Open File Envelope No. 8900

EL 1872

ROOPENA WEST

ANNUAL REPORTS FOR THE PERIOD 1/10/93 TO 30/9/98

Submitted by

WMC Resources Ltd and Normandy Gold Ltd
1998

Enquiries: Customer Services
Ground Floor
101 Grenfell Street, Adelaide 5000

Telephone: (08) 8463 3000
Facsimile: (08) 8204 1880

PRIMARY INDUSTRIES AND RESOURCES SA

WESTERN MINING CORPORATION LIMITED
EXPLORATION DIVISION

ANNUAL REPORT

FOR

E.L. 1872 - ROOPENA WEST

1ST OCTOBER, 1993 TO 30TH SEPTEMBER, 1994

PASADENA, S.A.
MAY, 1995

S. J. G. WOFFENDEN
PROJECT GEOLOGIST

TABLE OF CONTENTS

Page No.

1. INTRODUCTION 1

2. REGIONAL GEOLOGY 1

3. WORK COMPLETED 2

4. PROPOSED WORK 2

5. EXPENDITURE SUMMARY 2

6. REFERENCES 3

LIST OF FIGURES

Figure

1. Roopena Project, Lease Location Plan

2. Stratigraphy, South Eastern Gawler Craton

3. Schematic Regional Geology, Roopena Project, S.A.

4. Roopena West, Area of Aeromagnetic Survey

LIST OF PLANS

Plan

1. Bouguer Gravity Contour Plan, E.L. 1872, Sheet 6332 (Roopena) 1:100,000

2. Bouguer Gravity Contour Plan, E.L. 1872, Sheet 6333 (Carriewerloo) 1:100,000

1. INTRODUCTION

Exploration Licence 1872 was granted to Western Mining Corporation Limited (WMC) on the 1st October, 1993 for a period of one year. The term of the licence was renewed in 1994, and is now valid until 30th September, 1995.

The E.L. covers an area of 1,018 km^2 and is located to the northeast of Iron Knob and adjacent to WMC's E.L. 1775 on eastern Eyre Peninsula (Figure 1).

The target ore type is Cu-Au occurrences comparable to those on the Stuart Shelf or the Eastern Succession of the Mt Isa Block.

2. REGIONAL GEOLOGY

The regional geology of the eastern Eyre Peninsula is poorly understood due to the generally poor outcrop conditions. In an attempt to place the stratigraphy into a regional context WMC refers to the "Whyalla Group" (Figure 2); a sequence of Early Proterozoic volcanic and sedimentary rocks which unconformably overlies the early Proterozoic Hutchison Group, and is overlain by younger Gawler Range volcanic and sedimentary rocks.

The geochronology of units within the Whyalla Group, and those bounding it, indicate that its age spans the period 1800Ma to 1650Ma.

The Whyalla Group occupies a N-S belt immediately east of the Middleback Ranges and west of Whyalla (Figure 3). It has regional correlatives in the Moonta-Wallaroo area. The belt appears to be fault-bound on both its western and eastern sides, and is overlain unconformably to the north by Gawler Range volcanic and sedimentary rocks.

Simplistically, the Whyalla Group consists of two volcanic-sedimentary cycles - the lower Myola Volcanics and Broadview Schist and the upper McGregor Volcanics and Moonabie Formation. The McGregor Volcanics-Moonabie Formation have been correlated on the basis of geochronology with the Moonta Porphyry and Doora Schist.

The lower part of the Whyalla Group is intruded by the Wertigo Granite, a Lincoln Complex granite equated with the Middlecamp Granite which has an age of 1757Ma (U-Pb). On the basis of image processed aeromagnetics the Wertigo Granite has a comparable pattern to the Myola Volcanics and may therefore be related to the volcanic rocks. The entire Whyalla Group is intruded by Hiltaba Suite granites (e.g. Charleston Granite, 1585Ma U-Pb, Creaser and Fanning, 1993). The "Whalers Granite" (informal name) occurs on the northeastern side of the belt and belongs to the Hiltaba Suite.

The lower part of the Whyalla Group has undergone two of the three phases of the Kimban Orogeny. The regional structure can be interpreted to consist of tight to open folds with axial plane sub-parallel to faults having NNW and NNE orientations.

.. /2 ..

Two documented areas of historic workings occur within the Whyalla belt. The Murninnie Mine, situated 40 km SSW of Whyalla, was mined for Cu and Bi during the period 1860-1900. The mine was reassessed during 1970 but no exploration was carried out(MESA open file reports). Numerous small diggings occur at "Hancocks Prospect" within the McGregor Volcanics, but no records of production exist.

3. WORK COMPLETED

Airborne magnetics and radiometrics were completed at 200 m line spacing over the area shown on Figure 4. This was part of the 400 m line spacing SAEI survey over the Roopena 1:1,000,000 sheet (area B4), and WMC paid to have the 200 m infill lines flown.

A semi-regional gravity survey involving gravity stations being read along roads and tracks throughout the area was completed (Plans 1 and 2).

4. PROPOSED WORK

The aeromagnetics and gravity data will be used to define areas for reconnaissance electrical geophysics surveys during 1995. These surveys may define targets which warrant drill testing.

5. EXPENDITURE SUMMARY

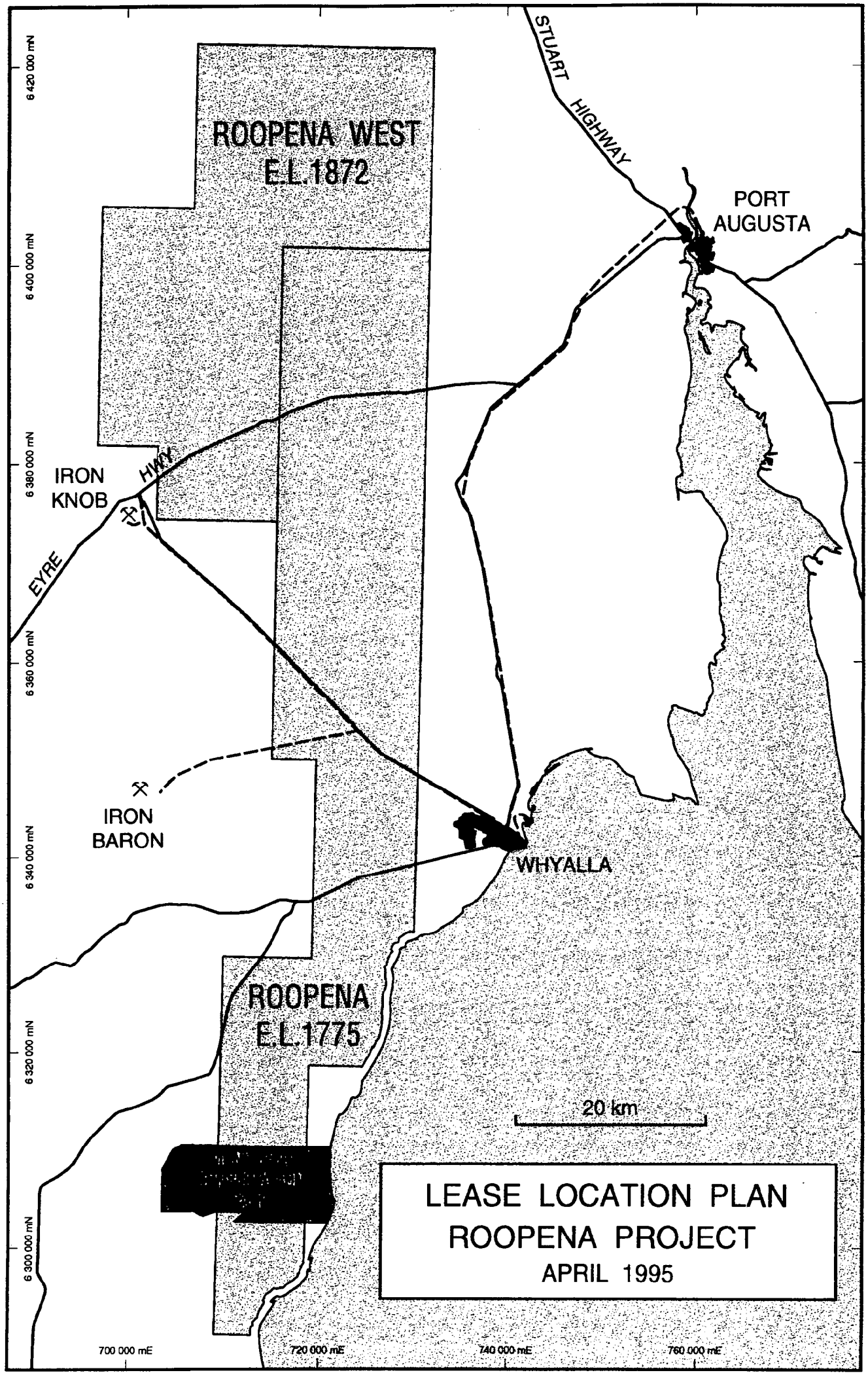
WMC Expenditure on E.L. 1872 - Roopena West.

EXPENDITURE FROM 1ST SEPTEMBER, 1993 TO 31ST AUGUST, 1994	
Activity	**$**
Geology	43,186
Geophysics	28,295
Geochemistry	3,162
Drafting	753
Analytical	-
Drilling	-
Leasing	2,147
Administration	8,288
TOTAL	**$85,831**

.. /3 ..

6. REFERENCES

Creaser, R.A., and Fanning, C.M., 1993, A U-Pb study of the Mesoproterozoic Charleston Granite, Gawler Craton, South Australia. Aust. Jnl. Earth Sciences, v40, 519-526.



P:\CORELDRW\DRAWINGS\GAWLER_C\ROOPENA\PAS3-30A.CDR 16/5/95

FIG.1

STRATIGRAPHY
SOUTH EASTERN GAWLER CRATON

(all ages U - Pb Zircon)

Pandurra Formation (Stuart Shelf)

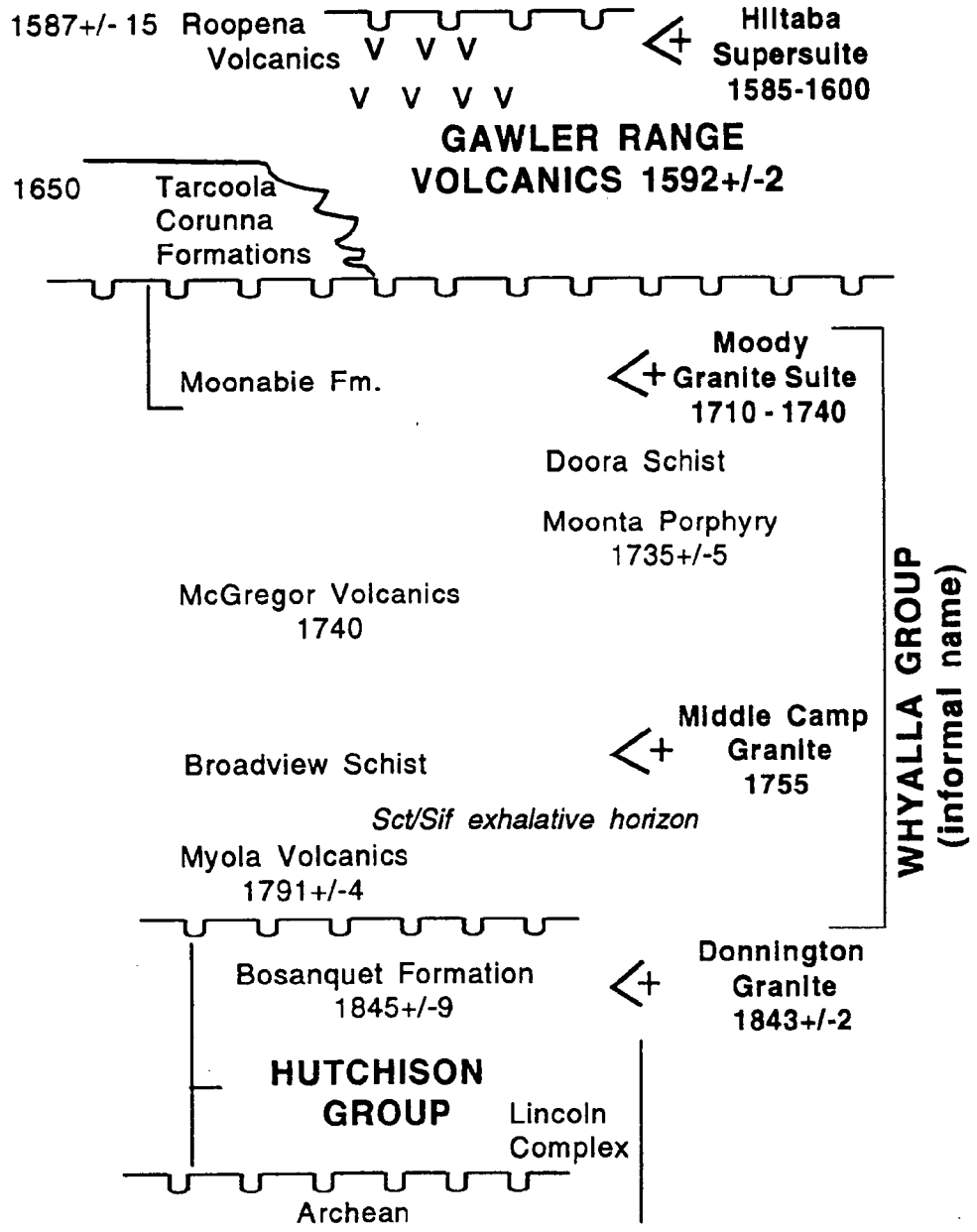
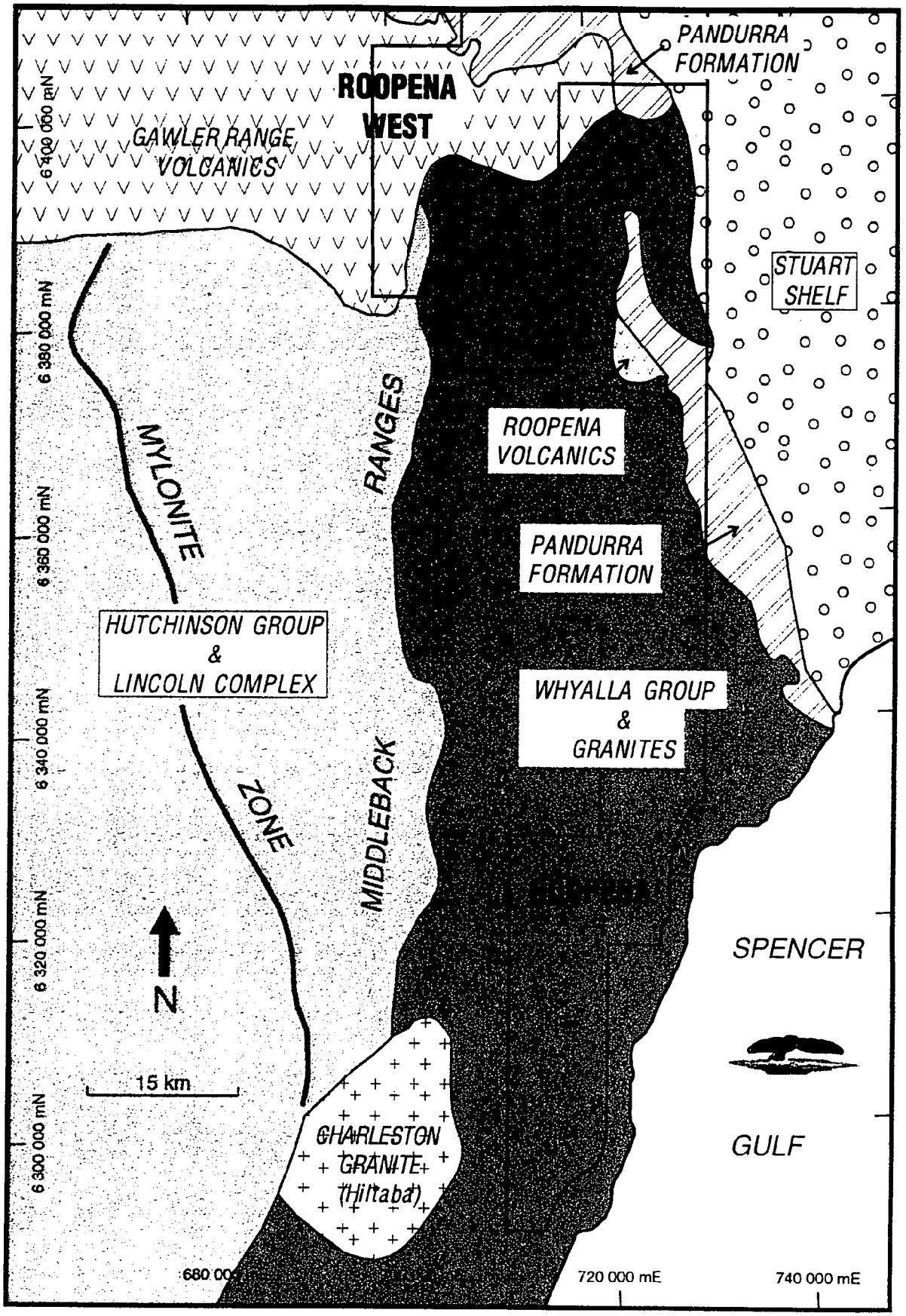


Figure 2



ROOPENA PROJECT S.A.
SCHEMATIC REGIONAL GEOLOGY

FIG.3

D:\CORELDRW\DRAWINGS\ROOPENA\PAS3-88.CDR (16/5/95)

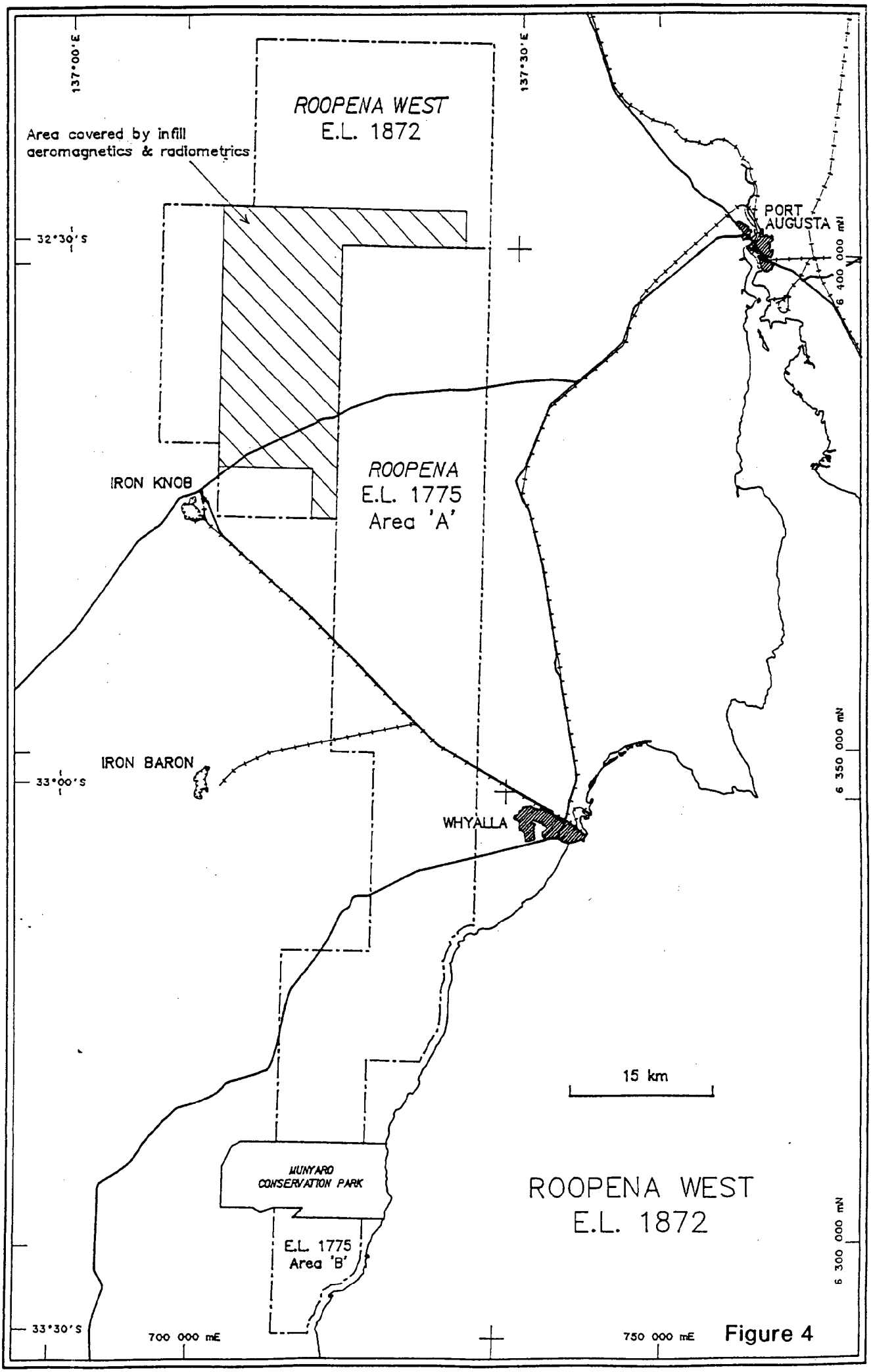

137°00'E
137°30'E
ROOPENA WEST
E.L. 1872
Area covered by infill
aeromagnetics & radiometrics
32°30'S
PORT
AUGUSTA
6 400 000 mN
ROOPENA
E.L. 1775
Area 'A'
IRON KNOB
IRON BARON
33°00'S
WHYALLA
6 350 000 mN
15 km
MUNYARO
CONSERVATION PARK
E.L. 1775
Area 'B'
ROOPENA WEST
E.L. 1872
6 300 000 mN
33°30'S
700 000 mE
750 000 mE

Figure 4

SHEET No. 6332

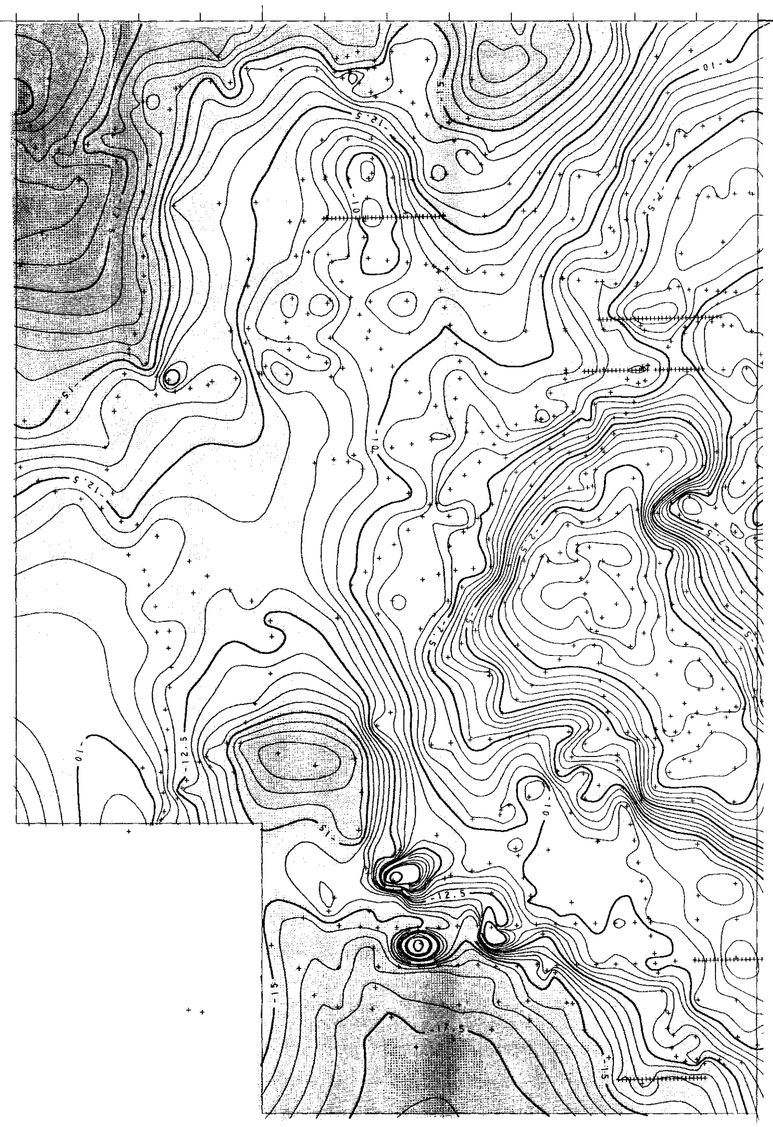
690000mE 700000mE 710000mE 720000mE 730000mE

32.30.00 lat — 32.30.00 lat

137.00.00 long — 137.30.00 long

6400000mN 6390000mN 6380000mN 6370000mN 6360000mN 6350000mN

ROOPENA WEST E.L.1872



-4.16
-5.47
-6.49
-7.25
-8.01
-8.71
-9.35
-9.89
-10.48
-11.04
-11.53
-12.09
-12.64
-13.13
-13.70
-14.29
-14.82
-15.46
-16.16
-16.93
-17.68
-18.70
-20.01
-21.74

GRAVITY
MGALS

33.00.00 lat — 33.00.00 lat

137.00.00 long — 137.30.00 long

690000mE 700000mE 710000mE 720000mE 730000mE

INDEX TO ADJOINING SHEETS

6233	6333	6433
6232	6332	6432
6231	6331	6431

SCALE 1:100000

2000 0 4000 8000
Metres

AUSTRALIAN MAP GRID
Grid interval 10000 Metres

GRID CELL SIZE = 200M
CONTOUR INTERVAL = 0.5,2.5 mGals
SURVEY DATE = ALL DATA TO 30May95
DATUM = GSN71
DATA FILE = RO_BEGN.GRV
COST CODE = 4174

8900-1

WESTERN MINING CORPORATION LIMITED
EXPLORATION DIVISION

GAWLER CRATON PROJECT

E.L. 1872 - ROOPENA WEST

BOUGUER GRAVITY

DATE: 30-05-95	AUTHOR: K.HUTCHINGS	PLAN NO. 1
SCALE: 1:100,000	MAP REF. 6332	

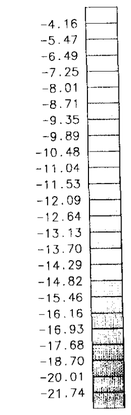
SHEET No. 6333

690000mE 700000mE 710000mE 720000mE 730000mE

32.00.00 lat — 32.30.00 lat

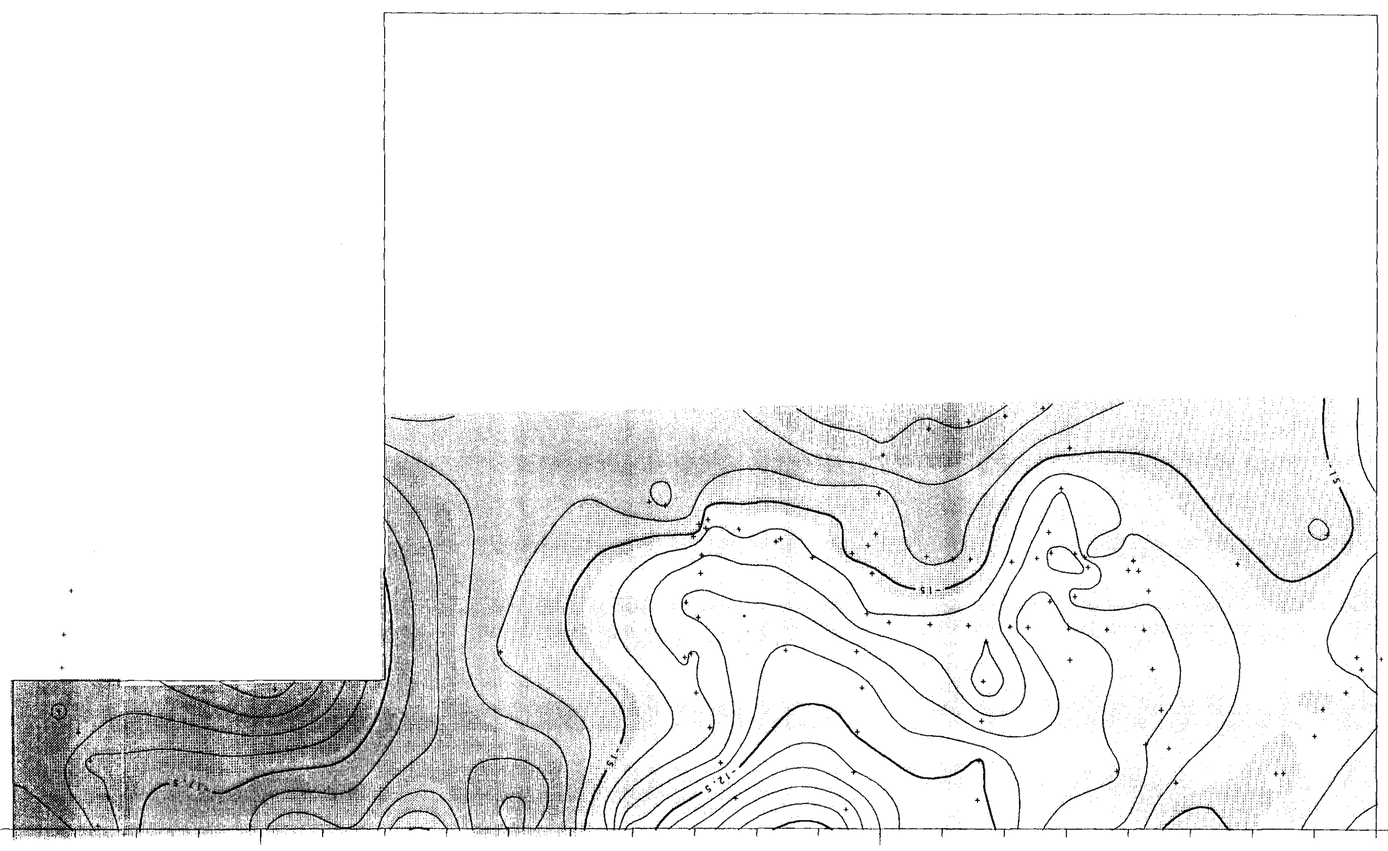
137.00.00 long — 137.30.00 long

6450000mN 6440000mN 6430000mN 6420000mN 6410000mN



GRAVITY
MGALS

ROOPENA WEST E.L.1872



690000mE 700000mE 710000mE 720000mE 730000mE

32.30.00 lat — 32.30.00 lat

137.00.00 long — 137.30.00 long

8900-2

INDEX TO ADJOINING SHEETS

6234	6334	6434
6233	6333	6433
6232	6332	6432

SCALE 1:100000

2000 0 4000 8000
Metres

AUSTRALIAN MAP GRID
Grid interval 10000 Metres

GRID CELL SIZE = 200M
CONTOUR INTERVAL = 0.5,2.5 mGals
SURVEY DATE = ALL DATA TO 30May95
DATUM = IGSN71
DATA FILE = PO_REGN.GRV
COST CODE = 4174

WESTERN MINING CORPORATION LIMITED
EXPLORATION DIVISION

GAWLER CRATON PROJECT

E.L. 1872 - ROOPENA WEST

BOUGUER GRAVITY

DATE: 30-05-95	AUTHOR: K.HUTCHINGS	PLAN NO. 2
SCALE: 1:100,000	MAP REF. 6333	

WESTERN MINING CORPORATION LIMITED
EXPLORATION DIVISION

ANNUAL REPORT

FOR

E.L. 1872 - ROOPENA WEST

1ST OCTOBER, 1994 TO 30TH SEPTEMBER, 1995

PASADENA, S.A.
FEBRUARY, 1996

R. R. RAMSAY
PROJECT GEOLOGIST

TABLE OF CONTENTS

Page No.

1. INTRODUCTION 1
2. REGIONAL GEOLOGY 1
3. WORK COMPLETED 2
4. PROPOSED WORK 3
5. EXPENDITURE SUMMARY 3
6. REFERENCES 3

LIST OF APPENDICES

Appendix

1. Round Hill, Block Dam, Pankalla and Kittle Prospects Lag Sample Co-ordinates and Assay Results
2. I.P. Results - Block Dam, Round Hill, Pankalla and Kittle Prospects

LIST OF FIGURES

Figure

1. Roopena Project, Lease Location Plan
2. Stratigraphy, South Eastern Gawler Craton
3. Schematic Regional Geology, Roopena Project, S.A.

LIST OF PLANS

Plan

1. Bouguer Gravity Contour Plan, E.L. 1872, Sheet 6332 (Roopena) 1:100,000
2. Bouguer Gravity Contour Plan, E.L. 1872, Sheet 6333 (Carriewerloo) 1:100,000
3. Induced Polarization Lines, E.L. 1872, Sheet 6332 (Roopena) 1:100,000

1. INTRODUCTION

Exploration Licence 1872 was granted to Western Mining Corporation Limited (WMC) on the 1st October, 1993 for a period of one year. The term of the licence was renewed in 1994, and is now valid until 30th September, 1996.

The E.L. covers an area of 1,018 km^2 and is located to the northeast of Iron Knob and adjacent to WMC's E.L. 1775 on eastern Eyre Peninsula (Figure 1).

The target ore type is Cu-Au occurrences comparable to those on the Stuart Shelf or the Eastern Succession of the Mt. Isa Block.

2. REGIONAL GEOLOGY

The regional geology of the eastern Eyre Peninsula is poorly understood due to the generally poor outcrop conditions. In an attempt to place the stratigraphy into a regional context WMC refers to the "Whyalla Group" (Figure 2); a sequence of Early Proterozoic volcanic and sedimentary rocks which unconformably overlies the early Proterozoic Hutchison Group, and is overlain by younger Gawler Range volcanic and sedimentary rocks.

The geochronology of units within the Whyalla Group, and those bounding it, indicate that its age spans the period 1800Ma to 1650Ma.

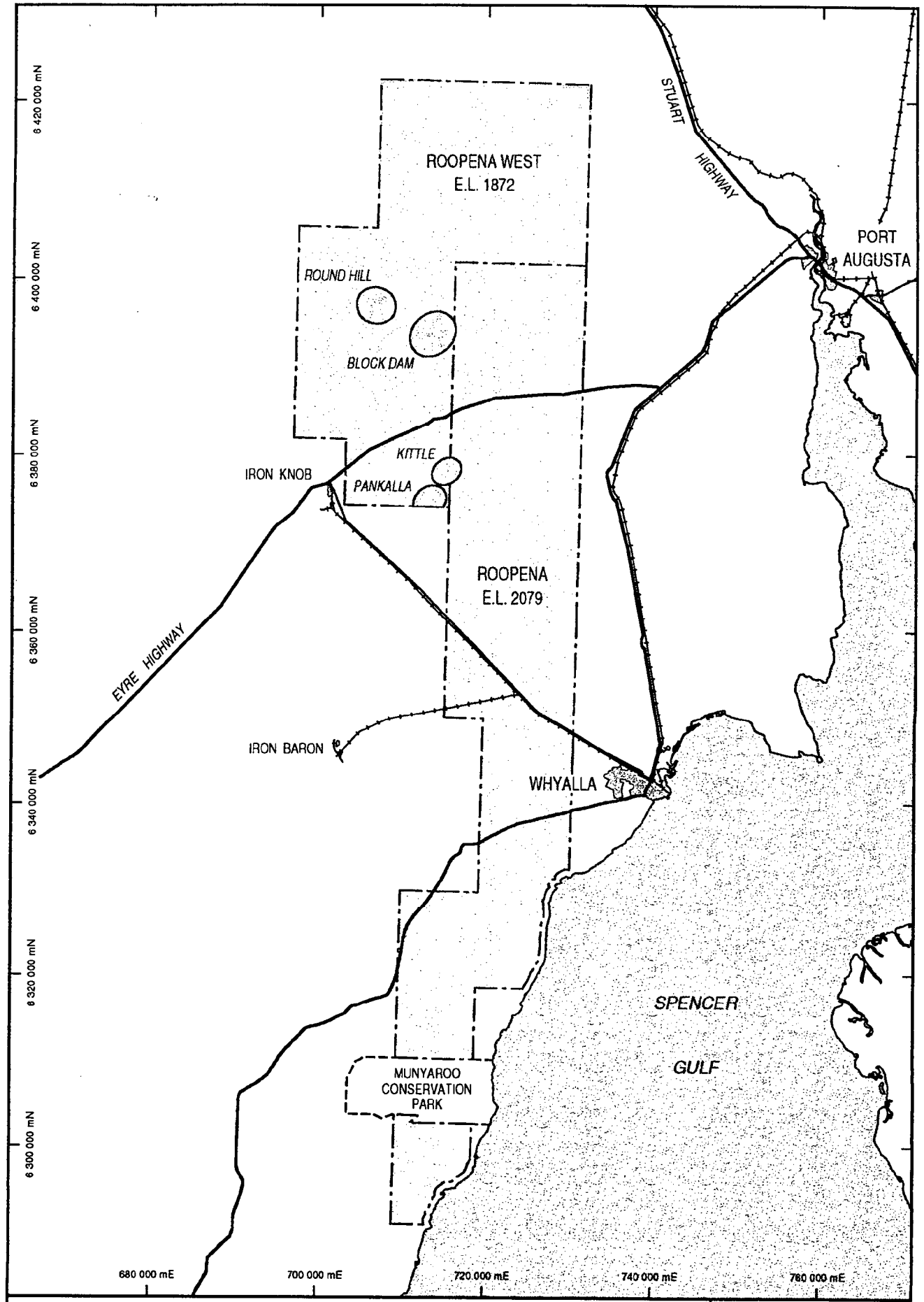
The Whyalla Group occupies a N-S belt immediately east of the Middleback Ranges and west of Whyalla (Figure 3). It has regional correlatives in the Moonta-Wallaroo area. The belt appears to be fault-bound on both its western and eastern sides, and is overlain unconformably to the north by Gawler Range volcanic and sedimentary rocks.

