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NUMBER 9401

EL 2293 MOUNT VICTOR
EL 2294 WAUKARINGA GOLDFIELD
EL 2295 YUNTA
EL 2296 PARATOO
EL 2298 BARATTA

RELINQUISHMENT REPORT FOR THE PERIOD ENDING 2/4/98

Submitted by

Lynas Gold NL
1998

MINES and ENERGY RESOURCES SOUTH AUSTRALIA

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ENVELOPE 9401

TENEMENT: EL 2293, Mount Victor
EL 2294, Waukaringa Goldfield
EL 2295, Yunta (partial relinquishment only)
EL 2296, Paratoo
EL 2298, Baratta

TENEMENT HOLDER: Lynas Gold NL, Mawson Gold NL (Olary JV project)

CONTENTS

[Note: Colour microfilm images of Pgs 5, 9, 11, 12, 13, 30, 36, 37, 38, 41, 42, 44, 48, 49, 52, 53, 54, 55, 56, 61, 62, 63, 65, 66, 70, 80, 81, 82 follow the plans on the microfiche].

END OF CONTENTS

OLARY JOINT VENTURE PROJECT
SOUTH AUSTRALIA
EXPLORATION LICENCES
2293, 2294, 2295 (Part), 2296 AND 2298
TECHNICAL REPORT - SURRRENDER
for period ending 2 April 1998

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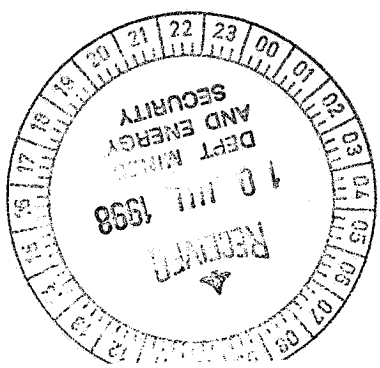
Lynas Gold NL

June 1998

Distribution:

Lynas Gold (1)
Mawson Gold (1)
PIRSA (1)



SUMMARY

Exploration on Exploration Licences 2293, 2294, 2295 (part), 2296 and 2298 was conducted in concert with exploration on contiguous exploration licences E2191, 2297 and 2299 forming the Olary Joint Venture Project. These tenements were surrendered at the close of the first year of tenure based on relative unprospectivity. Exploration activities on the surrendered tenements has been reconnaissance in nature and have included literature research, acquisition and interpretation of aeromagnetic survey data, reconnaissance mapping and minor geochemical sampling.

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1.0 INTRODUCTION

This report describes exploration activities in Exploration Licences 2293, 2294, 2295 (part of), 2296 and 2298 for the first year of tenure ending 2 April 1998. These tenements were surrendered at the end of the first year of tenure. These tenements and contiguous exploration licences E2191, 2297 and 2299 formed the Olary Joint Venture Project.

Exploration was conducted during the period by both Company personnel, and by geological/structural consultants Vearncombe and Associates. The latter compiled a comprehensive report detailing largely reconnaissance evaluation and geochemical sampling.

The proejct area covered an approximate 8800 square kilometre area situated along the southern flank of the Proterozoic Curnamona Craton (Olary Block) and the adjoining Nackara Arc of the NE Adelaide Geosyncline. The project area is viewed as having good exploration potential for major mineralisation. Several mineralisation models are applicable and have been pursued in exploration. These include intrusive related copper-gold mineralisation of the Cloncurry Belt and Olympic Dam styles, intrusive related copper-gold-molybdenum mineralisation associated with high level Cambro-Ordovician intrusives and SEDEX silver-lead-zinc mineralisation of the Broken Hill and Cannington styles.

2.0 TENURE

The surrendered exploration licences are broadly located astride the Barrier Highway between the townships of Nackara, Yunta and Olary (Figures 1 and 2). Exploration Licence E2191 of the original project area was granted on 30 August 1996 to Mawson Gold NL. In March 1997, Lynas Gold entered into a joint venture agreement with the tenement holder on ground that consisted of granted licence 2191 and several other exploration licence applications. Grant of the subsequent exploration licence applications was made on 3 April 1997. These comprise Exploration Licences 2293-2299. Since the date of grant, Lynas Gold has conducted all exploration activities on the tenements under the joint venture agreement. Relinquishment of Exploration Licences E2293, E2294, part E2295, and E2296 was made in April 1998, reducing the project area to 3363 square kilometres.

3.0 PREVIOUS MINING AND EXPLORATION

Mining activities have largely been confined to numerous small scale gold and basemetal camps. Within the Adelaidean, alluvial and reef gold mining has occurred mainly at the Waukaringa, Teetulpa, Manna Hill and Waukaringa goldfields. The Willyama Group rocks within the Outalpa Inlier are host to numerous small gold and basemetal mines. The location, production and geological context of these deposits is documented in the report by consultants, Vearncombe and Associates (Appendix 1).

A review of past exploration has been conducted largely using the PIRSA SAMREF database. I There have been in excess of 108 cases of reported prior exploration within the extensive project area.

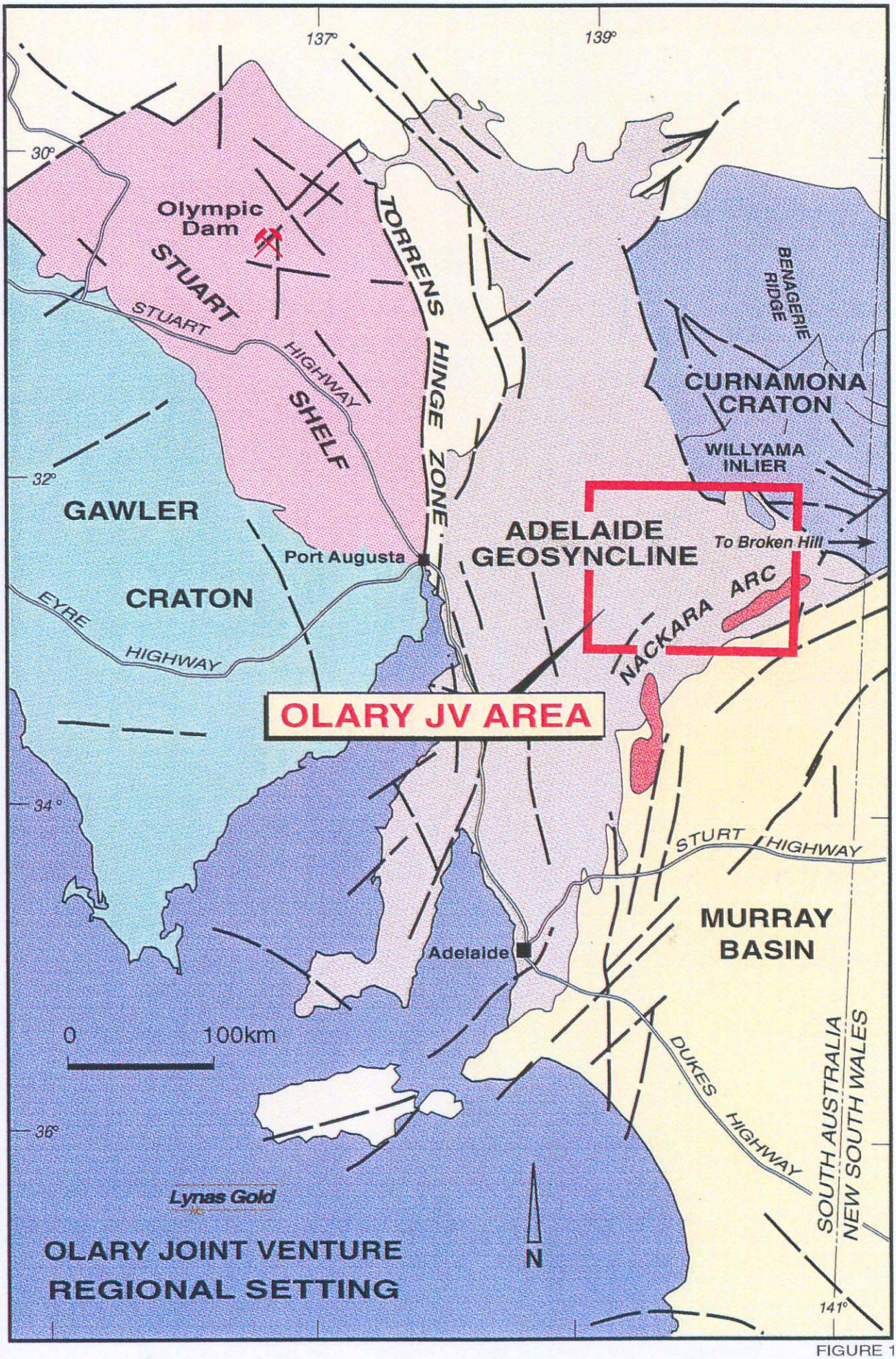
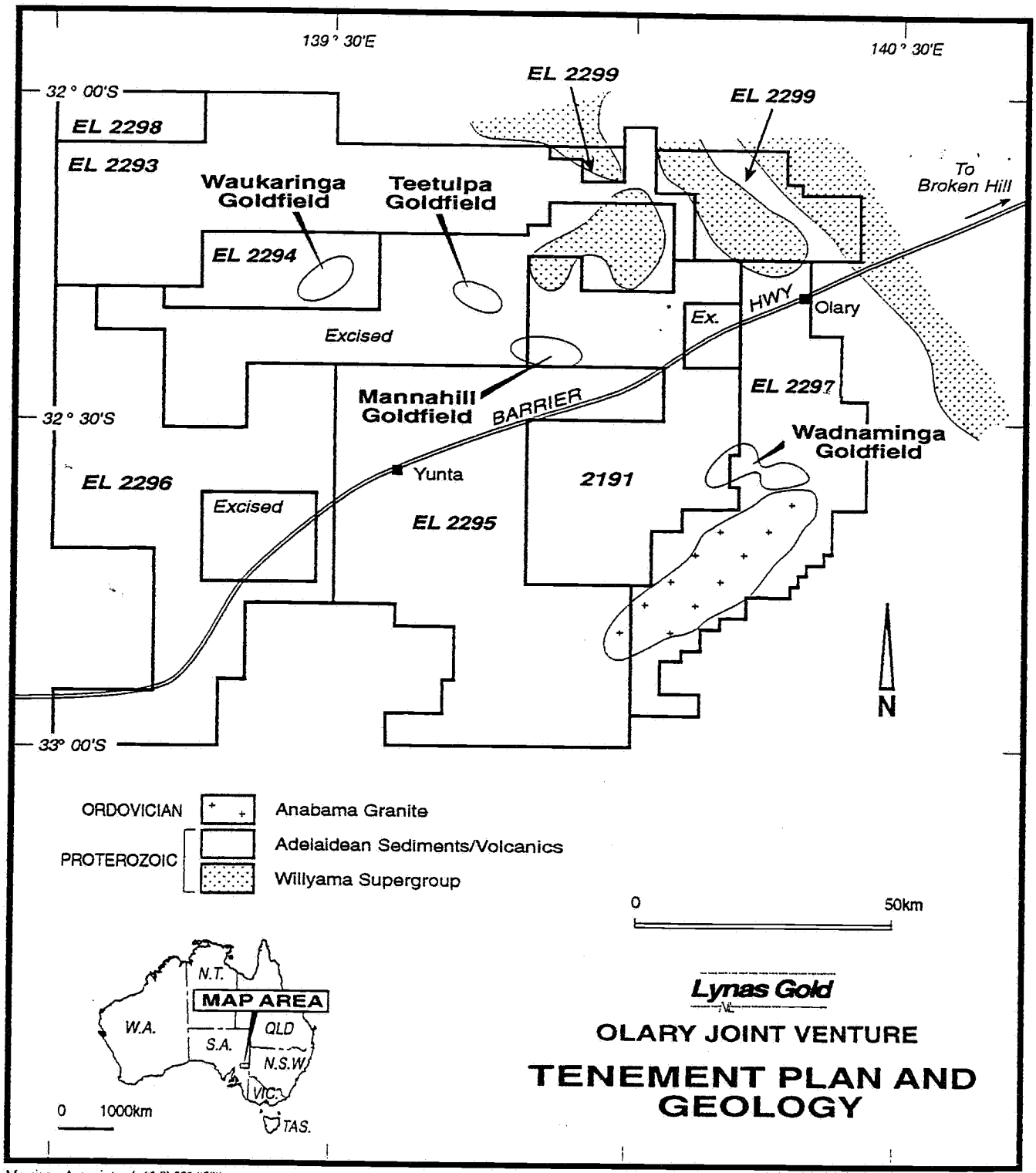

137°
139°
30°
32°
34°
36°
141°
Olympic Dam
STUART
STUART HIGHWAY
TORRENS HINGE ZONE
SHELF
BENAGERIE RIDGE
CURNAMONA CRATON
WILLYAMA INLIER
GAWLER
CRATON
EYRE HIGHWAY
Port Augusta
ADELAIDE GEOSYNCLINE
To Broken Hill
NACKARA ARC
OLARY JV AREA
STURT HIGHWAY
MURRAY BASIN
Adelaide
0
100km
DUKES HIGHWAY
SOUTH AUSTRALIA
NEW SOUTH WALES
Lynas Gold
N
OLARY JOINT VENTURE
REGIONAL SETTING

FIGURE 1



Lynas Gold NL

OLARY JOINT VENTURE

TENEMENT PLAN AND GEOLOGY

Merrison Associates (+61 9) 321 8598

FIGURE 2

4.0 REGIONAL GEOLOGY AND MINERALISATION

A structural/geological report on the project area has been compiled by consultants Vearncombe and Associates and is presented in Appendix 1. Figure 3 shows a summarised geological and structural interpretation for the project area. The accompanying plans (Plan 1) shows a more detailed interpretation at 1:250,000 scale.

In summary, the project area is dominantly underlain by the Late Precambrian Adelaidean Sequence, comprising 800 to 700Ma clastic and carbonate sediments. Four groups are recognised comprising the early rift phase Callana and Burra Groups, and later sag phase Umberatana and Wilpena Groups. The Adelaidean Sequence, at least in part, unconformably overlies the Early Proterozoic Willyama Supergroup of the Olary Block/Domain - part of the Curnamona Craton. This 1700Ma sequence comprises medium-high grade regionally metamorphosed and deformed sedimentary, minor volcanic and abundant intrusive rocks. The sequence is intruded by extensive volumes of mid-Proterozoic S-type granitoids with minor mafic dykes.

Tectonism of the approximate 500Ma Cambro-Ordovician Delamerian Orogeny produced doubly plunging anticlines and synclines, with northwest directed thrusts. Proterozoic growth and transfer fault architecture was probably reactivated during this period. The Delamerian age Anabama - Cornwell Granite complex truncates the the southern limb of the Wadnaminga anticline.

A complete description of the mineralisation and mines within the project area is provided in the consultants report (Appendices 1), and further discussed later in this report. A summary outline is provided here.

The Adelaidean Sequence within or enclosed by the project area are host to several small gold mining centres which together produced some 180,000 oz of gold from alluvial and reef workings. This represents some 90% of the gold production recorded for the Nackara Arc. It is likely that this mineralisation is related to the Delamerian orogeny with fluid movement and deposition related to the interplay of reactivated Proterozoic structures and thrust faulting.

The Willyama Group within the Outalpa Inlier is host to numerous small silver-basemetal, and lesser gold workings.

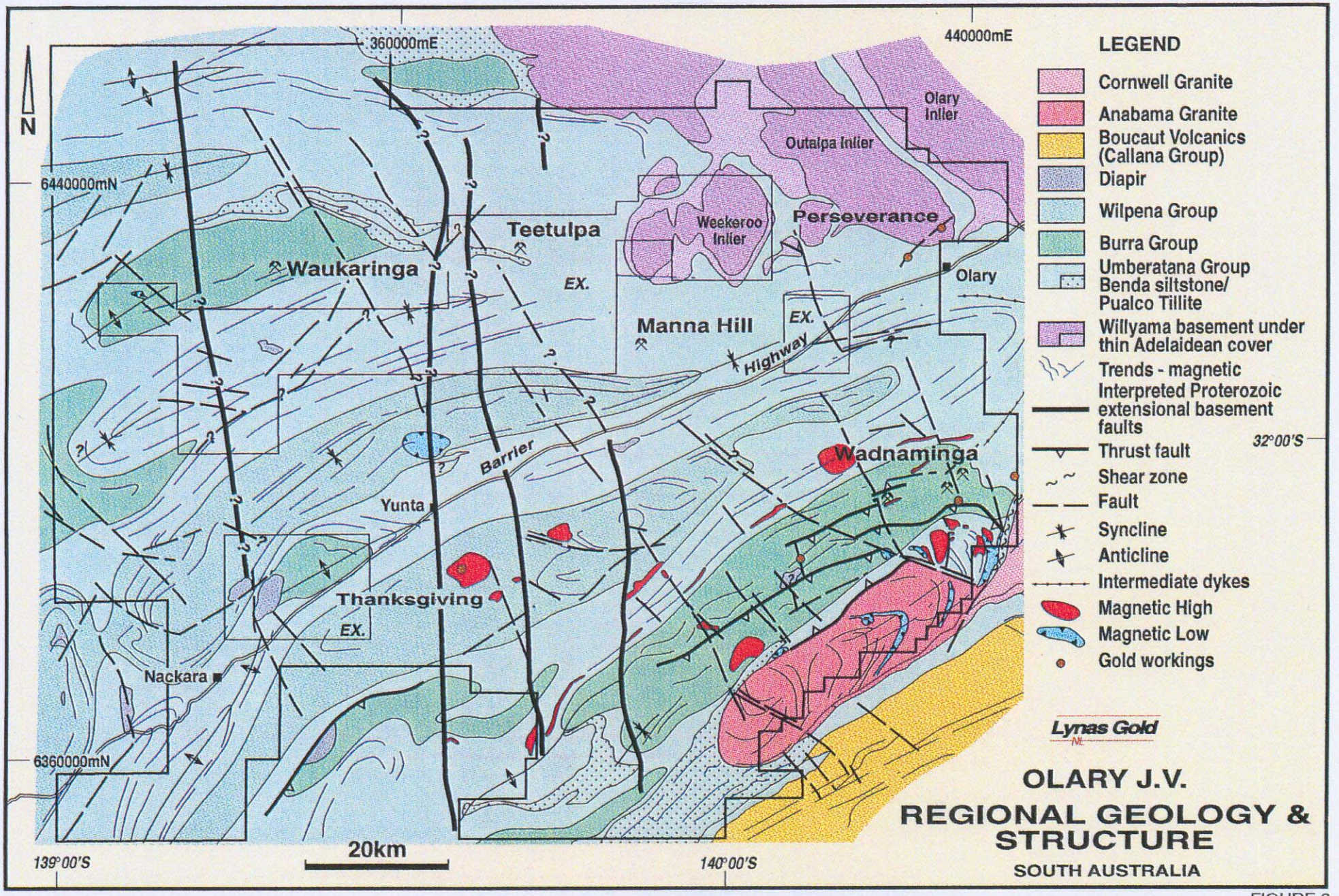


FIGURE 3

5.0 EXPLORATION

5.1 Exploration Models and Objectives

The project area is recognised to have potential to host four main styles of potentially economic mineralisation, and these have subsequently been pursued in exploration. These are:

1. Structurally related gold mineralisation within the Adelaidean Sequence

2. Copper-gold (-molybdenum) mineralisation associated with the Delamerian high level granitoids, and hydrothermal systems. This mineralisation may be particularly well developed in the more calcareous units of the Adelaidean (ie. skarn copper-gold mineralisation).

3. Copper-gold mineralisation associated with Proterozoic intrusives - of the Cloncurry Belt style

4. Silver-lead-zinc mineralisation of the Broken Hill and Cannington styles

Structurally related gold mineralisation occurs at several small gold mining centres within and proximal to the project area. Initial reconnaissance work and evaluation was conducted by consultants Vearncombe and Associates, and is documented in their report (Appendix 1). Follow-up work was conducted by Company personnel - this was generally low-level given that the major prospectivity was seen as outside the surrendered tenements.

5.2 Exploration Activities

Exploration activities have included the following:

- Literature research including the compilation of previous exploration data utilising the PIRSA SAMREF database

- Acquisition of digitised topographic and geological data

- Acquisition, imaging and interpretation of high resolution aeromagnetics and radiometrics

- Reconnaissance geological mapping and geochemical sampling

5.3 Database Formation

Digital topographic data at 1:100,000 scale was purchased from Auslig and incorporated in the project database. A minor proportion required digitising of hard copy plans in-house. All available geological mapping, including the BHI Geological Compilation of W. Laing were acquired.

5.4 Geophysics

MESA and BHI aeromagnetic and radiometric data for the project area were purchased and processed by Cowan Geodata Services, Perth. This was combined with available company aeromagnetics data for the Wadnaminga area. Extensive imaging of the data - particularly the aeromagnetics - was completed and provided a base for a subsequent structural and geological interpretation. This interpretation was conducted both in-house and by consultants Vearncombe and Associates.

Figure 4 and Plan 2 show one of the preferred aeromagnetic images for the project area.

Interpretation of this geophysical data coupled with field observations led to the establishment of a structural/geological interpretation for the project area as shown in Plan 1, and more simply in Figure 3. Particularly important aspects of this interpretation are:

- the recognition of a Proterozoic structural basement to the Adelaidean Sequence. Aspects of the original Proterozoic basinal architecture may be recognised - particularly several north-trending faults that delimit local Adelaidean basins. These probably represent original growth and transfer faults that are likely to have been recurrently active into at least Delamerian times.

- the recognition of thrust faulting in the Adelaidean sequence - presumably also a consequence of the Delamerian tectonism that formed the characteristic open folding of the cover sequence. Gold mineralisation is considered to be associated with the dilational parts of an evolving thrust system. The Wadnaminga goldfield, in particular, can be shown to be associated with a number of thrust structures in an area of constrained geometry and proximity to mineralising Delamerian granitoids.

5.5 Reconnaissance studies

Reconnaissance mapping and rock chip sampling was conducted over the whole project area by Vearncombe and Associates in April-May 1997. Their report on this work is provided as Appendix 1. Assays for rock chip sampling conducted by Vearncombe and Associates during that phase became available after production of their report, and is presented here in Table 1.

Most recommendations for further work dealt with prospects or areas outside the tenements described here. The sole exception was for the Wheal Bassett prospect within E2296. This is described further below.

