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OPEN FILE

EXPLORATION LICENCE 21/87 - BALFOUR

ANNUAL REPORT : YEAR 2

(20 January, 1989 - 19 January, 1990)

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December 1989

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TENEMENT INFORMATION

Exploration Licence (EL) 21/87 is a 20 km² tenement in the vicinity of Balfour, western Tasmania (Figure 1 and Plan 1).

The licence was originally granted on 13 January 1987 for an area of 231 km². A review of previous data undertaken in the first two quarters of Year 2 resulted in the EL being submitted for partial relinquishment in July 1989. The reduction in area to 20 km² was approved by the Minister for Mines on 2 October 1989.

The area comprises (approximate only):

- 80% State Forest
- 20% Arthur-Pieman Protected Area

and includes part of the Norfolk Range Australian Heritage Act Registered Entry and the Sumac Rivulet Australian Heritage Act Registered Entry.

The licence is owned by Aureole Resources Pty. Ltd (70%), Winston Resources Pty. Ltd. (25%) and Sierra Nevada Resources Pty. Ltd. (5%). Aureole Resources is operator.

EXPLORATION PHILOSOPHY & OBJECTIVES

Aureole's original primary target was to explore for platinum group metals, gold, and base metals, hosted mainly in receptive rocks along the eastern and southern margins of the Smithton Trough. Anomalous base metal and platinum values have been reported for mafic volcanics and carbonates from the district. The intense aeromagnetic anomalies along the trough margin correspond in part to known mafic volcanics and may also indicate the presence of ultramafics within early Cambrian sequences.

Subsequent to a review of Year 1 work on EL 21/87 and the acquisition of an adjacent tenement by Soloriens

