DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY
MINERAL RESOURCES DIVISION

EXPLORATION LICENCE 16

Progress Report for the Three Monthly Period Ending 26th January, 1974

by

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METALLIC MINERALS SECTION

Rept.Bk.No.74/46
G.S. No. 5362
D.M. No. E.L.16

7th February, 1974

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PLANS

DEPARTMENT OF MINES
SOUTH AUSTRALIA

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ABSTRACT

Follow up soil sampling has shown that the copper anomalies found in areas of alluvium give no indication of underlying bedrock; biogeochemical sampling is suggested as a possible alternative copper indicator in these areas.

Ground checking of two large radiometric anomalies has shown one locality worthy of further investigation.

INTRODUCTION

The regional geology of Exploration Licence 16 is described in an earlier three monthly report (Morris, 1973a) and shown on figure 2.

Due to unseasonal rains and the Christmas break only one short field trip was undertaken during the period 26th October, 1973 to 26th January, 1974.

Soil samples were collected to verify the copper anomalies found in areas of alluvium during the kilometer grid soil sampling programme.

A scintillometer survey using a hand held scintillometer was carried out to investigate two large radiometric anomalies found during an airborne radiometric survey (Webb 1970).

GEOCHEMISTRY

In the previous report (Morris 1973 b) concern was expressed over the reliability of soil samples taken in areas of deep alluvium in the kilometre grid soil sampling pattern.

The contour plan for copper (Fig.3) suggests that the samples in the alluvium are an expression of the drainage pattern and that anomalous values there are derived from transported material from the mineralized areas of Netley Hill and the northern contact zone between the granite and Adelaidean meta-sediments. A small soil sampling grid (Fig.4) has been completed centred on one of the anomalous copper values (Fig.3 line 3-sample 10) in an alluvial area. At each point on the grid samples were taken from the calcareous horizon in the soil profile at a depth of 100 cms and another sample from a depth of about 140 cms which was usually below the main calcareous layer. At two localities samples were also taken from just below the surface (20 cms). The results (Fig.4) show that all the copper values are uniformly low, (about 22 parts per million) with no regular variation with depth, and well below the 110 p.p.m. of the original sample over which the grid was centred. This would indicate that the anomalous sample was either an analytical error or due to a small amount of mineralized material, possibly derived from Netley Hill, in the alluvium.

The calcareous horizon in alluvial material can sometimes give a reflection of the copper content of the underlying bedrock in arid areas, but in this case copper values in the calcareous horizon were not significantly different from surface or deeper samples.

It is apparent that soil sampling in the areas of thick, alluvium (about 12 metres) is of no use; testing of these areas would have to be by drilling for bedrock samples.

Biogeochemical sampling is a possible alternative to soil sampling in the alluvial areas. Salt bushes are plentiful and survive in the driest conditions, suggesting that their root system must be deep seated and could take up minerals representative of the underlying granite.

An orientation survey using salt bush is planned over the Anabama Copper Mine (Fig.2) which consists of a mineralized quartz vein below 3 to 4 metres of alluvium.

The copper anomaly around Netley Hill (Fig.3) which is an area of good outcrop is centred to the north of Netley Hill and coincides with the site of an induced polarization anomaly (Wightman 1972). Follow up work is recommended here.

SCINTILLOMETER SURVEY

In the previous three monthly report (Morris 1973b) two areas of radiometric activity were selected from the results of an airborne radiometric survey (Webb, 1970) for ground checking.

Eastern Area (Fig.2)

This area of radiometric activity is over thick alluvium (about 12 metres) and it was thought that the radiometric anomalies might be due to concentrations of secondary uranium minerals in the alluvium. The anomalies are elongated in a north-south direction, approximately parallel to the drainage pattern.

Four localities were chosen (R1, R2, R3 and R4 Fig.2) in the area for scintillometer readings. At each locality one hole was drilled, with a portable power auger, centred on the anomaly with additional holes 50 metres west and 50 metres east

of that point. Scintillometer readings were taken at the surface, at a depth of about 80 cms and at a depth of about 150 cms. Results are shown on Table 1.

Locality R.1 was the most interesting. The hole centred on the anomaly showed the highest readings which increased with depth. The holes 50 m to the west and east had lower readings but they also increased with depth. Readings from localities R2, R3 and R4 were low and erratic. No uranium minerals were observed in the auger chips. The higher readings at R1 may be due to 1) some concentration of secondary uranium minerals in the alluvium below 1.7 m depth. 2) uranium minerals in the underlying granite or 3) a potassium rich portion of the granite.

