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EL 2372

MOUNT DUTTON

ANNUAL AND FINAL REPORTS FOR THE PERIOD 27/6/97 TO 26/6/99

Submitted by

Havilah Resources NL
1999

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PRIMARY INDUSTRIES AND RESOURCES SA

ANNUAL REPORT

FOR EL 2372

MOUNT DUTTON

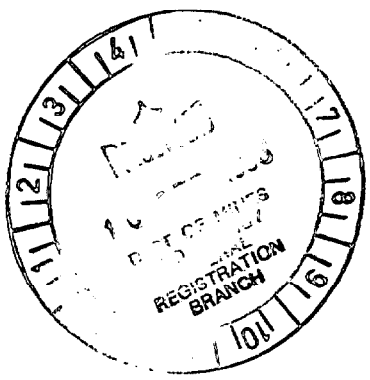
SOUTH AUSTRALIA

Compiled by Dr Chris Giles

Exploration Manager

Havilah Resources NL

August 1998



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1. INTRODUCTION

EL 2372 (Mount Dutton) was granted to Havilah Resources on 26 June 1997 for a period of twelve months. The northern part of the area lies astride the Marree – Ooodnadatta road, just south of Oodnadatta in the north of South Australia
(Figure 1). The EL is largely covered by low tablelands that are capped by lateritised Mesozoic sediments of the Great Artesian Basin

The area was originally applied for owing to reported occurrences of gold and copper mineralisation and its favourable tectonic setting within the major G2 gravity corridor. Gawler Craton exploration models, encompassing Olympic Dam, Challenger and Tunkillia styles of mineralisation are believed to be applicable.

After study of open file information available in PIRSA records plus some reconnaissance field work, a 1085 square kilometre portion of EL 2372 that was judged to be less prospective owing to the depth of cover rocks was relinquished in November 1997. The current area of EL 2372 now stands at 361 square kilometres (Figure 1).

2. GEOLOGICAL SETTING

The region is almost entirely covered by flat-lying Mesozoic and Cainozoic sediments. The Mesozoic sediments form part of the extensive Great Artesian Basin and include such widespread units as the Cretaceous Cadna-owie Formation and Bulldog Shale and the Jurassic Algebuckina Sandstone. Drilling shows that the sedimentary sequence reaches up to 600 metres in thickness some 10 kilometres north of EL 2372. However, 20 kilometres south at Mount Dutton the sediments are observed to onlap Permian sediments and Precambrian bedrock (Figure 2).

In the north, thin sequences of Tertiary conglomerates, sandstones, claystones and limestones veneer the Mesozoic sediments. Owing to frequent development of a hard silcreted or lateritic cap, the Tertiary rocks commonly form resistant flat-topped hills with well developed breakaways around their margins.

Precambrian bedrock, comprising Palaeoproterozoic Peake Metamorphics and Neoproterozoic Adelaidean rock sequences, are well known from isolated inliers and from the Peake and Denison Ranges to the south. In the Precambrian inlier at Algebuckina Hill minor copper shows were worked at the turn of the century in gossanous quartz-hematite zones in biotite schists, pegmatites and migmatites of the Peake Metamorphics. Gold was won from the basal conglomerates of the Algebuckina Sandstone at this locality, and is also reported in alluvials along the Neales River.

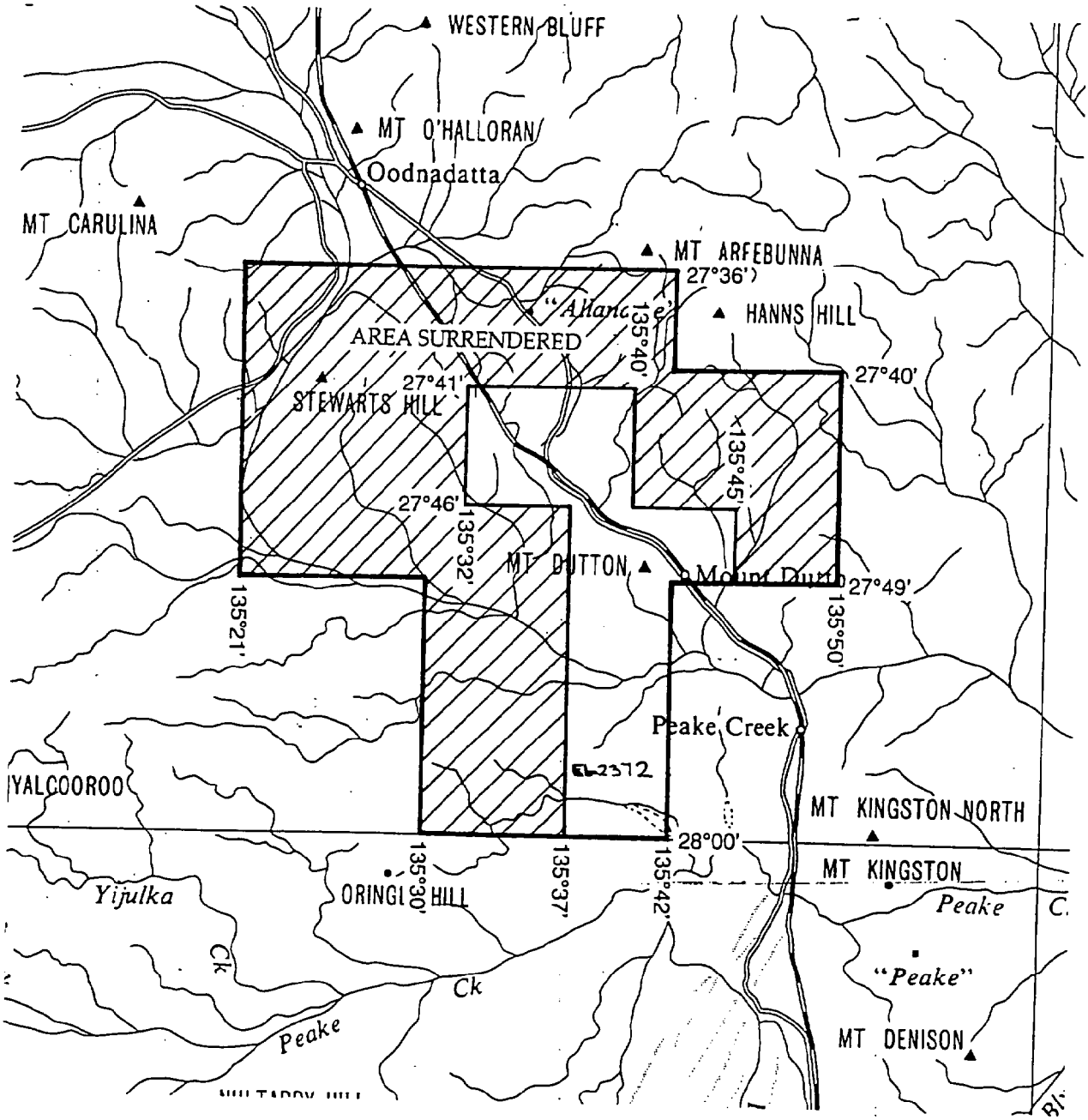
The area covers the northwestern extension of a prominent gravity and magnetic ridge that runs from the Precambrian Peake and Denison inlier. Faults mapped on the Oodnadatta 1:250.000 geological map parallel this feature, suggesting that it has been tectonically active at least until late Tertiary time.