Simplistically, the Whyalla Group consists of two volcanic-sedimentary cycles - the lower Myola Volcanics and Broadview Schist and the upper McGregor Volcanics and Moonabie Formation. The McGregor Volcanics-Moonabie Formation have been correlated on the basis of geochronology with the Moonta Porphyry and Doora Schist.

The lower part of the Whyalla Group is intruded by the Wertigo Granite, a Lincoln Complex granite equated with the Middlecamp Granite which has an age of 1757Ma (U-Pb). On the basis of image processed aeromagnetics the Wertigo Granite has a comparable pattern to the Myola Volcanics and may therefore be related to the volcanic rocks. The entire Whyalla Group is intruded by Hiltaba Suite granites (e.g. Charleston Granite, 1585Ma U-Pb, Creaser and Fanning, 1993). The "Whalers Granite" (informal name) occurs on the northeastern side of the belt and belongs to the Hiltaba Suite.

The lower part of the Whyalla Group has undergone two of the three phases of the Kimban Orogeny. The regional structure can be interpreted to consist of tight to open folds with axial plane sub-parallel to faults having NNW and NNE orientations.

.. /2 ..



WESTERN MINING CORPORATION LIMITED - EXPORATION DIVISION		Scale: 1:600,000
Map Ref.:	ROOPENA WEST PROJECT	Figure No. 1
Date: 4-1-96	PROSPECT LOCATION PLAN	Plan No. 7054-222
Author: R.R. Ramsay		
Revised:		

STRATIGRAPHY
SOUTH EASTERN GAWLER CRATON

(all ages U - Pb Zircon)

Pandurra Formation (Stuart Shelf)

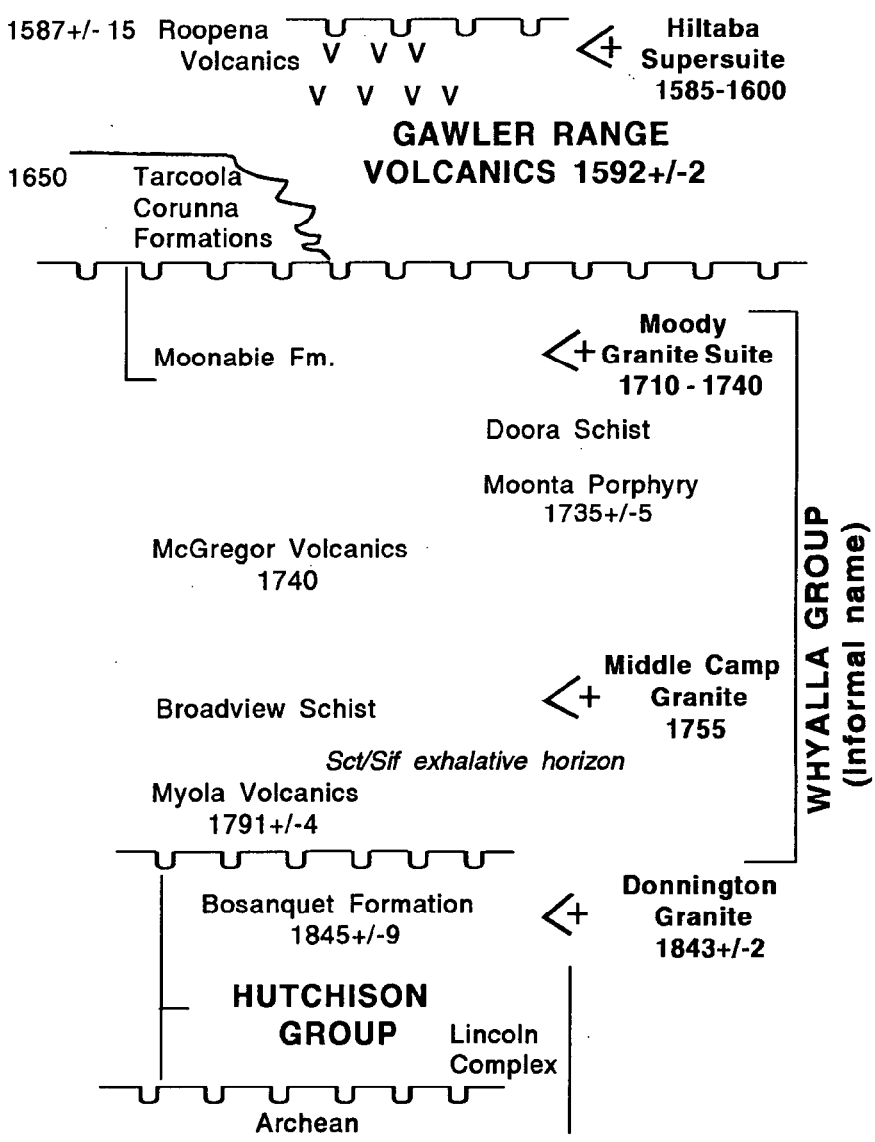
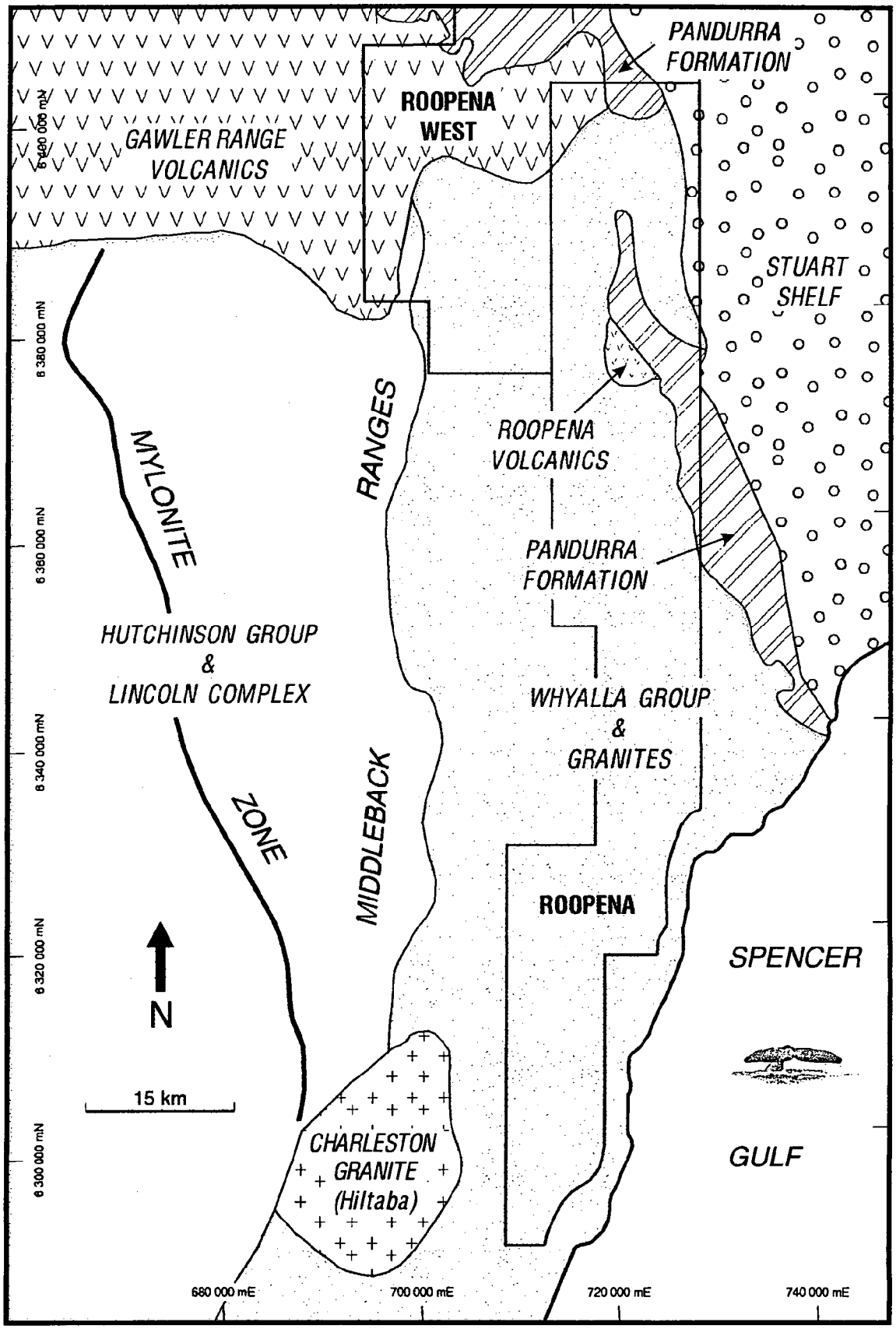


FIGURE 2

P:\CORELDRW\DRAWINGS\GAWLRCRT\PAS 3-14.CDR (22/2/94)



ROOPENA PROJECT - SOUTH AUSTRALIA
SCHEMATIC REGIONAL GEOLOGY

FIGURE 3

P:\CORELDRW\DRAWINGS\GAWLRCRT\ROOPENA\PAS3-8B.CDR (16/5/95)

Two documented areas of historic workings occur within the Whyalla belt. The Murninnie Mine, situated 40 km SSW of Whyalla, was mined for Cu and Bi during the period 1860-1900. The mine was reassessed during 1970 but no exploration was carried out(MESA open file reports). Numerous small diggings occur at "Hancocks Prospect" within the McGregor Volcanics, but no records of production exist.

3. WORK COMPLETED

Minor gravity surveys were conducted to infill regional coverage to a minimum density of one reading per square km. The interpretation of the regional gravity and aeromagnetics lead to the identification of four prospects.

Round Hill

A 2 km spread of 200 m dipole-dipole induced polarisation and 31 gravity stations at 100 m intervals was read on line 6 397 000N. No obvious responders were identified from this survey. Reconnaissance lag sampling along this line was also conducted and submitted for Cu and Au. A 930 ppb Au assay occurs at the western end of this line supported by values of 22, 2 and 4 ppb Au. The 930 ppb sample was re-assayed and returned a value of 76 ppb Au which is still strongly anomalous. A small grid has been pegged around the anomalous sample in preparation for follow-up sampling.

Block Dam

The magnetic anomaly at this location is coincident on the ground with a number of small ironstone capped rises. A 2 km spread of 200 m dipole-dipole induced polarisation and 31 gravity stations at 100 m intervals were read on lines 6 394 300N and 6 393 000N. Weak phase responses were identified associated with this survey. Reconnaissance lag sampling along this line was also conducted and submitted for Cu and Au, however no significant anomalism was detected.

Kittle

A 2 km spread of 200 m dipole-dipole induced polarisation and 21 gravity stations at 100 m intervals was read on line 6 378 000N. No obvious responders were identified from this survey. Reconnaissance lag sampling along this line was also conducted and submitted for Cu and Au, however no significant anomalism was detected.

Pankalla

A 2 km spread of 200 m dipole-dipole induced polarisation and 23 gravity stations at 100 m intervals was read on line 6 375 000N. No obvious responders were identified from this survey. Reconnaissance lag sampling along this line was also conducted and submitted for Cu and Au, however no significant anomalism was detected.

.. /3 ..

4. PROPOSED WORK

A small lag sampling program to follow up the anomalous gold sample at Round Hill will take place. The results of this survey will determine whether any further work will be conducted.

5. EXPENDITURE SUMMARY

EXPLORATION LICENCE 1872 ROOPENA WEST	
Activity	**$**
Geology	12,799
Geophysics	23,665
Geochemistry	6,758
Drafting	123
Field Costs	228
Drilling	600
Administration	27,786
TOTAL	**$71,959**

The expenditure statement above covers the twelve months from 1st October, 1994 to 30th September, 1995.

6. REFERENCES

Creaser, R.A., and Fanning, C.M., 1993, A U-Pb study of the Mesoproterozoic Charleston Granite, Gawler Craton, South Australia. Aust. Jnl. Earth Sciences, v40, 519-526.

Woffenden, S.J.G., 1994, Annual Report for E.L. 1872, 1st October, 1993 to 30th September, 1994. WMC report to MESA.

APPENDIX 1

LAG SAMPLING CO-ORDINATES AND ASSAY RESULTS

BLOCK DAM

ROUND HILL

PANKALLA

KITTLE

TRAVERSE SAMPLING

FORM 280

ARS No MIN5803

SAMPLE PREFIX	CO-ORD or No	N/E	AZM	MAP REF / PHOTO
QD64	6394300	N/E		

ACTIVE CO-ORD METRES E	SOIL TYPE	C	GEOLOGY	S	REMARKS 1	REMARKS 2
7606						
7112000						
050						
100						
150						
200						
250						
300						
350						
400						
450						
500						
550						
600						
650						
700						
750						
800						
850						
900						
950						
7113000						
050						
100						
150						
200						
250						
300						
350						
400						
450						

PROJECT / PROSPECT	SAMPLED BY	SAMPLE TYPE
ROOPENA / BLOCK DAM WEST	DSL / SJGW	-6+2 mm
COST CODE 4176	DATE 1/6/95	

TRAVERSE SAMPLING

FORM 280

ARS No MIN5803

SAMPLE PREFIX	CO-ORD or No	N/E	AZM	MAP REF / PHOTO
QD64	6394300	N/E		

ACTIVE CO-ORD METRES N/E	SOIL TYPE	C	GEOLOGY	S	REMARKS 1	REMARKS 2
7636						
7113500					↑NW trending	
550					at ridge,	
600					~10m elevation	
650						
700						
750						
800						
850						
900			NO SAMPLE		recent dam	
950					seds.	
7114000						
050						
100						
150						
200						
250						
300					Qtzite float	
350					-no fe	
400						
450						
500						
550						
600						
650						
700						
750						
800						
850						
900						
950						

PROJECT / PROSPECT	SAMPLED BY	SAMPLE TYPE
ROOPENA / BLOCK DAM WEST	SJGW / DSL	-6+2m
COST CODE 4176	DATE 1/6/95	

TRAVERSE SAMPLING

FORM 280

ARS No MIN5803

SAMPLE PREFIX	CO-ORD or No	AZM	MAP REF / PHOTO
QD64	6394300 (N)/E		

SAMPLE PREFIX	ACTIVE CO-ORD METRES N/E	SOIL TYPE	C	GEOLOGY	S	REMARKS 1	REMARKS 2
7666	715000			Qtzite.			
	END OF TRAVERSE						

PROJECT / PROSPECT	SAMPLED BY	SAMPLE TYPE
ROOPENA WEST / BLOCK DAM.	SJGW/DSL	-6 +2mm.
COST CODE 4176	DATE 1/6/95	

TRAVERSE SAMPLING

FORM 280

ARS No MIN5803

SAMPLE PREFIX	CO-ORD or No	AZM	MAP REF / PHOTO
QD64	6393000 N/E		

SAMPLE PREFIX	ACTIVE CO-ORD METRES N/E	SOIL TYPE	C	GEOLOGY	S	REMARKS 1	REMARKS 2
7667	711700						
68	750						
69	800						
70	850						
71	900						
72	950						
73	712000						
74	050						
75	100						
76	150						
77	200						
78	250						
79	300						
80	350						
81	400						
82	450						
83	500						
84	550						
85	600						
86	650						
87	700						
88	750						
89	800						
90	850						
91	900						
92	950						
93	713000						
94	050						
95	100						
96	150						

PROJECT / PROSPECT	SAMPLED BY	SAMPLE TYPE
ROOPENA WEST / BLOCK DAM	DSL / SJGW	-6 +2mm
COST CODE 4176	DATE 1/6/95	

TRAVERSE SAMPLING

FORM 280

ARS No MIN5803

SAMPLE PREFIX	CO-ORD or No	N/E	AZM	MAP REF / PHOTO
QD64	6393000	N		

SAMPLE PREFIX	ACTIVE CO-ORD METRES N/E	SOIL TYPE	C	GEOLOGY	S	REMARKS 1	REMARKS 2
7697	713200						
98	250						
99	300						
7700	350						
01	400						
02	450						
03	500						
04	550						
05	600						
06	650						
07	700						
08	750						
09	800						
10	850						
11	900						
12	950						
13	4000						
14	050						
15	100						
16	150						
17	200						
18	250						
19	300						
20	350						
21	400						
22	450						
7723	500			END OF TRAVERSE			

PROJECT / PROSPECT	SAMPLED BY	SAMPLE TYPE
ROOPENA / BLOCK DAM WEST	DSL/SJGW	-6+2mm
COST CODE 4176	DATE 1/6/95	

TRAVERSE SAMPLING

FORM 280

ARS No MIN5803

SAMPLE PREFIX	CO-ORD or No	N/E	AZM	MAP REF / PHOTO
QD64	6397000	N		

SAMPLE PREFIX	ACTIVE CO-ORD METRES N/E	SOIL TYPE	C	GEOLOGY	S	REMARKS 1	REMARKS 2
7724	705000						
25	050						
26	100						
27	150						
28	200						
29	250						
30	300						
31	350						
32	400			NO SAMPLE			
33	450						
34	500						
35	550						
36	600						
37	650						
38	700						
39	750			NO SAMPLE			
40	800						
41	850						
42	900						
43	950						
44	6000						
45	050						
46	900						
47	150						
48	200						
49	250						
50	300			NO SAMPLE			
51	350						
52	400			NO SAMPLE			
7753	706450						

PROJECT / PROSPECT	SAMPLED BY	SAMPLE TYPE
ROOPENA / ROUNDHILL WEST	DSL/SJGW	-6+2mm
COST CODE 4176	DATE 1/6/95	

TRAVERSE SAMPLING

FORM 280

ARS No MIN5803

SAMPLE PREFIX	CO-ORD or No	N/E	AZM	MAP REF / PHOTO
QD64	6397000	N		

SAMPLE PREFIX	ACTIVE CO-ORD METRES ~~N~~ E	SOIL TYPE	C	GEOLOGY	S	REMARKS 1	REMARKS 2
7754	706500						
755	550						
56	600						
57	650			NO SAMPLE			
58	700						
59	750						
60	800						
61	850						
62	900						
63	950						
64	707000						
65	050						
66	100						
67	150						
68	200						
69	250						
70	300						
71	350						
72	400						
73	450						
74	500						
75	550						
76	600						
77	650						
78	700						
79	750						
80	800						
81	850			NO SAMPLE			
82	900						
7783	707950						

PROJECT / PROSPECT	SAMPLED BY	SAMPLE TYPE
ROOPENA WEST / ROUND HILL	D&L / SJGW	-6+2mm
COST CODE 4176	DATE 1/6/95	

TRAVERSE SAMPLING

FORM 280

ARS No MIN 5803

SAMPLE PREFIX	CO-ORD or No	N/E	AZM	MAP REF / PHOTO
DA64	6397000	N/E		

SAMPLE PREFIX	ACTIVE CO-ORD METRES N/E	SOIL TYPE	C	GEOLOGY	S	REMARKS 1	REMARKS 2
7784	708000						
	END						

PROJECT / PROSPECT	SAMPLED BY	SAMPLE TYPE
ROOPENA WEST / ROUND HILL	DSL/SJGW	-6+2mm
COST CODE 4176	DATE 1/6/95	

TRAVERSE SAMPLING

FORM 280

ARS No MIN 5803

SAMPLE PREFIX	CO-ORD or No	AZM	MAP REF / PHOTO
QD 64	6375000 (N)/E		

SAMPLE PREFIX	ACTIVE CO-ORD METRES N/E	SOIL TYPE	C	GEOLOGY	S	REMARKS 1	REMARKS 2
7785	712000						
86	050						
87	100						
88	150						
89	200			NO SAMPLE			
90	250						
91	300						
92	350						
93	400						
94	450						
95	500						
96	550						
97	600						
98	650						
99	700						
800	750						
01	800						
02	850						
03	900						
04	950						
05	3000						
06	050						
07	100						
08	150						
09	200						
10	250						
11	300						
12	350						
13	400						
7814	450						

PROJECT / PROSPECT	SAMPLED BY	SAMPLE TYPE
ROOPENA WEST / PANKALLA	DSL/SJGW	-6+2mm
COST CODE 4176	DATE 2/6/95	

TRAVERSE SAMPLING

FORM 280

ARS No MIN 5803

SAMPLE PREFIX	CO-ORD or No	AZM	MAP REF / PHOTO
QD64	6375000 (N)/E		

SAMPLE PREFIX	ACTIVE CO-ORD METRES N/E	SOIL TYPE	C	GEOLOGY	S	REMARKS 1	REMARKS 2
7815	713500						
16	550						
17	600						
18	650						
19	700						
20	750						
21	800						
22	850						
23	900						
24	950						
25	4000						
26	050						
27	100						
28	150						
7829	714200						

PROJECT / PROSPECT	SAMPLED BY	SAMPLE TYPE
ROOPENA WEST / PANKALLA	DSL/SJGW	-6+2mm
COST CODE 4176	DATE 2/6/95	

TRAVERSE SAMPLING

FORM 280

ARS No MIN 5803

SAMPLE PREFIX	CO-ORD or No	AZM	MAP REF / PHOTO
QD64	6378000 N		

SAMPLE PREFIX	ACTIVE CO-ORD METRES E	SOIL TYPE	C	GEOLOGY	S	REMARKS 1	REMARKS 2
7830	714000						
31	050						
32	100						
33	150						
34	200						
35	250						
36	300						
37	350						
38	400						
39	450						
40	500						
41	550						
42	600						
43	650						
44	700						
45	750						
46	800						
47	850						
48	900						
49	950						
50	715000						
51	050						
52	106						
53	150						
54	200						
55	250						
56	300						
57	350						
58	400						
59	715450						

PROJECT / PROSPECT	SAMPLED BY	SAMPLE TYPE
ROOPENA / KITTLE WEST	DSL / SJGW	-6+2mm
COST CODE 4176	DATE 2/6/95	

TRAVERSE SAMPLING

FORM 280

ARS No MIN 5803

SAMPLE PREFIX	CO-ORD or No	AZM	MAP REF / PHOTO
QD64	6378000 N		

SAMPLE PREFIX	ACTIVE CO-ORD METRES N/E	SOIL TYPE	C	GEOLOGY	S	REMARKS 1	REMARKS 2
7860	715500						
61	550						
62	600						
63	650						
64	700						
65	750						
66	800						
67	850						
68	900						
69	950						
7870	716000						

PROJECT / PROSPECT	SAMPLED BY	SAMPLE TYPE
ROOPENA / KITTLE WEST	DSL / SJGW	-6+2mm
COST CODE 4176	DATE 2/6/95	

Roopena West EL 1872

Block Dam Lag Sampling Results

Line 6 394 300 N

Samp_No	As (ppm)	Au (ppb)	Bi (ppm)	Cu (ppm)	Mo (ppm)
QD647606	15	-1	0.9	10	2.5
QD647607	25	-1	1.0	15	3.0
QD647608	15	-1	1.2	15	2.5
QD647609	15	1	0.8	10	2.5
QD647610	20	-1	0.8	15	3.0
QD647611	25	-1	1.0	30	3.5
QD647612	25	-1	0.6	15	2.5
QD647613	25	-1	0.6	25	3.0
QD647614	30	-1	0.5	205	3.0
QD647615	25	-1	0.3	180	2.5
QD647616	20	-1	0.4	220	2.0
QD647617	25	-1	0.5	185	2.5
QD647618	20	-1	0.5	145	2.0
QD647619	15	-1	0.4	90	2.0
QD647620	15	-1	0.6	135	2.0
QD647621	20	-1	0.8	130	2.5
QD647622	20	-1	0.7	90	2.0
QD647623	25	-1	0.7	50	2.5
QD647624	30	-1	0.6	40	2.5
QD647625	15	-1	0.5	35	1.5
QD647626	15	-1	0.6	40	2.0
QD647627	15	-1	0.6	35	2.0
QD647628	20	-1	0.7	40	2.0
QD647630	20	-1	0.6	30	1.5
QD647631	-5	-1	0.4	30	1.0
QD647632	-5	2	0.3	15	-0.5
QD647633	-5	-1	0.2	15	-0.5
QD647634	-5	-1	0.2	15	-0.5
QD647635	-5	-1	0.2	10	-0.5
QD647636	-5	-1	0.3	10	-0.5
QD647637	-5	-1	0.2	10	-0.5
QD647638	-5	-1	0.1	10	-0.5
QD647639	-5	-1	-0.1	35	-0.5
QD647640	-5	-1	-0.1	20	-0.5
QD647641	-5	-1	-0.1	15	4.5
QD647642	-5	-1	-0.1	30	-0.5
QD647643	-5	-1	0.1	20	-0.5
QD647652	-5	-1	0.2	20	0.5
QD647653	-5	-1	0.1	30	1.0
QD647654	-5	-1	0.1	15	0.5
QD647655	-5	1	-0.1	5	-0.5
QD647656	-5	4	0.1	10	0.5
QD647657	-5	-1	0.1	20	-0.5
QD647658	-5	-1	-0.1	10	-0.5
QD647659	-5	-1	0.1	5	-0.5
QD647660	-5	-1	-0.1	10	-0.5
QD647661	-5	-1	-0.1	5	-0.5
QD647662	-5	-1	0.1	5	0.5
QD647663	-5	-1	0.2	10	-0.5
QD647664	-5	1	0.2	5	-0.5
QD647666	-5	2	0.1	10	-0.5

N.B. Negative results - below detection limit

Roopena West EL 1872

Line 6 393 000 N

Samp_No	As (ppm)	Au (ppb)	Bi (ppm)	Cu (ppm)	Mo (ppm)
QD647667	25	-1	1.2	65	2.5
QD647668	30	2	1.2	50	2.5
QD647669	25	-1	0.8	50	2.5
QD647670	15	-1	0.7	25	1.5
QD647671	20	-1	0.8	35	2.0
QD647672	20	3	0.8	35	1.5
QD647673	15	-1	0.7	25	1.5
QD647674	20	-1	0.8	30	1.5
QD647675	10	-1	0.6	15	1.0
QD647676	10	-1	0.6	25	1.0
QD647677	10	-1	0.5	20	1.0
QD647678	10	-1	0.7	25	1.5
QD647679	5	-1	0.5	15	1.0
QD647680	5	-1	0.4	15	1.5
QD647681	10	-1	0.4	20	1.0
QD647682	10	-1	0.4	25	1.5
QD647683	10	-1	0.4	15	0.5
QD647684	10	-1	0.4	20	1.0
QD647685	10	1	0.5	20	1.0
QD647686	10	-1	0.5	15	1.0
QD647687	5	-1	0.4	15	1.0
QD647688	5	5	0.6	15	1.0
QD647689	10	-1	0.6	15	1.5
QD647690	5	-1	0.4	15	1.0
QD647691	5	-1	0.4	20	1.0
QD647692	5	-1	0.4	15	1.0
QD647693	5	-1	0.4	15	1.0
QD647694	15	-1	0.7	20	1.0
QD647695	10	-1	0.7	30	1.0
QD647696	25	-1	0.5	60	2.0
QD647697	10	2	0.5	30	1.5
QD647698	5	-1	0.2	25	1.0
QD647699	-5	-1	0.1	25	0.5
QD647700	-5	-1	0.2	15	1.0
QD647701	5	-1	0.3	10	1.0
QD647702	5	-1	0.3	15	1.0
QD647703	5	1	0.4	30	1.0
QD647704	5	-1	0.3	45	1.0
QD647705	-5	-1	0.2	15	0.5
QD647706	10	-1	0.4	95	1.0
QD647707	15	-1	0.5	95	1.0
QD647708	5	-1	0.6	120	1.5
QD647710	10	-1	1.1	105	1.0
QD647711	10	-1	0.7	120	1.5
QD647712	10	-1	0.7	115	1.5
QD647713	15	1	0.7	190	1.5
QD647714	15	-1	1.4	170	1.5
QD647715	15	-1	0.5	135	1.0
QD647716	10	-1	0.6	105	1.0
QD647717	15	-1	0.7	115	1.5
QD647718	10	-1	0.4	55	0.5
QD647719	10	-1	0.6	60	1.0
QD647720	-5	-1	0.2	20	-0.5
QD647721	-5	-1	-0.1	25	0.5
QD647722	-5	-1	0.2	15	0.5
QD647723	-5	2	0.1	10	0.5

N.B. Negative results - below detection limit

Roopena West EL 1872
Round Hill Lag Sampling Results

Line 6 397 000 N

Samp_No	As (ppm)	Au (ppb)	Bi (ppm)	Cu (ppm)	Mo (ppm)
QD647724	-5	22	0.1	5	-0.5
QD647725	-5	-1	0.1	10	1.0
QD647726	-5	0	0.2	15	1.0
QD647727	-5	930	0.3	15	1.0
QD647728	5	2	0.3	20	1.0
QD647729	-5	4	0.3	15	0.5
QD647730	-5	-1	0.3	15	1.5
QD647731	-5	-1	0.2	10	1.0
QD647734	-5	-1	-0.1	10	-0.5
QD647735	-5	-1	-0.1	10	-0.5
QD647736	-5	-1	-0.1	10	0.5
QD647737	-5	-1	0.1	10	-0.5
QD647738	-5	-1	-0.1	10	-0.5
QD647740	-5	-1	-0.1	20	-0.5
QD647741	-5	-1	-0.1	10	-0.5
QD647742	-5	-1	-0.1	10	-0.5
QD647743	-5	2	-0.1	20	-0.5
QD647744	20	-1	0.2	45	1.0
QD647745	70	-1	0.2	290	1.0
QD647746	60	-1	0.4	80	0.5
QD647747	5	-1	-0.1	30	-0.5
QD647748	10	-1	0.3	45	0.5
QD647749	5	-1	0.2	25	0.5
QD647751	15	-1	0.7	90	1.0
QD647753	5	-1	0.2	60	-0.5
QD647754	5	-1	0.1	20	-0.5
QD647755	-5	-1	-0.1	15	-0.5
QD647756	-5	-1	0.2	15	0.5
QD647766	-5	-1	-0.1	10	-0.5
QD647767	-5	-1	-0.1	10	-0.5
QD647768	-5	-1	-0.1	10	-0.5
QD647769	5	-1	-0.1	10	-0.5
QD647770	10	-1	-0.1	10	-0.5
QD647771	5	-1	-0.1	10	-0.5
QD647772	5	-1	-0.1	10	-0.5
QD647773	-5	-1	-0.1	10	-0.5
QD647774	5	-1	-0.1	5	-0.5
QD647775	-5	-1	-0.1	10	0.5
QD647776	-5	-1	0.3	5	-0.5
QD647777	5	2	0.2	5	-0.5
QD647778	5	-1	0.2	-5	0.5
QD647784	5	-1	0.2	-5	0.5

N.B. Negative results - below detection limit

Roopena West EL 1872
Pankalla Lag Sampling Results

Line 6 375 000 N

Samp_No	As (ppm)	Au (ppb)	Bi (ppm)	Cu (ppm)	Mo (ppm)
QD647785	-5	-1	1.5	70	-0.5
QD647786	-5	-1	0.6	50	-0.5
QD647787	-5	3	1.6	35	0.5
QD647788	15	0	1.8	35	1.5
QD647797	-5	-1	1.0	10	1.0
QD647798	-5	1	0.5	5	1.0
QD647799	-5	-1	0.6	10	1.0
QD647800	5	-1	1.1	15	1.5
QD647801	10	-1	1.5	30	1.5
QD647802	-5	-1	1.2	30	1.0
QD647803	5	-1	0.9	25	1.0
QD647804	10	1	1.3	120	1.5
QD647805	10	-1	0.7	65	2.0
QD647806	15	-1	2.0	15	3.0
QD647807	20	-1	2.6	15	4.0
QD647808	20	-1	2.4	20	3.5
QD647809	25	-1	2.0	25	3.5
QD647810	20	-1	2.1	15	4.0
QD647811	20	1	2.2	15	4.0
QD647812	20	-1	2.3	15	3.5
QD647813	20	-1	2.3	20	3.5
QD647814	25	-1	2.3	25	3.5
QD647815	20	-1	2.1	20	3.0
QD647816	20	-1	2.0	20	3.5
QD647817	20	-1	2.3	25	3.0
QD647818	20	-1	2.2	20	3.5
QD647819	25	-1	1.7	30	3.0
QD647820	25	-1	2.3	25	3.0
QD647821	20	-1	1.8	30	3.5
QD647822	15	-1	1.4	25	3.0
QD647823	20	-1	1.6	30	3.0
QD647824	20	-1	1.6	30	3.0
QD647825	20	-1	1.4	25	3.0
QD647826	20	-1	1.4	25	2.0
QD647827	20	-1	1.2	30	2.0
QD647828	25	-1	1.3	30	2.5
QD647829	20	-1	1.7	30	2.5

N.B. Negative results - below detection limit

APPENDIX 2

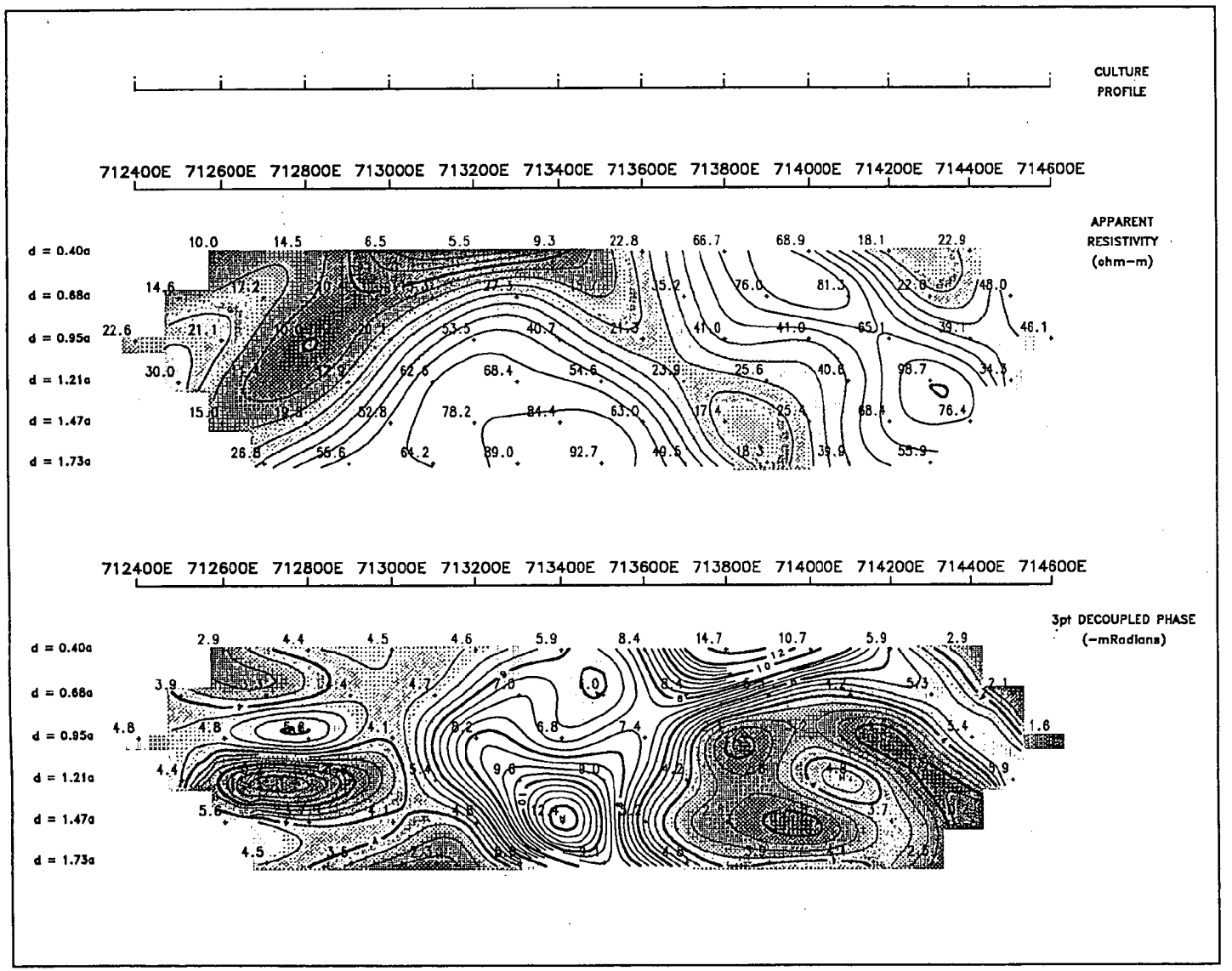
DIPOLE-DIPOLE IP RESULTS -

BLOCK DAM

ROUND HILL

PANKALLA

KITTLE



DIPOLE SIZE	: 200.00 Meters
SURVEY DATE	: 26-02-95
FREQUENCY	: .250 hz
CURRENT RANGE	: 6.0 to 20.0 Amperes
IP RECEIVER	: ZONGE GDP16 S/N1029
IP TRANSMITTER	: ZONGE GGT25 S/N2019A
SOFTWARE VERSION	: CR 0521
COST CODE	: 4176
CONTOUR INTERVALS,	
RESISTIVITY	: Logarithmic (10 per cycle)
PHASE	: 0.50, 2.00

