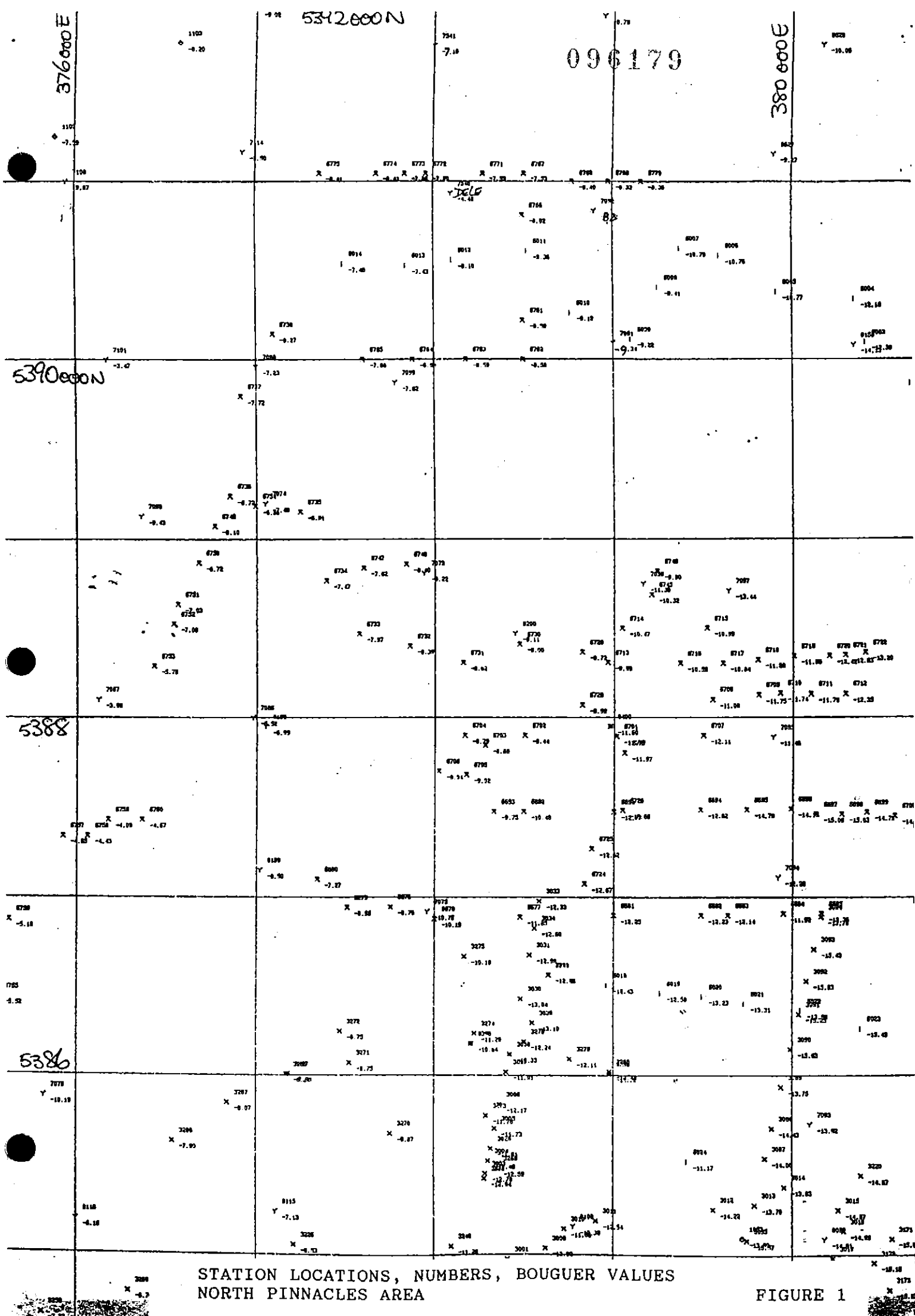
Observed and theoretical gravity (less 980)

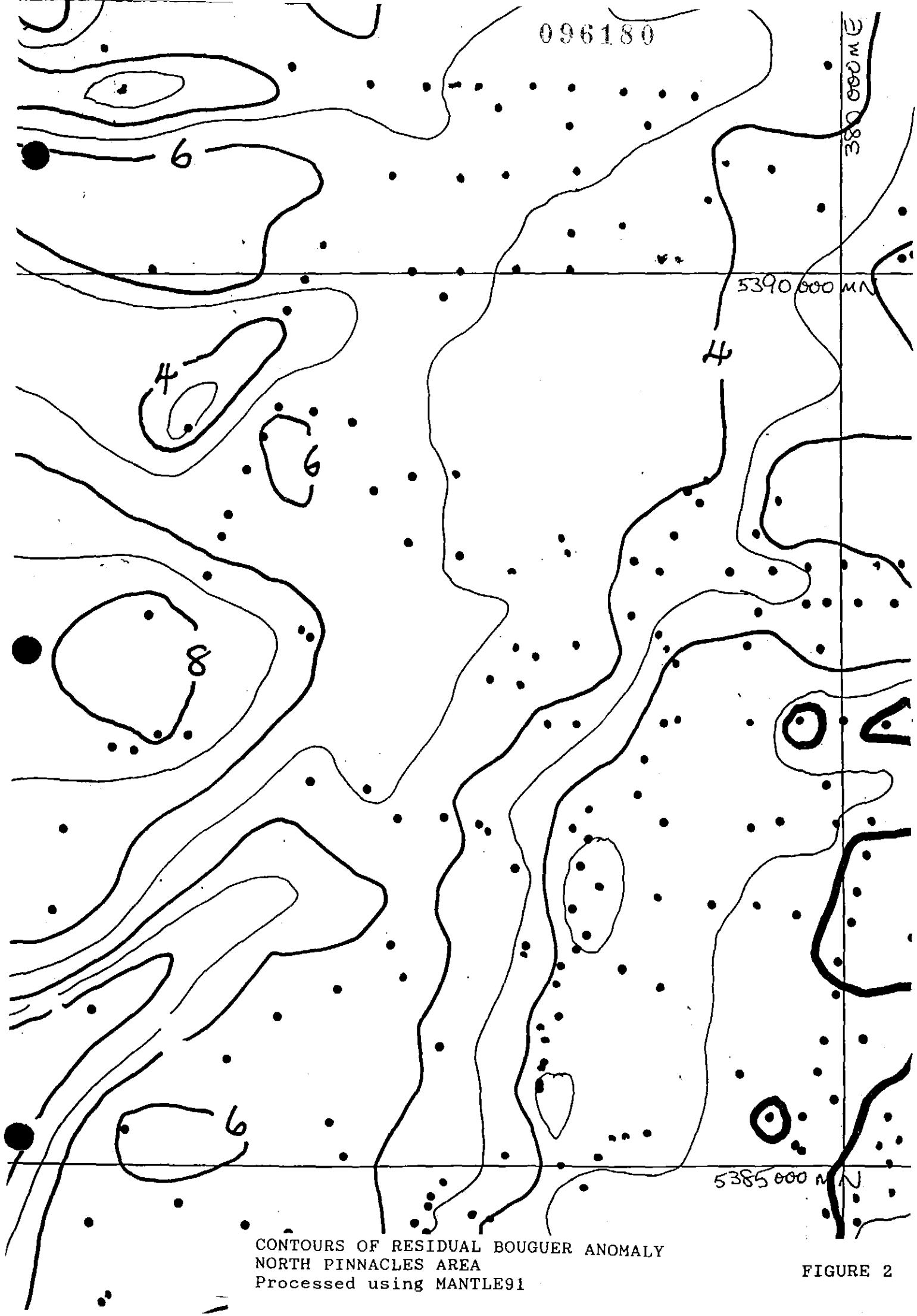
Terrain correction

Bouguer anomaly (reduced at  $2.67 \text{ t/m}^3$ )

|           |          |          |       |          |          |      |        |
|-----------|----------|----------|-------|----------|----------|------|--------|
| 9151.6677 | 378480.0 | 386890.1 | 568.0 | 0.203990 | 0.328663 | 1.09 | -11.85 |
| 9151.6678 | 378000.0 | 386880.1 | 492.0 | 0.221261 | 0.328664 | 0.43 | -10.19 |
| 9151.6679 | 377510.0 | 386944.0 | 459.7 | 0.230150 | 0.328606 | 0.45 | -7.58  |
| 9151.6680 | 377340.0 | 387100.1 | 479.0 | 0.226260 | 0.328478 | 0.72 | -7.27  |
| 9151.6681 | 379000.0 | 386900.1 | 590.0 | 0.199144 | 0.328662 | 1.20 | -12.25 |
| 9151.6682 | 379490.0 | 386900.1 | 526.0 | 0.212334 | 0.328668 | 0.63 | -12.23 |
| 9151.6683 | 379640.0 | 386900.1 | 545.0 | 0.208597 | 0.328670 | 0.72 | -12.14 |
| 9151.6684 | 379950.0 | 386910.1 | 541.0 | 0.209237 | 0.328667 | 1.08 | -11.92 |
| 9151.6685 | 380160.0 | 386910.1 | 569.0 | 0.203378 | 0.328669 | 1.00 | -12.36 |
| 9151.6691 | 379000.0 | 387475.1 | 628.0 | 0.191249 | 0.328198 | 0.64 | -12.77 |
| 9151.6692 | 378500.0 | 387475.1 | 567.0 | 0.205481 | 0.328191 | 0.69 | -10.48 |
| 9151.6693 | 378335.0 | 387475.1 | 544.0 | 0.210690 | 0.328189 | 0.73 | -9.75  |
| 9151.6694 | 379485.0 | 387485.1 | 611.0 | 0.194384 | 0.328196 | 0.79 | -12.82 |
| 9151.6695 | 379745.0 | 387485.1 | 678.0 | 0.178632 | 0.328200 | 1.41 | -14.78 |
| 9151.6696 | 379990.0 | 387490.1 | 672.0 | 0.180735 | 0.328199 | 1.07 | -14.19 |
| 9151.6697 | 380130.0 | 387460.1 | 690.0 | 0.175708 | 0.328225 | 1.71 | -15.06 |
| 9151.6698 | 380270.0 | 387460.1 | 692.0 | 0.175402 | 0.328227 | 1.66 | -15.03 |
| 9151.6699 | 380410.0 | 387470.1 | 702.0 | 0.173051 | 0.328221 | 2.28 | -14.79 |
| 9151.6700 | 380565.0 | 387450.1 | 684.0 | 0.176558 | 0.328239 | 2.51 | -14.61 |
| 9151.6701 | 379015.0 | 387895.1 | 595.0 | 0.199268 | 0.327859 | 0.48 | -11.06 |
| 9151.6702 | 378505.0 | 387900.1 | 541.0 | 0.211598 | 0.327848 | 0.39 | -9.44  |
| 9151.6703 | 378285.0 | 387845.1 | 511.0 | 0.218136 | 0.327889 | 0.35 | -8.88  |
| 9151.6704 | 378170.0 | 387900.1 | 538.0 | 0.212888 | 0.327843 | 0.33 | -8.79  |
| 9151.6705 | 378180.0 | 387680.1 | 503.0 | 0.219617 | 0.328021 | 0.44 | -9.02  |
| 9151.6706 | 378025.0 | 387700.1 | 531.0 | 0.214140 | 0.328003 | 0.37 | -9.04  |
| 9151.6707 | 379500.0 | 387900.1 | 603.0 | 0.196678 | 0.327862 | 0.45 | -12.11 |
| 9151.6708 | 379550.0 | 388100.1 | 584.0 | 0.201266 | 0.327701 | 0.47 | -11.08 |
| 9151.6709 | 379810.0 | 388125.1 | 606.0 | 0.196229 | 0.327684 | 0.49 | -11.75 |
| 9151.6710 | 379930.0 | 388135.1 | 608.0 | 0.195932 | 0.327678 | 0.40 | -11.74 |
| 9151.6711 | 380100.0 | 388130.1 | 640.0 | 0.188993 | 0.327684 | 1.01 | -11.78 |
| 9151.6712 | 380290.0 | 388130.1 | 652.0 | 0.186183 | 0.327687 | 0.89 | -12.35 |
| 9151.6713 | 378965.0 | 388305.1 | 551.0 | 0.208864 | 0.327528 | 0.37 | -9.90  |
| 9151.6714 | 379045.0 | 388500.1 | 551.0 | 0.208281 | 0.327371 | 0.23 | -10.47 |
| 9151.6715 | 379520.0 | 388500.1 | 555.0 | 0.206934 | 0.327378 | 0.27 | -10.99 |
| 9151.6716 | 379370.0 | 388300.1 | 565.0 | 0.205509 | 0.327537 | 0.29 | -10.59 |
| 9151.6717 | 379610.0 | 388300.1 | 578.0 | 0.202633 | 0.327540 | 0.36 | -10.84 |
| 9151.6718 | 379805.0 | 388320.1 | 578.0 | 0.202049 | 0.327527 | 0.49 | -11.28 |
| 9151.6719 | 380005.0 | 388340.1 | 613.0 | 0.194097 | 0.327513 | 0.84 | -11.98 |
| 9151.6720 | 380200.0 | 388340.1 | 636.0 | 0.188993 | 0.327516 | 0.99 | -12.42 |
| 9151.6721 | 380290.0 | 388345.1 | 645.0 | 0.186862 | 0.327513 | 0.83 | -12.93 |
| 9151.6722 | 380400.0 | 388360.1 | 656.0 | 0.184166 | 0.327503 | 1.08 | -13.20 |
| 9151.6723 | 378640.0 | 386566.1 | 602.5 | 0.197003 | 0.328926 | 0.95 | -12.45 |
| 9151.6724 | 378840.0 | 387074.1 | 644.3 | 0.187789 | 0.328519 | 1.31 | -12.67 |
| 9151.6725 | 378880.0 | 387268.1 | 636.7 | 0.189662 | 0.328363 | 0.83 | -12.62 |
| 9151.6726 | 379050.0 | 387483.1 | 630.5 | 0.190905 | 0.328192 | 0.59 | -12.66 |
| 9151.6727 | 379060.0 | 387803.1 | 607.9 | 0.195904 | 0.327934 | 0.47 | -11.97 |
| 9151.6728 | 378825.0 | 388070.1 | 558.2 | 0.207517 | 0.327715 | 0.39 | -9.99  |
| 9151.6729 | 378825.0 | 388365.1 | 545.0 | 0.210336 | 0.327477 | 0.20 | -9.72  |
| 9151.6730 | 378475.0 | 388410.1 | 544.3 | 0.211187 | 0.327436 | 0.19 | -9.00  |
| 9151.6731 | 378160.0 | 388305.1 | 547.7 | 0.210929 | 0.327517 | 0.23 | -8.62  |
| 9151.6732 | 377860.0 | 388400.1 | 568.3 | 0.206876 | 0.327436 | 0.37 | -8.39  |
| 9151.6733 | 377575.0 | 388470.1 | 563.4 | 0.208100 | 0.327375 | 0.48 | -7.97  |
| 9151.6734 | 377390.0 | 388770.1 | 525.2 | 0.216042 | 0.327131 | 0.31 | -7.47  |
| 9151.6735 | 377245.0 | 389155.1 | 506.8 | 0.219818 | 0.326818 | 0.39 | -6.91  |
| 9151.6736 | 376855.0 | 389240.1 | 469.9 | 0.226671 | 0.326744 | 0.92 | -6.72  |
| 9151.6737 | 376915.0 | 389795.1 | 546.2 | 0.210365 | 0.326297 | 0.76 | -7.72  |
| 9151.6738 | 377095.0 | 390145.1 | 560.7 | 0.206915 | 0.326017 | 0.53 | -8.27  |
| 9151.6745 | 379210.0 | 388690.1 | 542.0 | 0.210040 | 0.327220 | 0.24 | -10.32 |
| 9151.6746 | 379240.0 | 388820.1 | 526.0 | 0.213433 | 0.327116 | 0.41 | -9.80  |
| 9151.6747 | 377600.0 | 388840.1 | 541.0 | 0.212649 | 0.327077 | 0.38 | -7.62  |
| 9151.6748 | 377840.0 | 388860.1 | 555.0 | 0.208998 | 0.327064 | 0.49 | -8.40  |
| 9151.6749 | 376770.0 | 389075.0 | 461.0 | 0.229252 | 0.326876 | 0.84 | -6.10  |
| 9151.6750 | 376680.0 | 388870.1 | 479.0 | 0.225428 | 0.327040 | 0.67 | -6.72  |
| 9151.6751 | 376565.0 | 388640.1 | 510.0 | 0.219273 | 0.327224 | 0.60 | -7.03  |
| 9151.6752 | 376540.0 | 388530.1 | 565.0 | 0.207211 | 0.327313 | 1.87 | -7.08  |
| 9151.6753 | 376430.0 | 388290.1 | 502.0 | 0.221806 | 0.327505 | 1.16 | -5.79  |