3. PREVIOUS EXPLORATION WORK

Considerable exploration work has been carried out in the region mainly for diamonds, uranium and gold, much of which overlaps the present area. Exploration work by at least three

SCHEDULE A

Figure 1 Location of EL 2372



SCALE 1 : 500 000

10 0 10 20 30 40 50

KILOMETRES

APPLICANT : **HAVILAH RESOURCES N.L.**

DM : **16/97**

AREA : ~~1446~~ **361** square kilometres (approx.)

1:250 000 PLANS : **OODNADATTA**

LOCALITY : **MT. DUTTON AREA - Approximately 25 km southeast of Oodnadatta**

DATE GRANTED : **27 June 1997** DATE EXPIRED : **26 June 1998**

EL No : 2372

companies, namely Oilmin/Transoil/Petromin (1981-82), Stockdale Prospecting Limited (1982-85) and BHP Minerals (1982-85) failed to turn up any positive indicators for diamondiferous kimberlites in the region. BHP Minerals exploration work included an aeromagnetic survey at 300 metre line spacing and 80 metre terrain clearance over part of the area, which revealed three magnetic anomalies of interest, plus two possible kimberlite anomalies (Figure 2).

Western Mining Corp. Ltd. (1975) and later Carpentaria Exploration Company Pty. Ltd. (1981-82) explored the Algebuckina Hill area for gold mineralisation both in the basement inlier and in the cover rocks, but without significant success.

Exploration for coal in Permian sediments at the margin of the Boorthanna Trough was undertaken by Shell Minerals Limited in 1973-74 and later by the Getty Oil Co.Ltd in 1985-86, again without positive results.

