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EL 1196

TARLTON KNOB

PROGRESS AND FINAL REPORTS FOR THE PERIOD 4/3/84 TO 4/12/87

Submitted by

CRA Exploration Pty Ltd
1987

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PRIMARY INDUSTRIES AND RESOURCES SA

CONTENTS ENVELOPE 5403

TENEMENT: E.L. 1196 - Tarlton Knob.

TENEMENT HOLDER: C.R.A Exploration Pty. Ltd.

PLANS: Tarlton Knob E.L. 1196, S.A. Douglas Gully Prospect. 5403(II)-1
Utah Drill Hole WD012. Plan No. SAa 4850.

Tarlton Knob E.L. 1196 Douglas Gully Prospect Utah Drillhole - 5403(II)-2
WD 017. Plan No. SAa 4851.

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0003

CRA EXPLORATION PTY. LIMITED

FIRST QUARTERLY REPORT ON TARLTON KNOB E.L. 1196, SOUTH AUSTRALIA, FOR THE PERIOD ENDING 4TH MARCH, 1984.

AUTHOR: A.K. SCOTT

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SADME

DATE: 23RD MARCH, 1984

SUBMITTED BY:

ACCEPTED BY:

12562

CONTENTS

1. INTRODUCTION

The Tarlton Knob E.L. 1196 covers an area of 2400 km² in the Willouran Ranges at the northwestern end of the Flinders Ranges, 550 km north of Adelaide (see plan no. SAa 2230). The tenement was granted for a period of 12 months from 5th December, 1983.

2. INVESTIGATION

A considerable amount of exploration has been carried out in the past in this area, and Utah Development Company have been particularly active over the last seven years in their E.L.'s 277, 461 and 850.

Utah generated a large amount of data, the assessment of which has only recently commenced.

A.K. SCOTT

AKS/pw

EXPENDITURE

Expenditure for the period ended 29th February, 1984, the nearest accounting period was $921.00, as listed below.

	$
Payroll	87
Tenements	780
Overheads	54
TOTAL	$921

LOCATION

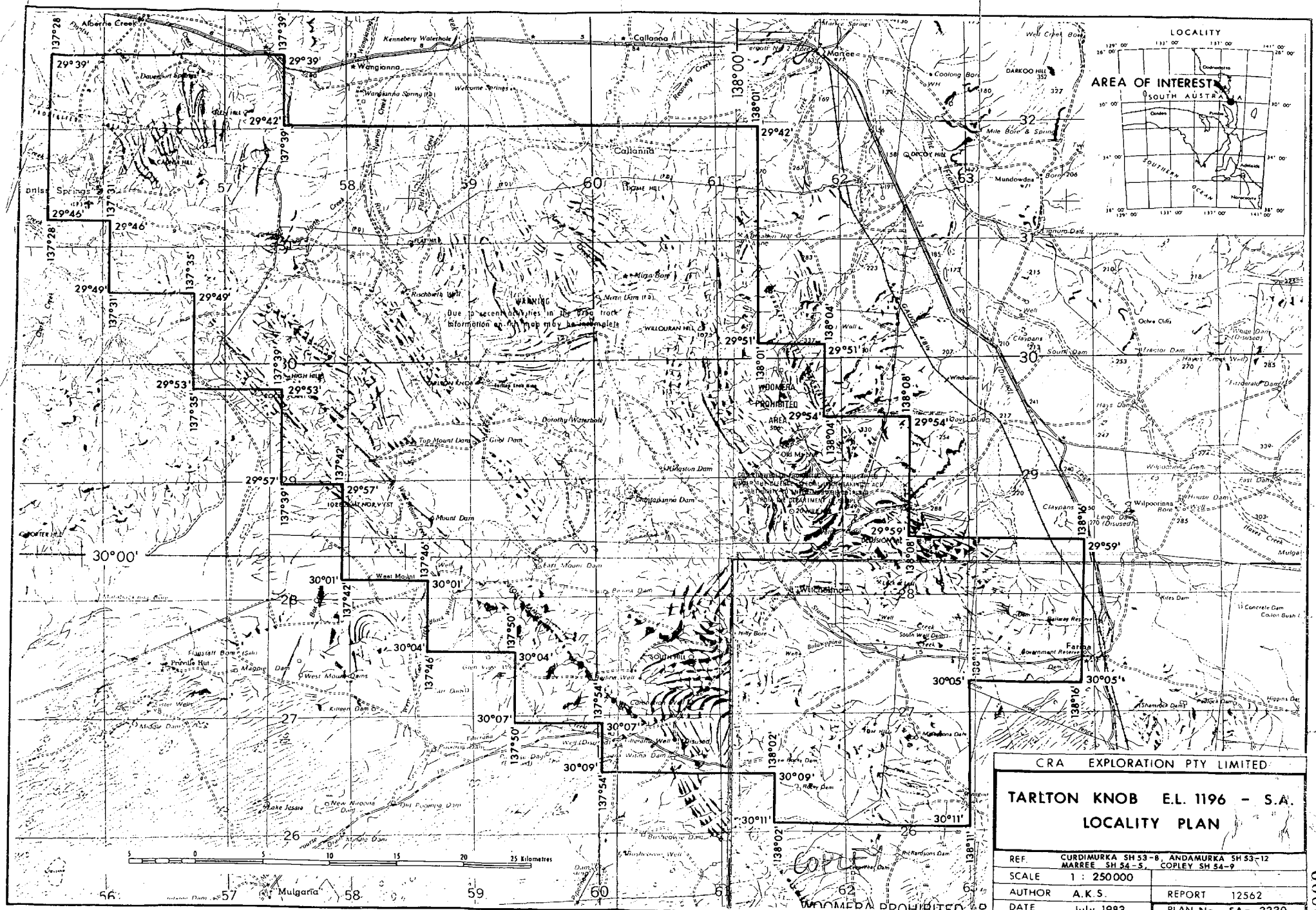
Curdimurka	SH53- 8	1:250 000 sheet
Andamooka	SH53-12	1:250 000 sheet
Marree	SH54- 5	1:250 000 sheet
Copley	SH54- 9	1:250 000 sheet

KEYWORDS

Data review

LIST OF PLANS

Plan No.	Title	Scale
SAa 2230	Tarlton Knob E.L. 1196 Locality Plan	1:250 000



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TARLTON KNOB E.L. 1196 - S.A.
LOCALITY PLAN

REF.	CURDIMURKA SH 53-8, ANDAMURKA SH 53-12, MARREE SH 54-5, COPLEY SH 54-9		
SCALE	1 : 250000		
AUTHOR	A.K.S.	REPORT	12562
DATE	July 1983	PLAN No	SAo 2230

80008

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0009

CRA EXPLORATION PTY. LIMITED

SECOND QUARTERLY REPORT ON TARLTON KNOB E.L. 1196, SOUTH AUSTRALIA, FOR THE PERIOD ENDING 4TH JUNE, 1984

AUTHOR: A. K. SCOTT

COPIES TO: CIS CANBERRA
SADME

DATE: 28TH JUNE, 1984

SUBMITTED BY:

ACCEPTED BY:

12711

0010

CONTENTS

1.0 SUMMARY

A study of Utah Development Company's data suggested that stratiform Cu targets had been thoroughly evaluated, but that potential still remained for the discovery of Olympic Dam type polymetallic deposits, and Au in altered rocks.

The Douglas Gully prospect contains Au in thin quartz-sulphide veins that form an open stockwork in a kaolinitic zone 450 m long by 150 m wide in Burra Group sandstones and shales. Some veins contain several ppm Au at the surface, but the overall bulk grade in one of Utah's diamond drill holes is very low.

Orientation stream sediment sampling for Ag, Mo and Au in three size fractions failed to find any values above detection limits. Reconnaissance stream sediment geochemistry is believed to be an inappropriate technique for detecting Au in this area.

2.0 RECOMMENDATIONS

Core or chip samples from Utah's other drill holes at Douglas Gully should be obtained and assayed for Au.

Investigations should be made around the Carpentarian windows and Callanna "diapirs" to determine their prospectivity for Olympic Dam type deposits.

3.0 INTRODUCTION

E.L. 1196 of 2399 square km was granted on 5th December, 1983, and covers most of the Willouran Ranges southwest of Marree (see plan no. SAa 2230).

Investigations described in this report include a study of the results of the exploration activities carried out by Utah Development Company between 1977 and 1983, an inspection and limited sampling of the Douglas Gully gold prospect, chip sampling elsewhere in the E.L., and orientation drainage sampling.

The first quarterly report for this E.L. is CRAE No. 12562.

4.0 STUDY OF UTAH DATA

Utah carried out a very large amount of work over a period of seven years in E.L. 850 which covers about two-thirds of E.L. 1196. The main target was a stratiform copper deposit of the Zaire-Zambian type and exploration, consisting mainly of mapping, geochemistry and drilling, centred on 22 project areas. It is considered that the extent and thoroughness of this search leaves little or no potential for this type of target.

From 1979, part of Utah's effort was switched to Olympic Dam type polymetallic targets. Exploration for this type of occurrence consisted of mapping, gravity, geochemistry and drilling in 11 areas, but the search does not appear to have been conducted as rigorously as the stratiform Cu search.

Gold became a target at five localities, but only one was considered worthwhile drilling. It is believed there is further potential for gold discoveries.

5.0 EXPLORATION ACTIVITIES

5.1 Douglas Gully

At Douglas Gully a large number of small pits have been sunk by early prospectors on malachite exposures in kaolinitic sandstones and shales of the Burra Group (see plan no. SAa 2829). A small amount of gold had also been recovered from the creek gravels in earlier years.

Utah recognised that most of the copper workings occurred in an altered zone of kaolinitic and partly silicified sediments, and that the copper was confined to thin quartz veins that contained limonite and malachite at the surface. Soil sampling showed that Au was also confined generally to this area, so a diamond drill hole was drilled through part of the kaolinitic zone (called the Elbow Shear) and analysed over its full length for Au. One 1 m sample contained 2.3 ppm Au while all other samples returned less than 0.18 ppm.

Two diamond holes and two percussion holes had been drilled previously into the prospect by Utah but had not been assayed for Au. Chalcopyrite was noted in quartz-calcite veins in WD17 and a wide pyritic zone in WD12.

The drilling showed that Au is restricted to thin quartz- sulphide veins that sometimes also carry carbonate. Surface mapping showed that these veins form a rather open stockwork throughout much of the kaolinitic zone, and appear to be more numerous at the western end than at the other.

CRAE's recent work consisted of mapping the margins of the kaolinitic zone and collecting a few rock chip samples. The zone is about 450 m long by a minimum of 150 m wide - its southern edge is indistinct and it may be more extensive in that area. It lies in the vicinity of a large drag fold where the predominant northerly strike of the basal Burra Group rocks has been altered over a short distance to an easterly strike.

Six rock chip samples (nos. 1159095-1159100) of quartz-limonite vein material were collected, two of which assayed 3.4 and 2.1 ppm Au (see Appendix I).

5.2 Additional Rock Chip Sampling

Several rock chip samples were collected from quartz-limonite veins in different parts of the E.L. Their locations are shown on plan no. SAa 2628, and analytical data in Appendix I.

The only samples that contained detectable gold were collected from Dunn's Mine where copper mineralisation occurs in siliceous veins in a setting somewhat similar to that at Douglas Gully. The samples were of vein material.

5.3 Orientation Stream Sediment Sampling

It was thought that stream sediment sampling may be useful in outlining other auriferous areas similar to the Douglas Gully prospect. Previous stream sediment sampling by CEC in 1968 had outlined some areas containing anomalous Mo and Altarama Search in 1970 had defined limited areas of weak Ag anomalism. In addition, these companies as well as SADME had determined that the greatest contrast in geochemical values for most metals was obtained from the -20#+40# fraction.

Accordingly, CRAE collected samples from three areas in three size fractions: -20#+40#, -40#+80# and -80#. The areas were at Douglas Gully (where recoverable Au had been found), and at Rook's and Dunn's Mines (where anomalous Mo had been found by CEC). Locations of the samples are shown on plan no. SAa 2828, and sampling details in Appendix II.

The samples were analysed for Ag, Mo and Au, the latter by AAS and also fire assay. All values were below detection limits.

6.0 CONCLUSIONS

Although Au occurs at Douglas Gully, it is restricted to narrow quartz-sulphide veins as shown in Utah's hole WD40. This hole traversed most of the kaolinised zone and contained a very low bulk grade of Au.

Stream sediment sampling at realistic reconnaissance spacing is unlikely to detect the weak Ag and Mo anomalism found by earlier surveys. These surveys were much more detailed and in fact showed only background values where the CRAE samples were taken.