|           |          |          |       |          |          |      |        |
|-----------|----------|----------|-------|----------|----------|------|--------|
| 9151.6754 | 376995.0 | 389185.1 | 517.8 | 0.217390 | 0.326791 | 0.68 | -6.86  |
| 9151.6755 | 375565.0 | 386440.0 | 435.0 | 0.237586 | 0.328985 | 0.31 | -5.52  |
| 9151.6756 | 375625.0 | 386875.0 | 435.0 | 0.237395 | 0.328635 | 0.51 | -5.16  |
| 9151.6757 | 375925.0 | 387340.0 | 423.0 | 0.239880 | 0.328264 | 0.53 | -4.65  |
| 9151.6758 | 376060.0 | 387340.0 | 424.0 | 0.240004 | 0.328266 | 0.43 | -4.43  |
| 9151.6759 | 376175.0 | 387430.0 | 425.0 | 0.240033 | 0.328195 | 0.47 | -4.09  |
| 9151.6760 | 376365.0 | 387430.0 | 458.0 | 0.232874 | 0.328198 | 0.56 | -4.67  |
| 9151.6761 | 378500.0 | 390220.1 | 522.0 | 0.214226 | 0.325976 | 0.47 | -8.59  |
| 9151.6762 | 378500.0 | 390000.1 | 510.0 | 0.216797 | 0.326154 | 0.45 | -8.58  |
| 9151.6763 | 378180.0 | 390000.1 | 503.0 | 0.218183 | 0.326149 | 0.43 | -8.59  |
| 9151.6764 | 377880.0 | 390000.1 | 503.0 | 0.218757 | 0.326145 | 0.41 | -8.03  |
| 9151.6765 | 377600.0 | 390000.1 | 502.0 | 0.219034 | 0.326141 | 0.48 | -7.88  |
| 9151.6766 | 378500.0 | 390805.1 | 482.0 | 0.221940 | 0.325504 | 0.73 | -8.02  |
| 9151.6767 | 378510.0 | 391050.0 | 449.0 | 0.228611 | 0.325307 | 0.84 | -7.53  |
| 9151.6768 | 378780.0 | 391000.1 | 482.0 | 0.221452 | 0.325351 | 0.68 | -8.40  |
| 9151.6769 | 378980.0 | 391000.1 | 485.0 | 0.220774 | 0.325353 | 0.84 | -8.33  |
| 9151.6770 | 379160.0 | 391000.0 | 465.0 | 0.224597 | 0.325356 | 0.93 | -8.36  |
| 9151.6771 | 378280.0 | 391050.0 | 439.0 | 0.230160 | 0.325303 | 0.80 | -7.99  |
| 9151.6772 | 377960.0 | 391050.1 | 480.0 | 0.222131 | 0.325299 | 0.85 | -7.90  |
| 9151.6773 | 377840.0 | 391050.1 | 494.0 | 0.219493 | 0.325297 | 0.77 | -7.86  |
| 9151.6774 | 377680.0 | 391050.1 | 540.0 | 0.209868 | 0.325295 | 0.79 | -8.41  |
| 9151.6775 | 377360.0 | 391050.1 | 546.0 | 0.208339 | 0.325291 | 1.13 | -8.41  |
| 9251.6002 | 380650.0 | 389865.1 | 519.6 | 0.210365 | 0.326292 | 0.71 | -13.00 |
| 9251.6003 | 380400.0 | 390095.0 | 461.9 | 0.222073 | 0.326103 | 0.79 | -12.38 |
| 9251.6004 | 380340.0 | 390340.0 | 443.7 | 0.225495 | 0.325904 | 0.97 | -12.16 |
| 9251.6005 | 379910.0 | 390380.0 | 447.6 | 0.226174 | 0.325866 | 0.87 | -10.77 |
| 9251.6006 | 379590.0 | 390580.1 | 518.3 | 0.212257 | 0.325700 | 0.73 | -10.76 |
| 9251.6007 | 379370.0 | 390620.1 | 548.8 | 0.206083 | 0.325665 | 0.92 | -10.70 |
| 9251.6008 | 379245.0 | 390405.1 | 520.4 | 0.213357 | 0.325837 | 0.69 | -9.41  |
| 9251.6009 | 379095.0 | 390115.1 | 523.3 | 0.213328 | 0.326069 | 0.59 | -9.22  |
| 9251.6010 | 378760.0 | 390265.1 | 533.5 | 0.211349 | 0.325943 | 0.53 | -9.12  |
| 9251.6011 | 378520.0 | 390605.1 | 509.1 | 0.216606 | 0.325666 | 0.55 | -8.36  |
| 9251.6012 | 378100.0 | 390555.1 | 504.4 | 0.217667 | 0.325700 | 0.71 | -8.10  |
| 9251.6013 | 377840.0 | 390525.1 | 502.7 | 0.218738 | 0.325721 | 0.67 | -7.43  |
| 9251.6014 | 377485.0 | 390535.1 | 526.0 | 0.214131 | 0.325708 | 0.63 | -7.48  |
| 9251.6018 | 378960.0 | 386510.1 | 534.0 | 0.210269 | 0.328976 | 1.23 | -12.43 |
| 9251.6019 | 379260.0 | 386465.1 | 503.0 | 0.216530 | 0.329016 | 0.96 | -12.58 |
| 9251.6020 | 379495.0 | 386445.1 | 509.0 | 0.214704 | 0.329036 | 0.97 | -13.23 |
| 9251.6021 | 379730.0 | 386405.1 | 478.0 | 0.221013 | 0.329071 | 0.72 | -13.31 |
| 9251.6022 | 380045.0 | 386365.1 | 487.0 | 0.218719 | 0.329108 | 0.63 | -13.96 |
| 9251.6023 | 380375.0 | 386265.0 | 418.0 | 0.230188 | 0.329193 | 1.29 | -15.49 |
| 9251.6024 | 379410.0 | 385525.0 | 426.0 | 0.233734 | 0.329777 | 1.07 | -11.17 |





