NEW HOLLAND MINING NL

EL26/87

SANDY CAPE, TASMANIA

ANNUAL REPORT

YEAR 1

(15.1.88 - 15.1.89)

Address of licencee
175 Great Eastern Highway
BELMONT, W.A. 6104

Author
William C. Cromer Pty Ltd
Consultant Geologists
190 Macquarie Street
HOBART TAS. 7000
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SUMMARY

Precambrian relatively unmetamorphosed sandstones, quartzites and siltstones are the dominant rock types on EL26/87.

The Devonian Pieman Granite, a large, elongate, largely offshore pluton, has intruded the Precambrian along the southwestern boundary of the tenement. Minor sulphide mineralisation is associated with the granite.

Tertiary sediments and basalts and Quaternary sediments, probably occupy a significant portion of the tenement, but the area has not been mapped in detail. The Tertiary sediments are the most likely source of anomalous base metals in recent stream sediments reported from several rivers and creeks.

The tenement has been included in several earlier exploration licences since the late 1960's. Reconnaissance geochemistry and geophysics have been done, with limited follow-up work, mainly for tin-copper replacement skarn deposits associated with the Pieman Granite.

Although there has not been significant mineralisation reported from the area, EL26/87 lies immediately to the west of the tin-copper mineralisation near Balfour and along the Norfolk Range. The tin-copper deposits are mainly small, uneconomic shows, with local significant mineralisation at Balfour where limited production has occurred.

The Balfour mineralisation may be sourced from a northeast, buried extension of the Pieman Granite. The tenement therefore remains prospective for replacement skarn tin and copper mineralisation, especially in the northeast corner near Balfour.

New Holland has completed a detailed geophysical interpretation, using available gravity and geophysical data, to investigate the form of the Pieman Granite.

Depending on the results of the geophysical study, acquisition of further aeromagnetic and helicoper-supported gravity data is recommended for prospect evaluation.

The geophysical work shows the granite to be a larger, more irregular body than previously thought, with a NE extension inferred to extend towards the Balfour tin-copper mineralisation. Thermal metamorphism is widespread.

Gravity data are sparce in the north of the EL. In-fill data need to be acquired at nominal 1 km^2 spacing in Year 2. Year 2 work will also include follow-up lithological and geochemical investigations in the southern part of the tenement, with helicopter support where appropriate.

1. INTRODUCTION

1.1 Tenement Details

EL26/87 (Figure 1) was granted to New Holland Mining NL on January 15, 1988. The Company is sole owner and manager.

The 143 km^2 of tenement comprises (guide only)

- State Forest 38.4km^2
- Arthur River Protected Area 104.6km^2

and lies wholly within the Norfolk Range Australian Heritage Act Interim Listing.

1.2 Exploration Aims

Since EL26/87 lies immediately to the west of Balfour-Norfolk Range tin-copper mineralisation, and in its southern part includes the northern boundary of the Pieman Granite, New Holland regards the tenement as prospective for replacement skarn tin - tungsten - copper deposits hosted in the Precambrian. In contrast to previous explorers, New Holland has made use of available regional gravity as well as aeromagnetic data as a primary exploration tool.

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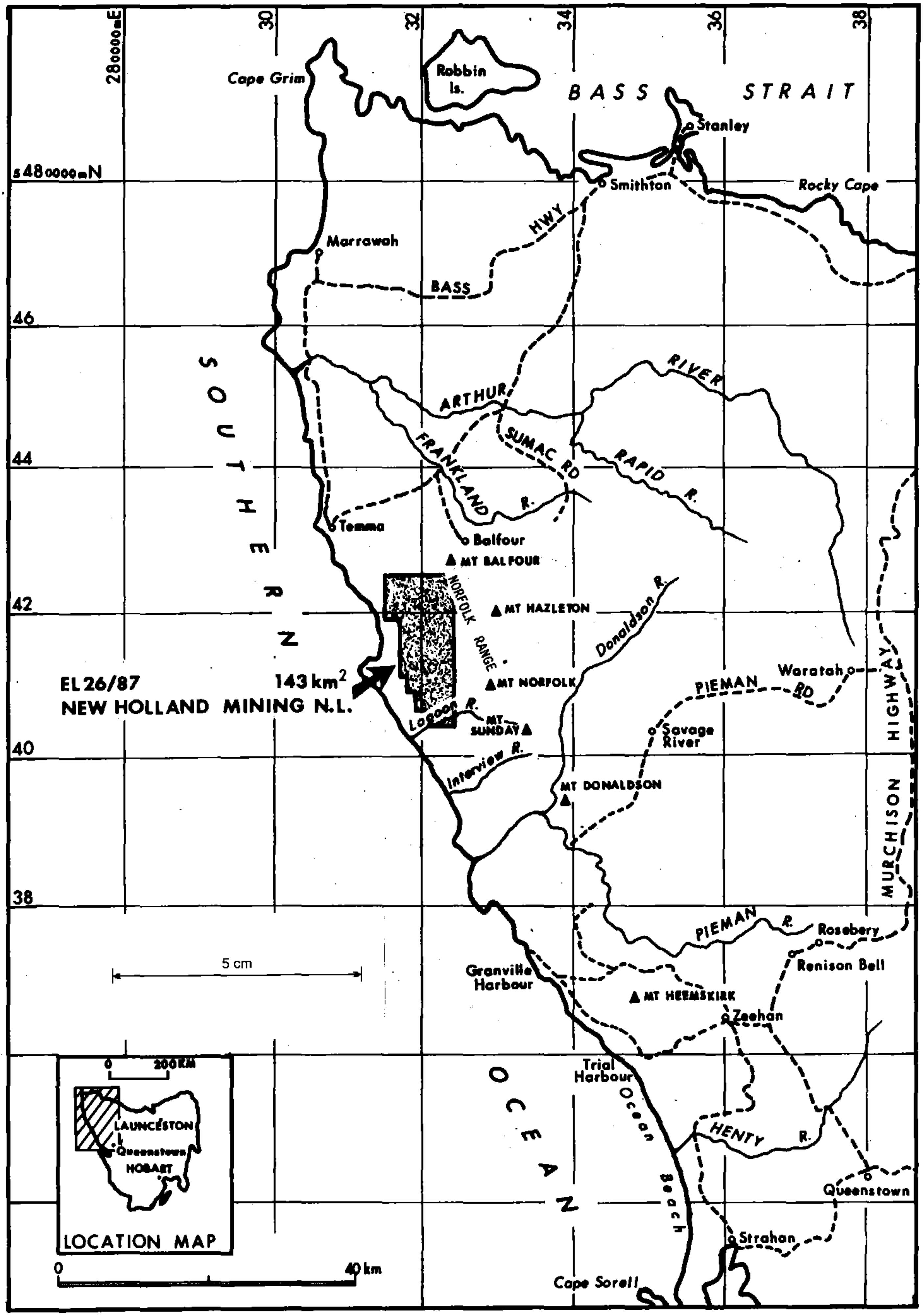

Figure 1. Location map, EL26/87

2. WORK COMPLETED IN YEAR 1

2.1 Summary

The main Year 1 activity towards the exploration aims has been

- a review of all previous exploration and the compilation of a prospectivity report on the tenement (Cromer, 1988).
- preparation of a regional geophysical interpretation of the licence area based on existing gravity and magnetic data (Leaman, 1988b).

2.2 Review of Previous Exploration

EL26/87 lies several kilometres south and west of the intensively explored Balfour-Norfolk Range tin-copper district, and includes part of the Pieman Granite along its southern boundary. Despite this, the area has seen little detailed exploration mainly because of its access problems and isolation. The current tenement has been included in several regional exploration programmes by previous companies with limited follow-up.

Veins containing tourmaline and arsenopyrite were reported from the granite at Sandy Cape (Figure 2) in the early 1900's, but no prospects are known to have been worked.

Pickands Mather conducted a regional stream sediment survey in northwest Tasmania in 1967. Within EL26/87, forty samples from the Lagoon River, Skull Creek, Devil Rivulet, Pedder and North Pedder Rivers, Native Hut Creek and Daisy River were analysed for Cu, Ni, Zn and Pb. Some anomalous values were obtained. Best assays were 40 ppm Cu, 50 ppm Ni, 1500 ppm Zn and 410 ppm Pb. Anomalous areas included the Lagoon River (1500 ppm Zn), the mid-reaches of Daisy Rivulet (50 ppm Ni, 190 ppm Zn), the headwaters of Wild Wave Rivulet (210 ppm Zn) and the mid-reaches of Devil Rivulet (410 ppm Pb). Tin assays were also done with the more anomalous values in the Lagoon River (100 ppm Sn) at or near inferred contacts with the Pieman Granite, (Moorland, 1982). Pickands Mather did no follow-up work in the area.

A syndicate comprising Renison Limited, A.C.I., Mt. Lyell and Consolidated Goldfields explored EL's 48 and 49/70 for tin-tungsten including Renison Bell style replacement orebodies. EL49/80 lay partly within the southern area of EL26/87. Aeromagnetics were flown but no anomalies worthy of follow-up were located within the current EL. A rock-chip sampling programme at Sandy Cape was not encouraging (Bell, 1972).

Exploration by the group also included a regional stream sediment sampling programme partly using Pickand Mathers' earlier results, conducted in areas of sedimentary rocks near the Pieman Granite. Anomalous Pb, Ag, Cu and Ni were returned from the junction of the Thornton and McLeod Rivers, Ag and Cu from the upper reaches of the same rivers, and a single spot Zn value on Daisy Creek. No detailed follow-up was done.

During 1973, Esso Australia Ltd. carried out a reconnaissance aeromagnetic and INPUT survey over EL2/73, including the present tenement (Neale, 1974). The target was massive base-metal sulphides, presumably of the Mt. Read Volcanic style hosted in volcanics within the Precambrian sedimentary rocks. Some INPUT anomalies were detected but no follow-up ground work done. The exploration programme was superficial and the licence relinquished in 1974.

The ground covered by EL26/87 lies partly within the very large EL1/77 held by CRA Exploration. The initial target near Sandy Cape was tin-replacement skarns associated with the Pieman Granite. Stream sediment work was done which incorporated previous survev data, but CRA was not encouraged and after limited ground follow-up relinquished the area (Weir, 1982, 1985).

The most extensive work to date has been that of the EZ Company of Australasia which explored for tin on EL56/80 between 1980 and 1984 (McDonald, 1985). EL56/80 covered all the central and southern portions of the current licence area. EZ's concept was carbonate-hosted replacement cassiterite-pyrrhotite skarn mineralisation related to the Pieman Granite. An aeromagnetic survey of 110 km detected several anomalies (Figure 2) which were followed up by photogeology, mapping, gridding, sampling, ground EM and limited diamond drilling. Anomaly 1 (McDonald, 1985, p.13) was located 4.5 km east of Sandy Cape with a strike length of 1 km and estimated depth 200 m. Minor sulphides were observed in siltstones interbedded with quartzites. Anomaly 4 between the Italian and Lagoon Rivers coincides with similar rocks containing local disseminations of pyrite. The amplitudes of anomalies 1 and 4 and others shown in Figure 2 were regarded by EZ as too low to represent economic mineralisation at depth. The company concluded slightly magnetic rock units in the Precambrian were responsible. However, two diamond drillholes totalling 195 m were completed in the area, presumably over anomalies 1 and 4. Results from the drilling were not available from the Tasmanian Mines Department when this present review was being done. From March 1983, EL56/80 was explored as a joint venture between EZ and Tennaco Oil and Minerals Ltd. No work was undertaken after May 1984 and the area was relinquished.