Gold was not detected in the stream sediment samples collected downstream from the Douglas Gully Au prospect, so it is unlikely that this exploratory technique will be of any value.

A. K. SCOTT

AKS/pw

0015

EXPENDITURE

Expenditure for the period ended 31-5-84, the nearest accounting period was $12 453.00, as listed below.

	$
Payroll	6796
Supplies	933
Vehicle	1003
Travel	159
Property	386
Overheads	3176
TOTAL	$12 453

0016

LOCATION

Curdimurka	SH 53- 8	1:250 000
Andamooka	SH 53-12	1:250 000
Marree	SH 53- 5	1:250 000
Copley	SH 53- 9	1:250 000

KEYWORDS

Copper, Gold, Geochem.-drainage

LIST OF PLANS

PLAN NO.	TITLE	SCALE
SAa 2230	Tarlton Knob E.L. 1196 Locality Plan	1:250 000
SAa 2829	Tarlton Knob E.L. 1196 Douglas Gully Prospect Geological Map & Drill Section	1: 1 000
SAa 2828	Tarlton Knob E.L. 1196 Geochemical Sampling Sites	1:100 000

LIST OF APPENDICES

Appendix I Rock Chip Samples
Appendix II Geochemical Drainage Sampling Ledgers

APPENDIX I

ROCK CHIP SAMPLES

ROCK CHIP SAMPLES

Sample No.	Au (ppm)	Location	Lithology
1159095	<0.01	Douglas Gully	Vein of quartz-limonite-malachite.
1159096	3.40	Douglas Gully	Quartz-limonite-malachite vein.
1159097	0.10	Douglas Gully	Quartz-limonite vein.
1159098	0.35	Douglas Gully	Quartz-limonite-malachite vein.
1159099	<0.01	Douglas Gully	Quartz-siderite(?)-limonite vein 75 cm wide.
1159100	2.10	Douglas Gully	Quartz-limonite-malachite material in pit.
1159101	<0.01	1 km north of Douglas Gully	Vein of brecciated quartz-limonite 2 cm wide.
1159102	<0.01	1 km north of Douglas Gully	Similar to 1159101, but 25 cm wide.
1159112	<0.01	4.5 km SW of Douglas Gully	Quartz blow with minor limonite.
1159140	<0.01	Rischbieth Well	Quartz-limonite vein material in thin bedded shales and F.gr. feldspathic sst in Rischbieth Creek.
1159141	<0.01	Rischbieth Well	Quartz-limonite veins in m.gr. quartzite on top of hill at Rischbieth Well.
1159142	<0.01	Rischbieth Well	Quartz-malachite-chalcocite veins in grey shale.
1159143	<0.01	Rischbieth Well	Quartz-limonite vein.
1159144	<0.01	Rischbieth Well	Crosscutting haematitic "vein" about 200 m south of Rischbieth.
1159145	<0.01	Euraminna	Massive haematite at WD33.
1159146	<0.01	Euraminna	C.gr. diorite(?), minor pyrite.
1159147	<0.01	Euraminna	Massive haematite on E side.
1159148	<0.01	Euraminna	Quartz porphyry.
1159149	0.40	Dunn's Mine	Limonite-quartz vein with minor malachite in slate, sandstone, dolomite.
1159150	0.25	Dunn's Mine	As above, 500 m south of 1159149.

APPENDIX II

GEOCHEMICAL DRAINAGE SAMPLING LEDGERS

C.R.A. EXPLORATION PTY. LIMITED

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Tenement: TARLTON KNOB EL 1196 — GEOCHEMICAL DRAINAGE SAMPLING LEDGER — D.P.O. No: B 0624

Area / Prospect: DOUGLAS GULLY — Sample Nos.: 1159103 - 115 — Geologist: AKS — Date: 3.5.84

Plan / Photo Ref: CURRIMURKA SVY 2091/98 — Mesh Size: ..... — Analysed by: COMLABS

Sample Number	H.M. Trap/ Random	Channel						Sediment					Mesh Size	Metal Content in p.p.m.										Geological Observations
		Wet/Dry	Width	Banks	Grad.	Alluv.	Colluv.	Grav %	Sand %	Silt %	Mud %	Org %		Ag	Mo	Au (1)	Au (2)							
1159103			12					50	30	20			-20 +40	<1	<4	<0.01	<0.01							Float: shale, qtzite,
104													-40 +80	<1	<4	<0.01	<0.01							qtz-limonite, malachite
105													-80	<1	<4	<0.01	<0.01							Same site as R/m
																								sample 917441.
1159106			15										-20 +40	<1	<4	<0.01	<0.01							Taken from point
107													-40 +80	<1	<4	<0.01	<0.01							bar. Same site as
108													-80	<1	<4	<0.01	<0.01							R/m sample 917442.
1159109			40										-20 +40	<1	<4	<0.01	<0.01							Taken from point
110													-40 +80	<1	<4	<0.01	<0.01							bar. Same site as
111													-80	<1	<4	<0.01	<0.01							R/m sample 917443.
1159113			12										-20 +40	<1	<4	<0.01	<0.01							Same site as
114													-40 +80	<1	<4	<0.01	<0.01							R/m sample 917444.
115													-80	<1	<4	<0.01	<0.01							

C.R.A. EXPLORATION PTY. LIMITED

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Tenement: TARLTON KNOB EL 1196 — GEOCHEMICAL DRAINAGE SAMPLING LEDGER — D.P.O. No: B 0624

Area / Prospect: ROOKS MINE — Sample Nos.: 1159116 – 1159139 — Geologist: AKS — Date: 3.5.84

Plan / Photo Ref.: CURDIMURKA SVY 2092/47 — Mesh Size: ..... — Analysed by: COMLABS

Sample Number	~~Hand Auger~~ / Random	Channel: Dry	Channel: Width	Channel: Banks	Channel: Grad.	Channel: Alluv.	Channel: Colluv.	Sediment: Grav %	Sediment: Sand %	Sediment: Silt %	Sediment: Mud %	Sediment: Org %	MESH SIZE	Metal Content in p.p.m.: Ag	Mo	Au①	Au②	Geological Observations
1159116			3					70	20	10			-20 +40	<1	<4	<0.01	<0.01	Float: limonitic q/z,
117													-40 +80	<1	<4	<0.01	<0.01	shale, qtzite.
118													-80	<1	<4	<0.01	<0.01	
1159119			5					70	25	5			-20 +40	<1	<4	<0.01	<0.01	Float: Qtzite, black
120													-40 +80	<1	<4	<0.01	<0.01	shale.
121													-80	<1	<4	<0.01	<0.01	
1159122			6					60	30	10			-20 +40	<1	<4	<0.01	<0.01	Float: Qtzite, black
123													-40 +80	<1	<4	<0.01	<0.01	shale, limonitic stot-
124													-80	<1	<4	<0.01	<0.01	Outcrop: Black shales.
1159125			2					70	10	20			-20 +40	<1	<4	<0.01	<0.01	Fl: Qtz - limonite,
126													-40 +80	<1	<4	<0.01	<0.01	black shale, qtzite.
127													-80	<1	<4	<0.01	<0.01	
1159128			8					65	25	10			-20 +40	<1	<4	<0.01	<0.01	Fl: Qtzite, bl. shale,
129													-40 +80	<1	<4	<0.01	<0.01	limonite.
130													-80	<1	<4	<0.01	<0.01	

C.R.A. EXPLORATION PTY. LIMITED

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GEOCHEMICAL DRAINAGE SAMPLING LEDGER

Tenement: TARLTON KNOB EL 1196 | D.P.O. No: B 0624

Area / Prospect: ROOKS MINE | Sample Nos.: | Geologist: AKS Date: 3.5.84

Plan / Photo Ref: CURRAMURKA SVY 2092/47 | Mesh Size: | Analysed by: COMLABS

Sample Number	H.M. Trap / Random	Channel						Sediment					MESH SIZE	Metal Content in p.p.m.				Geological Observations
		Wet / Dry	Width	Banks	Grad.	Alluv.	Colluv.	Grav %	Sand %	Silt %	Mud %	Org %		Ag	Mo	Au①	Au②	
1159131			2					55	20	25			-40 +80	<1	<4	<0.01	<0.01	O/c: Grey shale.
132													-40 +80	<1	<4	<0.01	<0.01	FI: limonite, shale
133													-80	<1	<4	<0.01	<0.01	
1159134			20					75	20	5			-40 +80	<1	<4	<0.01	<0.01	O/c: Black shale.
135													-40 +80	<1	<4	<0.01	<0.01	FI: Qtzite, shale, limonite
136													-80	<1	<4	<0.01	<0.01	
1159137			5					20	40	40			-40 +80	<1	<4	<0.01	<0.01	FI: Qtzite, shale.
138													-40 +80	<1	<4	<0.01	<0.01	
139													-80	<1	<4	<0.01	<0.01	

C.R.A. EXPLORATION PTY. LIMITED

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GEOCHEMICAL DRAINAGE SAMPLING LEDGER

Tenement: TARLTON KNOB EL 1196 — D.P.O. No: B 0624

Area / Prospect: DUNNS MINE — Sample Nos.: 1159151 - 1159177 — Geologist: AKS — Date: 3.5.84

Plan / Photo Ref: CURRUMURRA SUV 2092/47 — Mesh Size: — Analysed by: COMLABS

Sample Number	H.M. Trap / Random	Channel						Sediment					Mesh Size	Metal Content in p.p.m.										Geological Observations
		Wet / Dry	Width	Banks	Grad.	Alluv.	Colluv.	Grav %	Sand %	Silt %	Mud %	Org %		Ag	Mo	Au ①	Au ②							
1159151			1.5					90	5	5			-10 +40	<1	<4	<0.01	<0.01							Fl: Qtzite, shale,
152													-40 +80	<1	<4	<0.01	<0.01							minor gossan.
153													-80	<1	<4	<0.01	<0.01							
1159154			2					85	10	5			-10 +40	<1	<4	<0.01	<0.01							Fl: Qtzite, qtz-limonite,
155													-40 +80	<1	<4	<0.01	<0.01							shale.
156													-80	<1	<4	<0.01	<0.01							
1159157			2					90	5	5			-10 +40	<1	<4	<0.01	<0.01							o/c: Grey shale.
158													-40 +80	<1	<4	<0.01	<0.01							Fl: Qtzite, shale,
159													-80	<1	<4	<0.01	<0.01							qtz-limonite.
1159160			1.5					90	5	5			-10 +40	<1	<4	<0.01	<0.01							Fl: Qtzite, shale,
161													-40 +80	<1	<4	<0.01	<0.01							Hematite, qtz-limonite
162													-80	<1	<4	<0.01	<0.01							
1159163			3					80	10	10			-10 +40	<1	<4	<0.01	<0.01							Fl: Qtzite, slate,
164													-40 +80	<1	<4	<0.01	<0.01							limonitic rocks.
165													-80	<1	<4	<0.01	<0.01							

C.R.A. EXPLORATION PTY. LIMITED

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GEOCHEMICAL DRAINAGE SAMPLING LEDGER

Tenement: TARLTON KNOB EL 1196 D.P.O. No: 80624

Area / Prospect: DUNNS MINE Sample Nos.: Geologist: AKS Date: 3.5.84

Plan / Photo Ref: CURRIMURKA SVY 2092/47 Mesh Size: Analysed by: COMLABS

Sample Number	H.M. Trap/ Random	Channel						Sediment					MESH SIZE	Metal Content in p.p.m.				Geological Observations
		Wet/Dry	Width	Banks	Grad.	Alluv.	Colluv.	Grav %	Sand %	Silt %	Mud %	Org %		Ag	Mo	Au①	Au②	
1159166			4					80	10	10			-20 +40	<1	<4	<0.01	<0.01	FI: Qtzite, shale, limonite
167													-40 +80	<1	<4	<0.01	<0.01	
168													-80	<1	<4	<0.01	<0.01	
1159169								85	10	5			-20 +40	<1	<4	<0.01	<0.01	FI: Qtzite, shale
170													-40 +80	<1	<4	<0.01	<0.01	
171													-80	<1	<4	<0.01	<0.01	
1159172			3					70	15	15			-20 +40	<1	<4	<0.01	<0.01	FI: Qtzite, shale
173													-40 +80	<1	<4	<0.01	<0.01	
174													-80	<1	<4	<0.01	<0.01	
1159175			2					75	15	10			-20 +40	<1	<4	<0.01	<0.01	FI: Qtzite, shale,
176													-40 +80	<1	<4	<0.01	<0.01	limonite qtz.
177													-80	<1	<4	<0.01	<0.01	
										METHODS:				Ag, Mo by AAS				
														Au① by FIRE ASSAY				
														Au② by AAS				

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0025

CRA EXPLORATION PTY. LIMITED

THIRD QUARTERLY REPORT ON TARLTON KNOB E.L. 1196, SOUTH AUSTRALIA, FOR THE PERIOD ENDING 4TH SEPTEMBER, 1984.