In addition, substantial reconnaissance work was conducted by Company personnel - the particular objective of this work was to evaluate aeromagnetic and other targets generated largely as a result of the geophysical interpretation, and to conduct a field evaluation of the historic gold mining centres - particularly Wadnaminga. Rock chip sampling was conducted over numerous targets during this phase, and in more detailed follow-up work

Initial work by Vearncombe and Associates pointed to the potential for significant gold mineralisation at the **Wheal Bassett prospect** (refer to Plan 1). At the prospect, a dominantly quartzite package is anticlinally folded in proximity to potentially mineralising faults. Open pit working of part of the prospect has been conducted for railway ballast. A follow-up rock chip geochemical program involved the collection of 18 rock chip samples at the prospect. Samples

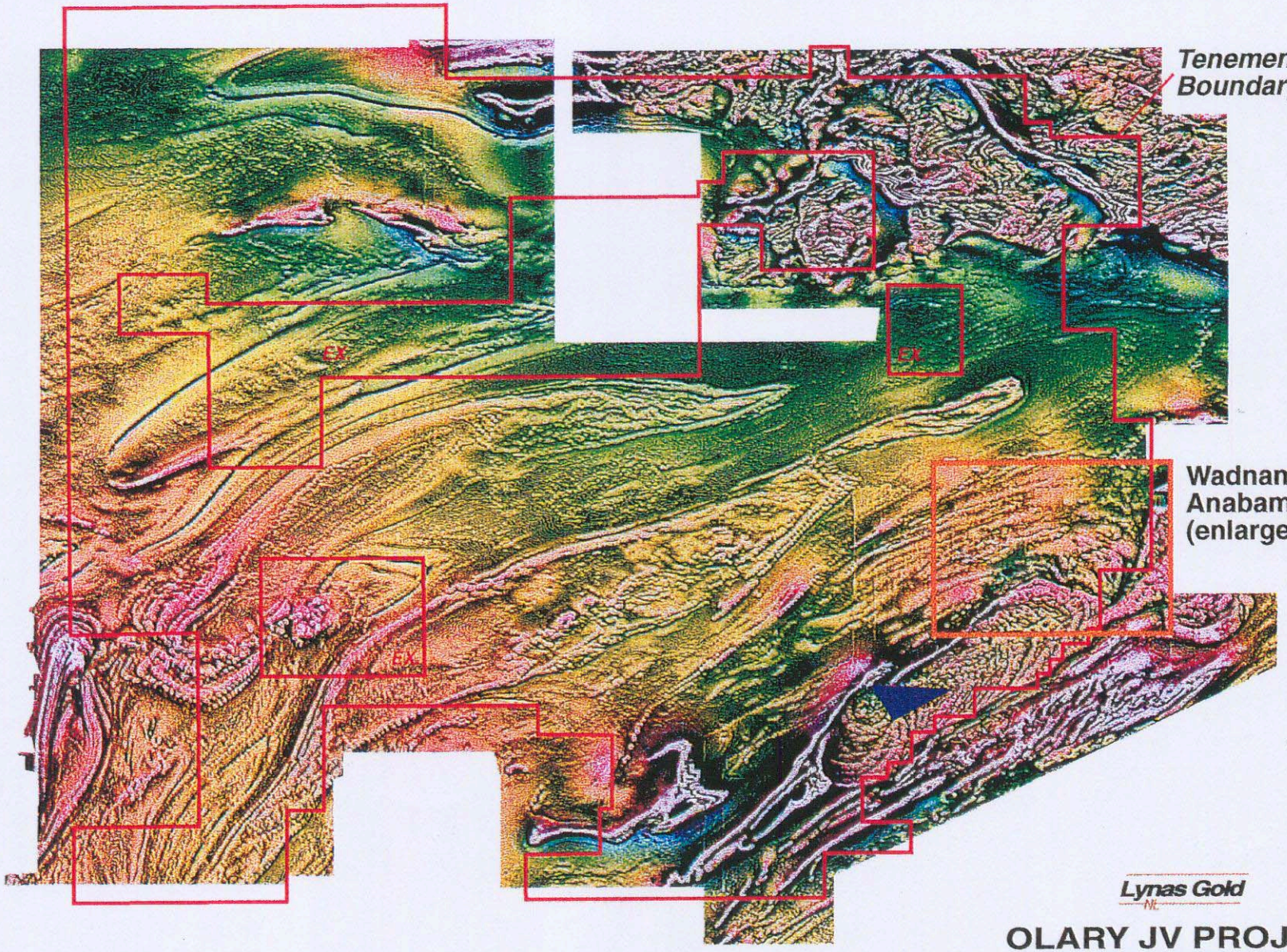

Tenement Boundary
EX
EX
EX
Wadnaminga-Anabama Area (enlargement)
Lynas Gold NL
OLARY JV PROJECT
AEROMAGNETICS

FIGURE 4

were taken of quartz veined and stockworked quartzite. Occasional sulphides were visible - mainly pyrite with rare arsenopyrite. Overall, the rocks were only weakly mineralised with a best result of 0.37 g/t gold. Moderate arsenic concentrations were recorded (refer to Table 2). No further work was recommended for this prospect, but the association of anomalous gold mineralisation with anticlinal fold noses in the district is noted.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Reconnaissance exploration of the tenements did not indicate any significant targets for further evaluation. Potentially the most interesting areas were the Waukaringa goldfield and the Wheal Bassett prospect. The former appears to have limited potential for a company scale operation, and although conceptual targets can be envisaged (eg. Telfer style), other areas within the retained tenements appear to have more favourable settings. Investigations at the Wheal Bassett prospect did not show the presence of significant gold mineralisation, and the potential for economic mineralisation appears low.

TABLE 1

OLARY JOINT VENTURE PROJECT

ROCK CHIP GEOCHEMISTRY

(Vearncombe and Associates - first phase)

Name of working	Sample number	Au ppm	Au dupl	Ag ppm	As ppm	Cu ppm	Pb ppm	Zn ppm	Ba ppm	Co ppm	Fe %
WHEAL BASSETT-PARATOO ANTICLINE											
Paratoo Mine	SA001	<0.01	<0.01	<1	<3	<2	<5	6	20	5	6.35
NE Nob Cu mine	SA002	<0.01		<1	54	3	5	5	20	16	1.99
Robertson Mine	SA003	0.22		7	46	7100	<5	29	80	50	5.38
WB4	SA004	0.01		<1	91	38	<5	7	15	5	1.2
Magnetic high S of Wheal Bassett	SA005	<0.01		<1	12	34	20	23	900	10	1.05
average		*0.12*		*7*	*50.8*		*12.5*	*14*	*207*	*17.2*	*3.19*
WAUKARINGA GOLDFIELD											
Group 3 workings	SA006	<0.01		<1	24	230	15	13	300	34	15.7
Group 9 workings	SA007	<0.01		<1	8	50	<5	45	100	9	2.57
Group 13 workings	SA008	<0.01		<1	14	290	<5	39	165	185	7.55
Waukaringa West Quartz vein	SA009	<0.01		<1	8	50	<5	45	100	17	2.57
Sediment in trench Ajax	SA010	0.08		<1	400	340	<5	45	320	14	13.3
Lovely Gully Quartzite	SA011A	0.69		1	73	12200	<5	48	5	11	10
Lovely Gully Pyritic Siltstone	SA011B	0.28		<1	12	12400	<5	42	250	6	4.06
average		*0.35*			*77*	*3651*	*15*	*39.6*	*177*	*39.4*	*7.96*
WILLYAMA SUPERGROUP (BASEMENT)											
Faugh-a-Ballagh	FAUGH ABALL WILLYAMA	0.11		2	6	1050	50	110	165	125	6.24
Maggie Mine area	MAGGIE MINE AREA	<0.01		<1	14	140	15	69	420	6	2.48
calc-silicate near Ameroo Dam	NEAR AMEROO DAM	0.05		<1	8	17	<5	30	300	13	5.68
Peryhumuck	PERYHUMUCK	1.57		2	<3	135	60	41	210	92	30.2
MacDonald Hill	MACDONALD HILL	0.16		1	40	1500	45	48	430	26	5.73
Centralia	CENTRALIA	0.09		14	12	63400	<5	56	65	29	4.6
average		*0.4*		*4.75*	*16*		*42.5*	*59*	*265*	*48.5*	*9.16*
MANNA HILL GOLDFIELD											
Eudunda Hope East	EUDUNDA HOPE A	1.1	1.38	2	1250	260	320	210	110	29	16
Eudunda Hope West	EUDUNDA HOPE B	0.02		<1	320	2350	490	5250	490	4	14.4
Westward Ho!	WESTWARD HO!	2.81	1.88	2	2350	1100	110	195	45	13	11.1
Euro	EURO	0.07		<1	50	48	5	35	30	5	5.41
Jackson	JACKSON	0.74		1	800	320	25	130	95	6	19.7
Nectar	NECTAS	0.05	0.02	<1	500	300	105	380	105	20	12.5
Homeward Bound	HOMEWARD BOUND (YES)	1.7	2.92	<1	185	750	165	170	65	70	5.14
average		*0.93*	*1.55*	*1.67*	*779*	*733*	*174*	*910*	*134*	*21*	*12*

WADNAMINGA GOLDFIELD											
Faugh-a-Ballagh	FAUGH ABALL	0.02		1	85	16	310	39	25	8	3.19
Lion Hill	LION HILL	11.5	11.8	4	600	160	2600	180	120	6	3.06
Bonnie Keith	BONNIE KEITH	28.8	29.2	35	1300	270	2100	340	105	3	5.68
Luron West	LURON WEST	0.86		2	220	185	480	165	80	4	5.06
New Milo	NEW MILO	11	11.1	6	650	120	220	250	180	19	4.43
South of Golden Record	S OF GOLDEN RECORDS	<0.01		<1	8	260	<5	4	90	22	35.6
North & South	NORTH # SOUTH	0.06		<1	36	340	25	36	20	28	15.1
Triumph South	TRIUMPH WORTH	0.03		4	40	59	9500	750	70	10	5.96
Welsh Prince	WELSH PRINCE	5.52	5.15	4	4	1050	20	11	420	4	8.01
ferrruginuous carbonate in outcrop in core of Wadnaminga anticline near Meadows Dam	MEADOWS DAM	<0.01		1	10	410	<5	19	150	27	39.4
average		*7.22*	*14.3*	*7.13*	*295*	*287*		*179*	*126*	*13.1*	*12.5*
GREISENS IN GRANITES											
Anabama Greisen	ANABAMA	<0.01	<0.01	<1	<3	68	<5	23	600	2	2.65
Anabama Greisen at Netley Hill	NETLEY HILL GREISON	<0.01		<1	<3	77	<5	10	250	2	2.69
ISOLATED WORKINGS/OUTCROPS											
Helene ironstone	SA012A	<0.01		1	44	39	40	470	250	51	37.1
Helene quartzite	SA012B	<0.01		<1	14	15	45	25	10	<2	0.82
Ironstone near Bumbumbie Hut	SA013	0.03	0.03	1	440	340	50	1150	85	155	40.4
Anabama Copper Mine	ANABAMA COPPER MINE	0.25		4	18	60500	<5	66	105	52	8.44
Gum Creek	GUM CREEK	0.13		<1	18	21300	<5	88	1500	40	3.09

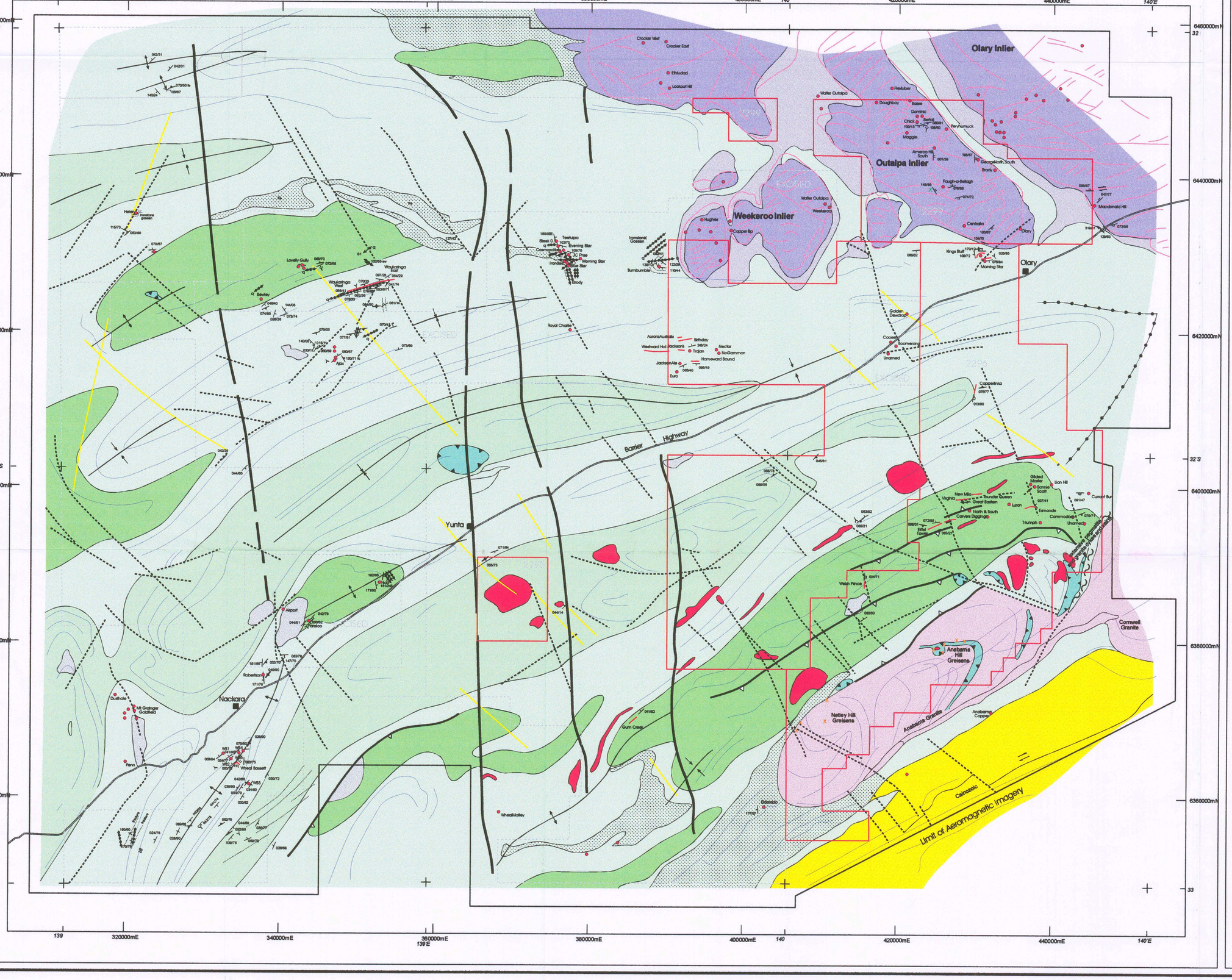
TABLE 2

OLARY JOINT VENTURE PROJECT

ROCK CHIP GEOCHEMISTRY

Phase 1

	OLARY PROJECT - ROCK CHIP SAMPLING - PHASE ONE				
Prospect	Sample	North	East	Au Avg	Description
Wheal Basset Pit/Waukaringa Gold Field	309801			0.04	qtz veined quartzite - Fe stained
	309802			0.21	Quartzite + qtz stockwork veining. Fe stained.
	309803			< 0.02	Qtz veined quartzite - arsenopyrite.
	309804			0.04	as above + Fe staining.
	309805			0.15	Qtz veined quartzite + arsenopyrite + Fe staining.
	309806			0.02	Fe/qtz veining in quartzite.
	309807			0.02	sheared quartzite + Fe stained qtz veins.
	309808			0.29	Vughy limonitic qtz vein material.
	309809			0.07	Pyritic quartzite -py to 5mm grains.
	309810			0.37	Sandstone + Fe stained qtz veins.
	309811			< 0.02	Quartz veined, ferruginised quartzite.
	309812			< 0.02	Quartzite + pyritic qtz stockwork.
	309813			< 0.02	Fe stained, qtz veined sheared sandstone.
	309814			< 0.02	Quartzite + qtz stockwork.
	309815			0.02	Fe stained qtz veins in sandstone.
	309816			< 0.02	Quartzite + pyritic stockwork veins.
	309817			< 0.02	Sheared, qtz veined sandstone.
	309818			< 0.02	Quartzite + qtz stockwork.
	309819			13.90	Waukaringa. Alma/Victoria massive sulphide lode.
Thanksgiving Prospect	309820	6386008	368324	0.05	Laminated qtz/CO3/chl vein.Trace Cpy.
	309821	6385976	368307	0.11	As above.
	309822	6385930	368306	0.89	As above.
	309823	6385930	368300	0.02	foliated chlorite/CO3 schist.
	309824	6386024	368353	0.02	Folded laminated qtz/CO3/chl/lim vein.
	309825	6386401	368364	0.02	Shear related qtz/CO3 vein.Trace lim.
	309826	6386452	368418	< 0.02	Qtz haematite rock + carbonaceous shale.
	309827	6386226	368488	< 0.02	Laminated qtz/CO3/lim/mica vein. Gossanous in part.
	309828	6385490	368295	< 0.02	Qtz vein with chl salvage. Float?
	309829	6385202	368257	< 0.02	Lim spotted dolomitic shale.
	309830	6385247	367909	< 0.02	Fe altered rock. Ox pyrite cubes in soil.
	309831	6385182	367703	< 0.02	Limonitic carbonaceous shale.
	309832	6384266	366893	< 0.02	Bucky sub-cropping qtz.
	309833	6384230	366669	< 0.02	Gossanous lim/qtz/CO3 vein.
	309834	6385108	366258	< 0.02	Laminated qtz/CO3/specular haematite vein. Trace pyrite.
	309835	6385034	366274	< 0.02	Haematitic dolomite.
	309836	6385422	366802	< 0.02	Magnetite/haematite qtz vein - limonitic.
	309837	6386007	368266	< 0.02	Specular haematite/malachite/pyrite qtz vein. Limonitic in parts.



LEGEND

- Anabama and Cornwell Granite
- Boucaut Volcanics (Callana Group)
- Wilpena Group
- Burra Group
- Umberatana Group
  Benda siltstone / Pualco Tillite
- Willyama basement under thin Adelaidean cover
- Interpreted Proterozoic extensional basement faults
- Faults, shear zones and cross-linears
- Thrusts
- Trends - magnetic
- Shear zone
- Willyama basement - internal magnetic linears
- Radiometric cross-linear
- Syncline
- Anticline
- Carbonate - ? sulphate diapir and breccia
- Calc silicates in Willyama basement
- Greisen
- Younging direction
- Bedding
- Cleavage
- Fold plunge
- Bedding / cleavage intersection lineation
- Schistosity
- Fault
- Trend of schistosity
- Trend of fractures
- Line of old workings
- Old working
- Quartz vein strike and dip
- Intermediate dykes
- Magnetic High
- Magnetic Low

N

0 25km

Lynas Gold NL

SOUTH AUSTRALIA

OLARY JOINT VENTURE

OLARY - YUNTA AREA GEOLOGICAL INTERPRETATION

Author :	Date : October 1997	Scale = 1 : 250.000

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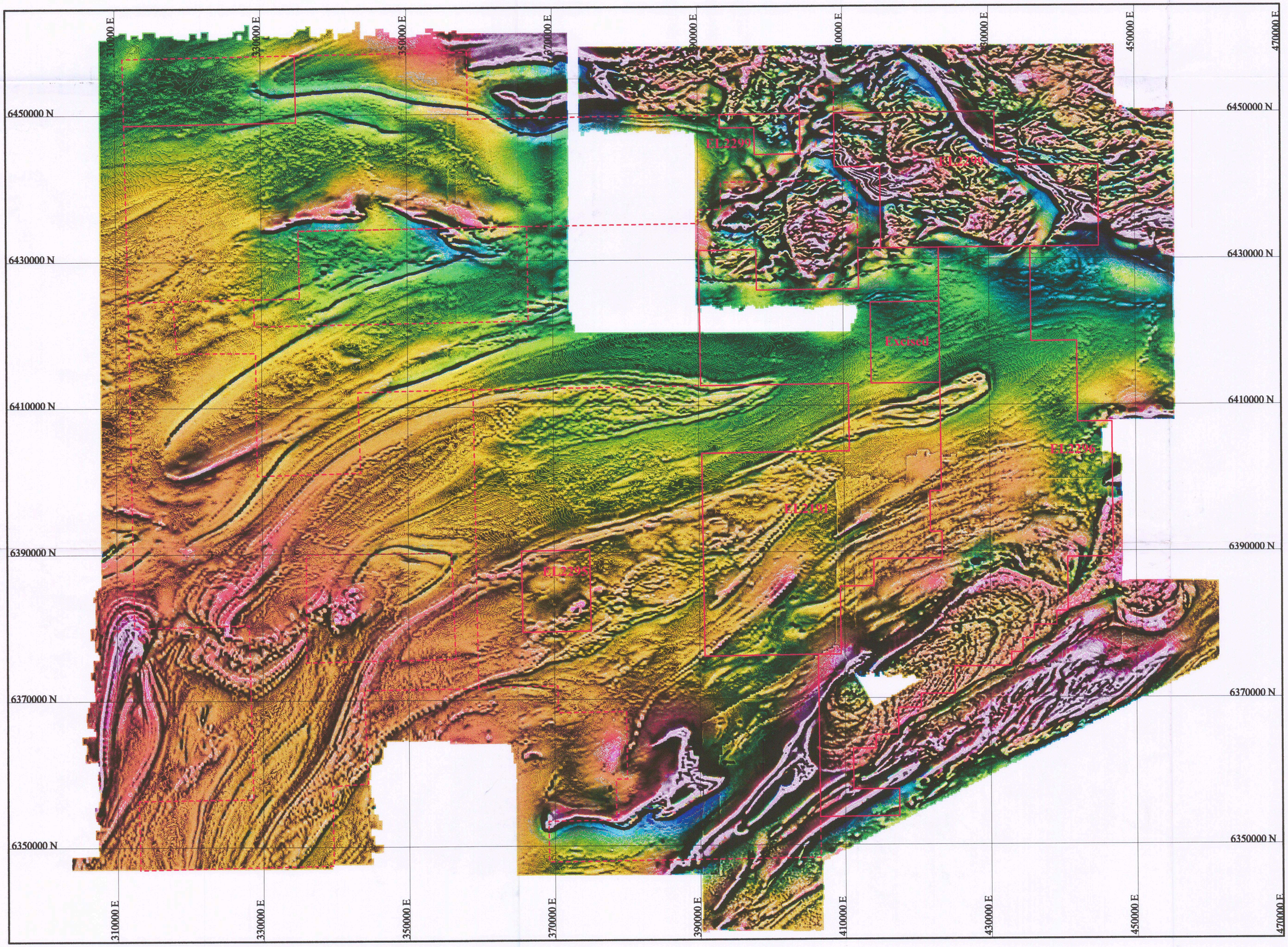

Lynas Gold NL
incorporated in Western Australia

Olary Joint Venture

Enhanced Magnetics Wavenumber Filtering with Tenement Boundaries

9401-2

APPENDIX 1

OLARY JOINT VENTURE PROJECT

EXPLORATION POTENTIAL OF THE NACKARA ARC

Report by Consultants Drs J. and S. Vearncombe

APRIL 1997

Exploration Potential of the Nackara Arc with special reference to the tenements of Lynas Gold NL

Report to Lynas Gold NL

50 Colin Street, West Perth, 6005, Western Australia

by

Julian Vearncombe BSc, PhD, FGS, FAIG, MAusIMM

and

Susan Vearncombe BSocSci, MSc, PhD, MAIG, MAusIMM

2 May 1997

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EXECUTIVE SUMMARY

The exploration tenements held by Lynas Gold NL in part of the Nackara Arc, South Australia comprise inliers of Early Proterozoic Willyama Supergroup (the Olary Domain), overlying Late Precambrian Adelaidean sediments and the intrusive Delamerian age Anabama and Cornwell granites.

The ~1700Ma Olary Domain comprises medium to high-grade regionally metamorphosed, sodic altered and deformed early-Proterozoic sedimentary and subordinate volcanic and intrusive rocks. The exploration potential of this Domain is for Broken Hill look-alikes. In the last eighteen months prospective horizons for Broken Hill-type mineralisation have been recognised in the Weekeroo and Olary Inliers. Although these inliers are excluded from the Lynas Gold NL tenements, they demonstrate the potential for Broken Hill targets in the Olary Domain. The newly recognised prospective horizons in the Weekeroo and Olary Inliers can be as little as 10cm thick and were recognised as a result of 1:10,000 scale mapping, detailed lithology studies and structural analysis to determine horizon extensions and repetitions around folds. The Outalpa Inlier, in the Lynas Gold NL tenement, includes encouraging magnetite-rich horizons and gossans at Chick in Green, Peryhumuck and Olary Ag old mines. Elsewhere within the inlier are extensive calcsilicate units. Whilst the potential for base-metal mineralisation has received prominence in the Olary Domain, gold mineralisation cannot be discounted.

The Late Precambrian, ~800Ma, Adelaidean comprises early rift sequences of the Callanna and Burra Groups, and later sag sequences of the Umberatana and Wilpena Groups. The Callanna Group including intermediate to felsic volcanic rocks is mostly outside the tenement area in the southeast of the Olary-Yunta project area. The Burra Group comprises coarse grained clastic sediments, siltstones and shales (host to the Wadnaminga goldfield) and carbonates, and is separated from the Umberatana Group by a basin wide hiatus which is locally an angular unconformity (with the Wheal Bassett gold mine at the contact). The Umberatana Group comprises basal tillites, ironstones, and thick interglacial laminated siltstones. The Tapley Hill Formation of the Umberatana Group includes the Cox Sandstone Member (host to Teetulpa and Waukaringa goldfields and Ajax mine) and interglacial siltstone and shales (host to Manna Hill goldfield). Upper glacial units of the Umberatana Group include massive tillites, pebble sandstones and laminated siltstones. The Wilpena Group comprises coarse to fine grained clastics, with the calcareous top of the Group marking a second basin-wide hiatus at end of the Late Precambrian.

Tectonism of the ~500Ma Delamerian Orogeny produced doubly plunging anticlines and synclines, with small-scale northwest directed thrusts. This thrusting may have occurred above a basal detachment. It is possible that the Wadnaminga, Manna Hill and Waukaringa goldfields are on layer parallel splays of blind thrusts or above thrust ramps.