The previous exploration history of the area is therefore one of regional reconnaissance by several major companies, and limited follow-up. In most cases, tin-tungsten mineralisation associated with the Pieman Granite was the primary target.

2.3 Tenement Geology

The geology of the Sandy Cape area is not well known. Previous mineral exploration was hampered by isolation, inclement weather and difficult terrain, and the district has not been regionally mapped by the Tasmanian Mines Department.

The tenement geology in Figure 2 is therefore a compilation of available sources including the Department of Mines 1:250 000 Burnie geological map (Williams and Turner, 1973), Carey's (1981) photogeological interpretation of northwestern Tasmania for CRA Exploration, and photogeology done by Hunting Geology and Geophysics for the EZ Company (McDonald, 1985). Rock distributions, in particular the extensive Tertiary sediments and basalt inferred by Carey, may need revision.

Precambrian Late Precambrian siltstones, sandstones and quartzites of the relatively unmetamorphosed Rocky Cape Group are the basement rocks in the region. Two of Carey's (1981) photogeologically inferred subdivisions are shown on Figure 2, corresponding to his Phi and Epsilon Groups. Weir (1982) correlated these rocks with the Interview Group and the Balfour Slates respectively. According to Carey, the Phi Group has low relief, little outcrop and numerous sink holes. He predicted dolomite with minor quartzite, but subsequent limited field work near Sandy Cape suggests quartzite, sandstone and slate are the dominant rock types.

The Epsilon Group is dominantly rhythmically bedded slates with minor quartzite.

No major volcanic or carbonate sequences have been reported in the Precambrian near Sandy Cape.

Structurally, the area is complex, but strikes are dominantly north-south at an angle of 20-30^{o} to the main NNW-SSE fault trends.

Several major and numerous smaller faults cross the tenement, especially in the far north-east corner near Balfour. This faulting may be related to, or part of, the Marrawah-Balfour trend, an elongate corridor up to 10 km wide extending NNW-SSE from Marrawah through Balfour and along the Norfolk Range to the Arthur Lineament. The corridor (Carey, 1981) contains most of the copper-tin deposits of the area.

Devonian Granite The Middle-Late Devonian Pieman Granite extends along the southwestern side of EL26/87. It intrudes the Precambrian rocks but is partly obscured beneath superficial cover.

Very little geological or petrological data is available on the granite in this area. However, Leaman (1987) has conducted a provisional regional interpretation of the pluton based on available gravity and magnetic data. The Pieman Granite is a large, elongate body, with steep, probably locally fault-controlled margins. It extends from the Pieman River to Sandy Cape, lies largely offshore, and may be connected at depth to the Heemskirk Granite further south.

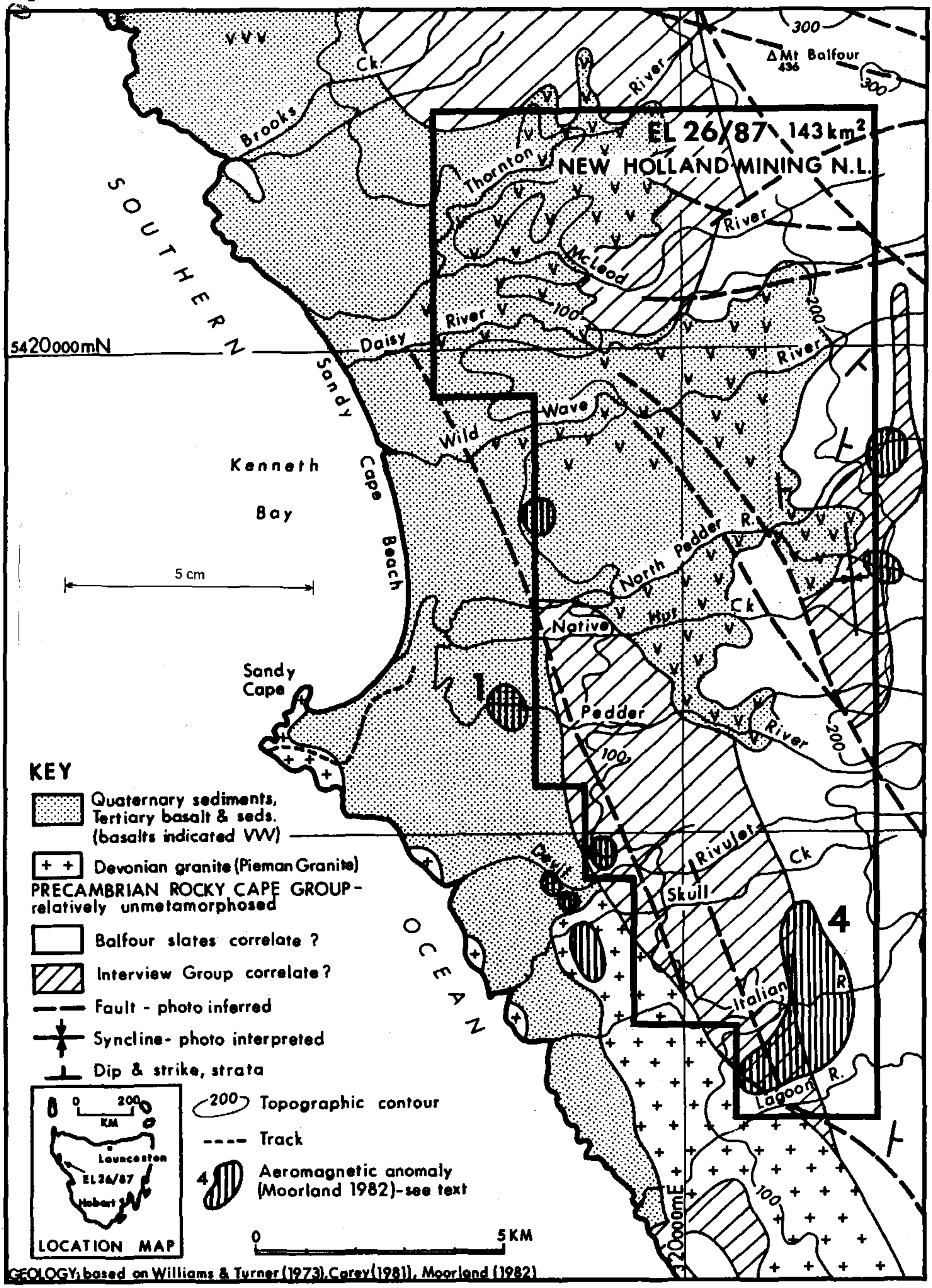

Figure 2. Generalised geology, EL26/87.

More recent work (Leaman 1988b, Appendix 1 this report) suggests the apparently steeply dipping eastern margin is more irregular than indicated in Leaman's 1987 report. There is a possibility of subsurface extensions of the granite to the east and northeast where it may have sourced the copper-tin mineralisation of Balfour and the Norfolk Range.

Tertiary Basalts and Sediments Carey (1981) has photointerpreted extensive basalts and sedimentary cover on EL26/87. There are also indications from other workers (e.g. McDonald, 1985) of widespread, scattered occurrences of Tertiary rocks on elevated interfluves.

The Tertiary rocks are probably remnants of the Henty Surface, a deeply dissected fluvial landform of Tertiary age which occurs extensively in coastal western Tasmania (Banks et al, 1977; Baillie and Corbett, 1985).

Quaternary sands occupy the low-lying coastal strip north and south of Sandy Cape, extending inland to a Tertiary (?) coastal escarpment along the western side of EL26/87.

Apart from tin-copper near Balfour and the Norfolk Range, minor arsenopyrite-tourmaline bearing veins in the Pieman Granite at Sandy Cape, and pyrite in Precambrian siltstones near the granite's northern boundary, there are no reported occurrences of primary mineralisation on or near the tenement.

Isolated, anomalous Cu, Ni, Pb, Zn and Sn have been reported by recent exploration companies in stream sediments, but no follow-up work has been done. It is likely the metals are derived from reworked Tertiary sediments.

Sporadic and locally significant Cu-Sn mineralisation is known at Balfour and along the Norfolk Range a few kilometres north and east of EL26/87. Many old leases were pegged late last century. Several are still current at Balfour, where alluvial tin and primary tin and copper have been mined. The copper is associated with granitic veins possibly derived from a concealed northeast extension of the Pieman Granite.

The Balfour-Norfolk Range mineralisation is confined within a NNW-SSE corridor (Carey, 1981) up to several kilometres wide and perhaps 100 km long which is the locus of several deep-seated and numerous smaller faults. The zone has crustal significance. Balfour is located near the intersection of this trend with several other major cross-cutting structures.

Several of the major faults within EL26/87 are sub-parallel to the Balfour trend.

2.4 Regional Geophysical Interpretations

As part of its Year 1 programme, New Holland Mining commissioned Dr. D.E. Leaman to review existing regional gravity and magnetic data over EL26/87 (Leaman, 1988b). His report is included here as Appendix 1. The main conclusions are

- the Pieman Granite has a more irregular and extensive form than previously thought, especially along the eastern margin.

- there is evidence of E-W extension, and NNW-SSE structural control on granite distribution.

- the granite has thermally metamorphosed the Precambrian Lagoon River sequence over a wide area. The absence of known pyrrhotitic mineralisation might indicate an absence of favourable hosts.

- magnetic anomalies in the southern part of the EL correspond with inferred buried spines and extensions of the granite.

- there is evidence on a regional scale that a NE trending extension of the granite has sourced the Balfour tin-copper mineralisation.

- In-fill gravity data, and limited geochemical and lithological studies, should be done in Year 2 follow-up work.

3. DISCUSSION

EL26/87 remains moderately prospective for Rension Bell replacement style skarn tin and possibly copper mineralisation related to the Pieman Granite.

Previous exploration companies carried out reconnaissance level work with only limited follow-up, and the tenement must be considered underexplored.

Carey (1981) inferred carbonates within the Precambrian sequences which could act as receptive hosts for mineralisation. These have not been reported by subsequent workers but no systematic mapping has been done.

The most prospective areas of the tenement are likely to be the southern margin where magnetic and gravity anomalies imply widespread thermal metamorphism of the Lagoon River sequence by shallowly buried granite, and the northeastern portion adjacent to the Balfour tin-copper mineralisation.

In view of the generally low tenor of the sporadically anomalous base metals in stream sediments, the prospectivity of the Tertiary sediments as a source of significant secondary mineralisation is given a low ranking.

4. PROPOSED FUTURE EXPLORATION

New Holland's Year 1 geophysical work and literature review have highlighted the underexplored potential of parts of EL26/87 for replacement skarn tin-copper mineralisation associated with the Pieman Granite.

It is proposed in Year 2 to follow up the work with

(a) the acquisition of in-fill gravity data, at a nominal 1 km^2 spacing, in the northern half of the tenement, and

(b) limited lithological and geochemical work in the southern part of the tenement where coincident magnetic and gravity anomalies imply thermal metamorphism of the Lagoon River sequence by the Pieman Granite.