4. CURRENT EXPLORATION WORK

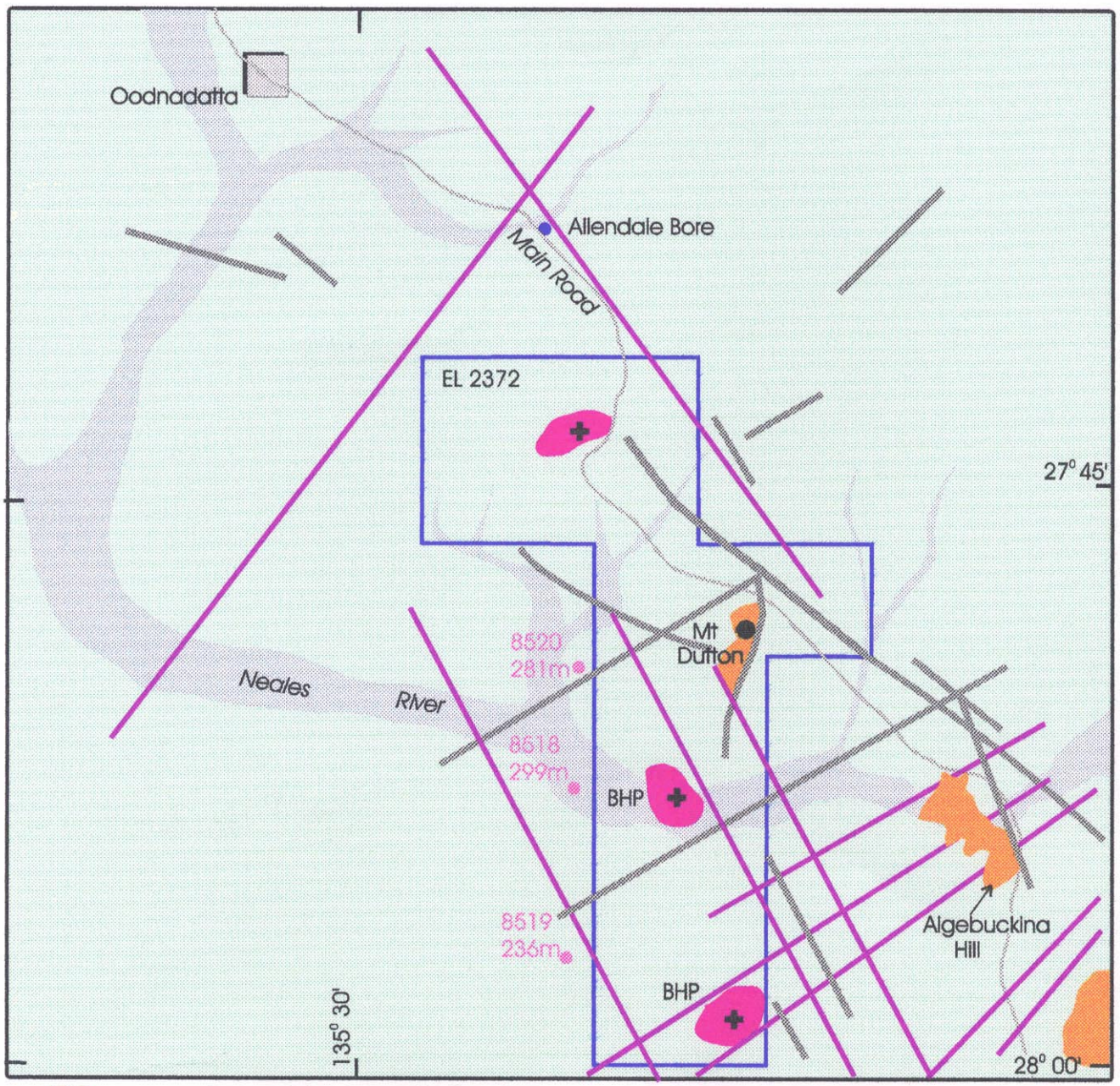
In view of the fact that potentially prospective basement rocks are buried it was essential to determine the likely depths to basement over the area. Consequently, initial work was directed towards locating all deep drilling data for the EL area and its immediate surrounds. The deepest drillholes were the Oodnadatta town bore and Allandale bore, which showed depths to basement in the north of the original EL area in the order of 500 metres, a point also confirmed by seismic data (see cross-section, Oodnadatta 1:250,000 geological map). Drilling by Getty Oil for Permian coal deposits in the Boorthanna trough showed considerable thicknesses of Mesozoic and Permian cover rocks lying in the western portion of the original EL area. Based on the evidence from Getty Oil drill holes 8518, 8519 and 8520 all of which bottomed in Permian sediments at depths of 299, 262 and 281 metres respectively, the depth to Precambrian bedrock is almost certainly in excess of 300 metres in this area (Figure 2). The decision to relinquish a large area of the northern and western portions of the original EL was mainly based on this drilling information.

Aeromagnetic data generated by BHP Minerals and the BMR clearly shows the rectilinear pattern of north-easterly and north-westerly trending structures apparent from regional geological interpretations (Figure 2). Three large roughly circular magnetic anomalies, almost certainly caused by Precambrian basement features, are evident in the data (Figure 2). The magnetic data is currently being interpreted to determine depths to source for each of these anomalies.

Field reconnaissance confirmed that much of the area is covered with flat-lying Cretaceous sediments, which in turn are often veneered by surficial Quaternary material. Consequently, there is no obvious geochemical sampling medium at surface that is suitable for testing for mineralisation in the bedrock.

5. FUTURE EXPLORATION WORK

Immediate work will concentrate on interpreting available magnetic data to determine depths to sources for the Precambrian basement features indicated by the three magnetic anomalies and obtaining further data if necessary. The results of this interpretation will assist in determining whether suitable drilling targets exist for buried large mineralised bodies.



Precambrian bedrock inlier within Mesozoic sediments

Magnetic lineament from BHP and MESA aeromagnetic data

Fault, from Oodnadatta 1:250,000 geological map

Magnetic Anomaly, BHP signifies from BHP aeromagnetic data

8518
299m

Drillhole and Depth

HR

Havilah Resources NL

EL 2372 - MOUNT DUTTON

GEOLOGY

0 5 10

km

Figure 2

6. REFERENCES

Unpublished company reports held in Open File at PIRSA

1973-74	EL 108	Shell Minerals Limited	PIRSA Env 2388
1975	EL 192	Western Mining Corp. Limited	PIRSA Env 2525
1981-82	EL 750	Oilmin / Transoil / Petromin	PIRSA Env 4041
1981-82	EL 888	Carpentaria Exploration Company Pty Ltd	PIRSA Env 4496
1982-85	EL 1202	BHP Minerals Limited	PIRSA Env 4909
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ANNUAL AND FINAL REPORT FOR EL 2372

MOUNT DUTTON

Compiled by

Havilah Resources NL

July 1999

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work by at least three companies, namely Oilmin/Transoil/Petromin (1981-82), Stockdale Prospecting Limited (1982-85) and BHP Minerals (1982-85) failed to turn up any positive indicators for diamondiferous kimberlites in the region. BHP Minerals exploration work included an aeromagnetic survey at 300 metre line spacing and 80 metre terrain clearance over part of the area, which revealed three magnetic anomalies of interest, plus two possible kimberlite anomalies (Figure 2).

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Field reconnaissance confirmed that much of the area is covered with flat-lying Cretaceous sediments, which in turn are often veneered by surficial Quaternary material. Consequently, there is no obvious geochemical sampling medium at surface that is suitable for testing for mineralisation in the bedrock.