Gold mineralisation recognised in numerous and extensive old workings is associated with bedding-parallel and thrust fault quartz-carbonate veins in Adelaidean sediments: Mostly hosted by siltstones, they are locally in sandstones and dolomites. The reefs have remarkable strike extent, many workings extend for more than 500m and some have strike lengths of several kilometres. Dips are generally shallow (<30°), and down dip extent is largely untested because of a general lack of effective drilling. These factors combined with the reported generally good grades (usually 3g/t or better) suggest significant exploration potential. However, the reefs are usually narrow being one metre or less in thickness. Only rarely are the reefs two metres or more in width. The restricted reef width and lack of stacked reefs is a major constraint on the economic potential of several goldfields especially at Teetulpa, Manna Hill and Waukaringa. However, potential for wider ore zones exists at Wheal Bassett and Wadnaminga.

The Delamerian age Anabama and Cornwell Granites truncate the southern limb of Wadnaminga Anticline. Greisens developed in the Anabama granite include up to 3% molybdenite and anomalous copper. Few of the reported results refer to gold and in one case imply that gold was not determined.

<u>In summary form, the recommendations are:</u>

- A detailed geological study of the Willyama basement rocks is required to assess the Broken Hill look-alike potential prior to any drilling. Incorporating existing University of New England and University of Melbourne Honours thesis mapping, and the compilations of Laing (1995), the Outalpa Inlier should be contact mapped in detail at 1:10,000 scale on quality air photographs. All biotite-magnetite schists and calcsilicate, magnetite and Mn-rich horizons should be sampled and examined petrographically, with all gossanous material assayed.

- Our preferred gold targets are those in the goldfields at Wadnaminga where more than one parallel reef is recognised and potential exists for stacked ore horizons and/or intersecting ore zones, and at Wheal Bassett gold mine, where a rheologically controlled vein network is developed in sandstones around fold noses.

- Exploration at Wadnaminga should involve extensive RC drilling. There are numerous obvious drill targets immediately down dip of known workings with proven potential demonstrated by past production, alteration, wallrock sulphidation, and potential for stacked ore zones at Thunder Queen, New Milo and Virginia, with the Eiffel Tower-Carvers Diggings line an excellent second target. Immediately before, or synchronous, with drilling we recommend a detailed documentation of the Wadnaminga goldfields with geological mapping at a scale of 1:10,000.

- Exploration at Wheal Bassett should involve RC drilling around the fold nose, aimed at locating Telfer-type targets, and mapping of the area at 1:10,000 scale.

- A grass roots target is the Gum Creek area, in a similar stratigraphic and structural position to the Wadnaminga goldfield, but on the west closing antiformal closure of the Wadnaminga anticline. Factors favouring this area are the coincidence of cross-cutting linears in the radiometric survey and the prominent change in magnetic intensity across a NW/SE linear which passes through the Gum Creek area. In general this area is poorly exposed and only one old working located at Gum Creek was found by us. Exploration of the Gum Creek area should be accompanied by geochemical sampling, RAB drilling and geological mapping.

- Drill core in the Anabama greisens, and the reported results should be reviewed before further consideration is given to exploration for gold and base metal in the Anabama granite.

STATEMENTS

- The conclusions and recommendations expressed in this report represent the opinions of the authors based on data available to them. The opinions and recommendations provided from this information are in response to a request from Lynas Gold NL and no liability is accepted for commercial decisions or actions resulting from them.

- This report has been prepared specifically for Lynas Gold NL as the Client. Neither the report nor its contents may be referred to or quoted in any statement, study, report, prospectus, loan, thesis, other agreement or document, without the express approval of Lynas Gold NL and Vearncombe and Associates Pty Ltd.

ACCOMPANYING MAP

MAP A

The map to accompany this report is reproduced separately. 1:250,000 Integrated Data Map of the Nackara Arc in the Olary-Yunta area, South Australia.

INTRODUCTION

The authors were asked by Steve Shelton to provide geological data in the form of structural maps and a report to act as the foundation for subsequent successful exploration in the Olary-Yunta area. Gold is the commodity of most interest, but the potential for base metals is also examined.

The field work was conducted by both authors between 17th March and 14th April, with report writing taking about 2 weeks after that. Given the large area of 16,000km^2 (including excisions) field work was necessarily of a reconnaissance nature. Extensive use was made of existing geological survey reports and maps, unpublished MESA reports prepared by mining companies who had previously held ground in the area, and geophysical images supplied by Cowan Geodata Services. Radiometric and aeromagnetic data were supplied at 1:250,000 and 1:100,000 and their interpretation was critical to this project.

Deliverables include this report and the accompanying Map A .

Figure 1 shows an interpretation of the 1:2,000,000-scale aeromagnetic image of southeastern South Australia, with the Olary-Yunta area highlighted.

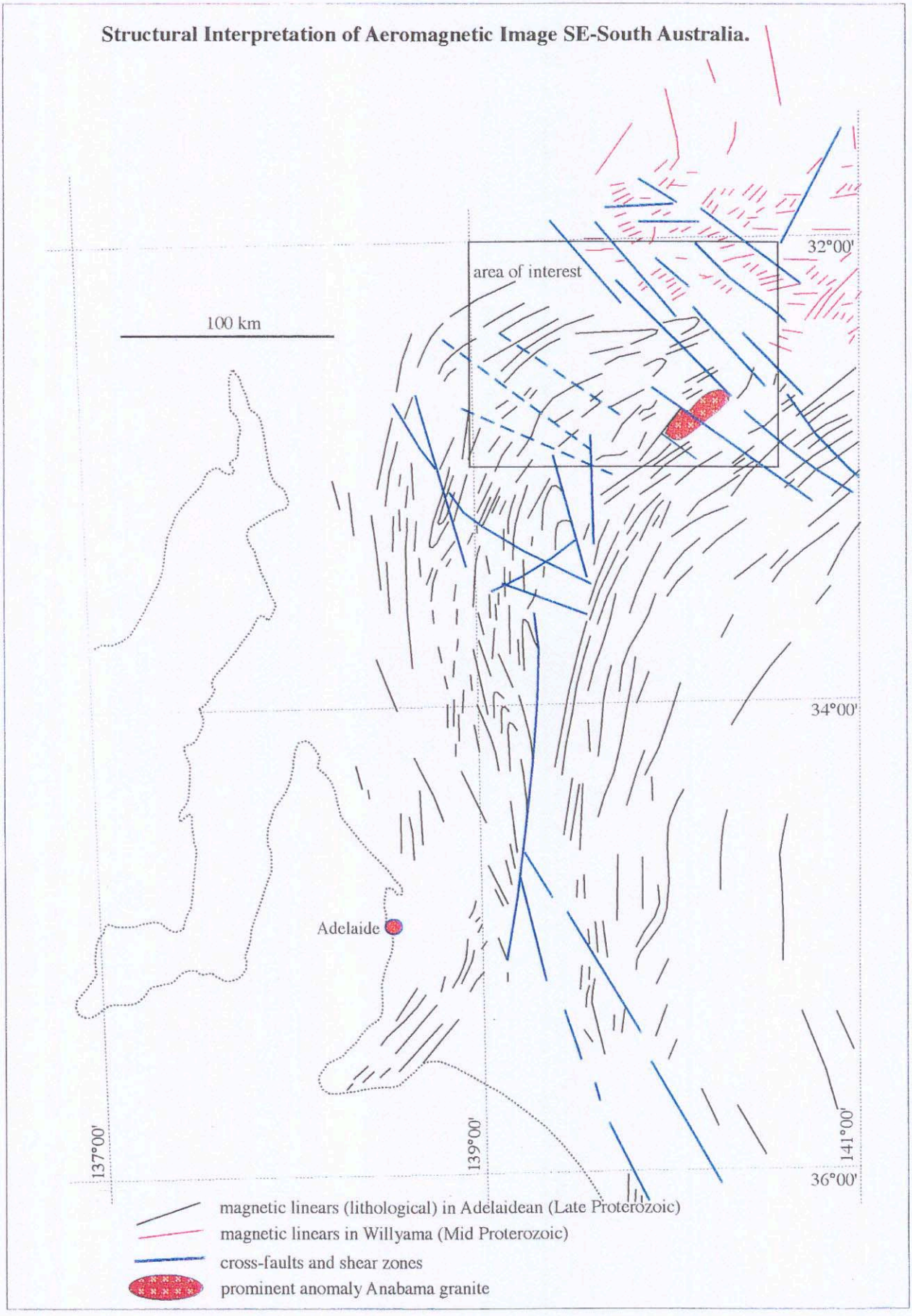


Fig. 1. Structural interpretation of the southeast of South Australia showing early-Proterozoic basement features of the Willyama Block, magnetic linears parallel to lithology in the Adelaidean and cross-faults and shear zones. The area of interest around Olary and Yunta is shown in the northeast of this interpretation.

WILLYAMA SUPERGROUP

Inliers of Early Proterozoic Willyama Supergroup crop out as a series of semi-isolated blocks in the northeast part of the study area. Collectively these are known as the Olary Domain or Olary Block. The joint venture area includes most of the Outalpa Inlier, but much of the Olary and Weekeroo Inliers are excluded. The Olary Domain is mostly composed of medium to high-grade regionally metamorphosed and deformed early-Proterozoic sedimentary, minor volcanic and abundant intrusive rocks. The sequence is intruded by extensive volumes of mid-Proterozoic S-type granitoids with a few mafic dykes. The late-Proterozoic Adelaidean sediments unconformably overlie, or, are in faulted contact with the Willyama Supergroup.

The Willyama Supergroup is interpreted to have been deposited in a failed early Proterozoic rift, which was subsequently deformed and metamorphosed (Willis et al., 1983). The central parts of this rift form the Broken Hill Block in NSW. The Olary Domain represents the rift margin and although detailed palaeo-environment analysis has not been attempted, the sequence is interpreted (Ashley et al., 1997) to be consistent with deposition in lacustrine to marine environments, including sabkha settings. Although coeval magmatism was largely felsic, there is some evidence for bimodality.

Historically mineral production in the Olary Domain has been minor, restricted to U-REE from Radium Hill, and scattered occurrences of feldspar, barite, U minerals and oxidised Cu ores. However, since the late 1960's the Olary Domain has been an active exploration area for minerals especially base metals, Au and U. In recent years exploration has focussed on "look-a-likes" for Broken Hill Pb-Zn-Ag deposits and epigenetic Cu-Au occurrences. Significant Cu-Au has been located at Kalkaroo (Anderson, 1996) and stratabound Au at the Portia prospect on the Benagerie Ridge (Cook, 1996).

The stratigraphy recognised within the Olary Domain by Ashley et al. (1997) is illustrated in Figure 2. Although the rocks are mostly gneisses precursors rock types are recognisable, primary textures are locally present and ghost stratigraphy has been interpreted in migmatites.

The Composite Gneiss Suite

Not strictly a stratigraphic unit, the Composite Gneiss Suite may be partly intrusive, being mobilised into and cutting units higher in the sequence. The Composite Gneiss Suite is probably sedimentary in origin, but is now a coarse-grained and migmatitic quartz-feldspar-biotite-sillimanite-garnet gneiss (Fig. 3). Locally it grades into psammopelitic and pelitic schists. Migmatites are banded, with massive leucocratic granitoids with nebulitic textures and rafts and xenoliths of gneiss.

Quartzofeldspathic Suite

This suite is extensive in the Olary Domain, and is correlated with the Thackaringa Group in the Broken Hill district. The rock is massive to layered quartz-feldspar, typically albite-quartz and psammopelitic schists grading to composite gneiss. The suite comprises several units including a Lower Albite, an Upper Albite and intervening Middle Schist of metasedimentary material and gneiss. Other rock types include quartzite,

quartz-Fe oxide-barite iron formations and rare amphibolite and tourmalinite. The iron formations are mostly associated with the Lower Albite, with a few containing anomalous Cu and Au values (eg. Peryhumuck and Olary Silver Mine in the joint venture area) (Lottermoser and Ashley, 1996).

Petrographic and geochemical work by Ashley et al. (1996) indicates that the Quartzofeldspathic Suite rocks have strong A-type granitoid affinities, but that there is variable, but generally strong, sodic alteration in many bodies and local Fe-enrichment. U-Pb SHRIMP ages on the A-type metagranitoids are 1701±8Ma, 1703±6Ma and 1717±14Ma (Ashley et al., 1996).

The Lower Albite is regionally extensive and distinctive, with massive and layered bodies. Many occurrences have been interpreted as metamorphosed felsic volcanic and volcaniclastics rocks (Ashley et al., 1997). The chemistry is A-type similar to the (above) A-type granites and U-Pb SHRIMP ages are similar at 1699±10Ma (Ashley et al., 1996). The Upper Albite is distinctive and widespread throughout the Olary Domain. It comprises commonly laminated rocks with albite and quartz plus minor potassium feldspar, biotite, magnetite, haematite and calcsilicate. The original sedimentary and igneous precursor rock types are interpreted to have been albitised (Na-enrichment) (Ashley et al., 1997). Hypersaline fluid inclusions are taken as support for this model.

Disseminated magnetite in much of the Quartzofeldspathic Suite, and local concentrations in iron formations and the laminated Upper Albite, is responsible for much of the aeromagnetic signature in the Olary Domain.

Calcsilicate Suite

The Calcsilicate Suite may be diachronous with the upper parts of the Quartzofeldspathic Suite especially the Upper Albite, and there are complete gradations from laminated quartzofeldspathic rocks into calcsilicate. This unit shows similarities with the Ettlewood Calcsilicate Member in the lower Broken Hill Group.

Calcsilicate horizons are interlayered with quartzofeldspathic rocks. Typically, the calcsilicate comprises amphibole (actinolite or hornblende), clinopyroxene (diopside-hedenbergite), epidote and garnet (grossular-andradite) with traces of scheelite and titanite. Calcsilicate can pass laterally into haematite-rich bands, and disseminated and vein sulphides occur locally. Mn-rich rocks containing piemontite and spessartine are present as regionally extensive and correlatable beds just a few metres below the contact with the Bimba Suite. Stratabound breccia masses up to tens of metres in width are characteristic of the calcsilicate. Often the focus of strong hydrothermal activity, the origin of the breccias remains enigmatic. Calcsilicate-bearing rocks locally contain pseudomorphs after minerals interpreted to be carbonate rhombs and gypsum (Ashley et al., 1997). These are taken to indicate former evaporitic conditions consistent with an oxidising sabkha or lacustrine environment, possibly with hot spring activity (Ashley et al., 1997).

Bimba Suite

The Bimba Suite is thin, less than 50m thick, relatively continuous and best developed in the Benagerie Ridge outside of the Lynas Gold NL tenement area. The Bimba Suite is characterised by heterogenous psammopelites and pelitic schist with laminated calc-silicates, marble, albite-quartz rocks and local iron formations. In the Weekeroo Inlier (excluded from the joint venture area) an amphibolite body occurs at the position of the Bimba Suite. All Bimba Suite rocks contain disseminated, laminated and vein sulphides. Gossanous ironstones are present. The Bimba Suite is interpreted to represent shallow water transitional carbonate-evaporite-pelite, in which episodic hot spring activity resulted in metal-rich sulphide accumulations (Cook and Ashley, 1992). Depositional conditions in the Bimba Suite were evidently more reducing than in the underlying units. Least radiogenic Pb in galena from sulphides in the Bimba Suite has a similar age of ~1700Ma to that of the Broken Hill ore bodies. There are lithologic similarities between the Bimba Suite and the Ettlewood Calcsilicate Member at Broken Hill, but rocks characteristic of the remainder of the Broken Hill Group are absent.

Pelite Suite

The Pelite Suite is widely distributed in the northern part of the Olary Domain, but mostly outside of the Lynas Gold tenement area. The unit is dominated by pelitic and psammopelitic schist comprising biotite, muscovite and quartz, locally with some of Al-silicates, garnet and tourmaline. The unit includes several occurrences of well-laminated manganiferous banded-iron formation, with magnetite and Fe-Mn garnet which are compositionally similar to banded-iron formations along strike from the Broken Hill orebody. But, these iron formations in the Pelite Suite are probably higher in the stratigraphy, the pelite suite being correlated with the Paragon Group in the Broken Hill Group.

Intrusive Units

Several suites of granitoid including A-type granites are intruded by a later S-type granite, and there are two suites of mafic intrusives recognised in the Olary Domain (Ashley et al., 1997).

Structure

The Willyama basement rocks have been divided into three phases of Willyama deformation (Clark et al., 1986), and two subsequent (?Delamerian) events. Our analysis of the Willyama basement suggests that whilst these interpretations may be correct in their type areas, the correlation of deformation events from one area to another is based on the unreliable criteria of style, and is, therefore, largely academic. The important component of future structural work in these domains will be the careful mapping of fabrics, especially linear elements, and to map out shear zones. Retrograde shear zones are commonly oriented east to eastnortheast, northeast and northwest. Some of these shear zones appear to extend for at least ten kilometres and are prominent on Landsat and interpreted from the aeromagnetic data. Both dextral and sinistral displacements are recognised in the field in adjacent small-scale zones (Fig. 4), and the overall kinematic pattern has not been determined. Retrograde shear zones cut the S-type granitoids (~1600Ma) suggesting that they are tectonically late. There has been periodic reactivation of shear zones and some of the shear zones propagate through the Adelaidean sequence.

Alteration

The Olary Domain is characterised by regional sodic alteration, although the effects of alteration are heterogeneously distributed. Alteration assemblages are indicative of oxidising conditions and large increases in the Na/K ratio.

Mineralisation

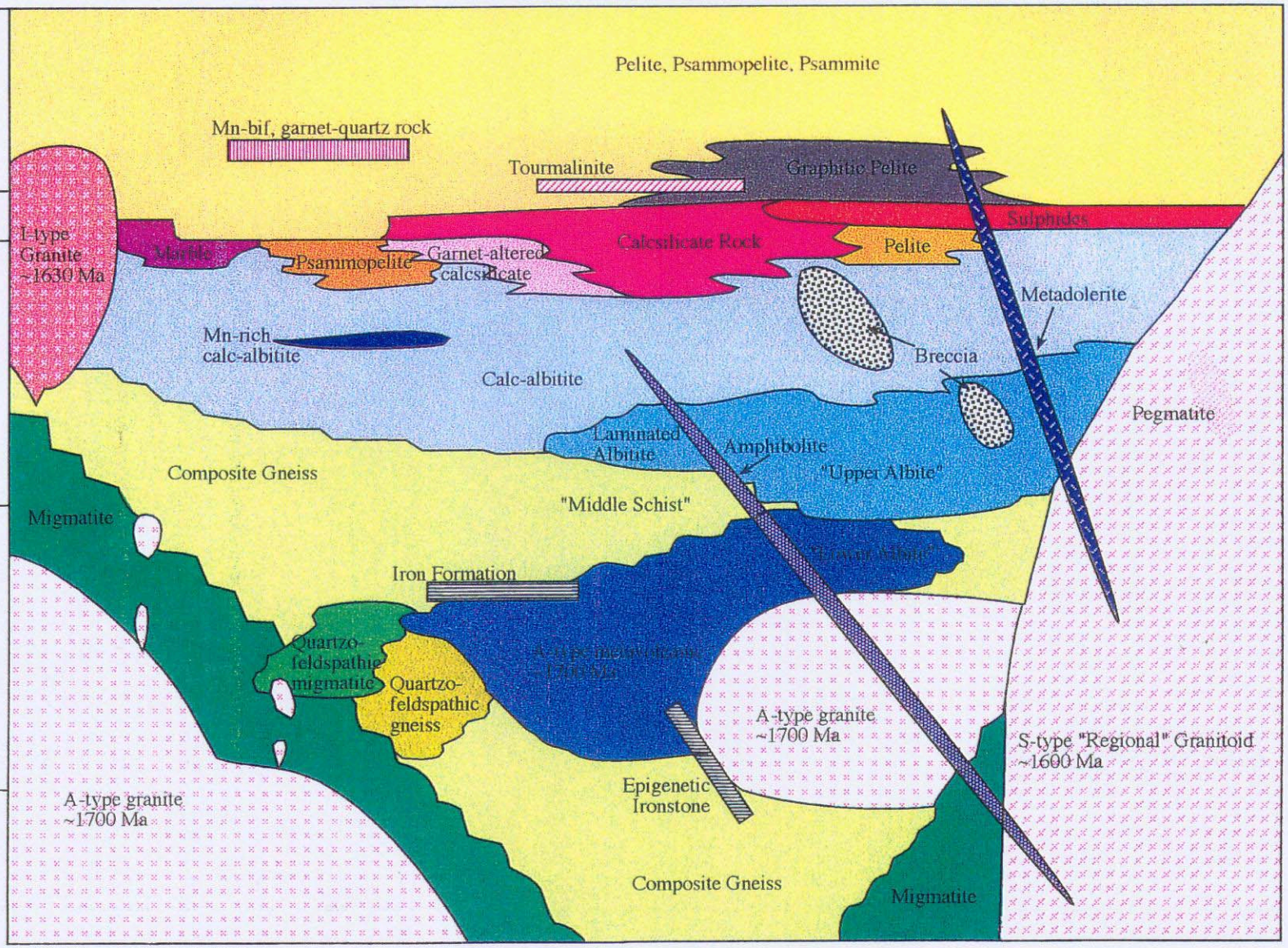
Mineralisation styles are discussed in Ashley et al. (1997). Those styles related to mineralisation outside the Lynas tenements are not discussed here, nor are the U-REE and supergene-type targets detailed in that text. Stratiform to stratabound base metals occur in several units in the stratigraphy. In the quartzofeldspathic unit, iron formations have anomalous Cu and Au values at Peryhumuck and Olary Silver Mines and they pass laterally into barite-bearing rocks. Vein and shear zone hosted epigenetic deposits are widespread in the Olary Domain. Copper is the principal product of the old workings but Pb, Zn, Au and Ba have been recovered, examples include the Centralia, MacDonald Hill and Faugh-a-Ballagh Mines.

Details of old workings are given in a subsequent chapter.

NEXT PAGE

Fig. 2. Olary Domain Stratigraphic Sequence Model, modified from Ashley et al. (1997)

Olary Domain Sequence Model



Modified from Ashley et. al., 1997)

Fig. 3 . Biotite-rich migmatite gneiss of the Composite Gneiss Suite with intrusive granite. The migmatite is derived from a psammopelitic sequence. From NE of the Kings Bluff gold mine, in the Willyama Complex, at 0432368E, 6432928N.

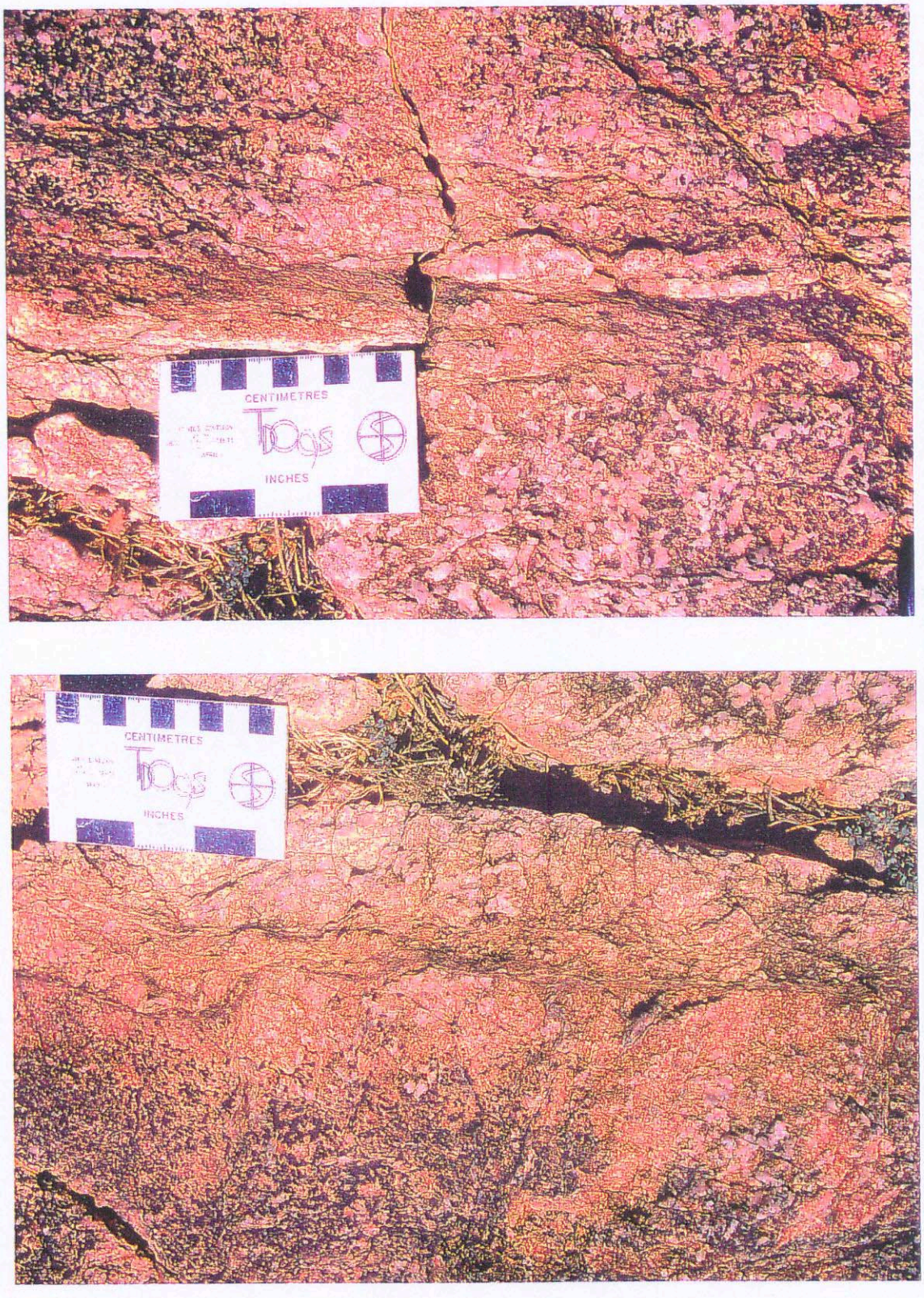


Fig. 4. Two retrograde shear zones in Composite Gneiss Suite near MacDonald Hill at 0444829E, 6436948N. The top photograph shows a sinistral shear zone and the bottom photograph is of the adjacent dextral shear zone.