In each case, helicopter support will be used as much as possible.

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APPENDIX 1

Regional Geophysical Review

by

Dr. D.E. Leaman

LEAMAN GEOPHYSICS

Survey Review, Specification, Reduction, Interpretation
Wide Experience Most Methods
Specialties:- Gravity, Magnetics, Seismic Methods

Registered Office:
21 Zomay Avenue, Dynnyrne TAS 7005
All Correspondence to:
G.P.O. BOX 320 D, HOBART, TAS. 7001.
TELEPHONE: (002) 240319

EL 26/87 NORTH PEDDER RIVER

REGIONAL GEOPHYSICAL REVIEW

for
NEW HOLLAND MINING N.L.

by
Dr. D.E. Leaman

November 1988

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FIGURES

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SUMMARY

Exploration licence "North Pedder River" includes a large part of the Pieman Granite of western Tasmania. This granite is not well understood although partly mapped in some detail; there having been some uncertainty about its form and contacts. Its chemistry has not been studied. Its economic significance is unknown but it has sourced some mineralisation near the Interview River a little south of EL 26/87.

EL 26/87 covers the north eastern contact of the pluton and the apparently unmineralised Precambrian rocks to the north.
This review has assessed the available magnetic and gravity data with a view to determination of the form of the pluton in this region, its effect on the country rocks and identification of any primary controls on intrusion or possible mineralisation. As such it provides a substantial improvement on existing information.

The Pieman Granite is shown to be a more irregular and extensive body than previous work and mapping has suggested and there is evidence of east-west structuring and control of the distribution of the granite. The pluton has significant E-W extension and there are suggestions of fracture control on the intrusion. The eastern margin is compound in form; including at least one rib and complex shelf structure on a steeply dipping surface.

The present work suggests that members of the Precambrian Lagoon River sequence have been thermally metamorphosed over a wide area. This is reflected in subtle changes in magnetic properties and is consistent with implications of gravity data where available. There is, however, no evidence for significant concentrations of pyrrhotite and it may be that the intruded rocks were not amenable to replacement.

The feasibility of using the relatively low cost gravity and magnetic methods within the area has been established by this review. Such data are able to resolve irregularities on the margin of the granite and relate them to abnormal responses within the intruded rocks. Some infill of the gravity data base is advised in order to define all intrusion irregularities. These sites should then be reviewed geochemically and petrologically for indications of mineralisation or viable hosts.

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INTRODUCTION

EL 26/87 "North Pedder River" is located on the west coast of Tasmania near Sandy Cape. It is about 20 km north of the mouth of the Pieman River (Figure 1).

The licence includes a small part of the Pieman Granite. No mineralised sites are known adjacent to the north eastern margin of the granite. There has been no detailed mapping of the area but an indication of the style of geological relationships is indicated by Gee et al (1969). Previous exploration has also been limited to some refinement of aeromagnetic coverage and follow up with some stream sediment geochemistry (e.g., Bishop, 1982; Morland, 1982). None of this work was especially encouraging but the form of the granite was not considered. The inferred outcrop distribution of the granite is shown in Figure 2.

Traces of tin and copper have been found in some streams east of the granite margin (Morland, 1982).

This review was commissioned with three basic objectives.

1. to provide a regional view of the granite and any anomalous character within or around it.
2. to assess the form of the granite beneath the Precambrian rocks near North Pedder River and any relationships between inferred structure and stream sediment indicators.
3. to suggest areas which warrant more detailed examination and the methods which might be used.

Available regional gravity and magnetic data have been used for this review.

DATA

Only geophysical data with regional coverage and value has been used for this review. In effect this means aeromagnetic and gravity data.
Some other data exists; including an airborne EM survey (see Leaman, 1980). None are relevant to first order appraisals and often can not be understood without such appraisal.

The aeromagnetic data used was acquired by the Mines Department in 1981 (Corbett et al, 1982; Leaman, 1986 a). It represents the most recent, fully recoverable and digital data set of uniform specification. The line spacing was about 500 m, with sampling at some 40 m, and nominal terrain clearance of 150 m. The contractor's contour presentation is given in Figures 2 and 3.

The gravity data was extracted from the Mines Department Tasgrav and Mt Read gravity data bases. The coverage is only complete at a spacing of 1 km in the southern part of the licence; there being large gaps elswhere (see station locations in Figure 4). Much of this data was acquired recently as part of the Mt Read Volcanics Project and has not been previously interpreted. The raw data has not been presented. A residual compilation based on the regional formulation of Leaman (1988 c) has been given in Figures 4 instead. This primary separation is crucial to any specific evaluation of local structure.

PREVIOUS WORK

The only regional assessments in the public or open file domain based on available data or, in the gravity case, earlier compilations of the data bases have been prepared by Leaman et al (1980) and Leaman (1986 a, b; 1987; 1988 a, b, c). No equivalent structural assessments have been attempted. Leaman (1987) updated the qualitative trend analysis provided by Leaman (1986 a, b) as part of a review of major mineralised sites and their gravity and magnetic responses. Some significant trends were found to be traceable into the area of EL 26/87 but were uncommented.
None of these early interpretations offer any detail on the eastern and northern faces of the Pieman Granite.

Leaman (1988 a) generated an interpretation of granite forms as part of a regional study of Precambrian and Lower Palaeozoic structures in north west Tasmania. This work was commissioned by the Mt Read Volcanics Project in order to provide a crustal setting. The Pieman Granite was included in the study. The analysis was limited by the regional nature of the work to fragments of three profiles but a generalised shape was suggested. The intrusion was thought to be elongate in a northwest sense but to possess steep lateral margins. A bulk density of about 2.62 t/cu m was implied for this granite which has a root more than 8 km deep within the crust.

Leaman (1988 b) suggested a regional setting for the granite by placing it near the late Precambrian margin of the proto- Dundas Trough and possibly an intra-Precambrian trough along the coast. As such it intruded up to 9 km of Late Precambrian Oonah Formation and possibly the basal Cambrian Formations (including members or correlates of the Success Creek and Crimson Creek Formations) if the inference that the Smithton Trough structure extends south west beneath an overthrust coastal block. All these youngest Precambrian rocks include dolomitic members but in the region of North Pedder and Lagoon Rivers few are known. The rocks are siliceous.

The net result of Leaman (1988 a, b) was production of a crustal formulation which could be used to prepare residual Bouguer anomaly maps (Leaman, 1988 c). The concept known as Mantle88 was refined and checked. It has been used to generate the presentation shown in Figures 4.

This review is built upon, and dependent upon, the implications and formulations of the foundations provided by Leaman (1986 a, 1988 a, 1988 c). The present review fine details the above work and assesses exploration factors in a way which would not be possible without that foundation.

Previous exploration has been limited to some review of magnetic surveys, ground magnetics (Bishop, 1982) and stream sediment sampling coupled with shallow drilling (Morland, 1982). This work recognised some thermal alteration effects but no encouraging mineralisation.

INTERPRETATION

QUALITATIVE COMMENTS

The following notes outline features of the gravity and magnetic fields and any obvious relationships. They also serve to draw attention to those elements perceived to be relevant to further exploration and worthy of immediate quantitative estimation (below).

The residual gravity field is tantalising (Figures 4) due to its incompleteness. It is, however, possible to recognise the narrow coastal extension of the Pieman Granite with increasing negative amplitude southward. This suggests that the granite mass becomes narrower or deeper northward. The gradients to east and west are moderately steep but not consistently so and there is a clear extension of negative effects to the east near the northing of the southern part of the licence area (near the Lagoon River). An isolated negative feature has been observed near the eastern limit of the licence. The gravity field is very vague elsewhere.

The magnetic field (Figures 2 and 3) offers a different perspective. The field is regionally low across the granite but much of this effect has been generated by the strong contact effect along the western margin. This has only been properly defined near the mouth of the Pieman River but the effect persists the length of the intrusion. No such effect has been recorded along the eastern margin of the granite. Some small anomalous features with limited strike length do occur near the eastern contact but their amplitude and continuity is much less than on the western side. The largest feature, in the far southern part of the licence (see Figure 3) can be related to mapped hornfels (Lagoon River Quartzite of Gee et al, 1969). Other anomalies might be presumed to be of this type and origin. No obvious patterns are evident in Figure 3 although there are some clear sub E-W corridor effects.

There is a clear correlation between some magnetic features and the magnitude of negative Bouguer anomaly in so far as coverage permits. This would suggest that the alteration in magnetic properties is related to granite at some moderate depth but whose distribution is irregular. There is no suggestion of any stratigraphic continuity effects within the Lagoon River sequence.

MINERALISATION RESPONSES

An attempt was made by Leaman (1986 a) using the same magnetic data to identify any patterns between mineralisation and responses. Patterns do exist but it is not known how relevant or specific these are due to the 500 m line spacing and the small scale of the known mineralised sites.

The absence of established mineralised sites within EL 26/87 precludes any local evaluation of extension of recorded trends from further east or south east. Most features identified by regional study can be recognised within this area (Figure 12) but their economic significance cannot be appraised at this time.

TREND PATTERNS

Gross patterns defined by previous work have been described by Leaman (1987).
The extant gravity data reflect the primary NW-SE trend of the granite but there are suggestions of gross NE-SW or E-W effects. The magnetic data offer a more refined, if complicated, view. Generally ghosted NW-SE trend fragments are evident which can often be related to marginal features. Some NE-SWw features are also present but the dominant characters are sub E-W. Two are evident within the EL but a third can be shown to be present at the northing of the Lagoon River at the southern boundary of the licence area (see Figure 2). A subjective summation of inferred trends is provided in Figure 12.

QUANTITATIVE EVALUATION

Both data sets have been assessed. Time constraints on this review have limited analysis and effort has therefore been concentrated on those elements defined qualitatively.

One gravity profile has been selected for study. This was oriented in such a way as to make greatest use of the available coverage and test the possible origin of negative anomalies. The location of the profile is shown in Figure 4.
A rather austere interpretation of this profile is presented in Figure 7. This shows that it is possible to fit the gross elements of the gravity field using reasonable bulk properties for both granite and Precambrian rocks. The misfit over the exposed granite implies an increased contrast locally and this option was tested. It was found that any increase in contrast, which implies either reduction in granite density or increase in Precambrian bulk density, cannot exceed -0.1 t/cu m but must be very local. This contrast value cannot be used generally. This may mean, since it is unlikely that the granite is much less dense than 2.62 t/cu m, that the locally metamorphosed rocks may have densities approaching 2.73 t/cu m.

Interpretation of this profile is not straightforward using simple 2D assumptions as inspection of Figure 4 will show. The extension of anomaly sub parallel to the profile limits the reliability of the model. No assessment of the smaller negative, and clearly three dimensional, feature at mid profile was attempted for this reason but a granite spine is certainly implied.

The limited gravity modelling undertaken generally supports the regional view of Leaman (1988 a) but the eastern face of the Pieman Granite, while often very steep, is irregular with major spines and ribs extending to the east.

A selection of profiles from the Mines Department magnetic survey (Corbett et al, 1982; Leaman, 1986 a) was also examined in order to evaluate any possible structural correlations with gravity data and assess property contrasts. The profiles extracted from the survey are shown in Figures 5 and 6. These clearly illustrate the generally random and unsystematic nature of magnetic anomalies - and their small amplitude.

