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EL 2101 ANABAMA HILL

FINAL REPORT FOR THE PERIOD
29/8/95 TO 28/8/96

Submitted by

G.R. Turner and J.A. Jones.
1996

MINES AND ENERGY
SOUTH AUSTRALIA

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ENVELOPE 9107

TENEMENT: EL 2101 Anabama Hill

TENEMENT HOLDER: G.R. Turner and J.A. Jones

CONTENTS

END OF CONTENTS

GEOLOGICAL INVESTIGATIONS ON EXPLORATION LICENCE 2101 - WADNAMINGA SOUTH AUSTRALIA

Final Report

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October 13th, 1996

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SUMMARY

Work undertaken during the term of the exploration licence included literature review, aeromagnetic interpretation, and a reconnaissance field trip.

While the tenement may still be prospective for metasomatic gold and base metal mineralisation associated with late stage magmatism related to the Anabama and Cornwell Granites, the depth of cover precludes cost-effective exploration.

Hence, the tenement has been recommended for relinquishment.

TABLE OF CONTENTS

LIST OF FIGURES

1.0 INTRODUCTION

1.1 Location and Access

The Anabama Exploration Licence No. 2101 is located some 6 kilometres south of the Wadnaminga Goldfield, approximately 25 kilometres south-east of Mannahill in the north-east of South Australia. See Figure 1. The Licence is between Latitudes 32°38'S and 32°45'S, and Longitudes 140°02'E and 140°17'E, just north of Anabama Hill.

Access from Mannahill on the Barrier Highway can be gained via either Wadnaminga or Oulnina Stations on all-weather roads, then via station access tracks to most parts of the Exploration Licence.

1.2 Land Tenure

Exploration Licence No 2101 was granted to Geoff Turner & Judith Jones on August 29th, 1995, for a period of 1 year. The licence covers an area of 182 sq. km.

The exploration licence covers portions of a number of pastoral leases, being Wadnaminga Station (including the old Benda and Taltabooka Stations), Devonborough Downs (including Canewood) and Netley Gap Stations.

1.3 Previous Work

The area has been subject to sporadic investigations over the previous 25 years, with the main focus being on the granite hosted **copper - molybdenum** mineralisation at Anabama Hill and Netley Hill. Following the discovery of anomalous mineralisation at these localities by Dept. of Mines and Energy geologists in 1966, Asarco (Australia) Pty. Ltd. undertook regional studies, culminating in rotary and diamond drilling at Anabama and Netley Hills (Hosking, 1969, 1970). From 1973 to 1976 the Department of Mines and Energy undertook further studies at Anabama Hill, including ground magnetics, IP surveys, soil geochemistry and geological mapping, concluding with a 3 hole diamond drilling program (Morris, 1981). CSR drilled a 796 metre deep diamond hole in 1982, obtaining a best intersection of 0.19% Copper (Miller, et al, 1982).

Mines Administration Ltd held an area overlapping the land area of EL 2101 under SML 282 from 1969 to 1971, during which time regional rock chip and geological mapping was undertaken (Bryan, 1971). Significant results included anomalous copper mineralisation in pyritic quartz veins near Round Hill (outside the tenement).

The ensuing Longreach Metals N.L. & Mines Administration joint venture on SML 556 (expanded area) also undertook colour air photography at 1:18 000 scale, geological mapping and rock chip sampling. Anomalous base metal values were obtained from rock chips near Round Hill and north-east of Netley Gap Well, and anomalous copper values were found in stream sediment samples south-west of Giles Knob (Edwards, 1971, 1972).

Amended.