ADELAIDEAN AND NACKARA ARC GEOLOGY

The Late Precambrian Adelaidean Sequence comprises 800 to 700Ma clastic and carbonate sediments, in the four groups comprising the early rift phase Callanna and Burra Groups, and later sag phase Umberatana and Wilpena Groups.

Relationship between Adelaidean and Willyama Supergroup

The contact of Adelaidean with the underlying Willyama Supergroup is defined as the MacDonald Fault in the vicinity of the Olary Inlier on the MESA 1:250,000 map. We have examined the contact in the railway siding east of Olary (0446988E 6434002N) and at MacDonald Hill (0444163E, 6436790N), and at both locations the contact appears unconformable, comprising siltstones overlain by conglomerate. We did not see evidence of a fault. South of Walparua Mine (at 0410028E, 6431894N), the Weekeroo Inlier of the Willyama basement is overlain unconformably by Adelaidean sediments, and a possible unconformable relationship is recognised at Kings Bluff where blocks of Willyama basement are present in coarse erratics. These relationships suggest that the basement-cover relationship is mostly an unconformity and the MacDonald Fault is not in the position shown on the 1:250,000 Olary MESA map. However, the northeastern contact of the Outalpa Inlier with the Adelaidean is not exposed, being a major creek system. On aeromagnetic data this contact is a well-defined long straight linear of strongly contrasting highly magnetic Willyama Supergroup to the southwest and low magnetic Adelaidean to the northeast. This may be a sharp fault contact.

Stratigraphy

The Late Precambrian, ~800Ma Adelaidean stratigraphy is described in Figure 5. The Callanna Group including intermediate to felsic volcanic rocks is mostly outside the tenement area in the southeast of the Olary-Yunta project area. The Burra Group comprises coarse grained clastic sediments, siltstones and shales and carbonates, and is separated from the Umberatana Group by a basin wide hiatus which is locally an angular unconformity. The Umberatana Group comprises basal tillites, ironstones, and thick interglacial laminated siltstones. The Tapley Hill Formation of the Umberatana Group includes the Cox Sandstone Member and interglacial siltstone and shales. Upper glacial units of the Umberatana Group include massive tillites, pebble sandstones and laminated siltstones. The Wilpena Group comprises coarse to fine grained clastics, with the calcareous top of the Group marking a second basin-wide hiatus at end of the Late Precambrian.

Structure

Tectonism of the ~500Ma Delamerian Orogeny produced doubly plunging anticlines and synclines (Map A), with small-scale northwest directed thrusts. A spaced pressure solution to locally slaty cleavage is developed axial planar to the regional-scale folds. Generally this cleavage is upright although it is recumbent in subvertical beds on the north limb of the Wadnaminga anticline (Fig. 6). Thrusting may have occurred above a basal detachment. It is possible that the Wadnaminga, Manna Hill and Waukaringa goldfields are on layer parallel splays of blind thrusts or above thrust ramps (Fig. 7). Figure 7 shows two interpretations, the first assuming décollement along the Willyama Supergroup basement contact following the suggestions of

Marshak & Flottmann (1996), and a modified version of this section allowing for the unconformable relationship between Willyama Basement and Adelaidean cover as seen in the Olary Domain basement domes.

Granites

The Delamerian age ~500Ma Anabama and Cornwell Granites truncate the southern limb of the Wadnaminga Anticline. Greisens are developed in the Anabama granite. Some contacts of the granite are strongly sheared and movement deduced from aeromagnetic interpretation is dextral strike-slip.

Goldfields

Substantial mineralised fields occur at Wheal Bassett-Paratoo, Waukaringa, Teetulpa (an exclusion within the tenement) and Wadnaminga. These are described in separate chapters, with a final chapter covering isolated workings not within any of these fields. AMG coordinates of all workings are listed in Table 1 at the end of the Chapters on old workings.

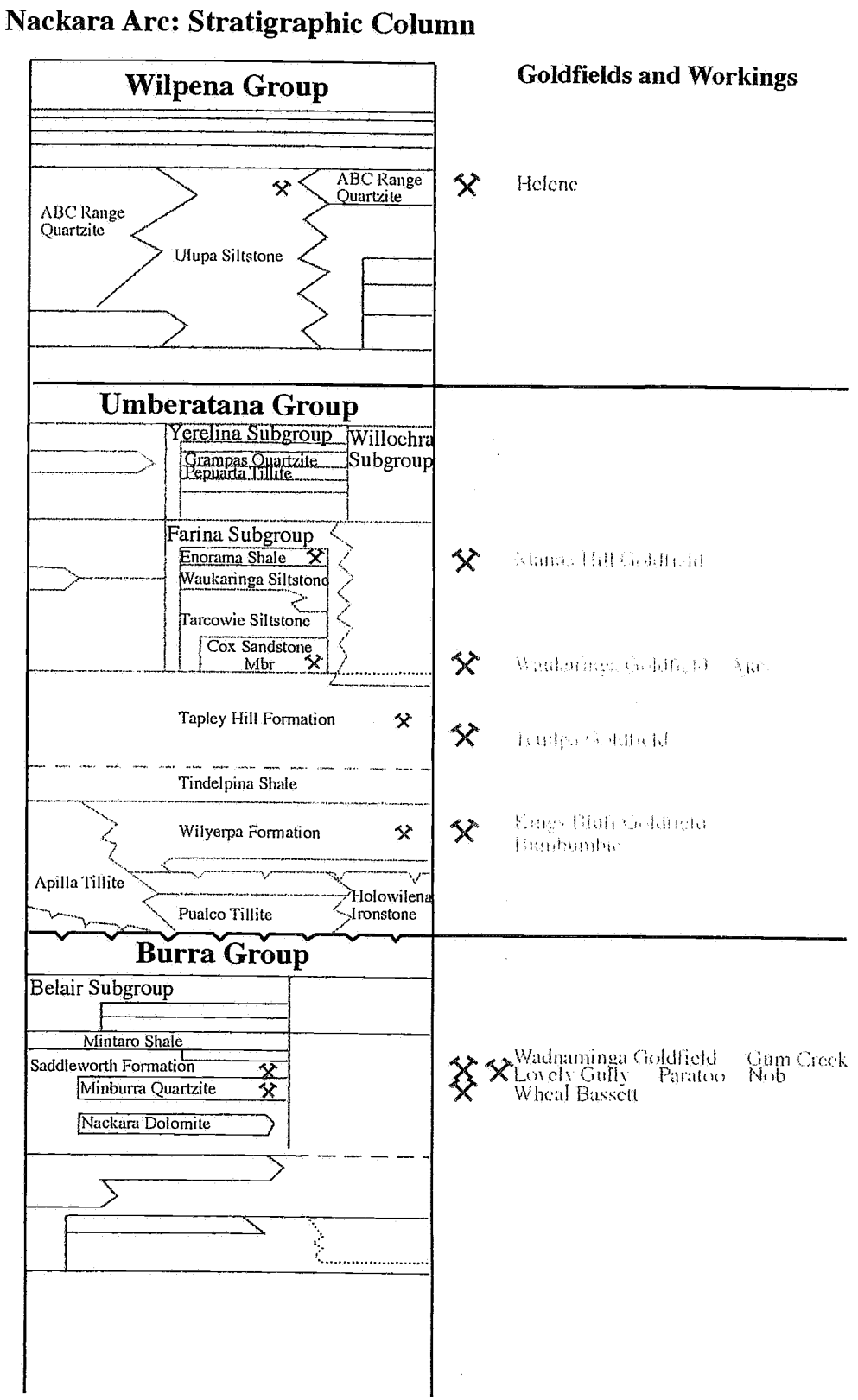


Fig. 5. The Late Precambrian, ~800Ma, Adelaidean stratigraphy and position of goldfields.

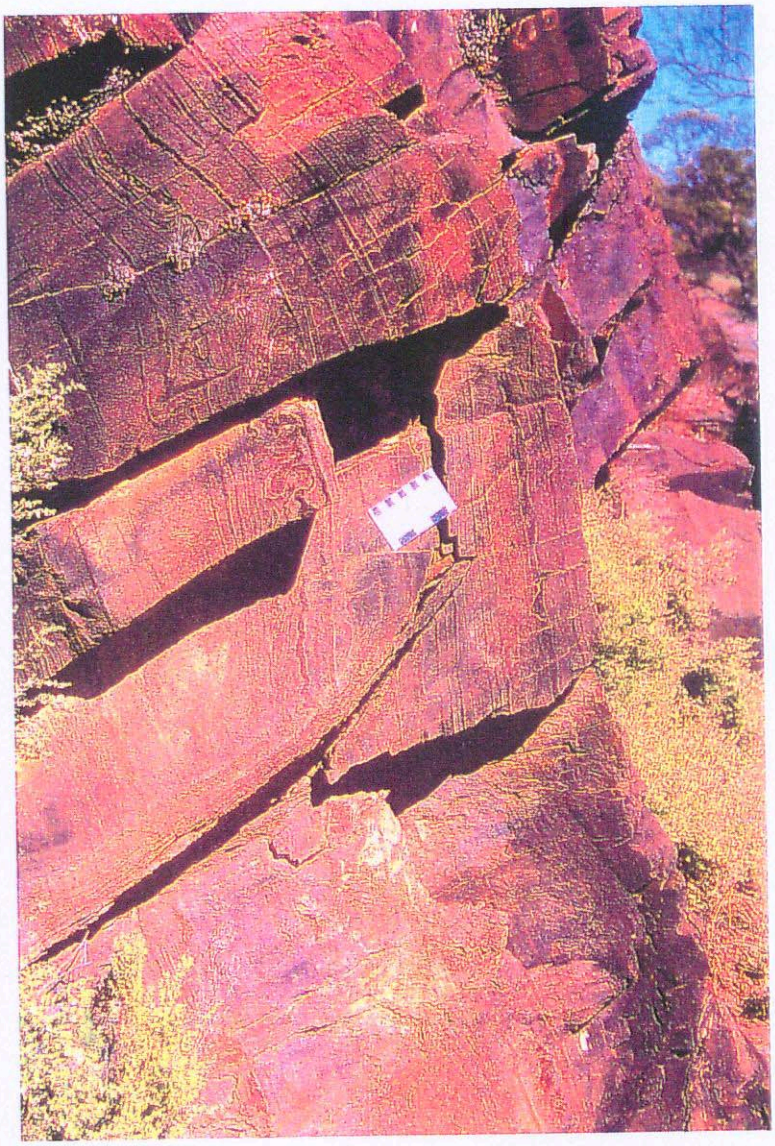


Fig. 6. Recumbent cleavage in subvertical beds on the north limb of the Wadnaminga anticline at 0415975E, 639586N.

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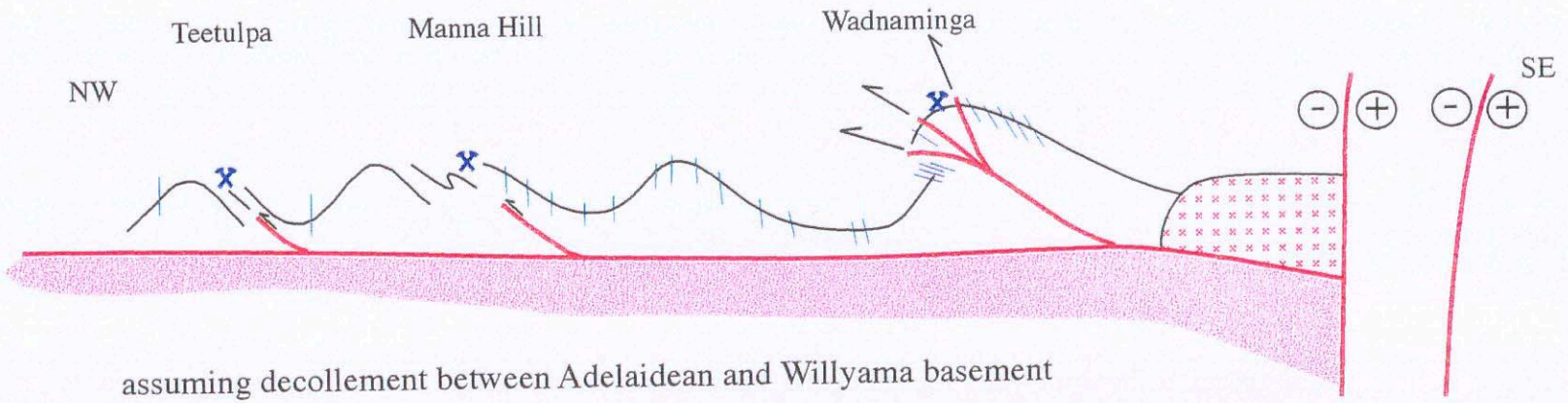
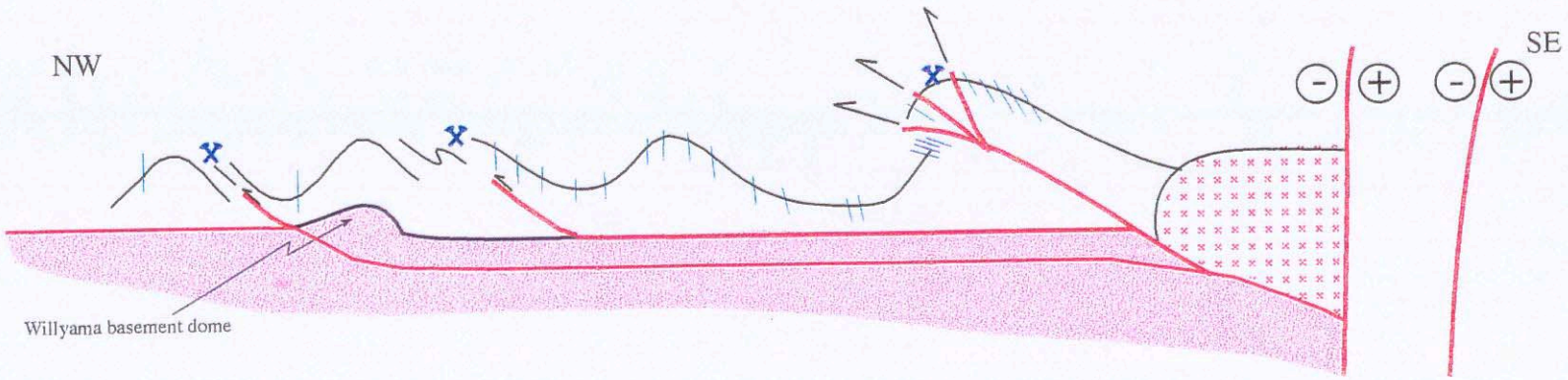
Fig. 7. Two interpretations, assuming décollement along the Willyama Supergroup basement contact following the suggestions of Marshak & Flottmann (1996), and a modified version allowing for the unconformable relationship between Willyama basement and Adelaidean cover .

Structural models for deformation in Adelaidean sediments of the Olary/Yunta area



assuming decollement between Adelaidean and Willyama basement



assuming unconformable relationship between Willyama basement domes and Adelaidean

Cleavage Fault Goldfield Strike-slip motion in/out of plane of paper

Basement Anabama Granite

MINERALISATION IN THE WILLYAMA GROUP

AMG coordinates of all mines, old workings and prospects are given in Table 1, at the end of the chapters on old workings.

The following list of workings is in alphabetic order.

Ameroo Hill South

This pegmatite has two open cuts which may have been worked about 1974 (the date on sign posts). The pegmatite is vertical and 053°-trending. They appear to have worked the pegmatite for the feldspar. Host rocks are psammopelitic gneiss.

Brady Mine, George North and South Mines

The Brady Mine is a small 1m deep pit located within a coarse pegmatitic portion of a quartz-feldspar-biotite leucogranite. George North, ~3km NW of the Brady Mine is similarly located around the edge of the same granitoid within a pegmatite. George South was not located, but geology in its approximate location comprises granite gneiss, migmatite quartz-pegmatite veins and biotite schist. Banding in the gneiss is 185/67E.

Centralia

Several pits and one deep shaft have worked quartz-feldspar gneiss with quartz veins and copper mineralisation with azurite and malachite. The host gneisses are at the gradational contact between migmatitic gneiss (Composite Gneiss Suite) with granites and biotite-bearing psammopelitic gneiss (Quartzofeldspathic Suite) to the north and west. Banding in the host gneiss swings from about 045° to about 015° in the workings.

Chick-in-Green Mine

Comprises two narrow trenches within green-grey quartz-albite-biotite schist at the contact with pegmatite and quartzofeldspathic biotite gneiss. Approximately 70m south of the workings is a 20-30m wide zone of quartz-feldspar-mica-magnetite schist, within which is a narrow 1.5cm thick massive magnetite horizon (Fig. 8). These rocks are oriented 076/52°S. South of Chick-in-Green at 0423173E, 6446945N sandstone units within albite schists show cross-bedding and southward younging. The sandstones strike 108/60°S and cleavage 080/81°S. Magnetite-bearing schists are present through the area. This area requires detailed mapping and a gossan search.

Domenic and Bortoli Mines

Domenic and Bortoli are feldspar mines within feldspar-quartz-white mica-pegmatitic granite.

Faugh-a-Ballagh

A quartz vein in a single pit comprises the Faugh-a-Ballagh copper working. The working appears to be on a shear zone oriented about 080°, and kinematic indicators suggest north-side-down movement. Wallrock gneisses are oriented about 003°. Near Faugh-a-Ballagh mine, Beckton (1993) described brecciation and replacement of albite-quartz rocks, with epigenetic infill and veining by iron oxides and quartz.

MacDonald Hill

(Not found in the location given on the MESA 1:250,000 map.) This single shaft in biotite-rich schist in quartzofeldspathic gneiss comprises gossans and malachite-strained rocks. Sulphides are recognised in some samples of quartzofeldspathic gneiss.

Maggie Mine

The Maggie Mine was not located but rocks in the vicinity comprise andalusite schists trending 074°, biotite schists, feldspar-quartz-mica granite gneiss, garnet-mica schists, tourmaline-mica schists and sandstones.

Olary Silver

The Olary Silver mine, located approximately 5.5km N of Olary, comprises a 10 to 25m deep pit within quartzofeldspathic biotite-muscovite gneiss, and a second, ~30m deep shaft with highly sulphurous rocks within magnetite-rich quartzite, oriented about 035°. The Olary Silver Mine and Perseverance (not found) Mines in the Willyama basement, and the Kings Bluff Goldfield, Outalpa, Coo-ee and Boomerang Mines lie on a 50° trend, which may represent a basement structure reactivated and affecting the Adelaidean cover.

Peryhumuck Copper

The Peryhumuck Cu Mine (Fig. 9) comprises a deep shaft and 4 pits extending along strike for ~100m. Mineralisation is associated with a 2 to 3m wide gossanous quartz-haematite-magnetite-pyrite-rich banded quartzite which can be traced beyond the workings to the east for a further 176m, where the unit is lost beneath alluvium. To the west, the mineralised banded quartzite is cut by migmatite and gneiss. The mineralised quartzite strikes 065/66S and is bounded by a two-mica schist and a sugary textured pinkish medium grained feldspathic biotite quartzite or albitite. A similar and probably equivalent horizon is exposed 2km SW of Peryhumuck where it is a magnetite quartzite.

NEXT PAGE

Fig. 9. The Peryhumuck Cu Mine with a 2 to 3m wide gossanous quartz-haematite-magnetite-pyrite-rich banded quartzite. To the west, the mineralised banded quartzite is cut by migmatite and gneiss. The mineralised quartzite is bounded by a two-mica schist and a sugary textured pinkish medium grained feldspathic biotite quartzite or albitite.

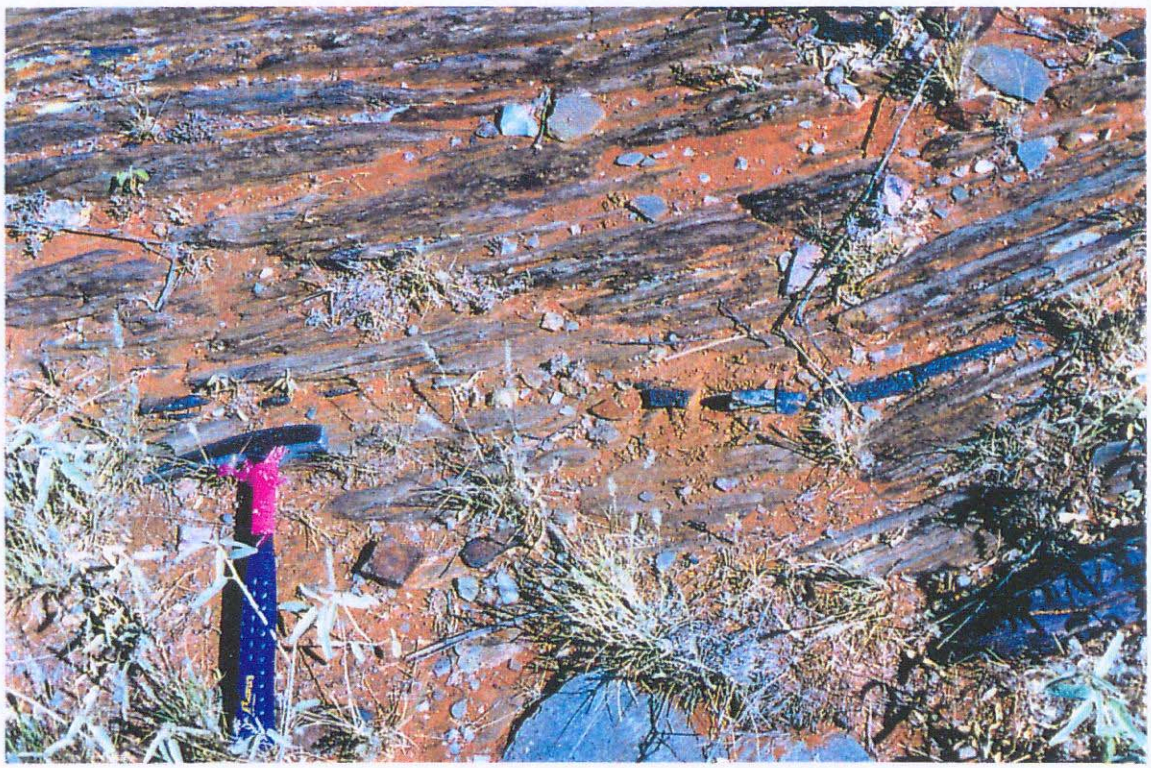
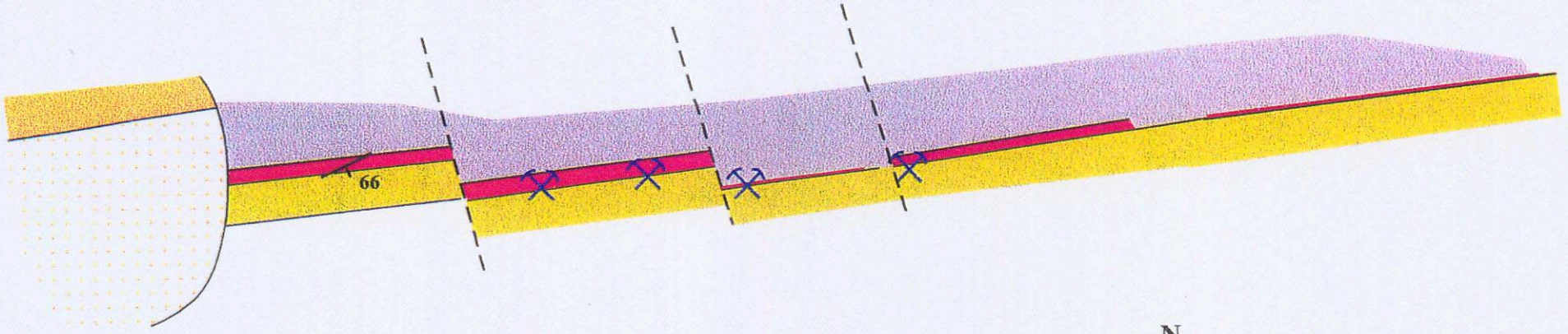


Fig. 8. A narrow 1.5cm thick massive magnetite horizon in quartz-feldspar-mica-magnetite schist, approximately 70m south of the workings at Chick-in-Green.