AUTHOR: A.K. SCOTT

COPIES TO: CIS CANBERRA
SADME

DATE: 1ST OCTOBER, 1984

SUBMITTED BY:

ACCEPTED BY:

CONTENTS

0026

1.0 SUMMARY

Tarlton Knob E.L. 1196 is located a few km southwest of Marree (see plan no. SAa 2230).

During the quarter, a number of rock chip samples and stream sediment samples were collected from various parts of the E.L., mainly in the search for lead-zinc mineralisation.

As this is part of an on-going programme that is not yet complete, the sample locations, assays and other data will be included in a full compilation of exploration activities in the fourth quarterly report.

A.K. SCOTT

AKS/pw

EXPENDITURE

Expenditure for the period ended 31st August, 1984, the nearest accounting period was $29 989.00, as listed below.

	$
Payroll	14 687
Supplies	2 783
Vehicle	2 206
Travel	287
Property	2 285
Contractors	192
Laboratory	1 802
Overheads	5 747
Total	$29 989

LOCATION

Curdimurka	SH 53- 8	1:250 000
Andamooka	SH 53-12	1:250 000
Marree	SH 53- 5	1:250 000
Copley	SH 53- 9	1:250 000

KEYWORDS

Lead, Zinc, Geochem -rock, Geochem -drainage.

LIST OF PLANS

Plan No.	Title	Scale
SAa 2230	Tarlton Knob E.L. 1196, S.A., Locality Plan	1:250 000

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0030

CRA EXPLORATION PTY. LIMITED

FOURTH QUARTERLY REPORT ON TARLTON KNOB E.L. 1196, SOUTH AUSTRALIA FOR THE PERIOD ENDING 4TH DECEMBER, 1984.

AUTHOR:	A.K. SCOTT
COPIES TO:	CIS CANBERRA SADME
DATE:	4TH DECEMBER, 1984
SUBMITTED BY:	AKScott
ACCEPTED BY:	Alan S. Tickwell

13004

CONTENTS

CONTENTS (cont.)

1. SUMMARY

A considerable amount of exploration, both regional and detailed, has been carried out in the Willouran Ranges, the majority of it being directed towards the discovery of a stratiform copper deposit.

The bulk of previous work was conducted by Utah Development Company who drilled 180 holes into a number of copper prospects and confirmed a regional stratabound copper anomalism in several stratigraphic units in the Adelaidean, but failed to discover any significant concentration of mineralisation.

CRAE's activities which consisted of a study of existing data and subsequent rock chip sampling were also concerned with stratiform copper as well as other commodities.

Olympic Dam type deposits in the vicinity of a number of pre-Adelaidean "windows" were thought to be a prime target, but field work indicated very strongly that the "windows" were in fact intrusive into Callanna rocks. Limited gravity work by Utah did not reveal the presence of any shallow pre-Adelaidean basement. The potential for this type of target is thus believed to be negligible.

Stream sediment and rock chip samples confirmed earlier assertions that the Tapley Hill Formation is anomalous in zinc. No other indications of lead or zinc mineralisation were noted.

Indications of stratiform copper were found in the Kingston area but the absence of many Copperbelt features showed the prospect to be of little value. In the Delusion Hill area the significance of rock chip samples containing up to 2000 ppm Cu has yet to be assessed.

Reconnaissance gravel sampling for kimberlitic ~~indicator~~ minerals was carried out over the entire E.L. but results will not be known for some months.

Areas of ferrugination, brecciation and veining were examined and sampled, but found to be devoid of anomalous geochemistry.

Analyses of magnesite samples from the Screech Owl Creek area indicated that material of good quality exists there.

2. RECOMMENDATIONS

Application has already been made for renewal of E.L. 1196 for a further 12 months. In the event that the renewal is granted, the following field investigations should be carried out.

a) Attempts should be made to locate H.K. Gillespie's sample no. HRG2109 (5000 ppm Pb) on the ground and determine its significance.

b) Systematic sampling on an established grid should be undertaken on the ferruginous shale in the Delusion Hill area from which samples nos. 1159220, 1159226-227 (1250-2000 ppm Cu) were collected. Magnetic and radiometric surveys should also be carried out on the same grid.

c) Ferruginous sediments flanking albitites, especially those at North Bungarider and Euraminna, should be sampled and assayed for gold.

d) Additional sampling of the magnesite at Screech Owl Creek, especially to determine width, is recommended only if this commodity is still regarded as a viable proposition for the Group. The area is remote and a backhoe would probably be required to provide better exposures.

In addition to this, follow up work will be required if any positive results are obtained from processing of the reconnaissance gravel samples.

3. INTRODUCTION

E.L. 1196 of 2399 km^2 was granted on 5th December, 1983, and covers most of the Willouran Ranges southwest of Marree (see plan no. SAa 2230).

The ground was taken up to search for the following primary targets:

1. Olympic Dam type deposits in areas of shallow basement (predominantly around the pre-Adelaidean "windows");

2. Stratiform Pb-Zn in Callanna, Burra and Umberatana sediments;

3. Copperbelt type stratiform Cu in Burra sediments close to the Callanna unconformity;

4. Diamonds.

Secondary targets were considered to be:

1. Polymetallic hydrothermal deposits in areas of brecciation or veining;

2. Magnesite in Skillogalee Dolomite.

The vast amount of data generated by Utah during their 6 year period of tenure in the Willourans became available on the SADME open file system after CRAE was granted E.L. 1196. This report includes an assessment of the drilling and other results obtained by Utah on the most important prospects.

CRAE's field investigations in E.L. 1196 have mainly been restricted to rock geochemistry which has been guided by conceptual ideas on ore occurrence as well as the existing mineral occurrences in the area. Reconnaissance gravel sampling for kimberlitic indicator minerals has also been carried out.

This report documents all exploration activities carried out in the first 12 months of tenure of E.L. 1196. Quarterly reports already submitted have CRAE report nos. 12562, 12711 and 12905.

4. PREVIOUS EXPLORATION

A number of companies have undertaken exploration activities in the Willouran Ranges since 1964; there is little recorded information on exploration before this date. Small scale copper mining was carried out between 1880 and 1920, but total ore production from the whole field was of the order of only 5000 t.

The history of exploration in the Willouran Ranges up to 1976 has been documented by Stadter (1976) and most of the following is based on his report. Between 1976 and 1983 Utah Development Company held most of the Willourans and carried out extensive work which is summarised from their open file reports.

The table below lists the tenements held by various companies over part or all of the Willourans since 1964.

Tenement	Company	SADME Envelope No.	Period
SML 65 & 70	Aust. Selection (Pty.) Ltd.	389, 599	May 1964-Feb 1966
SML 111 & 114	Anaconda Aust. Inc.	637	Jun 1966-Dec 1966
SML 165	Noranda Aust. Ltd.	884	
SML 169 & 353	Carpentaria Expl. Co.Pty.Ltd.	1145,1246	Jun 1968-Nov 1969
SML 368	Sunhill Corp. (Aust.) Ltd.	1391	Dec 1969-Jul 1970
SML 390	Altarama Search Pty. Ltd.	1328	Jun 1970-Jun 1971
EL 52, 53	H.R. Gillespie	2289,2290	Feb 1973-Apr 1973
EL 143	Dampier Mining Co. Ltd.	2436	Jul 1974-Aug 1975
EL 277, 461,850	Utah Development Company	2915,3507	Dec 1976-Jul 1983

A map showing the locations of stream sediment surveys and of Utah's geophysical surveys and drilling activities is given in plan no. SAa 2928, and significant geochemical results are presented on plan no. SAa 2931.

4.1 Australian Selection

Approximately 3000 stream sediment samples of -80# material were collected and analysed for Cu only. Ten anomalous areas were outlined and most of these were followed up by soil sampling in which Cu was again the only element determined. Two areas, Boorloo and Breaden Hill, were then wagon-drilled to shallow depth (about 15 m), and two diamond drill holes were put down at Boorloo. Best intersection was 0.5% Cu.

4.2 Anaconda

This company also collected about 3000 stream sediment samples of -80# which were analysed for Cu, Pb and Zn. The Tapley Hill Formation (Umberatana Group) produced the highest Zn values whilst elevated Cu values occurred in "diapirs", parts of the Callanna Group and in some areas of the Tapley Hill Formation. In addition a few rock chip samples were collected from a locality north of Witchelina Homestead.

4.3 Noranda

Noranda completed mapping, soil and rock chip sampling and costeaning in a number of areas. They also drilled 53 percussion holes to an average depth of 25 m into the Breaden Hill prospect and outlined a body of 100 000 t of oxide mineralisation with an average grade of 1.4% Cu.

4.4 Carpentaria Exploration Company

A statistical analysis of Anaconda's drainage sampling concluded that Cu was the only anomalous element of the three that were determined. An orientation stream sediment survey over Callanna rocks was carried out and this showed that:

a) the highest contrasts in Cu were obtained in the crushed -20+40# fraction and the lowest Cu content was in the -80# fraction,
b) there was negligible variation in the Pb contents between any fractions, and
c) the -80# fraction contained significantly more Zn than the coarser fractions.

CEC then collected 1060 stream sediment samples over Callanna and "diapiric" rocks and assayed the crushed -20+40# fraction for Cu only. The area between Dome Hill and the Rooks workings was believed to be anomalous and soil sampling was undertaken in this area. A few of the stream sediment samples were resubmitted for Mo analysis resulting in an anomaly west of the Rooks workings.

A brief assessment was made of the regional aeromagnetics.

4.5 Sunhill

A brief geological examination of the area around the Clara St. Dora mine was made.

4.6 Altarama Search

About 3500 samples of -80# stream sediment were collected and analysed for Pb, Zn, V and Ag. Enrichment of Pb, Zn and V was found in the Cretaceous sediments north and west of the Willourans and elevated Zn values were associated with the basal Umberatana Tapley Hill Formation on the eastern side of the ranges. A weak Ag anomaly was located in the Old Mt. Norwest Homestead locality, but this was not substantiated by later sampling by SADME (Stadter, 1976).

4.7 H.R. Gillespie

Twenty two rock chip samples collected from "diapirs" and other Callanna Group rocks were assayed for Cu, Pb, Co and Ni whilst another 25 were assayed for 22 elements in a search for carbonatite affinities. Notes were compiled on many of the Cu occurrences and the relationship of mineralisation to "diapirs".

4.8 Dampier Mining

Dampier Mining appears to be the first company to base its exploration on a Zambian Copperbelt model in the Willouran Ranges. Their target was a minimum of 30 Mt of ore of at least 1% Cu (open cut) or 3% Cu (underground). Exploration activities included mapping, inspection of mineralisation, petrography, gossan search and rock chip geochemistry analysed for Cu, Pb, Zn, Co, Ag and Au. Some of their conclusions were:

a) copper mineralisation is stratigraphically controlled in carbonates,
b) Burra and Umberatana Group rocks have sedimentary onlap (not diapiric) contacts with Callanna Group rocks, and
c) the depositional environment of most rocks was suspected to be shallow marginal marine in an arid climate.

4.9 B. Murrell

A major contribution to the understanding of the geology of the Willourans was made by Murrell (1977) in a doctoral thesis on all aspects of the regional geology of the area.

4.10 Utah

Utah also based the major thrust of their search on a Copperbelt model and aimed at an orebody containing a minimum of 12 Mt at a grade of 2.5% Cu. The favoured geology was sub-littoral deltaic clastics immediately above an unconformity. Their approach was to try to understand the depositional environment at each prospect by mapping, petrography and soil geochemistry and then to drill if there were enough favourable features. Part of their effort was also directed towards Olympic Dam type polymetallic targets in the vicinity of the pre-Adelaidean/Callanna unconformity, and these were investigated by mapping, geochemistry, gravity and drilling. Stratiform Au mineralisation was sought by geochemistry and drilling in four areas in lower Burra arenites stratigraphically equivalent to those containing minor Au, with Cu, at Douglas Gully.

In all, 27 prospect areas were evaluated (see plan no. SAa 2928) and drilling consisted of 40 diamond, 138 percussion and 317 shallow dragbit holes. All drill samples were assayed for Cu only, except for the last two diamond holes which were assayed for a wider variety of elements.