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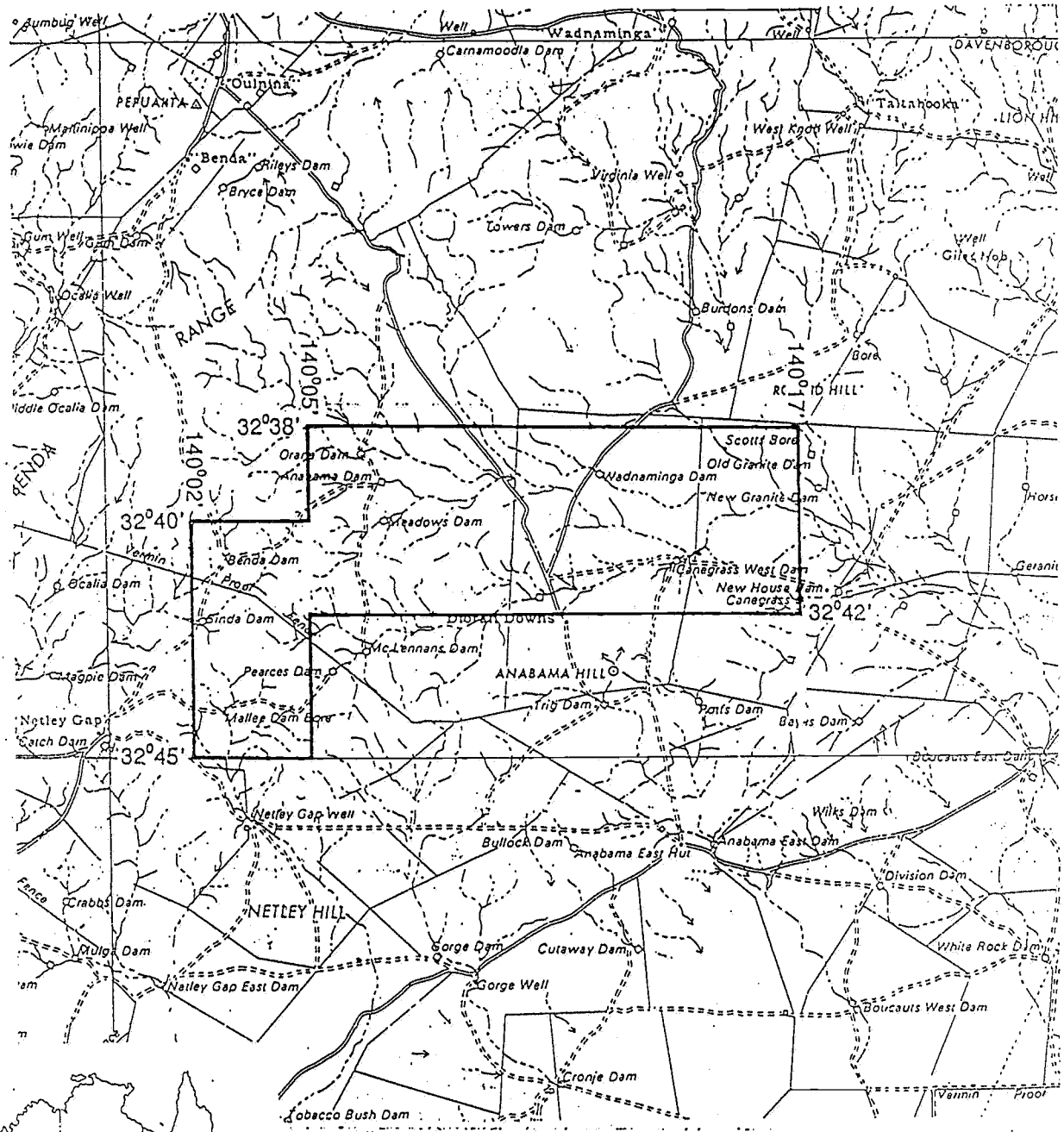
SCHEDULE A



APPLICANT : **G.R. TURNER AND J.A. JONES**

DM : **98/95** AREA : **182** square kilometres (approx.)