CONTOURS OF RESIDUAL BOUGUER ANOMALY  
NORTH PINNACLES AREA  
Processed using MANTLE91

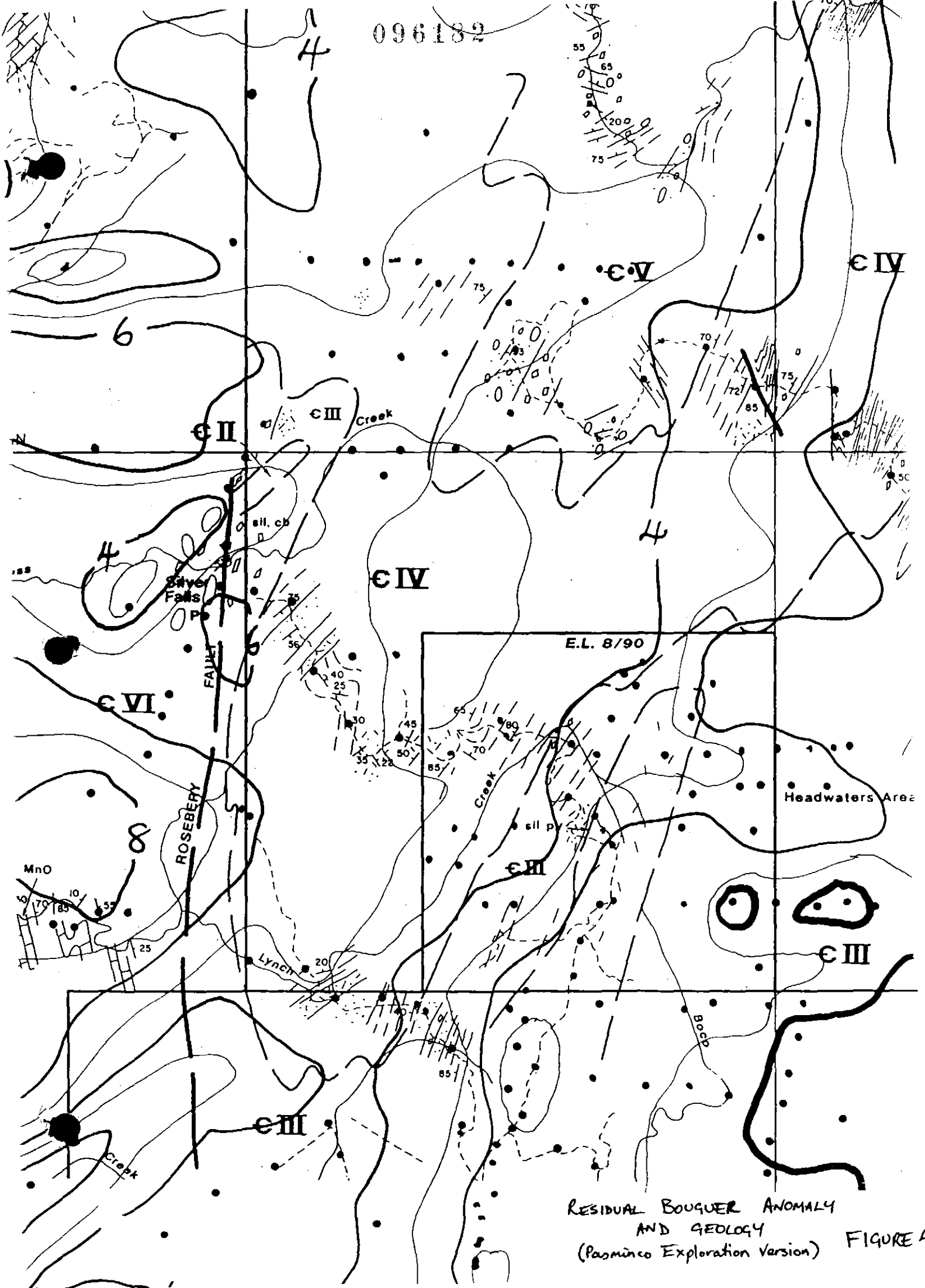
FIGURE 2



RESIDUAL BOUGUER ANOMALY AND GEOLOGY  
Corbett & McNeill (1986) version

FIGURE 3

096182



RESIDUAL BOUGUER ANOMALY  
AND GEOLOGY  
(Pasminco Exploration Version) FIGURE 4

096183

**MICROFILMED**

FICHE No. 013118-23

**PASMINCO EXPLORATION**

**EL 2/90 Boco**

**EL 8/90 North Pinnacles**

**EXPLORATION REPORT**

**FOR THE PERIOD**

**11 October 1990 – 29 February 1992**

volume 2 of 2

TCR 92-3343

MINES

EL2/90 & EL8/90

**OPEN FILE**

covering letter on  
both EL files

**AUTHOR:** L W Kirsner

**DATE:** March 1992

**REPORT No:** T92-3

**SUBMITTED TO:** Regional Exploration Manager – Tasmania

**DISTRIBUTION:** Department of Mines – Hobart

Pasminco Exploration – Burnie

– Melbourne

Billiton Australia

**SUBMITTED BY:**

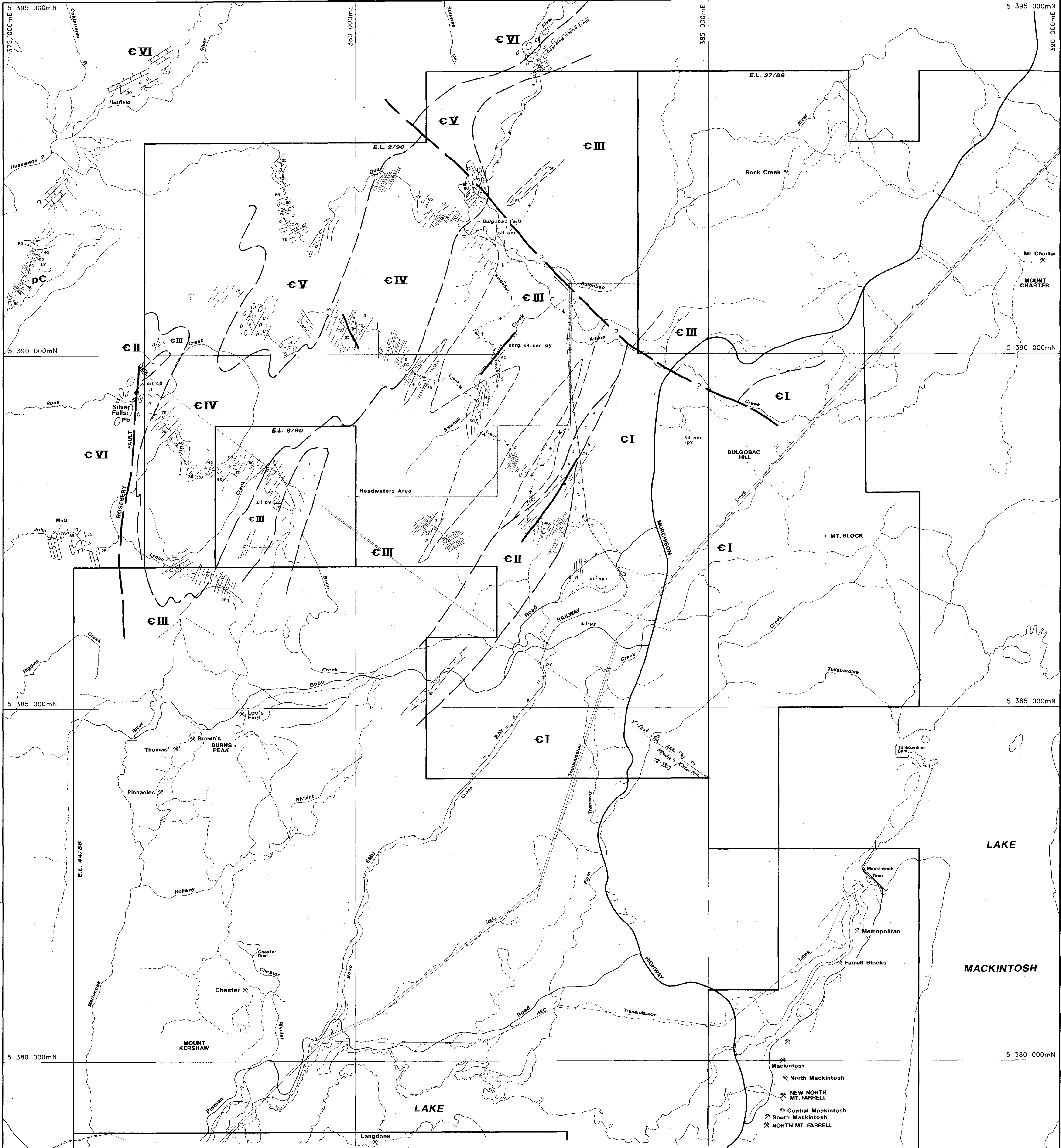
*Lindsay Kirsner*

**ACCEPTED BY:**

*[Signature]*

Burnie  
March 1992

## FIGURES



**ROCK TYPES**

Mafic intrusion

Dolomitic silt/sandstone

Conglomerate. Quartz matrix sil. sed., quartz, ultra mafic & rare volcanic clasts

Conglomerate. Volcanic quartz & mudstone matrix volcanic and rare sediment clasts

Siltstone, grey mudstone

Detrital quartz & feldspar sandstone

Volcanic quartz sandstone. Often black mud matrix

Black, highly graphitic mudstone

Quartz-feldspar porphyry

Quartz-feldspar rhyolite lava

Feldspar dacite

Dark grey, basalt-andesite. Feldspar, pyroxene

Volcaniclastic sandstone, quartz bearing

Coarse, volcaniclastic breccia, rhy-dacite comp.

Siliceous mudstone & siltstone

Micaceous sandstone

Pumiceous volcaniclastic without quartz

Green, feldspar andesite

**ALTERATION/MINERALISATION**

sil

silicification

ser

intense sericite alteration

cb

carbonate

MnO

manganese oxide

py

pyrite

Pb

Lead

Zn

Zinc

Au

Gold

**SYMBOLS**

Fault - mapped or drilled with dip

Fault - inferred with sense of mov't.

Major rock group boundary

Lithological boundary

Conformable geological boundary

Bedding

Cleavage

**PASMINCO EXPLORATION**  
A Division of Pasma Australia Limited

COMPILED: A.N.L.  
DATE: Mar., 1992  
DRAWN BY: G.M.B.  
REF.:  
REVISIONS:  
DRAWING No.

E.L. 2/90 - BOCO JV  
E.L. 8/90 - NTH. PINNACLES JV  
**INTERPRETED GEOLOGY**  
1991 - 1992 MAPPING PROGRAMME

SCALE 1:25,000

FIG. No. 9

5 375 000mE  
5 375 000mN

# LEGEND

1. General Form  
Colour, grain size, overall texture, Rock Type, constituents & textures, alteration, mineralisation.  
Descriptors and Rock Types to be separated by comma or slash. Derwent series 19 colours (in brackets) are intended for the Cambrian sequences.

2. Rock Types  
Laves L  
a (9) acid  
b (4) intermediate  
c (4) basaltic  
d (9) rhyolitic  
e (11) diatitic  
f (4) andesitic

3. Descriptors  
Colour:  
pale pale bl blue  
dk dark wht white  
clr clear yel yellow  
orange of olive  
blk black grn green  
pk pink psi purple  
rd red crn cream  
brn brown

Intrusives I  
a (7) acid  
b (4) intermediate  
c (4) basic  
f (4) felsic  
p (4) porphyritic  
g (12) granitic  
peg (4) pegmatitic

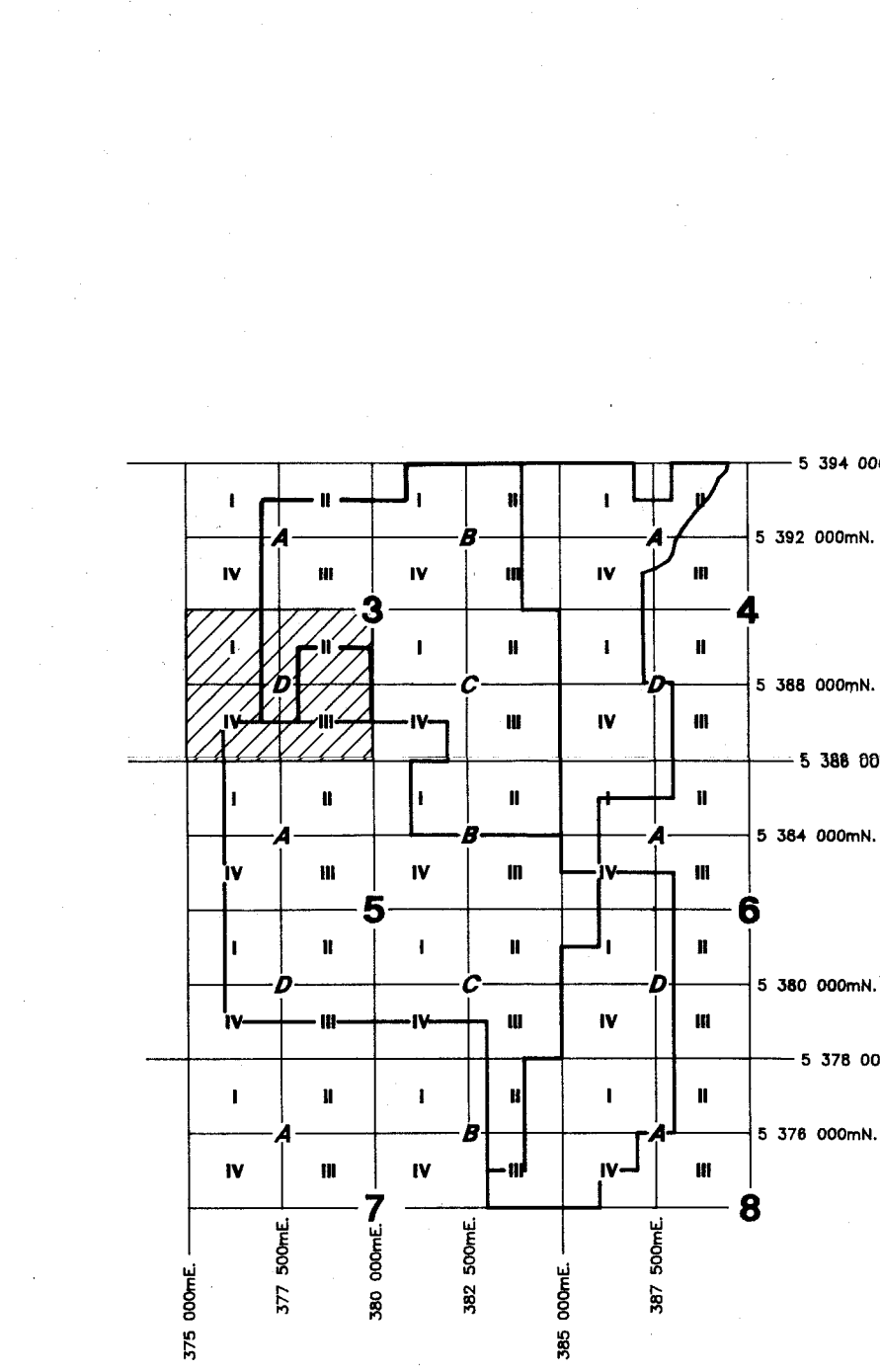
Volcaniclastics V  
pm (7) pumiceous mass flow  
q (32) quartz phytic mass flow  
sst (24) sandstone

Sediments S  
sh (33) shale  
l (24) slate incl. black slate  
slt (33) siltstone  
sst (24) sandstone  
tb (24) turbidite  
w (24) wacke  
cong (33) conglomerate  
bre (4) breccia  
ch (4) chert  
lt (4) limestone  
dol (4) dolomite  
qtz (24) quartzite  
Fe iron formation  
gl (4) glacial deposits  
al (4) alluvial deposits  
mud (33) mudstone

Metamorphic Rocks M  
Colours should be hatched  
sch (38) schist  
sp (33) semi-pelite  
ps (33) psammite  
am (4) amphibolite  
gran (4) granulite  
sk (4) skarn  
mb (4) marble  
m (4) mylonite

Unassigned ? Use alone or as a qualifier to other rock types where uncertain.