NOTE:

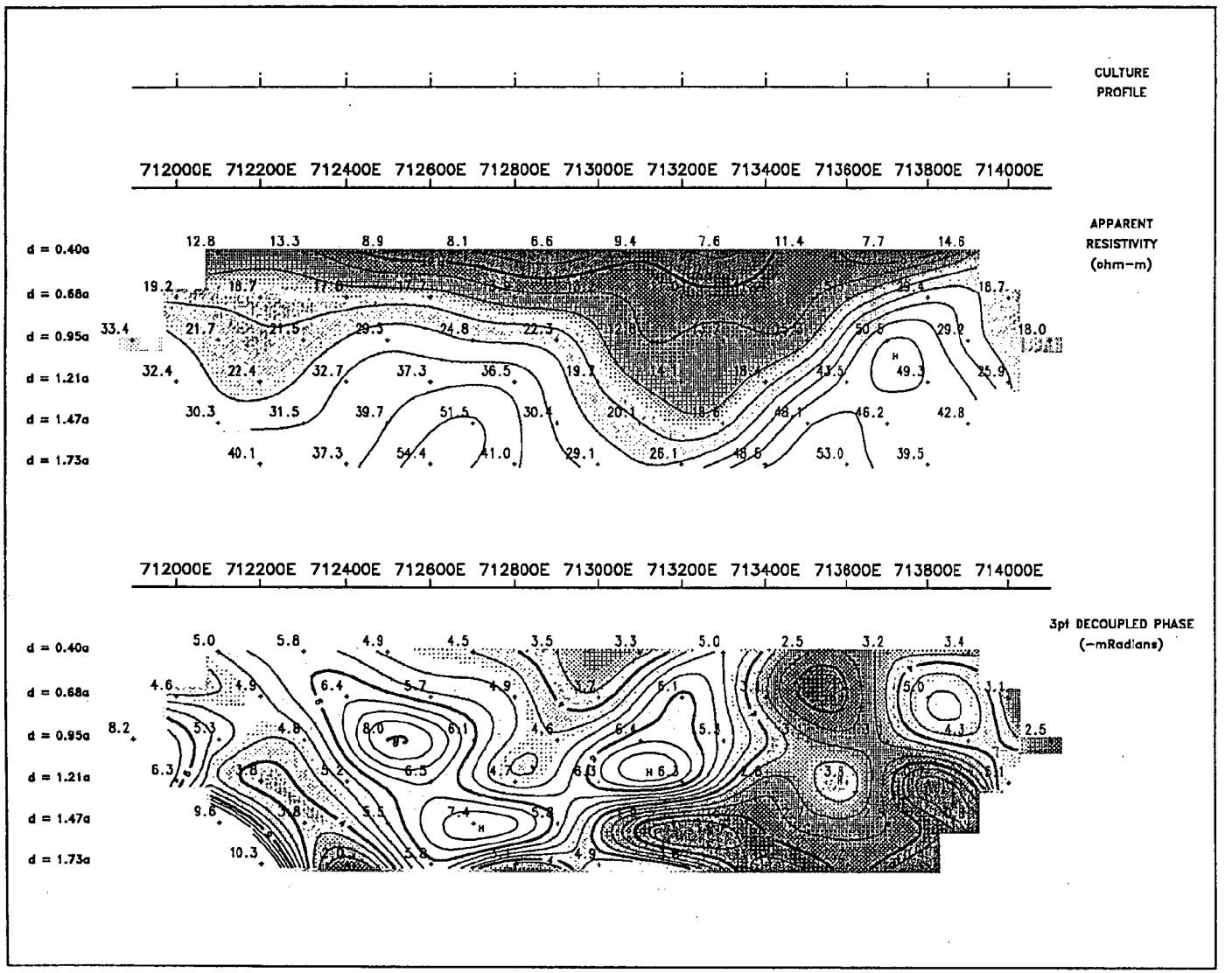
EDWARD'S depth scale has been used with a vertical exaggeration of 2 for plotting.

100 0 100 200 300 400 500 600
(meters)

WESTERN MINING CORPORATION LIMITED
EXPLORATION DIVISION

GAWLER CRATON PROJECT
DIPOLE – DIPOLE INDUCED POLARIZATION
ROOPENA WEST–BLOCK DAM
LINE 94300 North

DATE: 04/08/95	AUTHOR: KTH	PLAN NO.	
SCALE: 1:10000	REF.		



DIPOLE SIZE	: 200.00 Meters
SURVEY DATE	: 25-02-95
FREQUENCY	: .250 hz
CURRENT RANGE	: 10.0 to 20.0 Amperes
IP RECEIVER	: ZONGE GDP16 S/N1029
IP TRANSMITTER	: ZONGE GGT25 S/N2019A
SOFTWARE VERSION	: CR 0521
COST CODE	: 4178
CONTOUR INTERVALS,	
RESISTIVITY	: Logarithmic (10 per cycle)
PHASE	: 0.50, 2.00

NOTE:

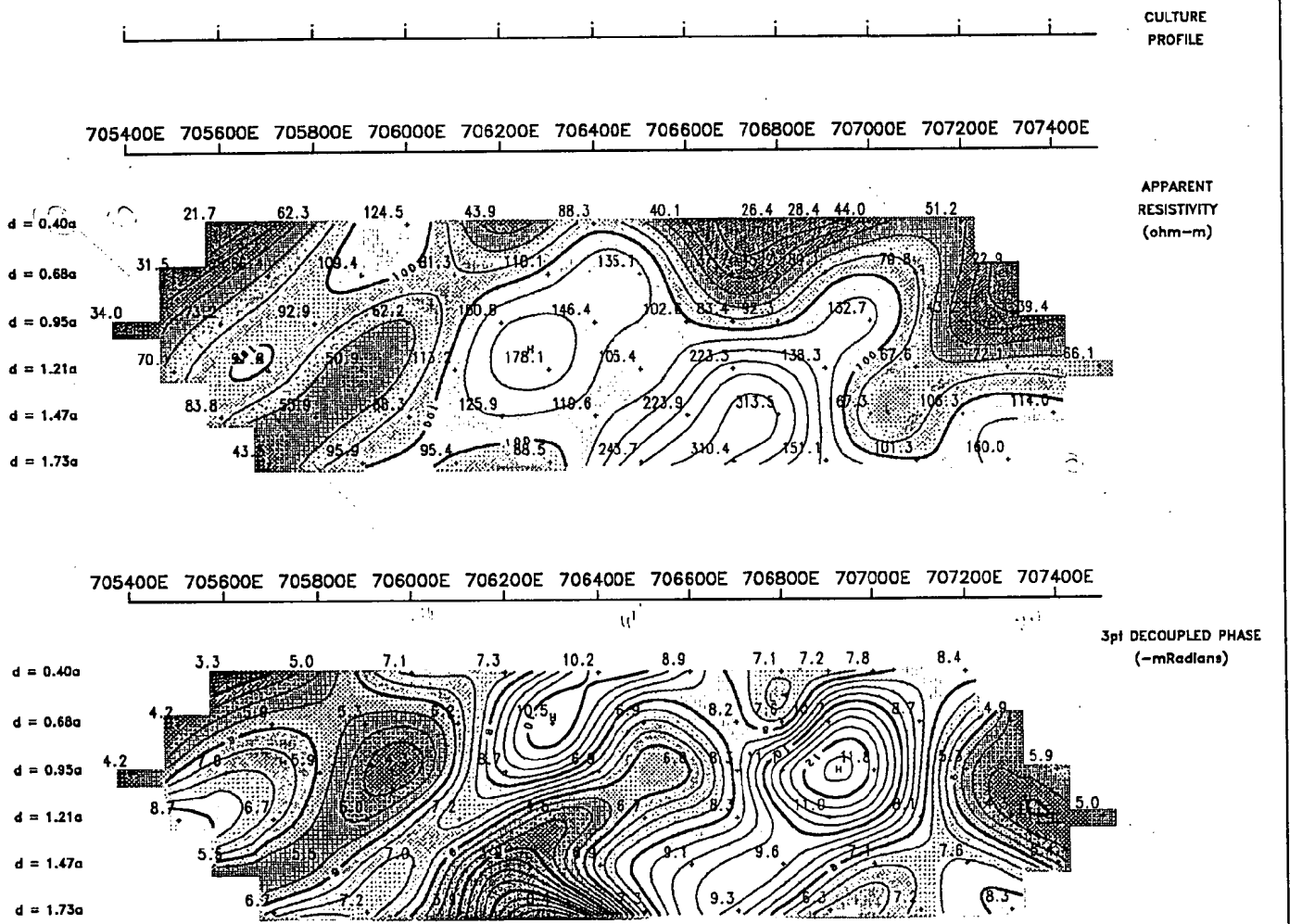
EDWARD'S depth scale has been used with a vertical exaggeration of 2 for plotting.

100 0 100 200 300 400 500 600
(meters)

WESTERN MINING CORPORATION LIMITED
EXPLORATION DIVISION

GAWLER CRATON PROJECT
DIPOLE - DIPOLE INDUCED POLARIZATION
ROOPENA WEST-BLOCK DAM
LINE 93000 North

DATE:	04/06/95	AUTHOR:	PLAN NO.
SCALE:	1:10000	REF.	



DIPOLE SIZE	: 200.00 Meters
SURVEY DATE	: 27-02-95
FREQUENCY	: .250 hz
CURRENT RANGE	: 5.0 to 15.0 Amperes
IP RECEIVER	: ZONGE GDP16 S/N1029
IP TRANSMITTER	: ZONGE GGT25 S/N2019A
SOFTWARE VERSION	: CR 0521
COST CODE	: 4176
CONTOUR INTERVALS,	
RESISTIVITY	: Logarithmic (10 per cycle)
PHASE	: 0.50, 2.00

NOTE:

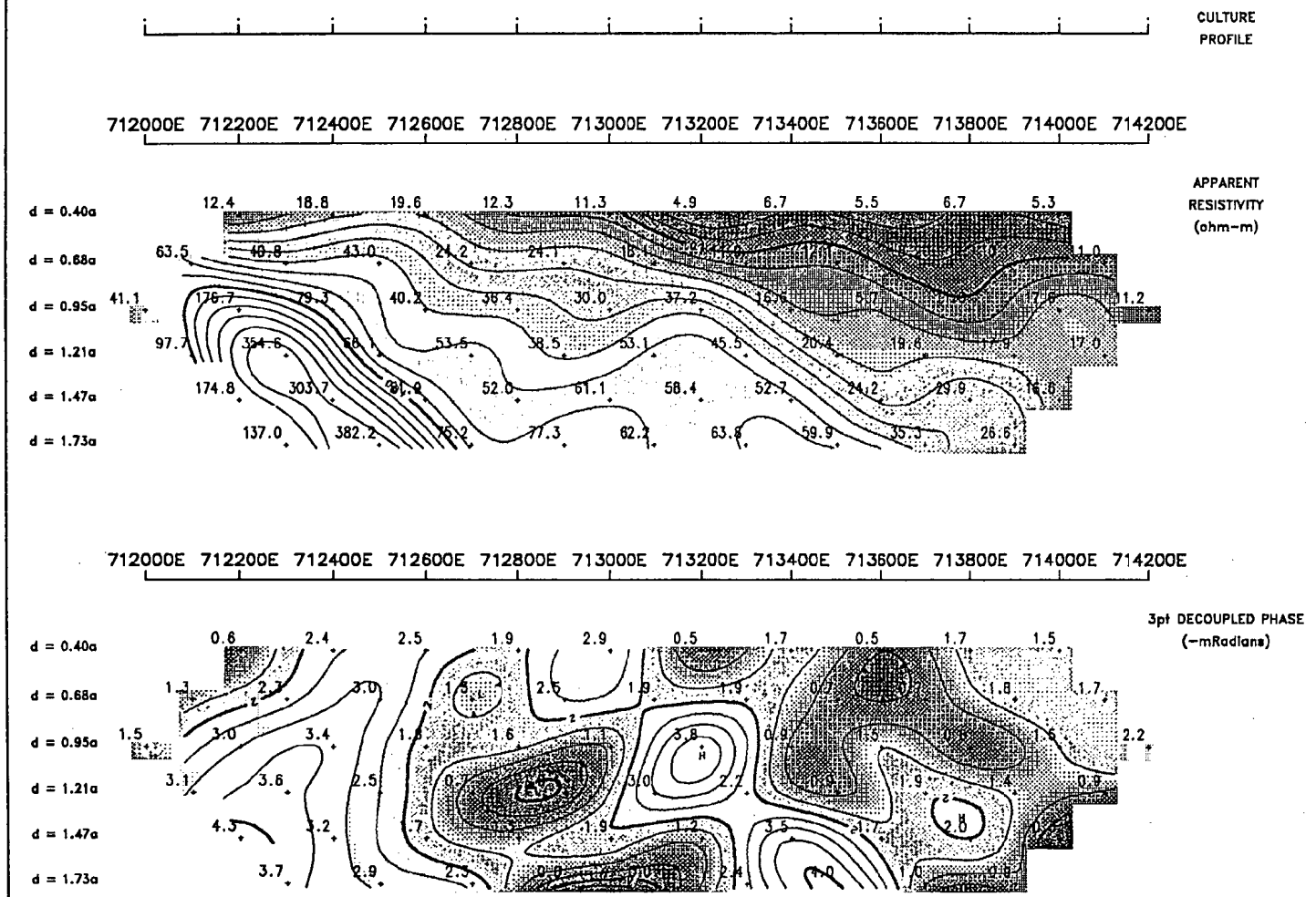
EDWARD'S depth scale has been used with a vertical exaggeration of 2 for plotting.

100 0 100 200 300 400 500 600
(meters)

WESTERN MINING CORPORATION LIMITED
EXPLORATION DIVISION

GAWLER CRATON PROJECT
DIPOLE - DIPOLE INDUCED POLARIZATION
ROOPENA WEST-ROUND HILL
LINE 97000 North

DATE: 05/06/95	AUTHOR:	PLAN NO.
SCALE: 1:10000	REF.	



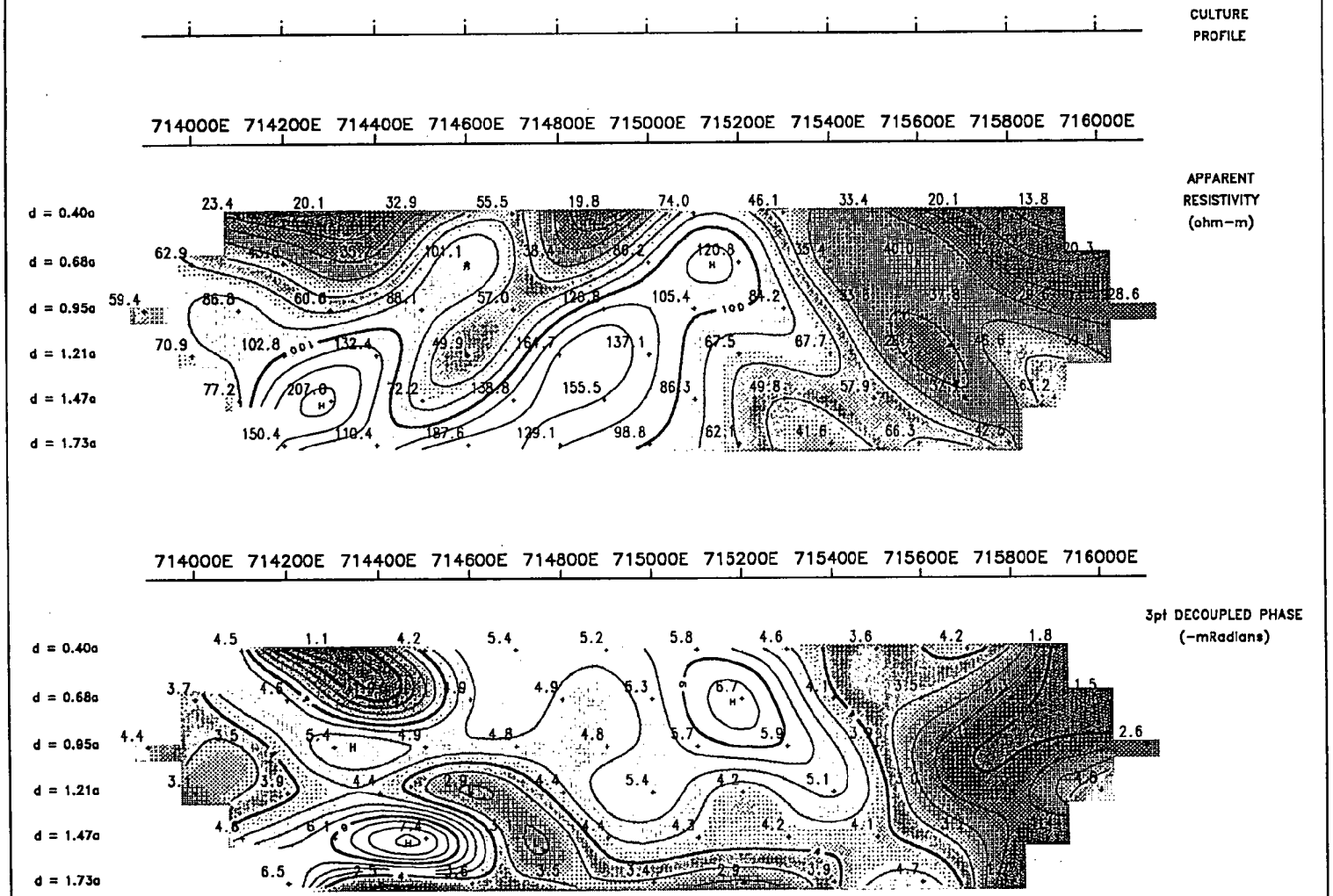
DIPOLE SIZE : 200.00 Meters
SURVEY DATE : 01-03-95
FREQUENCY : .250 hz
CURRENT RANGE : 8.0 to 20.0 Amperes
IP RECEIVER : ZONGE GDP16
IP TRANSMITTER : ZONGE GGT25
SOFTWARE VERSION : CR 0521
COST CODE : 4176
CONTOUR INTERVALS,
RESISTIVITY : Logarithmic (10 per cycle)
PHASE : 0.50, 2.00

NOTE:
EDWARD'S depth scale has been used with a vertical exaggeration of 2 for plotting.

WESTERN MINING CORPORATION LIMITED
EXPLORATION DIVISION

GAWLER CRATON PROJECT
DIPOLE - DIPOLE INDUCED POLARIZATION
ROOPENA WEST-PANKALLA
LINE 75000 North

DATE:	05/06/95	AUTHOR:	KTH	PLAN NO.	
SCALE:	1:10000	REF.			



DIPOLE SIZE	: 200.00 Meters
SURVEY DATE	:
FREQUENCY	: .250 hz
CURRENT RANGE	: 8.0 to 19.0 Amperes
IP RECEIVER	: ZONGE GDP16 S/N1029
IP TRANSMITTER	: ZONGE GGT25 S/N2019A
SOFTWARE VERSION	: CR 0521
COST CODE	: 4176
CONTOUR INTERVALS,	
RESISTIVITY	: Logarithmic (10 per cycle)
PHASE	: 0.50, 2.00

NOTE:

EDWARD'S depth scale has been used with a vertical exaggeration of 2 for plotting.

100 0 100 200 300 400 500 600
(meters)

WESTERN MINING CORPORATION LIMITED
EXPLORATION DIVISION

GAWLER CRATON PROJECT
DIPOLE - DIPOLE INDUCED POLARIZATION
ROOPENA WEST-KITTLE
LINE 78000 North

DATE: 04/06/95	AUTHOR: KTH	PLAN NO.
SCALE: 1:10000	REF.	

SHEET No. 6332

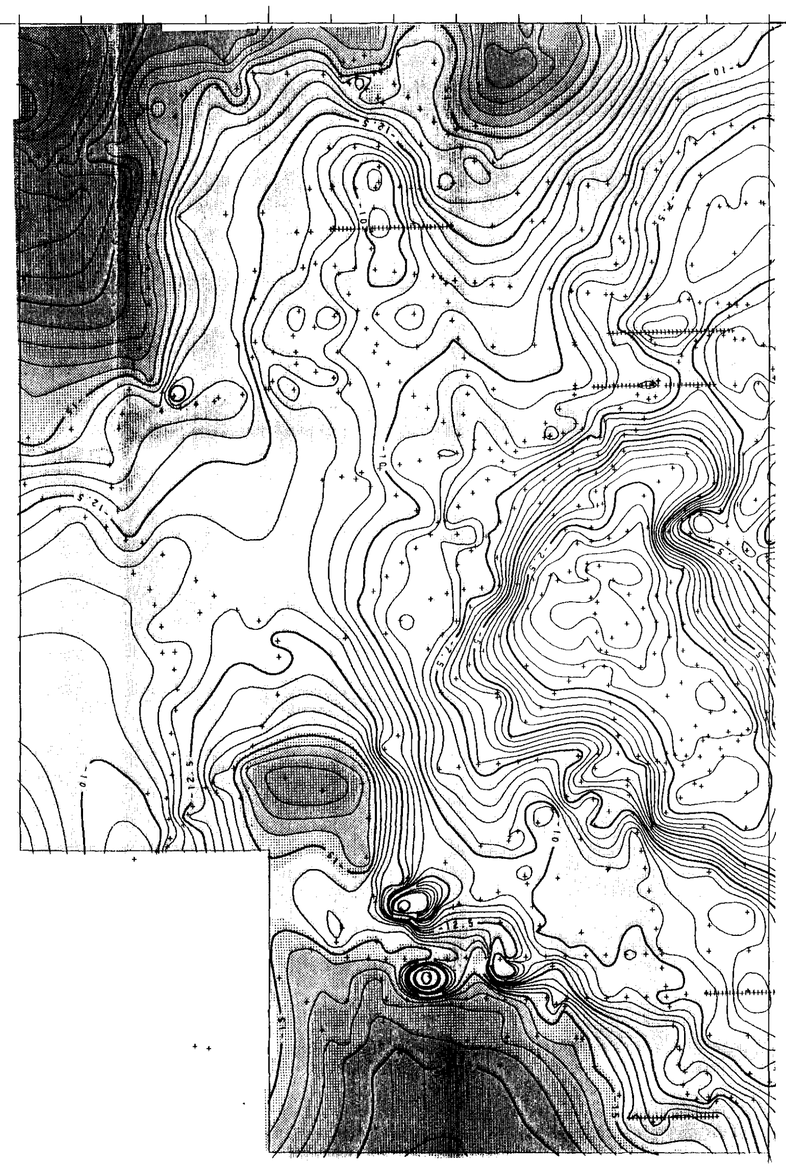
690000mE 700000mE 710000mE 720000mE 730000mE

32.30.00 lat — 32.30.00 lat

137.00.00 long — 137.30.00 long

6400000mN 6390000mN 6380000mN 6370000mN 6360000mN 6350000mN

ROOPENA WEST E.L.1872



-4.16
-5.47
-6.49
-7.25
-8.01
-8.71
-9.35
-9.89
-10.48
-11.04
-11.53
-12.09
-12.64
-13.13
-13.70
-14.29
-14.82
-15.46
-16.16
-16.93
-17.68
-18.70
-20.01
-21.74

GRAVITY
MGALS

33.00.00 lat — 33.00.00 lat

690000mE 700000mE 710000mE 720000mE 730000mE

INDEX TO ADJOINING SHEETS

6233	6333	6433
6232	6332	6432
6231	6331	6431

SCALE 1:100000

2000 0 4000 8000
Metres

AUSTRALIAN MAP GRID
Grid interval 10000 Metres

GRID CELL SIZE = 200M
CONTOUR INTERVAL = 0.5,2.5 mGals
SURVEY DATE = ALL DATA TO 30May95
DATUM = IGSN71
DATA FILE = RO_REGN.GRV
COST CODE = 4174

8900-3

WESTERN MINING CORPORATION LIMITED
EXPLORATION DIVISION

GAWLER CRATON PROJECT

E.L. 1872 - ROOPENA WEST

BOUGUER GRAVITY

DATE: **30/9/95**	AUTHOR: K.HUTCHINGS	PLAN NO. **1**
SCALE: 1:100,000	MAP REF. 6332	

SHEET No. 6333

690000mE 700000mE 710000mE 720000mE 730000mE

32.00.00 lat

137.00.00 long

137.30.00 long

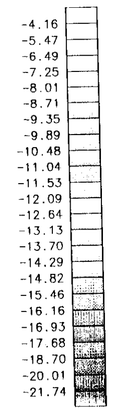
6450000mN

6440000mN

6430000mN

6420000mN

6410000mN



GRAVITY
MGALS

ROOPENA WEST E.L.1872

32.30.00 lat

INDEX TO ADJOINING SHEETS

6234	6334	6434
6233	6333	6433
6232	6332	6432

SCALE 1:100000

2000 0 4000 8000
Metres

AUSTRALIAN MAP GRID
Grid interval 10000 Metres

GRID CELL SIZE = 200M
CONTOUR INTERVAL = 0.5,2.5 mGals
SURVEY DATE = ALL DATA TO 30May95
DATUM = AGD71
DATA FILE = PO_BLGN.GRV
COST CODE = 4174

8900-4

WESTERN MINING CORPORATION LIMITED
EXPLORATION DIVISION

GAWLER CRATON PROJECT

E.L. 1872 - ROOPENA WEST

BOUGUER GRAVITY

DATE: **30/9/95**	AUTHOR: K.HUTCHINGS	PLAN NO. **2**
SCALE: 1:100,000	MAP REF. 6333	

SHEET No. 6332

690000mE 700000mE 710000mE 720000mE 730000mE

32.30.00 lat — 137.00.00 long — 6400000mN — 137.30.00 long — 6390000mN — 6380000mN — 6370000mN — 6360000mN — 6350000mN — 33.00.00 lat

ROUND HILL

6397000N

705500E 707500E 712500E 714500E

6394300N

BLOCK DAM

6393000N

712000E 714000E

ROOPENA WEST

E.L. 1872

ROOPENA

E.L.2079

KITTLE

6378000N

714000E 716000E

PANKALLA

6375000N

712000E

690000mE 700000mE 710000mE 720000mE 730000mE

INDEX TO ADJOINING SHEETS

6233	6333	6433
6232	6332	6432
6231	6331	6431

SCALE 1:100000

2000 0 4000 8000

Metres

AUSTRALIAN MAP GRID
Grid Interval 10000 Metres

8900-5

WESTERN MINING CORPORATION LIMITED
EXPLORATION DIVISION

GAWLER CRATON PROJECT

ROOPENA WEST E.L.1872

INDUCED POLARIZATION LINES

DATE: 07-02-96	AUTHOR: K.HUTCHINGS	PLAN NO. 3
SCALE: 1:100000	MAP REF. 6332	

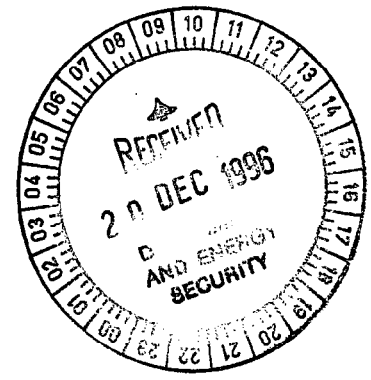
WMC Resources Ltd
Exploration Division - Copper

ANNUAL REPORT

FOR

E.L. 1872 - ROOPENA WEST

1ST OCTOBER, 1995 TO 30TH SEPTEMBER, 1996



PASADENA, S.A.
DECEMBER, 1996

R. R. RAMSAY
PROJECT GEOLOGIST

Distribution:

S.A.D.M.E. (2 copies)
Melbourne Properties (text only)
C.T.R.
File: PG 1-8f

1872AR96.doc
December, 1996

Table of Contents

1. Introduction 1

2. Regional Geology 1

3. Work Completed 3

4. Proposed Work 3

5. Expenditure Summary 4

6. References 4

List of Figures

Fig 1. ..... Roopena Project, Lease Location Plan

Fig 2. ..... Stratigraphy, South Eastern Gawler Craton

Fig 3. ..... Schematic Regional Geology, Roopena Project, S.A.

List of Appendices

Appendix 1 ..... Round Hill Prospect - Lag Sampling Results
..... (includes plans of Cu and Au values at 1:10000)

Appendix 2 ..... Block Dam Prospect - Reconnaissance Lag Sample

1. INTRODUCTION

Exploration Licence 1872 was granted to Western Mining Corporation Limited (WMC) on the 1st October, 1993 for a period of one year. The term of the licence was renewed in 1994, and again in 1995. In September 1996 the licence was renewed over a reduced area. The relinquished portion of the licence included an area covering the outcropping Gawler Range Volcanics to the north and a section of tested Broadview Schist to the south. The licence is now valid until 30th September, 1997.

The revised E.L. now covers an area of 254 km^2 and is located to the northeast of Iron Knob and adjacent to WMC's E.L. 2079 on eastern Eyre Peninsula (Figure 1).

The target ore type is Cu-Au occurrences and variations comparable to those on the Stuart Shelf or the Eastern Succession of the Mt. Isa Block.

Minimal work has been conducted on the licence in the period covered by this report. This is mainly as a result of WMC's efforts being concentrated on the adjacent Roopena Licence EL 2079 in the earlier part of the period and more recently through limited resources as a result of the re-assessment of WMC's exploration rationale. WMC is currently in the process of pursuing a potential JV partner to continue the exploration.

2. REGIONAL GEOLOGY

The regional geology of the eastern Eyre Peninsula is poorly understood due to the generally poor outcrop conditions. In an attempt to place the stratigraphy into a regional context WMC refers to the "Whyalla Group" (Figure 2); a sequence of Early Proterozoic volcanic and sedimentary rocks which unconformably overlies the early Proterozoic Hutchison Group, and is overlain by younger Gawler Range volcanic and sedimentary rocks.

The geochronology of units within the Whyalla Group, and those bounding it, indicate that its age spans the period 1800Ma to 1650Ma.

The Whyalla Group occupies a N-S belt immediately east of the Middleback Ranges and west of Whyalla (Figure 3). It has regional correlatives in the Moonta-Wallaroo area. The belt appears to be fault-bound on both its western and eastern sides, and is overlain unconformably to the north by Gawler Range volcanic and sedimentary rocks.

Simplistically, the Whyalla Group consists of two volcanic-sedimentary cycles - the lower Myola Volcanics and Broadview Schist and the upper McGregor Volcanics and Moonabie Formation. The McGregor Volcanics-Moonabie Formation have been correlated on the basis of geochronology with the Moonta Porphyry and Doora Schist.

The lower part of the Whyalla Group is intruded by the Wertigo Granite, a Lincoln Complex granite equated with the Middlecamp Granite which has an age of 1757Ma (U-Pb). On the basis of image processed aeromagnetics the Wertigo Granite has a

comparable pattern to the Myola Volcanics and may therefore be related to the volcanic rocks. The entire Whyalla Group is intruded by Hiltaba Suite granites (e.g. Charleston Granite, 1585Ma U-Pb, Creaser and Fanning, 1993). The "Whalers Granite" (informal name) occurs on the northeastern side of the belt and belongs to the Hiltaba Suite.

The lower part of the Whyalla Group has undergone two of the three phases of the Kimban Orogeny. The regional structure can be interpreted to consist of tight to open folds with axial plane sub-parallel to faults having NNW and NNE orientations.

Two documented areas of historic workings occur within the Whyalla belt. The Murninnie Mine, situated 40 km SSW of Whyalla, was mined for Cu and Bi during the period 1860-1900. The mine was reassessed during 1970 but no exploration was carried out(MESA open file reports). Numerous small diggings occur at "Hancocks Prospect" within the McGregor Volcanics, but no records of production exist.

3. WORK COMPLETED

The main field work completed during the period of reporting was at the Round Hill prospect in the northwest corner of the licence.

Round Hill

A small grid based lag sampling program to follow up the gold anomaly associated with the original reconnaissance was conducted . The results have shown a weak NE trending anomaly with values up to 68 ppb Au (Appendix 1). Further work is required to ascertain the extent and significance of this anomaly.

Block Dam

A reconnassance lag sample was taken associated with an ironstone outcrop at Block Dam. This was anomalous in both Au and Cu .

Geophysical modelling of the I.P. traverses conducted over the Block Dam prospect last year were completed. It was concluded (Hanneson, 1996) that significant potential exists for the anomaly to be related to sulphide mineralisation.

4. PROPOSED WORK

No further work is proposed by WMC at this stage. WMC is actively pursuing a partner to fund continued exploration on this and the adjacent Roopena Licence EL 2079.