1:250 000 PLANS : **OLARY**

LOCALITY : **ANABAMA HILL AREA - Approximately 50 km SSW of Olary**

DATE GRANTED : DATE EXPIRED : EL No :

During 1990 - 1991 Newcrest held an area equivalent to EL 2101 (as EL 1685). Significant work undertaken included close spaced aeromagnetics, an air photo interpretation by Australian Photogeological Consultants, and stream sediment, rock chip and soil sampling. Elevated gold and base metal values were obtained from stream sediment and rock chip samples near Mallee Dam Bore, west of Anabama Hill, and anomalous gold values (to 11 ppb) were obtained in BLEG soil samples east of Old Granite Dam (McEwen, 1991, and Switzer, 1991).

Dominion Metals Pty Ltd first explored in the region for mineral sands along the edge of the Murray Basin, particularly at Mutooroo, 50 to 60 kilometres east of EL 2101. Discovery of base metal indicators near Maldorky (30 kilometres north east) encouraged Dominion to consider base metal mineralisation associated with the large granite intrusions, namely the Anabama Granite and the related Cornwell Granite.

Dominion held a large area under EL 1782 from 1992 to 1994, during which time a program of aeromagnetic re-interpretation, rock chip sampling, and RAB drilling was undertaken. The RAB drilling intersected 0.19% copper over 3 metres, and anomalous zinc intersections were made in hydrothermally altered or metasomatised metasediments within a few kilometres of the boundaries of the Anabama Granite. All mineralised intersections were encountered in zones of **low total magnetic intensity**. The results of this work are discussed in Section 3.

1.4 Mineralisation

Gold has been exploited from the Wadnaminga Goldfield, 6 kilometres north of the EL, since its discovery in 1888 at the Eiffel Tower Mine. The largest producers were New Milo (9 938t @ 29 g/t), Virginia (8 827t @ 16 g/t) and Thunder Queen (1 795t @ 24 g/t). The gold occurs in easterly striking quartz veins, dipping at a shallow angle to the south, within sandy siltstones, phyllites and dolomitic rocks of the (PreCambrian) Mintaro Shale. Associated minerals are pyrite with minor amounts of galena, chalcopyrite, arsenopyrite, calcite and secondary derivatives of these minerals (Forbes, 1988).

Other minor gold deposits have been worked south-east of Taltabooka Homestead, and at the Welsh Prince Mine near Anabama Dam. The Welsh Prince occupies a north trending zone of brittle faulting, with copper (malachite and chalcopyrite?) and gold mineralisation developed within the brecciated sediments.

Copper has been noted near Giles Knob, a body of altered biotite granite and pegmatite related to either the Anabama Granite, or more probably, the later Cornwell Granite. Low grade copper and molybdenum mineralisation within hydrothermally altered granodiorite has been studied at **Anabama Hill** and **Netley Hill**. Anabama Hill is a large and prominent body of altered granite, or **greisen**, locally with copper values in the sub-percent range and sub-economic molybdenum mineralisation.

Silver was mined with lead from the Commodore Mine, east of Giles Knob.

2.0 REGIONAL GEOLOGY

The exploration licence application covers a portion of the Olary map sheet, 1:250 000 Geological Series (SI 54-2), published by the S.A. Department of Mines and Energy (Forbes, 1989).

Outcrop within the exploration licence application is confined to generally unaltered sediments, granite tors of the **Anabama Granite**, and minor outcrops of greisenised granite and zones of quartz veining. The EL covers the margin of the Tertiary Murray Basin, and hence some of the area is covered by up to 30 metres of fluvial sediments and calcrete.

The oldest rocks in the region are the **Boucaut Volcanics** of ?Willouran age. These outcrop as variably sheared and foliated acid volcanics south of the EL, in contact with mylonites, phyllites and tillite within the Anabama - Redan Shear Zone (McEwen, 1991).