Four line models have been included in this report (Figures 8 to 11). The iterations presented were selected to illustrate the nature of sources and the types of response involved. They do not represent modelling to exhaustion. This is not justified and there is too little geological control in any event.

Several general aspects can be described.
All sources have very low contrasts (0.0001 to 0.0004 cgs) which are consistent with minor alteration of essentially pure quartzite. There is clearly no significant magnetite or pyrrhotite content.
Most sources are exposed or virtually exposed and most of those nearest the granite are depth limited. There is not, however, sufficient resolution or control to enable the magnetic method to independently define the surface along which sources are terminated.
Although some sources are compound (e.g. Figures 8 and 11) all have a systematic but steep easterly dip. This is consistent with the mapping of Gee et al (1969) south of Lagoon River.

CONCLUSIONS

Review of regional data in the region of the Pieman Granite and North Pedder River has indicated

1. The Pieman Granite is probably a large body with substantial NW extension. The present work is not sufficiently definitive to suggest the structural patterns and relationships of the contacts but the gravity method could do so given adequate coverage.

2. The pluton has a steeply dipping eastern contact and a surface exposure which suggests fracture control along a NW-SE orientation.

3. Although the eastern margin is generally steep there is evidence of major irregularity near Lagoon River and the intrusion appears to spine eastward.

4. The granite spine near Lagoon River appears to link a subsidiary stock located about 7 km east of the exposed granite. The significance of this body is not known.

5. The marginal irregularities identified may have some economic significance but insufficient mapping, prospecting or geochemistry has been undertaken in order to evaluate the present findings.

6. Locally anomalous tin values have been observed immediately east of the granite margin in Pedder River at the western edge of the licence. These might indicate another granite irregularity but gravity data are not available. Magnetic data would indicate some thermal alteration.

7. Thermal metamorphism of the Precambrian rocks is reflected in the magnetic field but the property changes are minor. There is no indication of the introduction of large amounts of pyrrhotite or formation of magnetite.

8. The licence area can not be considered properly evaluated until the gravity coverage has been extended and interpreted and those sites where granite appears to occur at shallow depth have been inspected. Such inspection must consider nature of lithology, nature of any mineralisation and localised geochemical surveys centred on gravity features.

9. Present indications of rock type and effect where gravity and magnetic data are available, coupled with a historic disinterest in prospecting (a potentially misleading aspect) would suggest that exploration should not be continued beyond the second year programme without some confirmatation of prospectivity using the methods outlined above.

RECOMMENDATIONS

1. Although the present geophysical-structural review is not especially encouraging the Pieman Granite did introduce mineralisation and the prospectivity of the region clearly depends on the location of suitable host rocks within moderate distances of both the granite and land surface.

   Gravity methods are able to define granite forms and relate them to the present surface. Gravity coverage should therefore be completed across the entire licence area and those regions in which the granite is shallowest should be reviewed for potential hosts. Whole rock geochemistry may also be advised in case any mineralisation style is more subtle.

   Should this combined gravity-lithology-chemistry review not indicate interesting targets then the licence area should be relinquished.

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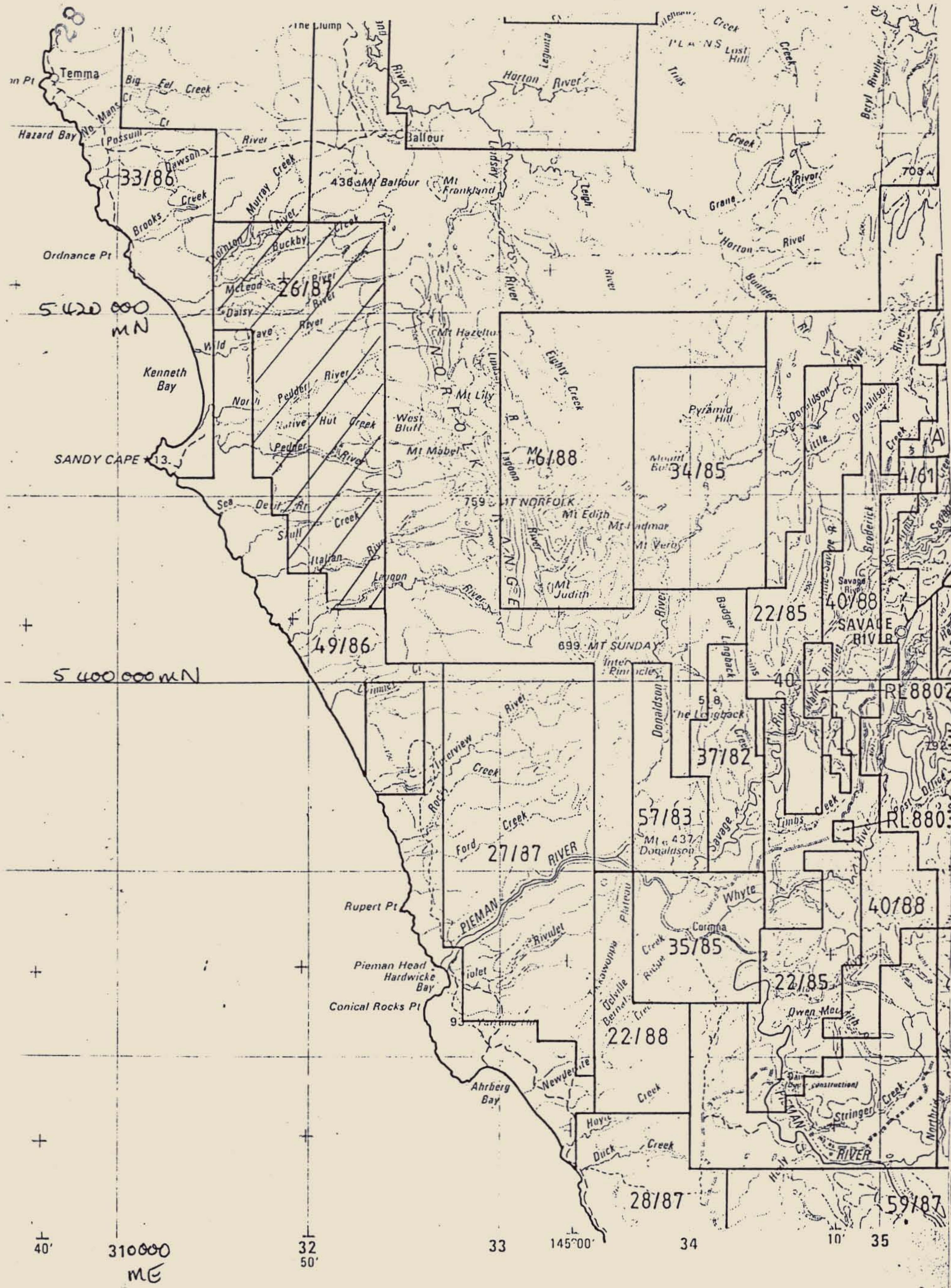
Report submitted on behalf of
Leaman Geophysics
by

D. Leaman

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

11 Nov 1988



EL 28/87

LOCATION DIAGRAM

FIGURE 1

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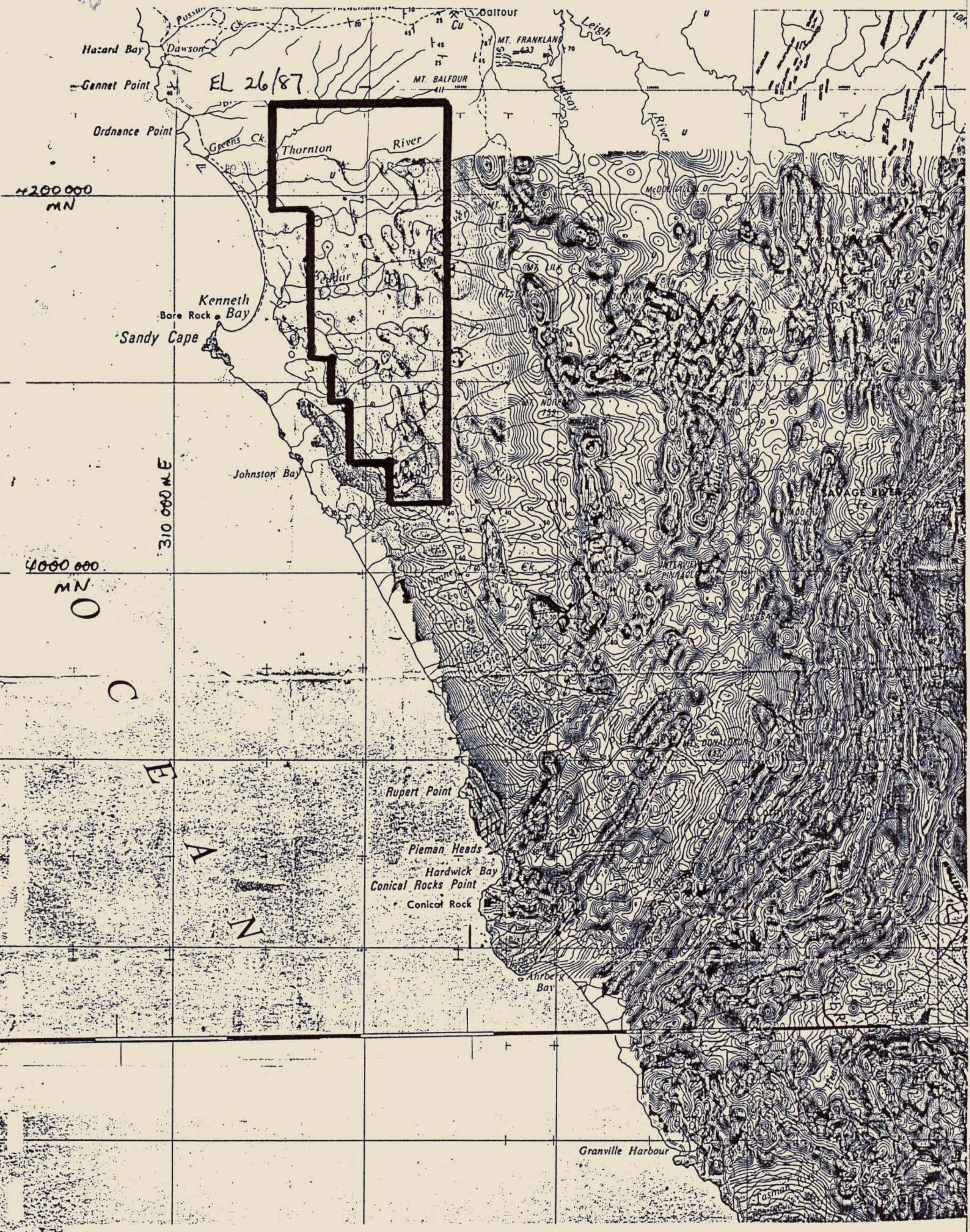
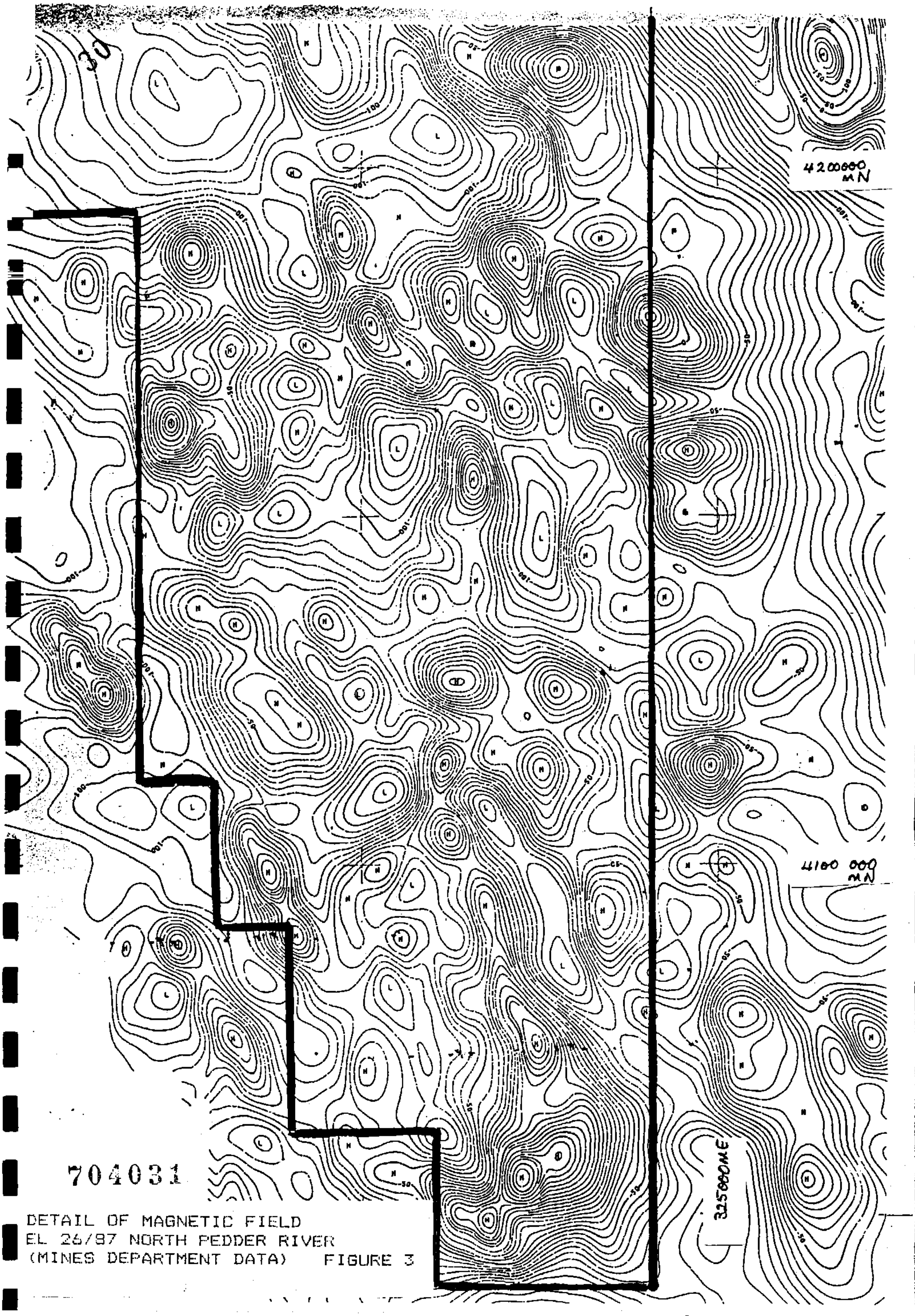
704030