5. EXPENDITURE SUMMARY

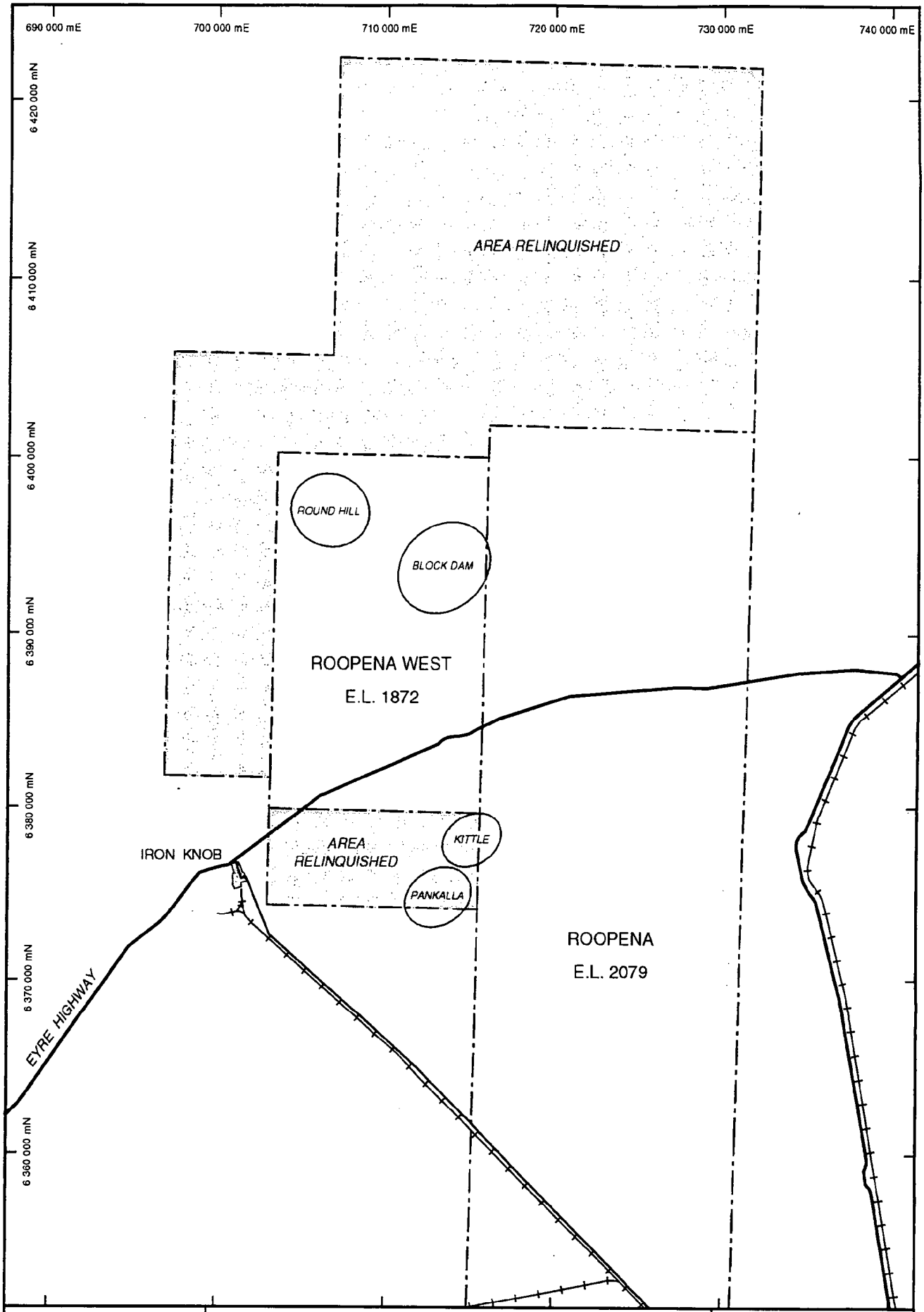
Roopena West EL 1872			
Activity	**12 Months**	**Cumulative**	**Percentage**
Geology	$6,885	$67,464	41.3%
Geophysics	$3,332	$50,081	30.7%
Geochemistry	$1,475	$12,215	7.5%
Surveying	$459	$459	0.3%
Leasing		$6,451	4.0%
Drafting	$25	$1,159	0.7%
Field Costs	$21	$249	0.1%
Drilling	$74	$674	0.4%
Administration	$7,376	$24,475	15%
TOTAL	**$19,647**	**$163,227**	**100%**

The expenditure statement above covers the twelve months from 1st October, 1995 to 30th September, 1996.

6. REFERENCES

Creaser, R.A., and Fanning, C.M., 1993, A U-Pb study of the Mesoproterozoic Charleston Granite, Gawler Craton, South Australia. Aust. Jnl. Earth Sciences, v40, 519-526.

Hanneson, J. E., 1996, Preliminary Interpretation of Geophsysical Data from the Block Dam Prospect, Roopena West EL 1872, Gawler Craton Project, South Australia, Internal WMC Report XPA23/96.



EXPLORATION A division of WMC Resources Ltd.	ROOPENA WEST PROJECT E.L. 1872 PROSPECT LOCATION PLAN	Scale: 1:300,000
Date: 17-12-96		Map Ref:
Author: R.R. Ramsay		Figure No. 1
Revised:		Plan No. 7054-254

STRATIGRAPHY
SOUTH EASTERN GAWLER CRATON

(all ages U - Pb Zircon)

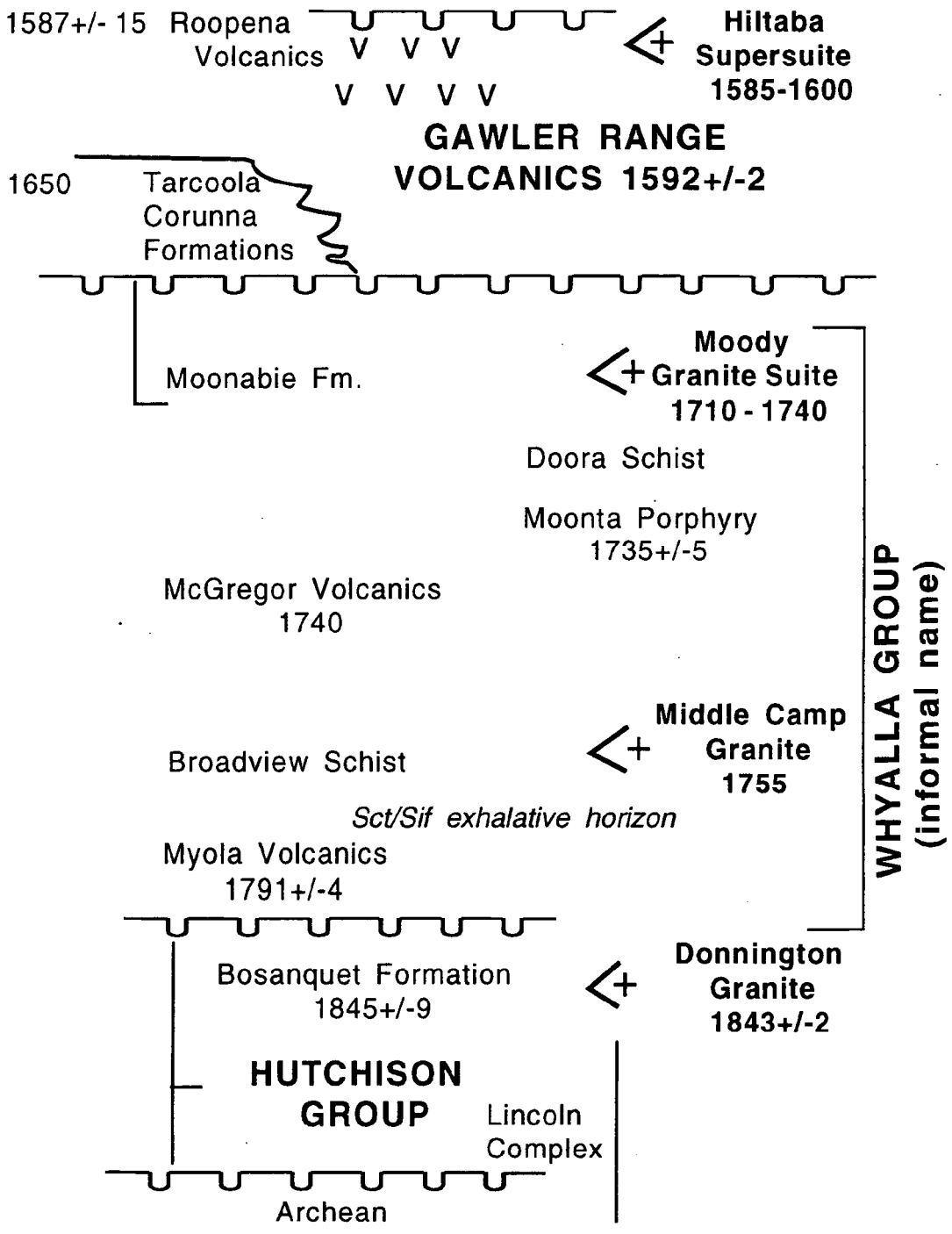
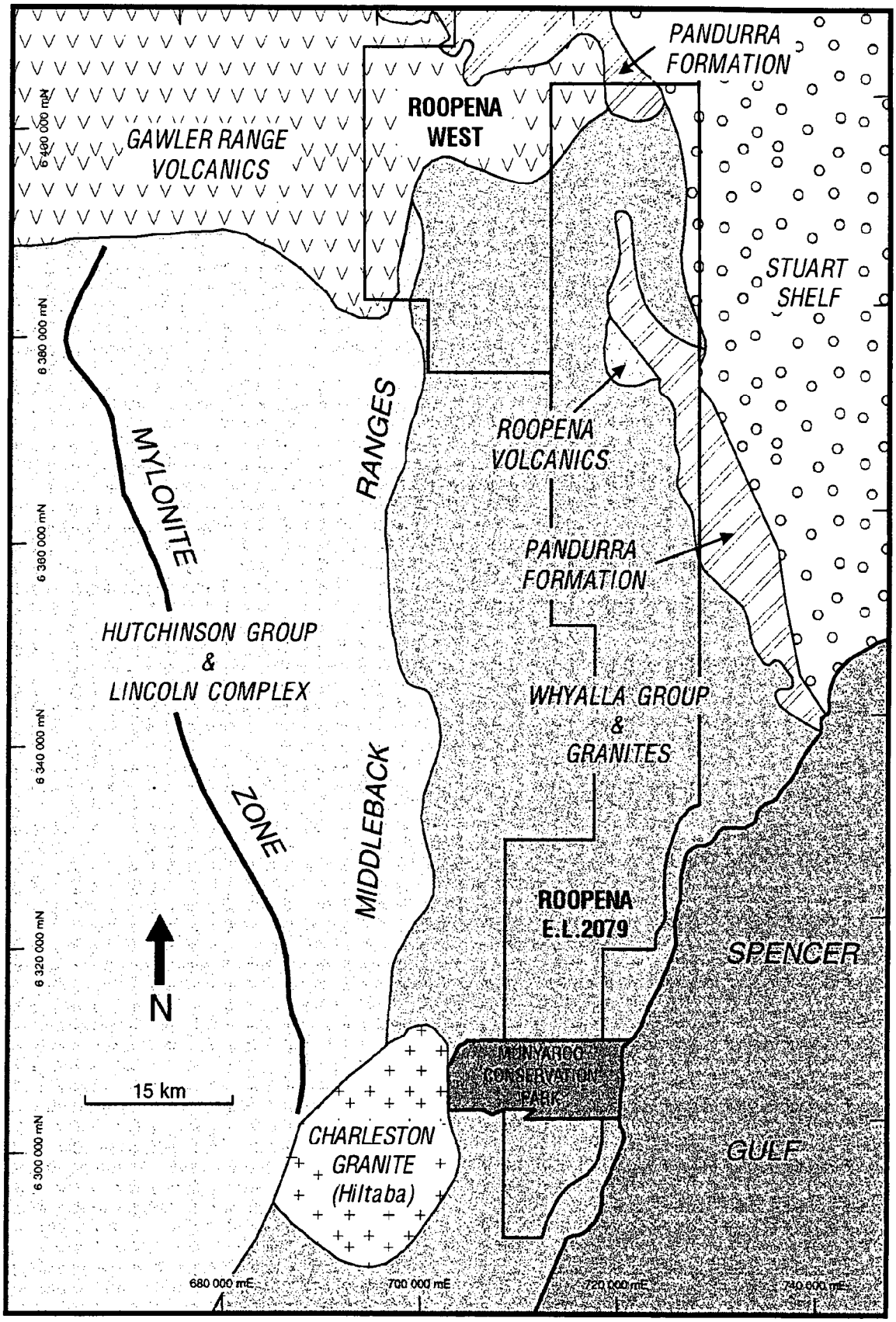


FIGURE 2

PAS03-14.CDR (22/2/94)



ROOPENA PROJECT - SOUTH AUSTRALIA
SCHEMATIC REGIONAL GEOLOGY

FIGURE 3

PAS03-21.CDR (17/12/96)

Appendix 1

Round Hill Prospect

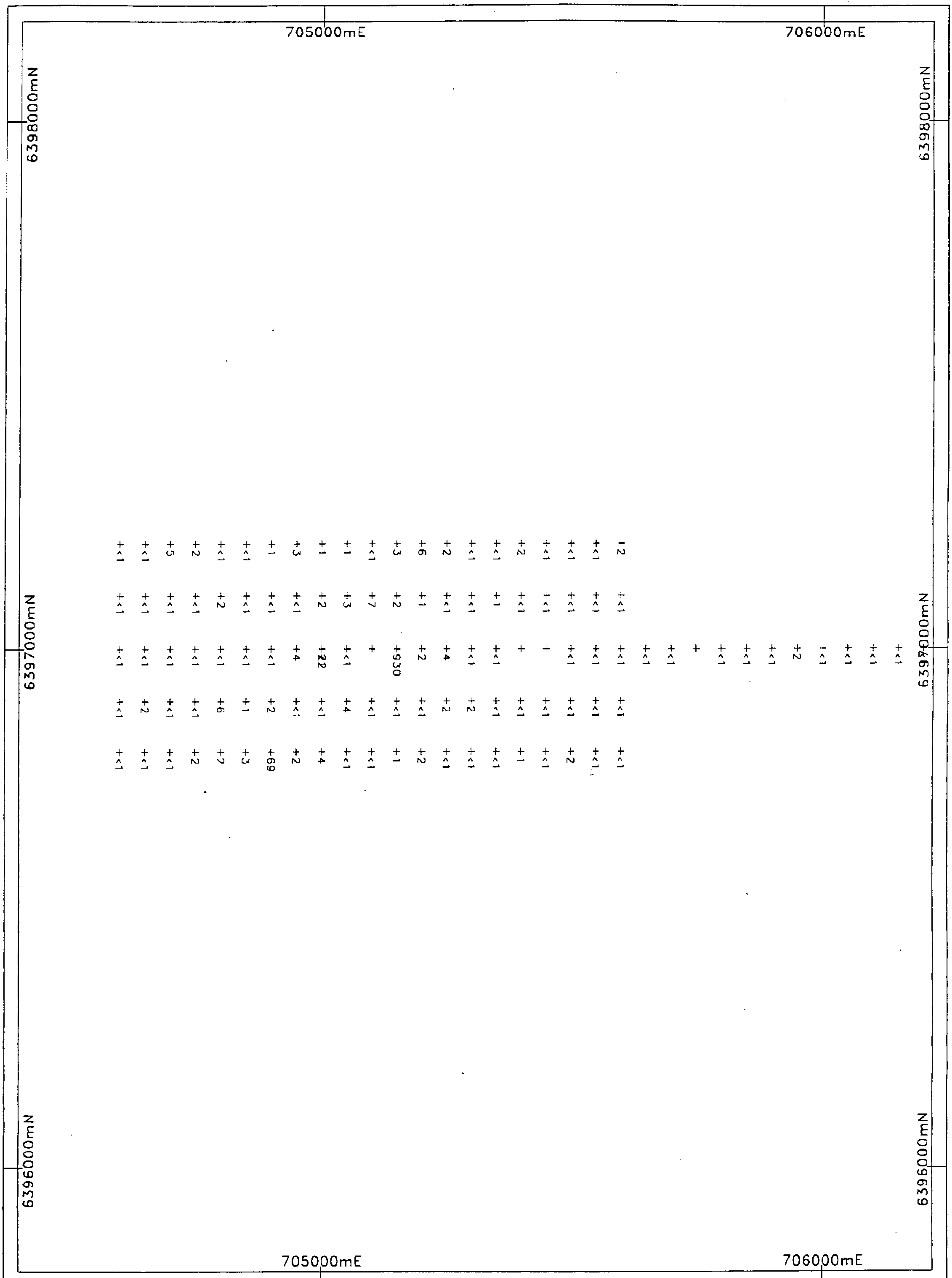
Lag Sampling Results

WMC Resources Ltd
Roopena West EL 1872
Lag Sampling Program - Round Hill Prospect
Sample Type: Lags -6+2mm
ARS No: MIN5709

Sample No:	Northing	Easting	Cu (ppm)	Au (ppb)
GC410001	6396800	704600	15	<1
GC410002	6396800	704650	10	<1
GC410003	6396800	704700	20	<1
GC410004	6396800	704750	10	2
GC410005	6396800	704800	5	2
GC410006	6396800	704850	5	3
GC410007	6396800	704900	10	69
GC410008	6396800	704950	10	2
GC410009	6396800	705000	15	4
GC410010	6396800	705050	90	<1
GC410011	6396800	705100	60	<1
GC410012	6396800	705150	75	1
GC410013	6396800	705200	85	2
GC410014	6396800	705250	50	<1
GC410015	6396800	705300	30	<1
GC410016	6396800	705350	35	<1
GC410017	6396800	705400	20	1
GC410018	6396800	705450	15	<1
GC410019	6396800	705500	20	2
GC410020	6396800	705550	20	<1
GC410021	6396800	705600	10	<1
GC410022	6396900	704600	10	<1
GC410023	6396900	704650	10	2
GC410024	6396900	704700	10	<1
GC410025	6396900	704750	10	<1
GC410026	6396900	704800	10	6
GC410027	6396900	704850	15	1
GC410028	6396900	704900	10	2
GC410029	6396900	704950	15	<1
GC410030	6396900	705000	15	<1
GC410031	6396900	705050	115	4
GC410032	6396900	705100	95	<1
GC410033	6396900	705150	85	<1
GC410034	6396900	705200	80	<1
GC410035	6396900	705250	40	2
GC410036	6396900	705300	20	2
GC410037	6396900	705350	20	<1
GC410038	6396900	705400	10	<1
GC410039	6396900	705450	20	<1
GC410040	6396900	705500	25	<1
GC410041	6396900	705550	15	<1
GC410042	6396900	705600	15	<1
GC410043	6397000	704600	20	<1
GC410044	6397000	704650	20	<1
GC410045	6397000	704700	10	<1
GC410046	6397000	704750	15	<1
GC410047	6397000	704800	5	<1

WMC Resources Ltd
Roopena West EL 1872
Lag Sampling Program - Round Hill Prospect
Sample Type: Lags -6+2mm
ARS No: MIN5709

Sample No:	Northing	Easting	Cu (ppm)	Au (ppb)
GC410048	6397000	704850	20	<1
GC410049	6397000	704900	10	<1
GC410050	6397000	704950	10	4
GC410051	6397000	705000	10	<1
GC410052	6397100	704600	10	<1
GC410053	6397100	704650	40	<1
GC410054	6397100	704700	15	<1
GC410055	6397100	704750	15	<1
GC410056	6397100	704800	10	2
GC410057	6397100	704850	15	<1
GC410058	6397100	704900	5	<1
GC410059	6397100	704950	10	<1
GC410060	6397100	705000	15	2
GC410061	6397100	705050	15	3
GC410062	6397100	705100	20	7
GC410063	6397100	705150	15	2
GC410064	6397100	705200	10	1
GC410065	6397100	705250	25	<1
GC410066	6397100	705300	10	<1
GC410067	6397100	705350	20	1
GC410068	6397100	705400	10	<1
GC410069	6397100	705450	10	<1
GC410070	6397100	705500	10	<1
GC410071	6397100	705550	5	<1
GC410072	6397100	705600	5	<1
GC410073	6397200	704600	10	<1
GC410074	6397200	704650	5	<1
GC410075	6397200	704700	10	5
GC410076	6397200	704750	5	2
GC410077	6397200	704800	10	<1
GC410078	6397200	704850	10	<1
GC410079	6397200	704900	10	1
GC410080	6397200	704950	15	3
GC410081	6397200	705000	10	1
GC410082	6397200	705050	30	1
GC410083	6397200	705100	55	<1
GC410084	6397200	705150	35	3
GC410085	6397200	705200	20	6
GC410086	6397200	705250	0	2
GC410087	6397200	705300	25	<1
GC410088	6397200	705350	25	<1
GC410089	6397200	705400	25	2
GC410090	6397200	705450	10	<1
GC410091	6397200	705500	5	<1
GC410092	6397200	705550	5	<1
GC410093	6397200	705600	10	2



WESTERN MINING CORPORATION LIMITED – EXPLORATION

Map Ref.	
Date	17/12/1996
Author	P.M. Baker
Revised	

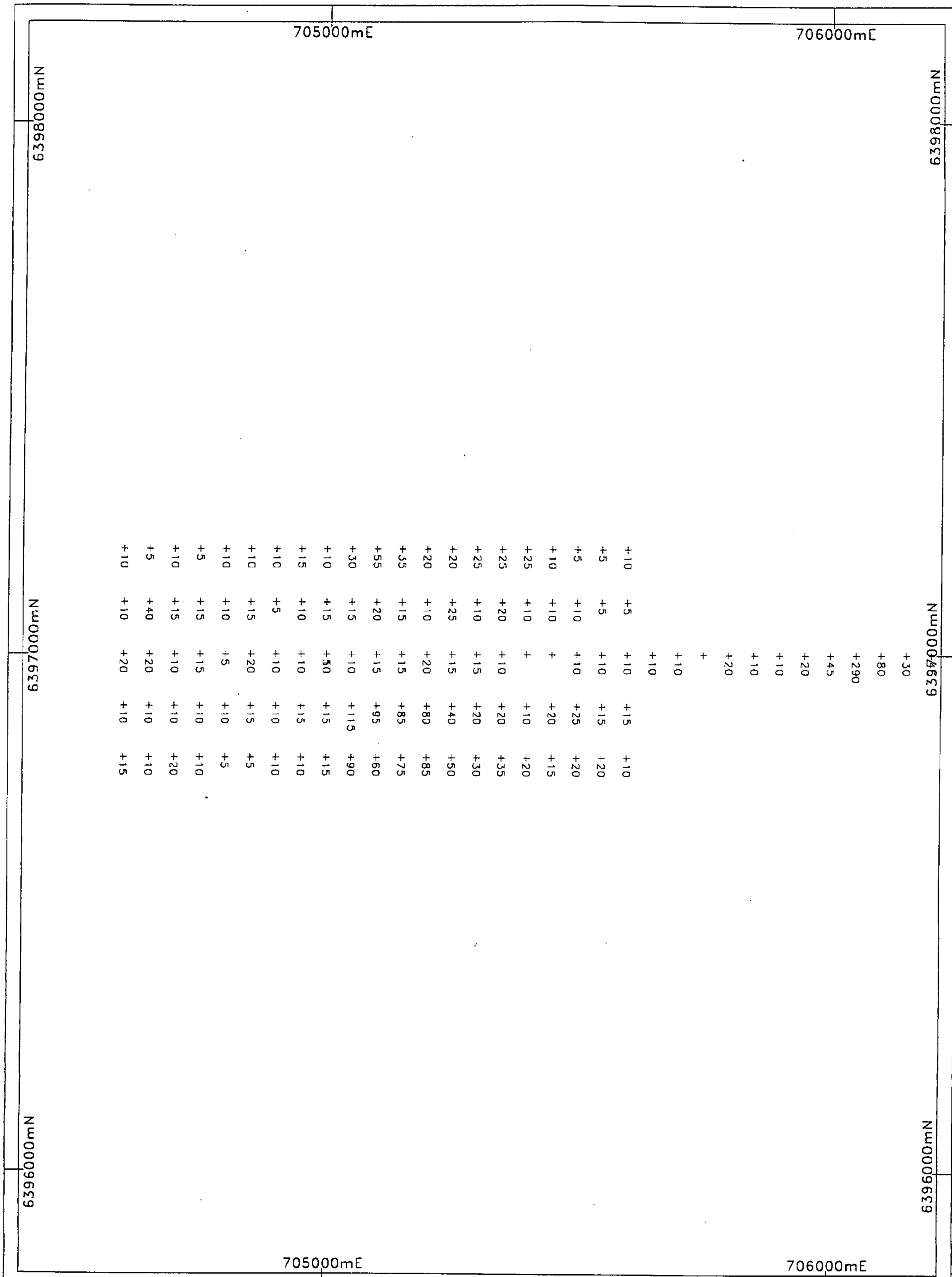
Roopena West Project - EL 1872
Round Hill
Surface Lags -ppb Au

Philip Baker (c) 1995 WINMAP version 5.0c 17/12/1996 - 9:25:11

Scale: 1:10000

Figure No.

Plan No.



WESTERN MINING CORPORATION LIMITED – EXPLORATION

Map Ref.		**Roopena West Project – EL 1872**	Scale: 1:10000
Date	17/12/1996	**Round Hill**	Figure No.
Author	P.M. Baker	**Surface Lags –ppb Cu**	Plan No.
Revised		Philip Baker (c) 1995 WINMAP version 5.0c 17/12/1996 – 9:24:03	

Appendix 2

Block Dam Prospect

Reconnaissance Lag Sample

WMC Resources Ltd
Roopena West EL 1872
Reconnaissance Lag Sample - Block Dam Prospect
Sample Type: Lag -6+2mm
ARS No: MIN5704
Date: 12/11/95

Sample No:	Northing	Easting	Cu (ppm)	Au (ppb)
DA748104	6393920	712720	260	6

NORMANDY
EXPLORATION LIMITED

ACN 006 306 690

103 - 105 King William Street, Kent Town, South Australia
PO Box 751, Kent Town, 5071, South Australia, Australia

Phone (08) 8464 2200
Fax (08) 8464 2299

EL 1872 - ROOPENA WEST

ANNUAL REPORT

FOR PERIOD FROM 01/10/96 TO 30/09/97

Port Augusta 1:250,000 Sheet SI 53-04

Author: A. J. Downie

Date: March, 1998

Authorised: Andy Price.

Distribution:

Department of Primary Industries and Resources	■
WMC Resources Ltd. - Adelaide	□
Norex - Library, Kent Town	□
Norex - SE Region	□

Report No. 22982

G:\CENTMAN\PRINGEOL\ROOPAP98.SAM

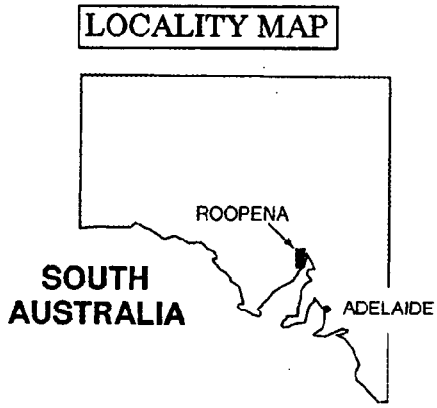
Report No: 22982

Title: Annual Report for EL 1872 (Roopena West) for the period 1 October, 1996 to 30 September, 1997.

Authors: A. J. Downie

Date: March, 1998

Location: Port Augusta 1:250,000 Sheet SI 53-4



ABSTRACT

This report summarises the exploration work carried out by WMC limited and Normandy Gold Ltd on EL 1872 from 1 October, 1996 to 30 September, 1997. EL 1872, together with EL 2079, comprise the Roopena Project.

The tenements cover a highly prospective area within the Gawler Craton and are situated on the eastern margin of the Eyre Peninsula. The tenements are registered to WMC Limited and are subject to a joint venture agreement with Normandy Gold Limited. During the farm-in period Normandy Gold have assumed project management.

WMC Limited's main priority during the reporting period was to divest part of its interest in this project. Their work consisted of compiling and preparing the data sets for appraisal by interested parties. Normandy Gold Ltd were the successful party in securing a joint venture agreement. Normandy Gold Ltd has completed compiling and reformatting WMC's exploration data. Regolith mapping at 1:100,000 scale and a structural interpretation of the project area was also completed during the reporting period by Normandy Gold Ltd.

Exploration proposed by Normandy Gold Ltd. for the forthcoming year includes regional and prospect scale geochemical assessment. Targets generated from these programmes will be drill tested using RAB or aircore techniques. Further drill testing at the Spencer Prospect is warranted.

CONTENTS

LIST OF FIGURES

	Page No.
1. 0 CONCLUSIONS and RECOMMENDATIONS	5
2.0 INTRODUCTION	5
3.0 TENURE	5
4.0 LOCATION and ACCESS	5
5.0 NATIVE TITLE	6
6.0 REGIONAL GEOLOGY	6
7.0 HISTORIC EXPLORATION	7
8.0 EXPLORATION COMPLETED	7
8.1 Data Compilation	
8.2 Geomorphological Mapping	
8.3 Structural Interpretation	
9.0 PROPOSED EXPLORATION	8
10.0 EXPENDITURE SUMMARY	8
11.0 REFERENCES	9
BIBLIOGRAPHIC DATA SHEET	

LIST OF FIGURES

Figure No.	Drawing No.	Description		Scale
1	72000L02	Locality Plan		1:4,000,000
2	72000M02	Native Title Plan		1:1,000,000
3	PASO3-21	Regional Geology	approx	1:500,000

LIST OF APPENDICES

Appendix	Title
1	Report on Regolith Mapping of the Roopena Area, South Australia - MDJ Derriman.
2	Preliminary Structural Geology Analysis of the Roopena Project, South Australia - Dr C N Windsor

1.0 CONCLUSIONS and RECOMMENDATIONS

Exploration completed by WMC Ltd. over the past five years on the Roopena Project has identified several areas of gold and copper anomalism. At the Spencer prospect gold and copper anomalism has been delineated over 2 km and is associated with the Spencer Fault. This could possibly represent a splay structure from the regional north-south trending Roopena Fault.

It is recommended that exploration be continued on both a regional and prospect scale. A regional surface geochemical programme is recommended to cover EL 1872. Results of which can be incorporated with the regolith mapping and structural interpretation. Priority targets generated from this programme will required drill testing.

2.0 INTRODUCTION

Exploration Licence 1872 was granted to Western Mining Corporation Limited (WMC) on the 1 October, 1993.

In September 1996 the licence was renewed over a reduced area. The relinquished portion of the licence included an area covering the outcropping Gawler Range Volcanics to the north and a section of tested Broadview Schist to the south. The revised EL now covers an area of 254 km^2 and is located to the northeast of Iron Knob and adjacent to WMC's EL 2079 on eastern Eyre Peninsula (Figure 1).

Normandy Gold Pty Limited have entered an agreement with WMC to earn an equity in the Roopena Project which consists of ELs 2079 and 1872. During the earn-in phase, Normandy Gold is responsible for the management and the statutory requirements for these tenements. This agreement commenced on the 23rd April, 1997.

This report details the work completed by WMC and Normandy Gold for the period 15/10/96 to 30/09/97.

3.0 TENURE

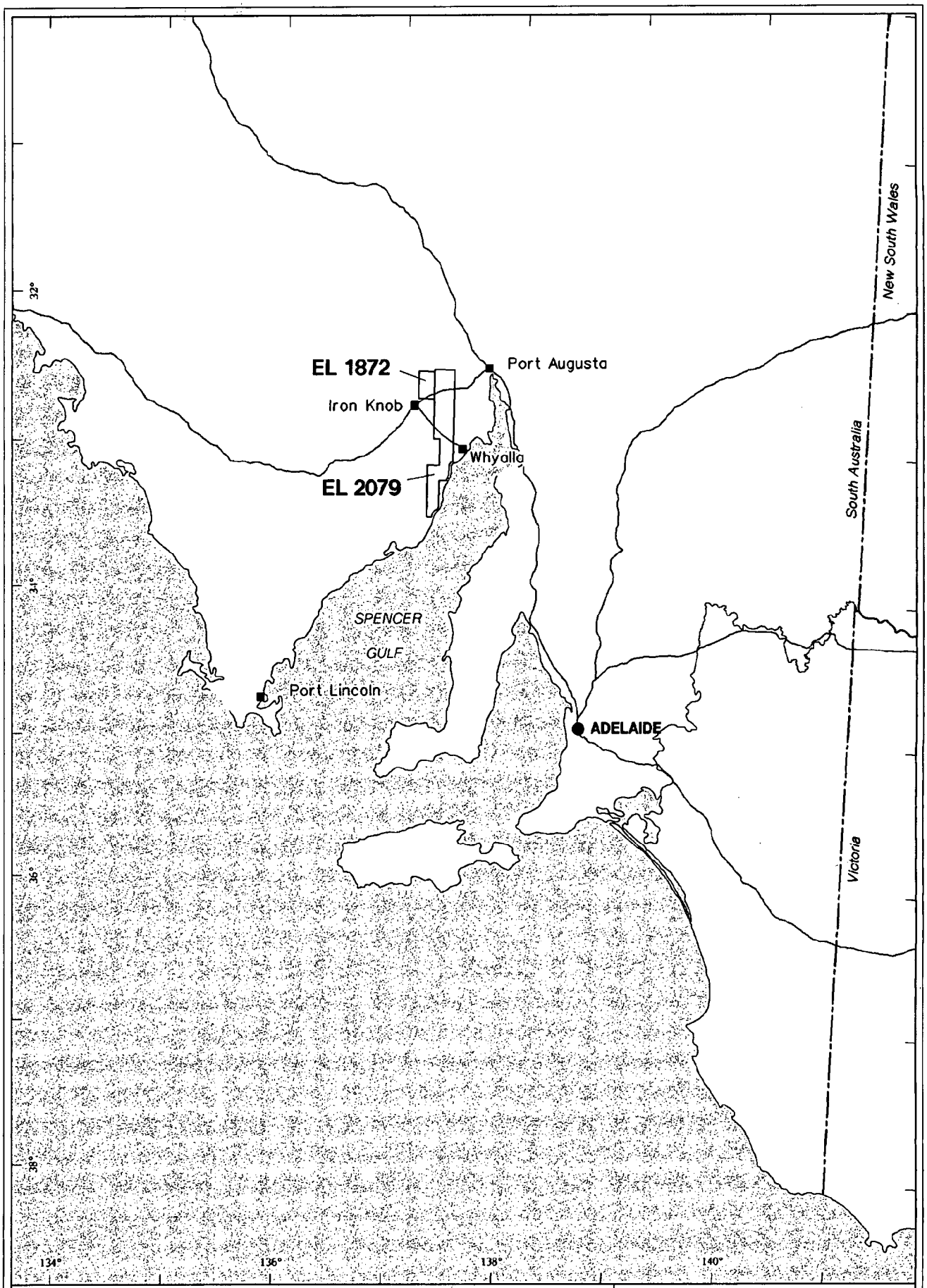
WMC Ltd. was granted EL 1872 on the 1 October, 1993. It covers an area of 254km^2 and is located on the Port Augusta (SI 53-04) 1:250,000 sheet.

4.0 LOCATION and ACCESS

The tenement EL 1872 is located approximately 50 kms west of Port Augusta. It represents a rectangular shape of 13km x 20m along and to the north of the Eyre Highway.

The major land use sheep and cattle grazing on essentially uncleared ground.

Access throughout the project is excellent with a complex network of well maintained tracks and boundary roads. The tenement is also cut by the Eyre Highway in the south eastern portion.



LOCALITY MAP

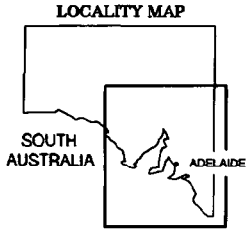


FIGURE 1

0 50 100 150 200Km

1:4 000 000

NORMANDY EXPLORATION LTD

Project: ROOPENA J.V. Project
EL 1872 and EL 2079

Title: **LOCATION PLAN**

Author A.D.	Date 8/97	Scale 1:4 000 000	
Drawn Luke	Office ADEL	Revised A.D.	Date 3/98
Dwg No. 720.00.L02		AMG 53	Encol No.

5.0 NATIVE TITLE

The Roopena Project tenements are covered by three native title claims. These are listed below and are shown in Figure 2.

* Barngala Native Title Claim (SC 96/4)

  This claim covers the entire Eyre Peninsula extending up to Leigh Creek in the northeast and across to Bulgunnia homestead in the northwest. This application was lodged with the National Native Title Tribunal on the 4th April, 1996 and accepted on the 21st August, 1996. The registered native title claimant is Henry Croft on behalf of the Barngarla families.

* Nukunu Native Title Claim (SC 96/5)

  This claim covers the area between Port Augusta and Port Pirie. This application was lodged with the National Native Title Tribunal on the 10th April, 1996 and accepted on the 4th October, 1996. The registered native title claimant is James Alexander Bramfield.

  This claim covers only a very small portion of the project in the extreme north-east corner.

* Kuyani Native Title Claim (SC 95/4)

  This claim covers a large area north of Whyalla. It extends as far as Maree in the north, west as far as Painted Hills and across to the SA/NSW border in the east. This application was lodged with the National Native Title Tribunal on the 19th September, 1995, and accepted on the 13th March, 1996. The registered native title claimant is Mark McKenzie Senior.