The best drill intersection of primary mineralisation was achieved at the Boorloo prospect where a 28 m interval from 128-156 m in percussion hole WP15 assayed 1.1% Cu. This was part of a 134 m intersection averaging 0.6% Cu. The best intersection of secondary mineralisation occurred at the Breaden Hill prospect where the interval 0-18 m averaged 1.6% Cu.

Utah concluded that statiform copper accumulations are present in several horizons in Callanna, Burra and Umberatana Group rocks, but orebody concentrations are absent. As for the Olympic Dam type targets, gravity results were difficult to interpret and drilling and geochemistry gave no encouragement.

A more detailed description and appraisal of Utah's investigations is given in section 6 of this report.

5. GEOLOGY

Regional mapping has been carried out by SADME at 1:250 000 scale over all of the Willouran Ranges, although the Curdimurka sheet which covers most of the area is in preliminary form only. The most comprehensive regional mapping and synthesis of the area is by Murrell (1977), whilst a considerable amount of detailed mapping has been carried out by Utah (SADME envelopes 2915, 3507). The geological map shown on plan no. SAa 2929 is a compilation which draws on all these sources, although it is based chiefly on Murrell's work.

Geophysical information is very limited for this area. The flight-line spacing of the aeromagnetic coverage (1600-3200 m) is too coarse to allow definition of the required resolution, and the regional gravity data shows little more than a linearity consistent with the major tectonic trends and a broad correlation between Bouguer gravity lows and areas of exposed Callanna beds. A small amount of detailed gravity work carried out by Utah is described later.

The following is a very brief summary of the geology of the Willourans up to the Umberatana/Wilpena boundary. It is based mainly on Murrell's thesis.

5.1 Regional Setting

The sediments of the Willouran Ranges were deposited in an intracratonic trough trending northwesterly between the stable Stuart Shelf on the southwest and the Muloorina Ridge on the northeast. Approximately 6000 m of Callanna, 6000 m of Burra and 3000 m of Umberatana Group sediments accumulated in the geosyncline with additional thicknesses of Wilpena Group rocks to the east and west.

Although several major faults now disrupt the sedimentary sequence, it is likely that the area was divided into only two tectonic domains during post-Callanna times - a shelf area to the west and a basinal area to the east, separated by a hinge line in the position of the Norwest Fault. This differs sharply from Utah's thinking which involved the contemporaneous development of three separate basins in post-Callanna time.

5.2 Pre-Adelaidean

Murrell and Utah geologists all believed that a number of small exposures of leucocratic crystalline rocks, most of which can be classed as albitites, are inliers or windows of pre-Adelaidean age that form the basement to the Adelaidean sediments.

However, field observations made by CRAE (see section 7.1) and also by J. Parker (SADME, pers. comm.) strongly suggest that these rocks are parts of igneous bodies that intrude Callanna Group sediments. This interpretation tends to be confirmed by regional aeromagnetics which indicate a depth of several km to magnetic basement and by some detailed gravity carried out by Utah which show that many areas underlain by Callanna rocks are relatively lighter than those underlain by the younger sediments. This is the reverse of what is expected if Callanna Group exposures are assumed to indicate shallower basement.

It is thus believed that there are no pre-Adelaidean rocks exposed in the Willouran Ranges, and that the albitites, because of their exclusive occurrence in Callanna terrains, are of Callanna (or pre-Burra) age.

5.3 Callanna Group

Callanna rocks occur in two distinct styles - layered sequences typical of normal sedimentary piles, and irregular bodies of chaotic megabreccia, generally referred to as "diapirs" in most literature.

The layered sequences consist mainly of sandstone, siltstone and dolomite of shallow water evaporitic affinity. The breccias contain a chaotic assemblage of large and small blocks, the lithologies of which are all represented in the layered sequences, as well as areas of mafic volcanics. The matrix of the breccia is usually carbonatic.

There is uncertainty as to the relative stratigraphic positions of these two groups of Callanna rocks. Murrell places the megabreccia towards the base of the layered rocks on the basis of detailed examinations in the Dome Hill-Dunn's Mine area where he mapped several irregular layers of megabreccia at different stratigraphic levels within the layered rocks, but connected to each other by cross cutting bodies of breccia. His interpretation is that the sediment load induced decollement in certain early Callanna (possibly evaporite-rich) units causing plasticity and piercement of overlying layers.

Utah, however, placed the megabreccia at the top of the Callanna Group and suggested that its chaotic nature was the result of rifting that signalled the formation of basins in which the Burra, Umberatana and Wilpena Groups would be deposited. They believed that the basalt occurrences, which they equated with the Beda Volcanics, supported the rift theory.

Although this matter remains unresolved, these workers have demonstrated very clearly that the Callanna rocks were deformed and lithified before the onset of Burra sedimentation, and that the Burra and Umberatana Groups show a simple onlap relationship upon the Callannas.

Callanna rocks are severely faulted and tightly folded and are rather more metamorphosed than the younger formations. There are a number of copper ocurrences in the Callannas, most of them located in the layered rocks.

5.4 Burra Group

In broad terms, the Burra consists of a lower and upper sandstone/shale sequence and a middle section of dolomite and shale. The sequence is a simple layered one although there are many lateral facies changes reflecting differing depositional environments due to the proximity or otherwise of the Callanna basement. Evaporitic conditions were not uncommon during much of the Burra period as shown by the pseudomorphs of chert after anhydrite in shales of the Witchelina Subgroup, and by the abundance of magnesite in the Skillogalee Subgroup in the western part of the Willourans. Algal dolomites are also a feature of the Skillogalee Subgroup.

The Burra rocks have been gently deformed into broad open folds. Copper mineralisation occurs in places, generally near the Callanna unconformity.

5.5 Umberatana Group

The Umberatana Group exhibits an unconformable relationship with the Callanna Group, and a disconformable to unconformable one with the Burra. At its base is the glacigene Bolla Bollanna Formation, although this is not present everywhere. This is overlain by a thick monotonous shale sequence of Tapley Hill and Amberoona Formations. Large scale slumping occurs in the Amberoona shales in places.

The Boorloo and Breaden Hill copper workings occur in the basal Umberatana.

6. ASSESSMENT OF PROSPECTS FOLLOWING UTAH'S INVESTIGATIONS

Most of the detailed prospect evaluation carried out in the Willouran Ranges was done by Utah, and the extent of their investigations demands an assessment in order to judge their effectiveness.

The following sections deal briefly with each of Utah's prospects, the locations of which are shown on plan no. SAa 2928. The local stratigraphic nomenclature set up by Utah is used in each case. Note that Utah's diamond drill holes are prefixed WD and percussion holes WP. The comments at the end of each section are observations and conclusions made by CRAE.

6.1 Boorloo

Located in equivalents of Umberatana Tapley Hill Formation, consisting of dark shales interbedded with lithic rudites and lithic arenites which rest unconformably on megabreccias of the Callanna Group. CRAE's observations show that secondary Cu mineralisation occurs in quartz-limonite(-carbonate?) veins up to 15 cm thick. Old workings are restricted to a short strike length.

Australian Selection's soil and rock geochemistry produced Cu anomalies that crossed the stratigraphy at low angles. Two diamond holes were drilled with best intersection being 0.5% Cu. Utah drilled 5 diamond and 11 percussion holes into units B2 and B3.2 which showed that chalcopyrite was distributed along bedding in places, as well as in the quartz veins.

Drill hole grades in the oxidised zone, which extends to a depth of 40-50 m, were generally between 0.1 and 0.5% Cu with a few up to 1%. Only one hole, WP15, contained any values above 1%. In the primary zone, most intersections were below 0.1% Cu, although a few isolated samples returned values to 0.5% and fewer still to 1% or more, although these were mostly due to the intersection of individual quartz veins in a sample (e.g. WD4). The only exception to this pattern was WP15 which contained a 28 m intersection from 128-156 m averaging 1.1% Cu. This was part of a much wider interval of 134 m from 22-156 m which averaged 0.6%.

Twenty-two samples from WP15 were also assayed for Au, but values were all below 0.01 ppm. A track etch survey on several very widely spaced traverses showed that weak uranium anomalism was associated with Cu mineralisation.

Comments: The mineralisation intersected in WP15 was closed off 95 m updip by WP66, 60 m downdip by WD4, 400 m along strike to the north by WP27, and 300 m along strike to the south by WD8. The most optimistic estimate of tonnage represented by WP15 is about 17 Mt, with a grade probably of 0.5% Cu or less. The Cu potential of the prospect appears to be fully explored, and the possibility of Au mineralisation in a vein stockwork is severely downgraded by the negative Au assays from WP15.

6.2 Breaden Hill

The Breaden Hill workings are located at the same stratigraphic level as Boorloo, but about 3 km to the south. Shallow percussion drilling was carried out first by Australian Selection and then by Noranda who outlined 100 000 t of oxidised mineralisation running 1.4% Cu, to a maximum depth of 25 m.

Utah drilled two percussion holes in the vicinity of the workings. Although WP18 assayed 1.6% Cu over the top 18 m, primary mineralisation in both holes was below 0.1%.

Five other percussion holes were drilled into unit B3.2 at distances from 1 to 4 km along strike from Breaden Hill, but all values were less than 500 ppm Cu.

Widely spaced track etch surveys were also carried out in this area with results similar to those at Boorloo.

Comment: A weak stratigraphic distribution of Cu in unit B3.2 has been demonstrated by drilling at approximately 1 km intervals north and south of the Breaden Hill mine. No further work is warranted.

6.3 Black Shale

Old workings occur in two separate areas in black shale and arkosic sandstone towards the top of the in-sequence Callanna Group. Several strike oriented Cu anomalies were outlined by Australian Selection and Noranda, and Utah drilled 14 percussion and two diamond drill holes in several areas, as well as some shallow geochemical holes.

All holes except two returned Cu assays of several hundred ppm only. WP86 intersected 34 m of 0.3% from 12-46 m, and WP110, located 300 m along strike in the same stratigraphy, obtained 38 m of 0.2% over the interval 52-90 m.

Comment: Several units were shown to contain elevated but subeconomic Cu values over a considerable strike distance. Soil samples in the thick black shale unit BS3 contained no anomalous Pb and Zn, thus downgrading a McArthur River Pb/Zn model.

6.4 Callanna

The principal target in this area was unit R3 consisting mainly of calcareous arenite and siltstone, and belonging to the layered Callanna Group sequence. In Murrell's stratigraphic scheme, R3 comprises the top of the Dome Formation (felspathic sandstone, shales), all of the Rook Tuff (andesitic to rhyodacitic silty tuff) and most of the Dunn's Mine Formation (calcareous siltstone, dolomites), the latter being the host to a large number of abandoned Cu workings.

Stream sediment geochemistry carried out successively by Australian Selection, Anaconda and CEC outlined the same Cu anomalies each time, although CEC was able to pin down the unit R3 as being responsible for most of the anomalism.

CEC then soil sampled the most anomalous zones but did not cover all parts of the anomalous unit.

Utah carried out a soil sampling programme over part of the area, then drilled 16 percussion holes and 4 diamond drill holes in anomaly A extending south from The Dome prospect for about 3.5 km, 3 percussion and 1 diamond hole over a strike length of 400 m in the vicinity of the Callanna mine (anomaly B), 4 percussion and 3 diamond holes in anomaly C over a strike length of 700 m, and 6 percussion and 2 diamond holes over a strike length of just over 1 km at a fourth anomaly. Holes were sited on a combination of stratigraphic and geochemical targets.

In anomaly A, most holes reported values of several hundred ppm Cu, although there were five intersections, generally about 6 m wide, in the range 0.2-0.35% Cu in the primary zone. At anomaly B, the Callanna mine, the hole sited directly beneath the diggings intersected 6 m of 0.5% Cu, whilst adjacent holes again contained short intervals of about 0.3%. At anomaly C no significant intersections were made. The fourth anomalous area, west of the Callanna mine, produced the highest grade intersection in the whole prospect, 8 m of 0.8% Cu from 132-140 m in WP121, but this was not duplicated 80 m downdip by WD34, in which all assays were less than 0.1% Cu.

Utah's soil samples were also assayed for uranium, with the maximum value being 29 ppm although the majority were below 4 ppm.

Utah also carried out a gravity survey over the soil sampling grid - an area of 4 km^2. This was prompted by the hope that pre-Adelaidean basement would occur beneath the Callannas at relatively shallow depth and also by the few U values between 20 and 29 ppm in soil samples. There was little gravity relief over the area except for a single low that corresponded with Dome Hill and was thought to be a topographic effect.

Comment: The large amount of drilling carried out in this area appears to have fully tested the geochemically anomalous units. No additional targets were suggested by the gravity work.