TABLE 1

Scintillometer Results

(Technical Associates model PUG-1,series 263 scintillometer)

R.1	counts per minute(cpm)	50 metres East of R.1		50m West of R1	
Depth (in cms)		Depth(in cms)	cpm	Depth(in cms)	cpm
surface	135	surface	114	surface	82
100	170	80	162	80	142
150	191	170	178	150	176
R.2		50 metres East of R.2		50m West of R2	
Depth (in cms)		Depth(in cms)	cpm	Depth(in cms)	cpm
surface	98	surface	70	surface	48
80	124	60	128	60	78
150	132	150	106	150	72

R.3		50 metres East of R.3		50m West of R3	
Depth (in cms)		Depth(in cms)	cpm	Depth(in cms)	cpm
surface	46	surface	98	surface	60
60	122	60	124	60	90
150	94	150	64	150	90

R.4		50 metres East of R.4		50m West of R4	
Depth (in cms)		Depth(in cms)	cpm	Depth(in cms)	cpm
surface	40	surface	58	surface	62
60	92	50	90	100	54
100	70				

R.5		R.6		R.7	
Depth(in cms)	cpm	Depth (in cms)	cpm	Depth(in cms)	cpm
surface	60	surface	88	surface	110
60	58	110	74	creek bed	128

R.8	
Depth (in cms)	
surface	36
100	50

An airborne radiometric anomaly at the western end of the Anabama Granite mass near Maldorky Dam (Fig.3) was investigated by Longreach Metals N.L. and they found granite below about 6 m of alluvium. A scintillometer survey confirmed the anomalous values which were considered to be due to a potassium rich portion of the granite.

No further work is recommended at localities R2, R3, and R4 but scintillometer readings down an auger hole drilled to granite at R1 is recommended.

Western Area (Fig.2)

This area of radiometric activity is also over alluvium. One drill hole to a depth of about 100 cms was made at each of the localities R5, R6 and R8 with scintillometer readings taken at the surface and at the bottom of the hole. The anomaly at R7 was centred on a creek and scintillometer readings were taken on the bank and in the creek bed.

Results at R5, R6 and R8 were all low (Table 1) and slightly higher at R7 which appears to be associated with the heavy mineral concentration in the river gravels. No uranium minerals were observed, and no further work is recommend in this area.

GROUNDWATER SURVEY

The recent heavy rains in the area have caused a large influx of fresh water to the groundwater system diluting the metal content, thus the proposed groundwater survey (Morris 1973) has been postponed till later in the summer to allow the mental concentration to approach equilibrium.

PROPOSED EXPLORATION FOR THE NEXT THREE MONTHLY PERIOD

1. Carry out an orientation biogeochemical survey over the Anabama Copper Mine to determine if salt bush can be used as an indicator of copper mineralization below a thickness of alluvium.

2. Carry on with the kilometer grid soil sampling programme along the margins of the granite mass where there is good outcrop and residual soils.

3. Carry out the proposed groundwater survey.

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BJM:CF
7th February, 1974

REFERENCES

Morris, B.J., 1973a. Exploration Licence 16. Progress Report for the three monthly period ending 26th January, 1973 Department of Mines unpublished report R.B.73/28.

Morris, B.J., 1973b. Exploration Licence 16. Progress Report for the three monthly period ending 26th October, 1973. Department of Mines unpublished report R.B.73/264.

Webb, J.E., 1970. Mines Administration Pty. Ltd. Report on Airborne Radiometric Survey Cockburn and Lilydale Areas. S.M.L.'s 281 and 282 (S.Aust. Dept. of Mines open file Env.1260 - unpublished).

Wightman, W.E., 1972. Netley Hill Induced Polarization Survey No.2. Department of Mines unpublished report R.B.72/226.