Regional aeromagnetic data clearly shows the rectilinear pattern of north-easterly and north-westerly trending structures apparent from regional geological interpretations (Figure 3). A deep magnetic complex is evident on the SAEI E3 survey data in the north of the area. In addition, two roughly circular magnetic anomalies, almost certainly caused by Precambrian basement features, are evident in the 300 metre spaced data generated by BHP in the south of the area (Figure 3). The likely depths to source for both of these anomalies, assuming a variety of shape and susceptibility parameters, was modelled by Koch Geoservice and Allender Exploration from data kindly supplied by PIRSA. Best fits were obtained using dyke shaped bodies of moderate susceptibility. However, the indicated depths of the magnetic sources were > 700 metres below surface and hence beyond reasonable drilling depth, especially in

the current adverse exploration climate (see Appendix 1 for report of modelling work by Koch Geoservice).

All the work to date has not identified any obvious gold or basemetal drilling targets within reasonable depth of the surface. The decision was made to relinquish EL 2372 as it was felt that the remaining exploration potential did not justify the risk, especially considering the uncertainty and likely expense involved in resolving outstanding Native Title issues.

5. REFERENCES

Unpublished company reports held in Open File at PIRSA

1973-74 EL 108 Shell Minerals Limited PIRSA Env 2388
1975 EL 192 Western Mining Corp. Limited PIRSA Env 2525
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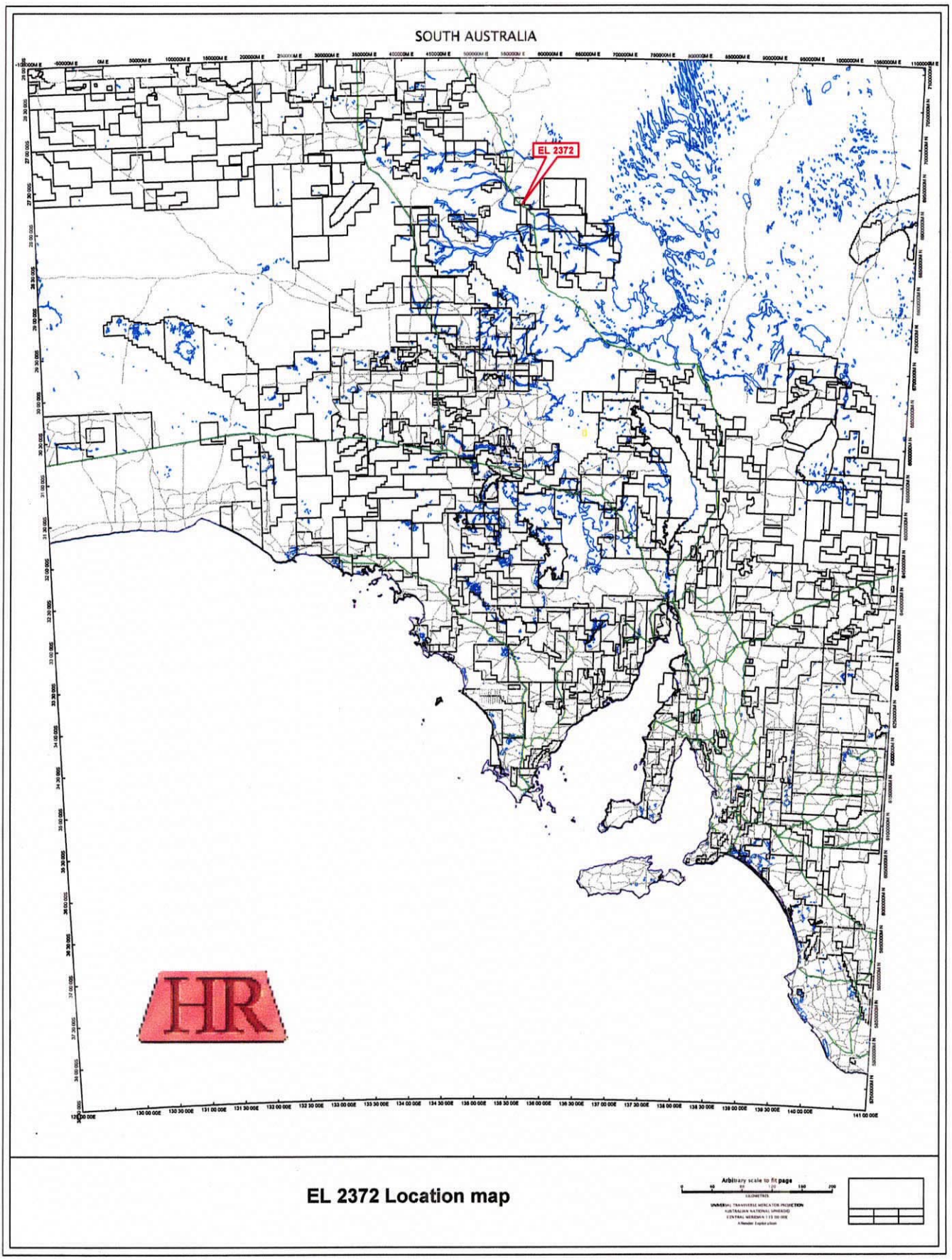
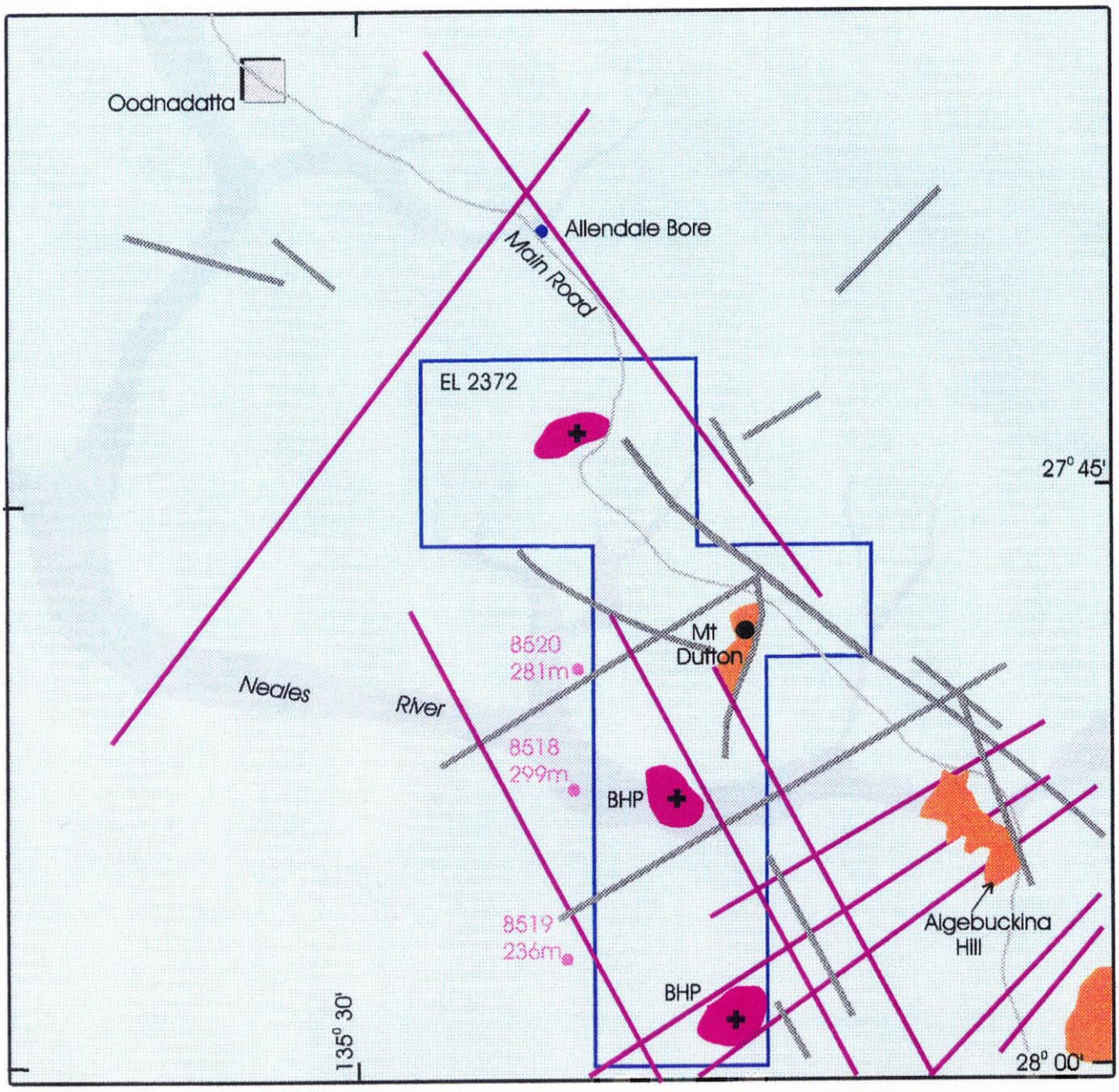