Peryhumuck Cu Mine

Sketch map



Migmatite and gneiss

Granite and migmatite

Feldspathic sandstone

Quartz-magnetite-pyrite rock,
gossan and Fe-rich quartzite equivalent

Two-mica schist

N

~50metres

THE WHEAL BASSETT-PARATOO GOLD-COPPER FIELD

This group of workings lie along the Nackara Anticline which is oriented NE/SW. Copper and gold mineralisation is located at or proximal to the anticlinal axis, and hosted in sandstone/quartzite interbeds in a siltstone-dominated sedimentary package.

Nob Copper Mine

The Nob Copper Mine, 10km northeast of Paratoo Railway Station, is geologically located immediately east of the axis of the Nackara Anticline, comprises a shaft and diggings within grey, laminated siltstones with interbeds of sandstones. The siltstones strike 171/50E and bedding/cleavage intersection is 72° to 017°. Approximately 1.5km NE of the mine, straddling the axis of the anticline, a coincident NE/SW-trending fault, is associated with a series of parallel quartz veins at 151/24S. There is little surface indication of copper mineralisation, and few quartz veins. However, gossanous Cu-bearing veins carrying locally high Cu (>5%) and gold (3g/t) grades (Greene, 1988), and chip samples across the ore zone include 0.84g/t Au and 8.15% Cu and 1.15g/t Au and 11.8% Cu (Parker, 1995).

Paratoo Mine (excluded)

The Paratoo copper workings are located within grey-green, laminated, carbonated siltstone with sandstone lenses of the Burra Group (Fig. 10), abutting a large evaporitic diapir and a dolerite sill. The Cu-workings, comprise three significant open cuts and several shafts on the axis of an anticline, close to the intersection of a major NE/SW -trending and a NW-trending fault. Mineralisation (Cu-malachite) is primarily in fibrous extensional quartz veins (Fig. 11), located within zones of brittle faulting (Fig. 12) and 2-3m wide crush zones parallel and sub-parallel to stratigraphy, and separated by a zone of contorted siltstones. Subordinate Cu mineralisation is also present along bedding planes. The sediments within the mineralised zones show carbonate alteration in the form of coarse carbonate pits. Bedding strikes about 044 to 059°, whereas, the fault and crush zones strike about 042/80SE. The quartz veins comprise quartz-haematite-pyrite-malachite, the wide veins being coarsely fibrous, the fibres perpendicular to stratigraphy. Other veins include thin (up to 3cm) quartz-Fe veins with narrow Fe-rich. These veins establish a stockwork of veins. These old workings were looked at by several companies late 1960's to mid 1980's, and exploration with a diamond hole and 70 percussion holes produced best assays 3.05% Cu and 0.3g/t Au over 1m (Parker, 1995).

Robertson Mine (excluded)

The Robertson Mine, located SW of the Paratoo workings, comprises small diggings trending 169°, hosted by intensely cleaved, grey carbonate-altered siltstones and interbeds of sandstones of the Umberatana Group. Copper mineralisation is hosted within massive to vuggy quartz-haematite veins. Bedding is 185/73W, and cleavage is 047/67SE. Gold and copper has been recorded from the Robertson Mine, associated with an about 1m wide sulphide-rich vein and associated supergene enrichment. Copper grades are reported to 26.5%, and gold grades from 1.53g/t to 7.5g/t in Cu-poor zones (Greene, 1988). The grades are reported to be highly erratic.

Wheal Bassett Cu Workings

The Wheal Bassett group of mines comprises Cu workings along the western and eastern margins of the Wheal Bassett anticline, and a large Au working in the fold nose of a north-plunging section of the anticline (see below).

The Wheal Bassett Cu workings **WB2 & WB5** are the most substantial of the Cu workings, located on the western limb of the Wheal Bassett anticline. **WB2** comprises a group of shallow diggings and shafts aligned ~051°, over a distance of approximately 200m, hosted within calcareous/dolomitic siltstones and granular sandstones (?Tindelpina Shale), white massive quartz veins, and dolomitic tillite (Appila Tillite). Malachite and oxidised pyrite associated with white vuggy quartz is hosted primarily within the dolomitic siltstones. The sandstones are cross-bedded, oriented 054/77NW and younging to the NW. **WB5** is located 1.3km NE of, and at the same stratigraphic position as WB2, and comprises 2 shafts and 2 shallow diggings, in quartz vein material within carbonate-altered siltstone, dolomitic-rich tillite and quartzite. The diggings extend over ~100m with no indication of Cu mineralisation. Bedding in the siltstones is 041/subvertical.

Of the smaller Cu workings, **WB1** and **WB4** occur on the western limb of the Wheal Bassett anticline, and WB3 on the eastern limb. **WB1** comprises 2 deep shafts within well laminated calcareous siltstones and sandstones (Tarcowie Siltstone). Minor malachite is associated with narrow quartz veins within the siltstones. Bedding strikes 053° dipping steeply 84° to the NNW. Much of this area has been covered with recent scrapings. **WB4** is a single shallow pit associated with massive white quartz-haematite within quartzite in contact with carbonated dolomitic siltstones. The quartz veins are up to 24cm wide and are oriented about 070/75N. Bedding in the quartzites is 075/80N, and cleavage 026/90. This working is most similar to the large Wheal Bassett gold working. **WB3** is located on the eastern limb of the Nackara Anticline in a single small digging associated with a single quartz vein within highly cleaved interbedded siltstones and sandstones. Bedding strikes 034/80E and cleavage 024/90.

Wheal Bassett Au Workings

The Wheal Bassett Au working is a substantial pit (Fig. 13), approximately 25m deep and 350m long, curving around the nose of the NE-plunging section of the Nackara Anticline in the Wheal Bassett area. Quartz vein stockwork has been mined from host quartzite bounded by hangingwall pink dolomites/dolomitic siltstones and footwall grey laminated siltstones and subordinate sandstones of the Burra Group. High angle faults splay around the anticline but are most prevalent in the nose, striking between 037° and 048° and dipping mostly SE at about 65° (Fig. 14). These faults are about 1m wide with crush zones. Quartz veins comprise tension gashes oriented 140/29NE, stockworks, a prominent 019°- striking E-dipping set, a prominent 100°-striking S-dipping set on the eastern limb, and a prominent 122°-striking SW-dipping set on the western limb of the anticline. Bedding varies around the nose of the anticline, and cleavage is consistent at about 030/90.

The mined width is in the order of 15m. Down-plunge extensions of this mineralisation represents a excellent exploration target.

Fig. 10. Cross-bedded sandstone of the Burra Group, at the Paratoo Mine.

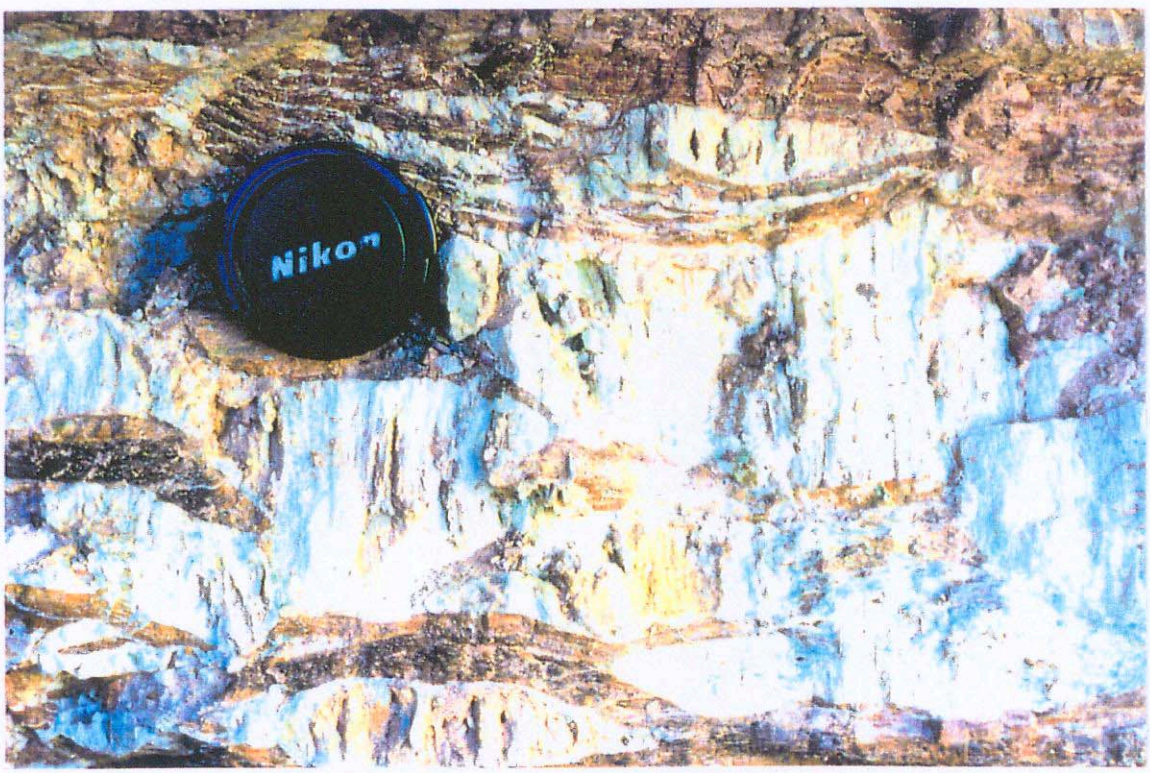


Fig. 11. Extensional fibrous quartz veins hosting malachite ±gold within siltstones and sandstones at the Paratoo Mine.

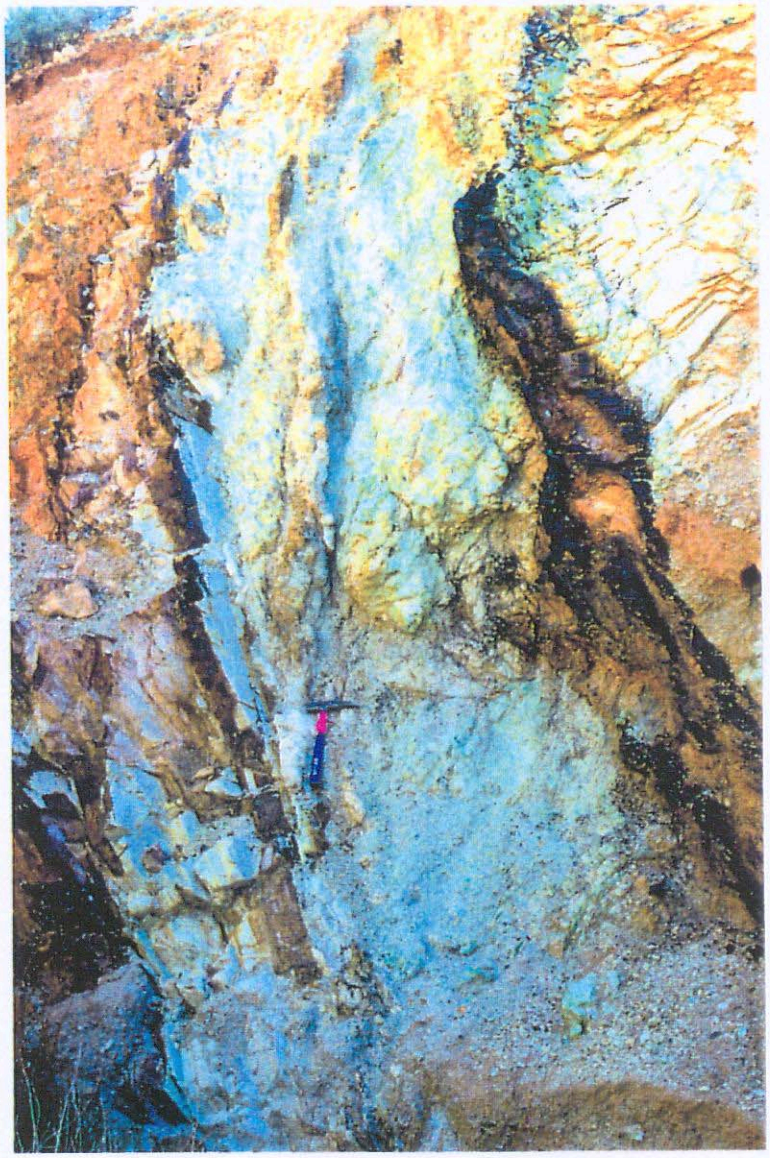


Fig. 12. Brittle fault and crush zone containing Cu ±Au mineralisation at the Paratoo Mine.

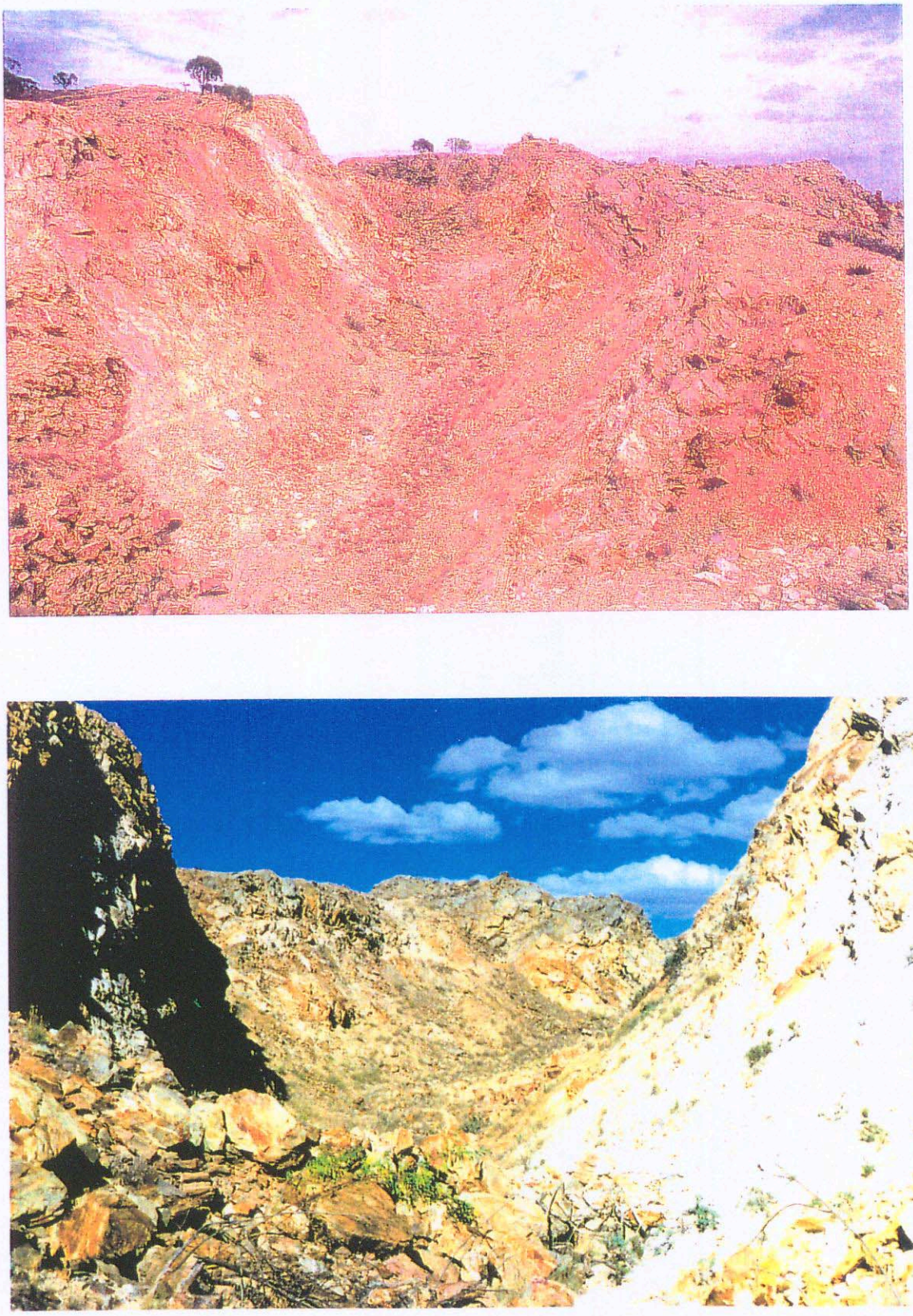


Fig. 13. Two views of the Wheal Bassett Au working, top view from bench looking northwest, bottom view from base of pit looking southeast. Details of geology are given in Figure 14.

Wheal Bassett Au Mine

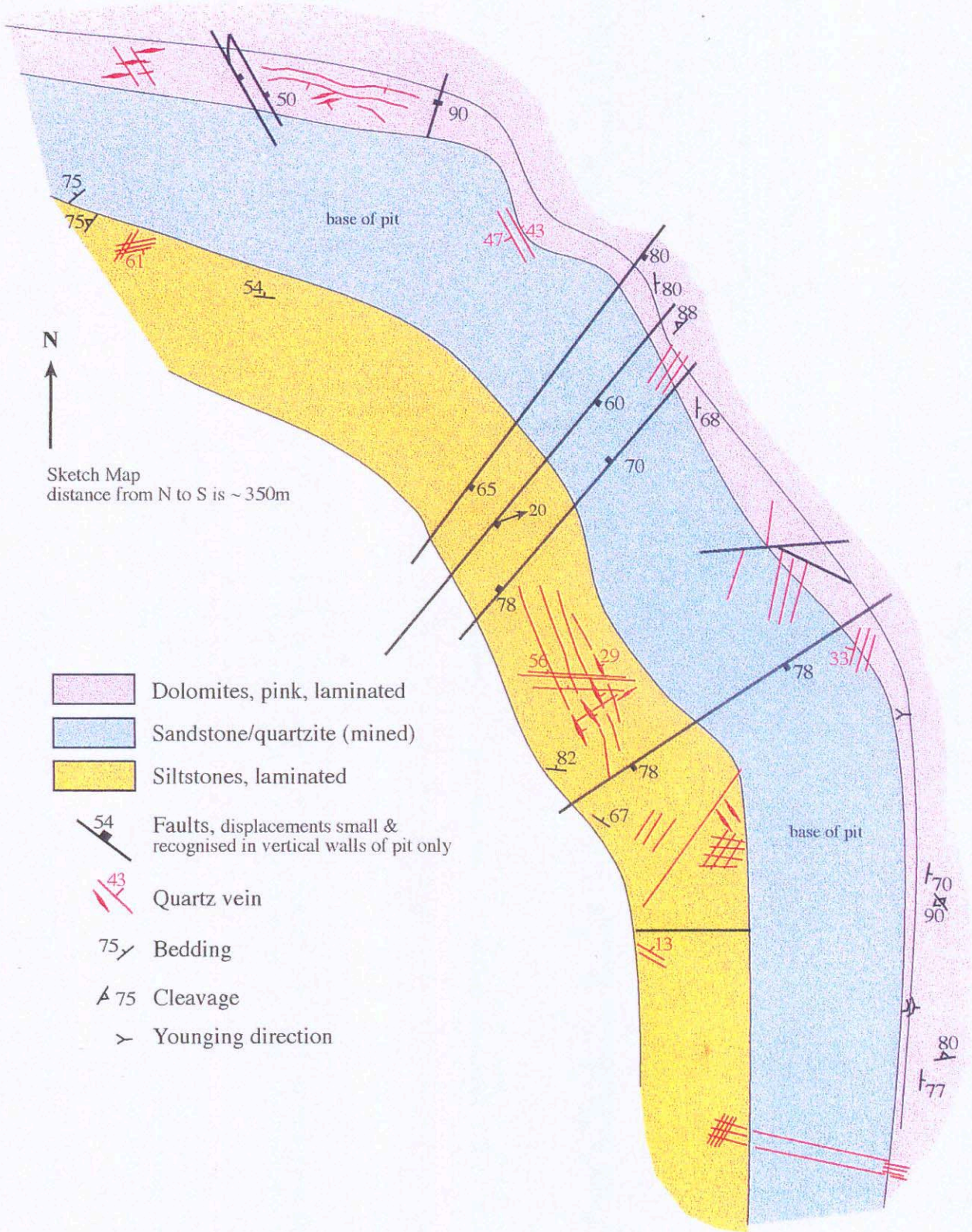


Fig. 14. The Wheal Bassett Au working where the mined width is in the order of 15m, curving around the nose of the NE-plunging Wheal Bassett anticline. Quartz vein stockwork has been mined from host quartzite bounded by hangingwall pink dolomites/dolomitic siltstones and footwall grey laminated siltstones and subordinate sandstones of the Burra Group.

THE WAUKARINGA GOLDFIELD

Ajax (excluded)

The Ajax group of workings (6.5km SW of Simons Well Hut) extend along a prominent strike ridge for a distance of approximately 900m within the Tarcowie Siltstone, on the southeastern limb of the Waukaringa Syncline, in a stratigraphically equivalent position to the Waukaringa gold workings. Ajax comprises adits and shafts along a single, bedding-parallel mineralised horizon with azurite and arsenates. The host rocks are flaser bedded dark grey calc-siltstones and fine-grained sandstones, located stratigraphically above a footwall of massive, grey to pinkish calcareous sandstones. There is minor quartz veining, and, in contrast to Waukaringa, the sediments are mineralised rather than quartz veins. Bedding in the sediments strikes 060/57NW, and there is a prominent fracture set oriented 150/71NE.

Bewley

The Bewley mine comprises a single shaft within the Apilla Tillite. In the vicinity of the shaft is quartz veining and chloritised and carbonated tillite. Approximately 1.3km SE of Bewley mine are two small diggings in dolomitic siltstones and breccias of the Tapley Hill Formation, but no evidence of Cu or Au mineralisation.

Lovely Gully

The Lovely Gully Cu workings comprises in all, 30 adits, shafts and pits oriented about 096° within carbonated pyritic siltstones and fine-grained sandstones. Malachite is present along the bedding planes within siltstones and vein quartz. Gossans contain malachite, chalcopyrite, haematite and quartz, and malachite.

Waukaringa

The Waukaringa Au workings (Fig. 15) extend over a strike length of approximately 8km and comprise a series of shafts, adits and pits located on the northern side of the Waukaringa Syncline. Mineralisation is located at the contact of the Tapley Hill Formation and the Tarcowie Siltstone. The Tapley Hill Formation comprising mostly laminated grey siltstones, has a 1m thick massive dolomite unit in its uppermost part (Fig. 16) which can be traced intermittently from Group 7 workings (Alma-Victoria) to east of Salt Creek (Waukaringa West). The Tarcowie Siltstone comprises distinct flaser-bedded siltstones and massive sandstone units. Quartz±pyrite veins are up to 3m thick and narrow subsidiary veins, occur between a laminated, flaser bedded calc-siltstone unit and a granular carbonated, friable to massive, sandstone unit (the Cox Sandstone Member). The sandstone is silicified along the ridge tops forming prominent outcrops. These two units are interbedded at the northeastern end of the workings, where three successive horizons have been worked for gold mineralisation. However, only a single horizon has been worked along strike to the SW. The workings are aligned along the strike of stratigraphy and the prominent ridge. Stratigraphy is right-way up, indicated by cross-bedding in the calc-siltstones. The laminated, flaser-bedded, calc-siltstone unit is interpreted to indicate a shallow-marine and high energy environment.

A section typifying the nature of the mineralised vein worked for gold, and associated stratigraphy can be seen in Salt Creek (Waukaringa West) close to the disused Government underground workings approximately 3.7km W of Waukaringa.