6.5 Dunn's

This is a southwards continuation of similar stratigraphy covered by the Callanna area, and likewise contains many old workings in unit R3, as well as others in R1 (siliceous siltstones and arenites, possibly the same as Murrell's Rook Tuff).

Stream sediment and soil geochemistry by Australian Selection indicated Cu anomalism associated with the R3 unit. Noranda supplemented this with some hand augering.

Utah drilled 16 percussion holes at four different stratigraphic levels and also carried out soil sampling over a black pyritic shale (unit WR3) and dolomitic arenite (WR4). Nine percussion holes were drilled to investigate about 5 km strike length of R3, three were drilled into unit R1, three into unit WR2.2 (a pyritic dolomitic siltstone) and one into WR3 and WR4.

Although weak Cu anomalism was shown to occur at each of these stratigraphic levels, only R3 produced primary grades over a few hundred ppm. WP10 contained 8 m of 0.6% Cu from 52-60 m and WP13 intersected 6 m of 0.4% from 68-74 m.

Comment: All cupriferous units appear to have been adequately tested.

6.6 Rook's

The stratigraphy and search targets are identical to those in the Dunn's area to the north, and similar work was carried out by Australian Selection and Noranda.

Units R1 and R3 were both investigated by Utah over a strike length of about 1.5 km by 6 percussion and 2 diamond holes (R1) and 4 percussion holes (R3), whilst WR2.2 was investigated by three percussion holes and WR3 and WR4 by one. Sub-economic sulphides were intersected over short intervals only in R1 (e.g.: 4 m of 0.6% Cu in WD5). No primary mineralisation of any significance was intersected in R3, WR2.2 or WR3/WR4, although WP6 intersected 20 m of 0.5% Cu in the oxidised zone in R3.

A programme of rock chip sampling on a 100 x 25 m grid (1197 samples) was then carried out over several kilometres of strike exposure of basal Burra units ER2 and ER3 to search for stratiform Au. The maximum assay was 0.15 ppm Au but most samples contained less than 0.005 ppm.

Comment: The stratiform Cu and Au potential have been adequately investigated.

6.7 Kersantite

This area adjoins the southern boundary of the Rook's area. The Callanna Group consists of a complexly deformed layered sequence and an area of megabreccia containing mafic volcanics and an exposure of albitite mapped by Utah as a pre-Adelaidean window.

No geochemical anomalies were detected in this area. Rock chip samples were collected by various companies, and included one by Dampier Mining that assayed 1100 ppm Zn and 600 ppm Pb (see plan no. SAa 2931) although its location cannot be precisely determined.

Utah drilled no holes but did carry out a gravity survey over 8 km^2. Higher Bouguer values appeared to coincide with Burra Group sediments and lower values with Callannas. No distinct anomalies that might indicate Olympic Dam type mineralisation were observed.

Comment: The Dampier rock sample should be followed up.

6.8 West Willourans

This area lies immediately south of Kersantite and consists of a Callanna sequence similar to that in Kersantite and an on-lapping Burra sequence on the eastern side which contains many old Cu workings.

In the Callannas, an evaporitic unit of dolomites and siltstones (WU2) and the overlying black pyritic shale (WU3) (equivalent to WR2 and WR3 in the Rook's and Dunn's areas) were investigated by four percussion and two diamond holes by Utah. The only significant intersection was 2 m of 0.25% Cu from 40-42 m in the primary zone in WP115.

In the southwestern part of this area, it was thought that the block of Callannas just east of Dorothy Waterhole was a horst and that the pre-Adelaidean unconformity might be relatively close to surface. Hence a gravity survey was conducted over 9 km^2. This showed in general that the Callanna rocks gave a lower gravity response than Burra or Umberatana. No discrete anomalies were found.

Twenty-three rock samples collected over Callanna rocks by Utah gave a maximum of 9 ppm U. There was no correlation between U and Cu assays.

Utah carried out a large amount of drilling for copper in the arenitic Burra sequence lying unconformably on the Callannas, and also carried out soil sampling and drilling specifically for gold. Nine percussion and seven diamond holes were drilled over a strike length of about 3.5 km to investigate unit WW2 which Utah believed to be located somewhat above the base of the Burra Group, although Murrell put it right at the base in the Top Mount Sandstone. The highest results were obtained in the vicinity of the main group of workings at Douglas Gully where WD17 intersected 10 m of 0.5% Cu from 56-66 m and two percussion holes intersected 0.4 and 0.3% mineralisation. The next ranking intersections (0.1-0.2%) were made at a second group of workings south of Douglas Gully, but all other holes contained insignificant values in the primary zone.

A small amount of Au had been recovered from Douglas Gully at one time so Utah soil sampled an area of Burras about 2 km along strike by 500 m wide on a 100 x 25 m grid. Almost all samples contained less than 0.1 ppm Au but a very restricted anomaly of 19.5 ppm in the middle of the Cu workings induced Utah to drill a hole (WD40) through the

kaolinitic zone known as the Elbow Shear which was thought to be the host to the Au mineralisation. Four separated 1 m samples assayed between 0.1 and 0.18 ppm Au and a fifth assayed 2.3 ppm, but in each case the core sample contained a quartz-sulphide vein, and Cu was also elevated.

Comment: The stratiform Cu and Olympic Dam type targets have been adequately investigated. Further examination of the Au potential may be warranted.

6.9 Euraminna

The Euraminna prospect contains the largest exposure of albitite thought to represent pre-Adelaidean basement. Surrounding this are mafic volcanics, felspar porphyry, coarse clastic sediments, all of which may be haematitic and/or brecciated in places, and an upper sequence of chemo-clastic sedimentary units of Callanna age.

Twenty-one rock samples were collected by Murrell who first suggested a pre-Adelaidean age for the albitite, and a large area was soil sampled by Utah. No significant base metal or Ag values were obtained.

Utah considered this area to be highly prospective for Olympic Dam type mineralisation and drilled two percussion and three diamond holes in an effort to investigate the "unconformity" believed to occur at the margin of the albitite. A track etch survey of 302 cups at 100 m centres was also conducted.

Only one hole (WP80) passed definitely into albitite. Three remained in Callanna Group rocks for their full length (WP79, WD19, WD20) and one (WD33) was interpreted to have drilled within the contact zone for most of its length. Apart from a 2 m intersection of 0.2% Cu in Callannas in WP79, there were no Cu assays greater than 500 ppm in any hole. Other base metal values were no higher than several hundred ppm, Au was below detection limit (not given) in WD33 and U was less than 18 ppm in the same hole. Ag assayed up to 10 ppm in WD20, but below 1 ppm in WD33.

The track etch survey showed that the igneous complex and surrounding rocks were low in radioactivity although three anomalies of up to 6 times background were detected over Callanna rocks. The highest was partly tested by WP79.

Geochemical sampling of rocks on a 100 x 25 m grid for Au was then carried out over 4 km of strike exposure of lower Burra Group units E8 and E9 (548 samples) but the maximum assay was 0.02 ppm Au.

Comment: The albitite exposed here and elsewhere in the Willourans is not now believed to be of pre-Adelaidean age (see later in this report). In any case, in view of the low drill hole assays obtained by Utah, no further work is warranted at this prospect.

6.10 Horseshoe

This area is situated between the northeastern side of Euraminna and the western side of Callanna and covers layered rocks and megabreccia of the Callanna Group lying unconformably beneath clastics and carbonates of the Bungarider Formation.

Dampier Mining collected a few rock chip samples in the area and Utah carried out more extensive soil sampling and dragbit drilling (deeper soil sampling) but without achieving any significant results.

Utah believed that the presence of basic volcanics in the Callannas might suggest proximity to pre-Adelaiden basement and hence carried out a gravity survey over 4 km^2 to search for Olympic Dam type mineralisation at or close to the unconformity.

Gravity relief was low and there was again a weak correspondence between gravity lows and Callanna beds, and between gravity highs and Burra rocks.

Extensive dragbit soil sampling was carried out over the Burra Group sediments but all values were low.

Comment: There appears to be no potential for the discovery of unconformity related mineralisation here, and the unfavourable soil sampling results offer no encouragement for stratiform mineralisation in the Burra rocks.

6.11 Bungarider-Chintapanna

This area covers a strip of ground parallel to and on the northeast side of the Bungarider Fault. Coarse to fine clastics of Callanna age form a complex zone over which shales of possible Amberoona Formation age were deposited unconformably in several areas. Sediments of the Bungarider Formation onlap to the east. Two small exposures of albitite occur in Callanna rocks, although only one of these (the Chintapanna "window") was recognised by Utah.

Australian Selection and Utah both collected soil samples in the Chintapanna window area but, apart from two small anomalous copper zones found by the former, no major anomalies were delineated.

The presence of albitite with its presumed inference of possible shallow pre-Adelaidean basement influenced Utah to carry out a gravity survey over the whole area (16 km^2). Gravity relief was up to 8 mgal and several prominent anomalies were outlined. A gravity high partly surrounded by three lows was selected for drilling although the hole (WD37) was sited somewhere between this high and an adjacent low to the northeast, and about 300 m off the centre of the high. WD37 intersected dolomitic siltstone over its full length of 288 m (vertical hole) and base metal, Au and U assays were not anomalous.

Utah believed that the rocks intersected in WD37 belonged to the Amberoona Formation and that their higher density accounted for the gravity high; the lows all coincided with Callannas.

Comment: The modelling by Utah's consultant of a hollow-cone model to best fit the gravity lows shows the low density source to be the Callanna beds themselves rather than the inferred proximity of low density pre-Adelaidean basement.

Although WD37 cannot be said to have tested the source of the anomaly, the steep slope of the north and south flanks (>1 mgal over less than 200 m) implies a shallow source. If the source was to be a metallic ore deposit and not a thickening of the carbonate unit intersected in WD37, it would be expected that soil and rock chip samples on lines 7600N and 7800N would have contained anomalous values. The absence of such values strongly suggests that the anomaly is caused by a wedge of high density sediments onlapping the Callanna palaeo-islands.

No other significant anomalies are apparent in the contoured data.

Haematitic and brecciated zones should be inspected.

6.12 Tarlton North

This area, which lies northwest of the Bungarider-Chintapanna area but in the same location with respect to the Bungarider Fault, contains a Callanna sequence consisting of severely deformed carbonates and clastics as well as zones of mafic volcanics and one of albitite, all in disoriented fault blocks. There are several areas of old Cu workings.

Utah collected 528 soil samples but no anomalous base metal values were obtained. A gravity survey was then carried out over about 20 km^2 (including a small separate area north of Rischbieth). Several gravity highs were delineated, the two most prominent being over an exposure of basalt containing some Cu workings known as Muntu, and near Rischbieth Gap over an area of Burra Group sediments close to their unconformable contacts with the Callanna.

The Muntu anomaly was investigated by WD38 which intersected 80 m of basalt which was assumed to explain the anomaly. It contained no anomalous base metals or Ag. The Rischbieth Gap anomaly was drilled by WD35 with the expectation of penetrating a pre-Adelaidean basement high. The hole remained in dolomitic siltstones of Burra age for its entire 490 m length and contained no more than 250 ppm Cu, even where it traversed the cupriferous Burra unit T2 (see Warra Warra section).

Comment: It is very difficult to interpret the gravity data in such a structurally complex area as here, and its nature is therefore doubtful. The Muntu anomaly seems to be satisfactorily explained, and the low geochemical levels in the hole drilled to investigate the Rischbieth Gap anomaly offer no encouragement to examine it in more detail.

Haematitic and brecciated zones should be inspected.

6.13 Warra Warra

Warra Warra adjoins the eastern side of the Tarlton North area and covers a sequence of cupriferous Burra sediments that unconformably overlie Callanna rocks. There are many old Cu workings here including the Warra Warra mine that was the biggest producer of copper (at least 1250 t of ore) in the Willourans.

Stream sediment Cu anomalies were delineated by Australian Selection, Anaconda and Altarama Search. Australian Selection soil sampled about 4.5 km^2 over the Warra Warra mine and surrounding area, and demonstrated a stratigraphic control over the anomalous Cu distribution.

Utah carried out limited soil sampling and then drilled 26 percussion and four diamond holes into six stratigraphic targets: four in the lowermost N2 unit, one in T2, and unit W2.2 which hosts the major geochemical anomaly and most of the old workings. In N2, eight percussion and one diamond hole obtained grades varying from zero up to 0.4% Cu. Three percussion holes were drilled into unit T2 around the Warra Warra North workings but no Cu mineralisation was intersected. The W2.2 unit was intensively explored over a strike length of 3 km by 11 percussion and three diamond holes but the highest primary grades encountered were only 0.2% Cu in four holes all near the old workings, although 10 m of 1.3% Cu was intersected

in the secondary zone at the same location. It was noted by Utah that most of the better downhole Cu intersections were coincident with quartz veins.