6.0 REGIONAL GEOLOGY (after Ramsay 1996)

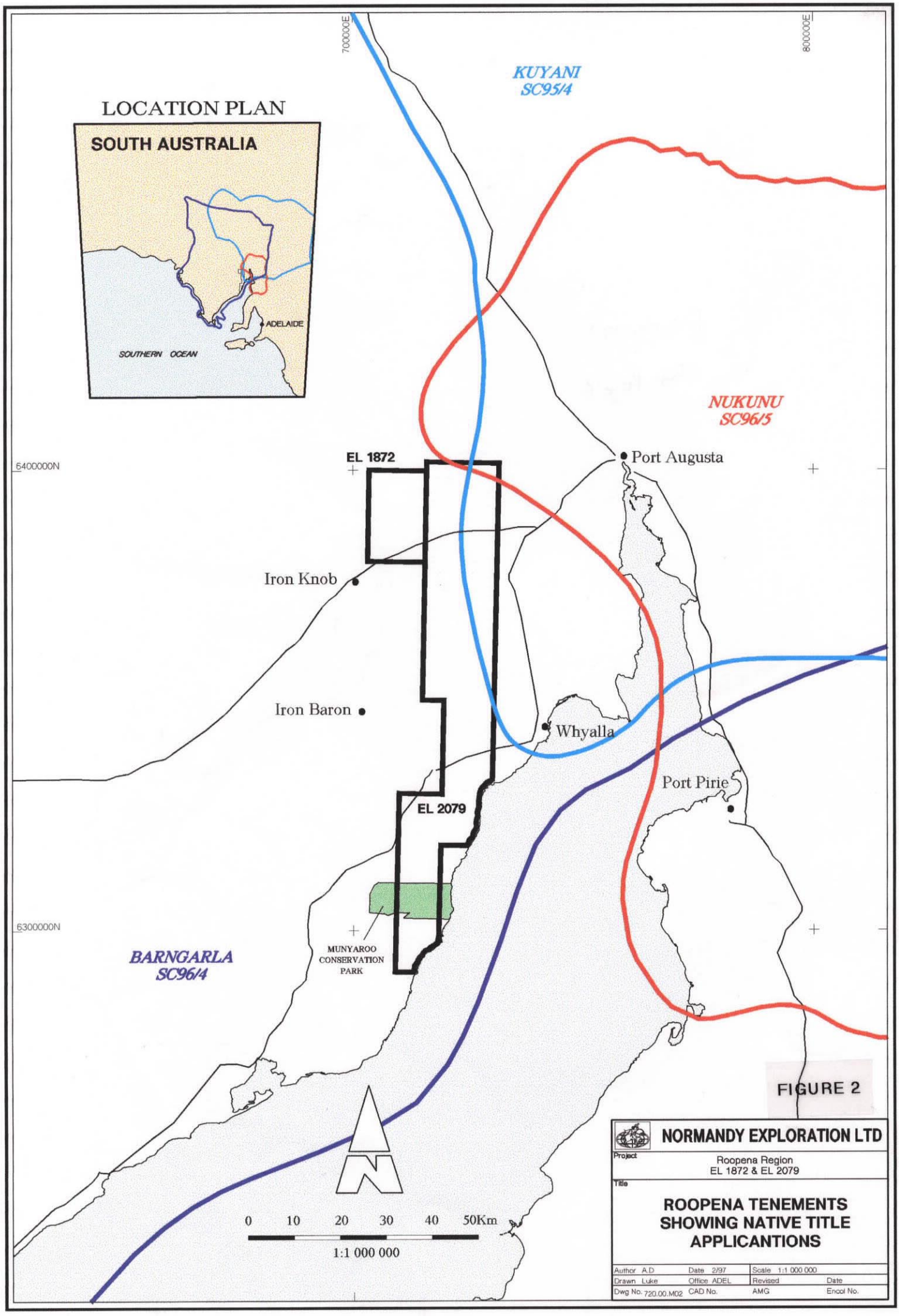
In an attempt to place the stratigraphy of the Roopena area into a regional context WMC refers to the "Whyalla Group" (Figure 3): the sequence of early Proterozoic volcanic and sedimentary rocks which unconformably overlies the early Proterozoic Hutchison Group, and is overlain by younger Gawler Range volcanic and sedimentary rocks.

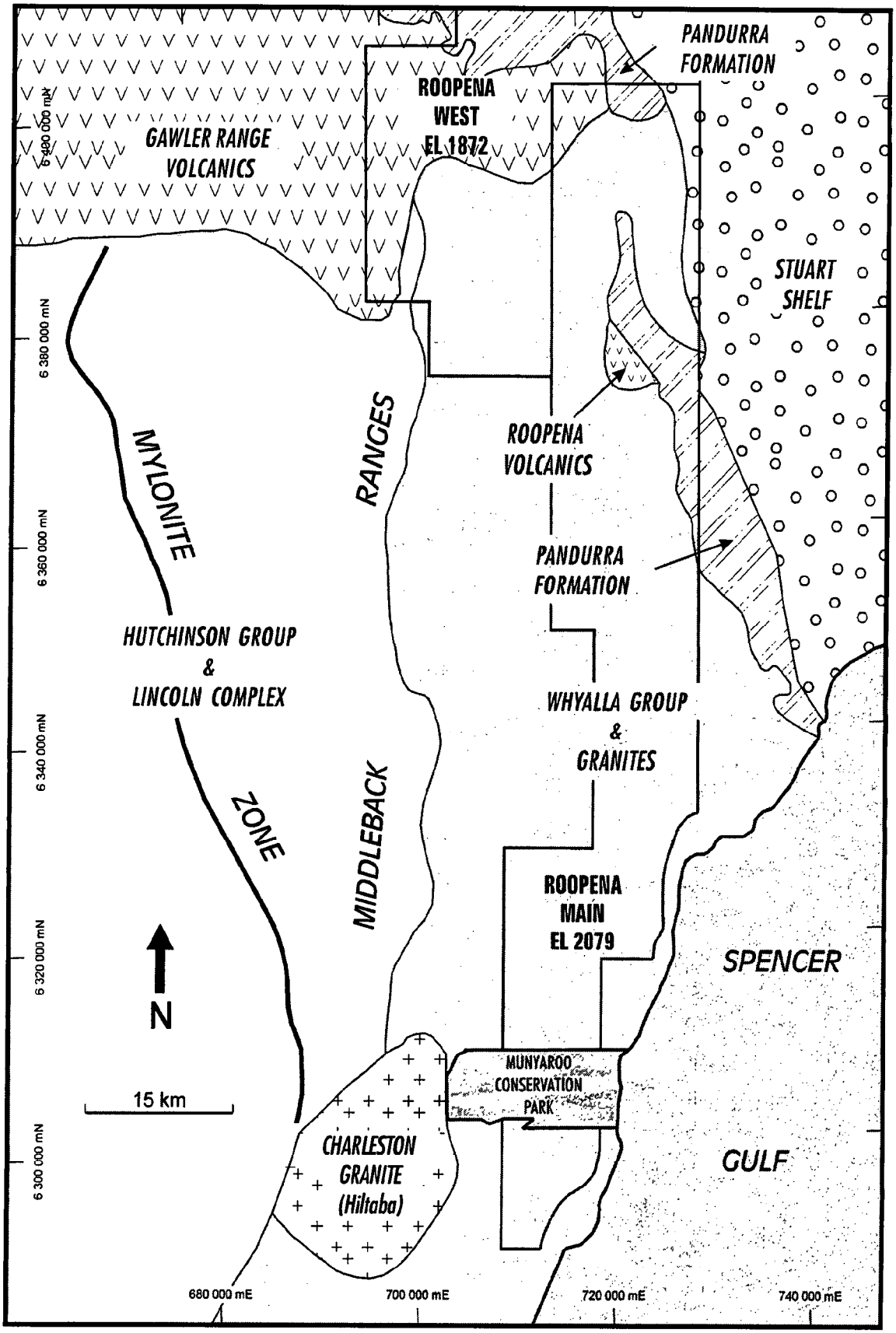
The geochronology of units within the Whyalla Group and those bounding it, indicate that its age spans the period 1800 Ma to 1650 Ma.

The Whyalla Group occupies a north-south belt (part of the Moonta Sub-domain) immediately east of the Middleback Ranges and West of Whyalla. It has regional correlatives in the Moonta-Wallaroo area.

The belt appears to be fault bound on both its western and eastern sides, and overlain unconformably to the north by Gawler Range volcanic and sedimentary rocks.

Simplistically, the Whyalla Group consists of two volcanic-sedimentary 'cycles' - the lower Myola Volcanics and Broadview Schist, and the upper McGregor Volcanics and Moonabie Formation. The McGregor Volcanics - Moonabie Formation have been correlated on the basis of geochronology with the Moonta Porphyry and Doora Schists.


LOCATION PLAN
SOUTH AUSTRALIA
ADELAIDE
SOUTHERN OCEAN
700000E
800000E
KUYANI
SC95/4
NUKUNU
SC96/5
6400000N
6300000N
EL 1872
EL 2079
Port Augusta
Iron Knob
Iron Baron
Whyalla
Port Pirie
MUNYAROO
CONSERVATION
PARK
BARNGARLA
SC96/4
0 10 20 30 40 50Km
1:1 000 000
FIGURE 2
NORMANDY EXPLORATION LTD
Project
Roopena Region
EL 1872 & EL 2079
Title
ROOPENA TENEMENTS
SHOWING NATIVE TITLE
APPLICANTIONS
Author A.D
Date 2/97
Scale 1:1 000 000
Drawn Luke
Office ADEL
Revised
Date
Dwg No. 720.00.M02
CAD No.
AMG
Encol No.



NORMANDY EXPLORATION

ROOPENA PROJECT - SOUTH AUSTRALIA
SCHEMATIC REGIONAL GEOLOGY

PAS03-21.CDR (17/12/96)

FIGURE 3

The lower part of the Whyalla Group is intruded by the Wertigo Granite, a Lincoln Complex granite equated with the Middle Camp Granite which has an age of 1757 Ma (U-Pb). On the basis of image processed aeromagnetics the Wertigo Granite has a comparable pattern to the Myola Volcanics and may therefore be related to the volcanic rocks. The entire Whyalla Group is intruded by Hiltaba Suite granites (e.g. Charleston Granite, 1585 Ma U-Pb, Creaser and Fanning, 1983). The "Whalers Granite" (informal name) occurs on the north-eastern side of the Whyalla belt and belongs to the Hiltaba Suite. Creek exposures contain large tourmaline veins. The lower Whyalla Group has undergone two of three phases of the Kimban Orogeny. The regional structure can be interpreted to consist of tight to open folds with axial plane sub-parallel faults having NNW and NNE orientations.

7.0 HISTORIC EXPLORATION

Historical exploration in the Whyalla area has been previously discussed in Norris 1994, and will not be covered in this report.

8.0 EXPLORATION COMPLETED

During the reporting period, the majority of WMC's work has been focussed on divesting this project. This has involved the compilation and preparation of their data sets for assessment by potential joint venture partners. Following on from this, negotiations with interested companies was also completed, of which Normandy Gold Ltd was the successful partner.

Normandy Gold's work on EL 1872 during the reporting period has involved data compilation of previous exploration, geomorphological mapping and the completion of a structural/geophysical study.

8.1 DATA COMPILATION

Previous exploration conducted by WMC includes surface geochemistry and drilling. This data was reformatted and imported into Normandy's in-house Explorer III database.

8.2 GEOMORPHOLOGICAL MAPPING

Geomorphological mapping of the Roopena Project area was completed by Mark Derriman (Senior Regolith Geochemist) seconded from Normandy's Perth office. The project area was mapped at a scale of 1:100,000 using colour aerial photography along with image processed thematic mapper imagery. In conclusion the project area can be essentially divided into 2 domains. The area north of Middleback homestead comprises of outcrop and thinly developed colluvial detritus.

The Southern area is dominated by depositional regime material apart from some outcrop associated with the abandoned Murminie copper mine. This report is attached in appendix 1.

8.3 STRUCTURAL INTERPRETATION

A structural study of the Roopena Project area was undertaken by consultant Dr Colin Winsor. The structural interpretation was completed at 1:100,000. covering the Roopena Project area. Several stages of deformation have been interpreted along with potential sites of dilation. This report is attached in appendix 2.

9.0 PROPOSED EXPLORATION

Exploration to be completed over the next 12 months for the Roopena Project will involve:

* Orientation geochemistry
* Regional and Prospect scale surface geochemistry

No systematic regional exploration has been conducted on this project focussed on gold mineralisation. The above work outlined will be targeted in the majority on the regional scale. Targets and anomalies generated from this program will be drill tested using RAB/aircore techniques.

10.0 EXPENDITURE SUMMARY

An expenditure breakdown for exploration completed on the Roopena West tenement EL 1872 is detailed overleaf.

ROOPENA

Expenditure by Natural Account From 1 October 1996 to 30 September 1997

Description	EL 1872
Eligible Staff Training	1057
Conferences/Mine Visits	
Entertainment	
Stationery/Office Supplies/Printing	30
Couriers/Freight Charges/Postage	299
Bank Charges	
Sponsorships/Contributions	
Publications/Maps/Subscriptions	875
Data Purchase/Search Charges	
Analytical & Assay	
Travel/Accomodation/Meals	1,012
Field Supplies/Exploration Consumables	264
Equipment Hire/Lease	
Equipment Maintenance/Repairs	
Equipment Purchases (under $500 only)	32
Communication	
Safety	244
Office Rental and Utilities	
House Expenses	
Vehicle Hire/Lease	
Vehicle Operating Costs	426
Air Charter/Helicopter	
Tenement Costs - incl. Rental & Shire Rates	784
Traditional Landowner Costs	
Regional Office Cost	3,871
Fixed Asset Usage Charge	1,540
Drafting Services and Supplies	318
Other Contractors/Casuals	
Geophysical	100
Aerial Photography/Photogramatry	
Computing Services/Supplies/Maintenance	100
Computer Hardware (<$500)	87
Computer Software (<2000)	261
Mineralogy/Petrology	
Legal Services	
Other Consultants	3,750
Diamond Drilling	
RC Drilling	
RAB Drilling	
Other Drilling	
Surveying/Gridding	
Site Preparation/Rehabilitation/Environment	
Image Processing	
Time Charges - Salaries & Wages	17,073
	$32,123

11.0 REFERENCES

BMR P427. Magnetics.

Derriman M.D.J. (1997). Report of regolith mapping of the Roopena area, South Australia. Internal Report Normandy Exploration Ltd. 5p. (RN64249).

Fietz G.B. (1989). The geological structure and slope stability of the Iron Duke iron ore deposit. Thesis for Graduate Diploma in applied geology, South Australian Institute of Technology.

Norris M.S. (1994). Annual Report for EL 1775 Roopena, 22nd April 1992 to 21st April, 1993. Vol. 1, 2, 3, 4. WMC Ltd. Exp. (CR21344) .

Parker A.J. & Daly S.J. (1982). Symposium on the Gawler Craton Drill Hole Logs. Dept. Mines and Energy, SA. Report Bk.No. 82/9.

Parker A.J. & Lemon N.M. (1982). Reconstruction of the early proterozoic stratigraphy of the Gawler Craton, South Australia. J.geol. Soc. Aust. 29, 221-238.

Parker A.J., Fanning C.M., Flint R.B., Martin A.R., Rankin L.R. (1988). Archaean - early proterozoic granitoids, metasediments and mylonites of southern Eyre Peninsula, South Australia. Specialist group in tectonics and structural geology. Field guide No. 2, 90 pp.

PNC Exploration (Australia) (1986). Quarterly Report (CR21930).

Ramsay R.R. (1979). Structure, stratigraphy, mineralogy and comparative geochemistry of Iron Duke, southern Middleback Range, SA. BSc (Hons) Adel.Uni.

Ramsay R.R. (1996a). Annual report for EL 1872 Roopena West. (CR21374) WMC.

Ramsay R.R. (1996b). Annual report for EL 2079 Roopena 25/4/95 - 24/4/95. WMC (CR21347).

SAEI Area B4. Magnetics.

Tardell Pty. Ltd. (1990). EL 1646 Roopena area progress report for the period to 6/6/90. Open File envelop No. 8314 SADME.

Weste G. (1994)a. Roopena pretertiary geology 1:100,000 SADME Preliminary mapping.

Weste G. (1994)b. Roopena geology 1:100,000 SADME.

WMC/Kevron (1993). Magnetics

Woffenden S.J.G. (1994). Annual Report for EL 1775 Roopena 22/4/93 - 21/4/94. WMC Ltd. - Exploration Division. Vol. 1, 2. (CR21347).

Woffenden S.J.G. (1995). Annual Report for EL 1872 Roopena West 1/10/93 - 30/9/94. WMC Ltd. - Exploration Division. Vol. 1, 2. (CR21373).

Woffenden S.J.G. (1996). Annual Report for EL 1775 Roopena 22/4/94 - 21/4/95. WMC Ltd. - Exploration Division. Vol. 1, 2. (CR21346).

Yeates G. (1990). Middleback Range iron ore deposit. In geology of the mineral deposits of Australia and Papua New Guinea (ed. F.E. Hughes) pp. 1045-1048 AIMM.

BIBLIOGRAPHIC DATA SHEET

Report Number	:	22982
Report Title	:	Annual Report on Exploration Licence No. 1872 (Roopena West) for period from 1 October, 1996 to 30 September, 1997.
Author	:	A. J. Downie
Date	:	March, 1998
Commodities	:	Gold, Copper-Gold
Tectonic Units	:	Gawler Craton
1:250,000 Map Sheet	:	Port Augusta SI 53-04
Keywords	:	Gawler Craton Hiltaba Suite Granite Sample Analysis

APPENDIX 1

Report on Regolith Mapping of the Roopena Area, South Australia - MDJ Derriman

1. Introduction

Regolith mapping was undertaken within the Roopena project area for Normandy Exploration Ltd (Adelaide) during May 1997. Prior to the field mapping some photogeological interpretation was carried out on 1:40,000 colour aerial photography in addition to image processing of thematic mapper imagery. The field work comprised a series of traverses, mainly along existing tracks and roads.

2. Location

The Roopena project area is located 15km west of Whyalla and approximately 200km NW of Adelaide. Access is via the sealed trans Australia highway (Route 1) which bisects the project area. Numerous dry weather station tracks and fencelines traverse the project area.

3. Data Sources

3.1 Landsat Thematic Mapper Imagery

Thematic Mapper (TM) imagery was purchased for the Roopena Project Area and processed using TNT Mipps software. Several treatments are included at the rear of the report. The TM imagery has highlighted the dominantly erosional nature of the terrain in the north and the dominantly depositional nature in the southern portion.

TM Band 7

This is the 'clay' channel with higher albedo areas representing areas of exposed sediments or weathered rock. The northern area represents just such material.

TM Bands 7, 4, 2 (with Decorralation Stretch)

TM bands 7, 4, 2 is a standard combination to highlight regolith and geological features as various colour tones. The decorralation stretch is a specific contract enhancement to add further discrimination. In the northern area several lithological and regolith units are easily distinguishable. The sand dune terrain in the far south is recognisable as a bright green tone due to thick eucalypt and acacia cover.

Principle Components 1, 4 and 5

Principle components is a technique whereby high discrimination of geological and regolith units is possible by separating the data from the combined bands using axis which are aligned with the trend of the data. Lower order principle components highlight more subtle aspects of the data and can contain geological information not apparent in a standard 7, 4, 2 composite. In this imagery the sand dunes are again apparent in the south as is the surface expression of an extensive NNE-SSW breakaway, the base of which is highlighted by yellow proximal colluvium. Geological and regolith units are easily distinguished in the north of the project area due to the higher level of erosional material.

Ratios 5/4, 4/7 and Band 4

The maximum discrimination obtained was from a combination of ratios and a single band image. Unfortunately the ratio process in the southern half was swamped by the sharp contrast between ocean and land so only the erosional/depsoitonal terrain in the northern half was processed. A comparison of this imagery with the preceding ones indicates the extent of the discrimination possible using ratios, particularly in the northern portion of the project area.

3.2 Aerial Photography

Detailed colour aerial photography at 1:40,000 scale was obtained for the project area. The photography purchased covers all of EL 2079 but only the eastern half of EL 1872 as outlined below:

(A) Port Augusta Sheet (SI53-04)

Film No.	Run No.	Frame No.	No. of Frames
SVY SA 5081	5081	097-102	6
SVY SA 5081	5081	063-068	6
SVY SA 5081	5081	014-019	6
SVY SA 5093	5093	015-019	5
SVY SA 5075	5075	386-391	6
SVY SA 5079	5079	338-342	5
SVY SA 5079	5079	305-311	7
SVY SA 5079	5079	258-263	6

(B) Whyalla Sheet (SI53-08)

Film No.	Run No.	Frame No.	No. of Frames
SVY SA 5043	5043	005-008	4
SVY SA 5043	5043	053-057	5
SVY SA 5043	5043	061-066	6
SVY SA 5043	5043	106-111	6
SVY SA 5043	5043	114-118	5
SVY SA 5043	5043	161-164	4
SVY SA 5045	5045	171-175	5
SVY SA 5046	5046	330-333	4

The photography was used to impart a 3-dimensional aspect to the processed TM data as well as indicating vegetation effects highlighted with the TM imagery. A full photo interpretation was not carried out.

3.3 Geological Mapping

Geological mapping at 1:100,000 scale was carried out by G Weste of the South Australian Department of Mines and Energy. This data was used to categorise some of the TM regolith units in addition to field traverses. The 1:100,000 geological mapping was carried out over the northern half of the project area with 1:250,000 geological mapping available for the southern half.

3.4 Drilling

Extensive drilling has been carried out within the Roopena Project Area by previous tenement holders. Only the drilling within the southern half of the tenement (carried out by BHP Minerals) was looked at as this area comprises a thick sequence of Quaternary and Tertiary Sediments.

Traverse PP1-PP5

This 10km E-W drill traverse was carried out across unit DW1 in the extreme south of the project area. The average depth of the percussion drill holes was 140m and comprised from 60-120m of Quaternary red clayey sands and gravels overlying white sandy clays. These units in turn overly a sequence of Tertiary sediments comprising glauconitic sands, lignite and fossilferous limestone. The Quaternary and Tertiary Sequences thin towards the coast.

Traverse PP12-PP18

This 17km N-S traverse parallels the present day coastline across unit EC1 which occurs to the east of a prominent scarp (possible fossil shoreline?). The average depth of drilling was 100m with a 25m thick Quaternary sequence of for Traverse PP1-PP5 overlying a similar, and up to 60m thick Tertiary sequence, which in turn overlies Proterozoic bedrock lithologies. The drilling indicates overall thinning of the sequence towards the north.

4. REGOLITH UNITS

4.1 Relict Regime

Lateritic material is confined to NW section of the project area and comprises a small ridge of cutinous haematitic laterite and lateritic lag.

4.2 Erosional Regime

Erosional regime material dominates the northern half of the project area and varies from isolated outcrops and extensive proximal colluvium.

4.3 Depositional Regime

4.3.1 Channel Alluvium - Active (DA1/DA2)

Active channel alluvium is confined to several discrete channels. The alluvium can be up to 4m thick and is locally mottled.

4.3.2 Sheetwash Alluvium (DA32)

The sheetwash alluvium is quartz dominant with lesser lithics. Extensive sheetwash alluvium occurs adjacent to the Pandurra Homestead.

4.3.3 Valley Side Colluvium (DC1)

This is proximal alluvium adjacent to erosional regime material and is likely to be thinly developed ie < 2-3m.

4.3.4 Valley Plain Colluvium (DC2/DC22)

This is more distal colluvium and has 2 varieties within the project area.

(a) North of 'Middleback Homestead' the colluvium (DC22) is dominated by quartz rich lag associated with granitic bedrock. This colluvium is possibly <2-4m in thickness.

(b) The majority of the valley plan colluvium comprises of a mixture of lithic, quartz and ferricrete lag and is the dominant cover type in the south of the project area. The lag is coarser in the north due to the abundance of erosional regime material.

4.3.5 Lake and Lacustrine Sediments (DL1)

Two small freshwater lakes occur in the north east of the project with a Cu mineral occurrence located just to the west of the southern most lake.

4.3.6 Silcrete (DS1)

Several prominent silcrete ridges are located in the NW of the project area with a small area in the NE comprising silcrete fragment with a silica cement.

4.3.7 Aeolian Sand Dunes and Plains (DW1 and DW2)

The extreme southern part of the project area is dominated by sand dunes to 12m in height and covered by a moderate canopy of eucalypt and acacia vegetation. A line of drilling across this unit indicates the dunes cover a Quaternary Sediment sequence to 80m in thickness.

4.3.8 Breakaways (EB1)

A distinctive breakaway parallels the current coastline for a distance of up to 50km and possibly represents the position of a fossil coastline. There is a build up of rounded concretionary calcrete on the leading edge, the calcrete being of possible aeolian origin. The breakaway is in part associated with the Roopena fault which may have be the impetus for the fosil coastline development.

4.3.9 Proximal Colluvium to Breakaway (EC1)

There is a zone of proximal colluvium to the east of the breakaway in the southern section of the project area, this colluvium overlies a Quaternary Sequence to 40m in thickness.

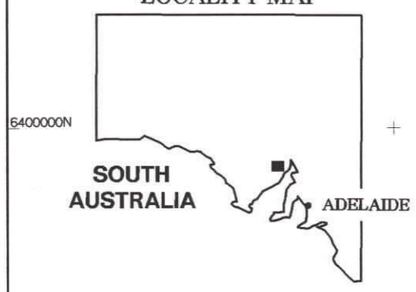
5. CONCLUSION

The Roopena project area can essentially be divided into 2 domains comprising an essentially erosional domain north of 'Middleback' homestead comprising outcrop and thinly developed colluvial detritus. This is shown in figure 4. An extensive area of sheetwash is developed adjacent to the 'Pandurra' homestead, the depth of which could be ascertained from the drilling records of previous companies.

The southern domain is dominated by depositional regime material apart from some outcrop associated with the abandoned Murminie copper mine. Previous drilling records have indicated the area south of 'Middleback' homestead is dominated by a Quaternary and Tertiary Sedimentary sequence to 100m in thickness and thinning from south to north.

710000E 720000E 730000E 740000E

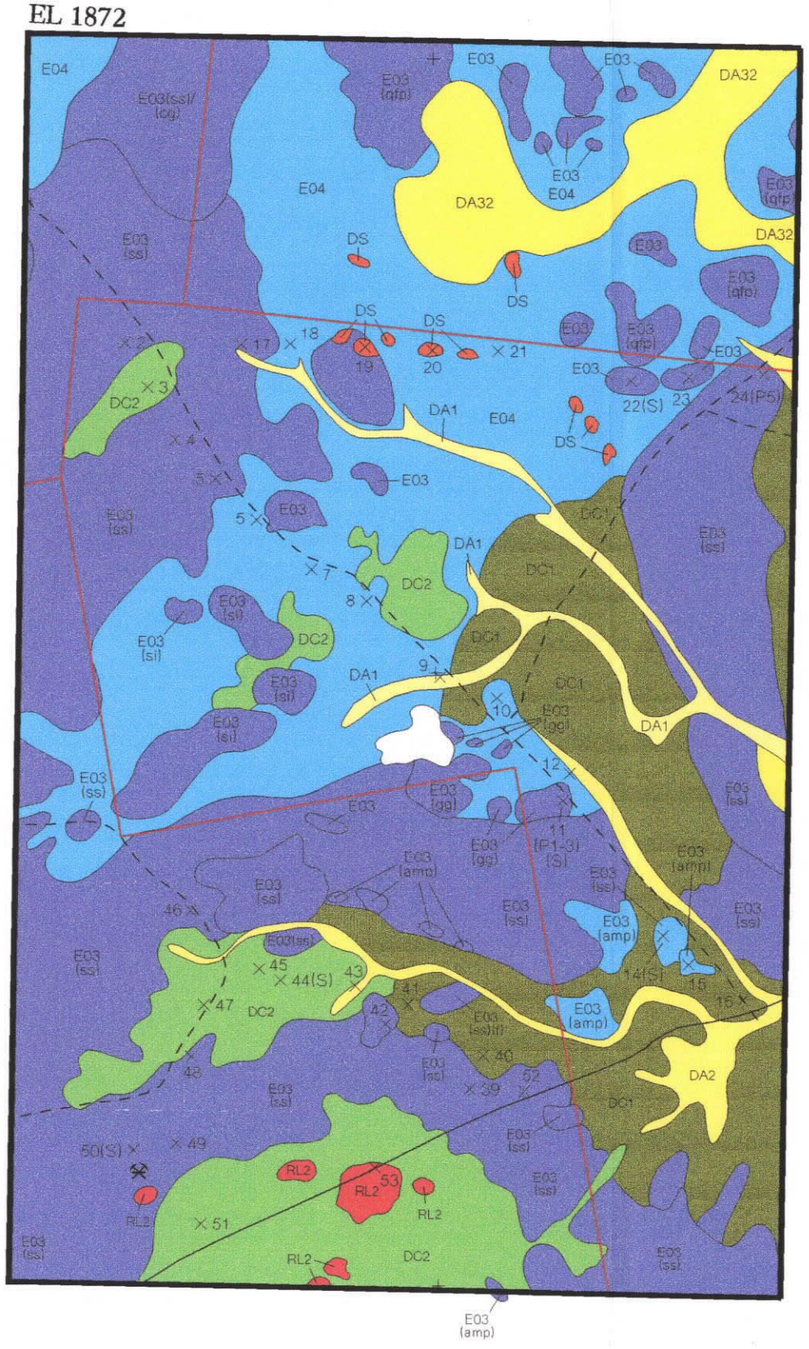
LOCALITY MAP



6390000N

6380000N

EL 1872



0 1 2 3 4 5 10km

1:100 000

RELICT REGIME

- RL1/RL2 — Pisolite gravel (1) and laterite duricrust (2) over insitu complete lateritic profile

EROSIONAL REGIME

- E02 — Hills with high relief (90-300m) and proximal colluvium
- E03 — Low hills with gentle slopes (10-90m) and proximal colluvium
- E04 — Erosional plain including pediplains, peneplains and etchplains with bedrock frequently exposed (<10m) and proximal colluvium
- EB1 — Outcrop of shallow proximal colluvium adjacent to breakaway. This colluvium covers up to 40m of Quarternary sediments in the southern half of the project area
- EC1 — Proximal colluvium to breakaways

DEPOSITIONAL REGIME

- DA1 — Alluvium in minor channels (Strahler Order 1-3)
- DA2 — Alluvium in major channels
- DA32 — Sheetwash alluvium frequently active and quartz dominant
- DC1 — Valley side colluvium(proximal)
- DC22 — Valley plain colluvium(distal) quartz dominant
- DC2 — Valley plain colluvium with sparse rounded concretionary calcrete lag in the southern half of the tenement
- DL1 — Lakes of laoustrine sediments (fresh to brackish)
- DS — Massive silcretes and "Grey billy" frequently observed to be cementing well rounded clasts
- DW1 — Aeolian sand dunes
- DW2 — Aeolian sand plains
- E03 (qfp) — Erosional Terrain comprising of quartz feldspar porphyry

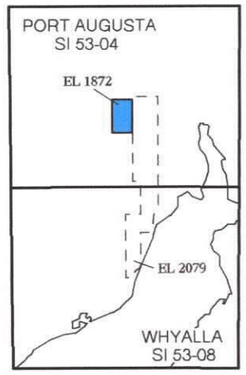
SYMBOLS

- X 66 — Field descriptor site (see appendix to report, for details)
- X 66(s) — Field descriptor site with rock sample
- X 66(P1) — Field descriptor site with slide number
- Mine, abandoned
- Quarry, abandoned
- Quarry
- Principal road, sealed
- Secondary road, unsealed
- Light railway
- Homestead
- Property boundary

LITHOLOGICAL DESCRIPTORS

- qfp — Quartz Feldspar Porphyry
- ss — Sandstone
- bv — Basalt
- cg — Conglomerate
- gr — Granite
- si — Silcrete
- gg — Gneissic Granite
- amp — Amphibolite
- ss(f) — Ferruginous Sandstone
- qzt — Quartzite
- vq — Vein Quartz
- myl — Mylonite
- • PP1 — BHP percussion drill hole
- • PPD23 — BHP diamond drill hole
- • EB1 — BHP percussion drill hole

1:250 000 SHEET LOCATION



N

N.B. Compiled from interpretation of 1995 1:40,000 black and white aerial photography and TM imagery which was used to create the base map. Brief reconnaissance field checking occured. Some interpretation and spatial discrepancies are regrettable but inevitable.

NORMANDY EXPLORATION LTD

Project: ROOPENA J.V Project
EL 1872

Title:

REGOLITH MAPPING

FIGURE 4

Author M.D.	Date 12/97	Scale 1:100 000	
Drawn Luke	Office ADEL	Revised	Date
Dwg No. 720.01.R01		AMG	Encol No.

APPENDIX 2

Report on Structural Geology
Analysis of the Roopena Project, South Australia - Dr C N Winsor

1. INTRODUCTION

Structural analysis was undertaken as part of mineral exploration within the Roopena Project area for Normandy Exploration Limited (Adelaide) during August 1997. The structural analysis involved examination of aerial magnetic data, gravity data, thermatic mapping (TM) imagery, surface geological mapping (by MESA), regolith mapping and LANDSAT imagery. Based on trend analysis a deformation history was established and potential sites for mineralisation have been identified. Previous structural investigations include those by Parker & Lemon (1982) and Parker et. al (1988).

2. LOCATION

The Roopena project area is located 15 km west of Whyalla and approximately 200 km NW of Adelaide. The area extends in a N-S trending belt from 6400000N to 6390900N. Access is via the sealed Eyre highway (Route 1) which bisects the project area.

3. DATA SOURCES

3.1 MESA Geological Mapping

Regional mapping has been undertaken by Weste (1994)a,b, of the Pre-tertiary Geology and Roopena Geology map sheet area. A prominent suite of NW to NNW trending dykes (the Gairdner Dykes) transect the area. To the west of the Roopena Fault an extensive belt of the Broadview schist unit extends from north to south. Various N-S to NE-SW faults transect the area. Previous mapping of selected areas has also been undertaken at Iron Knob and Iron Duke (e.g. Fietz 1989).

3.2 LANDSAT

Structural trends have been identified on LANDSAT TM imagery for the Red - bnd 7, Green - bnd 4 and Blue - bnd 2. This data is presented in a report by M Derriman (1997).

3.3 Regolith

Regolith mapping has been undertaken by M Derriman (1997). Traverses for field checking were carried out mainly along existing roads and tracks.

3.4 Drilling

Previous drilling which has been undertaken in the Roopena area is listed in Table 1 and includes reference to drilling completed by companies to 1982 by Parker & Daly (1982). In the northern section WMC and PNC Exploration have undertaken drilling. In the southern area drilling has been carried out by BHP. WMC drilling in the northern area of the exploration licence spanning the interval 1992 - 1996 is contained in reports by Norris (1994), Ramsay (1996a, b) and Woffenden (1994, 1995 and 1996).

Table 1

Roopena Drilling 1969 - 1996

EL	Envelop No. (Company Report)	Target	Company	Date
SML 204	BHP RP	Base Metals (RP3 on Roopena Fault)	BHP Exploration	1969
EL 266	2869	U	BHP Exploration	1970
EL 50	2273	Base Metal/Cu	Mt. Gunson	1973
EL 266	3154	Ag, Au Base Metals, Fe	BHP Exploration	1977
EL 1041 398, 692	3292	Base Metals	SADME	1978
EL 332	3024	Base Metals	CSR Ltd.	1978
EL 766	4124	Coal	BHP Exploration	1981
EL 692	3292	Base Metals	Sameda Oil Co., ESSO, SADME	1982
EL 1339	6778	Base Metals	PNC Exploration	1987
EL 1775	CR21344	Base Metals, Ozone & Laura Targets	WMC	1/1994
EL 1775	CR21345	Copper/Au, Spencer & Bayview Prospect	WMC	7/1994
EL 1775	CR21346	Base Metals, Mallee River Prospect Kennedy Dam Extension Tank Mulga Dam Tank Hill Spencer Prospect/Bayview South Prospect	WMC	4/1996

The results of drilling in the northern section of the tenement area by PNC Exploration is contained in a PNC Quarterly Report (1986). Plate 1 (6778-1) of this report displays drilling completed over the Roopena area (EL 1339) until July, 1987.

Exploration drilling across the northern section of the exploration licences by Tardell Pty. Ltd. was carried out in 1990, results of which are contained in Tardell (1991).

3.5 Aeromagnetics

Magnetic data is of good quality in the northern section of the exploration licence EL 2079 and within all of exploration licence EL 1872. In the southern section of EL 2079 the quality is very much reduced, being only BMR 1600m line spaced date.

In exploration licence EL 1872 and the northern part of EL 2079 the data used for the interpretation includes magnetic E, NW, NE sun angles, and grey scale first vertical derivation. This data includes SAEI area B4 (400m line spacing E-W) and WMC/Kevron 1993 (200m line spacing E-W).