Gold production from the Waukaringa line of workings is relatively low. Most production has come from two areas, Triumph (~3860g of gold recovered at an average grade of 17.98g/t) and Alma-Victoria (13191kg at an average grade of 25g/t Au). Three successive quartz-Fe lodes in the eastern part of the Waukaringa workings(Fig. 17), become, for the greater strike extent of the workings, only one principal quartz-Fe lode (Fig. 17), which makes the economics of modern mining difficult, despite the considerable strike extent. Old reports do not record substantial vein widths at depth, nor repeated lodes.

Group 1 Workings (East Alma)

These workings comprise 2 shafts and one adit aligned to 173°, over a distance of ~60m. The northemmost adit follows the dip of a 2m wide quartz-Fe vein at the upper contact of calc-siltstones and the lower contact of sandstone. The main vein strikes 061/25S, and a subsidiary set of narrower veins curve from 180/41W to 170/90. Bedding strikes 054/29SE, and 50m SW of the workings, bedding swings and dips more steeply to 069/79S. A 20m deep shaft has a prominent fracture oriented 142/87NE. A second shaft is ~20 to 30m deep within flaser bedded calc-siltstones. The quartz vein/lode can be traced roughly along strike in outcrop to Group 2 at the same stratigraphic position.

Group 2 and 3 Workings (Balaklava/East Alma)

These workings align with Group 1 at an 080° orientation. The main quartz vein (lode) shows small-scale folding, the fold axis oriented to ~054°. Group 3 workings comprise one shaft and one adit oriented to 150°, located within flaser calc-siltstones with prominent small-scale ripples. A 1m thick quartz vein occurs at the upper contact of the calc-siltstones and the sandstone above. The vein is oriented 082/21S, which is roughly parallel to bedding which strikes 074/42S.

Group 4, 5 & 6 Workings (Mid Alma/Alma)

Group 4 workings are oriented ~E-W comprising 4 adits and 1 pit. Adits are oriented towards 200°, and cut into a sequence of interbedded laminated flaser calc-siltstones and massive sandstone/dolomite. Group 5 workings comprise 2 adits and 3 pits. The adits and pits are oriented to 170° within massive (dolomitic) sandstones at the contact with calc-siltstones. Group 6 workings comprises a shaft with prominent fractures oriented ~163/84NE, and a narrow vein ~153/83W within blue-grey (dolomitic) granular sandy siltstones, and 4 small vertical pits in blue-grey sandy siltstone. Beds young to the S.

Group 7 Workings (Alma-Victoria)

East of the Group 6 workings are 2 pits, a 30m long trench, and an adit extending along the strike of workings for a further 40m at Alma. Quartz veins strike 074/28S. Group 7 workings of Alma-Victoria comprise 2 shafts, 4 adits, 10 pits and one trench over a strike length of ~295m. Quartz-Fe veins and crush zones along the selvedges are consistent with the other veins in workings described above. The largest adit (30m width) in

the Waukaringa line of workings is at Alma-Victoria (at 0353665E, 6426770N). Here there are two vein sets, a main set at 001/41W and a subsidiary set at 097/48S which have been mined. Bedding in the siltstones is 083/40S and cleavage 053/61NW.

Group 8 & 9 (Sebastopol/Balaklava West)

Four adits, one shaft, a drive and a trench make up the workings at Sebastapol. At the southern end of the workings is a massive, 1m thick dolomitic horizon at the top of the Tapley Hill Formation. On the main ridge at Waukaringa, the Cox Sandstone Member becomes two distinct horizons separated by green, granular carbonate-Fe -rich siltstone. Quartz-Fe veins, 1m thick, occur at the base of the two quartzite horizons. The quartz-Fe veins are oriented 073/26S and show low amplitude folds. Bedding is at 072/34°S.

Group 10 (Alma West)

The workings at Alma West are located on the immediate E side of the Arkaroola road. The lens of massive dolomite is semi-continuous from Groups 8 & 9, and the quartz-Fe vein mined variously along strike is located between the two quartzite horizons.

Group 11 (Alma West Extended)

Along strike from Alma West are a series of semi-continuous trenches, in which adits accessed a 0.5-1m thick quartz vein. The Cox Sandstone Member becomes a single horizon again. Bedding in the siltstones is oriented to 077/29S, cleavage 079/68N, and the main quartz vein is oriented 096/32S.

Group 12 Workings

Comprises 2 shallow pits within laminated and flaser-bedded green, calcareous sandstones and siltstones. Cross-bedding indicates southward younging. Bedding strikes 070/28S.

Group 13 (Triumph/Day Dawn)

This group extends along strike for ~170m, comprises 1 shaft, 11 adits and a semi-continuous trench targeting a 1m wide quartz-Fe vein. Bedding is oriented 070/48S. Historically, 215 tonnes of ore was processed from Triumph, with ~3860g of gold recovered at an average grade of 17.98g/t (Fradd, 1986 in Townsend & Horn, 1987).

Waukaringa West

The Waukaringa West workings comprise 10 shafts, 9 adits and 3 pits and 2 trenches and extend from Salt Creek near the old Government underground workings, for 2km to the west following a strike ridge. These workings lie at the same stratigraphic position as the other workings at Waukaringa, at the contact between the Tapley Hill Formation and the Tarcowie Siltstone. The quartz veins strike 072/36S, bedding strikes 064/37S, and young S. Folding of the quartz veins, along a NE-SW fold axis is evident along the entire line of the Waukaringa line of workings.

NEXT PAGE

Fig. 15. The Waukaringa Au workings on the northern side of the Waukaringa Syncline. Mineralisation is located at the contact of the Tapley Hill Formation and the Tarcowie Siltstone.

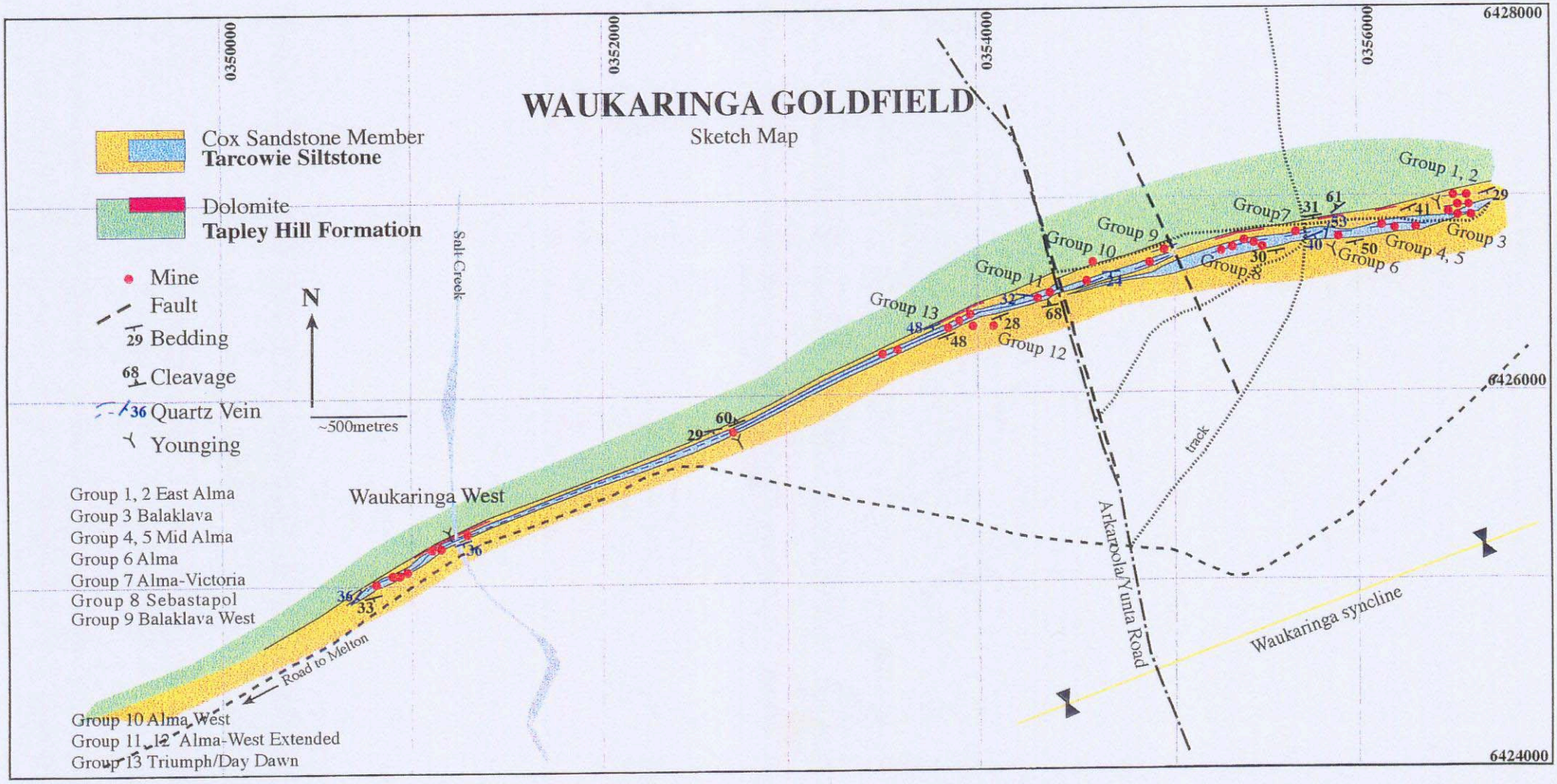

WAUKARINGA GOLDFIELD
Sketch Map
0350000
0352000
0354000
0356000
6428000
6426000
6424000
Cox Sandstone Member
Tarcowie Siltstone
Dolomite
Tapley Hill Formation
Mine
Fault
29 Bedding
68 Cleavage
36 Quartz Vein
Younging
N
~500metres
Salt Creek
Waukaringa West
Road to Melton
track
Arkaroola/Yunta Road
Waukaringa syncline
Group 1, 2
Group 3
Group 4, 5
Group 6
Group7
Group 8
Group 9
Group 10
Group 11
Group 12
Group 13
Group 1, 2 East Alma
Group 3 Balaklava
Group 4, 5 Mid Alma
Group 6 Alma
Group 7 Alma-Victoria
Group 8 Sebastapol
Group 9 Balaklava West
Group 10 Alma West
Group 11, 12 Alma-West Extended
Group 13 Triumph/Day Dawn

Fig. 16. The Tapley Hill Formation laminated grey siltstones with overlying 1m thick massive dolomite unit at Waukaringa West.

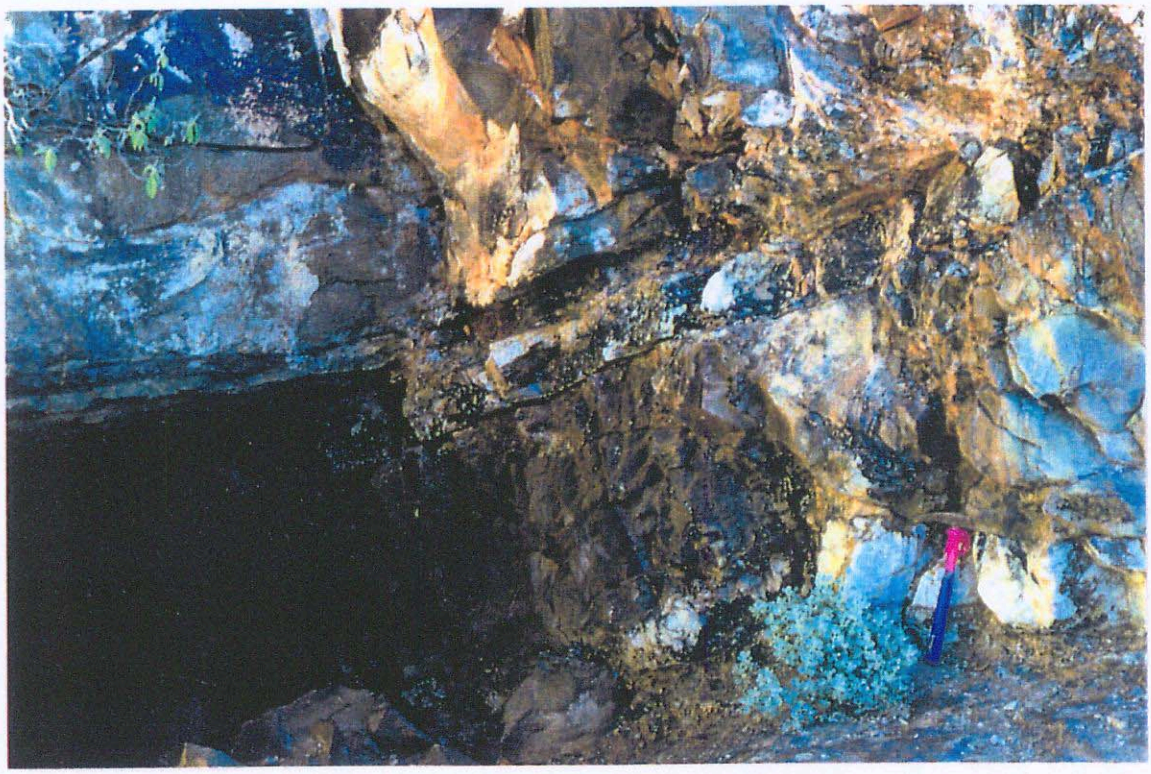


Fig. 17. Two of three successive quartz-Fe lodes in the eastern part of the Waukaringa workings (top photograph) and the one principal quartz-Fe lode at Waukaringa West (bottom photograph).

THE TEETULPA GOLDFIELD

Teetulpa (excised)

Many lines of workings make up the Teetulpa Goldfield. Lithotypes include pink dolomite, and grey laminated siltstones and sandstones of the Tapley Hill Formation. Bedding strikes predominantly about E-W, dipping N and S in a series of open to tight anticlines and synclines, at high angle to mineralised quartz veins, but, about parallel to basement-trending structures. Cleavage strikes 093° dipping 30 to 50S.

The hard-rock workings, are sub-parallel oriented about 162°-trending quartz-Fe veins (Figs 18 & 19). Each line of working mostly follows a single quartz-Fe vein. Gold is mostly contained within <0.5m gossanous crush zones along the vein selvedges (Fig. 19); the quartz veins in large part remain unmined. A series of about 100/40S -trending quartz veins cut across the Teetulpa Goldfield, intersecting in places the 160° -trending mineralised veins, but the strike-parallel veins do not contribute to mineralisation.

Alluvial gold is actively mined in the area, confined to palaeochannels approximately 20-25m deep and up to 60m wide. Alluvial gold nuggets are recovered from an approximately 0.5-1m wide zone of coarse alluvials, comprising gypsum-rich diapiric rock, siltstones and quartzite, located only several metres from the bedrock. Most of the alluvial gold nuggets recovered are between 1-10g, although larger ounce plus nuggets are being recovered. Production from the Teetulpa Goldfield is estimated at about 87,000oz of gold from both the alluvial and hard rock workings (Parker, 1995).

Bumbumbie

The Bumbumbie mine consists of two 20m long trenches and a 0.5m pit trending 168° along quartz veins in well laminated grey siltstones, and micaceous, Fe-rich banded sandstones. The workings are located on the axis of a small anticline. The characteristics of Bumbumbie are similar to Teetulpa. Near Bumbumbie Hut, at AMG 0387279 / 6432115 is an ironstone outcrop which was sampled for assay. Result are not yet available.

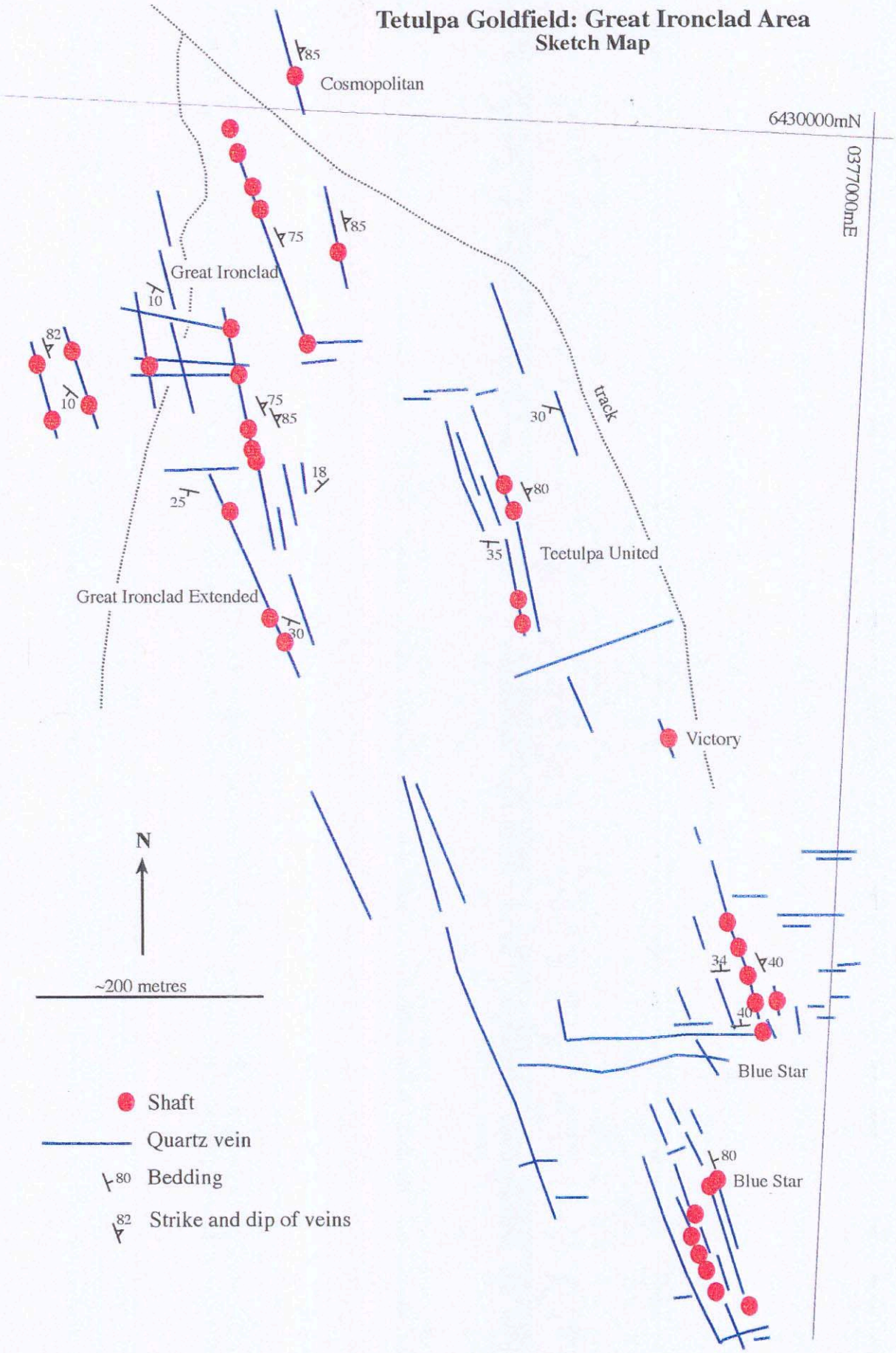


Fig. 18. Geological sketch map of the Teetulpa hard rock workings in the vicinity of Great Ironclad.

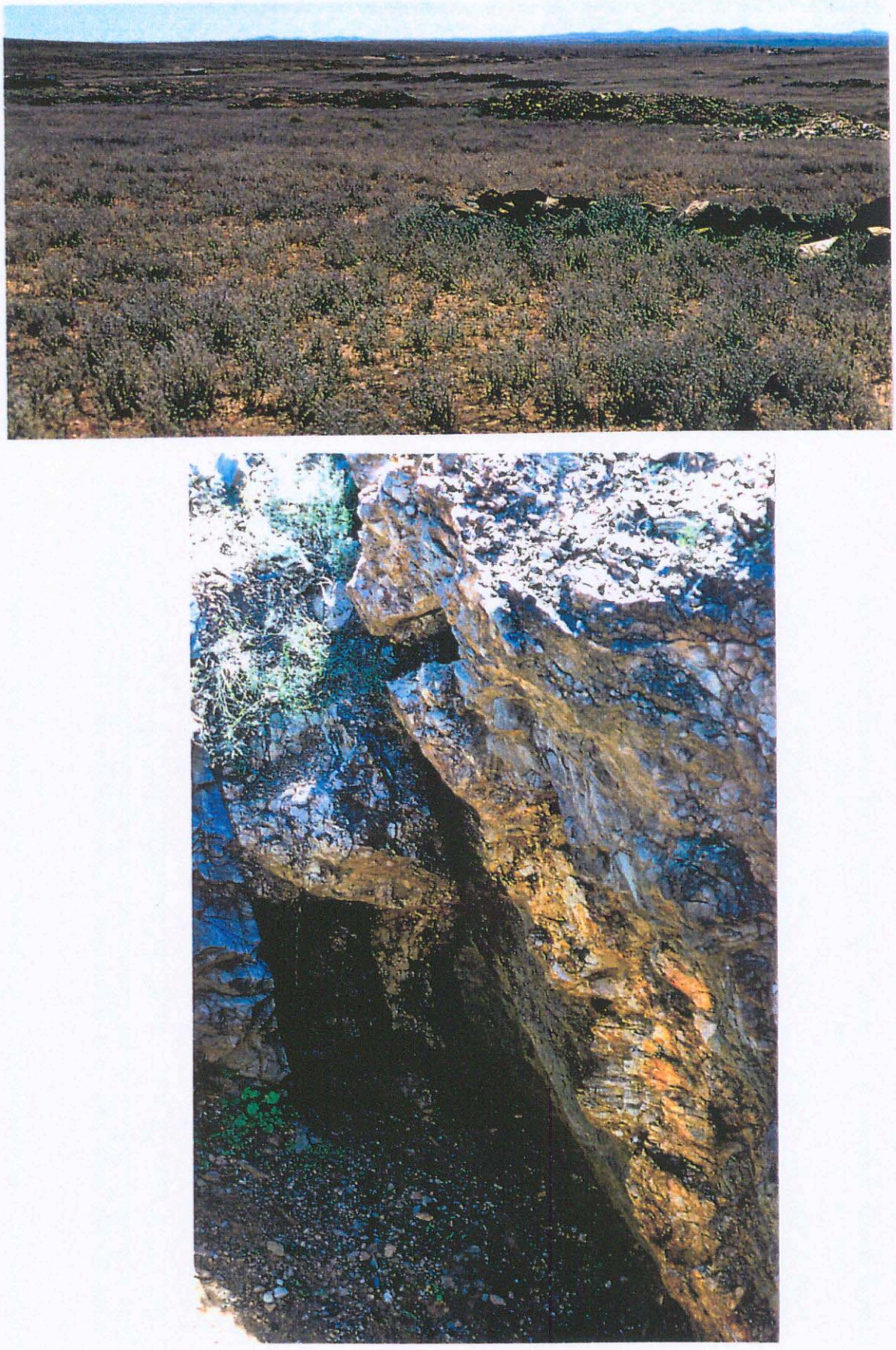


Fig. 19. Hard-rock workings at Teetulpa oriented about 162°-trending quartz-Fe veins (top photograph). Gold mostly contained in <0.5m gossanous crush zones along the vein selvedges with the veins left unmined (bottom photograph).

THE MANNA HILL GOLD FIELD

At Manna Hill several differently stratigraphic horizons are mineralised in dolomite and dolomitic siltstone/shale of Enorama Shale. The Enorama Shale is a planar laminated calcareous to dolomitic siltstone with sandy intercalations towards the top of the sequence. The dolomitic siltstone comprises fine-grained sparry ankerite of possible diagenetic origin. Manna Hill is on the northern limb of Winnininnie Syncline, and at most workings mineralisation is parallel to bedding which dips at 20° to 25 ° S, and cleavage is axial plane to the syncline. In contrast steep cleavage-parallel veins occur at Birthday and Aurora Australis. Mineralisation is hosted by quartz-carbonate-sulphide veins, some highly gossanous, typically <1m thick with pyrite, pyrrhotite plus minor chalcopyrite and arsenopyrite

The Manna Hill goldfield produced in excess of 155,000 grams of gold . it was discovered in 1885 and the two principal producers were Homeward Bound and Westward Ho! (excised). According to Parker (1995) an estimate of production over the 1m interval along the Westward Ho!-Eudunda Hope-Jackson's line is 1.7 million tonnes of ore at 2.5g/t Au.