The northern half of the Exploration Licence Application is covered by sediments of the Burra Group, which outcrop in a north-east striking open anticlinal structure - the Wadnaminga Anticline. These sediments, in particular the **Mintaro Shale - Belair Subgroup** and the **Saddleworth Formation** are host to gold mineralised quartz veins in the Wadnaminga Goldfield. The Mintaro Shale - Belair Subgroup is a mixed sequence of flaggy siltstone, dolomite and quartzite, and the Saddleworth Formation is a mixed dark grey siltstone and dolomite sequence. These two stratigraphic units, particularly the dolomitic phases, are the target rocks for base metal mineralisation.

The Burra Group sediments are overlain by the **Pualco Tillite** and **Benda Siltstone** to the north and south of the Wadnaminga Anticline.

The Anabama Granite truncates the southern limb of the Wadnaminga Anticline, with strongly sheared contacts. (Movement indicators, both in outcrop and from aeromagnetic interpretation, indicate the gross movement along the sheared contacts to be dextral strike-slip.) A second granitic event resulted in the emplacement of the **Cornwell Granite**, mainly north-east of the main Anabama Granite body. The Cornwell Granite does not outcrop but was identified as having a distinctive aeromagnetic signature, different from that of the Anabama Granite, by Dominion Metals, and confirmed by RAB drilling. Aeromagnetic interpretation also confirms the cross-cutting aspect of the Cornwell Granite which follows a north-east striking fracture within the Anabama Granite.

North-east striking basic dykes, and north-west to north striking aplite and pegmatite dykes cut most lithologies.

There are two dominant structures affecting the region, being:

- Anticline - syncline pair (Yunta syncline & Wadnaminga Anticline) created by regional coaxial compression along a north-west - south-east axis, and

- Regional dextral strike-slip shearing in a north-easterly direction, effected by regional non-coaxial compression along an east-west axis. Major shear zones are located along the northern and southern contacts of the Anabama Granite (the Anabama-Redan Shear Zone has been identified along the southern margin of the Anabama Granite).

Minor folding with a north-south axis is evident east of the EL. This has been interpreted to be the result of an early compressional event (Forbes, 1988).

Most of the other structures in the region, i.e. faults and minor shears, may relate to the above two main events.

Carbonate rich breccias, probably representing diapiric phases can be seen in outcrop south of the Welsh Prince workings, and north of Mallee Dam Bore. These may be remobilised calcareous phases of Burra Group (Skillogalee Dolomite) or Callanna Group units.

4.0 SUMMARY OF WORK DONE

4.1 Aeromagnetic Interpretation

Enhanced images of the aeromagnetic data as flown by Dominion Mining were interpreted, digitised and plotted using Micromine ™ software. The plot of this interpretation is shown as figure 2 at the back of this report.

4.2 Field Traverse

A field traverse in September-October 1995 confirmed the strong sodic (phlogopite) and potassic (biotite) alteration to exist within a few kilometres of the Anabama Granite boundary. These alteration zones extend further from the boundary along crush or fault zones, for example at the Welsh Prince workings where gold and copper mineralisation exists within fractured and strongly brecciated Benda Siltstone.

The breccia zone is up to 3 metres wide, and strikes north north-east. No parallel structures were observed.

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6400000N

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WADNAMINGA GOLDFIELD

EIFFEL TOWER

BURDENS BORE

GILES KNOB

CORNWELL GRANITE

GUINNS BORE

TURKEY NEST BORE

ROUND HILL

LOW MAG

HIGH MAG

LOW MAG

WELSH PRINCE

GLENN BORE

SCOTTS BORE

PINE BORE

ANABAMA GRANITE

ANABAMA HILL

MALLEE DAM BORE

HIGH MAG

GRANITE BOUNDARY (solid) ———

FAULT (solid) ———

TREND LINES (dashed) – – – – –

MAGNETIC HIGH (dotted) . . . . . .

MAGNETIC LOW (dotted) . . . . . .

TJ MINERALS

WADNAMINGA PROJECT

MAGNETIC INTERPRETATION

Scale	DATE	SHEET
1: 150000	09/03/96	1 of 1
	REF No. MAG-FEAT	
	Plotted with MICROMINE	

410000E 420000E 430000E 440000E

0013