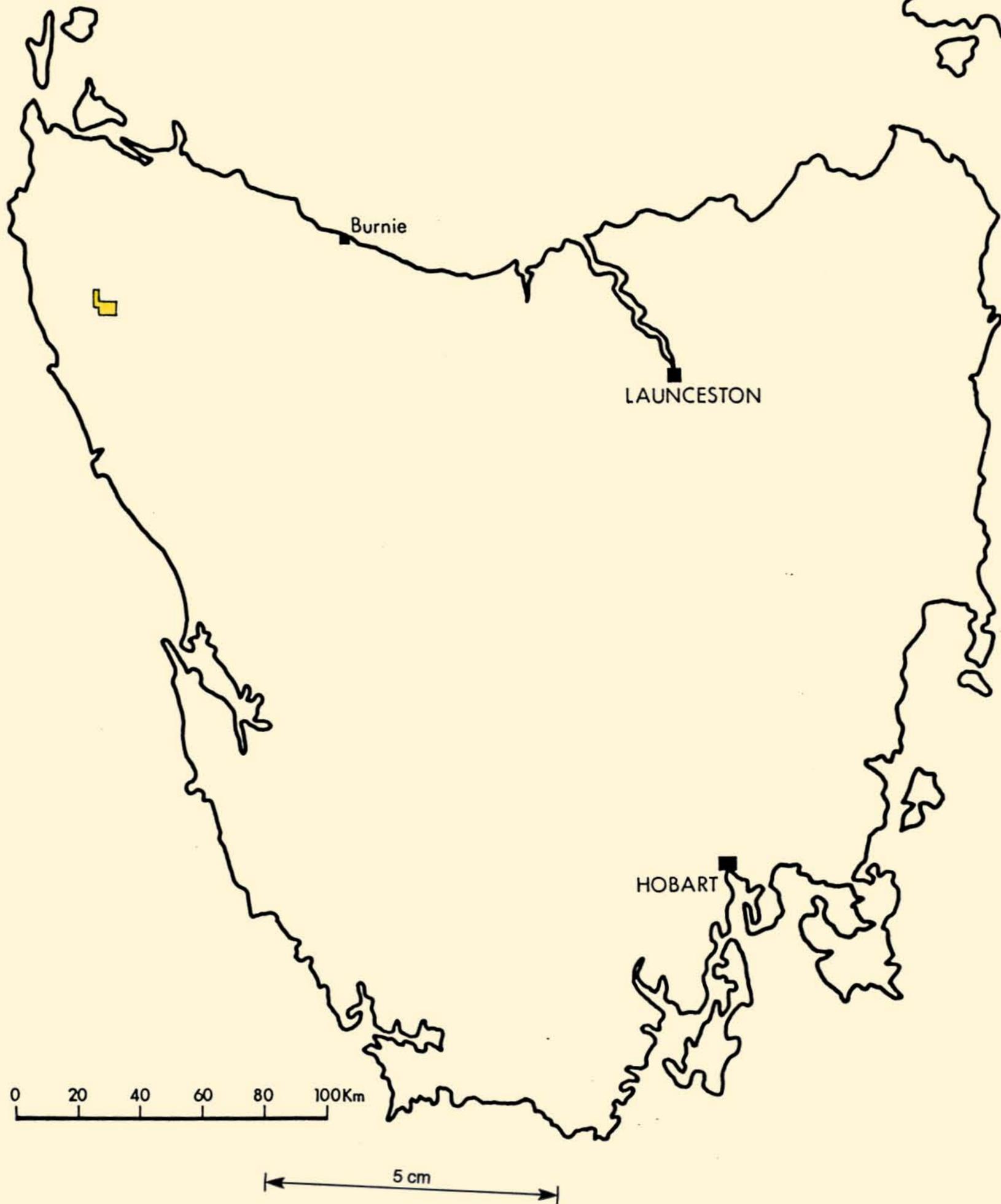
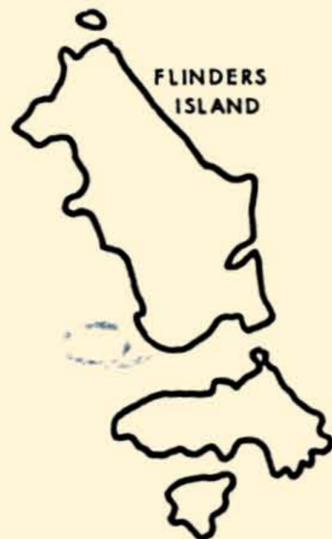
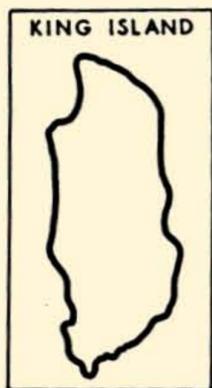


Figure 1. Location Map - EL 21/87, Balfour

Mining Pty. Ltd., a company related to the Aureole Resources group, exploration emphasis shifted to the Balfour mineral field resulting in the partial relinquishment outlined above.

The licencees primary objective therefore is to explore for Balfour type mineralisation and possible Cambrian-sourced base metals along the Balfour mineralised trend.

The presence of mineralised quartz-porphyry dykes in the area suggests that mineralisation at Balfour is probably granite related. Leaman (1988) suggests a possible granite body beneath Balfour which may represent a a cupola extension of the Devonian Pieman Granite to the southwest. Other cupolas may extend east from the granite.

SUMMARY OF WORK COMPLETED PRIOR TO CURRENT TERM

Activity in Year 1 included : -

- (a) Review of previous exploration and compilation of a 1:50,000 interpretative map of the 231 km² EL based on available data.
- (b) Evaluation of regional geophysics to high grade prospective areas for mafic and ultramafic rocks and to assist in structural interpretation of the tenement.
- (c) Reconnaissance geological mapping to confirm broad rock types with regional rock chip sampling and assaying for base and precious metals.
- (d) Petrological studies of selected rock types.

Dr D.E. Leaman's interpretation of existing aeromagnetic and gravity data (1988a, 1988b) highlighted the potential of the 20 km² southern part of the tenement where there is untested prospectivity for Balfour-style copper-tin mineralisation sourced from a buried extension of the Pieman Granite.