Following this work a geochemical survey was conducted over an area about 2 km along strike by an average of 1.4 km wide in order to cover units N2 and T2 in the search for stratiform Au. A total of 1510 samples (mostly rocks, but a few soils) were collected, the only significant results being two assays of 0.5 and 0.9 ppm Au near some old pits in unit N2. Diamond hole WD39 was drilled to investigate subsurface Au and Cu values at this location and also, it was hoped, to penetrate the Burra/Callanna unconformity. The 610 m hole did not reach the unconformity and contained no significant Au values (maximum 0.04 ppm). Copper mineralisation was restricted to a 4 m interval of 1.0% in the secondary zone.

Comment: The cupriferous horizons have been adequately tested, although some of the embayments in the Burra/Callanna unconformity may be worth examining more closely.

6.14 Rischbieth

This area contains Burra sediments onlapping Callanna Group rocks of the Tarlton North area. A number of old workings occur at several stratigraphic levels and ten geochemical traverses were made to locate the most cupriferous beds. One percussion and one diamond hole were drilled near a group of workings but 1 m of 0.4% Cu was the only assay of any interest.

Comment: The Callanna/Burra unconformity area should be examined as well as the Rischbieth Dolomite reef zone of Murrell.

6.15 Wangianna

Only Cretaceous and Tertiary rocks outcrop in this area. A 12 km^2 gravity survey was carried out in order to investigate in greater detail a gravity high shown on regional SADME maps. A high and a low both with an amplitude of about 3 mgal and both trending north-northwest were delineated. Speculation was made upon their causes and two holes were recommended to investigate them but were never drilled.

Comment: The survey reproduced the regional gravity pattern in more detail. The anomalies appear to be of no particular form and do not warrant drilling

6.16 Tarlton West

West of Tarlton North a narrow exposure of Callannas is surrounded by Burras with a fault contact on the west and an unconformity on the east.

Utah carried out soil sampling on six widely spaced traverses but only four assays were above 100 ppm Cu, the highest being 280 ppm in dolerite.

Comment: No further work is warranted here.

6.17 Top Mount

The Top Mount area covers Callanna and Burra rocks close to the Norwest Fault. A few old pits occur in two localities in lower Burras.

Utah sampled on two traverses over Callanna rocks and on five traverses over Burra rocks and delineated a strike oriented Cu anomaly over unit TM6 in the vicinity of the Top Mount diggings. It was observed that copper occurred in siderite-quartz veins at both sets of diggings.

Thirty-nine stream sediment samples were collected over Callanna and Burra terrains in the area. The highest Cu values (70 ppm) corresponded to the unit TM6.

Comment: In view of the fact that Cu occurs in basal Burra arenites, the area should be further examined.

6.18 General Comments

Utah noted that anomalous Cu values were widespread at certain stratigraphic levels, but that significant concentrations of Cu mineralisation were usually located:

a) on fold limbs,
b) close to an unconformity,
c) in association with quartz-carbonate-sulphide veins and stringers,
d) often in areas of leached and/or silicified sediments.

7. CURRENT EXPLORATION

This section documents the year's activities under target headings as described in the Introduction.

All samples collected during the year are located on plan no. SAa 2828. Petrographic descriptions of rocks are given in Appendix I and analyses are listed on sample ledger sheets in Appendix II.

7.1 Olympic Dam Type Deposits

The exposures of albitite were natural starting points in the search for Olympic Dam type mineralisation because of the belief that they were windows of pre-Adelaidean age. However, after making field inspections at six localities and having considered Murrell's and Utah's earlier work, it is now believed that the albitites are intrusive into Callanna Group rocks and, because of their absence in Burra terrains, are probably of Callanna age.

Support for this assertion comes from various features noted at the different outcrops. The albitites are named on plan no. SAa 2828 as well as being shown on the geological map (plan no. SAa 2929). As will become apparent, the term "albitite" is used rather loosely and, although the rocks are not identical, they are all coarse grained and leucocratic with a high content of felspar and commonly contain green or brown calcic or mafic minerals. They all have orange-brown weathered surfaces and are considerably fractured.

At Chintapanna where Utah describe the igneous rock as a leucocratic, haematitic, oligoclase quartz diorite, it contains large grains of interstitial haematite. Although the actual contact is concealed, Callanna quartzites with vertical dip were observed cropping out about 40 m away from the diorite at its southern end, suggesting an abutment of these rocks against the diorite rather than a sedimentary onlap.

At North Bungarider the rock has been described as an albitised epidotised leucogabbro (sample no. 1159305) and as an albitised quartz-syenite (sample no. 1159335) and is flanked on the northeast and southeast sides by iron-flooded shales.

The Euraminna albitite was examined in detail by Murrell and Utah geologists and appears to consist of a core of epidotised essexite (an alkali felspathic gabbro) surrounded by a rim of syenite rich in albitic plagioclase (and carbonate). The adjacent rocks comprise mafic volcanics, iron-rich conglomerate and siltstone, basaltic felspar porphyry and lamprophyric bodies. These rocks dip both away from and towards the igneous complex, and contain zones of brecciation.

The Callanna albitite is felspar rich with interstitial haematite. Dolomites and shales on the western side dip to the east and west, and in several places strike directly towards the igneous body only 10-20 m away. The sediments are also brecciated and contain quartz in many places.

At West Willouran the rock is described as an albite-diorite or soda-syenite which contains about 85% albite and therefore qualifies for the name albitite (sample no. 1159294). Magnetite or pyrite constitutes about 2-3% of the rock volume. The albitite appears to have a sheared iron-rich contact on the northern side with shales, sandstones and mafic volcanics, and there is a probable high angle contact between sandstone and albitite on the eastern side.

In the Rischbieth area, sample no. 1159202 is a quartz syenite containing 80% alkali felspar and interstitial limonite. It is similar to sample no. 1159335 from the North Bungarider albitite and to no. 1159294 from West Willouran. It is cut by a dyke of phlogopite-albite (sample no. 1159203). The albitite contains limonite-filled fractures and appears to be fault bounded on all sides.

The major features shown by these six occurrences are:

a) petrological similarity,
b) the presence of surrounding rocks rich in iron,
c) shearing or brecciation in surrounding rocks,
d) the transgressive nature of the contacts with surrounding rocks, either along strike or down dip.

Taking into account the presence of iron-bearing minerals in interstitial positions, thus suggesting they are of primary origin, the above features are compatible with the intrusion of an iron-bearing leucocratic felsic igneous body into a sedimentary pile, perhaps still saturated, causing brecciation and haematitisation of some of the wall rocks. Albitisation of the igneous felspars may well have been caused by sodium-rich fluids derived from the Callanna sediments, many of which were halitic.

The geochemistry of the albitites and wall rocks has also been investigated. Sample numbers and analyses are given on sample ledger sheets in Appendix II. Samples 1159145-148 were analysed for Au only, whilst the remainder were analysed for Cu, Pb, Zn, Ag, Au, Hg, Ba, Ce and As, but no anomalous values were detected. For convenience, the sample numbers referring to various localities are set out below.

Chintapanna	1159306	albitite
North Bungarider	1159197	albitite
	1159305	albitite
Euraminna	1159145	massive haematite
	1159146	albitite
	1159147	massive haematite
	1159148	quartz porphyry
Callanna	1159288	albitite

West Willouran	1159193	mafic volcanic near contact
	1159194	albitite
	1159295	shale at contact
Rischbieth	1159304	albitite

Murrell also carried out analyses of the albitite and adjacent rocks at Euraminna and Utah analysed rocks from most areas also. No anomalous assays were reported from any of this work.

All albitites except the Euraminna one were found to exhibit background levels of radioactivity except for an occasional high spot up to twice background.

Utah's detailed gravity surveys, as discussed earlier, were of limited value and provided no encouragement to investigate any areas in more detail.

7.2 Stratiform Lead-Zinc

The search for stratiform Pb-Zn mineralisation took three forms:

a) the delineation and sampling of local black shale basins,
b) examination of the Rischbieth Dolomite,
c) other sampling.

7.2.1 Local Basins

In the West Willouran area, a black pyritic shale unit of the Callanna Group appears to infill two small basins as shown by the outcrop patterns of the units above and below (see plan no. SAa 2977).

The black shales of unit WU3 crop out very poorly but Utah's diamond drill hole WD25 traversed most of the unit at its thickest part without encountering any base metal sulphides. Samples were collected from dolomites and cherts (nos. 1159188-192) of unit WU2 but these were low in all elements except for slightly elevated base metal values in a weathered sample. Four of Utah's percussion holes penetrated this unit.

Growth faulting associated with deposition of the Tapley Hill Formation was noted on the eastern side of the E.L., 4.5 km southeast of Willouran Hill. This area, known as East Willouran, was also the site of some elevated Zn

values from a stream sediment survey carried out by Anaconda, which values are shown on plan no. SAa 2931. The area was mapped, and rock samples and additional stream sediment samples were collected (see plan no. SAa 2924). Ledger sheets for rock samples are contained in Appendix II and for stream sediment samples in Appendix III.

Thin bedded stromatolitic dolomites with interbedded fine grey sandstones, probably of the Burra Group, are truncated on their northern side by the growth fault and on their eastern side by either a fault or an unconformity. The major zone of Burra arenites in the western part of the area is bounded by an unconformity in the south and possibly by a fault in the north.

Basal Umberatana sediments consist of black shales (predominant) containing beds of conglomerate and dolomite 0.5-3 m thick. Most of the conglomerates consist of sub-rounded pea-sized pebbles of the Burra dolomite and sandstone, although clasts can vary from grit size up to 0.5 m. The abundance and grain size of conglomerates decreases northwards and eastwards. The attitude of these sediments close to the growth fault can be clearly seen, and the predominance of black shale indicates that they belong to the Tapley Hill Formation.

The black shales adjacent to the northern side of the growth fault were thought to be a possible host for stratiform Pb-Zn mineralisation. Anaconda obtained five values over 100 ppm Zn in this area, the highest being 173 ppm, but these were not duplicated by the current sampling which gave a maximum of only 70 ppm, although approximately in the same location. (Both surveys utilised the -80 mesh fraction). A number of rock samples were collected, the highest assay being 115 ppm Zn. No gossanous material or other signs of sulphide mineralisation were observed.

7.2.2 Rischbieth Dolomite

The Rischbieth Dolomite, as mapped by Murrell, is a reef facies southeast of Rischbieth Well developed where the shales, dolomites and sandstones of the Mirra Formation (Skillogalee Subgroup) lap onto the underlying Callanna rocks. The environment appeared to have potential to host Mississippi Valley type mineralisation.

A thorough examination was made of the reef area and the (gradational) interface between reef and deeper water facies but no signs of solution collapse or other brecciation were observed. Minor quartz and haematite veining occurred at one locality but no mineralisation or gossan was noted anywhere in the area. No samples were taken.

7.2.3 Other Sampling

Rock chip samples were collected from other units of black shale at various locations, and also in areas where sampling by previous workers returned anomalous lead or zinc assays.

Samples of black shale of Callanna age were collected from the Boorloo Siltstone (1159247-248 and 1159296) and the Recovery Formation (1159249) in the Boorloo-Dome Hill area and from the Boorloo Siltstone (1159291-293) in the Dunn's-Rook's area. Sample no. 1159250 was collected from an area of Black Knob Marble, 4 km west of the Callanna Mine, where Dampier recorded 110 ppm Pb (see plan no. SAa 2928), and samples 1159220-229 and 1159232-233 from ferruginous and brecciated shales in the Delusion Hill area where a sample containing 5000 ppm Pb was reported by H.R. Gillespie. Three of the latter samples returned values between 1250 and 2000 ppm Cu, but Pb values were all low (see plan no. SAa 3027).

In Burra Group rocks, samples of black shales were collected from the basal Witchelina Subgroup at the Top Mount Diggings (1159205-206), from the Camel Flat Shale in the Twenty Mile Hill area (1159230-231, 1159235-237) and from other Skillogalee Subgroup rocks near Mt. Norwest (1159207) and near Old Mt. Norwest Homestead (1159234).

A number of samples were collected from shales of the Tapley Hill and Amberoona Formations near the base of the Umberatana Group. Nos. 1159302-303 were obtained between Finniss Springs Homestead and Rischbieth Well, and nos. 1159289-290 from an area 4 km north of Mirra Bore where Dampier recorded 930 ppm Zn. Nos. 1159179-186 and 1159238-246 were taken in the East Willouran area already described (see plan no. SAa 2924).