FIGURE 1 EL 2372 Location Map



Precambrian bedrock inlier within Mesozoic sediments

Magnetic lineament from BHP and MESA aeromagnetic data

Fault, from Oodnadatta 1:250,000 geological map

Magnetic Anomaly, BHP signifies from BHP aeromagnetic data

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Drillhole and Depth

HR

Havilah Resources NL

EL 2372 - MOUNT DUTTON

GEOLOGY

0 5 10

km

Figure 2

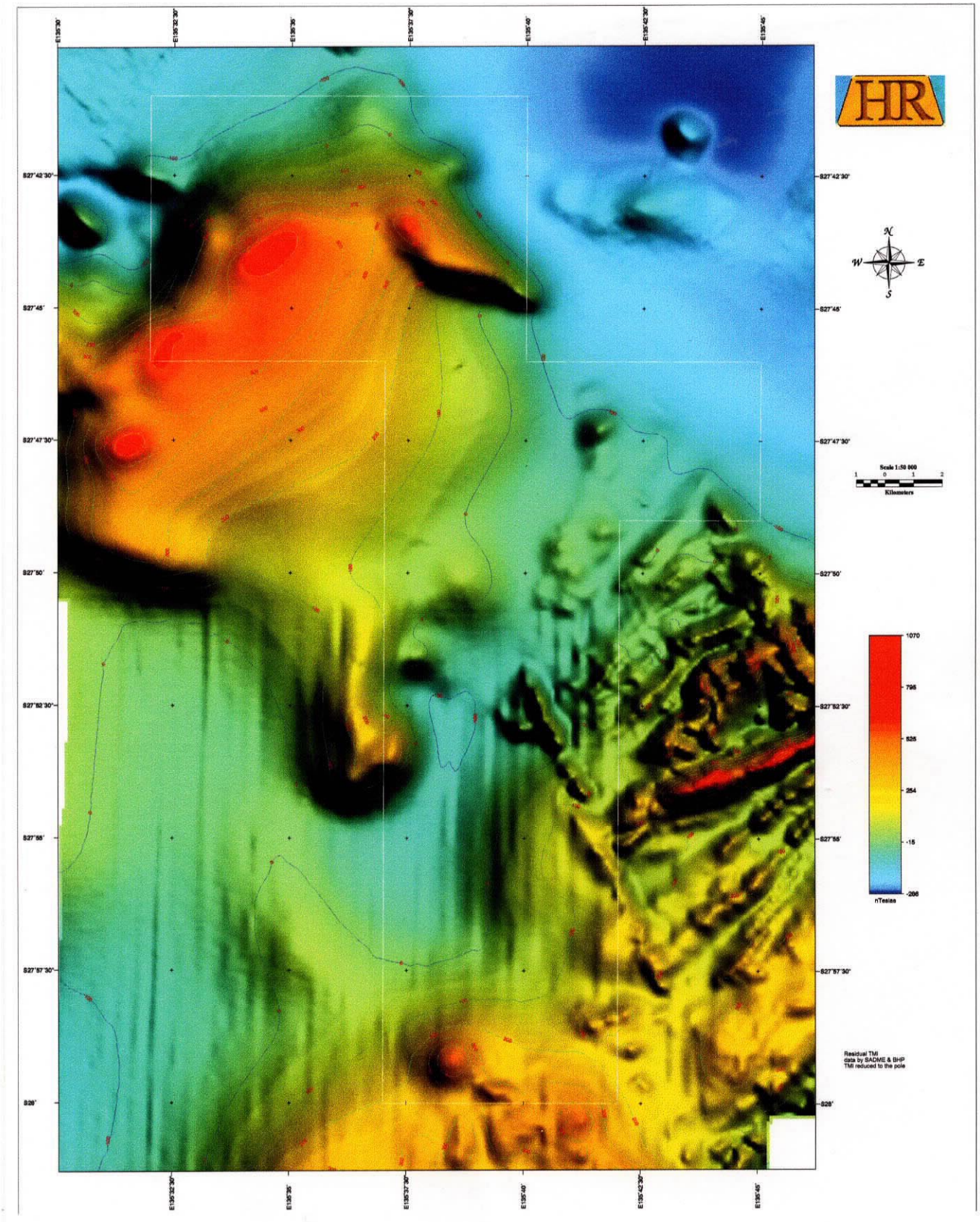
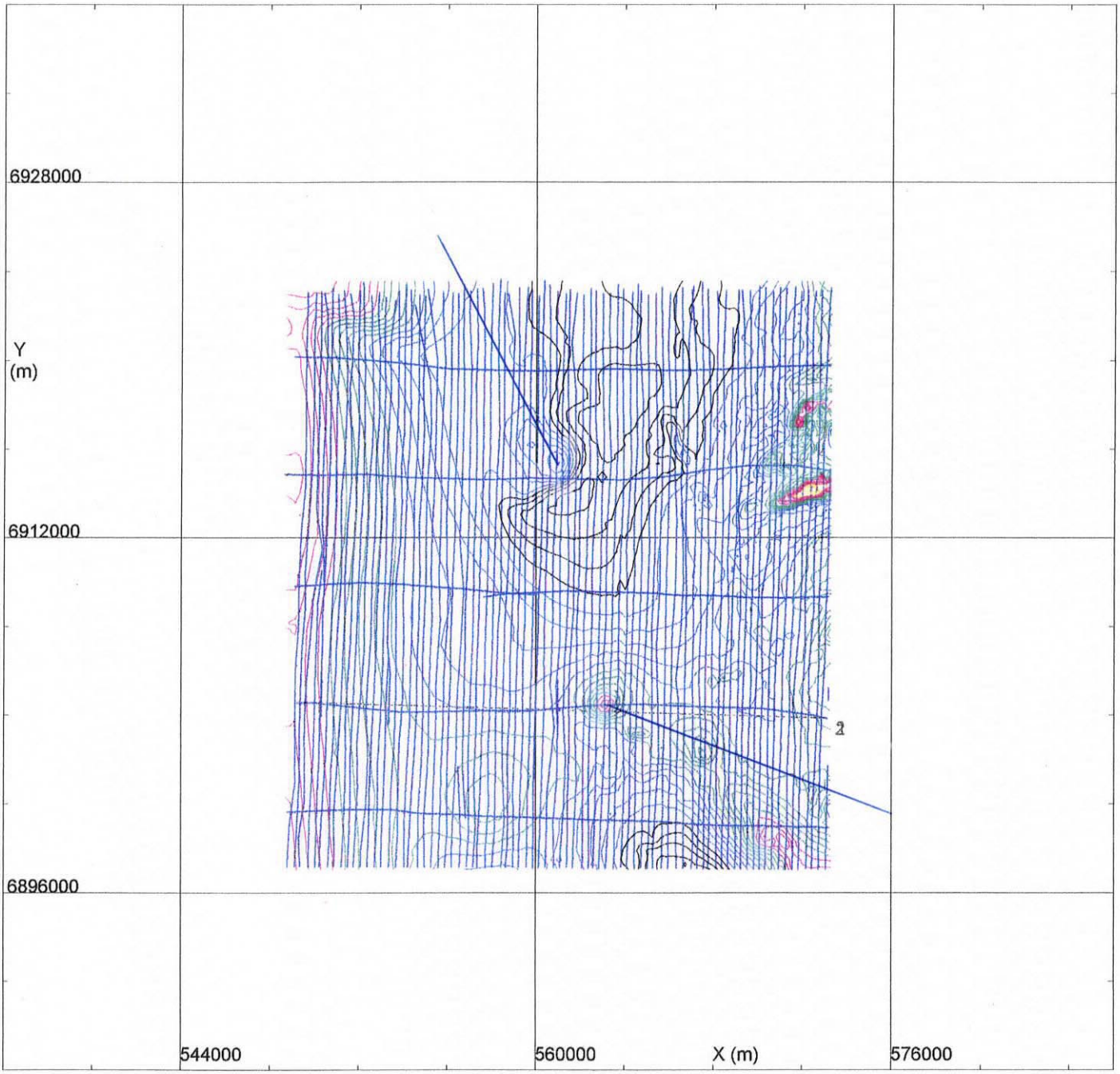
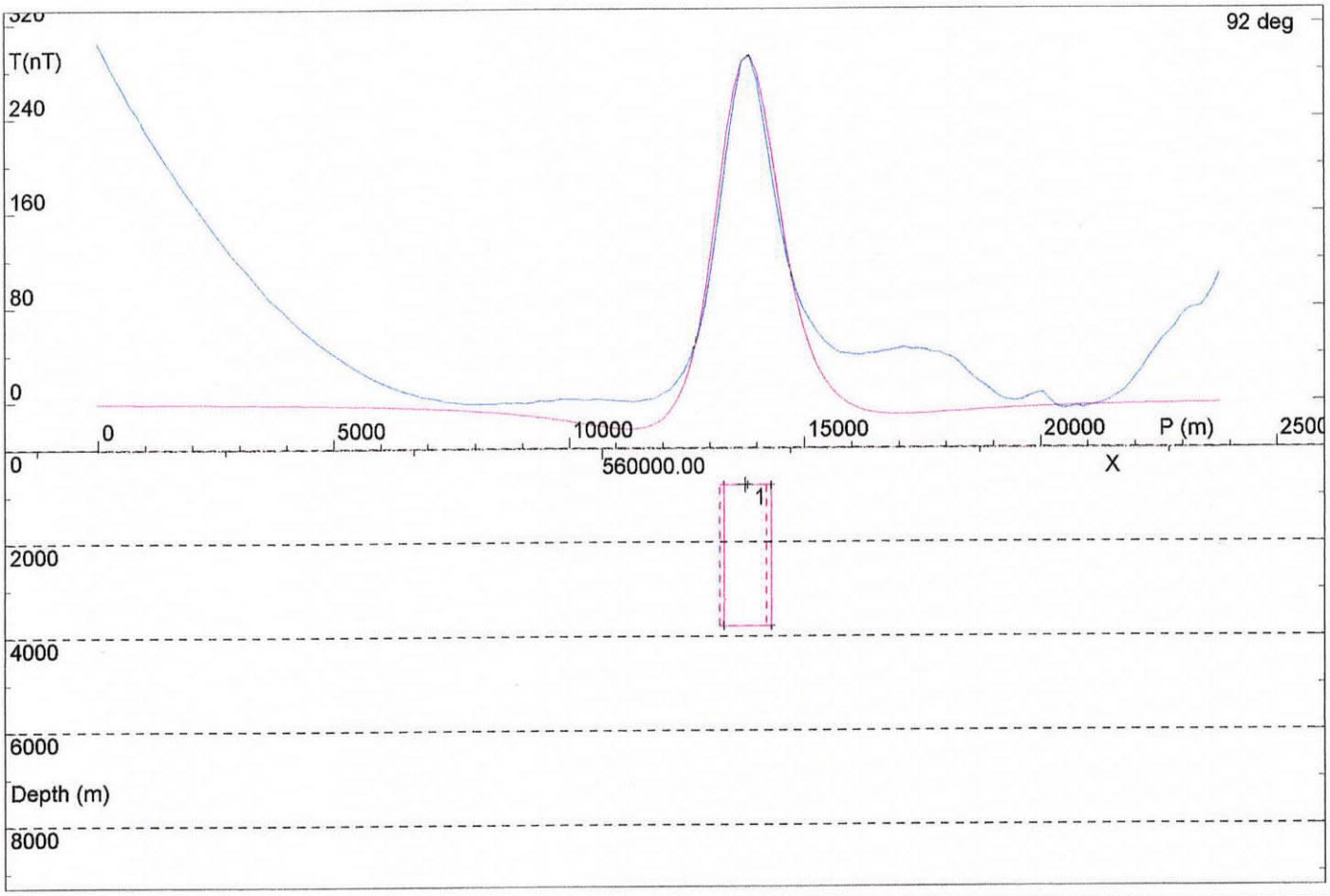