SUMMARY OF WORK COMPLETED IN YEAR 2

A reappraisal of Year 1 work resulted in the July 1989 partial relinquishment. Subsequent Year 2 exploration was run in conjunction with a related company, Soloriens Mining Pty. Ltd. which holds licence over the adjoining 245 km² EL 53/88.

A review of previous exploration efforts over the Balfour mineral field, principally those of ACI Ltd. for copper and by CRA Exploration Pty. Ltd. for tin, was conducted.

The major component of Year 2 work was a gravity survey of the tenement to test for the presence of a granite body. As the area of the survey represented a potential extension of the existing state gravity coverage, the Mines Division, Department of Resources & Energy, agreed to carry out the survey in joint venture, with the resultant data subsequently being compiled within the TASGRAV data base.

The nominal area of the survey covered both EL 21/87 and the adjoining EL 53/88 (Figure 2). Preliminary inspection and interpretation of this data has been carried out by Dr D.E. Leaman, Leaman Geophysics.

REGIONAL SURVEYS

REVIEW OF PREVIOUS EXPLORATION

Exploration Licence 21/87 partially covers the Balfour mineral field. Between 1900 and 1920, several thousand tonnes of copper ore and tin ore were mined from numerous small mines in this field. During the early 1970's and early 1980's, only two serious modern exploration efforts were conducted, by ACI Ltd. for copper, and by CRA Exploration Pty. Ltd. for tin.

The ACI programme established extensive copper mineralisation of carbonate replacement style, grading around 0.5%. Reserves were not quantified but several drill intersections of around 20 metres of this mineralisation were achieved.

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The CRA tin programme established that a stockwork system of tin and tungsten bearing quartz veins outcrop in a zone parallel to, and westward of, the copper mineralisation. The company concluded that vein grade was on average $>1\%$ Sn but that vein frequency was erratic and too low to support the large scale open cut operation being sought. CRA drilling on this prospect showed that at depth, below the tin/tungsten mineralisation, a complex association of sulphide hosted tin, copper, tungsten, zinc and silver mineralisation exists.

Although the economic geology of the region is well demonstrated, it has previously been subjected to only low intensity mining and exploration. These facts, in combination with current markets for tin/tungsten, present the Balfour mineral field as a prospective area for current exploration efforts.

GRAVITY SURVEY

A gravity survey of EL 21/88 and the adjoining EL 53/88 (Figure 2) was the major component of Year 2 work.

The inaccessibility of the study area by vehicle, combined with the large area to be surveyed, suggested that helicopter survey was the most feasible and economic method of data collection. As this survey represented a potential extension of the existing state gravity coverage, the Mines Division, Department of Resources and Energy, agreed to conduct the survey in joint venture with the licencees. The companies met all costs associated with helicopter hire and terrain correction. The Mines Division supplied labour, equipment, vehicles, maps, data processing and plotting. It was agreed that the data so collected would be incorporated within the state TASGRAV data base to be available to the public 3 months after processing.

The survey was subsequently conducted in March 1989 utilising an Aerospatiale UH-SRB helicopter provided by Helicopter Resources Pty. Ltd. The nominal area of the survey is

indicated in Figure 2. An almost complete coverage of the area at a station density standard of one station per square kilometer was achieved in all but the wooded northern portions of the the survey area. Where helicopter access was impeded due to terrain difficulties and/or canopy cover, access was achieved, where possible, by 4WD vehicles on existing forestry roads e.g. Sumac Road. Data was collected at a total of 538 stations.

Terrain correction was carried out in April 1989 by Leaman Geophysics using MANTLE-88 (Leaman, 1988c) to remove deep crustal effects. Processing of the data was completed by the Mines Division, Department of Resources and Energy, in May 1989. This data has subsequently been incorporated within the Mines Division's TASGRAV data base, stored under the following files:

BALF183A.GRV

BALF183B.GRV

and is now available to the public.

Survey Results & Conclusions

A data acquisition report and preliminary assessment of the data was prepared by Leaman Geophysics and is appended to this report (Appendix 1).