4. Mapping Symbols  
Strike and Dip of Strata  
Strike and dip of inverted strata  
Strike and dip of cleavage or foliation  
Plunge of lineation  
Geological boundary position accurate  
Geological boundary position approximate  
Mine  
Abandoned prospect or mine  
Crest or trench  
Diamond drill hole, including projection



096186

**92-3343.**

**PASMINCO EXPLORATION**  
A Division of Pasminco Australia Limited

COMPILED :  
DATE :  
DRAWN :  
REFERENCE :  
REVISIONS :  
DRAWING No. :  
SCALE 1:5000  
FIG. No. 11

**E.L. 2/90 - BOCO JV**  
**E.L. 8/90 - NTH. PINNACLES JV**  
**E.L. 44/88 - BURNS PEAK JV**  
**OUTCROP GEOLOGY**

LEGEND

1. General Form  
Colour, grain size, overall texture, Rock Type, constituents & textures, alteration, mineralisation.  
Descriptors and Rock Types to be separated by comma or slash. Derwent series 19 colours (in brackets) are intended for the Cambrian sequences.

2. Rock Types

Lavas

L

|   |      |              |
|---|------|--------------|
| a | (9)  | acid         |
| i | (44) | intermediate |
| b | (44) | basaltic     |
| r | (9)  | rhyolitic    |
| d | (1)  | dacitic      |
| n | (45) | andesitic    |

3. Descriptors

Colour:

|     |        |     |        |
|-----|--------|-----|--------|
| pl  | pale   | bl  | blue   |
| dk  | dark   | wh  | white  |
| clr | clear  | yl  | yellow |
| or  | orange | ol  | olive  |
| blk | black  | grn | green  |
| pk  | pink   | plp | purple |
| rd  | red    | crm | cream  |

|            |   |     |                   |                  |     |                     |
|------------|---|-----|-------------------|------------------|-----|---------------------|
| Intrusives | I | a   | (10) acid         | Grain size:      | fg  | fine grained        |
|            |   | i   | (40) intermediate |                  | mg  | medium grained      |
|            |   | b   | (40) basic        |                  | cg  | coarse grained      |
|            |   | fel | felsic            |                  | vsg | very coarse grained |
|            |   | p   | porphyritic       | Overall Texture: | aug | augen               |

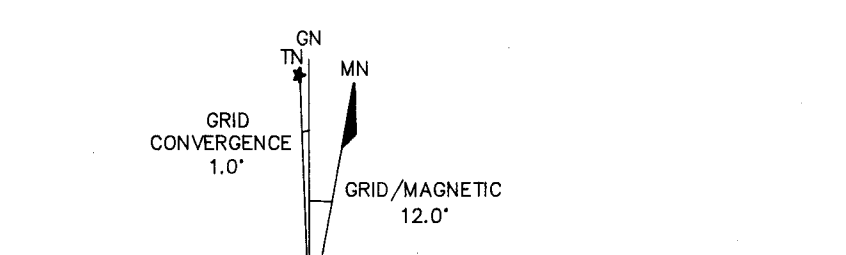
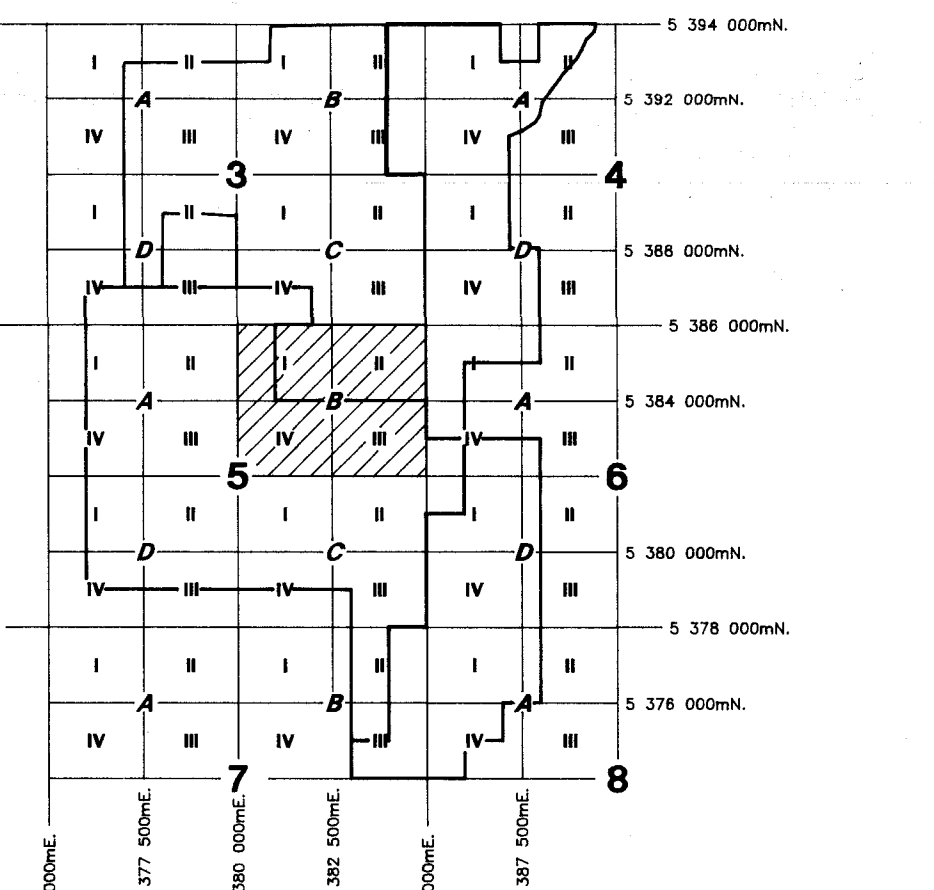
|                 |   |     |                              |                                   |     |            |
|-----------------|---|-----|------------------------------|-----------------------------------|-----|------------|
| Volcaniclastics | V | pm  | (7) pumiceous mass flow      | Constituents & Internal Textures: | f   | feldspar   |
|                 |   | q   | (30) quartz phytic mass flow |                                   | q   | quartz     |
|                 |   | sst | (30) sandstone               |                                   | l   | lentic     |
|                 |   |     |                              |                                   | pm  | pumice     |
|                 |   |     |                              |                                   | stl | stylolites |

|           |   |     |                              |             |     |                      |
|-----------|---|-----|------------------------------|-------------|-----|----------------------|
| Sediments | S | sh  | (30) shale                   | Alteration: | ab  | altered              |
|           |   | sl  | (30) slate incl. black slate |             | ca  | carbonate alteration |
|           |   | sst | (30) sandstone               |             | chl | chloritised          |
|           |   | tu  | (30) tuff                    |             | ser | sericited            |
|           |   | w   | (30) wacke                   |             | kol | kaolinitised         |

|                   |   |     |                  |                 |     |              |
|-------------------|---|-----|------------------|-----------------|-----|--------------|
| Metamorphic Rocks | M | sch | (30) schist      | Mineralisation: | dis | disseminated |
|                   |   | sp  | (30) semi-pelite |                 | str | stringer     |
|                   |   | ps  | (30) psammite    |                 | mas | massive      |
|                   |   | am  | (40) amphibolite |                 | gas | gossan       |
|                   |   | grn | (40) granulite   |                 | bx  | boxwork      |

|            |   |    |             |  |     |             |
|------------|---|----|-------------|--|-----|-------------|
| Unassigned | ? | sk | skarn       |  | py  | pyrite      |
|            |   | mb | (60) marble |  | ps  | pyrrhotite  |
|            |   | m  | mylonite    |  | cap | carapachite |
|            |   |    |             |  | gn  | garnet      |
|            |   |    |             |  | sp  | spinel      |

|                    |                                          |                   |
|--------------------|------------------------------------------|-------------------|
| 4. Mapping Symbols |                                          | Unconformity      |
| 25                 | Strike and Dip of Strata                 | Fault             |
| 30                 | Strike and dip of inverted strata        | Thrust Fault      |
| 60                 | Strike and dip of cleavage or foliation  | Plunging antiform |
| 50                 | Plunge of lineation                      | Plunging synform  |
|                    | Geological boundary position accurate    |                   |
|                    | Geological boundary position approximate |                   |
|                    | Mine                                     |                   |
|                    | Abandoned prospect or mine               |                   |
|                    | Crestline or trench                      |                   |
|                    | Diamond drill hole, including projection |                   |



096187 92-3343.

PASMINCO EXPLORATION  
A Division of Pasminco Australia Limited

COMPILED :  
DATE :  
DRAWN :  
REFERENCE :  
REVISIONS :  
DRAWING No. SCALE 1:5000 FIG. No. 12

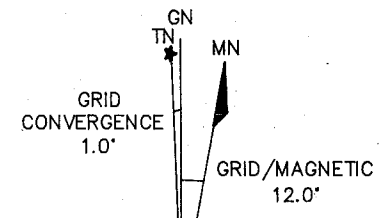
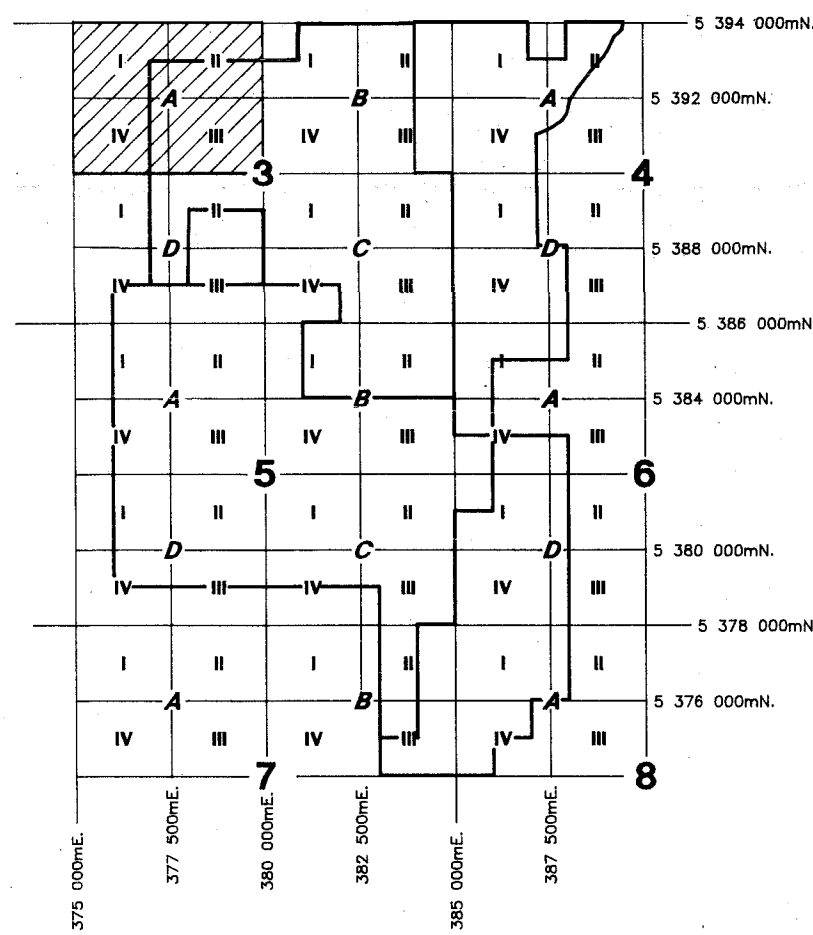
E.L. 2/90 - BOCO JV  
E.L. 44/88 - BURNS PEAK JV

OUTCROP GEOLOGY



LEGEND

X30567- Rock Chip Sample.