There were no anomalous results from any of the above samples, except for the few Cu assays already mentioned. No secondary Pb or Zn mineralisation was noted.

7.3 Stratiform Copper

Utah's stratiform Cu search was directed at rocks satisfying three main criteria.

a) Located stratigraphically just above an unconformity. The importance of the unconformity was believed to decrease from the pre-Adelaidean/Callanna boundary upwards.
b) Arenites deposited in a subtidal deltaic environment.
c) Units that are geochemically anomalous in Cu over wide areas.

Utah's investigations suggested that elevated Cu values do occur at a few stratigraphic levels over long distances in the Willouran Ranges but none of their drilling intersected significant concentrations of Cu.

CRAE's model for Copperbelt mineralisation was rather more defined than Utah's, the main factors being:

a) Localisation in synforms or small basins directly overlying basement (mineralisation could even be in contact with basement in places),
b) Host rock of sandstone, arkose, conglomerate or shale with abundant anhydrite (or its pseudomorph) close to the mineralisation,
c) A prominent dolomite above the mineralised bed.

The proximity to basement was believed to be of prime importance and it was considered that, in the Willourans, the Callanna Group is the basement equivalent to the Muva System of Zambia. The main reasons for this are:

a) Callanna rocks are the oldest exposed in the Willourans. (The albitites are thought to be of Callanna age - see section 7.1 of this report).
b) Onlap relationships are common at Callanna/post-Callanna boundaries.
c) The Callannas are severely faulted and folded, and are metamorphosed to greenschist grade, whereas the younger successions occur in broad open folds and are virtually unmetamorphosed.
d) The Callannas contain several Cu occurrences.

On this reasoning, the main target for stratiform Cu mineralisation was the interbedded arenite-shale sequence at the base of the Witchelina Subgroup where it lies in contact with Callanna Group rocks. The actual name of this basal sequence is unclear - in places it is referred to as the Top Mount Sandstone whilst in others it is probably part of the Willawalpa Formation.

7.3.1 Kingston Area

A large number of very shallow old pits have been dug at two stratigraphic levels in the Willawalpa Formation in the Kingston area over a strike distance of about 3 km (see plan no. SAa 3028). The location of the Callanna/Burra unconformity is in contention in this area because there is no angularity to mark the boundary, nor are the lithotypes diagnostic. However, it is thought that the unconformity occurs approximately where Murrell locates it: on the east side of a continuous quartzite ridge, to the east of which the units appear (from photo interpretation) to have an onlap relationship to it. This is supported by the fact that the sediments west of, and including, this quartzite

are tightly folded at a locality 4 km southeast of the Kingston mine, whilst the rocks to the east are undeformed, strongly suggesting that the former are of Callanna age.

It can be seen then (from plan no. SAa 3028) that the Cu occurrences are very close to the unconformity, but the photo trends clearly show that they occur at two different stratigraphic levels. In fact the pits at Upper Wattle Well can be seen in detail to lie at three different levels.

Most mineralisation occurs in felspathic quartzite (see petrographic descriptions of samples 1159317-318, 1159330 in Appendix I). In the Kingston area, mineralisation is restricted to a single bed of felspathic quartzite which contains many transverse quartz veins of probable diagenetic origin. Mineralisation is generally located within a few centimetres of these veins. A few similar veins also occur at Upper Wattle Well, but most mineralisation occurs in patches in a 2 m wide quartzite. A few scattered grains of chalcopyrite were noted in this bed, and cavities after sulphide were common. No anhydrite or pseudomorphs thereof were observed in the vicinity of these occurrences.

Cobalt values were very low, being less than 4 ppm even for samples containing more than 1% Cu. No anomalous radioactivity was noted.

7.3.2 Warra Warra Area

About 1.5 km west of the Warra Warra North mine there is an embayment of Willawalpa Formation and succeeding units resulting in a synform known as the Warra Warra Syncline. The area near the Callanna contact was prospected and samples (numbered 1159347-350) were collected in the axial region of the fold. Two samples contained 590 and 950 ppm Cu, but these were taken a few hundred metres along strike from Cu workings and are not considered significant.

Sample no. 1159353 was collected adjacent to the Callanna/Burra contact where it is crossed by the Rischbieth-Warra Warra track, and no. 1159337 was taken 1.5 km west-southwest of the Warra Warra mine in the footwall unit, and within 50 m of the unconformity. Neither sample was anomalous.

7.3.3 Other Areas

The Top Mount Sandstone was inspected at Cadnia Hill and at a locality 8 km northwest of Cadnia Hill. The unit consists mainly of thin bedded fine to medium grained

felspathic sandstones and minor sandy siltstones. They contain only minor ferruginous matter and exhibit very low radioactivity. No indications of mineralisation were noted.

An embayment about 1000 m across of Willawalpa Formation in Callanna basement lies about 3 km west of Willouran Hill and contains siliceous siltstones with many cavities after pyrite. There are also some conglomerates, and veins of limonite are common. Radioactivity is up to 200 cps (i.e.: about 1.7 times background on BGS-3 scintillometer) and sample no. 1159338 contained 360 ppm Cu.

At the Top Mount diggings which are located in possible Copley Quartzite, soil sampling by Utah defined weak stratiform zones of anomalous Cu in unit TM6. However, exposures in pits strongly suggest that the bulk of the Cu is confined to cross-cutting quartz (-carbonate) veins. Sample 1159342 (2700 ppm Cu) taken in wallrock about 40 cm away from a cupriferous vein and 1159343 (560 ppm) taken about 1 m away from a different vein seem to confirm this.

At the Horseshoe prospect 5.5 km west of the Callanna mine, shales and dolomites of the Myrtle Springs Formation (Bungarider Subgroup) lie unconformably on Callanna rocks and are folded into a tight syncline. Siliceous dark slates (samples 1159340-341) contained 200 and 120 ppm Cu.

7.4 Diamonds

Reconnaissance gravel sampling was carried out over the entire E.L. to search for kimberlitic indicator minerals. The programme was helicopter assisted and 126 samples were collected. Their locations are shown on plan no. SAa 3029.

Results of the processing of these samples will not be available for many months.

7.5 Hydrothermal Mineralisation

Areas of conspicuous veining, fracturing and brecciation were examined and sampled in the search for hydrothermal deposits of base metals, gold or uranium.

The following observations were made at each locality.

a) Breccia 3 km northwest of Witchelina homestead consists of fractured clean fine grained quartzite with a matrix of quartz and quartzite. The rock contains a few cavities after sulphide. No anomalous radioactivity was noted, and no haematite was observed.

b) Breccia 2.7 km northwest of Chintapanna Dam. A massive hard haematitic siliceous rock with a few cavities after sulphide lies adjacent to a medium grained grey crystalline(?) rock of quartz-felspar composition containing large laths of felspar and veined by haematite. Radioactivity on the former is background and on the latter up to twice background. Sample no. 1159333 of the latter material contained no anomalous values.

c) Breccia 6.2 km northwest of Chintapanna Dam. This is a true breccia consisting of angular and sub-rounded fragments of slate and quartzite in a matrix of finely crystalline haematite. Radioactivity is 1-1.5 times background. Sample no. 1159334 contained no anomalous values.

d) A locality 1.5 km west-northwest of North Bungarider Dam contains irregular outcrops of yellow-brown jasper with background radioactivity. No values of interest in sample no. 1159336.

e) Quartz veining is common in the Rischbieth Well area. Sample no. 1159140 was collected from an outcrop of thin bedded shales and fine grained felspathic sandstone containing a network of thin quartz-limonite veins, on the east bank of Rischbieth Creek a few hundred metres south of the well. Sample no. 1159141 was collected from similar rock, although more siliceous, at the top of a hill adjacent to this site. Both samples were analysed for Au only but contained less than 0.01 ppm.

Samples 1159344-346 were collected from various rocktypes about 1 km south and southwest of the well but no significant assays were returned. No anomalous radioactivity was observed.

f) An area 3.5 km south-southeast of Rischbieth Well contains tectonically brecciated quartzite with minor haematite in the matrix. Radioactivity is 1-1.5 times background.

g) Tectonic brecciation of a clean quartzite also occurs 0.5 km west of Muntu diggings. The rock has a ferruginous coating in places. Low radioactivity.

h) A prominent "vein", one of several northerly oriented veins that transgress several hundred metres of stratigraphy in an area 1-2 km east of Rischbieth Well was sampled (no. 1159144) and analysed for Au only (<0.01 ppm). No actual vein material can be distinguished but the veins may consist of ferruginised country rock along fractures.

i) At Douglas Gully in the West Willouran area, the kaolinitic zone known as the Elbow Shear was mapped (plan no. SAa 2829) and six samples of quartz-limonite-malachite vein material were collected (see second quarterly report, CRAE no. 12711, for details). Although one of these assayed 3.4 ppm Au, the nature of the gold mineralisation seems to have been fairly well established by Utah's drill hole WD40 which showed that gold was associated only with the veins, and that the country rock was barren.

7.6 Magnesite

Magnesite is a common constituent of the Cadnawitana Formation (also known as the Skillogalee Dolomite) of the Skillogalee Subgroup in the western part of the Willouran Ranges, with a decrease in abundance towards the east. The greatest development of magnesite occurs in the northwesterly trending strip of Cadnawitana Formation west of the Norwest Fault in the vicinity of Screech Owl Creek.

The unit is 500-600 m thick here and dips are almost vertical. Magnesitic beds may account for about one-third of this thickness but the width of individual beds varies greatly from a few centimetres up to several metres. (The thickest observed bed was 3 m, but soil and scree obscured its true thickness). The other two-thirds of the succession consist chiefly of shale and algal dolomite.

The magnesitic beds generally consist of a framework of rounded magnesite intraclasts set in a matrix of fine grained magnesite. Poorer quality beds contain intraclasts of shale or have a matrix of calcitic magnesite.

Ten samples were collected (nos. 1159208-217) and analyses are give in Appendix II. Sample nos. 1159213-216 which represent the full width of beds 2.5-3 m thick show that good quality magnesite is present. These samples have a range of MgO from 40.1-42.8%, 2.95-7.65% CaO, 1.83-6.15% SiO_2 and 0.07-0.23% Fe_2O_3.

8. CONCLUSIONS

8.1 Olympic Dam Type Deposits

It is believed that there are no exposures or near surface occurrences of pre-Adelaidean basement in the Willouran Ranges.

Rock sampling of the so-called albitites previously believed to represent basement windows but now thought to be Callanna age intrusives, revealed no anomalous geochemistry, and a re-assessment of Utah's detailed gravity surveys failed to reveal any anomalies warranting follow up work.

8.2 Stratiform Lead-Zinc

There is regional geochemical Zn anomalism in some units, particularly the Tapley Hill Formation at the base of the Umberatana Group. However, detailed stream sediment sampling of the most anomalous area failed to locate any concentration of this element.

The lack of gossans, lack of secondary minerals and low Pb-Zn rock geochemistry throughout the E.L. gave no encouragement for the discovery of Pb-Zn mineralisation.

However, the Delusion Hill area may still be of interest for two reasons. Firstly, it was not possible to duplicate the reported 5000 ppm Pb found in one of H.R. Gillespie's samples, the location of which is not known precisely, and secondly, three of CRAE's samples (nos. 1159220, 1159226-227) collected from Callanna Group ferruginous shales exposed intermittently over about 2 km of strike length contained between 1250 and 2000 ppm Cu. Follow up of these samples is warranted.

8.3 Stratiform Copper

The extensive exploration carried out by Utah did not produce an economic copper deposit, but it did show that Cu anomalism was widespread in various units particularly in the Callanna, and lower Burra Groups. The Cu occurrences that exist in these units have a stratiform aspect but are invariably associated with veins, even stockworks, of quartz-carbonate-sulphide. It is suggested that they are produced by remobilisation of the widespread anomalous Cu at the time of veining - perhaps during late diagenesis.

The Cu at Kingston and Upper Wattle Well is somewhat different and appears to have certain characteristics of true Copperbelt type mineralisation, e.g.: its proximity to a major unconformity, stratabound nature and favourable hostrocks. But is lacks a number of features believed to be important in Copperbelt type deposits, such as local small scale undulations in the basement surface, significant Co content, evidence of anhydrite and, most importantly, potential to attain significant thickness.

Few of these favourable characteristics were noted elsewhere in the E.L., and it is believed that no potential exists in this area for the discovery of such a deposit.

8.4 Diamonds

As there are no results yet available from the gravel sampling programme, no comments can be made on its outcome.

8.5 Hydrothermal Mineralisation

Most areas of brecciation, ferrugination and veining noted by previous workers and observed during the present investigations were inspected, sampled and checked for radioactivity, but assays were uniformly low.