3.6 Gravity

Bouguer gravity data is fairly good in the northern portion of the exploration licence areas EL 1872 and EL 2079. A prominent gravity high exists about 6385000N, 711500E displaying NE, SW and South trending arms. This major gravity high lies to the east of the Iron Knob BHP steel mine. Most of the data were collected by WMC along traverses (roads and tracks).

3.7 Induced Polarisation

Detailed IP survey results have been completed as part of the WMC Roopena exploration investigation 1993-1996 identifying areas of potential mineralisation. IP investigations were also undertaken by PNC Exploration across the Warkaka and Pandurra Grid which extends across the Roopena Fault Zone.

This report does not include an investigation of all IP investigations undertaken over the exploration licences.

4. STRUCTURAL INTERPRETATION

The interpretation made here mainly covers the northern section of the Roopena exploration licences where there is better geological and geophysical data available. In the southern area of the licence prior to defining an exploration target further regional geological and geophysical investigations are required. Until further field investigations are carried out in the northern area, this interpretation must be considered preliminary.

4.1 Regional Geology

Although outcropping rocks in the region are sparse, it is evident that the Roopena area comprises a north-south belt of metasediments and volcanoclastic metasediments of Palaeoproterozoic age to the west of the Roopena Fault (Weste 1994 a, b). Foliation trends to the north, north-northwest (Weste 1994b).

Locally amphibolite lenses follow the layering (probably a metamorphic fabric) in the Broadview Schist and syntectonic granites and basic intrusions intrude the Broadview Schist as part of the Lincoln Complex.

Stratigraphically overlying the Broadview Schist is a unit of metasandstones and minor volcanoclastic metasandstones the Moonabie Formation towards the base of which a unit of ore grade hematite is present which is the rock unit mined for iron ore at Iron Knob in the north-south belt extending south to Iron Duke (Yeates 1990). Locally on the Roopena Pre-tertiary geology of Weste (1994a) in the north-south belt extending to the west of the Roopena Fault, the Moonabie Formation is absent. This may be a result of stratigraphic facies changes or absence of the unit due to faulting. Field investigations should be able to verify the nature of the contact between the Broadview Schist and Wanderah Metasiltstone.

Overlying the Moonabie Formation in the Roopena Lease area is a rock unit known as the Wandearah metasiltstone comprising thinly laminated dolomitic and sandy metasiltstone. This unit is present in a north-south belt about
2 km wide.

The McGregor volcanics are rhyolitic volcanics which intrude the Moonabie Formation and Wandearah metasiltstone.

The Corunna conglomerate and minor basal dolomite overlies the McGregor Volcanics. This is overlain by Roopena Volcanics comprising basalt, volcanic siltstone and rhyolite.

To the east of the Roopena Fault, a north-south belt of granite and granodiorite is exposed, of interpreted Hiltaba Suite age. This is informally known as the Whalers Granite.

Dolerite Dykes of the Gairdner Dyke Swarm transects the exploration licence trending to the NW-SE. Locally along the Roopena Fault, dolerite has been intruded.

4.2 Previous Structural Interpretations

Structural investigations over the Roopena EL and adjacent areas have either involved preliminary regional investigations not necessarily linked to mineralisation as in Parker & Lemon (1982) and Parker et. al (1988), or have involved detailed structural investigations of adjacent iron ore resources as in Fietz (1989) and Ramsay (1979).

The Roopena EL is mainly within the Cleve Subdomain as discussed by Parker & Lemon (1982) and Parker et. al (1988). This is an orogenic belt or orogenic zone of early to middle Proterozoic rocks transected by the Roopena Fault.

To obtain further information on the deformation history identified in the Roopena EL's see Parker & Lemon (1982).

4.3 Structural Investigation based on:

4.3.1 - LANDSAT and Regolith

Structural trends identified on LANDSAT TM imagery for the Red-bnd 7, green-bnd 4 and Blue-bnd 2 are contained in Plan 2. The results of regolith mapping by Derriman (1997) in terms of areas where major regolith units are also identified in Plan 2. The major regolith units include Collivium, Valley plain colluvium, hills and erosional plains.

Prominent structural trends are readily identified on the LANDSAT TM imagery (Plan 2) and include prominent NE-SW, NW-SE, E-W and N-S trends. (Note: Lineament analysis could form a valuable adjunct to this investigation).

Comparison between the LANDSAT structural trends and the geological mapping by Weste (1994a, b) reveals that many of the lineaments correspond to distinct geological boundaries either rock unit contacts or faults. The Roopena Fault Zone and the NE-SW trending fault to the NW of the licence area are readily identified from the LANDSAT imagery.

The LANDSAT imagery and regolith mapping of Derriman (1997), particularly in the southern portion of EL 2079, does provide additional information on structural trends and potential for mineralisation in an area where there is poor resolution geophysical data. Significantly there does not appear to be as many structural lineaments identified in the southern area as present in the northern section, possibly reflecting a lower exploration potential to the south.

4.3.2 Aeromagnetics - (Northern area)

Interpreted magnetic trends over the Roopena 1:100000 map sheet area in the exploration lease reveal magnetic high trends to the northwest - north-northeast, north-south and east-west. These trends are obvious on all magnetic maps (Plans 3-7), but are probably best identified on the Roopena greyscale magnetics RTP-IVD, (Plan 3).

Comparison between the interpreted magnetic trends and the Pre-tertiary Roopena geology map and the Roopena mapping by Weste (1994a,b) reveals that magnetic highs transecting the area with trends to the north-south and northwest, corresponds to a suite of dolerite dykes (the Gairdner Suite). Other magnetic trends are assigned to faults (e.g. the Roopena Fault zone is easily identified as a prominent north south trending magnetic low This is due to magnetite distruction as a function of shearing. A number of minor fault splays are identified in the area adjacent to the Roopena Fault. Their orientation is suggestive of an interval of left lateral (sinistral) strike slip movement on the fault. This is indicated where the Roopena Fault makes a slight left lateral dilatational jog, where it is transected by a major northwest trending dolerite dyke (this is at coordinate 721000E 6372000N).

The Roopena Fault is believed to exhibit evidence for more than one interval of strike slip movement. This is evident where a NNE trending arm of the fault displaces it in a dextral sense (right lateral) the prominent NW trending dolerite dyke discussed previously.

The interpretation of the aeromagnetic data suggests the Roopena Fault has had a complex history of strike slip movement.

Another prominent fault evident from the aeromagnetic data intersects position 720000E, 6400000N and trends to the NE-SW.
South of 6370000N and to the west of the Roopena Fault a series of closely spaced N-S, NNW to NNE trends are believed to reflect either foliation trends or joints parallel to the foliation. These trends and others identified should be verified in the field.

Structural trends interpreted over the Roopena 1:100,000 lease areas for the magnetic NW shade (Plan 4), E shade RTP and bouger gravity (Plan 5) and NE shade (Plan 6) strongly resemble the trends established and the grey scale RTP-IVD interpretation (Plan 3).

Preliminary analysis suggests northwest dolerite dykes and faults transect the area. Fabric trends are suggested in the region adjacent to the Roopena Fault locally indicating north and south plunging fold closures (Plan 4). Without field investigation it is difficult to determine the nature of these suspected fold closures, whether representing anticlines or synclines. However, comparison with the Roopena pre-tertiary geology indicates most fold closures are north plunging synclines (probably F_1 folds). The Roopena Fault is a prominant north-south linear feature through the centre of lease area EL 2079. Other structural trends apparent include minor ENE to NE trending faults, inferred to be related to the movement history of the Roopena Fault.

Aeromagnetics - Southern Area

Magnetic data across the southern section of EL 2079 (south of 6340000N) is of a much lower resolution than that to the north. The difference is a function of the line spacing (1,600m vs. 200m).

The resolution on the Grey scale magnetics over the Middleback 1:100,000 map sheet as interpreted in Plan 7 is sufficient to identify broad trends, but not of a high enough resolution to identify fine detail as has been possible across the Roopena 1:100,000 map sheet. For this reason, exploration targets have not been identified in the southern area.

On the Middleback magnetics a broad magnetic high extends from the north in a NS trend to a SW trend to the south.

Another magnetic high is situated to the west about 711000E to 712000E, comprising a narrow NE-N-S to SSE trending belt (see Plan 7).

4.3.3 Gravity Roopena 1:100,000 (Northern Area)

The Roopena 1:100,000 gravity trends reflect the underlying structure.

A fairly narrow N-S gravity high extends south of 6400000N along the entire length of the Roopena map sheet. This trend represents the western contact of the Roopena Fault, with maximum gravity high about 1-2 km to the west of the fault. This broad trend follows the western margin of the Roopena Fault and individual troughs and highs. The trend may also represent secondary faults to the Main Roopena

Fault, but individual structural elements are difficult to identify from the gravity data.

A broad gravity high is situated about 710000E and 6400000N near the site of a NE-SW trending fault. (Figure 3). A broad arm of this trend extends to the southeast, the trend following the direction of a dyke.

Gravity Roopena 1:100,000 (Southern Area)

The gravity data in the southern area is not of a sufficient quality to distinguish features, only establish broad regional trends (Middleback 1:100,000 sheet detailed WMC gravity).

A gravity high exists to the NE and another to the SW. These appear to be related to magnetic highs (see Plan 7).

5. PRELIMINARY DEFORMATION HISTORY

Interpretation of the structural history of the Roopena Licence area must at present be considered as preliminary and intuitive based on a regional appreciation of deformation events affecting Proterozoic rocks in South Australia, since detailed structural analysis has not been undertaken in the field as part of this study. Despite the preliminary nature of the study, significant progress can be made on the structural history based on the observations made by others (e.g. Parker & Lemon, 1982 and Parker et al. 1988) and the author of the Iron Duke deposit (Winsor unpublished data).

5.1 D_1 Shortening and Relaxation

The deformation history established in the Roopena Exploration Licence areas is depicted in Table 2. Dilational sites related to phases of folding, shearing and extension during this history are also shown.

Folds on the Roopena 1:100,000 geological map (Weste 1994) adjacent to the Roopena Fault are believed to be first generation (F_1) folds. If these folds formed in their present orientation, they are a result of east-west shortening, however, they probably did not form in their present orientation but would have been transformed into this orientation by folding (and/or faulting). During D_1 extension or tension fractures or veins probably developed normal to the fold axis.

The Roopena Fault probably was initiated towards the end of the first deformation as either a thrust or normal fault along the inflexion zone of an F_1 syncline.

At the final stages or after the first deformation, dyke material intruded along the Roopena Fault (see Table 2b).

5.2 D_2-D_3 Shortening and Relaxation

A second (and/or third) deformation phase resulting in shortening about a NE-SW trending axis and producing gentle warps with fold axes plunging to the NW-SE. These folds are not evident in the Roopena lease area, but are suggested by the occurrence of a NW trending dyke swarm.

Faults, joints and fractures which trend to the NE-SW, as in the fault which passes through 710000E 6390000N, probably were initiated as tension fractures normal to the D_{2-3} shortening axis. Evidently however, from the aeromagnetic interpretation (e.g. Plan 3), these structural weaknesses are not very common. Following D_{2-3} shortening and associated shearing, stress relaxation took place about a NE-SW axis (Table 2a). Tension occurred normal to this direction and a suite of NW-SE trending dykes intruded (the Gairdner Dyke Swarm). The curvature of some of the dykes suggests they have undergone a period of shearing.

5.3 D_4 Shortening

A minor interval of shortening occurred about a NW-SE trending principal stress axis, resulting in NE-SW trending folds. Evidence for this deformation phase is suggested by the curved (arcuate) nature of some dykes of the Gairdner Dyke Swarm.

6. SITES OF DILATION RELATED TO DEFORMATION HISTORY

The potential sites of dilation related to the deformation history are indicated in Table 2. Extension veins and fractures are either normal or parallel to the folding shortening directions.

Movement on the Roopena Fault or other NS trending faults can be responsible for the development of dilational gashes that could host mineralisation. At the present time, the relative timing of the mineralisation in relation to the structure is unknown.

7. PROPOSED EXPLORATION TARGETS BASED ON STRUCTURAL INTERPRETATION

Based on the structural interpretation developed above, the inferred sites of mineralisation which support this interpretation and areas defined from previous exploration programs (as revealed in Table 1), are depicted on Plan 8. These inferred sites incorporate all of the dilational sites identified in Table 2 and reflect the stages across the entire deformation history. In Plan 8, letters (a) - (e) at the respective sites refer to the relative timing of mineralisation in relation to structure.

Many of the potential exploration targets identified from this study are also areas that have been assigned from earlier exploration programs, for example the Kennedy Dam and Block Dam WMC prospects (Plan 8). Other prospects previously identified appear to be close to potential sites recognised in this report as in Mulga Dam Prospect. In some large prospect areas that have been previously recognised, as in the WMC 1996 Bayview Prospect or the Tank Hill Prospect, specific exploration targets have been identified in the current study.

Importantly it should be recognised that the sites identified in Plan 8 across the northern area of the Roopena Lease are sites of structural dilation that may host mineralisation. Obviously other factors are important to consider in controlling whether mineralisation is present, such as:

1) timing of structure in relation to mineralisation
2) source rocks
3) potential heat source.

After a more thorough examination is undertaken of the previously collected geological and geophysical data, the potential exploration targets should be tested, probably starting with sites along the Roopena Fault where there is a dilational jog, i.e. type b) sites from Table 2 and Plan 8. After this, the other targets identified should be examined in a systematic manner.

8. RECOMMENDATIONS

1. Complete review of all previous geological and geophysical investigations in an effort to evaluate potential targets. Previous investigations include those carried out by:

   Pacminex, WMC, Australian selection, BHP/Dampier, SADME, Billiton, ESSO, and PNC exploration.

2. Detailed surface mapping in areas identified as having exploration potential, incorporating lithological and structural mapping.
   Refining targets and establishing the history of structural events and relationship to mineralisation.

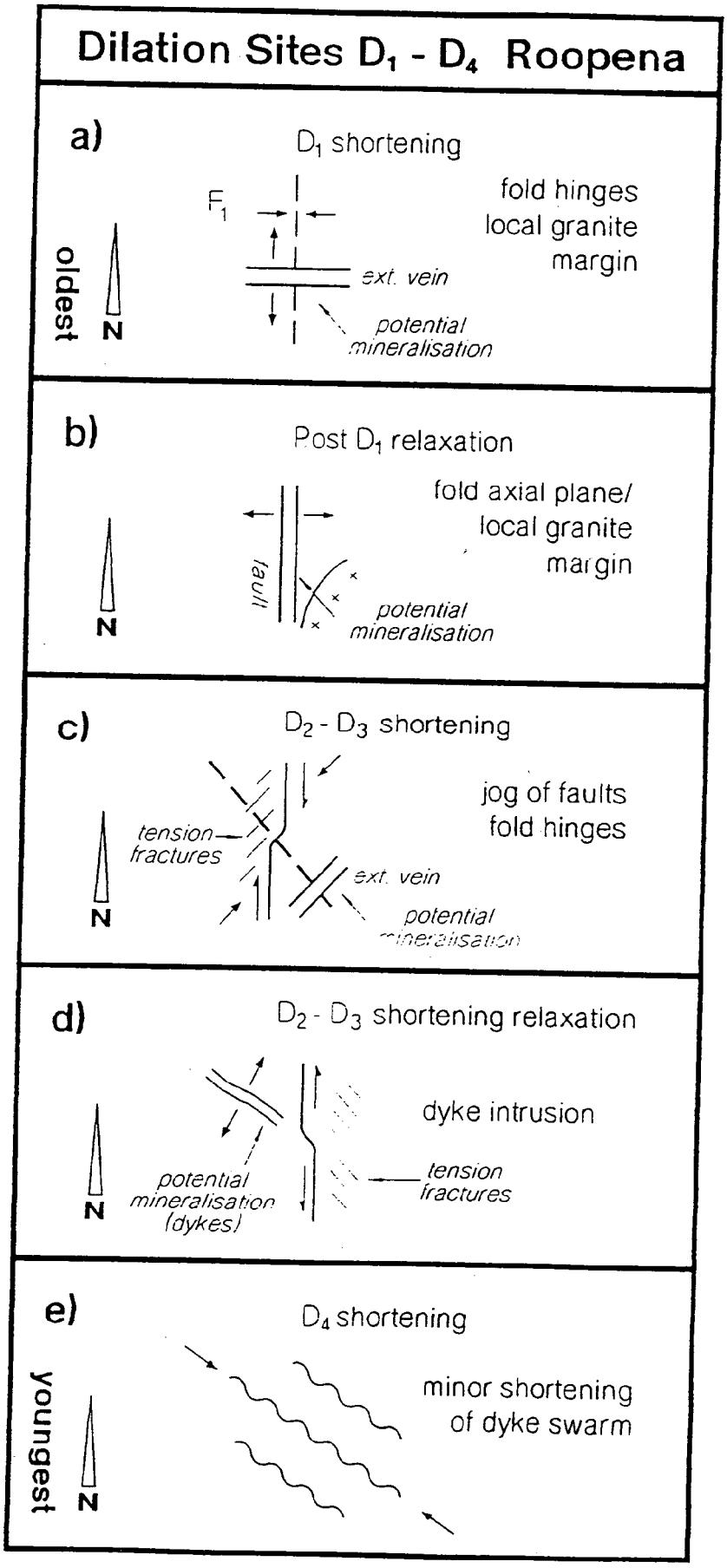
3. Collection of geochemical samples in areas identified as having exploration potential.

4. Collection of further magnetic data in southern portion of lease area if required.

5. Localised drilling over potential targets if required.

6. Review interpretation and mineralisation potential.

Table 2


Dilation Sites D1 - D4 Roopena
a)
D1 shortening
F1
fold hinges
local granite
margin
ext. vein
potential
mineralisation
oldest
N
b)
Post D1 relaxation
fold axial plane/
local granite
margin
fault
potential
mineralisation
N
c)
D2 - D3 shortening
jog of faults
fold hinges
tension
fractures
ext. vein
potential
N
d)
D2 - D3 shortening relaxation
dyke intrusion
potential
mineralisation
(dykes)
tension
fractures
N
e)
D4 shortening
minor shortening
of dyke swarm
youngest
N

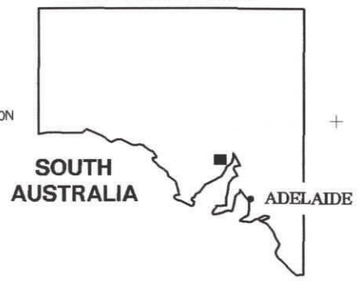
710000E 720000E 730000E 740000E

6400000N

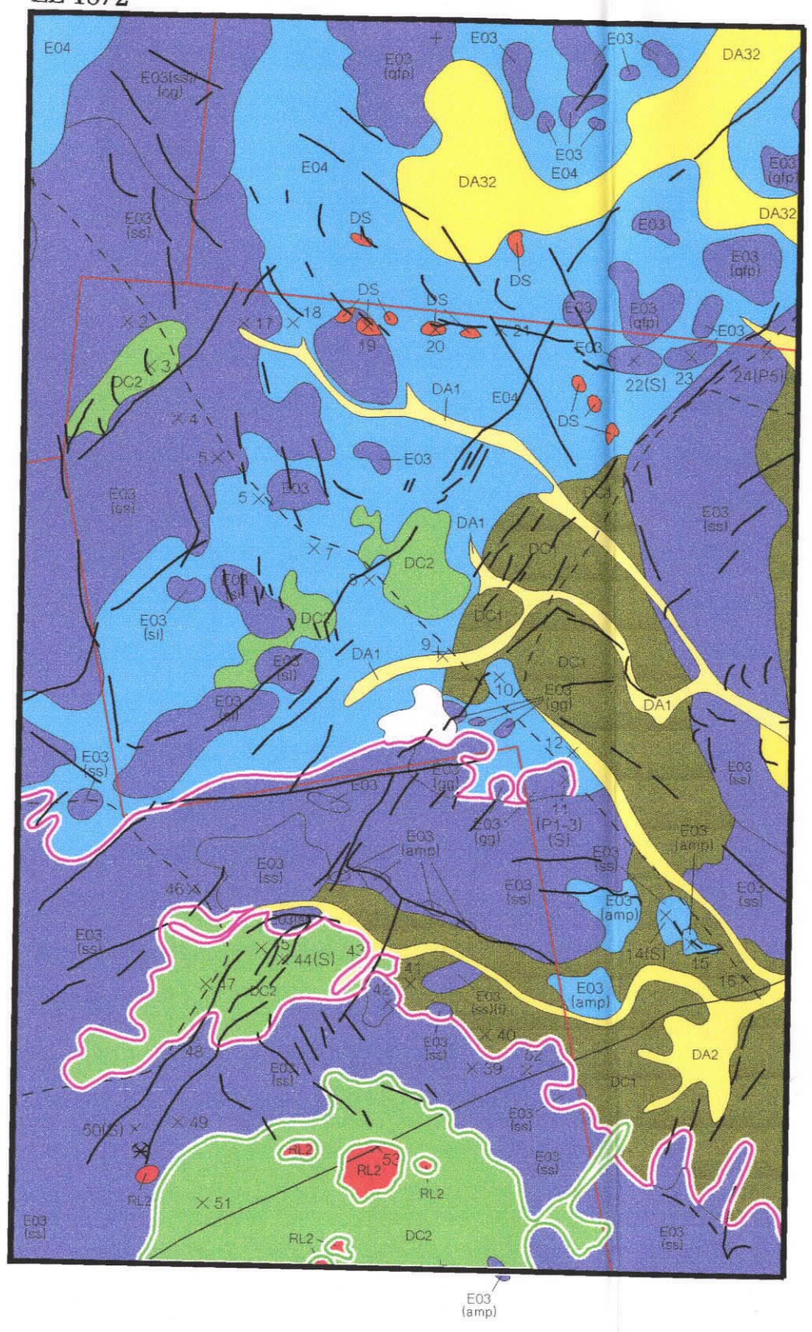
6390000N

6380000N

LOCALITY MAP



EL 1872



RELICT REGIME

	RL1/ RL2	Pisolite gravel (1) and laterite duricrust (2) over insitu complete lateritic profile

EROSIONAL REGIME

	E02	Hills with high relief (90-300m) and proximal colluvium
	E03	Low hills with gentle slopes (10-90m) and proximal colluvium
	E04	Erosional plain including pediplans, peneplains and etchplains with bedrock frequently exposed (<10m) and proximal colluvium
	EB1	Outcrop of shallow proximal colluvium adjacent to breakaway. This colluvium covers up to 40m of Quarternary sediments in the southern half of the project area
	EC1	Proximal colluvium to breakaways

DEPOSITIONAL REGIME

	DA1	Alluvium in minor channels (Strahler Order 1-3)
	DA2	Alluvium in major channels
	DA32	Sheetwash alluvium frequently active and quartz dominant
	DC1	Valley side colluvium(proximal)
	DC22	Valley plain colluvium(distal) quartz dominant
	DC2	Valley plain colluvium with sparse rounded concretionary calcrete lag in the southern half of the tenement
	DL1	Lakes of lacustrine sediments (fresh to brackish)
	DS	Massive silcretes and "Grey billy" frequently observed to be cementing well rounded clasts
	DW1	Aeolian sand dunes
	DW2	Aeolian sand plains
	E03 (qfp)	Erosional Terrain comprising of quartz feldspar porphyry

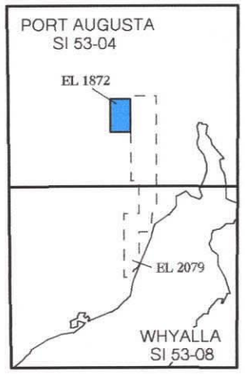
SYMBOLS

× 66	Field descriptor site (see appendix to report, for details)
× 66(s)	Field descriptor site with rock sample
× 66(P1)	Field descriptor site with slide number
	Mine, abandoned
	Quarry, abandoned
	Quarry
	Principal road, sealed
	Secondary road, unsealed
	Light railway
	Homestead
	Property boundary

LITHOLOGICAL DESCRIPTORS

qfp	Quartz Feldspar Porphyry
ss	Sandstone
bv	Basalt
cg	Conglomerate
gr	Granite
si	Silcrete
gg	Gneissic Granite
amp	Amphibolite
ss(f)	Ferruginous Sandstone
qzt	Quartzite
vq	Vein Quartz
myl	Mylonite
• PP1	BHP percussion drill hole
• PPD23	BHP diamond drill hole
• EB1	BHP percussion drill hole

1:250 000 SHEET LOCATION



0 1 2 3 4 5 10km

1:100 000

N.B. Compiled from interpretation of 1995 1:40,000 black and white aerial photography and TM imagery which was used to create the base map. Brief reconnaissance field checking occured. Some interpretation and spatial discrepancies are regrettable but inevitable.

NORMANDY EXPLORATION LTD

Project: ROOPENA J.V Project
EL 1872 — PLAN 2

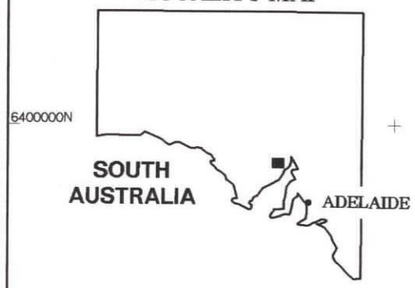
Title:

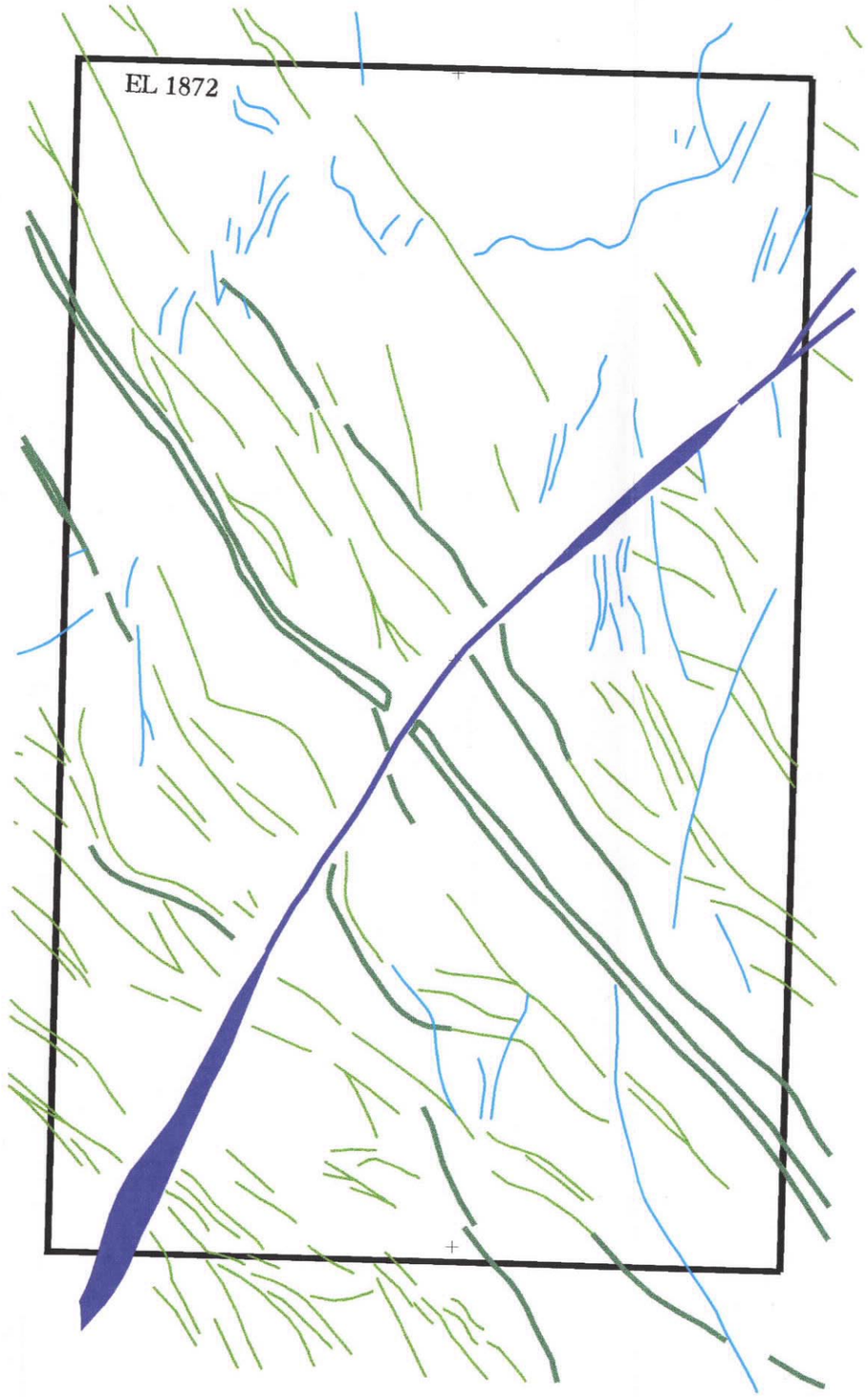
STRUCTURE LANDSAT INTERPRETATION AND REGOLITH INFORMATION RED BAND 7, GREEN BAND 4

Author C.N.W	Date 7/97	Scale 1:100 000	
Drawn Luke	Office ADEL	Revised	Date
Dwg No. 700.01.P02		AMG	Encol No.

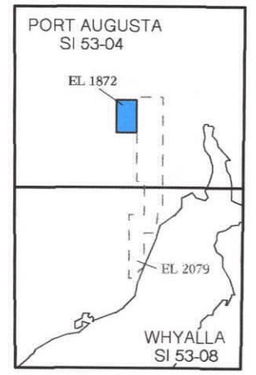
710000E 720000E 730000E 740000E

LOCALITY MAP





1:250 000 SHEET LOCATION



Cleavage S_1 and/or (S_0) trends

Dyke from Geological Map

Fracture/dyke inferred from Aeromag

Fault from Geological Map

Fault/Joint/S_1 trends inferred from Aeromag

Sense of Shear

Dex Sin

N

0 1 2 3 4 5 10km

1:100 000

NORMANDY EXPLORATION LTD

Project

ROOPENA J.V Project
EL 1872

Title

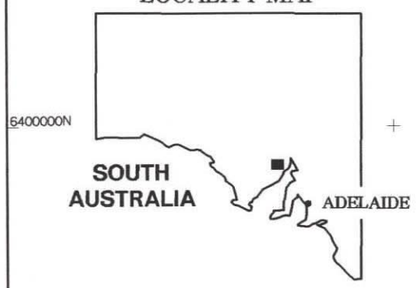
INTERPRETED STRUCTURAL TRENDS
MAGNETIC RTP - 1VD
greyscale

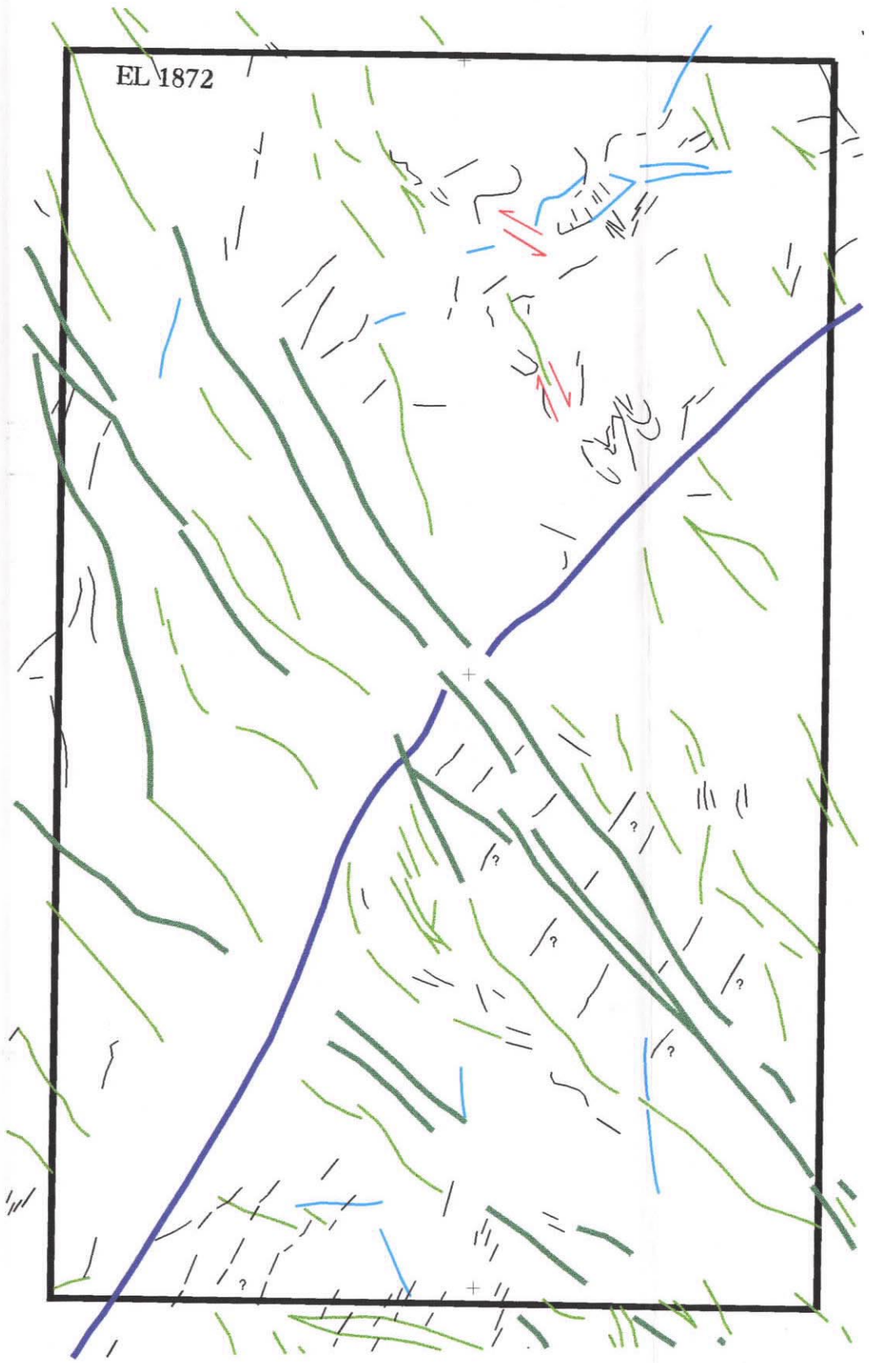
PLAN 3

Author C.N.W	Date 12/97	Scale 1:100 000	
Drawn Luke	Office ADEL	Revised	Date
Dwg No. 720.01.P03		AMG	Encol No.

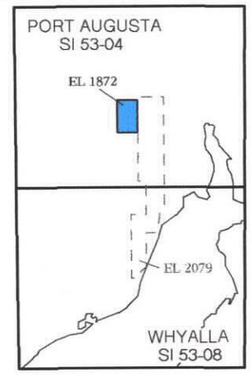
710000E 720000E 730000E 740000E

LOCALITY MAP





1:250 000 SHEET LOCATION



Fold Closure

Cleavage S_1 and/or (S_0) trends

Dyke from Geological Map

Fracture/dyke inferred from Aeromag

Fault from Geological Map

Fault/Joint/S_1 trends inferred from Aeromag

Sense of Shear

Dex Sin

0 1 2 3 4 5 10km

1:100 000

NORMANDY EXPLORATION LTD

Project

ROOPENA J.V Project
EL 1872

Title

INTERPRETED STRUCTURAL TRENDS
MAGNETIC NW SHADE

PLAN 4

Author C.N.W	Date 12/97	Scale 1:100 000	
Drawn Luke	Office ADEL	Revised	Date
Dwg No. 720.01.P04		AMG	Encol No.