FIGURE 3 TMI reduced to the pole

Aeromagnetic data by BHP and SADME. Imaging by Allender Exploration



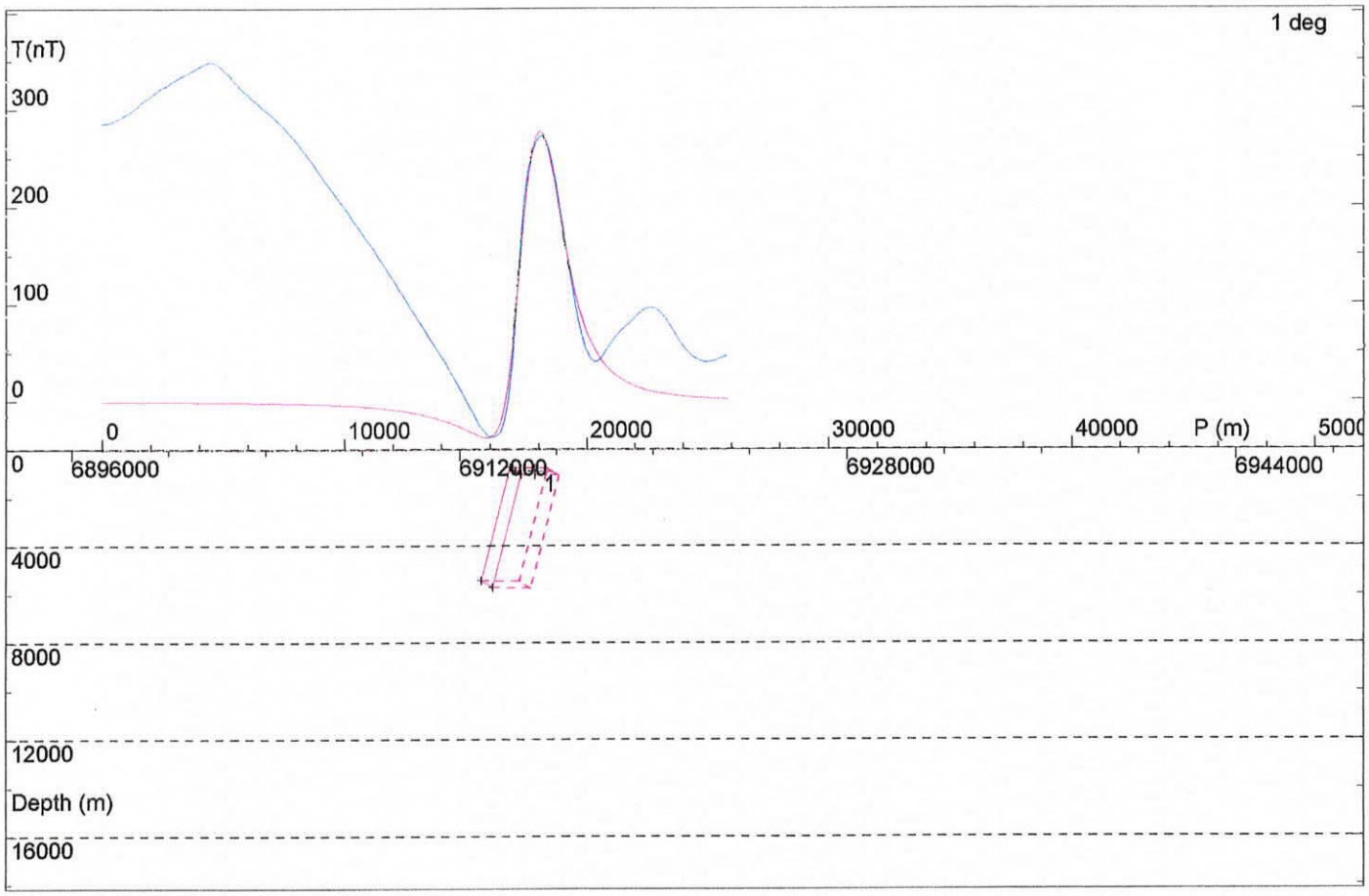
Observations:	/ EASTING_AMG NORTHING_AMG MAG
Model:	
Contours of:	Observed field; Contour intervals: 40.0000, 200.0000 nT
POTENT v3.10A	Plan drawn at 16:59 21/07/1999 for Koch Geoservices



Observations: / EASTING_AMG NORTHING_AMG MAG
Profile #2;
Model: PEAKE SOUTH
Calculation mode: Total Magnetic Intensity

Observed: Calculated:
Residual: Individual body:

POTENT v3.10A Profile drawn at 16:46 21/07/1999 for Koch Geoservices



Observations: / EASTING_AMG NORTHING_AMG MAG
Profile #2; PEAKE NORTH
Model:
Calculation mode: Total Magnetic Intensity

Observed: Calculated:
Residual: Individual body:

POTENT v3.10A Profile drawn at 19:32 21/07/1999 for Koch Geoservices

KOCH GEOSERVICE

2a Drew Grove St Georges SA 5064
Phone/Fax: (08) 8379 4745
Mobile: 0414 587 510
Email: gkoch@dove.net.au

FORWARD MODELLING REPORT FOR PEAKE

Allender Exploration contracted Koch Geoservice to calculate depth estimates for two magnetic anomalies for the Peake area. Geosoft xyz line files were supplied containing AMG Eastings, AMG Northings and Mag. No elevation data was present in these files hence all depth estimates are calculated from the aircraft sensor (approximately 80m above ground level). The two anomalies targeted for depth analysis is shown on the flight path / contour plan overleaf ie. Peake North and Peake South.

PEAKE

PEAKE SOUTH

BODY SHAPE

Body type:	Dyke
Width:	1000m
Height:	3000m
Slope:	90.0 degrees
Length:	3000m

PHYSICAL PROPERTIES

Mag Sus:	0.0580 SI units (above background)

BODY POSITION

AMG X:	563058mE
AMG Y:	6904601mN
Strike:	0.0 degrees

DEPTH: **780 metres below aircraft**

(Refer to model diagram PEAKE SOUTH)

Note that 780m below aircraft sensor is optimum depth for the given susceptibility. An attempt was made to calculate minimum possible depth by changing various properties and parameters. It was concluded that it was unlikely that the minimum depth is above 650m below aircraft sensor.

PEAKE NORTH

BODY SHAPE

Body type:	Dyke
Width:	800m
Height:	5000m
Dip:	110.7 degrees
Length:	2000m
Plunge:	1.2 degrees

PHYSICAL PROPERTIES

Mag Sus:	0.0659 SI units (above background)

BODY POSITION

AMG X:	560768mE
AMG Y:	6915083mN
Strike:	-37.0 degrees

DEPTH: **900 metres below aircraft**

(Refer to model diagram PEAKE NORTH)

Note that 900m below aircraft sensor is optimum depth for the given susceptibility. An attempt was made to calculate minimum possible depth by changing various properties and parameters. It was concluded that it was unlikely that the minimum depth is above 800m below aircraft sensor.

- ALL MODELLING FOR THIS EXERCISE WAS DESIGNED FOR "BALL PARK" DEPTH ESTIMATES ONLY. MORE ACCURATE ANALYSIS WOULD BE REQUIRED FOR DRILLING PURPOSES.
- ALL MODELLING WAS CARRIED OUT USING POTENT SOFTWARE.

Grant Koch