096188 **92-3343.**

**PASMINCO EXPLORATION**  
A Division of Pasminco Australia Limited

COMPILED : ANL  
DATE : March, 1992  
DRAWN :  
REFERENCE :  
REVISIONS :

E.L. 2/90 - BOCO JV

**SAMPLE  
LOCATIONS**

DRAWING No. SHEET 3A SCALE 1:5000 FIG. No. 13



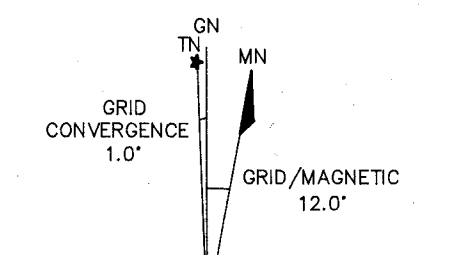
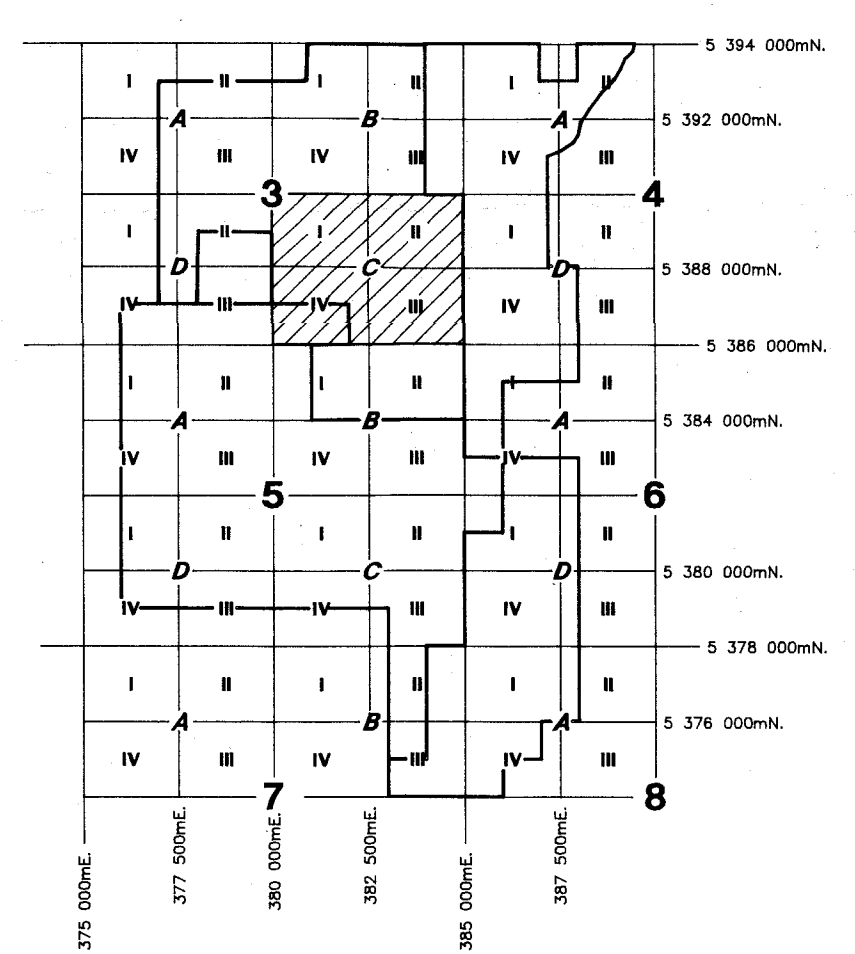


EL. 2/90 BOUNDARY

EL. 44/88 BOUNDARY

LEGEND

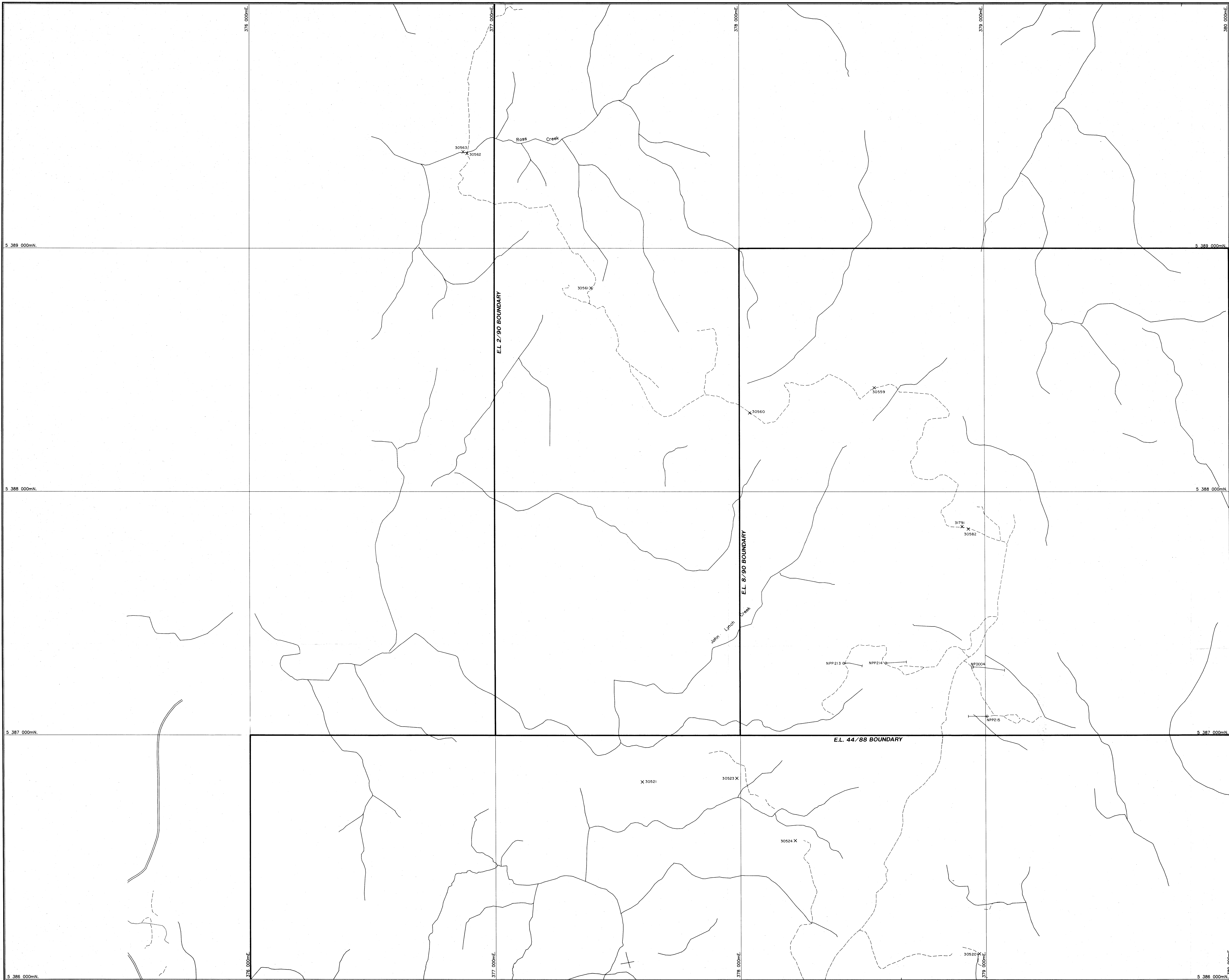
X30540 - Rock Chip Sample



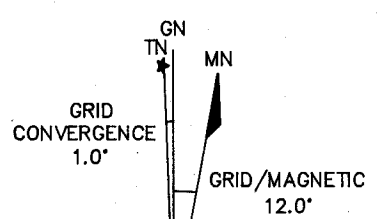
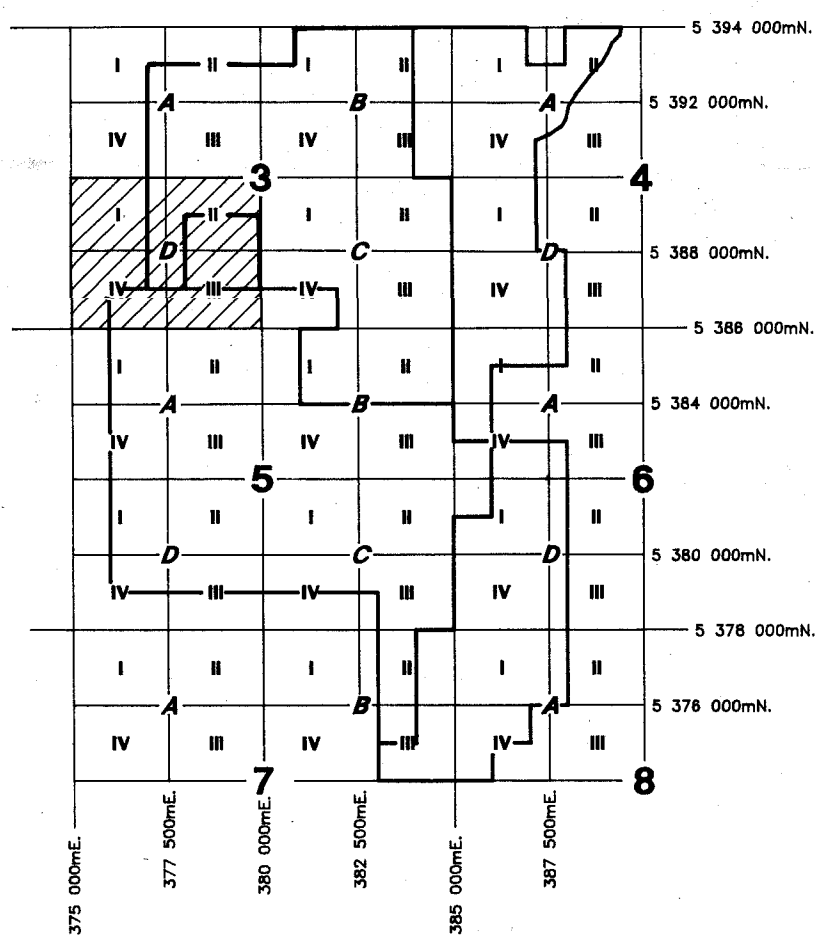
096190 **92-3343.**

**PASMINCO EXPLORATION**  
A Division of Pasminco Australia Limited

|                      |                   |                            |
|----------------------|-------------------|----------------------------|
| COMPILED: ANL/LWK    | DATE: March, 1992 | E.L. 2/90 - BOCO JV        |
| DRAWN:               | REFERENCE:        | E.L. 44/88 - BURNS PEAK JV |
| REVISIONS:           |                   | <b>SAMPLE LOCATIONS</b>    |
| DRAWING No. SHEET 3C | SCALE 1:5000      | FIG. No. 15                |



LEGEND  
X31791 - Rock Chip Sample



096191 **92-3343.**

**PASMINCO EXPLORATION**  
A Division of Pasminco Australia Limited

COMPILED : ANL/LWK  
DATE : March, 1992  
DRAWN :  
REFERENCE :  
REVISIONS :  
**E.L. 2/90 - BOCO JV**  
**E.L. - 8/90 NTH. PINNACLES JV**  
**E.L. 44/88 - BURNS PEAK JV**  
**SAMPLE LOCATIONS**

DRAWING No. SHEET 3D SCALE 1:5000 0 100 200 METRES FIG. No. 16



PLAN

**PLAN**

Access Track  
Creek  
AK1  
CLEARING  
553.7m E.O.H.

384 400mE 384 500mE 5 388 900mN 384 600mE 5 388 800mN 384 700mE 5 388 800mN 384 800mN 384 900mN 384 400mE 5 388 900mN 384 500mE 5 388 800mN 384 600mE 5 388 800mN 384 700mE 5 388 800mN 384 800mN 384 900mN

**SECTION LINE**  
125° AMG

**SECTION**

400mR.L.  
300mR.L.  
200mR.L.  
100mR.L.  
00mR.L.  
-100mR.L.