REGIONAL PRESENTATION
MAGNETIC FIELD AND GEOLOGY (MINES DEPARTMENT DATA)

FIGURE 2



DETAIL OF MAGNETIC FIELD
EL 26/87 NORTH PEDDER RIVER
(MINES DEPARTMENT DATA) FIGURE 3

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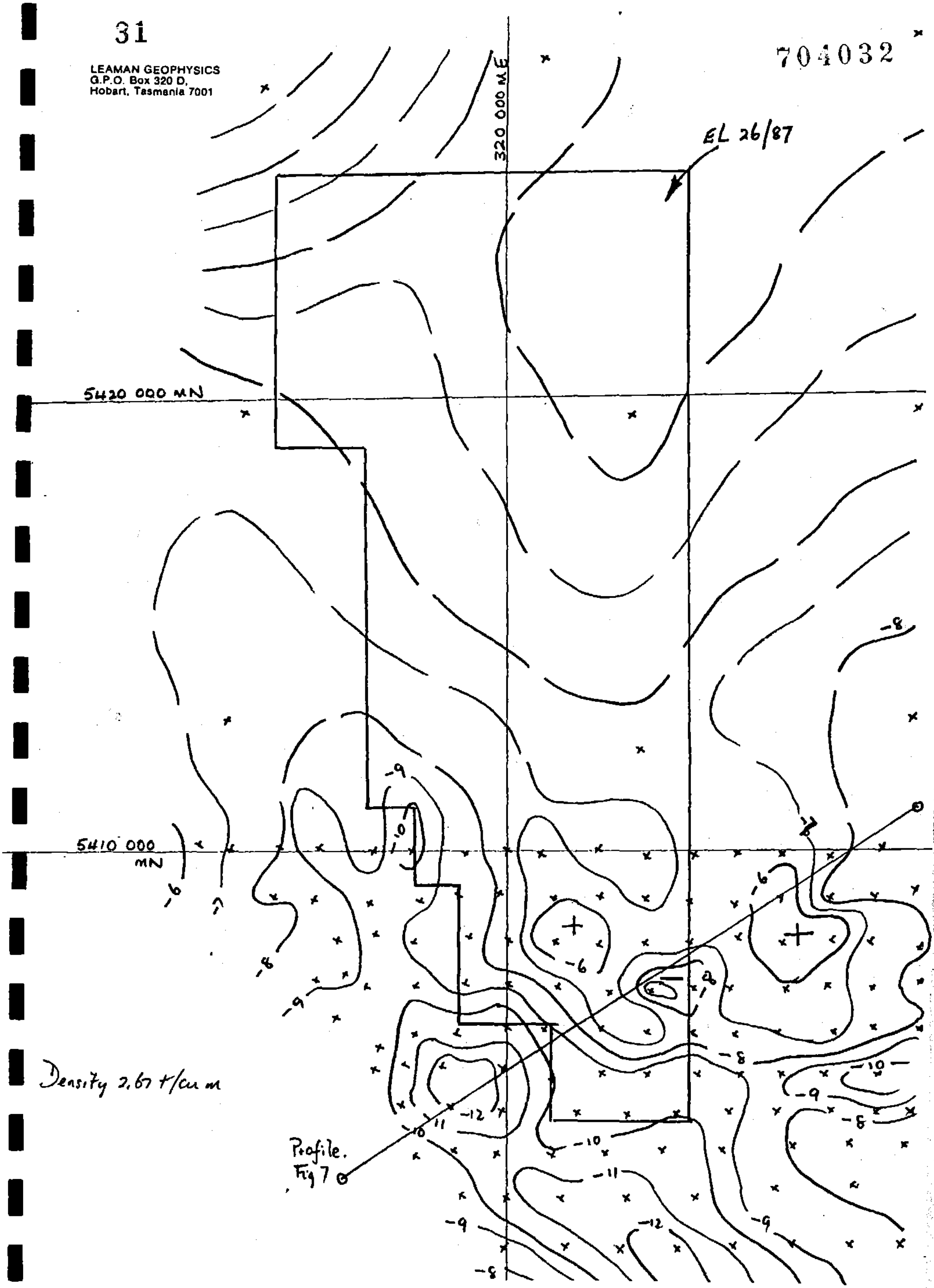
704032



RESIDUAL BOUGUER ANOMALY
EL 26/87 NORTH PEDDER RIVER

FIGURE 4

32

704033

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Specialties:- Gravity, Magnetics, Seismic Methods

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All Correspondence to:
G.P.O. BOX 320 D, HOBART, TAS. 7001.
TELEPHONE: (002) 240319

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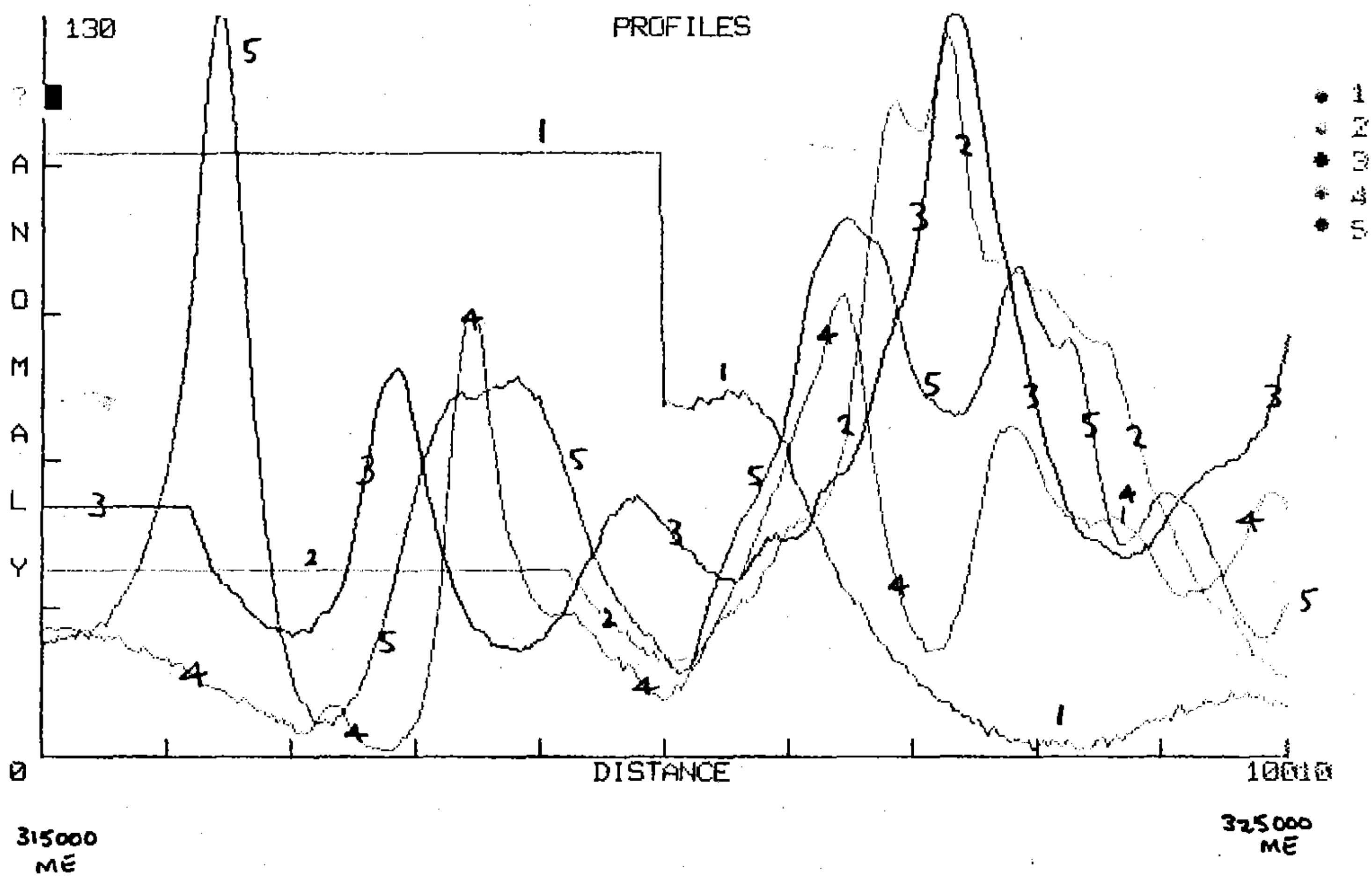
2	B:M2125	PEDDER RIVER PROJECT LINE 2125	5405
3	B:M2170	PEDDER RIVER PROJECT LINE 2170	5407500
4	B:M2230	PEDDER RIVER PROJECT LINE 2230	5410
5	B:M2270	PEDDER RIVER PROJECT LINE 2270	5412500