The known tin mineralisation at Balfour appears to have occurred in areas peripheral to a northerly subsurface extension of the Pieman Granite. This extension is represented as a ridge of negative anomalies extending north from Mt Norfolk (320 000 nE, 5 410 000mN) through EL 53/88 to Mt Balfour (322 000mE, 5 427 000mN). It is probable that this granite has locally intruded the mafic and dolomitic rocks of the Smithton Trough which persist beneath an overthrust cover of Precambrian rocks translated from the west (Leaman, 1988b). The dolomites offer excellent host conditions for replacement style mineralisation.

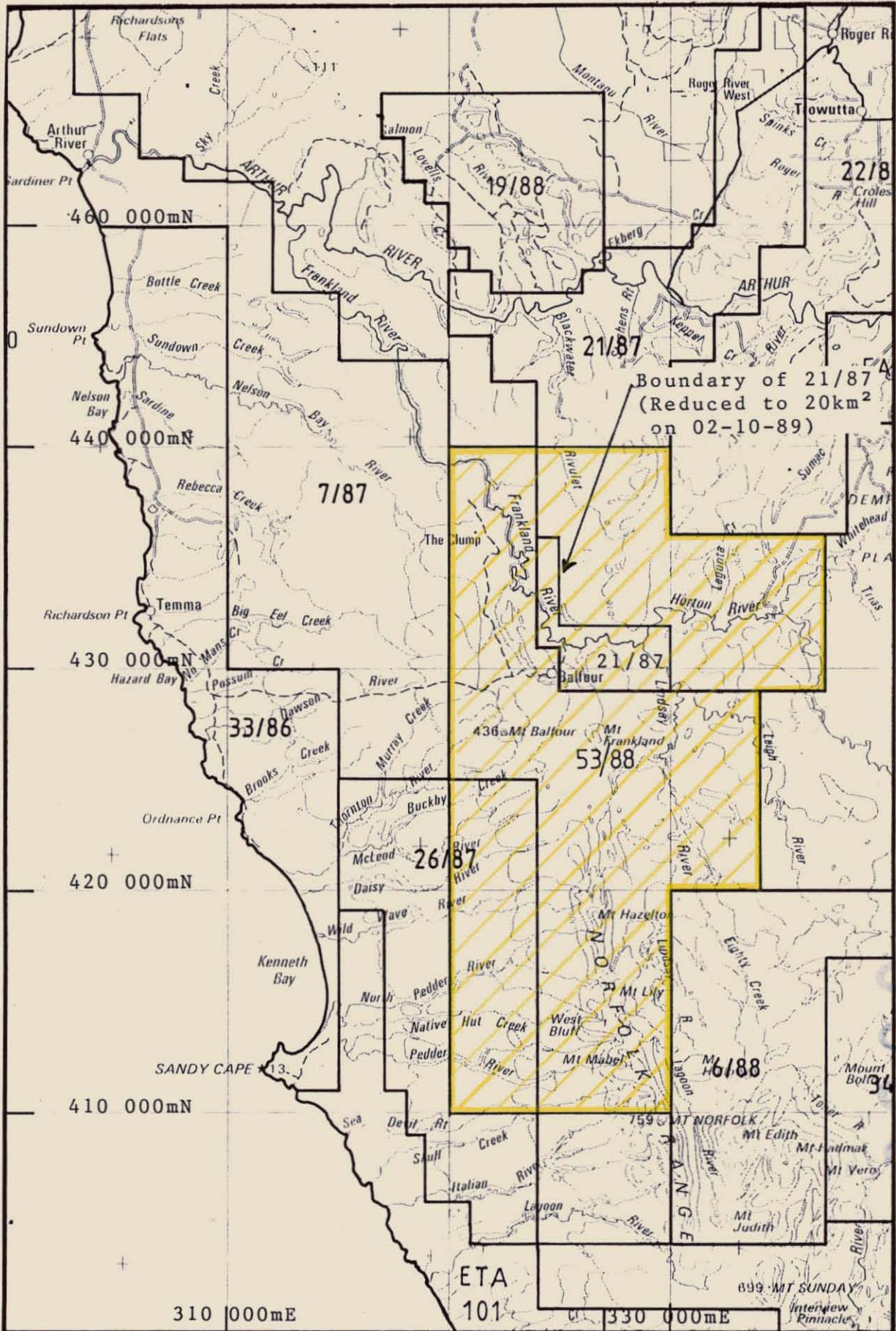


Figure 2. Nominal area of 1989 gravity survey,
 EL 21/87 - Balfour,
 EL 53/88 - Mt Frankland.

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CONCLUSIONS & RECOMMENDATIONS

The 1989 gravity survey has reinforced the prospectivity of the remaining 20 km² of EL 21/87 for Balfour-style copper-tin mineralisation sourced from a buried extension of the Pieman Granite. The dolomitic rocks of the Smithton Trough present as hosts for such mineralisation, the margin of this sequence occurring within EL 21/87, just east of Balfour.

PROPOSED FUTURE EXPLORATION

The proposed work programme for Year 3 on EL 21/87 will be run in conjunction with a related company, Soloriens Mining Pty. Ltd., who holds licence over the adjoining 245 km² EL 53/88. Exploration will focus on a follow up programme to the Year 2 gravity survey and consist of a ground based geophysical survey together with the drilling of any notable subsurface anomalies.

A thorough review of all previous work will be conducted as will reconnaissance field mapping and sampling of target areas.

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Mines Tasm.*

LEAMAN GEOPHYSICS

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DATA ACQUISITION REPORT GRAVITY SURVEY EL 53/88 MT FRANKLAND

for
SOLORIENS MINING PTY LTD
by
Dr D.E. Leaman

June 1989

INTRODUCTION

A preliminary assessment of extant data in the Balfour area of NW Tasmania (Leaman, 1988c) indicated that the Pieman Granite may be more extensive than previously thought (e.g., Leaman, 1988b). Sparse gravity data corrected for crustal thickness suggested that mineralisation around Balfour may be related to granite spines or cupolas on this granite.