**LEGEND**

- Fault
- Geological contact, measured
- Geological contact, interpreted
- Bedding - true dip
- Bedding - projected dip
- Bedding facing

**QUATERNARY GLACIAL DEPOSITS**

GLACIAL TILL  
VARVED CLAYS  
GLACIAL TILL  
VARVED CLAYS  
Basal sandy gravel  
Base of weathering  
Hydrothermal breccia?  
Fault zone and broken core with traces of py and gr  
Flow margin/ lava breccia  
Strongly silicified  
Hydroclastite  
Flow banding  
Silicified  
Hydroclastite  
Flow margin/ lava breccia  
Chertified feebly  
Flow banding  
Pyrite and carbonate in veins and vugs  
Traces of gofena in carbonate veins  
Pyrite and gofena traces in carbonate veins  
Flow top breccia  
Blotchy silica alteration  
Flow banding  
MAFIC INTRUSIVE  
fine grained, dark grey  
(incorporating two faults)  
AMYGDALOIDAL MAFIC INTRUSIVE  
quartz amygdaloids to 3mm across  
MAFIC INTRUSIVES  
MINOR MAFIC INTRUSIVE  
Faulted zone and broken core  
MIXED CLASTIC SEQUENCE  
Interbedded ash layers and feldspar crystal-rich volcaniclastic sandstone  
LAMPROPHYRE INTRUSION  
(CRETACEOUS)  
black, porphyritic  
FELDSPATHIC DACITIC LAVA  
MAFIC INTRUSIVE  
23mSW of section  
553.7m E.O.H.

**CAMBRIAN**

**VOLCANICS**

**(CENTRAL VOLCANIC SEQUENCE)**

**RHYODACITIC LAVA**  
**LAVA BRECCIA**  
**AND**  
**HYOCLASTITE**

Massive, flow banded, variably sil-ser-chl altered, minor pyrite and brecciated or fragmented horizons. (occur for full length of hole, unless otherwise indicated)

096193  
**92-3343.**  
**PASMINCO EXPLORATION**  
A Division of Pasminco Australia Limited  
COMPILED : L.W.K.  
DATE : March 1992  
DRAWN : G.M.B.  
REFERENCE :  
REVISIONS :  
DRAWING No. SCALE 1:1000 20 0 20 m FIG. No. 19  
E.L. 2/90 - BOCO JV  
ANIMAL CREEK  
DRILL HOLE SECTION  
AK1

**PLAN**

384 400mE 5 388 000mN 384 500mE 5 388 900mN 384 600mE 5 388 800mN 384 700mE 5 388 000mN 384 800mE

Access Track

Creek

AK1

CLEARING

553.7m E.O.H.

SECTION LINE

125° AMG

400mR.L.

300mR.L.

200mR.L.

100mR.L.

00mR.L.

-100mR.L.

**QUARTERNARY GLACIAL DEPOSITS**

GLACIAL TILL

VARVED CLAYS

GLACIAL TILL

VARVED CLAYS

Base of weathering

Hydrothermal breccia?

chil, py tr ap.

100m

Base of lava flow and brecciated flow top

Strongly silicified

Hydrothermal breccia

Flow banding

Silicified

Hydrothermal breccia

Flow margin/lava breccia

Chertified feebly

Flow banding

Pyrite and carbonate in veins and vugs

300m

Traces of dolomite in carbonate veins

Pyrite and dolomite traces in carbonate veins

Flow top breccia

Blotchy silica alteration

Flow banding

400m

500m

23mSW of section

553.7m E.O.H.

**CAMBRIAN**

**VOLCANICS**

**(CENTRAL VOLCANIC SEQUENCE)**

**RHYODACITIC LAVA AND LAVA BRECCIA AND HYOCLASTITE**

Massive, flow banded, variably sil-ser-chl altered, minor pyrite and brecciated or fragmented horizons. (occur for full length of hole, unless otherwise indicated)

**MAFIC INTRUSIVE**  
fine grained, dark grey (incorporating two faults)

**AMYGDALOIDAL MAFIC INTRUSIVE**  
quartz amygdaloids to 3mm across

**MAFIC INTRUSIVES**

**MIXED CLASTIC SEQUENCE**  
interbedded ash layers and feldspar crystal-rich volcanoclastic sandstone

**LAMPROPHYRE INTRUSION**  
(CRETACEOUS)  
black, porphyritic

**FELDSPATHIC DACITIC LAVA**

**MAFIC INTRUSIVE**

**LEGEND**

- Fault
- Geological contact, measured
- Geological contact, interpreted
- Bedding - true dip
- Bedding - projected dip
- Bedding facing

**SECTION**

384 400mE 384 500mE 5 388 900mN 384 600mE 5 388 800mN

096193

**92-3343.**

**PASMINCO EXPLORATION**  
A Division of Pasminco Australia Limited

COMPILED : L.W.K.  
DATE : March 1992  
DRAWN : G.M.B.  
REFERENCE :  
REVISIONS :  
DRAWING No.

E.L. 2/90 - BOCO JV  
ANIMAL CREEK  
DRILL HOLE SECTION  
AK1

SCALE 1:1000

FIG. No. 19

PLAN

**PLAN**

Access Track  
Creek  
AK1  
CLEARING  
553.7m E.O.H.

384 400mE 384 500mE 5 388 900mN 384 600mE 5 388 800mN 384 700mE 5 388 800mN 384 800mN 384 900mN 384 400mE 5 388 900mN 384 500mE 5 388 800mN 384 600mE 5 388 800mN 384 700mE 5 388 800mN 384 800mN 384 900mN

**SECTION**

400mR.L.  
300mR.L.  
200mR.L.  
100mR.L.  
00mR.L.  
-100mR.L.

QUARTERNARY GLACIAL DEPOSITS  
GLACIAL TILL  
VARVED CLAYS  
GLACIAL TILL  
VARVED CLAYS  
Base of weathering  
Hydrothermal breccia?  
Fault zone and broken core with traces of py and gr  
Base of lava flow and brecciated flow top  
Strongly silicified  
Hydrothermal breccia  
Flow banding  
Sillified  
Hydrothermal breccia  
Flow margin/lava breccia  
Chertified feebly  
Flow banding  
Pyrite and carbonate in veins and vugs  
Traces of silica in carbonate veins  
Pyrite and silica traces in carbonate veins  
Flow top breccia  
Blotchy silica alteration  
Flow banding  
AMYGDALOIDAL MAFIC INTRUSIVE  
quartz amygdaloids to 3mm across  
MAFIC INTRUSIVES  
MINOR MAFIC INTRUSIVE  
Faulted zone and broken core  
MIXED CLASTIC SEQUENCE  
Interbedded ash layers and feldspar crystal-rich volcaniclastic sandstone  
LAMPROPHYRE INTRUSION  
(CRETACEOUS)  
black, porphyritic  
FELDSPATHIC DACITIC LAVA  
MAFIC INTRUSIVE  
553.7m E.O.H.

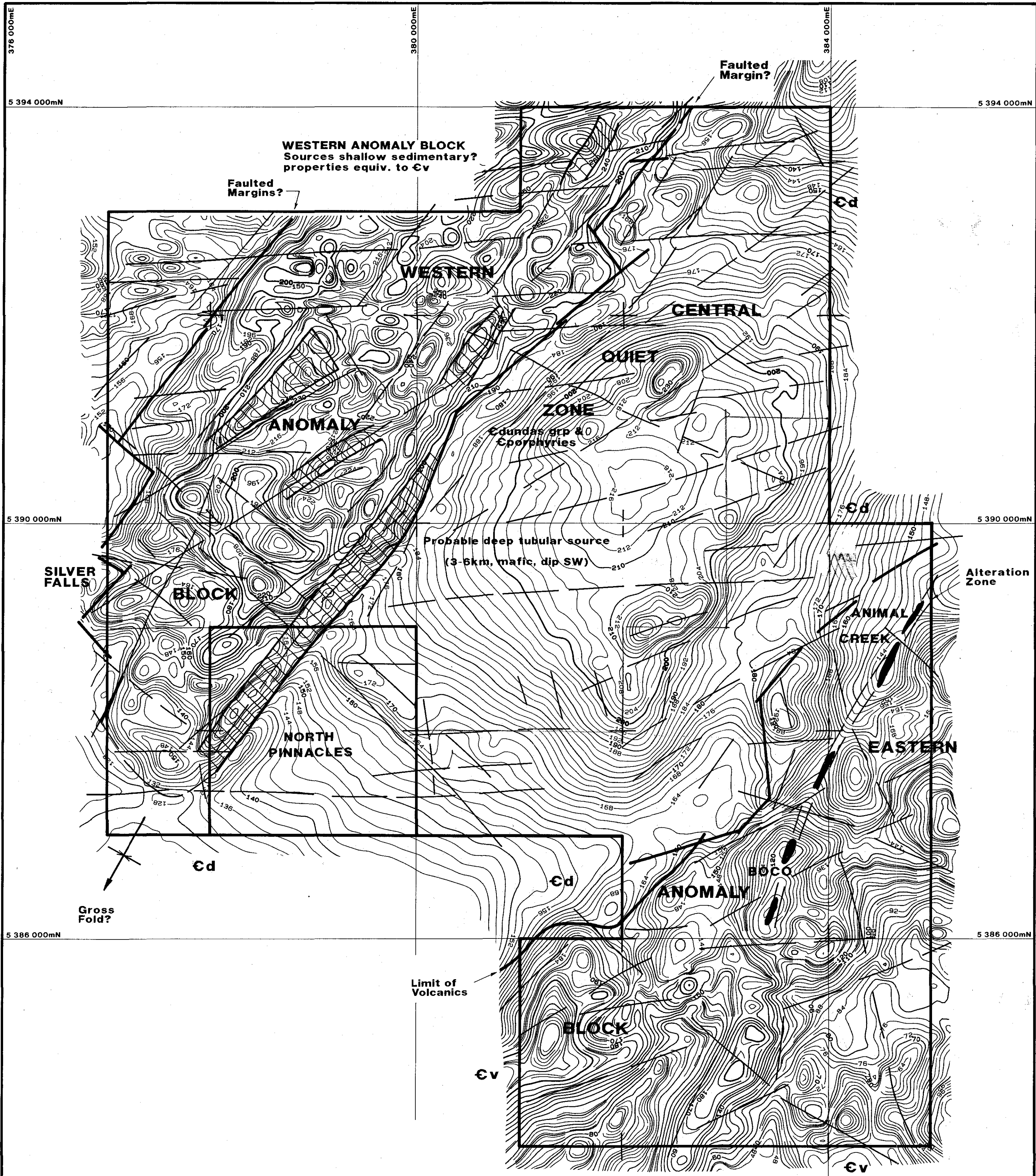
**LEGEND**

- Fault
- Geological contact, measured
- Geological contact, interpreted
- Bedding - true dip
- Bedding - projected dip
- Bedding facing

**SEQUENCE**

096193  
92-3343.  
PASMINCO EXPLORATION  
A Division of Pasminco Australia Limited  
COMPILED : L.W.K.  
DATE : March 1992  
DRAWN : G.M.B.  
REFERENCE :  
REVISIONS :  
DRAWING No. SCALE 1:1000 20 0 20 m FIG. No. 19

E.L. 2/90 - BOCO JV  
ANIMAL CREEK  
DRILL HOLE SECTION  
AK1



**KEY**

- Inferred Alteration
- High Contrast Units
- Interpreted Fault
- Magnetic Trends

**BASE CONTOUR PLAN - PART OF SHEET N**

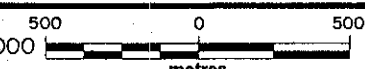
"Residual Magnetics"  
Contour Interval 2nT  
Terrain Clearance 120m  
Processed by Tas. Division of Mines & Mineral Resources,  
Aug., 1991