ZERO SHIFT : 105.1



OBSERVED MAGNETIC PROFILES
(1981 Mines Dept survey)

EL 26/87 NORTH PEDDER RIVER
SOUTHERN ZONE

FIGURE 5

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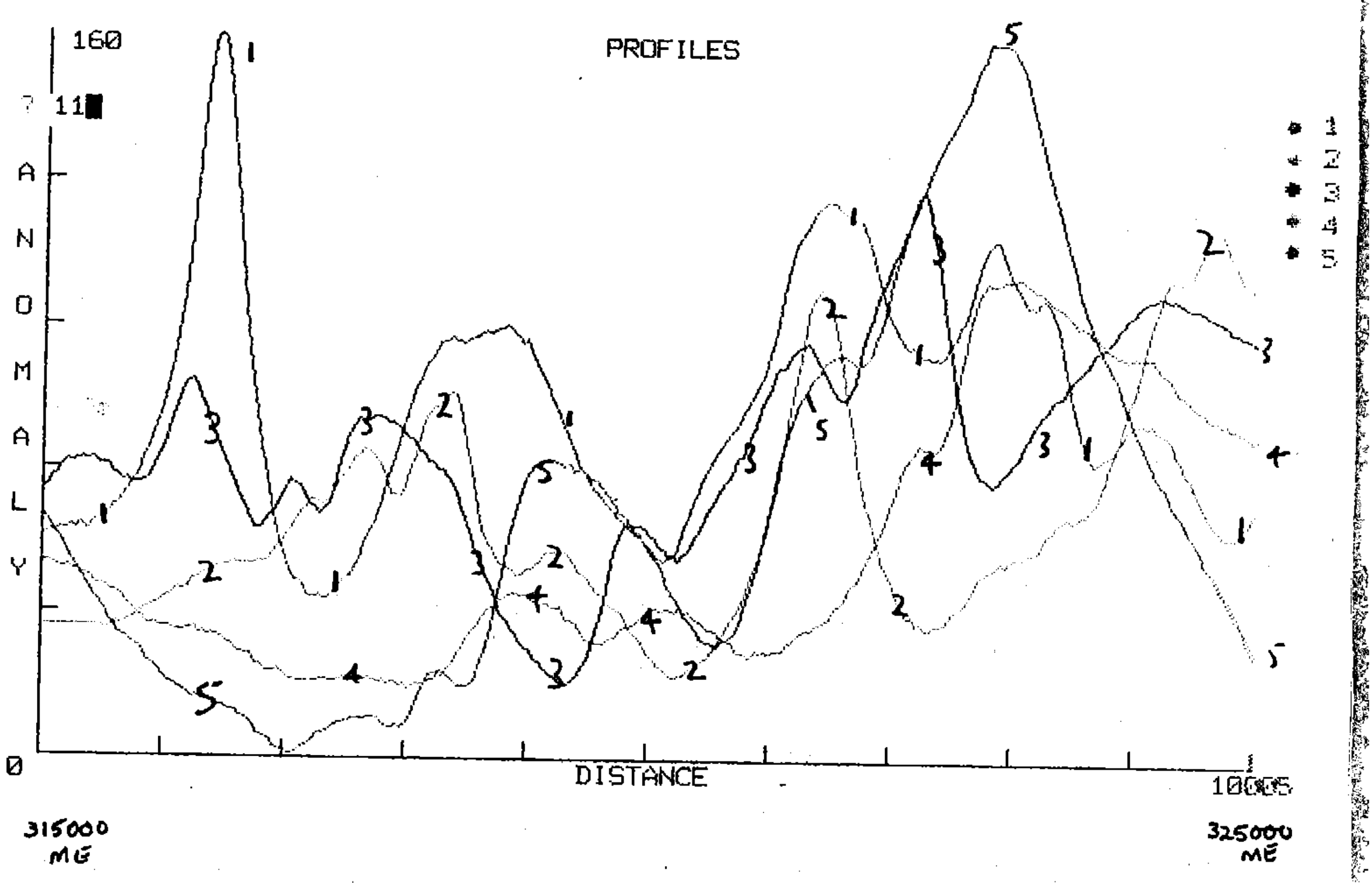
Wide Experience Most Methods
Specialties:- Gravity, Magnetics, Seismic Methods

Registered Office:
21 Zomay Avenue, DYNNYRNE TAS 7005
All Correspondence to:
G.P.O. BOX 320 D, HOBART, TAS. 7001.
TELEPHONE: (002) 240319

1	B:M2270	PEDDER RIVER PROJECT LINE 2270	5412 500 mN
2	B:M2330	PEDDER RIVER PROJECT LINE 2330	5415 500
3	B:M2390	PEDDER RIVER PROJECT LINE 2390	5418 500
4	B:M2420	PEDDER RIVER PROJECT LINE 2420	5420
5	B:M2451	PEDDER RIVER PROJECT LINE 2451	5421 600

ZERO SHIFT : 134.6



OBSERVED MAGNETIC PROFILES
(1981 Mines Dept survey)

EL 26/87 NORTH PEDDER RIVER
NORTHERN ZONE

FIGURE 6

E PARAMETERS - ORIGIN,LIMIT,INCR : 0 15000 500

704035

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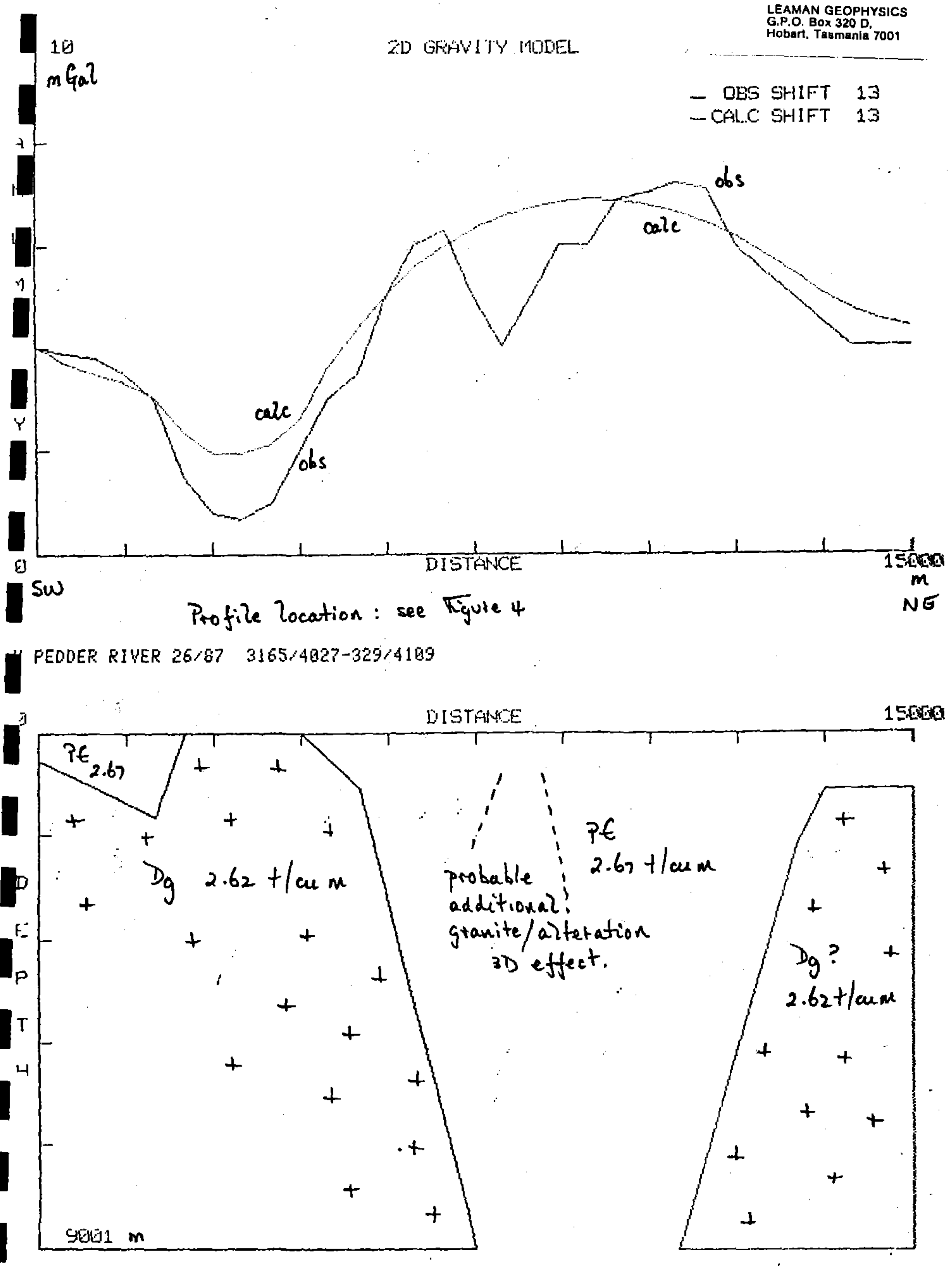