Tomich (1995) states that thinness of the mineralised veins at Manna Hill workings suggests low tonnage potential, and pervious drilling has produced mixed results. However, the veins are near surface and appear to be continuous for large distances.

Aurora Australis

Aurora Australis covers an area of several hundred square metres with numerous scattered pits. In general, the mineralisation at Aurora Australis comprises quartz-carbonate-sulphide veins sub-parallel to bedding in dolomitic siltstones. Parts of the area may be on an anticline with some beds dipping north. Unlike many of the other workings in the Manna Hill Goldfield the workings show thick >2m quartz veins and cleavage-parallel veins linking to those parallel to bedding. The controls are described as fault-controlled by Parker (1995) .

In 1886 2.1 tonnes of ore produced 3.37g/t Au while composite grab samples by Jarmand Minerals assayed 0.33g/t Au, 0.99 g/t Ag, 123 ppm Co, 637 ppm Cu, and 1665ppm Ni. Three RAB holes by Hallmark Gold NL did not produce any significant results (Parker, 1995).

Birthday

More than 1300m of strike extent of numerous workings at Birthday comprises of 065°-trending cleavage-parallel veins, usually about 20cm in width, and all less than 1m in dolomitic siltstones. At least one small pit shows that the mineralised position is an anticline although other workings show about 60° S dips parallel to bedding. Assays quoted by Parker (1995) for ? grab samples are 0.18g/t Au and 1.0g/t Ag. 1851ppm Ni with minor As, Cu and Pb.

A single fence line comprising three collared RAB holes is evident at Birthday, these were drilled by Hallmark Gold NL and did not intersect any significant gold (Parker, 1995).

Eudunda Hope

Eudunda Hope comprises a widespread and large area of numerous workings stretching for more than 1km and 200m width on quartz-carbonate-sulphide veins. The workings are on a single gently-south dipping quartz-carbonate-pyrite vein with minor malachite which dips parallel to bedding and may be a minor décollement plane.

Five tonnes of ore were crushed in 1887 for an average grade of 36.7g/t, and 32.7 tonnes were crushed in 1898 for an average of 7.4g/t. Based on Newmont drilling Aminco and Associates estimated a possible resource of 400,000 tonnes between Eudunda Hope and Jackson's but indicated grades are low (<1g/t Au) (Parker, 1995).

Euro

This working is located at the transition from the Enorama Shale and the Gumbowie Arkose. Siltstones with well developed foresets, erosion surfaces and flaser bedding (Fig. 20) host mineralisation and comprise the hangingwall at Euro. The mineralised horizon is partly dolomitised, with bedding parallel and oblique quartz-carbonate veins (Fig. 20). No deformation related to bedding plane slip nor a cross-cutting cleavage are recognised here. Production records show 12 tonnes of ore were treated at Peterborough for an average grade of 12g/t Au.

Homeward Bound

At Homeward bound a quartz-carbonate-pyrite vein with minor malachite occurs in a 0.5 to 1m thick horizon at the contact between lower finely bedded siltstones and upper calcareous shale. The mineralised horizon extends for 900m with numerous old workings along the strike length. The line of workings is cut to the west by a barren steep quartz vein (Tomich, 1995). Bedding and the mineralised horizon strikes about 095° and dips about 20° south. Although host rocks are not folded, dump material of the ore zone quartz-carbonate veins show numerous small-scale concentric folds. A steep normal fault dipping southeast occurs in one pit but lacks quartz-carbonate veining and appears to be unrelated to mineralisation.

Homeward Bound produced at least 379g Au at an average grade of 46.09g/t from 1000 tonnes of ore (Parker, 1995). Newmont rock chip samples at Homeward Bound ranged up to 17g/t over 0.3 m, but indicated an average grade of 4.3g/t. Two drill holes into Homeward bound indicated 0.2m at 18.4 g/t Au at 37.7m and 0.2m at 3.1g/t Au at 35.65m. Rock sampling of the spoils including massive and laminated ferruginous veins at Homeward Bound assayed at 9.8g/t (Tomich, 1995). Future exploration should comprise fence lines of vertical RC holes aimed at testing the down dip potential.

Jackson's

The Jackson's workings have about 400m of extent. They comprise quartz-carbonate-pyrite veins with several zones to 1m thick associated with upright metre-scale concentric folds in calcareous shales and siltstones. The veins cut bedding and the style of mineralisation is distinctly different to that at Homeward Bound and Eudunda Hope. This style of mineralisation is described by Parker (1995) as high-angle thrusts or reverse fault in an anticline. Future exploration should comprise fence lines of angled RC holes aimed at testing the down dip potential.

Nectar

Found in 1885, Nectar comprises several deep pits which appear to have worked bedding parallel and high-angle quartz-carbonate veins in dolomitic siltstone. Two RC collars are recognised and some RAB drilling may have occurred at this old working.

No Gammon

This small pit is similar geologically to the nearby Nectar working.

Trojan

At Trojan a series of quartz-carbonate veins parallel the cleavage. The area comprises numerous small pits and one >5m deep shaft. Mineralisation is hosted in dolomitic siltstones and the area may be an anticline. Recorded production was 4.5 tonnes at about 3g/t.

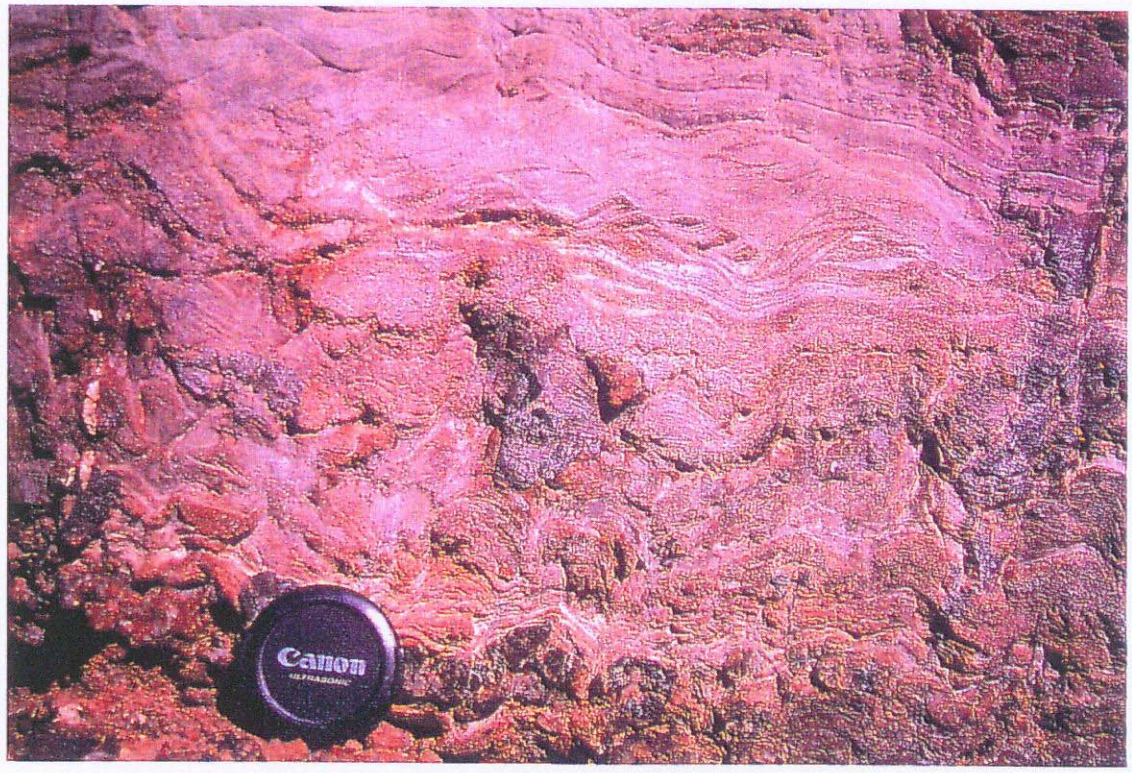
Westward Ho!

Near a slimes dam, extensive old workings with over a kilometre of strike, have worked a single bedding parallel horizon of quartz-carbonate veins. Bedding in finely bedded calcareous shale strikes about 095° and dips about 30°S. Cleavage strikes about 085° and is upright. Quartz veins include possible replacement textures of quartz after sulphates, and well developed colloform quartz.

Westward Ho! was found in 1886. A twenty head stamp battery operated between 1887 and 1889 (Parker, 1995). 34729 g Au from 4000 tonnes is the documented production, but it may have been 100,000 g Au. Recovery grades varied from 7 to 19g/t (Parker, 1995). The main shaft extends 77.7m into the quartz-sulphide siderite vein.

Drilling results have included 1.5m at 20.6g/t and 0.13m at 33g/t. MESA investigated the tailings at Westward Ho! (Parker, 1995) and suggest that there is a resource of about 4900 tonnes at 3.97g/t Au. There is a small mining lease over the main Westward Ho! mine.

Future exploration should comprise fence lines of RC holes across the down-dip (southern) target aimed at testing the known structure.



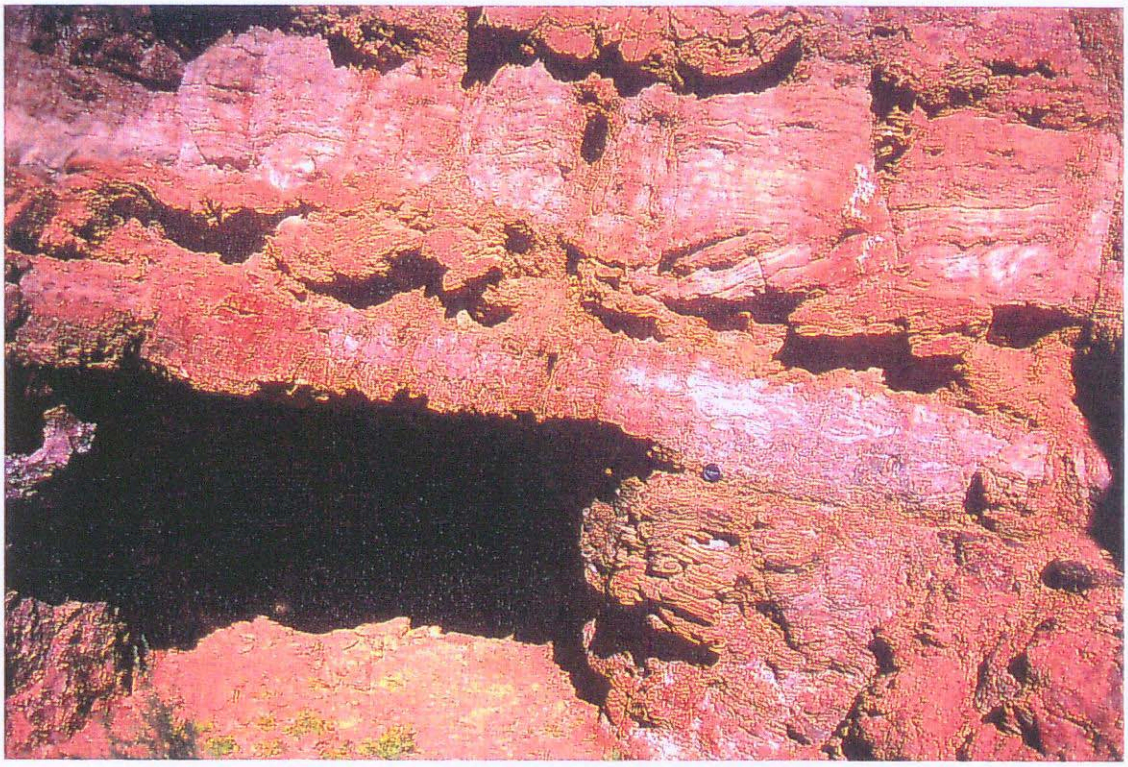


Fig. 20. Euro workings located at the transition from the Enorama Shale to the Gumbowie Arkose. Siltstones with well developed foresets, erosion surfaces and flaser bedding (top photograph). A substantial cut into the rock face with the mineralised horizon in fine grained partly dolomitised shale, with bedding parallel and oblique quartz-carbonate veins (bottom photograph).

THE WADNAMINGA GOLDFIELD

On the northern limb of the Wadnaminga Anticline, the Wadnaminga Goldfield, hosted by rocks of the Burra Group, is associated with northward directed thrust faults and an anticlinal fold closure. The goldfield contrasts with that at Manna Hill in that structures and not just bedding planes are mineralised. A structural model for mineralisation in the Wadnaminga Goldfield is shown in Figure 21.

Gold has been exploited in the Wadnaminga Goldfield since its discovery in 1888 at the Eiffel Tower Mine. The largest producers were New Milo (9,938t @ 29g/t), Virginia (8,827t @ 16g/t) and Thunder Queen (1795t @ 24g/t). Associated minerals are pyrite with minor amounts of galena, chalcopyrite, calcite and secondary derivatives of these minerals (Forbes, 1988).

Bonnie Keith

Several old workings at Bonnie Keith reveal a thrust fault with hangingwall ramp. Mineralisation occurs in a stockwork vein array in the immediate footwall to the thrust fault in a rheologically strong sandstone unit. Stockwork veining implies the possibility of >1m thickness to the mineralised zone, and a possible fold in the hangingwall may suggest potential to host mineralisation at depth in a fault-ramp. This is a possible exploration target.

Commodore

The Commodore old workings extend for over 150m of strike, with two shafts and several pits. The host rocks are biotite schist, and rocks within 100m of the workings include pelites with megablasts of ?cordierite and/or andalusite. The workings are aligned to 082°, but one quartz vein viewed in one pit was oriented at 038/28E cross-cutting the cleavage at 070/71S. According to the geological survey map this working produced silver and lead.

Currant Bun

At the Currant Bun workings, a sulphidic pelite and quartz veins appear to have been worked. The workings are oriented about east-west and the quartz vein at 091/47S. There is greater than 100m of strike but the quartz vein is less than 0.5m thick. The area is mostly of alluvium with the working on a small rise.

Eiffel Tower-Carvers Diggings Line, comprising old workings (from west to east) at Eiffel Tower, Golden Record, Golden Tower, Countess of Jersey, Victoria Tower, Oulnina Tower and Carvers Diggings.

This line of old workings is more than 3.5km in length. The gold is mostly within laminated quartz veins but the host siltstones are highly micaceous (possibly indicating alteration) and contain numerous pits after oxidised sulphides. The line comprises north-directed thrust-fault controlled quartz veins on the northern asymmetric limb of an anticline, hosted in locally dolomitised siltstone within the Saddleworth Formation of the Burra Group. Importantly, this is a different stratigraphic and structural position to that at the Virginia-New Milo-Great Eastern Mines. Structure as revealed at Oulnina Tower and Victoria Tower is of a south-dipping

thrust fault comprising between one and three parallel fault planes, verging north and carrying an antiformal fold closure (Fig. 22, top left).

Gilded Monster

Gilded Monster comprises a couple of small pits. Bedding is steeply north dipping. The exploration potential is not clear.

Lion Hill

A four metre deep shaft and several scattered pits comprise the Lion Hill Mine. Host rocks are siltstones and dolomites. Mineralisation is hosted in quartz veins and the host rock has a strong cleavage locally trending to 152°, and northeast-dipping.

Luron - Faugh-a-Ballagh - Esmonde Mines

This line of workings occurs in the area which is mapped as being the northern half of the major Wadnaminga anticlinal closure. The area is included in the exploration target described as "Golden Sophia" by Hextall (1989). Although total recorded production is small, the average grade was usually in excess of 1 ounce/ton. Battle Mountain conducted 400m of RC drilling in 1988/1989. Mineralisation differs from other parts of the Wadnaminga goldfield in being bedding-parallel and generally northeast-dipping. At Luron bedding is striking about 082° and cleavage highly oblique at 039°, with asymmetric small-scale folds plunging to about 072°, compatible with the large-scale anticlinal closure. At Faugh-a-Ballagh bedding trends about 104° and mineralisation appears to be along a bedding-parallel vein. At Esmonde the bedding parallel vein is clearly seen in one old working and the line of pits trends to 137°. These workings appear to run parallel to bedding around the northern part of the fold nose.

Mineralisation occurs in siltstones and sandstones which are well bedded and young northerly. Mintek Services petrographic descriptions appended to Hextall (1989) show the rocks to be typical clastic sediments, but with biotite, sericite, chlorite and sulphides (usually oxidised). The presence of sericite and biotite suggests a potassic alteration, and the sulphides locally comprise 22% of the rock. Biotite is metamorphically at far higher grade than the regional low greenschist metamorphism of the Nackara Arc, suggesting the infiltration of hot potassic fluids. Petrographic samples collected in proximity to the mineralisation appear to lack carbonate minerals.

At least three fence lines of closely spaced RC drilling is evident at Luron and Faugh-a-Ballagh. The results of this drilling and 1140m of RAB drilling are presented in Hextall (1989). These results indicate that many of the anomalous intersections occur in altered micaceous sandstones and siltstones with disseminated oxidised sulphides. Nine RAB holes had significant intersections , the best being 7m @ 1.05g/t. Significant RC results including 2m @ 1.52g/t and 4m @ 0.6g/t were obtained in rocks lacking quartz veining suggesting that disseminated sulphides in wallrock may be a significant component of the mineralising system. One hole intersected 6m @ 1.07 g/t at 14m, 2m @ 1.19 at 18m, 2m at 0.38g/t at 32m and 6m @ 3.04g/t at 34m. Other holes and one complete fence line of RC holes were less successful. However, these results indicate the

potential for wallrock sulphidation mineralisation in addition to the quartz vein mineralisation. They are the only modern drilling results that we are aware of in the area and they strongly justify continued exploration in the Wadnaminga goldfield. Hextall (1989) concluded that it is a "large pervasively mineralised system" and "clearly, there is potential for economic mineralisation along strike".

Additional information in Haxtall (1989) includes copies of memos concerning geophysical anomalies. The anomalies appear to be small and highly magnetic, and were interpreted as "on the margin of an intrusive source". The location of the magnetic anomalies is given in local grid and not AMG. Time constraints have prevented us from following up these details. However, these should be examined carefully in any subsequent work.

Luron West

This small old working comprises one deep shaft and a few small pits. There is no rock outcrop. Rubble includes quartz vein material with oxidised sulphides.

North and South

This group of small pits comprises quartz rubble of presumed ore veins in dolomitised siltstones. Circosta (1983 to 1987) describes exploration activity at North and South, he suggests that the mineralised horizon dips west, at an angle to the host sediments which dip steeply north. Drilling here intersected "positive gold" in three of five sulphide-bearing quartz veins.

Thunder Queen

This line of workings extends for more than 900m, and is located in a structural position north of the Virginia-New Milo-Great Eastern Mines. It is not an extension of those workings. Hosted by micaceous siltstones, the mineralisation is associated with gently (<25°) south-dipping quartz veins along interpreted thrust faults. The bedding in the fault hangingwall is gently dipping and that in the footwall steeply dipping. A problem at the main workings 0430740E, 6399445N is a cleavage dipping at a moderate angle to the north (Fig. 22). This contrasts with the structures seen elsewhere in the Wadnaminga goldfield and suggests a structural complication which is unresolved, but may imply complex fold and fault geometries.

Triumph

Described as a Au-Cu-Ag working on the survey map, Triumph is one small pit and very difficult to assess. Samples of possibly mineralised quartz vein material have been collected to determine the range of metals.

Unnamed, south of Currant Bun

This substantial single working is developed in pelites with aluminosilicate porphyroblasts. There is a strong smell of sulphide around the shaft and ore material appears to be gossanous quartz veins. The area is intruded by numerous pegmatite and granite dykes and veins. Cleavage trends to 062/86S and quartz vein are parallel to cleavage.

Virginia-New Milo-Great Eastern Mines

This line of workings extend from 0427647E, 6398694N in the west to 0429439E, 6398835N in the east, a distance just short of two kilometres. Within the line of workings are three major declines and shafts with waste dumps (two with tailings) at Virginia, New Milo and Great Eastern. Hosted by siltstones of the Mintaro Shale - Belair Subgroup, bedding is mostly dipping at angles >45° to the north, and the workings have followed gentle (<30°) south-dipping quartz veins and fault gauge. Cleavage occurs at a high angle to bedding, but curves into sub parallelism with the mineralised quartz veins. The cleavage/bedding intersection lineations are subhorizontal at 080°/260°. The mineralisation is associated with quartz veins comprising numerous centimetre wide veins in a zone up to 1m thick. Euhedral spar quartz is present with buck quartz and sulphides but generally the veins lack carbonate minerals. Locally, the mineralised zone is two metres thick and comprises stockwork-like veins. Host siltstones are micaceous and contain oxidised sulphides. Outcrop at the far eastern end (east of Great Eastern) suggests that the mineralised structure is not an isolated feature but may be repeated in the footwall. The mineralised structure is interpreted to be a northward directed thrust fault with both hangingwall and footwall ramp as it pierces bedding on the northern limb of an asymmetric fold.

A drill hole into Great Eastern is reported by Circosta (1983 to 1987). The hole reached its target at 118.7m where it intersected three narrow quartz veins, but gold assays were below detection. Similarly, a drill hole at New Milo is described by Circosta (1983 to 1987) as containing 19 intervals of interest but only one of these return a significant gold assay of 0.35g/t.

Welsh Prince

This small workings comprises two shafts and two pits aligned to 004° along the line of a steeply east dipping fault zone. The fault zone is 2-4 metres wide, and comprises quartz veins, some laminated and brecciated. Malachite is common, although the mine is described in the survey mapping as a gold mine. This mineralisation is unusual in being at a high angle to stratigraphy. The workings are close to, but not in, an area described as diapir in the MESA 1:250,000 mapping. Examination of the most prominent hill of "diapir" material revealed extensive ferricrete and silcrete. The carbonate and possible sulphate material recognised in other diapirs was not found on the hill examined by us.

Welsh Prince Mine is one of the few historic workings in the Craddock Quartzite. Recorded production is about 10 tonnes for 3.5 ounces of gold.

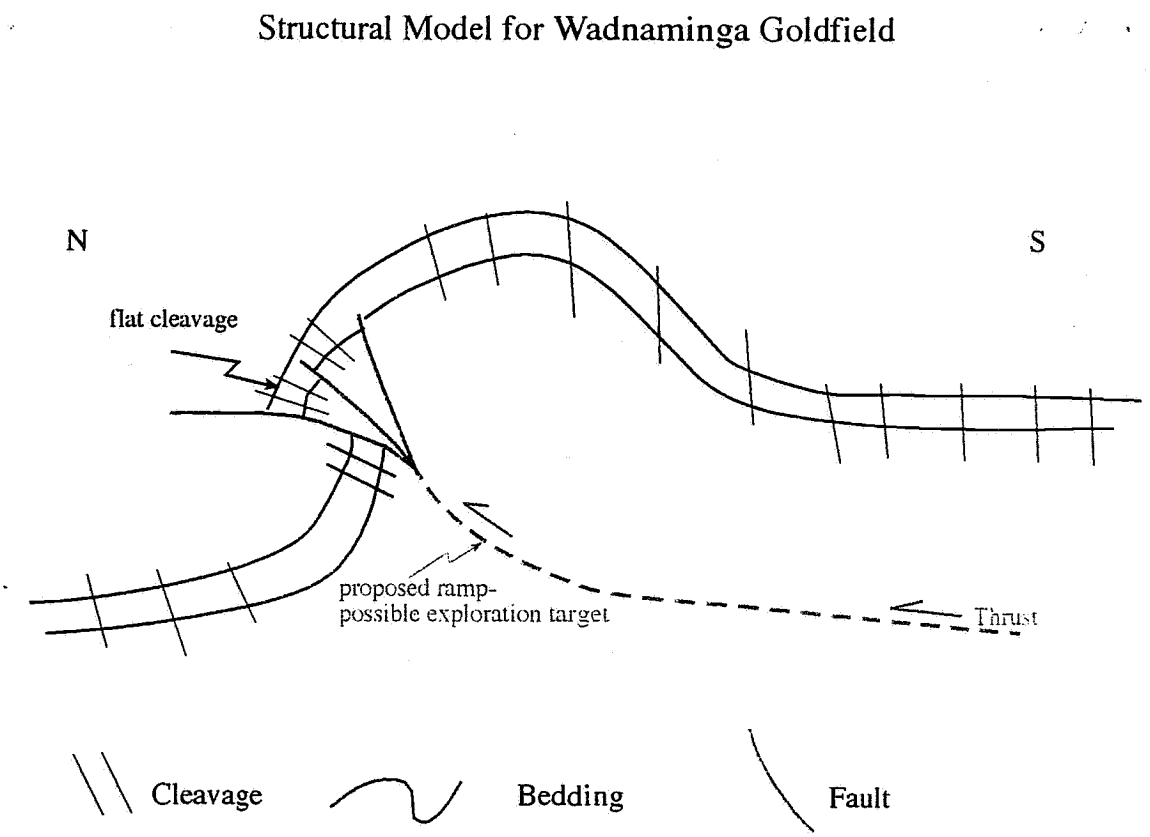
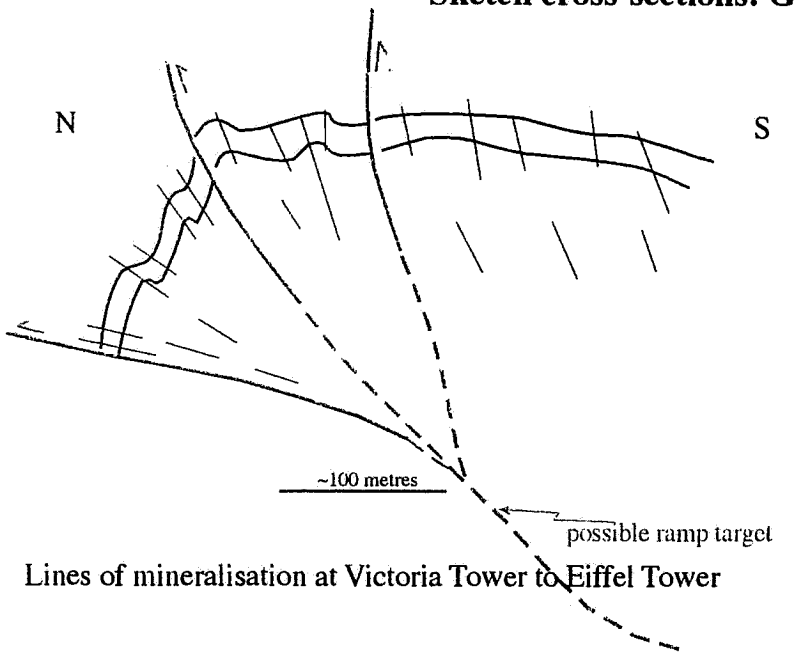


Fig. 21. A structural model for the Wadnaminga Goldfield showing a recumbent cleavage in subvertical beds (as per Fig. 6) on the north limb, a product of thrusting and a ramp fold above a thrust ramp.