**NOTE**

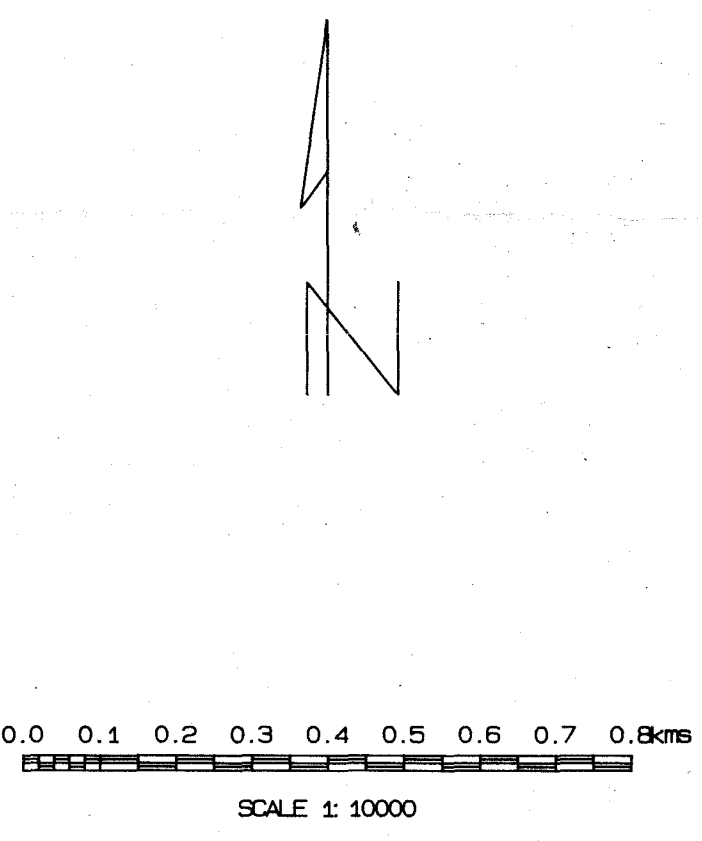
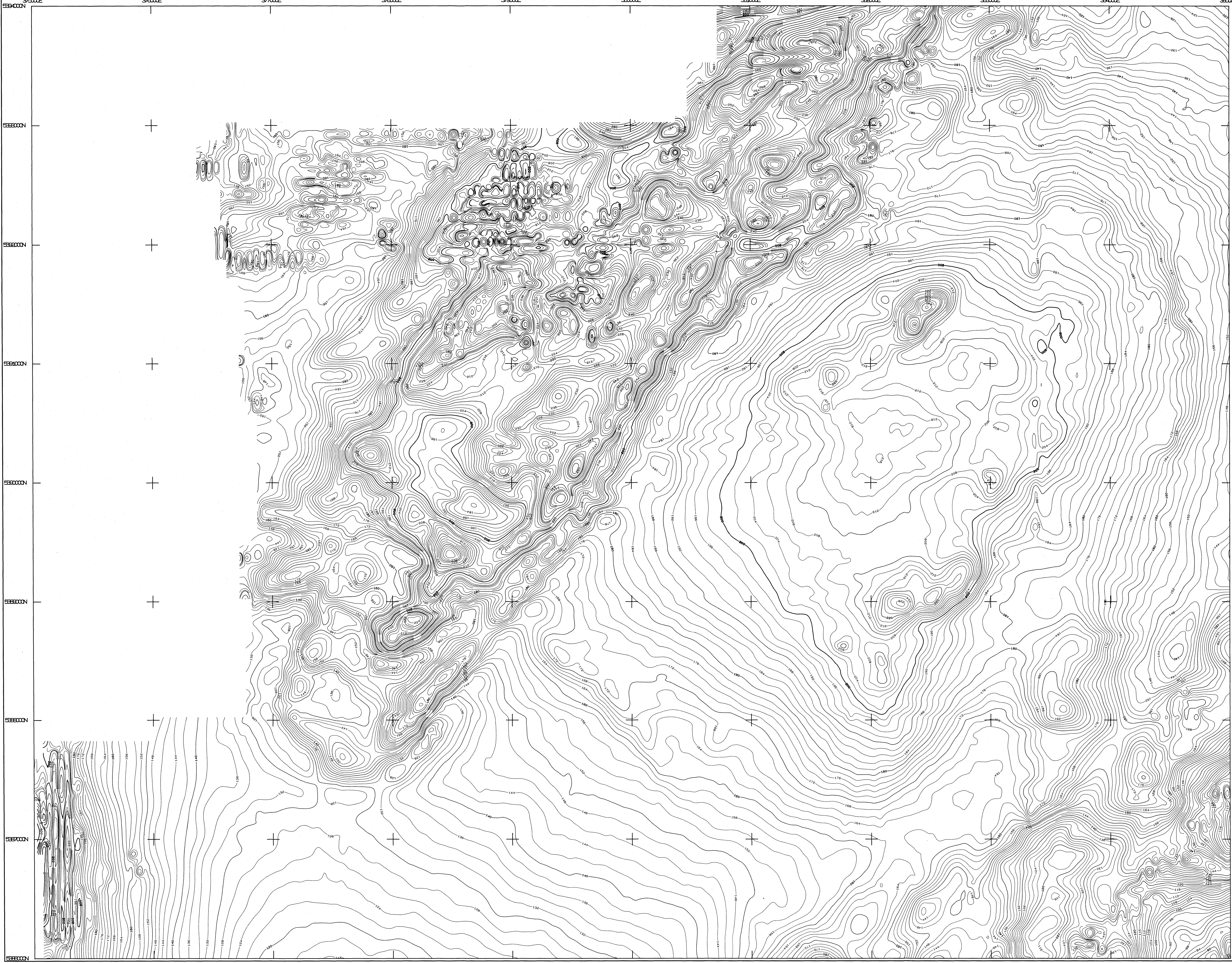
Subtle anomalies require further review  
after upgrade of surface mapping

096194

**92-3343.**

|                                                                                                                                                                              |                                                                                                                                                                                                 |                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
|  <b>PASMINCO EXPLORATION</b><br><small>A Division of Pasminco Australia Limited</small> |                                                                                                                                                                                                 |                       |
| COMPILED: D.L.                                                                                                                                                               | <b>E.L. 2/90 - BOCO JV</b><br><b>E.L. 8/90 - NTH. PINNACLES</b><br><b>INTERPRETATION AND</b><br><b>TREND SUMMARY OF</b><br><b>PRELIMINARY</b><br><b>INTERPRETATION</b><br><b>(Leaman 1991a)</b> |                       |
| DATE: Mar., 1991                                                                                                                                                             |                                                                                                                                                                                                 |                       |
| DRAWN: L.K./G.B.                                                                                                                                                             |                                                                                                                                                                                                 |                       |
| REF:                                                                                                                                                                         |                                                                                                                                                                                                 |                       |
| REVISIONS:                                                                                                                                                                   |                                                                                                                                                                                                 |                       |
| DRAWING No.                                                                                                                                                                  | SCALE 1:25,000                                                                                             | FIG. No.<br><b>22</b> |

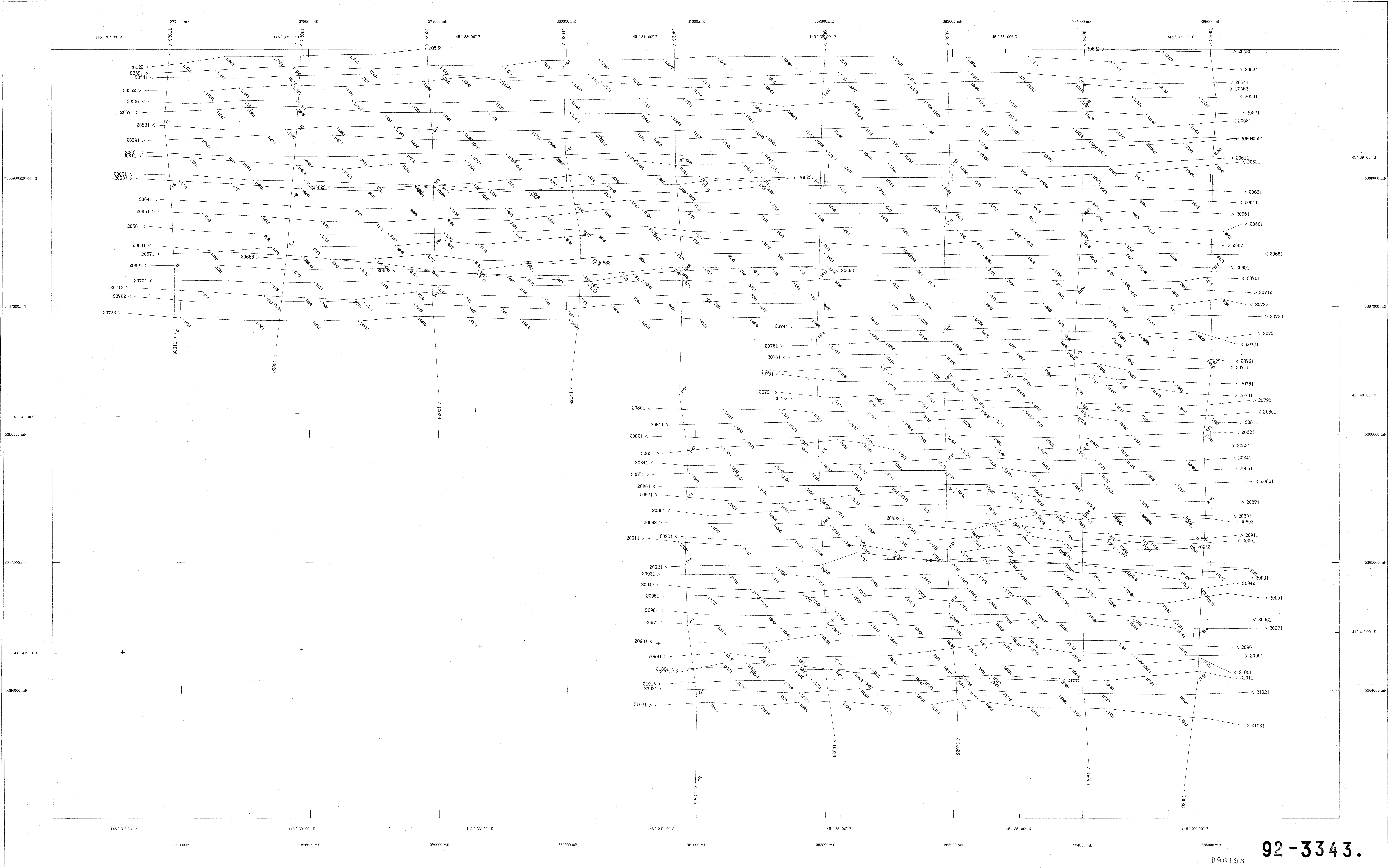




**92-3343.**

096196  
PASMINO EXPLORATION  
WEST TAS TENEMENTS  
RESIDUAL MAGNETICS  
Contour Interval 2 nT  
Terrain Clearance - 120m  
SHEET 3  
Processed Tas Division of Mines & Mineral Resources  
August 1992

# **APPENDIX FIGURES**



92-3343.

096198

AIRBORNE SURVEY EQUIPMENT

Aircraft  
Magnetometer  
Magnetometer Resolution  
Magnetometer Sample Interval  
Data Acquisition  
Data Recording  
Spectrometer  
Crystal Size  
Spectrometer Sample Interval  
Flight Path Record  
Flight Path Recovery

Aerospatiale Ecureuil "Squirrel" VH-URR  
Geometrics G833 Helium Vapour  
0.2 seconds (approx 7 metres)  
Geonstruments Model 2000  
1.2M floppy disk  
Geometrics G8000  
16.4 litres in downward array  
1.0 Seconds (approx 35 metres)  
VHS Colour Video System  
Visually onto aerial photographs

AIRBORNE SURVEY SPECIFICATIONS

Flight Line Direction  
Flight Line Separation  
The Line Direction  
The Line Separation  
Terrain Clearance

Flown by GEONSTRUMENTS PTY. LTD.