2D GRAVITY INTERPRETATION PIEMAN GRANITE EL26/87 FIGURE 7

7200 1500 35

LINE PARAMETERS - ORIGIN,LIMIT,INCR : 0 9984 208

704036

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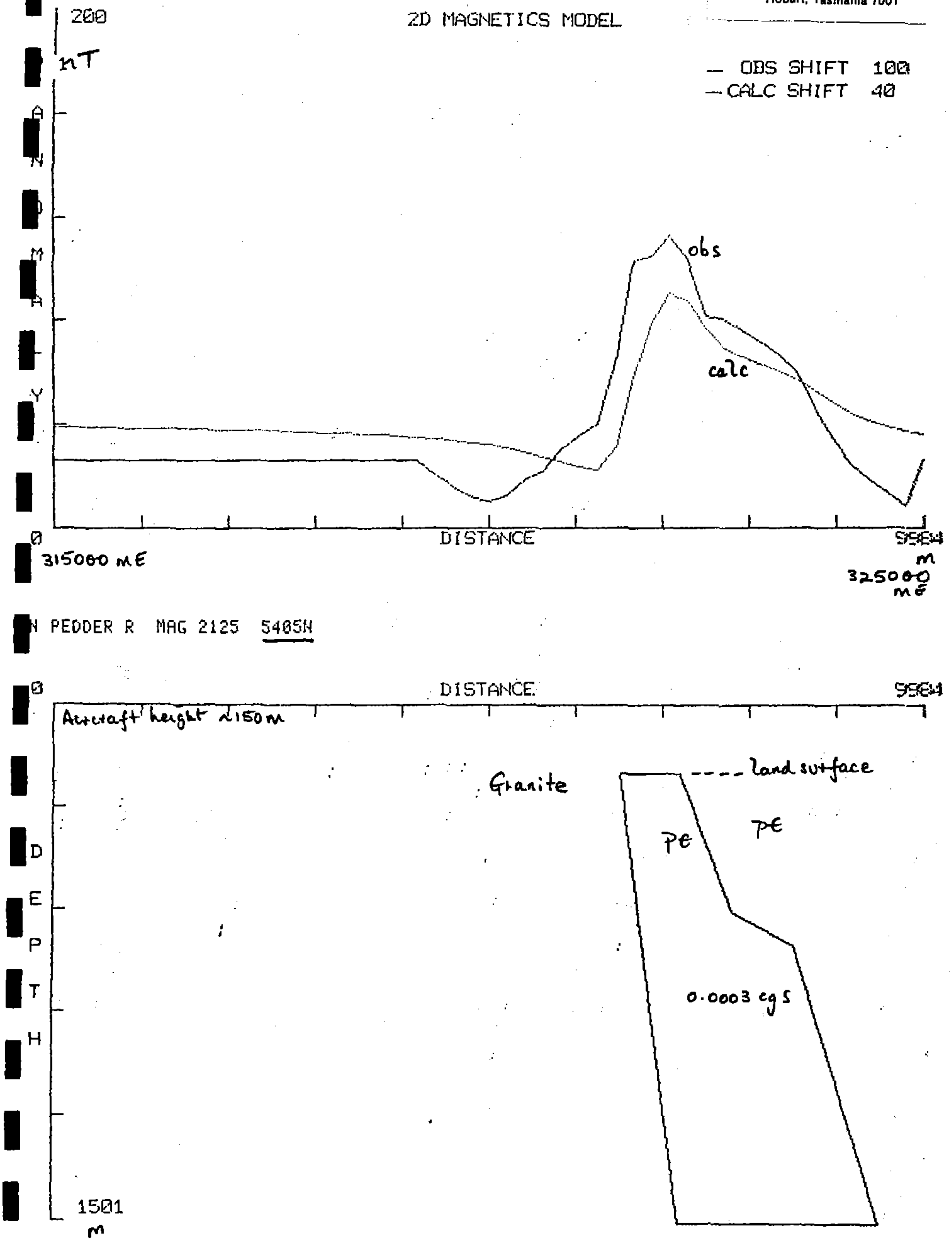

MAGNETICS INTERPRETATION LINE 2125

FIGURE 8

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LINE PARAMETERS - ORIGIN,LIMIT,INCR : 0 9996 178.5

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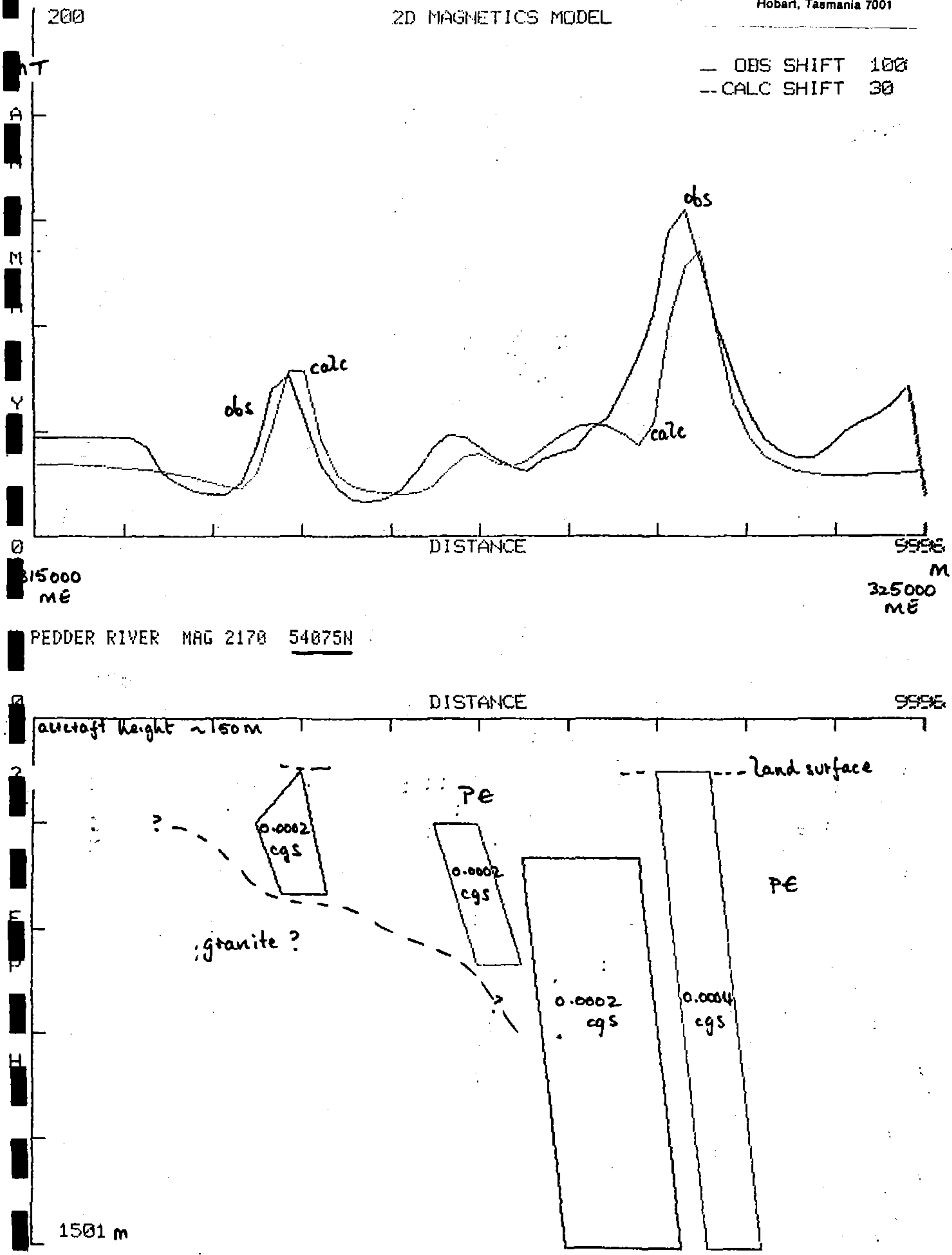

MAGNETICS INTERPRETATION LINE 2170

FIGURE 9

LINE PARAMETERS - ORIGIN,LIMIT,INCR : 0 9996 204

704038

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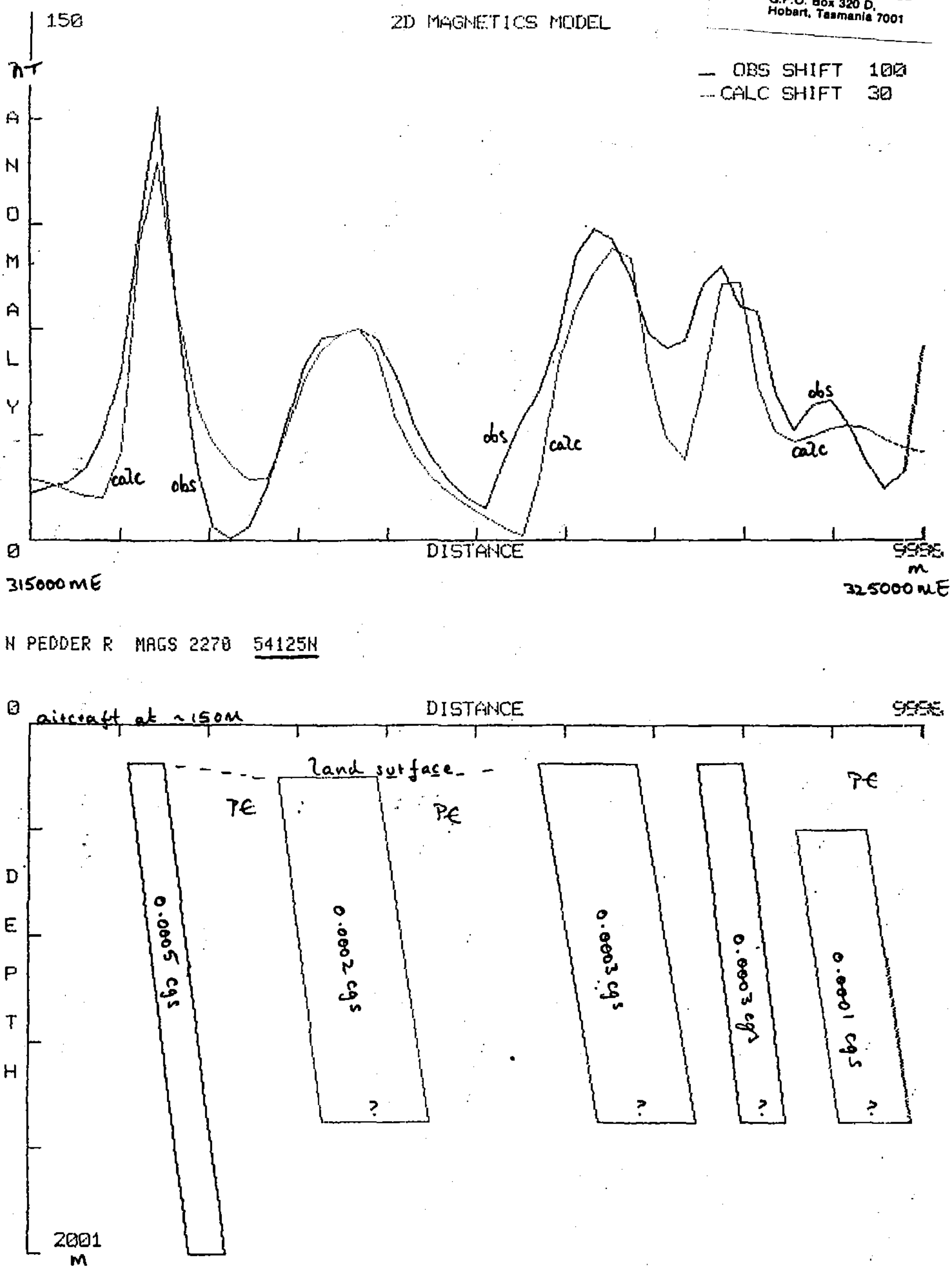