EL 53/88 was acquired in order to test this proposition and to enable complete evaluation of the SW part of EL 21/87. (Both licences are held by the same company group).

Since gravity data appeared to offer useful information using a limited data base an infill survey was planned as the first year programme.

This brief report details the survey and offers comments on the implications of the work completed.

GRAVITY SURVEY

As indicated in Introduction some data was already available for the Balfour region and the ranges to the south. This data was available in the Mines Department TASGRAV data base and was purchased. South of 5410 000 mN this data had been acquired for 1 km nominal station centres as part of the Mt Read Volcanics Project; elsewhere it was 1973 BMR helicopter reconnaissance data at 7 km centres.

The new survey was undertaken to the same specifications as the Mt Read surveys and extended to east and west of the EL in order

to relate coastal anomalies (including granite responses) to those in the licence area and at the same time be able to assess larger regional effects. Restricting the survey to the limited licence area was considered to be potentially counter productive.

An agreement between Soloriens Mining Pty Ltd and the Mines Department enabled work to be completed in March 1989. The company paid all acquisition costs (including helicopter hire) for department field crews supervised and led by Dr. R. G. Richardson. The Department arranged for basic data correction, reduction and check plots at its cost; terrain correction was done by the writer as sub contractor to the company. This arrangement has proven beneficial to all; the state data base has or will be augmented and the cost to the company was reduced. Only those parts of the survey within the EL await release pending relinquishment of area.

Wherever possible a nominal station spacing of 1 km was achieved with a nominal precision in Bouguer anomaly of about 0.5 mGal. Barometric elevation determinations are responsible for this level of precision.

The raw Bouguer values, at reduction density of 2.67 t/cu m, have not been included in this report due to the distortions produced from coastal regional gradients. Such a presentation conceals near surface geological responses.