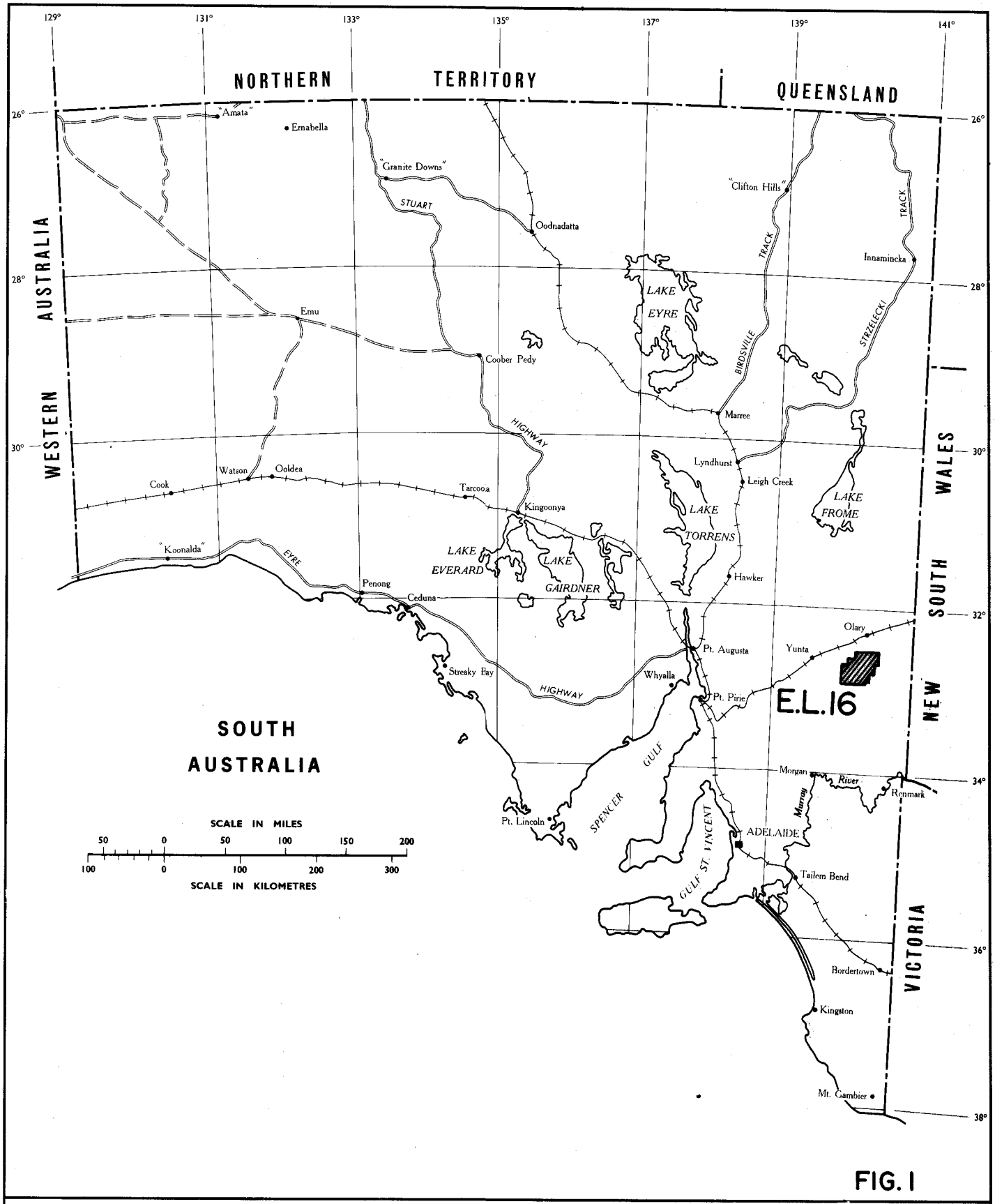
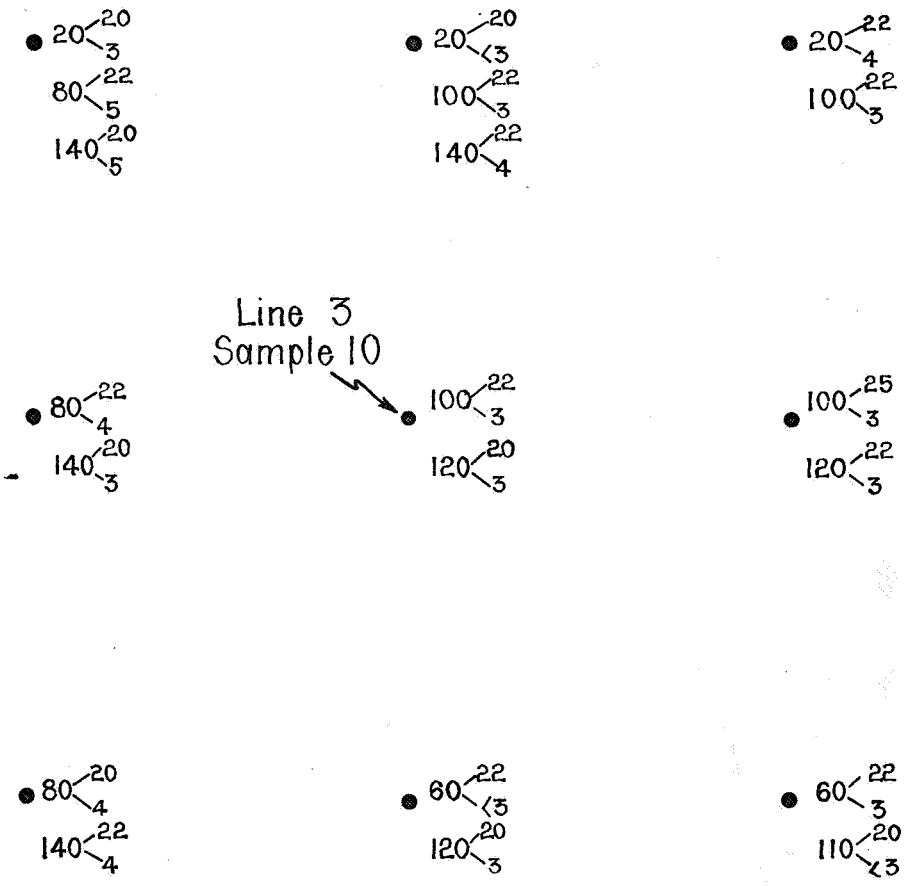