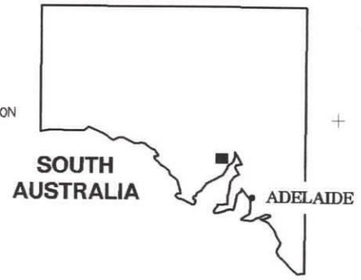
710000E

720000E

730000E

740000E

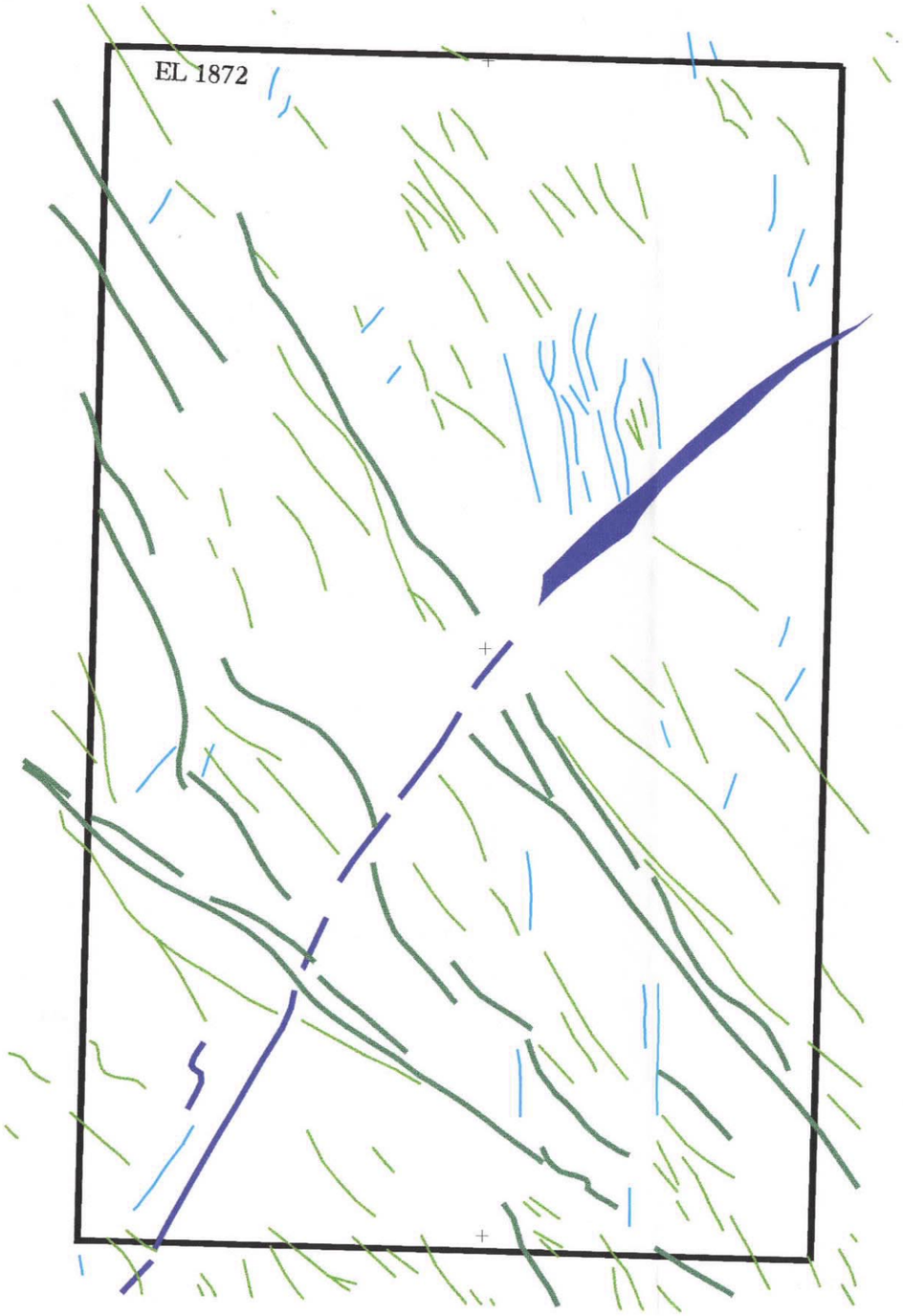
LOCALITY MAP

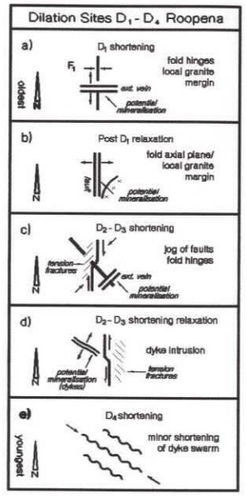


6400000N

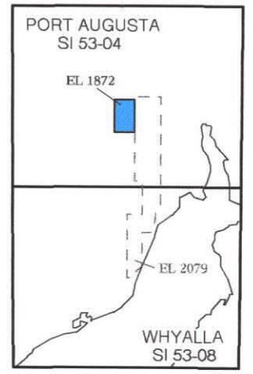
6390000N

6380000N





1:250 000 SHEET LOCATION



Fold Closure

Cleavage S_1 and/or (S_0) trends

Dyke from Geological Map

Fracture/dyke inferred from Aeromag

Fault from Geological Map

Fault/Joint/S_1 trends inferred from Aeromag

N

0 1 2 3 4 5 10km

1:100 000

NORMANDY EXPLORATION LTD

Project: ROOPENA J.V Project
EL 1872

Title:

INTERPRETED STRUCTURAL TRENDS
MAGNETIC E SHADE
PLAN 5

Author C.N.W	Date 12/97	Scale 1:100 000	
Drawn Luke	Office ADEL	Revised	Date
Dwg No. 720.01.P05		AMG	Encol No.

710000E

720000E

730000E

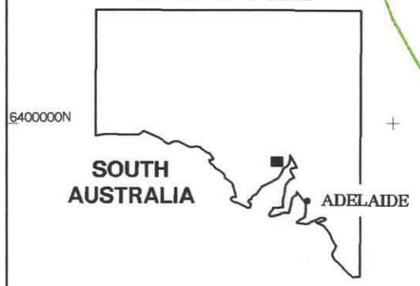
740000E

6400000N

6390000N

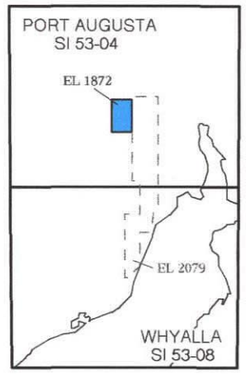
6380000N

LOCALITY MAP



EL 1872

1:250 000 SHEET LOCATION



Fold Closure

Cleavage S_1 and/or (S_0) trends

Dyke from Geological Map

Fracture/dyke inferred from Aeromag

Fault from Geological Map

Fault/Joint/S_1 trends inferred from Aeromag

Sense of Shear

Dex Sin

N

0 1 2 3 4 5 10km

1:100 000

NORMANDY EXPLORATION LTD

Project

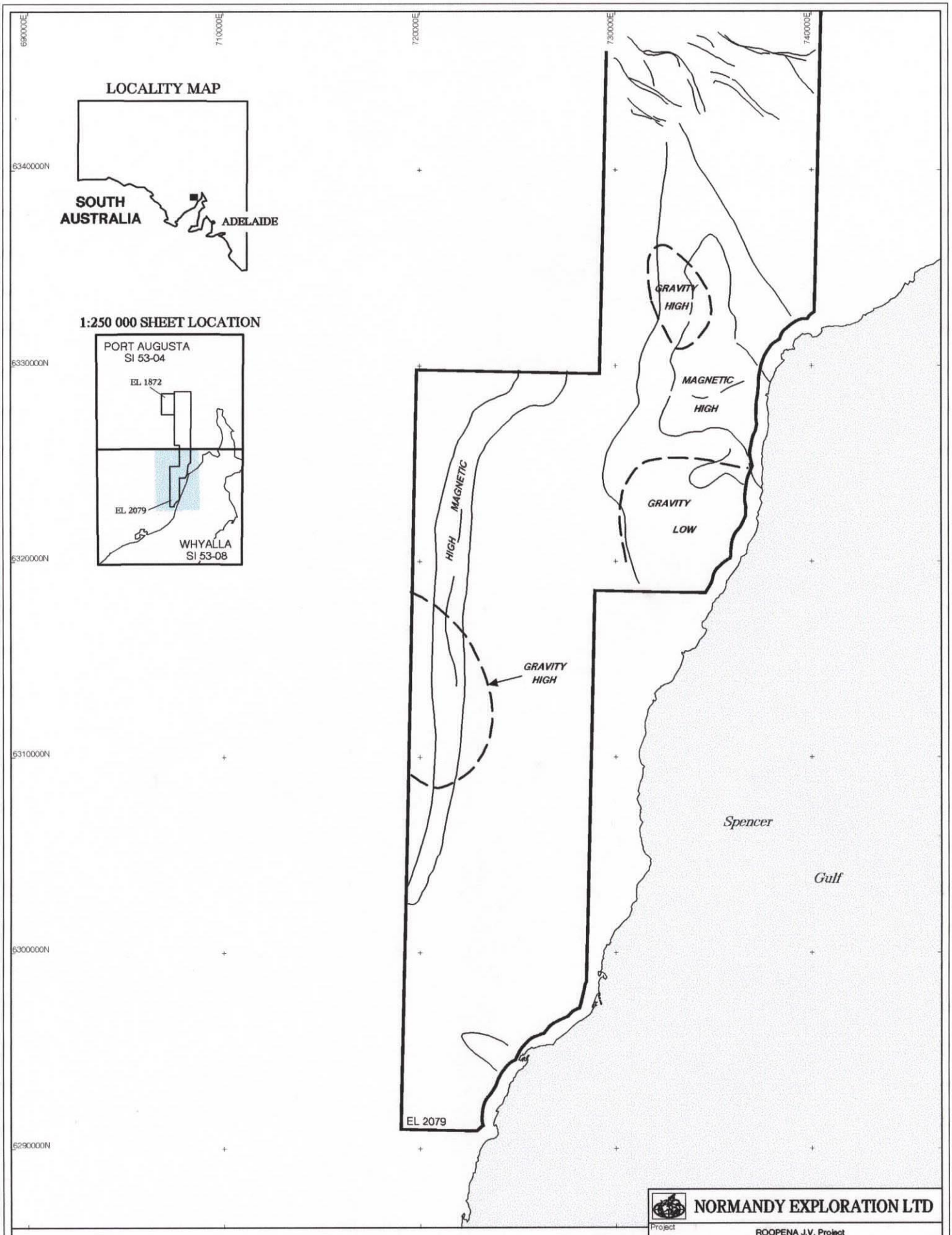
ROOPENA J.V Project
EL 1872

Title

INTERPRETATION STRUCTURAL TREND MAGNETIC NE SHADE

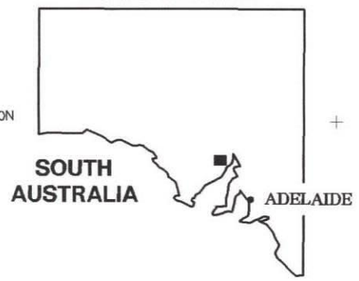
PLAN 6

Author C.N.W	Date 12/97	Scale 1:100 000	
Drawn Luke	Office ADEL	Revised	Date
Dwg No. 720.01.P01		AMG	Encol No.


690000E
710000E
720000E
730000E
740000E
6340000N
6330000N
6320000N
6310000N
6300000N
6290000N
LOCALITY MAP
SOUTH AUSTRALIA
ADELAIDE
1:250 000 SHEET LOCATION
PORT AUGUSTA
SI 53-04
EL 1872
EL 2079
WHYALLA
SI 53-08
GRAVITY HIGH
MAGNETIC HIGH
GRAVITY LOW
HIGH MAGNETIC
GRAVITY HIGH
EL 2079
Spencer
Gulf
0
10
1:250 000
PLAN 7
NORMANDY EXPLORATION LTD
Project
ROOPENA J.V. Project
EL 2079
Title
MAGNETICS GRAYSCALE
SAEI AREA B4
AND DETAILED WMC GRAVITY
Author C.N.W
Date 12/98
Scale 1:250 000
Drawn Luke
Office ADEL
Revised
Date
Dwg No. 720.02.P01
AMG
Encol No.

710000E 720000E 730000E 740000E

LOCALITY MAP



6400000N

EL 1872

WMC BLOCK DAM
IP '96

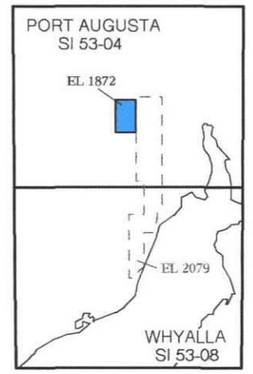
no significant anomaly

D_1 D_3

6390000N

6380000N

1:250 000 SHEET LOCATION



0 1 2 3 4 5 10km

1:100 000

NORMANDY EXPLORATION LTD

Project

ROOPENA J.V Project
EL 1872

Title

POTENTIAL SITES OF MINERALISATION BASED ON STRUCTURE AND AEROMAGNETICS

PLAN 8

Author C.N.W	Date 12/97	Scale 1:100 000	
Drawn Luke	Office ADEL	Revised	Date
Dwg No. 720.01.G01		AMG	Encol No.

NORMANDY
GOLD PTY LIMITED
ACN 007 511 006

103-105 King William Street, Kent Town 5067, South Australia, Australia
PO Box 751, Kent Town 5071, South Australia, Australia

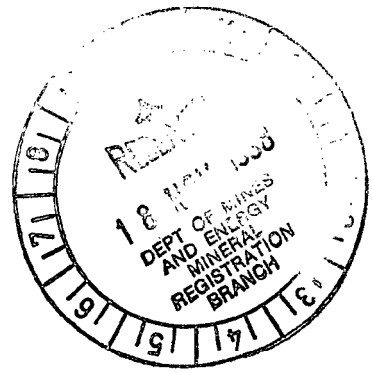
Telephone +61 8 8464 2200
Facsimile +61 8 8464 2299

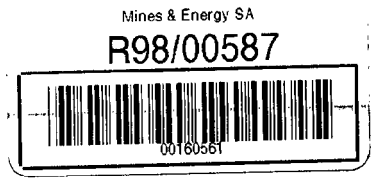
ROOPENA WEST

Exploration Licence (EL) 1872

Annual Report

For the period 01 October 1997 to 30 September 1998





Author: S Dries

Tenement Holder: Normandy Gold Pty Ltd

Date: November 1998

Authorised:

Distribution: Department of Primary Industries and Natural Resources
WMC Resources Limited
Normandy Exploration- South East Region Office, Adelaide
Normandy Exploration- Library, Adelaide

Report No: 23621

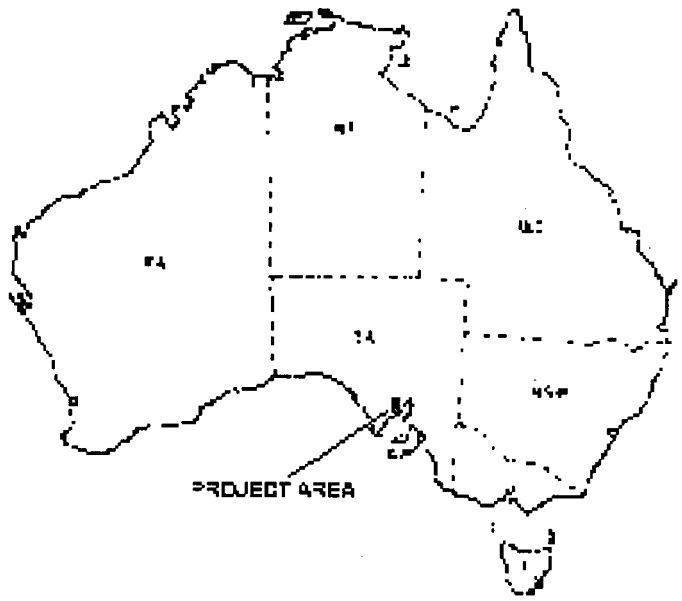
Report No: 23621

Title: ROOPENA WEST, Exploration Licence (EL) 1872, Annual Report
For the period 01 October 1997 to 30 September 1998

Author: S Dries

Date: November 1998

Location Map:



SUMMARY

This report provides a summary of the work completed by Normandy Exploration Limited (Normandy) on behalf of WMC Resources Limited (WMC) on EL1872 during the period 01 October 1997 to 30 September 1998.

EL 1872, in conjunction with EL 2079 constitutes the Roopena JV Project. The tenements cover a highly prospective area within the Gawler Craton and are situated on the eastern margin of the Eyre Peninsula. The tenements are registered to WMC and are subject to an agreement with Normandy Gold Limited (Normandy). During the farm-in period Normandy have assumed project management.

Work completed by Normandy during the reporting period included; reviewing and summarising previous exploration, ground truthing regolith mapping and negotiations with Native Title claimants for Site Clearance Agreements.

TABLE OF CONTENTS

		Page No
Summary		i
1.0	CONCLUSIONS AND RECOMMENDATIONS	1
2.0	INTRODUCTION	1
3.0	LOCATION AND ACCESS	1
4.0	TENURE	1
5.0	NATIVE TITLE	1
6.0	GEOLOGY	2
7.0	PREVIOUS WORK	3
8.0	WORK COMPLETED DURING REPORTING PERIOD	
	8.1 Reconnaissance Geological Investigations	3
	8.2 Site Clearance Surveys	3
9.0	REHABILITATION	3
10.0	REFERENCES	3
BIBLIOGRAPHIC DATA SHEET		5

LIST OF FIGURES

Figure	Drawing No	Title	Scale
1	720.00.L02	Location plan	1:4 000 000
2	720.00.M02	Roopena Tenements with Native Title Claims	1:1 000 000

LIST OF APPENDICES

Appendix	Title
1	Chronological Summary of Previous Exploration

1.0 CONCLUSIONS AND RECOMMENDATIONS

Work completed by Normandy during the reporting period included reviewing previous exploration, ground truthing regolith landform mapping and negotiations with Native Title Claimants for Site Clearance Agreements. No further fieldwork can be undertaken until agreements with Native Title claimants are successfully completed.

Once clearance has been granted, proposed exploration includes regional and prospect scale geochemical assessment. Targets generated from these programs will be tested with RAB, aircore or RC drilling.

2.0 INTRODUCTION

This report provides a summary of the work completed by Normandy Exploration Limited (Normandy) on behalf of WMC Resources Limited (WMC) on EL 1872 during the period 1 October 1997 to 30 September 1998.

Normandy Gold Limited (Normandy) have entered an agreement with WMC to earn an equity in the Roopena JV Project which comprises ELs 1872 and 2079. During the earn-in phase, Normandy is responsible for the management and the statutory requirements for these tenements. This agreement commenced on the 23rd April 1997.

3.0 LOCATION AND ACCESS

EL 1872 is located approximately 50 kms west of Port Augusta, South Australia. The licence area covers rectangular area (about 20 km x 13 km) north of the Eyre Highway (Fig. 1).

The major land use is sheep and cattle grazing on essentially uncleared ground. Access throughout the project is excellent with a complex network of well maintained tracks and boundary roads. The Eyre Highway intersects the tenement in the south eastern portion.

4.0 TENURE

Exploration Licence (EL) 1872 (254 km^2) was granted to WMC on 1 October 1993, and expired on 30 September 1998. An exploration licence covering the same areas is currently under application (ELA 213/98).

EL 1872, in conjunction with EL 2079 constitutes the Roopena JV Project, which in accordance with the agreement is managed by Normandy during the earn-in phase. The agreement commenced on the 23rd April 1997.

5.0 NATIVE TITLE

The Roopena JV Project tenements are covered by three native title claims. These are listed below and are shown in figure 2.

Barngala Native Title Claim (SC 96/4)
This claim covers the entire Eyre Peninsula extending up to Leigh Creek in the northeast and across to Bulgunnia homestead in the northwest. This application was lodged with the National Native Title Tribunal on the 4th April 1996 and accepted on the 21st August 1996.

The registered native title claimant is Henry Croft on behalf of the Barngarla families.

Nukunu Native Title Claim (SC 96/5)
This claim covers the area between Port Augusta and Port Pirie. This claim covers only a very small portion of the licence in the extreme north-east corner. This application was lodged with the National Native Title Tribunal on the 10th April 1996 and accepted on the 4th October 1996. The registered native title claimant is James Alexander Bramfield.

Kuyani Native Title Claim (SC 95/4)
This claim covers a large area north of Whyalla. It extends as far as Maree in the north, west as far as Painted Hills and across to the SA/NSW border in the east. This application was lodged with the National Native Title Tribunal on the 19th September 1995, and accepted on the 13th March 1996. The registered native title claimant is Mark McKenzie Senior.

6.0 GEOLOGY

The geology covered by EL 1872 is illustrated on the Port Augusta (SI 53-04) and Whyalla (SI 53-08) 1:250,000 sheets, and summarised below by Norris (1994).

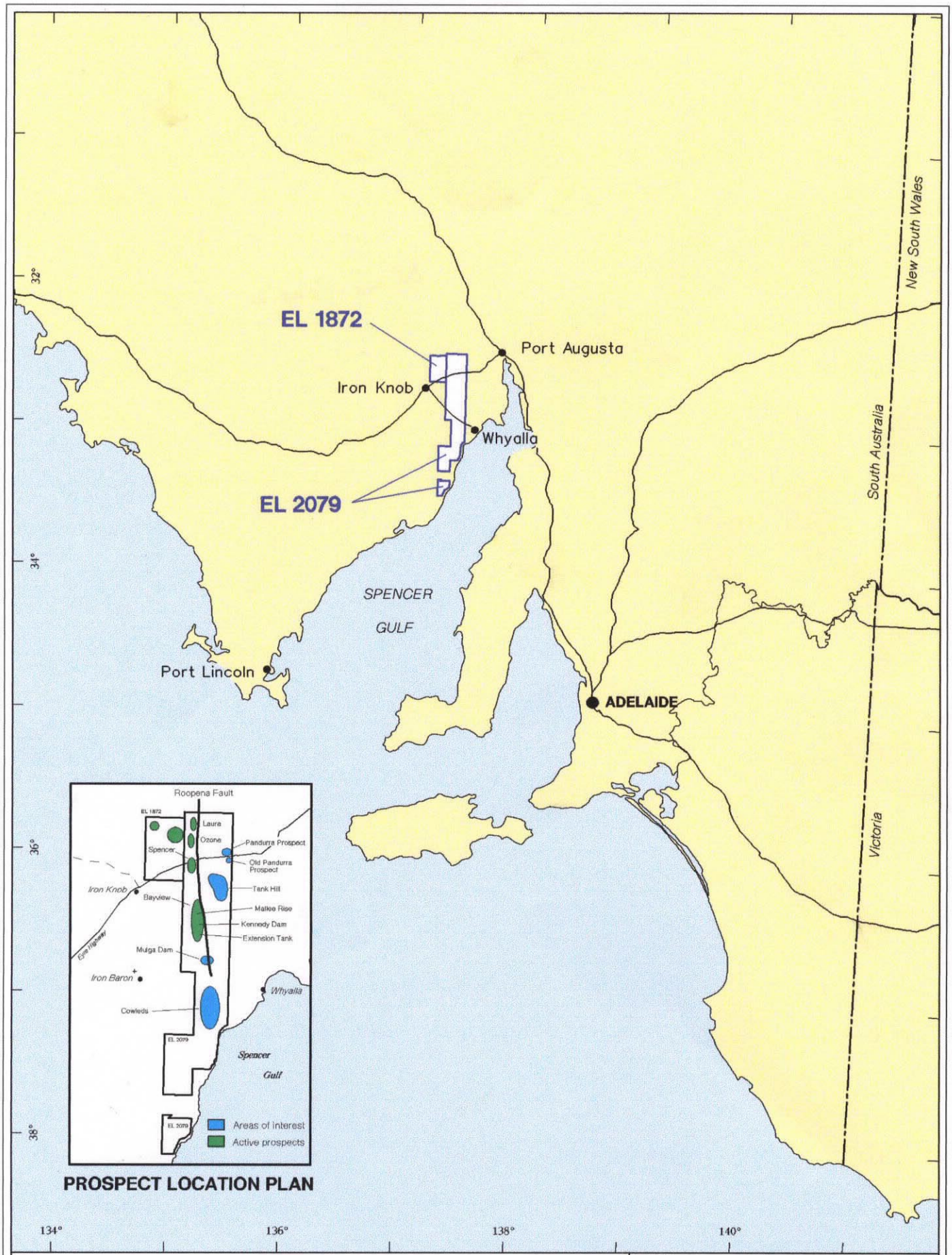
In an attempt to place the stratigraphy of the Roopena area into a regional context WMC refers to the "Whyalla Group". The Whylla Group comprises the sequence of early Proterozoic volcanic and sedimentary rocks, which unconformably overlie the early Proterozoic Hutchison Group, and is overlain by younger Gawler Range volcanic and sedimentary rocks.

Simplistically, the Whyalla Group consists of two volcanic-sedimentary 'cycles' - the lower Myola Volcanics and Broadview Schist, and the upper McGregor Volcanics and Moonabie Formation. The McGregor Volcanics - Moonabie Formation have been correlated on the basis of geochronology with the Moonta Porphyry and Doora Schist.

The geochronology of units within the Whyalla Group and those bounding it, indicate that its age spans the period 1800 Ma to 1650 Ma.

The Whyalla Group occupies a north-south belt (part of the Moonta Sub-domain) immediately east of the Middleback Ranges and West of Whyalla. It has regional correlatives in the Moonta-Wallaroo area. The belt appears to be fault bound on both its western and eastern sides, and overlain unconformably to the north by Gawler Range volcanic and sedimentary rocks.

The lower part of the Whyalla Group is intruded by the Wertigo Granite, a Lincoln Complex granite equated with the Middle Camp Granite, which has an age of 1757 Ma (U-Pb). On the basis of image processed aeromagnetics, the Wertigo Granite has a comparable pattern to the Myola Volcanics and may therefore be related to the volcanic rocks. The entire Whyalla Group is intruded by Hiltaba Suite granites (e.g. Charleston Granite, 1585 Ma U-Pb; Creaser and Fanning, 1983). The "Whalers Granite" (informal name) occurs on the north-eastern side of the Whyalla belt and belongs to the Hiltaba Suite. Creek exposures contain large tourmaline veins. The lower Whyalla Group has undergone two of three phases of the Kimban Orogeny. The regional structure can be interpreted to consist of tight to open folds with axial plane sub-parallel faults having NNW and NNE orientations.



PROSPECT LOCATION PLAN

LOCALITY MAP

0 50 100 150 200Km

1:4 000 000

NORMANDY EXPLORATION LTD

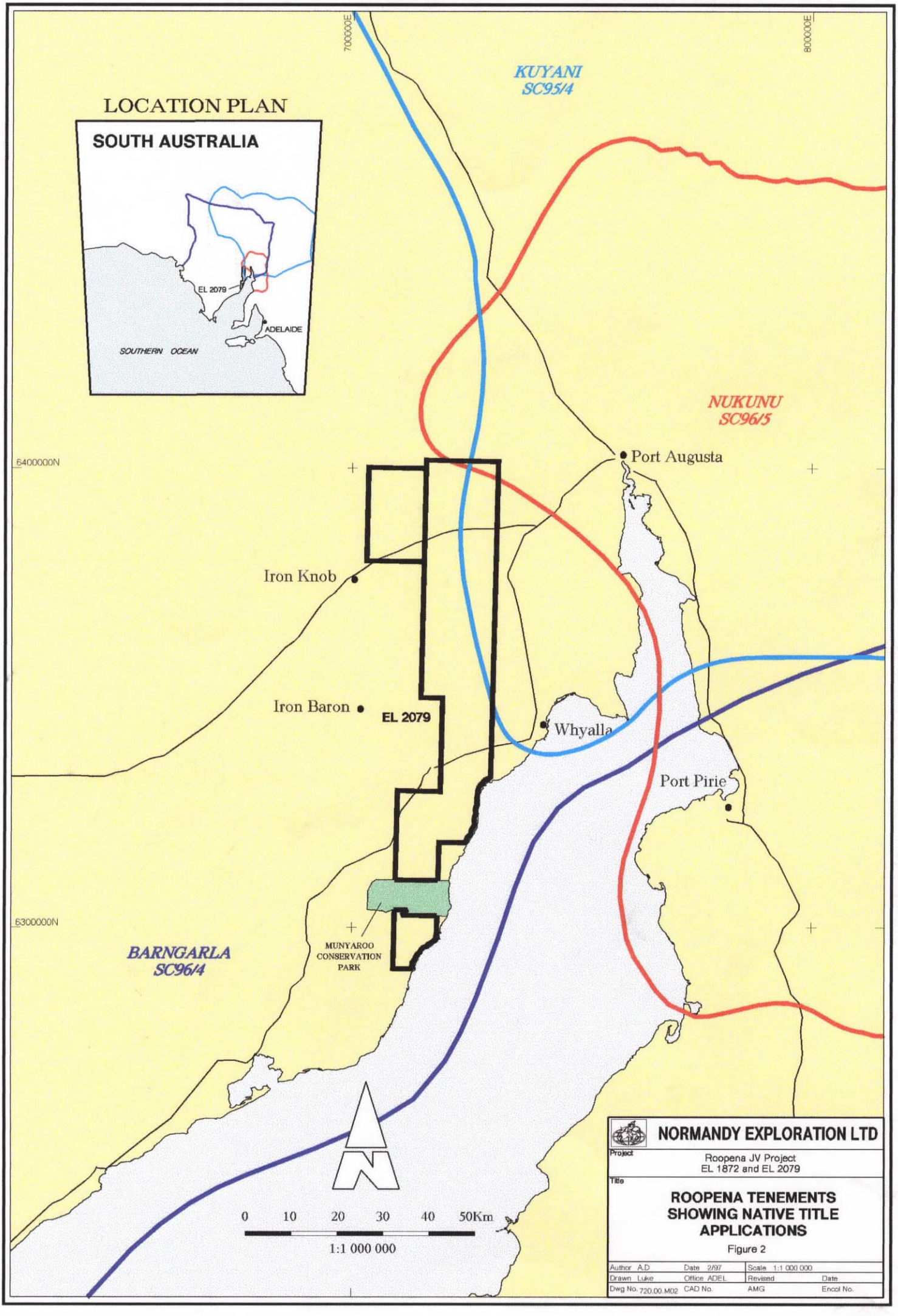
Project: ROOPENA J.V. Project
EL 1872 and EL 2079

Title

LOCATION PLAN

Figure 1

Author A.D.	Date 8/97	Scale 1:4 000 000	
Drawn Luke	Office ADEL	Revised S.S.D	Date 10/98
Dwg No. 720.00.L02		AMG 53	Encol No.


LOCATION PLAN
SOUTH AUSTRALIA
EL 2079
ADELAIDE
SOUTHERN OCEAN
700000E
800000E
KUYANI
SC95/4
NUKUNU
SC96/5
6400000N
6300000N
Port Augusta
Iron Knob
Iron Baron
EL 2079
Whyalla
Port Pirie
MUNYAROO
CONSERVATION
PARK
BARNGARLA
SC96/4
N
0 10 20 30 40 50Km
1:1 000 000
NORMANDY EXPLORATION LTD
Project
Roopena JV Project
EL 1872 and EL 2079
Title
ROOPENA TENEMENTS
SHOWING NATIVE TITLE
APPLICATIONS
Figure 2
Author A.D
Date 2/97
Scale 1:1 000 000
Drawn Luke
Office ADEL
Revised
Date
Dwg No. 720.00.M02
CAD No.
AMG
Encol No.

7.0 PREVIOUS WORK

Details of previous exploration have been discussed in Norris (1994) and the other annual reports listed in the references. Previous exploration was reviewied and a chronological summary is included in Appendix 1.

8.0 WORK COMPLETED DURING REPORTING PERIOD

8.1 Reconnaissance Geological Investigations

Regolith Landform mapping of the project area completed in August 1997 was ground truthed during reconnaissance geological investigations. This work helped identify suitable sample mediums for surface geochemical sampling.

8.2 Site Clearance Surveys

Negotiations with the Native Title claimants and the Aboriginal Legal Rights Movement (ALRM) for Site Clearance Agreements were instigated and are still ongoing. No further fieldwork can be undertaken until agreements with Native Title claimants are successfully completed.

9.0 REHABILITATION

Existing roads and stations tracks were used for access. An assessment of areas where previous drilling has occurred will be done once access to the ground is granted. Any rehabilitation required will be conducted at this time. For future drilling programs drill holes will be sited to cause the least impact to flora. All holes will be plugged, excess cuttings will be flattened out and all hand dug trenches filled in or leveled out.

10.0 REFERENCES

CREASER R.A. and FANING C.M., 1993. A U-Pb study of the Mesopreoterozoic Charleston Granite, Gawler Craton, South Australia. Aust. Jour. Earth Sciences, V40, 519-526

DERRIMAN M.D.J., 1997. Report of regolith mapping of the Roopena area, South Australia. Internal Report Normandy Exploration Ltd. 5p. Report No 64249.

DOWNIE A.J., 1998. Annual Report for EL 1872 Roopena West for the period 1 October 1996 to 30 September 1997. Report No 22982.

NORRIS M.S., 1994. Annual Report for EL 1775 - Roopena, 22nd April 1992 to 21st April 1993. WMC report to Mines and Energy, SA. Report No CR21344

PARKER A.J. & DALY S.J., 1982. Symposium on the Gawler Craton Drill Hole Logs. Dept. Mines and Energy, SA. Report Bk.No. 82/9.

PARKER A.J. & LEMON N.M., 1982. Reconstruction of the early proterozoic stratigraphy of the Gawler Craton, South Australia. J.geol. Soc. Aust. 29, 221-238.

PARKER A.J., FANNING C.M., FLINT R.B., MARTIN A.R., RANKIN L.R., 1988. Archaean - early proterozoic granitoids, metasediments and mylonites of southern Eyre Peninsula, South Australia. Specialist group in tectonics and structural geology. Field guide 2, 90 pp.

PNC Exploration (Australia) 1986. Quarterly Report CR21930.

RAMSAY R.R., 1996. Annual report for EL 1872 Roopena West. WMC. CR 21374

RAMSAY R.R., 1979. Structure, stratigraphy, mineralogy and comparative geochemistry of Iron Duke, southern Middleback Range, SA. BSc (Hons) Adel.Uni.

SAEI Area B4. Magnetics.

TARDELL PTY. LTD. 1990. EL 1646 Roopena area progress report for the period to 6/6/90. Open File envelop No. 8314 SADME.

WESTE G., 1994a. Roopena pretertiary geology 1:100,000 SADME Preliminary mapping.

WESTE G., 1994b. Roopena geology 1:100,000 SADME.

WMC/Kevron 1993. Magnetics

WOFFENDEN S.J.G., 1995. Annual Report for EL 1872 Roopena West for the period 1 October 1993 – 30 Spetember 1994. WMC Ltd. - Exploration Division. Vol. 1, 2. CR21373.