Geonstruments job number  
Survey flown  
Processed by

090 - 270.00 degrees  
100 metres  
0 - 180 degrees  
2000 metres  
80 metres (MTC)

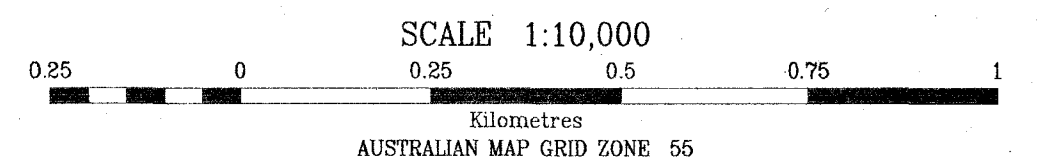
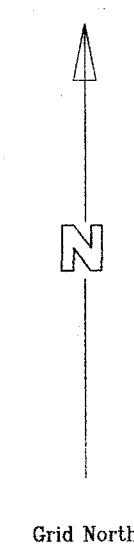
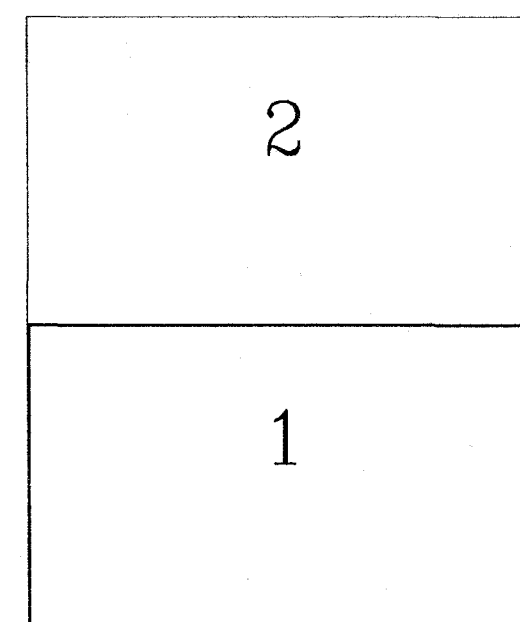
February 9101  
Kevron Geophysics

FLIGHT PATH PROCESSING

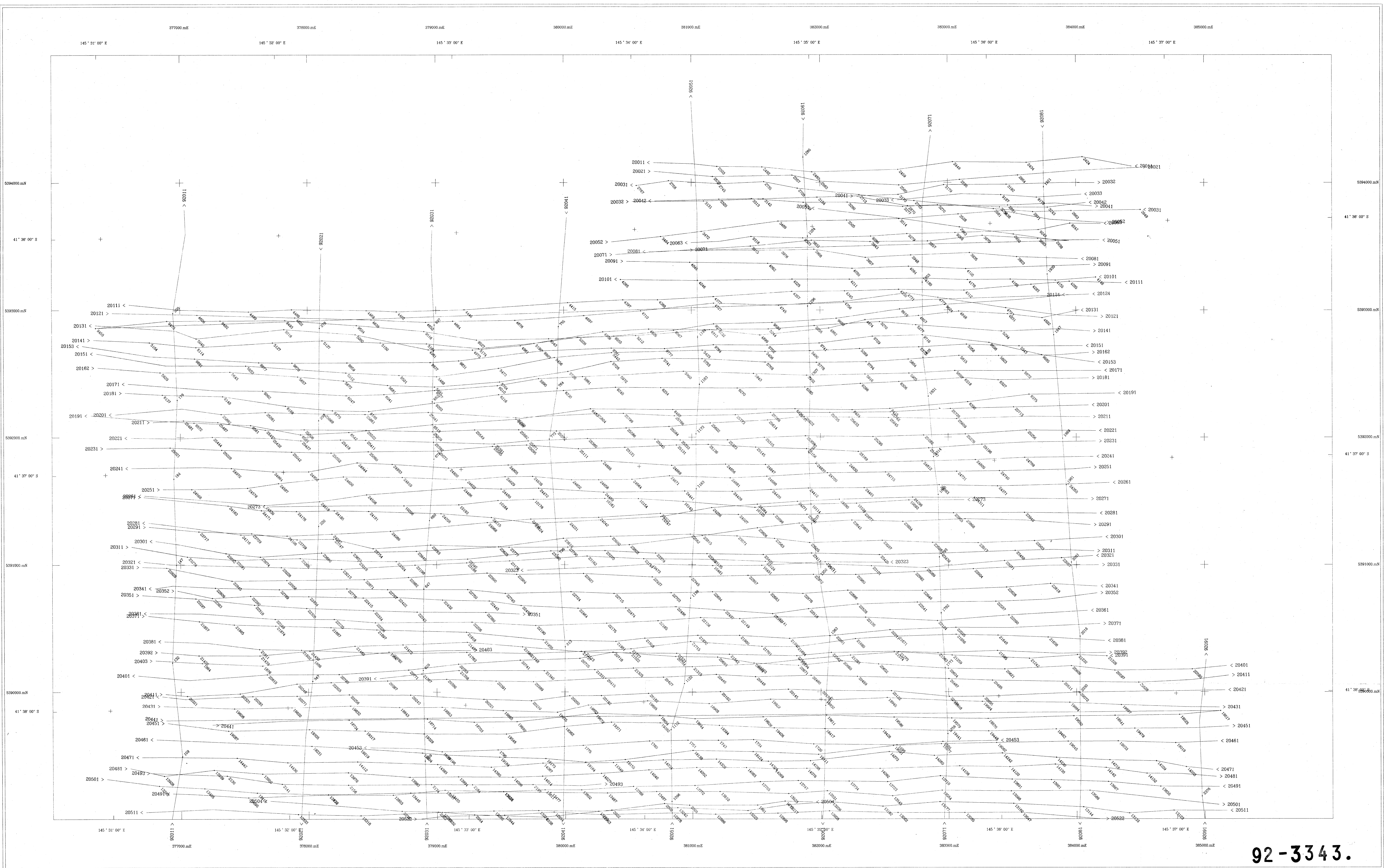
Flight path visually recovered onto aerial photographs  
and transferred to 1:10000 topographic maps

Grid notation refers to Australian Grid Zone 55

Sheet Index



| PASMINCO EXPLORATION                     |            |
|------------------------------------------|------------|
| A Division of Pasminco Australia Limited |            |
| EL 2/90 - Boco                           |            |
| Flight Path                              |            |
| DATE : Jun 1991                          | REPORT :   |
| DRAWN : Kevron Geophysics                | PLAN NO. 1 |
| SCALE 1: 10000                           |            |



92-3343.

AIRBORNE SURVEY EQUIPMENT

Aircraft: Aerospatiale Bourrel "Saurin" VH-HBR  
Magnetometer: Geometrics G833 Helium Vapour  
Magnetometer Resolution: 0.01 nT  
Magnetometer Sample Interval: 0.2 seconds (approx 7 metres)  
Data Acquisition: Geoinstruments Model 2000  
Data Recording: 1.2MB floppy disk  
Spectrometer: Geometrics G8200  
Crystal Size: 18.4 litres in downward array  
Spectrometer Sample Interval: 1.0 Seconds (approx 35 metres)  
Flight Path Record: VHS Colour Video System  
Flight Path Recovery: Visually onto aerial photographs

AIRBORNE SURVEY SPECIFICATIONS

Flight Line Direction: 090 - 270.00 degrees  
Flight Line Separation: 0 - 100 metres  
Tie Line Direction: 0 - 180 degrees  
Tie Line Separation: 2000 metres  
Terrain Clearance: 80 metres (MTC)

Flown by GEOINSTRUMENTS PTY. LTD.

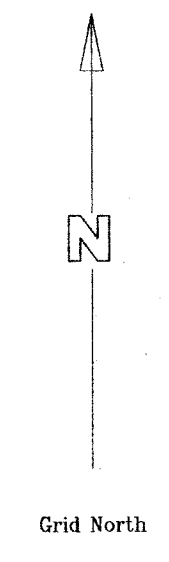
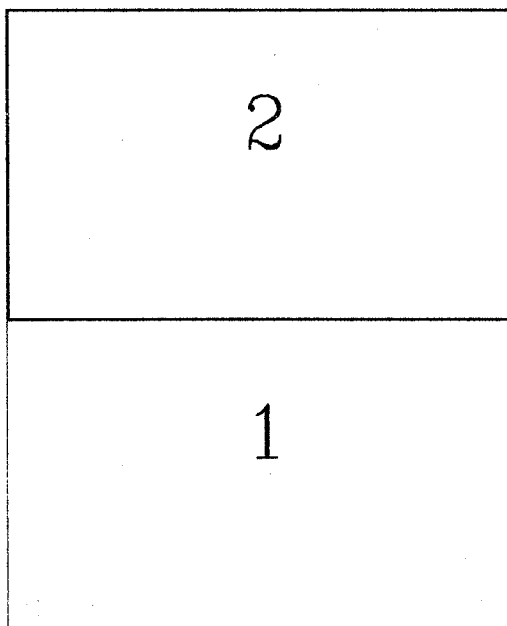
Geoinstruments job number: 9101  
Survey flown: February 1991  
Processed by: Kevron Geophysics

FLIGHT PATH PROCESSING

Flight path visually recovered onto aerial photographs and transferred to 1:10,000 topographic maps

Grid notation refers to Australian Grid Zone 55

Sheet Index

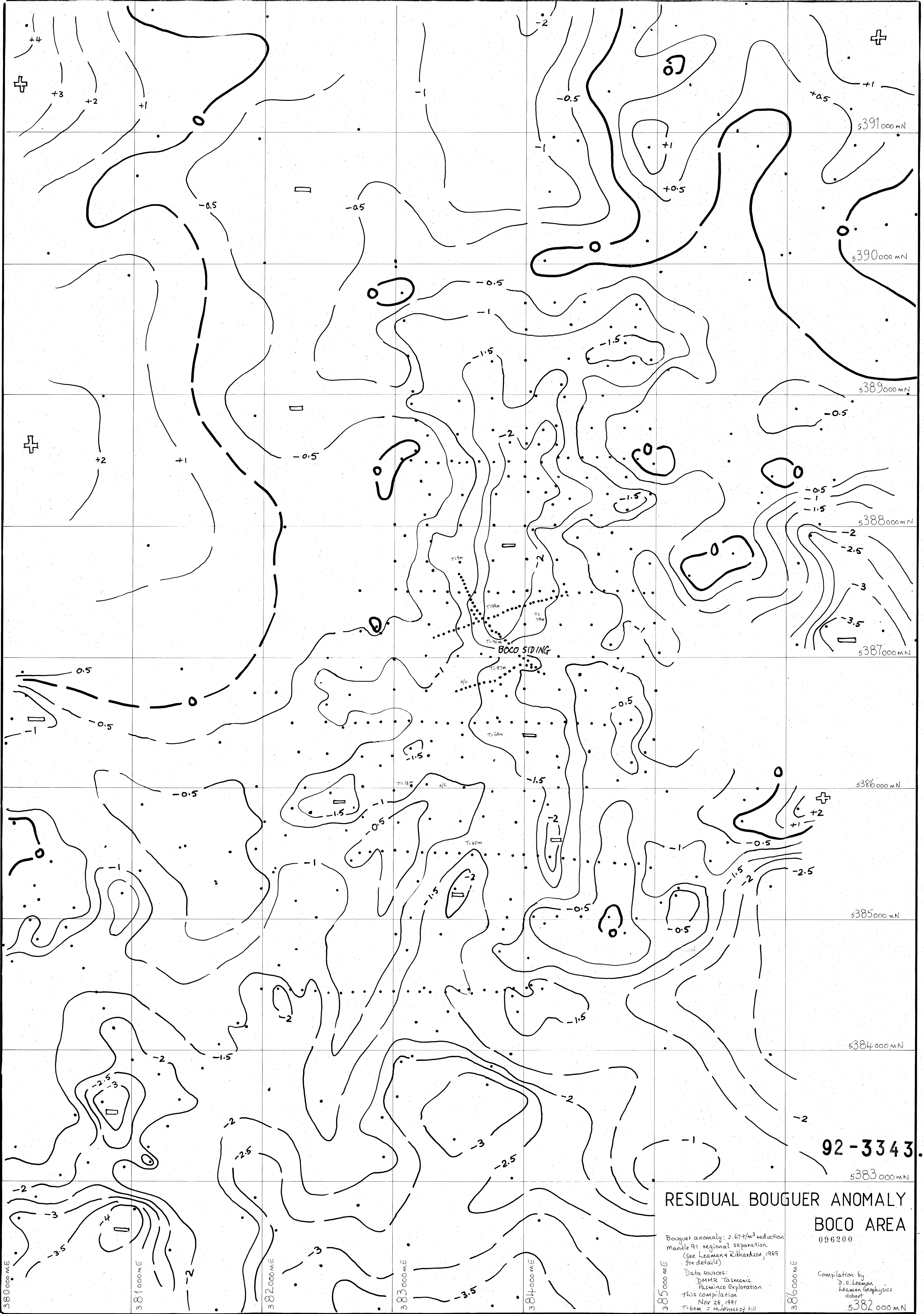


096199 SCALE 1:10,000  
0.25 0 0.25 0.5 0.75 1  
Kilometres  
AUSTRALIAN MAP GRID ZONE 55

PASMINCO EXPLORATION  
A Division of Pasminco Australia Limited

EL 2/90 - Boco  
Flight Path

|                           |          |
|---------------------------|----------|
| DATE : Jun 1991           | REPORT : |
| DRAWN : Kevron Geophysics | PLAN NO. |
| SCALE 1: 10000            |          |



92-3343.

RESIDUAL BOUGUER ANOMALY  
BOCO AREA  
096200

Bouguer anomaly: 2.67/m<sup>3</sup> reduction  
Mantle 91 regional separation  
(see Leaman & Richardson, 1989  
for details)  
Data sources:  
DMR Tasmania  
Pascimco Exploration  
this compilation  
Nov 28, 1991  
T=60m = thickness of till

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