FIG. 1

DEPARTMENT OF MINES —— SOUTH AUSTRALIA

Compiled. A.S.F.	EXPLORATION LICENCE 16 ANABAMA PROJECT LOCALITY PLAN	Date: 30 JAN. 1973
Drn. D.J.M. Ckd.		Drg. No. S10115 Fl

P.F. No. S5850 994.2



LEGEND

22 ppm Cu
20 cms
3 ppm Mo

Soil sample locality showing depth (in cms) of samples and assay values of copper and molybdenum in p.p.m.

23 p.p.m Cu
100 cms
3 p.p.m Mo

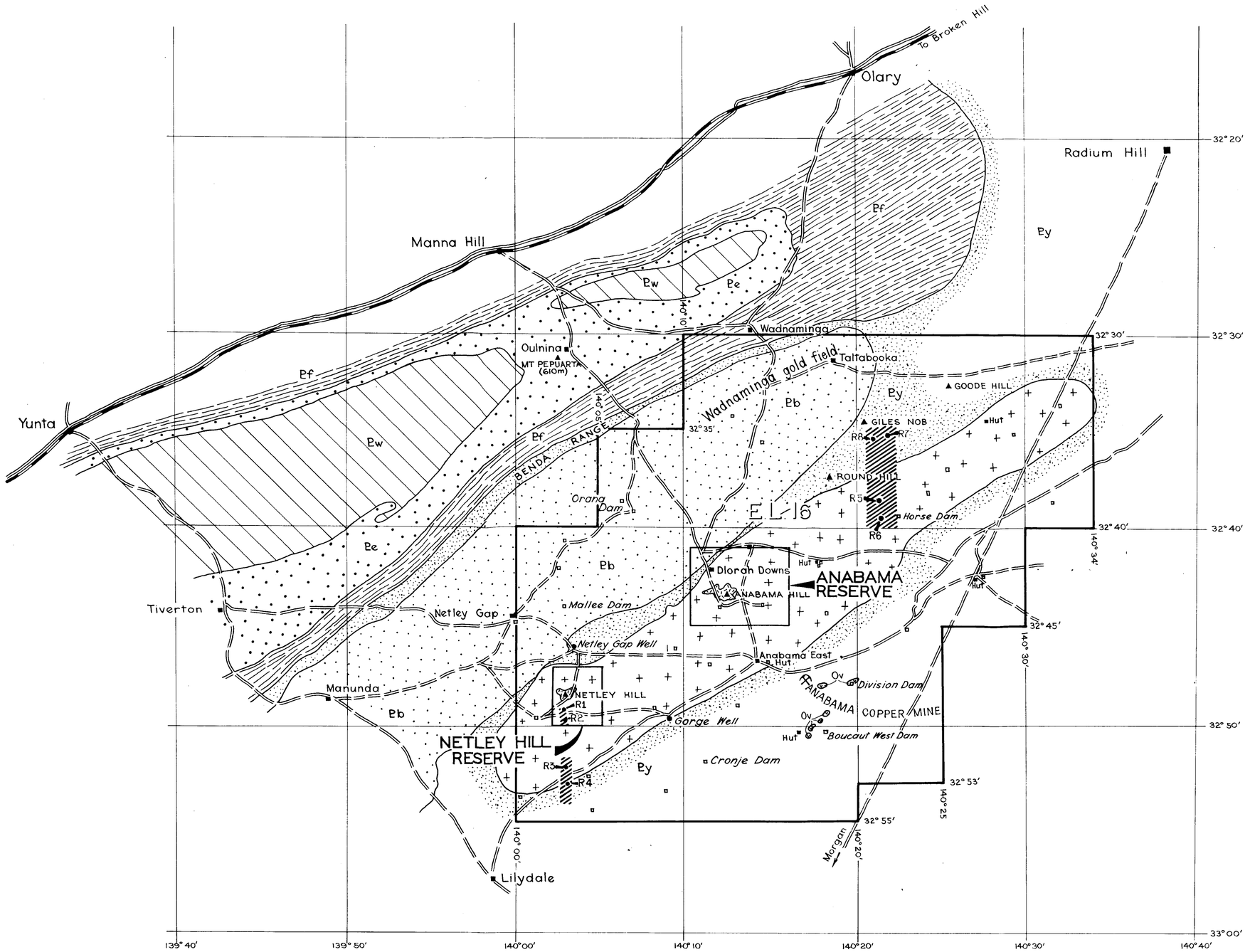
SCALE IN METRES
0 10 20 30 40 50

FIG. 4.

DEPARTMENT OF MINES — SOUTH AUSTRALIA

METALLIC MINERALS SECTION	Drn. BJM Tcd. BDW Ckd. Exd.	EXPLORATION LICENCE 16 SOIL SAMPLE GRID AROUND LINE 3 – SAMPLE 10 REFER PLAN NO 73-534	SCALE: 1 : 1000 S10691 fl DATE: 30 JAN 1974

500–2.69 665



LEGEND

- "Anabama Complex": Greisened granitic suite.
- Anabama Granite (Ordovician). Biotite granite, adamellite and granodiorite.
- Ov — Acid volcanics.

ADELAIDEAN (PROTEROZOIC) — UMBERATANA GP.

- Pw — WILPENA GROUP: Limestones, siltstones, dolomites & quartzites.
- Pe — YERELINA SUB-GROUP: Sandstones, quartzites, Pepuarta Tillite in upper part.
- Pf — FARINA SUB-GROUP: Siltstones, shales.
- Py — YUDNAMUTANA SUB-GROUP: Siltstones, quartzites with Braemar Iron Formation and Appila Tillite.
- Pb — BURRA GROUP: Siltstones, dolomite, quartzites, sandstones.

- Exploration Licence boundary