YEATES G., 1990. Middleback Range iron ore deposit. *In* geology of the mineral deposits of Australia and Papua New Guinea (ed. F.E. Hughes) pp. 1045-1048 AUSIMM

BIBLIOGRAPHIC DATA SHEET

REPORT NUMBER	23621
REPORT TITLE	ROOPENA WEST, Exploration Licence (EL) 1872, Annual Report for the period 1 October 1997 to 30 September 1998
PROJECT NAME	Roopena JV Project
TENEMENT NUMBERS	EL 1872 "Roopena West"
OWNER/JV PARTNERS	WMC Resources Limited (with Normandy Gold Pty Ltd earning an equity)
COMMODITIES	Gold, Copper
TECTONIC UNIT	Gawler Craton
STRATIGRAPHIC UNITS	Hutchison Group, Broadview Schist, Gawler Range Volcanics, Hiltaba Suite
1:250,000 MAP SHEET	Port Augusta SI 53-04 Whyalla SI 53-08
1:100,000 MAP SHEETS	Roopena 6332 Middleback 6331
KEYWORDS	Proterozoic, Regolith, Exploration Review

Appendix 1

Chronological

Summary of Exploration

	Roopena West	EL1872
	Roopena Main	EL2079
	Regional	entire project area

EXPLORATION TYPE	ACTIVITY	From DATE	To DATE	PROSPECT	DESCRIPTION
Mining	Mining	1860	1900	Murninnie	Cu and Bi mined
Drilling	Drilling	1969		SML 204	Exploration by BHP Exploration for base metals (RP3 on Roopena Fault). Defined an inferred resource at Pandurra Cu-Mn Mine, 120 000 t @ 0.3-0.4% Cu
Geophysics & Drilling	Aeromag & radiometric survey & Drilling	late 1960	early 1970		Exploration by BHP Exploration for Iron Ore. 4 percussion holes (2 within WMC area of interest intersected mafics, quartzites with trace malachite and azurite).
Assesment	Assesment	1970		Murninnie	Assesment (SADME open file data)
Drilling	Drilling	1970		EL 266	Exploration by BHP Exploration for U
Drilling	Drilling	1973		EL 50	Exploration by Mt Gunson for base meatal/Cu
Drilling	Drilling	1977		EL 266	Exploration by BHP Exploration for Ag, Au, base metals, Fe
Assesment	Assesment	1977	1979	Pandurra	Revisited Pandurra prospect, did not improve BHP's resource
Drilling	Drilling	1978		EL's 1041, 398, 692	Exploration by SADME for base metals
Drilling	Drilling	1978		EL 332	Exploration by CSR ltd. for base metals
Drilling	Drilling	1978	1985	EL 692	Exploration by Sameda Oil Co., ESSO, SADME for base metals. Concentated on the 1050 prospect 5 km south Roopena Prospect. Discovered Cu mineralisation within ~5 m thick heamatite-tourmaline-dolomite breccia in the uppermost quartzites of the Moonablie Formation, and near the northern tip of the Whalers Granite. Significant pyrite occured above the breccia. Max 3.4% Cu, 660 ppm Zn, 111 ppm Ag, 185 ppb Au and 112 ppm U
Drilling	Drilling	1978	1985	Laura	Samedan drilled 8 shallow perc holes, 6 of which intersected basement clays and quartzites.
Drilling	Drilling	1978	1985	Bayview	Samedan drilled single RAB traverse. 3 holes intersected+E8 haematitic doterite and iron oxides with max 934 ppm Cu.
Drilling	Drilling	1978	1988	Ozone	Samedan and PNC drilled 23 perc holes (21 Samedan, 2 PNC) and minor ground mag. Max 490 ppm Cu. IP and Alpaha Card? surveys SE of ozone
Drilling	Drilling	1981		EL 766	Exploration by BHP Exploration for coal
Drilling and geophysics	Drilling, aeromag, radiometric, IP and semi regional gravity	1984	Jul 88?	EL 1339 +?	Exploration by PNC Exploration for base metals. Compiled gravity data. E47Drilled regional RAB traverses then concentrated at Wartaka prospsect (20 km north of Iron Knob) and Pandurra prospect (8 km NW of Pandurra homestead). In the south they concentrated on Corunna Conglomerate east of Iron Duchess
Drilling	Drilling	1990			Exploration by Tardell Pty Ltd
Geochemistry	Rock Chip Sampling	Jan-92		Regional	4 samples collected SW of Myola homestead near Ash Dam. submitted for Au + multielements (DA660086-0087) Max 230 ppm Cu
Geochemistry	Rock Chip Sampling	Jan-92		Kennedy Dam	2 samples collected on ironstone near Kennedy Dam, submitted for Au + multielements (DA660086-0087) Max 230 ppb Au
Geochemistry	Rock Chip Sampling	Jan-92	Feb 92	Kennedy Dam	1 sample collected west of Kennedy Dam along Roopena Fault and 1 sample collected near Kennedy Dam submitted for Au + multielements (DA660141-0142) Max 100 ppm W
Geochemistry	Lag Sampling	Feb-92		Pankala?	Bulk lag sampling near shallow q-h? shaft in vicinity of MM to west of Roopena magneic units. 4 samples submitted for Au + multi elements (DA660144-0147) Max 140 ppm Cu
Geochemistry	Rock Chip Sampling	Feb-92		Pankala?	1 sample collected at shallow shaft, submitted for Au + multielements (DA6600143)
Geophysics	Interpretation	Apr-92	Apr 93	Project	Image processing and interpretation of BMR data over Whyalla and Port Augusta 1:250 000 sheets. Acquisition and digitising of BHP 1969 aeromag data and other open file data to produce
Geology	Interpretation	Apr-92	Apr 93	Project	Geological interpretation completed and target areas identified

Geomorphology	Interpretation	Apr-92	Apr 93	Project	Reconaisance air-photo interp completed by work experience student
Geophysics	Ground Magnetics	Apr-92	Apr-93	Ozone	200 x 20 m
Geophysics	Gravity	Apr-92	Apr-93	Ozone	400 X 100 m
Geophysics	IP	Apr-92	Apr-93	Ozone	400 X 200 m dipole and 3 lines of 100 m dipoles
Geophysics	TEM	Apr-92	Apr-93	Ozone	400 X 200 Loop TEM
Geophysics	Interpretation	Apr-92	Apr-93	Ozone	Intperpretation identified ~N-S trending magnetic units , which in the eastern area had co incident gravity anoamlies, intersected by a NW trending mag unit possibly related to the Roopena Volcanics.
Drilling	Diamond Drilling	Apr-92	Apr-93	Ozone	2 holes across the main magnetic anomaly
Summary	Summary	Apr-92	Apr-93	Laura	Geophysical surveys conducted over 4.5 km x 2 km area.
Geophysics	Ground Magnetics	Apr-92	Apr-93	Laura	200 x 20 m
Geophysics	Gravity	Apr-92	Apr-93	Laura	400 x 100 m
Geophysics	IP	Apr-92	Apr-93	Laura	400 X 200 m Dipole
Geophysics	TEM	Apr-92	Apr-93	Laura	400 X 200 m Loop TEM
Geophysics	Interpretation	Apr-92	Apr-93	Laura	Geophysical surveys failed to identify targets, no drilling completed
Geochemistry	Lag Sampling	Jul-92		Mulga Dam??	Lag sampling along Roop 3 (Railway cut over magnetic response 2? Km NW Middleback homestead). 15 samples plus 5 standards? submitted for Au + multi elements (QD622422-2436)
Geochemsitry	Rock Chip Sampling	Jul-92		Mulga Dam??	15 samples submitted for Au + multielements (DA723001-3015) Anomalous Ba, max 4700 ppm Ba
Geochemistry	Lag Sampling	Jul-92		Kennedy Dam	Maple Leaf prospect. Lag sampling along Roop 4 (ironstone outcrop). 17 samples + 5 standards submitted for Au + multi elements (QD622405-2421)
Geochemistry	Rock Chip Sampling	Jul-92		Kennedy Dam	Maple Leaf prospect. 1sample submitted for Au + multielements (DA723016)
Geochemistry	Rock Chip Sampling	Jul-92		Tank Hill	Samples collected near Roopena homestead. 2 samples submitted for Au + multielements (DA723017-3018). Anomalous Ba, Mn, Cu (225 ppm), Zn (240 ppm)
Geochemistry	Rock Chip Sampling	Nov-92		Bayview	18 samples submitted for Au, Cu, Bi (DA683401-3418) Max 350 ppm Cu, 18.2 ppm Bi
Geochemistry	Rock Chip Sampling	Nov-92		Spencer	20 samples submitted for Au, Cu, Bi (DA683419-3438) Max 2900 ppm Cu
Geochemistry	Soil Sampling	Feb-93		Bayview	Traverse over outcropping ironstone and malachite. Various mesh sizes. 13 samples + 4 standards? submitted for Au, Cu (DA723044-3056). Max 1100 pm Cu
Summary	Summary	Feb-93		Ozone	Strong magnetic anomaly at lineament intersections, weakly anomalous Cu from previous percussion drilling. Geophysical surveys conducted over 6 km x 3 km area.
Geochemistry	Lag Sampling	Feb-93		Ozone	Reconaissance lag sampling along 6392600N. Ferricrete/pisolite hill SW of Red Dam. 13 samples and 5 standards? submitted for Au, Cu (QD637349-7361). No anomalous results returned.
Geochemistry	Rock Chip Sampling	Feb-93		Ozone	Rock chips collected at above location. 2 samples submitted for Au, Cu (DA660084-0085) Max 160 ppm Cu
Drilling	RC Drilling	Feb-93	Mar 93	Ozone	17 holes for 1717.62 m testing magnetics, gravity, IP (RPAC1-17). 8 holes were drilled across the main magnetic anomaly, 3 holes were drilled in the NW and 3 in the SE. A water bore (RPAC2) was drilled on the Roopena Fault RPAC1 and 3 drilled on eastern N-S mag response-intersected weakly hm quartzites, no anom Cu results. RPAC4 and 5 into NW trending mag anomaly, intesected magnetite bearing wackes and mt-hm-cb-ch-ep-mnr py-tr cpy rocks. RPAC 6-13 drilled across western mag units, intersected altered and deformed mafic-intemediate rocks volcanoclastic? and doleritic origin? RPAC16-17 intersected quartzites and mafic rocks XX samples + standards were anaylsed for Cu and Au and selected holes for a multielement suite. Max 930 ppm Cu

Geochemistry	Lag Sampling	Mar-93		Bayview	Reconaissance lag sampling along Roop 7 (northern Bayview) and Roop 8 (central Bayview). 126 samples submitted for multi elements (QD622437-2500 & 2801-2815 and QD622816-2862) Max 220 ppm Cu.
Geochemistry	Rock Chip Sampling	Mar-93		Bayview	Samples collected over gossan and granite. 10 samples submitted for Au, Cu, Bi (DA723057-3066) .
Geochemistry	Rock Chip Sampling	Mar-93		Spencer	2 samples submitted for Au, Cu, Bi (DA723067-3068)
Geophysics	Gravity	Apr-93	Apr 94	Regional	compilation of data
Summary	Summary	Apr-93	Apr 94	Spencer	Identified from aeromag as weakly anomalous, located on magnetic lineaments, favorable structural position. Target area is 2.5 x 6 km on the W side of Roopena fault.
Geophysics	Gravity	Apr-93	Apr 94	Spencer	400 x 100 m
Geophysics	IP	Apr-93	Apr 94	Spencer	400 x 100 m dipole IP, ID two responders? Possibly hematite vs. magnetite ironstone. Both are drill targets
Geophysics	TEM	Apr-93	Apr 94	Spencer	partially covered by 400 x 100 m coincident loop TEM
Geophysics	Interpretation	Apr-93	Apr 94	Spencer	Identified N-S to NW trending magnetic units within magnetically complex zone, and coincident 2.5 mgal gravity anomaly. Source of magnetics possibly magnetic stratigraphy, magnetic intrusives (dolerite or granite) or hydrothermal Fe-Ox concentrations. IP phase anomalies
Geochemistry	Lag Sampling	Apr-93	Apr 94	Spencer	250 samples (QD635001-082, 564-731) collected on a 400 x 50 m grid (6 lines) ID weakly anom Au. Max 40 ppb
Geochemistry	Stream Seds	Apr-93	Apr 94	Spencer	11 samples -6mm + 2 mm (DA728922-932). Max 21 ppb
Geochemistry	Rock chip	Apr-93	Apr 94	Spencer	1 sample collected for XRD (DA723074)
Drilling	Diamond Drilling	Apr-93	Apr 94	Spencer	3 holes for 551.7m, testing geophysical targets, RPAD18, 21, 23. RPAD18 and 23 drilled to test IP pants legs anomaly, intersected sheared altd hm-sl vn & bx grt-diss py. RPAD21 tested weaker IP response, intesected silceous seds broadview schist?. No anom Cu Au results
Geophysics	Interpretation	Apr-93	Apr 94	Bayview	Regional aeromag with coincident bouger grav. Festone outcrop, granite w/ qz vein and py, and mnr grt-hm bx. Interp of Mag and gravity ID NNW trending mag units, disrupted and poss folded. Poss mag strat units, intrusions (dolerite? or grt). Prospect also cut by NW trending gairdner dykes. Modelling of geophysics data => 2 drill targets, + 1 target generated from TEM conductor+IP+Cu lag anom (510 ppm)
Geophysics	gravity	Apr-93	Apr 94	Bayview	400 x 100 m
Geophysics	IP	Apr-93	Apr 94	Bayview	400 x 100 m dipole IP
Geophysics	TEM	Apr-93	Apr 94	Bayview	400 x 100 m Coincident loop TEM
Geochemistry	Lag sampling	Apr-93	Apr 94	Bayview	1001 samples collected (QD622437-500, 601-700, 801-876, QD635401-563, QD637401-8000) on a 400 x 50 m grid. Analysed for Au, Cu, Bi, Mo, As. ID 3 Cu anomalies. (i) max 325 ppm Cu, 47 ppb Au, mylonitc porp felsic => Roopena fault. Infill sampled to 250 x 50 m. Subsequently tested with 18 RC holes. (ii) Broad anom, max 235 ppm Cu. Abundant Fe stone, basement close to surface. Tested with 6 RC holes. (iii) Wide anom, max 510 ppm Cu, with strong Mo anom. Coincident TEM conductor.
Drilling	Diamond Drilling	Apr-93	Apr 94	Bayview	5 holes for 989 m drilled to test geophysics targets.RPAD20, 22, 24, 31 and 32. RPAD20 drilled to test IP, intersected albitised and epidote altered amph+zones grt veining, shearing, cb and mnr hm veining + diss py. Results??? RPAD22 abandoned, replaced with RPAD24. RPAD24 & 31 targeted IP-TEM-gravity response. Intersected variably albitised and epidote altered amph with zones hm veining + mnr breccation + mnr py + tr cpy. Max 3 m @ 3085 ppm Cu (incl 1 m @ 6100 ppm). Results??? RPAD32 tested TEM conductor+Cu lag anom. Results???
Geophysics	SAEI Aeromag + radiometrics	May-93		Regional	400 m line spacing commisioned to fly 200 m line spacing at 80 m height
Geophysics	Gravity	Oct-93	Sep 94	Roopena West	Semi regional gravity survey. Stations collected along roads and tracks

Drilling	RC Drilling	Feb-94	Apr 94	Bayview	25 holes for 516 m drilled testing Cu lag anomalies (i) and (ii) above (RPAC25-30, 33-50), and 1 water bore (RPAC19). 1387 samples were submitted for Au, Cu, As analysis (DA746561-6600, 6701-7000, DA718801-8820, DA747031-757, 7781-8000, DA777501-7580). RPAC33-50 drilled to test anom (i) directly over the Roopena Fault. Intersected oxidised, variably ferrug, sheared phyllites, amphibolites and mylonitic porphyritic felsics. Best results 12m @1120 ppm Cu and 5 m @ 1232 ppm Cu (RPAC35), 2 m @ 1600 ppm Cu (RPAC45), 4 m @ 48 ppb Au (RPAC44), 5 m @ 55 ppb Au (RPAC34) and 4 m @ 45 ppb Au (RPAC42). RPAC25-30 drilled to test anom (ii) with large As Bi halo. Intersected ferrug. phyllite and amph. Max 410 ppm Cu.
Geochemistry	Rock chip	Mar-94		Regional	1 sample collected for XRD (DA723078)
Geochemistry	Drill chips	Mar-94		Spencer	7 samples submitted for XRD from RPAD18 (6 samples) and RPAD21 (1 sample) (DA728129-8134, 8137)
Geochemistry	Rock chips	Mar-94		Bayview	4 samples collected for XRD (DA723073, 3075-3077) from anom (iii) above
Geochemistry	Drill chips	Mar-94		Bayview	2 samples submitted for XRD from RPAD20 (DA728135-8136)
Geochemistry	Lag Sampling	Apr-94	Apr 95	Spencer	xx samples (xxxxxx) infilling to a 200 x 50 m grid. -6+2 mm fraction analysed for Au, +/- Cu, As and some Mo. ID weak coherent anom trending NNW 3 km x 500 m. Max 66 ppb Au
Geophysics	IP	Apr-94	Apr 95	Spencer	Extension of last years 400 x 100 m dipole IP to the west. Also 2 x 500 m spreads of 50 m dipole IP. Very weak phase response interp at 6383400N, 717900E.
Drilling	Auger Drilling	Apr-94	Apr 95	Spencer	51 shallow holes for xx m, (1-8.3 m depth) testing depth to and geochem of basement. RPxxxxxxx. Xx samples analysed for xx. Intersected oxidised quatzite/phyllite in west beneath 1-2 m cover, but no recognisable bedrock in east.
Drilling	RC Drilling	Apr-94	Apr 95	Spencer	31 holes for xx m, (40 m depth) drilled along two traverses, testing lag anomaly and linear aeromag feature (RPAC51-81) xx 2kg sample collected at EOH and analysed for Au, Cu, As, Mo, Sb, Tl and Cr. Best result 46 ppb Au. Holes on 6383300 N intersected weathered metasediments with variable quartz veining, no holes over mag lineament intersected fresh rock. 6382100N intersected haem granite at eastern end and deeply weathered quartzite with minor phyllite and amph elsewhere. xx 1 m intervals analysed for Au, As and Cu. Best Au results occur west of aeromag lineament within weathered quartzite, phyllite, argillite +/- qz veining (Max 1 m @ 650 ppb). Best Cu results within clay, weathered quartzite and amphibolite (Max 1 m @ 1180 ppm). Generally anom Au and Cu intervals do not coincide.
Drilling	RC Drilling	Apr-94	Apr 95	Spencer	6 holes for 480 m, (80 m depth) drilled along 6383400N, in order to intersect fresh bedrock. As above the holes were testing weak phase and resistivity high (IP) and linear aeromag feature (RPAC112-117). Base of oxidation ~60 m, intersected silicified quartzites, interbedded quartzites and phyllites with minor shearing, plus magnetite bearing amphibolite to the west. Xx 1 m intervals analysed for Au, As and Cu. Two holes (RPAC 114, 115) intersected anomalous mineralisation. RPAC114 - Best results 6 m @ 2455 ppm and 2 m @ 1035 ppm Cu, 4 m 220 ppb Au. RPAC115 - Best results 19 m @ 1834 ppm Cu and 15 m @ 532 ppb Au.
Petrography	Petrography	Apr-94	Apr 95	Spencer	xx chip samples from RPAC115 were submitted for petrographic studies
Geochemistry	Lag Sampling	Apr-94	Apr 95	Bayview	xx samples (xxxxxx) were collected on a 400 x 50 m grid. -6+2 mm fraction analysed for Au, Cu, As and Mo. Doubt over the effectiveness of program due to sheetwash. Disappointing results, max 100 ppm Cu.
Geophysics	IP	Apr-94	Apr 95	Bayview	Extended IP coverage with 10 lines of 400 m x 100 m dipole IP
Geophysics	Interpretation	Apr-94	Apr 95	Bayview	Four prospect defined within Bayview South which warrant further work - Mallee Rise, Kennedy Dam, Extension Tank and Mulga Dam
Geochemistry	Rock Chips	Apr-94	Apr 95	Mallee Rise	1 rock chip collected around 2-3 small pits with Cu-ox minerals. 1100 ppm Cu.

Geophysics	IP	Apr-94	Apr 95	Mallee Rise	Infill line (6567600N) closed sampling to 200 m x 100 m. Data indicates resistive and polarisable body 200-300 m wide, co incident with anomalous rock chip. A further 3, 25 m spreads of 25 m dipole-dipole IP were read over the rock chip area after 40% malachite was intersected in drilling (RPAC82). Data ID malachite but did not suggest a deeper source.
Geophysics	TEM	Apr-94	Apr 95	Mallee Rise	Infill line (6567600N) closed sampling to 200 m x 100 m Coincident loop. Results broadly consistent with IP
Geophysics	Gravity	Apr-94	Apr 95	Mallee Rise	xx 100 m spaced stations collected along 6567600N. Residual high corresponding with IP response.
Drilling	RC Drilling	Apr-94	Apr 95	Mallee Rise	9 holes for xx m drilled (RPAC82, 83, 85, 86, 87, 88, 89, 90, 98) xx samples were submitted for Au, Cu, As analysis (DAxxx). RPAC82,86,98 were drilled under the Cu anomalous rock chip, and intersected cherty volcaniclastics, granites +/- haem, red rock altd amphibolite, up to 40 % malachite. RPAC83, 85, 86, 87 were drilled to test the broad IP response on 6367600N. Same as above plus magnetite bearing +/- red rock altered amphibolite, with py (accounting for the IP response. RPAC89, 90 were collared b/w 85, 86 to test strike extension of malachite, but none was intersected. Max 1m @ 7.8 % Cu in RPAC82. No further work warranted.
Drilling	Diamond	Apr-94	Apr 95	Mallee Rise	1 hole for xx m drilled testing a magnetic body within a resistivity high (RPAD84). xx samples were submitted for Au, Cu, As analysis (DAxx). Intersected haem granite, cherty volcaniclastics, red rock altered amphibolite with mnr haem granite veining, + minor coarse blebby pyrite.
Drilling	RC Drilling	Apr-94	Apr 95	Kennedy Dam	2 holes for 120 m drilled (RPAC91,92) to test weak resistive IP phase response on 6365000N (from 719300E to 719500E). xx samples were submitted for Au, Cu, As analysis (DAxxx). Intersected weakly haematitic laminated cherty volcaniclastic sediments over a redrock-epidote altered weakly haem amphibolite, plus some haem granite with mnr diss py, and mnr mgt. MAx 6m @ 727 ppm Cu. No further work is warranted.
Drilling	RC Drilling	Apr-94	Apr 95	Extension Tank	13 holes for 780 m drilled (RPAC93-97, 99-106) to test structurally complex mag and grav anomalies, and IP responses near a mag break with sinistral offset. xx samples were submitted for Au, Cu, As analysis (DAxxx). RPAC102-106 testing resistive phase high, intersected redrock altered sheared amphibolite+/-magnetite, laminated siliceous volcaniclastics + mnr quartzite. Did not account for phase response. RPAC93-97 testing E-W mag feature with break. Intersected cherty, bedded volcaniclastics, with up to 10 % magnetite, beneath 10 m gravelly cover. Max 1m @ 120 ppb Au probably within cover. No further work warranted.
Drilling	RC Drilling	Apr-94	Apr 95	Mulga Dam	5 holes for ?300 m drilled (RPAC107-111) to test strong resistive IP phase response with coincident mag anomaly on flank of grav anom. xx samples were submitted for Au, Cu, As analysis (DAxxx). Intersected bedded siliceous volcaniclastic sediment +/-magnetite, with mnr red rock altered amph, sheared magnetite-bearing granite and biotite-muscovite schist. No anomalous results, no further work warranted.
Geophysics	IP	Apr-94	Apr 95	Tank Hill	8 lines of 200m dipole-dipole IP along 6377000, 6379000, 6379500, 6379800, 6380500, 6381000, 6382200 and 6381000N. Modelling ID phase and resistivity high at 722350E. Coincident to mag body, adjacent to magnetite-destructive fault to east and plateau in steep gravity gradient to the west.
Geophysics	TEM	Apr-94	Apr 95	Tank Hill	200m single loop TEM was read on 6379000, 6379800 and 6381000N
Geophysics	Gravity	Apr-94	Apr 95	Tank Hill	Barometrically levelled gravity stations read at 100m spacing on all reconaissance geophysics traverses??
Drilling	RC Drilling	Apr-94	Apr 95	Tank Hill	15 holes for xx m drilled (RPAC118-132) to test residual gravity anomalies adja+E111cent to mag-destructive faults within Roopena volcanics. xx samples were submitted for Au, Cu, As analysis (DAxxx). RPAC118-125 intersected amygdaloidal, +/- mgt chloritic basalt with zones haem alteration (Roopena volcanics). Out of RPAC126-131 only RPAC131 penetrated Pandurra Formation to intersect Roopena Volcanics as above. RPAC32 drilled to test IP anomaly described above.

Summary	Summary	Apr-94	Apr 95	Pandurra Cu Mine	Cu-Mn mine located 3 km ESE of Pandurra Station. Number of pits upto 2 m deep in 100 x 50m area with malachite and zurite. Inferred resource 120 000 t @ 0.3- 0.4 % Cu.
Geophysics	IP	Apr-94	Apr 95	Pandurra Cu Mine	3, 500 m spreads of 50m dipole-dipole IP along 6386050, 6385850, 6385650N. Phase responses over old workings and along strike. Results not yet integrated.
Summary	Summary	Apr-94	Apr 95	Pandurra	Weak, magnetic and gravity anomalies on 2 parallel NW trending faults, possibly masked by sediment cover.
Geophysics	IP	Apr-94	Apr 95	Pandurra	200 m dipole-dipole IP along 6388000N (725500-729000E) and 6389400N (723000-726000E). Weak phase response, but no further work is warranted
Geophysics	Gravity	Apr-94	Apr 95	Pandurra	100 m spaced stations read on above two lines
Geophysics	Gravity	Apr-94	Apr 95	Cowleds	131 stations read on 100 x 500 m spaced grid, targetted poorly defined coincident mag and gravity anomalies on Roopena Fault at intersection of SE trending structure. Showed small cluster of gravity anomalies along Roopena Fault. Resolution needs improving before targetting can be completed.
Geophysics	Gravity	Apr-94	Apr 95	Regional	Semi regional gravity survey. 150 stations collected south of the Lincoln Hwy and east of the Roopena Fault.
Geophysics	Gravity	Oct-94	Sep 95	Round Hill	31 stations collected at 100m intervals along 6397000N. Infilling regional gravity survey to 1station per km^2
Geophysics	Interpretation	Oct-94		Block Dam	Magnetic anomaly coincident with ironstone capped rises
Geophysics	Gravity	Oct-94	Sep 95	Block Dam	31 stations collected at 100m intervals along 6394300 & 6393000N. Infilling regional gravity survey to 1station per km^2
Geophysics	Gravity	Oct-94	Sep 95	Kittle	21 stations collected at 100m intervals along 6378000N. Infilling regional gravity survey to 1station per km^2
Geophysics	Gravity	Oct-94	Sep 95	Pankala	23 stations collected at 100m intervals along 6375000N. Infilling regional gravity survey to 1station per km^2
Geochemistry	Lag Sampling	Oct-94	Sep 95	Round Hill	Reconaissance lag sampling on small grid. 93 samples submitted for Cu, Au (GC41001-0093). Max 69 ppb Au
Geophysics	IP	Feb-95		Round Hill	2km of 200m dipole-dipole IP along 6397000N
Geophysics	IP	Feb-95		Block Dam	2km of 200m dipole-dipole IP along 6394300 & 6393000N. Weak phase responses identified
Geophysics	IP	Feb-95		Kittle	2km of 200m dipole-dipole IP along 6378000N
Geophysics	IP	Mar-95		Pankala	2km of 200m dipole-dipole IP along 6375000N. No obvious responders identified
Geophysics	Gravity	Apr-95	Apr 96	Regional	Regional gravity survey continued with xx stations collected over a number of prospect areas. Collected using La Coste and Romberg gravimeter barometrically levelled with Digibar barometers. Radio linked real-time GPS was used to establish grids.
Geochemistry	Lag Sampling	Apr-95	Apr 96	Spencer	234 samples (GC408601-8834) extending grid to south and southwest. Collected on 100 x 50 m grid. -6+2 mm fraction analysed for Au, Cu. Results closed off anomaly to the south, and anomaly in the SW possibly attributed to surface topography and better sampling conditions.
Geophysics	Magnetics	Apr-95	Apr 96	Spencer	31.2 line km read on 100 m spaced lines with 10 m stations.
Geophysics	IP	Apr-95	Apr 96	Spencer	4, 1 km x 1 km blocks and 1, 1 km x 1.5 km block of gradient array IP (50 m dipoles on 100 m spaced lines) was conducted to assist in determining strike ext of mineralisation. Defined 2 zones- higher phase response to the east correlating with haem/chlorite granite gneiss, - and weaker phase response to the west containing localised highs. Downhole IP was conducted on RPAD133.
Geophysics	Magnetics	Apr-95	Apr 96	Cowleds	Phase 1 - gound magnetics read 500 m intervals on 1km lines. Phase 2 - 100 m intervals on 1 km lines. Resulted in 10 X 5 km block with ~500 m spaced stations?
Geophysics	Gravity	Apr-95	Apr 96	Cowleds	200 m spaced stations on above grid. Data plus above magnetics data generated drill targets
Geophysics	IP	Apr-95	Apr 96	Cowleds	200 m spaced dipole dipole IP on 5 traverses. Weak phase anomaly at 6332000N, 723900E at break in mag feature and southern end of gravity anomaly => drill target.

Drilling	RC? Drilling	Apr-95	Apr 96	Cowleds	7 holes for 576 m, drilled along 5 traverses, testing geophysics anomalies (RPAC0201-0207). 505, 1 m samples were analysed for Au, As, Al, Bi, Ca, Co, Cu, Fe, Mg, Mn, Mo, Pb, S, Sb, Si, U, W and Zn. (DA980722-0766, 0801-0865, 0871-0960, 0971-1000, 1872, 2501-2656, 2671-2757, 2761-2791) Intersected ~30 m cover over weathred basement clays. Max RPAC202 1 m @ 0.11% Cu
Geophysics	IP	Apr-95	Apr 96	Pandurra	Gradient array IP. Two 1kmx 1 km blocks suing 50 m dipoles on 100 m lines. ID 2 main phase anomalies. Anomalies probably attributed to significant pyrite within Pandurra Fm intersected in Pacminex drilling.
Geophysics	Gravity	Apr-95	Apr 96	Pandurra	xx stations collected at 100 m spacing on two traverses 600 m apart. No further work warranted.
Geophysics	Gravity	Apr-95	Apr 96	Murninnie	Semi regional gravity survey. xx stations collected at 500 m spacing on 1 km spaced traverses. No further work warranted.
Geophysics	TEM	Apr-95	Apr 96	Tank Hill	Single line of high power TEM read on 6379700N. No bedrock conductor ID, no further work warranted.
Geochemistry	Lag Sampling	Jun-95		Round Hill	Reconaissance lag sampling along 6397000N. 42 samples submitted for Cu, Au (QD647724-7784). Max 930 ppb Au (reassayed @76 ppb) returned on western end. Max 290 ppb Cu
Geochemistry	Lag Sampling	Jun-95		Block Dam	Reconaissance lag sampling along 6394300 & 6393000N. 118 samples submitted for Cu, Au (QD647606-7666 & QD647667-7723). No anomalous results returned.
Geochemistry	Lag Sampling	Jun-95		Kittle	Reconaissance lag sampling along 6378000N. 41samples submitted for Cu, Au (QD647830-7870) No anomalous results returned.
Geochemistry	Lag Sampling	Jun-95		Pankala	Reconaissance lag sampling along 6375000N. 37 samples submitted for Cu, Au (QD647785-7829) No anomalous results returned.
Drilling	Diamond Drilling	Jul-95		Spencer	1 hole for 151 m (RPAD133) , drilled 5 m west of RPAC115 (hole with most significant Cu). 105 samples collected and analysed for Au, Cu, As, Mo, U_3O_8 and Bi. (DA968611-8658, DA722001-2057) Results 28.4 m @ .22% Cu, 0.292 ppm Au, incl 12.5 m @ .31% Cu, 0.548 ppm Au. Max assay 0.8 m @ 1.77 % Cu, 4.03 pm Au. Intersected quartzite and phyllite with mineralisation within silicified and veined quartzite and in a thin amphibolite unit above silicified zone.
Drilling	RC Drilling	Jul-95	Aug 95	Spencer	18 holes for 1440 m. (80 m depth) drilled along three traverses, testing anomalous geochem (RPAC134-151). 1440, 1 m samples analysed for Au, Cu, As, Mo and Bi. (DA968661-DA970100) Intersected metasediments, quartzites, and interpreted metatuff and granite gness (east of metasediments). Program not completed and potential remains for mineralisation near RPAD133 at depth. Best results in RPAC141, 146, 147, 150, 151. 13 m @ .33% Cu, 1 m @ .78 ppm Au. 7 samples analysed using XRD (DA969534, 9540, 9613, 9813, 9939, 9984, 9990, 70000, 0018)
Geochemistry	Calcrete Sampling	Aug-95		Spencer	1 calcrete sample collected at sump of RPAD133. Analysed for Au, Cu, Mo and Bi. Returned 15 ppm Cu, 2 ppb Au
Petrography	Petrography	Oct-95		Spencer	10 samples of mineralised and unmineralised portions from RPAD133 submitted for petrography. Confirmed petrographic studies in 1994-95. Alteration clearly overprints, thus postdates metamorphism. Cu mineralisation is exclusively chalcopyrite, and is intimately associated with alteration, unclear if same origin. Spencer has been focus of strong hydrothermal activity with some deposition of Cu and Au, yet to determine if economic concentrations
Geophysics	Interpretation	Oct-95	Sep 96	Block Dam	Modelling of IP traverserses concluded significant potential exists for the anomaly to be related to sulphide mineralisation

Drilling	RC Drilling	Nov-95	Dec-95	Spencer	19 holes for 1505 m, drilled along four traverses, testing IP gradient array targets (RPAC154-158, 160-166, 168-175). xx samples analysed for Au, Cu (DA961166-1236, 1246-1313, 1325-1405, 1415-1494, 1505-1578, 1078-1152, 1005-1073, 1605-1676, 1701-1759, 1801-1862, 1881-1941, 1951-2035, 2041-2106, 2121-2200, 2201-2340, 2361-2500, 0501-0600, 1791- 1794, 0801-0680) Best result RPAC156 1m @0.234 ppm Au, RPAC166 1m @0.13 % Cu. Intersected altered silicifies metasediments to the east and less silcified unaltered phyllites to the west. Over highest phase response intersected pyritic and haematitic grt. RPAC168 intersected pyritic dolerite. 3 samples analysed using XRD (DA748101-8103)
Geochemistry	Lag Sampling	Nov-95		Block Dam	Reconaissance lag sample collected at ironstone outcrop (DA748104). 260 ppm Cu, 6 ppb Au returned.
Geology	Geology	May-96	Jun-96	Spencer	Geological logging and assaying of unlogged portions of RPAD21-23, (DA722101-2136, DA983030-3074)
Geology	Geology	May-96	Oct-96	Bayview	Geological logging and assaying of unlogged portions of RPAD31- 32, (DADA21714-1756), Max 830 ppm Cu
Geology	Geology	May-96	Oct-96	Bayview Sth / Mallee Rise	Geological logging and assaying of unlogged portions of RPAD84 (DA9830013029)
Geology	Geology	Sep-96		Ozone	Geological logging and assaying of unlogged portions of RPAD14-15 (DAxxxx)
Geomorphology	Regolith Landform Mapping	May-97		Project	Mapping at 1:100 00 scale and photogeological interpreation at 1:40 000 scale by M Derriman. Plus processing TM imagery.
Structural Interpretation	Structural Interpretation	Aug-97		Project	Geophysical/structural interpretation at 1:100 000 scale by Colin Windsor. ID potential dilation sites for Au, Cu mineralisation
Geochemistry	Geochemical Orientation	Jan-98		Spencer	52, -180um soil samples (+ 2 stds) collected at 50 m spacings along 3 traverses at Spencer and 1 traverse at Spencer South. Samples were submitted to Amdel, Adelaide for Au + multielement analysis analysis (1022101-152)
Geochemistry	Geochemical Orientation	Jan-98		Kennedy Dam	1, -180um soil sample and submitted to Amdel, Adelaide for Au + multielement analysis analysis (1022153)
Geochemistry	Geochemical Orientation	Jan-98		Spencer	50, BLEG samples (same locations as above; 1022201-251 submitted to Norex Lab Welshpool for Au, Ag, Cu analysis
Geochemistry	Geochemical Orientation	Jan-98		Kennedy Dam	1 BLEG samples (same location as above; 1022251) submitted to Norex Lab Welshpool for Au, Ag, Cu analysis
Geochemistry	Geochemical Orientation	Jan-98		Spencer	6 calcrete samples (1022001-006) collected and submitted to Amdel, Adelaide for Au analysis
Compilation	Data Compilation	Feb-98		Project	WMC's data was reformatted and incorporated into Norex's database
Geochemistry	Geochemical Orientation	Feb-98		Spencer	52, Lag samples (+ 2 stds) collected at 50 m spacings along 3 traverses at Spencer and 1 traverse at Spencer South were submitted to Amdel, Adelaide for splitting into magnetic and normal lag fractions and Au + multielement analysis (1022301-352)
Geochemistry	Geochemical Orientation	Feb-98		Spencer	52, -125um soil samples (+ 2 stds) collected at 50 m spacings along 3 traverses at Spencer and 1 traverse at Spencer South were submitted to Amdel, Adelaide for Au + multielement analysis (1022401-452)
Geochemistry	Geochemical Orientation	Feb-98		Spencer	16 bulk soil samples collected and submitted to Amdel, Adelaide for size fraction determination (1022252-267)
Drilling	Drilling	Apr-98		Spencer	35, 1m core samples from RPAD23 submitted to Amdel for Au + multi element analysis (1022501-535) No anomalous results returned
Geochemistry	Rock Chips	Aug-98		Murninnie	4 rock chips samples collected and submitted to Amdel for Au + multi element analysis (1022010-013). Max 2.2% Cu
Geochemistry	Rock Chips	Aug-98		Spencer	1 rock chip sample (quartzite lag) collected and submitted to Amdel for Au + multi element analysis (1022021). 1060 ppb Au
Geochemistry	Rock Chips	Aug-98		Regional	3 rock chips samples collected from the Roopena area and submitted to Amdel for Au + multi element analysis (1022025, 030, 031)