The crustal formulation, MANTLE-88, prepared by Leaman (1988a) has been used to remove most of the deep crustal effects from the data and a residual compilation is given in Map 1. This is a much more useful format.

COMMENTS

The large negative anomalies (-10 mGal) south of Sandy Cape are associated with exposure of the Pieman Granite. At about 5405 000 mN this anomaly axis is offset about 2 km to the east and it then continues to 314 000 mE, 5415 000 mN. The granite is believed to be the source offset but to be a little more deeply buried north of the offset. The gross trend remains NW-SE.

The entire region from the coast, south of 5422 000 mN, inland for nearly 30 km, presents negative residual anomalies. The +2 mGal contour may roughly map the ultimate extent of this pluton but the roof is clearly irregular and often deep if this is indeed the case.

Data in the region of the Norfolk Range are ambiguous. A spine of negative anomalies extends from Mt Frankland south to Mt Norfolk (322, 5427 to 330 000 mE, 5410 000 mN) and its position approximates the high ground. This raises questions as to whether

- a) the data has been properly and fully terrain corrected,
- b) the material in the range above mean topographic levels on either side is much less dense than 2.67 t/cu m, or
- c) a granite rise extends beneath the general area of the range.

Review of all data points and correction values suggests that while the terrain corrections are almost certainly underestimates given some station positions and descriptions any error is not several mGal in magnitude. Stations at an array of site types yield similar results in any event.

Even if the range materials were composed of pure quartzite it is unlikely that any density deviation greater than -0.05 t/cu m is possible. This could generate a maximum Bouguer compensation error of about -0.7 mGal.

These results suggest that some other source is involved.

The termination of the effect at Mt Norfolk is striking. The gravity field south of this point bears no systematic relationship to exposed geology or terrain and confirms the above implication concerning ultimate sources of anomaly.

A strong E-W gradient and lineament occurs at 5405 000 mN. This feature, offsets granite at the coast and may well have controlled some mineralisation. Savage River lies on this feature.

Map 1 also shows the sites of principal, known prospects around Balfour and several kilometres to the NW.

If it is presumed that the ridge of negative anomaly extending along and beyond the range is assumed to be related to granite then the Balfour mineralisation is precisely where we might expect - peripheral to a cupola. The exploration area to the NW, explorer unknown at present, is in a similar location. Equivalent sites may occur near Mt Hazelton and within the range.

In view of the access problems in these ELs it is suggested that the most accessible targets be considered in detail; e.g., those centred on 321 000, 5436 000; 322 500, 5427500; 324 000, 5425 000; 327 500 mE, 5421 000 mN.

Detailed work at these sites will enable testing of known mineralised areas but with a re-focus toward probable sources of mineralisation and some blind tests of comparable sites not yet known to be associated with mineralisation.

On this basis much of the southern and eastern parts of EL 53/88 are redundant (as is all but the SW corner of EL 21/87).

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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