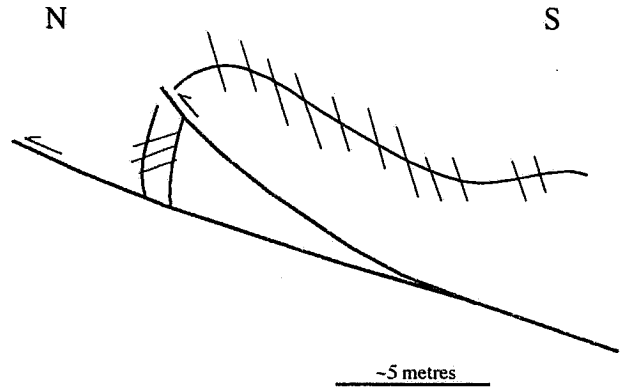
NEXT PAGE

Fig. 22. Structural cross-sections of workings in the Wadnaminga goldfield showing northward directed thrusts, splaying thrusts and associated cleavage. In all cases the thrust plane hosts a mineralised quartz vein.

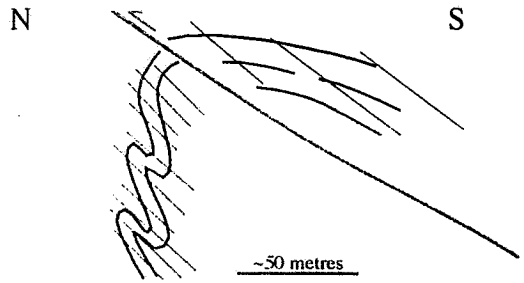
Sketch cross-sections: Gold Workings, Wadnaminga Goldfield



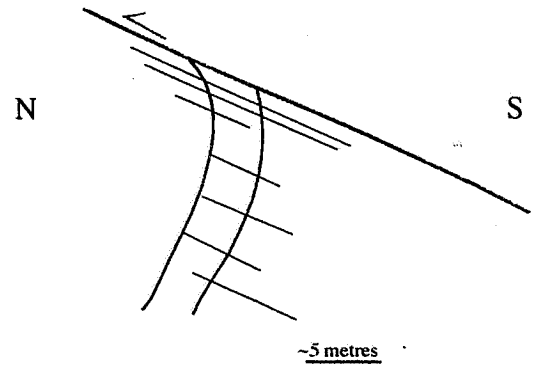
Lines of mineralisation at Victoria Tower to Eiffel Tower



Thunder Queen



Oulina Tower



Carvers Diggings

Mineralised fault planes Bedding Cleavage

OTHER MINERAL WORKINGS

Anabama Granite (greisen prospect)

This prospect is a broad area around the micaceous greisen developed on the Anabama granite. The area has several tracks made on the hillside and diamond drill pads. A report on exploration into Anabama Hill suggests that molybdenite and chalcopyrite are present in veins and associated with vein selvedges. Up to 3% molybdenite is present in muscovite/quartz greisens adjacent to quartz-pyrite veins. Maps in the report (the maps are labelled "after Asarco") show a broad anomalous copper zone within which is a more confined molybdenite zone. The molybdenite zone shows some coincidence with a central zone of quartz-muscovite alteration, within zones of potassium feldspar-biotite and an outer propylitic zone. In the reports given to us on exploration on and around the Anabama granite, we note that few of the results refer to gold and in one case imply that the rocks were not assayed for gold. If possible, the drill core and complete reported results should be reviewed before any further consideration is given to this prospect. The gold-base metal potential of the area may remain open.

Anabama Copper Mine (excluded)

This copper working occurs south of the exploration licence in Benda Siltstone adjacent to the contact with Boucaut Volcanic rocks. There is little outcrop at the old workings which appear to have been on a quartz vein. The geometry of the quartz vein is not clear but it may have been flat.

Copperlinka

One vertical shaft and several pits, comprise this mine in sandstones with well developed large (~3mm) pyrite alteration in the host rocks. At this mine bedding is subhorizontal, cleavage subvertical and oriented to 076°, and the workings aligned along a cross-fault oriented 013° and subvertical. The area has been the subject of some drilling ?RC drilling.

Eldorado

Eldorado is single pit in Benda siltstones of the Umberatana Group. The siltstones include oxidised sulphides, but the pit lacks quartz veining. Two point two kilometres from the nearest motorable track, this was not worth the walk.

Gum Creek Mine

Two >15m deep shafts and numerous old pits extend for 300m parallel to ~045°-trending bedding , within a 20 metre corridor in shale and siltstone in the Saddleworth Formation of the Burra Group. Dolomite crops out to the southeast. Individual workings occur on oblique quartz veins about 200mm in width with about 1m-wide haloes of bleaching and malachite staining. Quartz veins trend ~065°. This oblique trend is parallel to a minor aeromagnetic linear. Copper mineralisation with malachite occurs with quartz breccia, and in host siltstones. Pyrite is present as large octahedral grains in quartz veins. Quartz veins include well developed extension fibres and botryoidal open-space infill (Fig. 23). Some of these textures are similar those found in Carlin-type gold deposits. Previous exploration here comprises 2 vertical drill chip holes (RC or RAB). Both

are vertical, placed about 5m away from the ore zone and drilled down bedding. These holes have not tested mineralisation!

Future exploration should comprise fence lines of angle RC holes across the corridor aimed at testing the known structure and finding possible parallel features. Regional RAB should be conducted over the poorly exposed region.

Helene

Helene is a single shaft located at the contact between massive ironstone and bleached laminated siltstones in the Ulupa Siltstone of the Wilpena Group. The ironstone crops out over 100m, oriented about NE-SW. Of all the workings through the tenement areas, Helene is the only example associated with ironstone (Fig. 24). Ten kilometres S of Helene are three small (0.5m deep) fault bounded unnamed Cu workings, located within grey laminated siltstones 5m below the contact with pink, well-bedded dolomitic siltstones. Above the dolomites are quartz-veined quartzites overlain by tillite. The bounding faults trend 148° with about 20m of right lateral displacement, and characterised by breccia, quartz veining and milled rock.

Kings Bluff Goldfield

The Morning Star and Kings Bluff workings are located within the Wilyerpa Formation, less than 2km from gneisses and migmatites of the Willyama Complex. Mineralisation is associated with quartz veins controlled by fracture sets within quartzite which splay around an anticline closing to the west. The core of the anticline comprises blue-grey to green siltstones, overlain by erratics, followed by a thick quartzite unit. The siltstones are locally highly micaceous to schistose. The erratics comprise fragments of graphite, siltstone, quartz and mica schist within a grey siltstone matrix. The quartzites are weakly feldspathic. Bedding on the southern limb of the anticline is 076/64S, and youngs to the S (Fig. 25). Through the axis of the anticline, bedding strikes 089/60N, cleavage is 109/72S, and fractures are oriented to 178/85E. On the northern limb of the anticline bedding strikes 172/10°W, youngs N, and cleavage is 082/78S.

The Morning Star group of workings, located on the southern limb of the anticline comprises 23 diggings, 12 adits, and 2 shafts. The diggings and adits follow a prominent fracture direction striking 025° dipping steeply E or W, hosting quartz veins in quartzites (Fig. 25). Mineralisation is within the quartzites close to, or at, the contact with erratics. The quartzites, particularly around shafts have a distinct grey to yellow sulphurous alteration. Several small workings and trenches continue around the anticlinal closure and join the Kings Bluff group of workings on the northern limb of the anticline at the same stratigraphic position. At Kings Bluff there are 3 shafts, 8 adits and 5 pits.

The Perseverance Cu Mine, reported to be in this area, was not located.

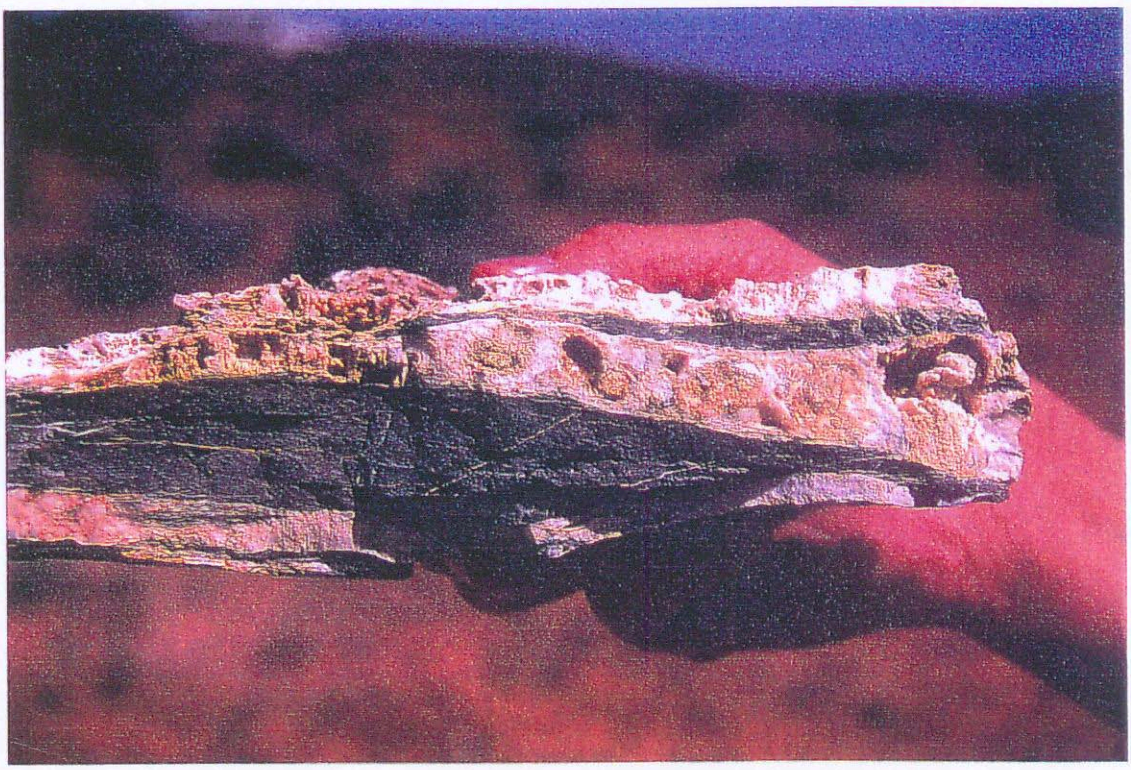


Fig. 23. Quartz vein from the Gum Creek mine with well developed botryoidal open-space infill.

Fig. 24. Outcrop of ironstone at Helene in the Ulupa Siltstone of the Wilpena Group. The ironstone crops out over 100m, is oriented about NE-SW. Of all the workings in the Adelaidean, through the tenement areas, Helene is the only example associated with ironstone.

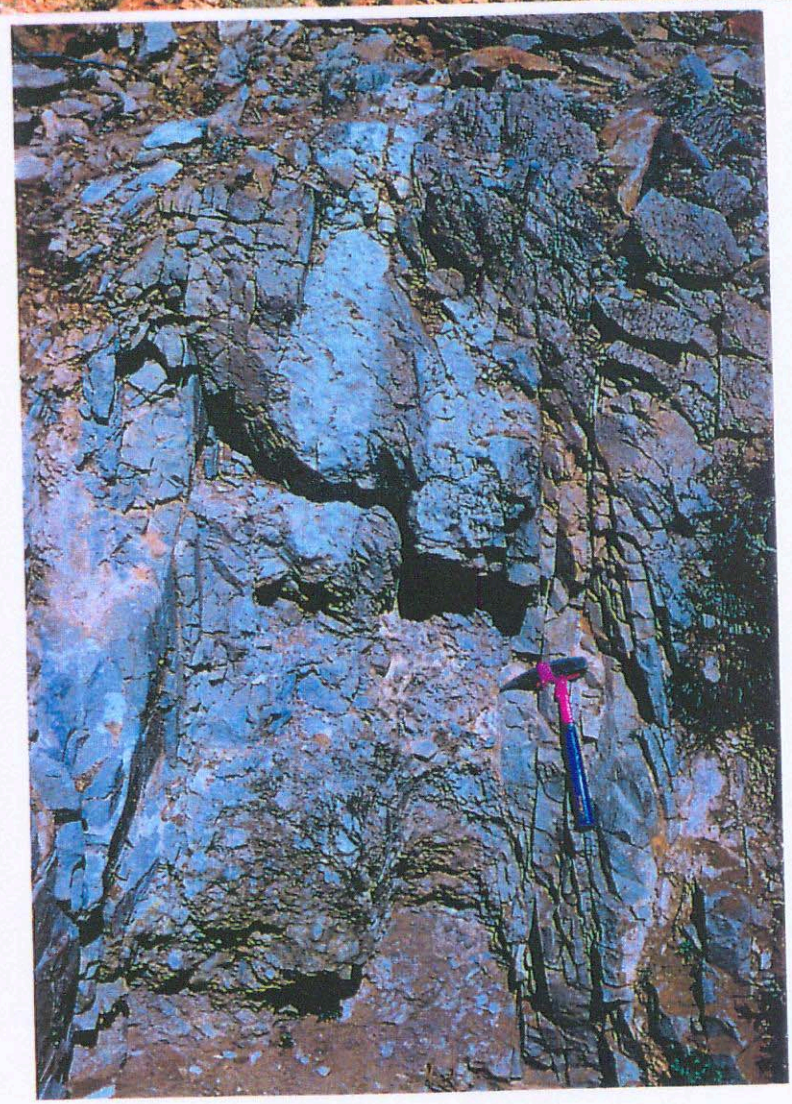


Fig. 25. The Morning Star group of workings, located on the southern limb of the southern limb of the Kings Bluff anticline (top photograph). A prominent fracture direction striking 025° hosts quartz veins is in quartzites at Kings Bluff (bottom photograph).

TABLE 1

LOCATION OF OLD WORKINGS, all coordinates in AMG on square 54H
Workings are listed from west to east.

NAME	COMMODITIES	STATUS	EASTING	NORTHING
Helene	?Au, Cu	Shaft	0320859	6435206
Unnamed Cu	Cu	pits	0323339	6430246
Wheal Bassett Cu	Cu	Old workings	0333572 to 0333770	6364784 6365004
Wheal Bassett Au	Au	Open cut	0335343	6365818
Bewley	Cu	shaft	0337295	6424084
Robertson	Cu/Au		0337855	6375763
Unnamed	Au	shaft	0342148	6428418
Lovely Gully	Au	shafts, adits and pits	0342530 to 0342849	6428433 to 6428437
Paratoo	Cu	Old workings	0343295	6382869
Ajax area	Au	shaft	0346689	6417843
Ajax area	Au	shaft	0346781	6417551
Ajax	Au	shafts, adits and pits	0346959 to 0347707	6416227 to 6416893
Waukaringa West	Au	shafts, adits and pits	0349249 to 0347809	6425200 to 6424643
Waukaringa Group 13 Triumph/Day Dawn	Au	adits	0351971	6426358
Waukaringa Group 12	Au	pits	0352090	6426297
Waukaringa Group 11 Alma West Extended	Au	trenches and adits	0352424	6426512
Waukaringa Group 10 Alma West	Au	adits	0352591	6426499
Nob	Cu	shaft and pits	0352795	6387589
Waukaringa Group 8, 9 Sebastapol/Balaklava	Au	adits and shafts	0353374 to 0353000	6426745 to 6426575

Waukaringa, Group 7 Workings (Alma-Victoria)	Au	Old workings	0353444 to 0353729	6426761 6426797
On S side of Waukaringa ridge	Au	deep shaft (50m+)	0353455	6426690
East of Group 6, Alma	Au Au Au	pit 0.5m pit and trench adit	0353941 0353807 0353457	6426753 6426821 6426715
Waukaringa, Group 6 Workings	Au	Old workings	0353923 to 0353946	6426960 6426766
Waukaringa, Group 5 Workings	Au	Old workings	0354116 to 0354159	64267824 6426845
Waukaringa, Group 4 Workings. Mid Alma	Au	Old workings	0354216 to 0354295	6426803 6426773
Waukaringa, Group 3 Workings	Au	Old workings	0354463	6426901
Waukaringa, Group 2 Workings	Au	Old workings	0354543	6426928
Waukaringa, Group 1 Workings Balaklava/East Alma	Au	Old workings	0354648	6426929
Teetulpa	Au	shafts, adits, pits, alluvial	0371600 to 0375820	6431000 to 6430574
ironstone near Bumbumbie	?Au	outcrop	0387279	6432115
Gum Creek	Cu	Old workings	0386288	6369816
Bumbumbie	Au	pits	0389028	6428480
Gum Well	Au	Not found	Map coord: 0389500	6370500
Westward Ho!	Au	Extensive old workings	0388399 to 0387432	6417517 6417436
Eudunda Hope	Au	Old workings	0390231 to 0389278	6417514 6417563
Odd trick	Au	Not found		
Euro	Au	Old workings	0391573	6414674

Jackson's	Au	Old workings	0391710	6417639
Aurora Australis	Au	Old workings	0391949	6419120
Birthday	Au	Old workings	0391967 to 0393211	6418615 6419104
Jackson Pile	Au	Old working	0392010	6415929
Trojan	Au	Old workings	0392902	6417408
Homeward Bound	Au	Extensive old workings	0393985 to 0393116	6415929 6416142
Nectar	Au	Old workings	0396693	6417630
No Gammon	Au	Small pits	0396861	6417452
Eldorado	Au	A small pit	0402517	6358981
Three Blocks	Ag, Pb	Not found	Map coord: 0403700	6401850
Welsh Prince Mine	Au, Cu	Old workings	0416093	6387880
North and South	Au	Pits	04219178	6398308
Chick-in-Green	Cu?	pits	0422662	6447247
Bortoli	pegmatite	pit	0422990	6448043
Domenic	pegmatite	15-20m deep pit	0422340	6447916
Ameroo Hill	pegmatite	2 open cuts	0424550	6443742
Eiffel Tower, Golden Record, Golden Tower, Countess of Jersey, Victoria Tower	Au	Two lines of old workings, about 700m in length	west of 0424701	6395059
S of Golden Record	Au	Old pits	0424777	6394684
Victoria Tower	Au	Old workings	0425132	6395222
Faugh-a-Ballagh	Cu	One pit	0425267	6438699
Anabama Granite	? on greisen	Prospect with core drilling	around 0425584	6379028
Oulnina Tower	Au	Old workings	0425629	6395471
Peryhumuck	Cu	Shaft & pits	0426203	6446391
Carvers Diggings	Au	Old workings	0426585	6393978
Carvers Diggings East	Au	Old pits	0427522	6396195
Virginia	Au	Extensive old workings	0428098	6398734

CONCLUSIONS AND RECOMMENDATIONS

Base metal (Broken Hill-type) potential of the Willyama basement

Geological mapping in the last eighteen months by the University of Melbourne and MESA has recognised prospective horizons for Broken Hill type mineralisation in the Weekeroo and Olary Inliers. Although these immediate and obvious target horizons are excluded from the joint venture tenements, they demonstrate the potential for Broken Hill targets in the Olary Domain. The Outalpa Inlier, within the Lynas Gold NL tenement, includes encouraging magnetite-rich horizons and gossans at Chick in Green, Peryhumuck and Olary Silver mines. Elsewhere within the inlier are extensive calcsilicate units. The newly recognised prospective horizons in the Outalpa and Olary Inliers can be as little as 10cm thick and were recognised as a result of 1:10,000 scale mapping, detailed lithology studies and structural analysis to determine horizon extensions and repetitions around folds.

We recommend a detailed geological study of the Willyama basement rocks prior to any drilling. Incorporating existing University of New England and University of Melbourne Honours thesis mapping, and the compilations of Laing (1995), the Outalpa Inlier should be mapped at 1:10,000 on quality air photographs. All calcsilicate, magnetite and Mn-rich horizons should be sampled and examined petrographically, with all gossanous material assayed.

Gold in the Adelaidean

Gold mineralisation recognised in numerous and extensive old workings is associated with bedding-parallel and thrust fault quartz-carbonate veins. Mostly hosted by siltstones, they are locally in sandstones and dolomites. The reefs have remarkable strike extent, many workings extend for more than 500m and some have strike lengths of several kilometres. Dips are generally shallow (<30°), and down dip extent is largely untested because of a general lack of effective drilling. These factors combined with the reported generally good grades (usually 3g/t or better) suggest significant exploration potential. However, the reefs are usually narrow and one metre or less in thickness. Only rarely are the reefs two metres or more in width. The restricted reef width and lack of stacked reefs is a major constraint on the economic potential of several goldfields especially at Teetulpa, Manna Hill and Waukaringa .

Our preferred exploration targets are:

(i) in the goldfields at Wadnaminga where more than one parallel reef is recognised and potential exists for stacked ore horizons and/or intersecting ore zones;

(ii) at Wheal Bassett gold mine, where a rheologically controlled vein network is developed in sandstones around fold noses has the potential for Telfer-style mineralisation;

(iii) the Gum Creek area, in a similar stratigraphic and structural position to the Wadnaminga goldfield, but on the west closing antiformal closure of the Wadnaminga anticline. An additional factor favouring this area is the

coincidence of crosscutting linears in the radiometric survey and the prominent change in magnetic intensity across a NW/SE linear which passes through the Gum creek area. In general the area is poorly exposed and only one old working located at Gum Creek was found by us.

Exploration at Wadnaminga and Wheal Bassett should involve extensive RC drilling. There are numerous obvious drill targets immediately down dip of known workings and we recommend starting at Wheal Bassett and in the Wadnaminga field at disused workings with proven potential from past production, known wallrock sulphidation, and the potential for stacked ore zones at Thunder Queen, New Milo and Virginia. The Eiffel Tower-Carvers Diggings line is an excellent second target. Immediately before, or synchronous, with drilling we recommend a detailed documentation of the Wheal Bassett area, and of the Wadnaminga goldfields with geological mapping at a scale of 1:10,000. Exploration of the Gum Creek area is grass roots and should be accompanied by geochemical sampling, RAB drilling and geological mapping.

Greisens in Anabama Granite

Greisens developed in the Anabama granite include up to 3% molybdenite and anomalous copper. Few of the results refer to gold and in one case imply that gold was not considered. If possible, the drill core and complete reported results should be reviewed before any further consideration is given to this prospect. The gold-base metal potential of the area may remain open.

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