MAGNETICS INTERPRETATION LINE 2270

FIGURE 10

LINE PARAMETERS - ORIGIN,LIMIT,INCR : 0 9996 178.5

704039

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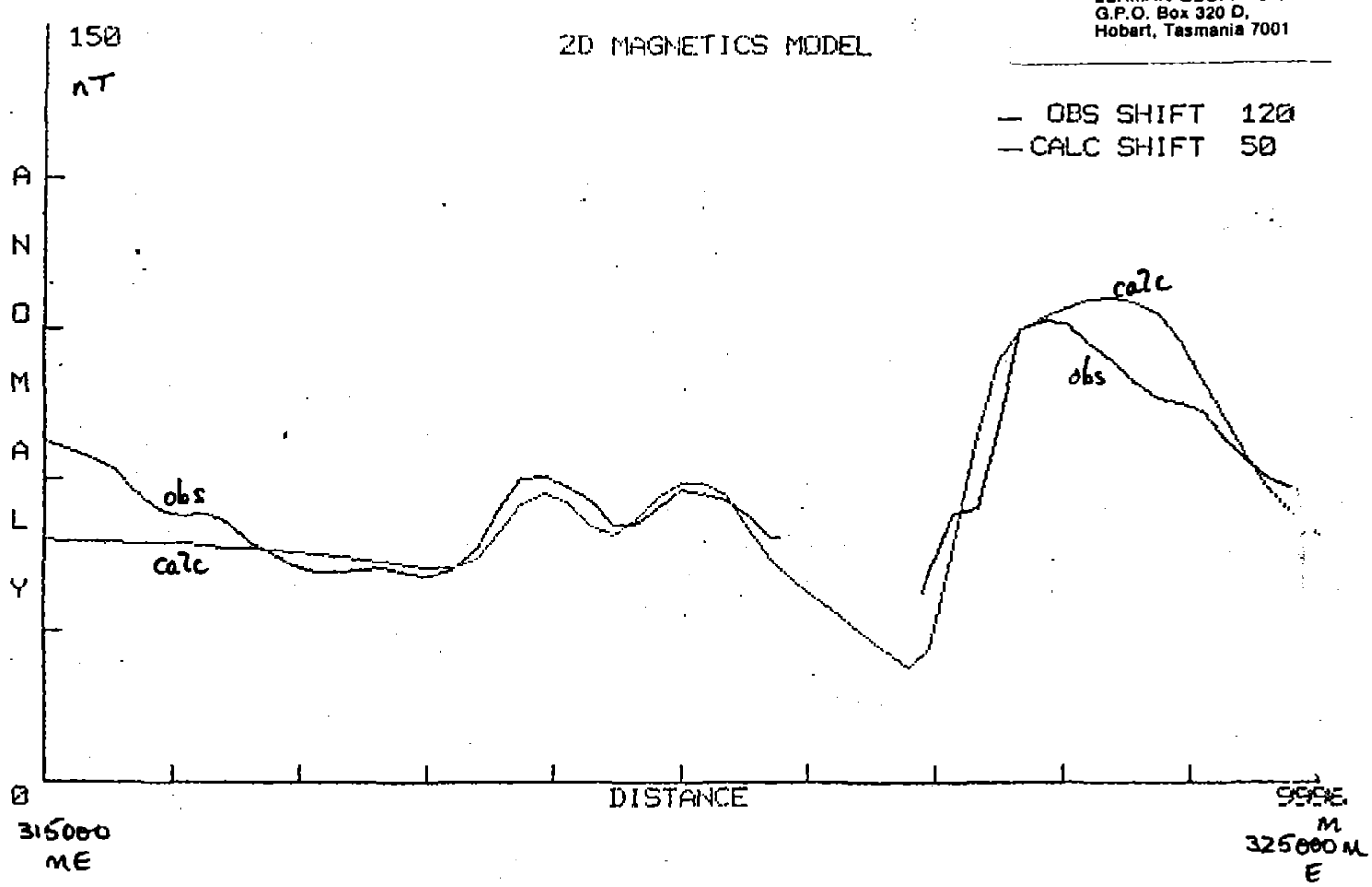
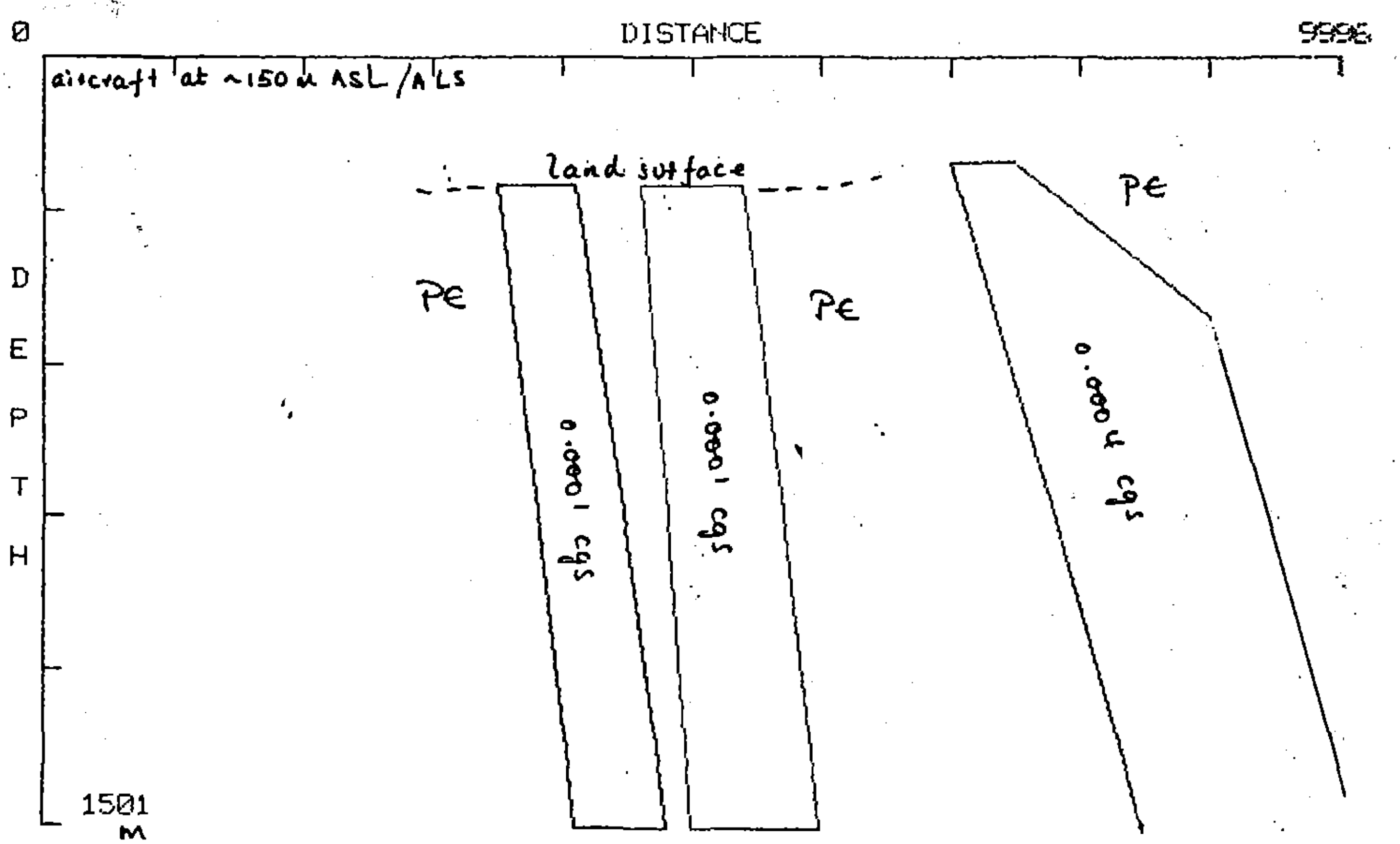


H PEDDER R MAGS2420 5420N

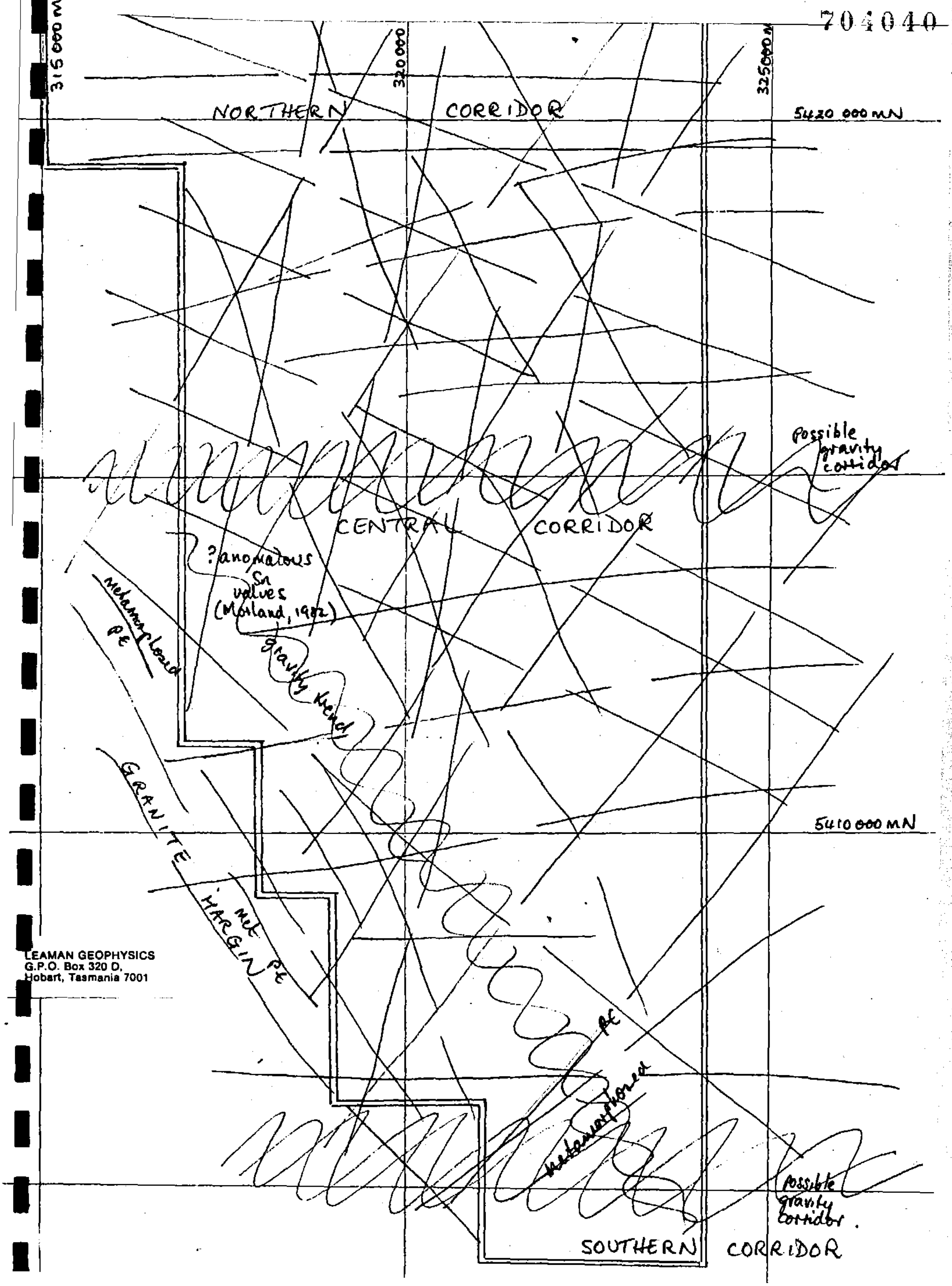


MAGNETICS INTERPRETATION LINE 2420

FIGURE 11

39 TREND AND INTERPRETATION SUMMARY NORTH PEDDER RIVER FIGURE 12

704040



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