June 10, 1989

APPENDIX 1

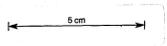
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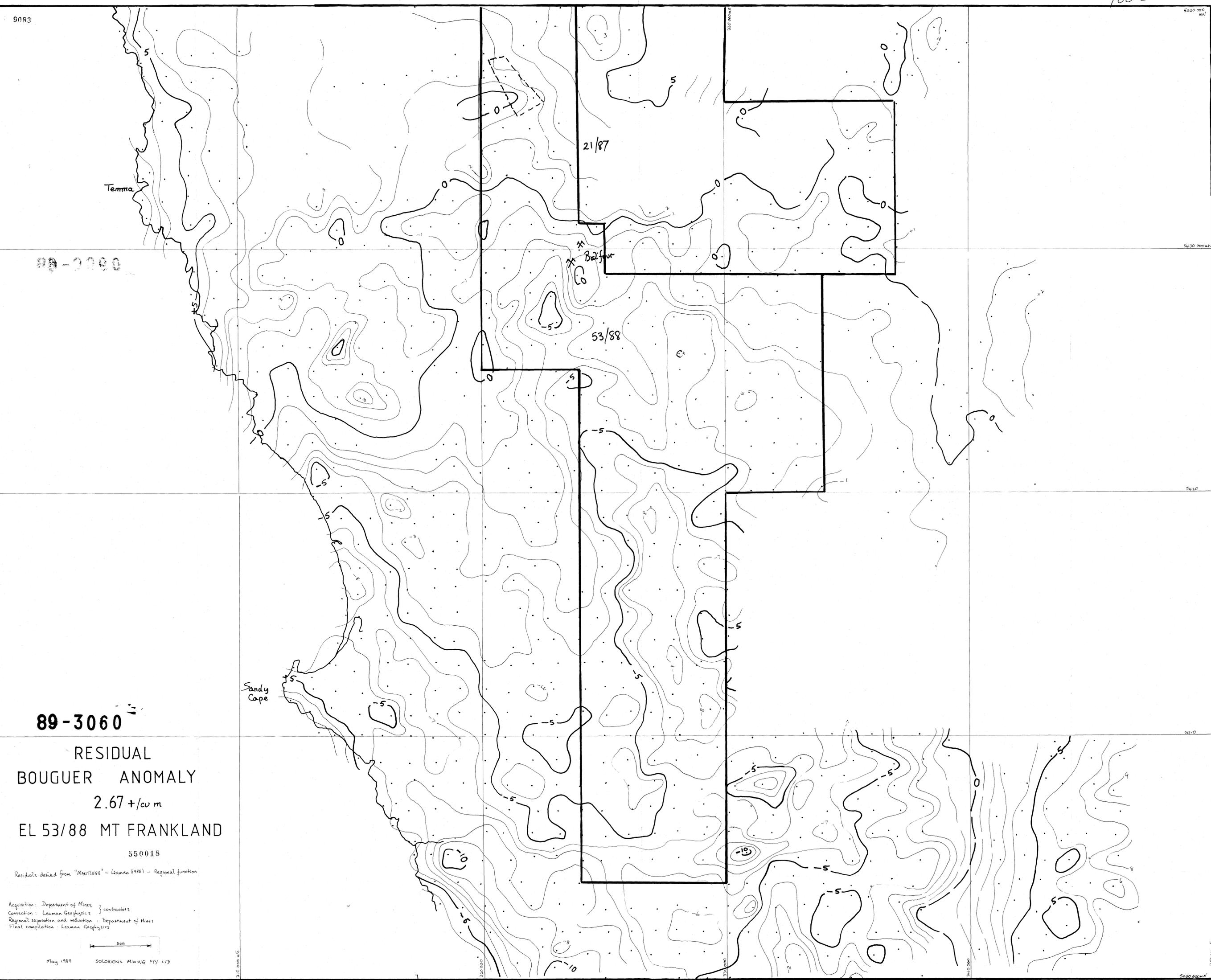
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2.67 +/- 0.1 m
EL 53/88 MT FRANKLAND
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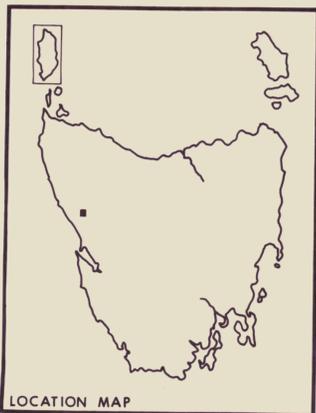
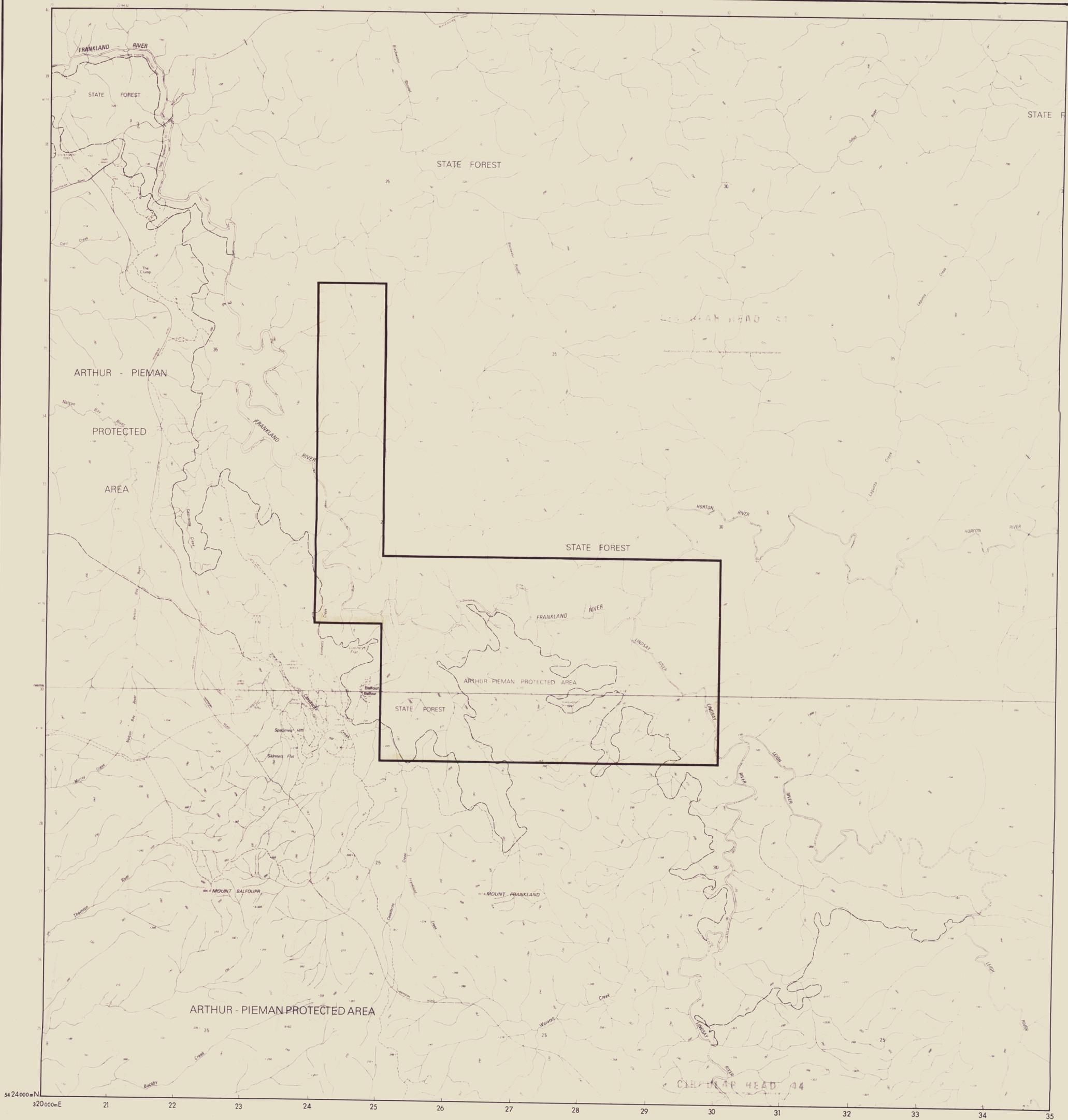
Residuals derived from "MINTLESS" - Leaman (1988) - Regional function

Acquisition: Department of Mines } contractors
 Correction: Leaman Geophysics }
 Regional separation and reduction: Department of Mines }
 Final compilation: Leaman Geophysics }



May 1989 SOLORIENS MINING PTY LTD





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AUREOLE RESOURCES PTY LTD, WINSTON RESOURCES PTY LTD & SIERRA NEVADA RESOURCES PTY LTD	
EL. 21/87 - BALFOUR, TASMANIA	Compiled V.H.
LOCATION PLAN	Drawn T.K.D Contracting
	Date November 1989
	Scale 1 : 25,000
	PLAN No. 1