- Railway
- Highway
- Graded road
- Track
- Homestead
- Dam
- Area of significant airborne radiometric anomaly.
- R1 — Locality of scintillometer reading.

SCALE IN KILOMETRES
5 0 5 10 15 20 25 30
4 2 0 4 8 12 16 20
SCALE IN MILES

Regional geology after B.G. Forbes, (Olary 1:250 000)

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EXPLORATION LICENCE 16
ANABAMA PROJECT
REGIONAL GEOL. MAP & RADIOMETRIC ANOMALIES

METALLIC MINERALS SECTION		Drn. B.J.M.	SCALE: 1:250 000 (Orig)
		Tcd. A.F.	74-80
		Ckd.	Fl
Director of Mines		Exd.	DATE: 15 January 1973

FIG. 2.

140°00' 10' 20' 140°30' 140°40'

32°30' 35' 40' 32°45' 50' 55' 33°00'

WADNAMINGA

MUTOOROO

ANABAMA

LINE 1 LINE 2 LINE 3 LINE 4 LINE 5 LINE 6 LINE 7 LINE 8 LINE 9 LINE 10 LINE 11 LINE 12 LINE 13 LINE 14 LINE 15

EXPLORATION LICENCE 16

KILOMETRES 0 1 2 3 4 5 6 8 10 12 14 KILOMETRES

MILES 0 1 2 3 4 6 MILES

LEGEND

- Track
- Stream course
- Inferred boundary of granite
- Soil sample locations
- Contours of copper (values in parts per million)

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ANABAMA PROJECT
EXPLORATION LICENCE 16
SOIL SAMPLE RESULTS

METALLIC MINERALS SECTION		Drn. BJM	SCALE: 1:100 000 (orig.)
		Trd. DJM	73-534
		Chd.	FB
Director of Mines		Encl.	DATE: 6 AUG. '73

73-534 7 L