The gold mineralisation at Douglas Gully was shown to be confined to individual quartz-sulphide veins and to be too weak to be of interest. This association was also indicated by sampling at Dunn's, Kingston and Top Mount prospects.

8.6 Magnesite

Although there are indications that the magnesite at Screech Owl Creek may be of reasonable quality, its location and distance from the coast are major drawbacks that would probably inhibit large scale development.

A detailed sampling programme will be necessary if more accurate thickness and quality estimates are required.

8.7 Other

There is another environment which was not investigated in any detail and which may be prospective for Au mineralisation. This is the zone of ferruginous rocks surrounding the albitites. It is not clear whether the iron content of these units is the result of primary depositional processes or of later alteration associated with the emplacement of the albitites (although the latter has been espoused earlier in this report).

If the iron is primary, the units can be classed as true iron formations and thus hold potential for Au mineralisation. The most obvious iron-rich metasediments are those associated with the albitites at North Bungarider

and Euraminna, although samples of massive haematite at Euraminna (nos. 1159145 and 1159147 which contained <0.01 ppm Au) have already downgraded that area. Less well developed ironstones occur around the Chintapanna and West Willouran albitites.

A.K. SCOTT

AKS/pw

EXPENDITURE

Expenditure for the period ended 30th November, 1984, the nearest accounting period was $30 903.00, as listed below.

	$
Payroll	10 493
Supplies	754
Vehicle	913
Travel	228
Property	989
Contractors	12 258
Laboratory	2 123
Overheads	3 145
Total	$30 903

REFERENCES

Murrell, B., 1977 Stratigraphy and tectonics across the Torrens Hinge Zone between Andamooka and Marree, South Australia. Ph.D. Thesis, University of Adelaide (unpublished).

Stadter, M.H., 1976 Base metal exploration in the Willouran Ranges to September 3, 1976. S. Aust. Dept. of Mines, Rept. Bk. 76/132.

LOCATION

Marree	SH 53-5	1:250 000
Curdimurka	SH 53-8	1:250 000
Copley	SH 53-9	1:250 000
Andamooka	SH 53-12	1:250 000

KEYWORDS

Copper, Diamonds, Gold, Lead, Magnesite, Zinc, Data Review, Geochem Drainage, Geochem Rock.

LIST OF PLANS

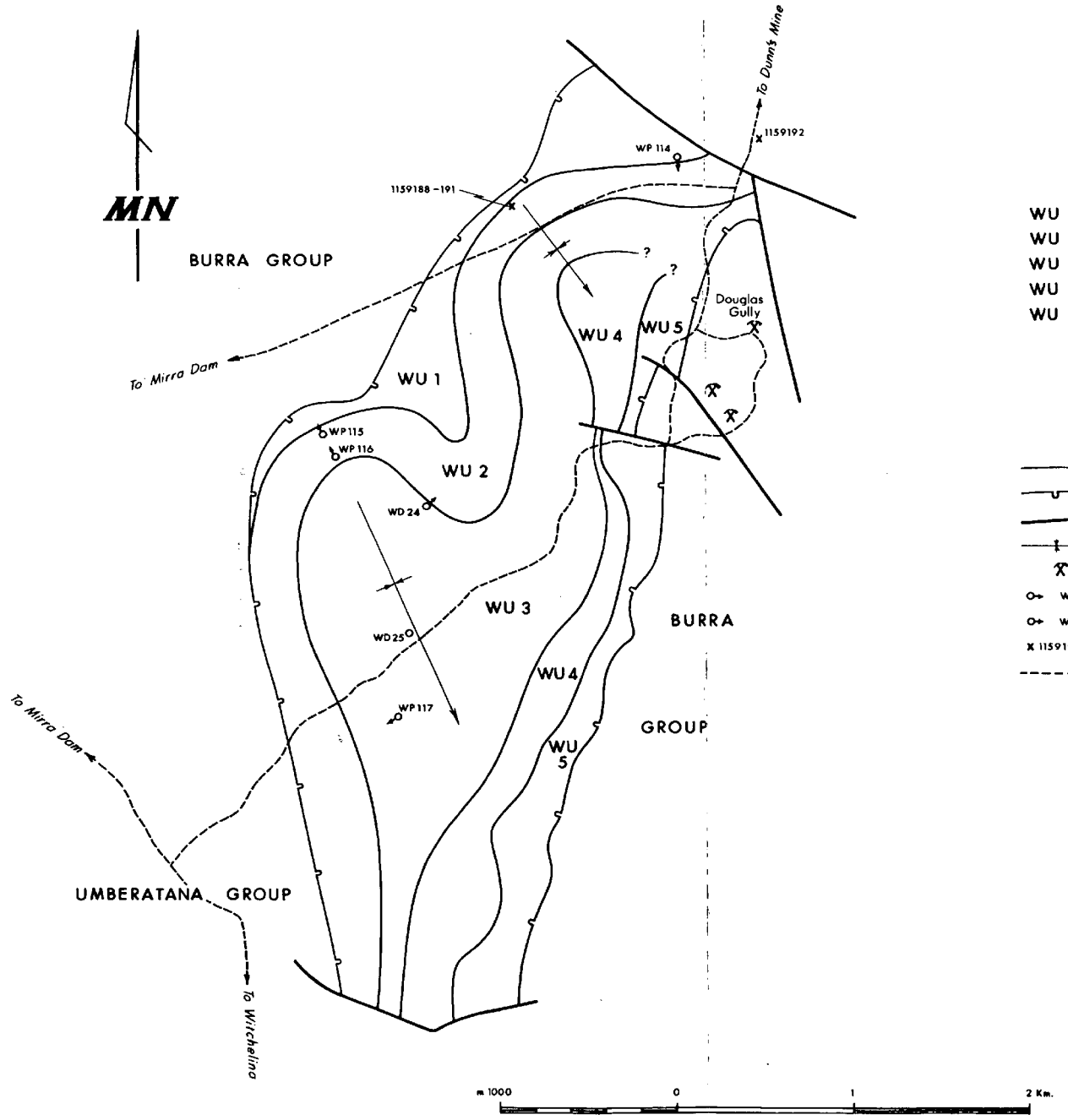
Plan No.	Title	Scale
SAa 2230	Tarlton Knob E.L. 1196 Location Plan	1:250 000
SAa 2928	Tarlton Knob E.L. 1196 Previous Exploration, Location & Type	1:100 000
SAa 2931	Tarlton Knob E.L. 1196 Previous Exploration; Significant Geochemical Values	1:100 000
SAa 2929	Tarlton Knob E.L. 1196 Adelaidean Geology	1:100 000
SAa 2932	Tarlton Knob E.L. 1196 Bouguer Gravity Contours & Aeromagnetic Anomalies	1:100 000
SAa 2828	Tarlton Knob E.L. 1196 Geochemical Sample Sites	1:100 000
SAa 2977	Tarlton Knob E.L. 1196 Callanna Geology, West Willouran Area	1: 25 000
SAa 2924	Tarlton Knob E.L. 1196 East Willouran Area; Geochemical Sampling	1: 28 000
SAa 3027	Tarlton Knob E.L. 1196 Delusion Hill Area; Sample Locations	1: 50 000

LIST OF PLANS (cont.)

Plan No.	Title	Scale
SAa 3028	Tarlton Knob E.L. 1196 Kingston Area; Sample Locations	1: 50 000
SAa 3029	Tarlton Knob E.L. 1196 Location of Gravel Samples	1:100 000
SAa 2829	Tarlton Knob E.L. 1196 Douglas Gully Prospect; Geological Map and Drill Section	1: 1 000

LIST OF APPENDICES

Appendix I	Petrographic Descriptions
Appendix II	Geochemical Ledger Sheets - Rock Samples
Appendix III	Geochemical Ledger Sheets - Stream Sediment Samples



WU 5	Dolomitic siltstone
WU 4	Arenites
WU 3	Black to dark green pyritic shale
WU 2	Dolomitic siltstone
WU 1	Grits

	Geological boundary
	Unconformity
	Fault
	Syncline
	Cu workings
WP 115	*Utah percussion drill hole*
WD 24	*Utah diamond drill hole*
1159192	*Rock sample. CRAE*
	Track

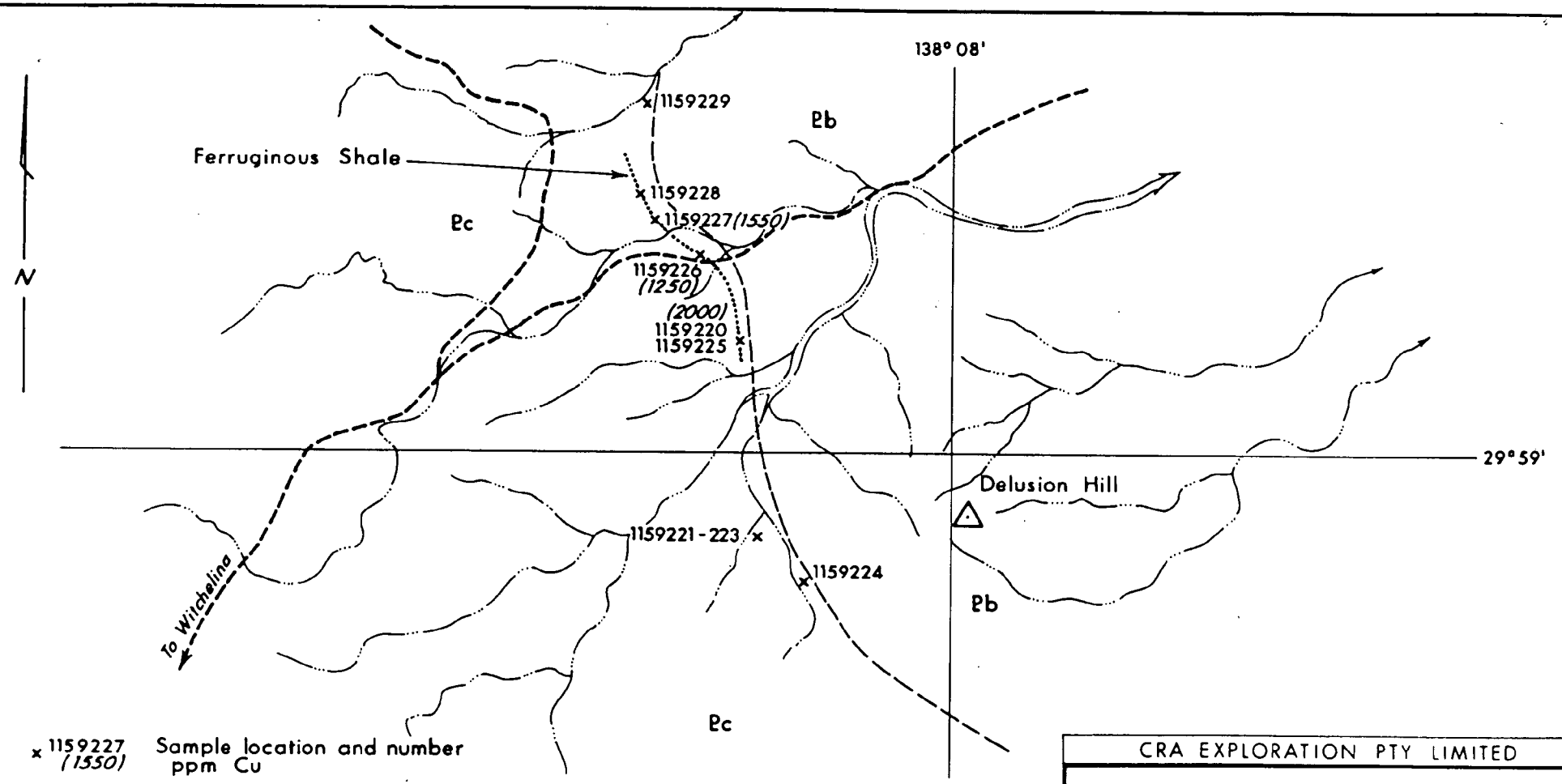
Note : Geology after "Utah Development Company." (Env. 3507)

CRA EXPLORATION PTY LIMITED

TARLTON KNOB E.L.1196 – S.A.
CALLANNA GEOLOGY
WEST WILLOURAN AREA

REF.	CURDIMURKA SH 53 - 8		
SCALE	1: 25000		
AUTHOR	A.K.S.	REPORT	13004
DATE	Dec. '84	PLAN No	SAa 2977

0070



× 1159227 (1550) Sample location and number ppm Cu

Pb Burra Group

Pc Callanna Group

Geological boundary

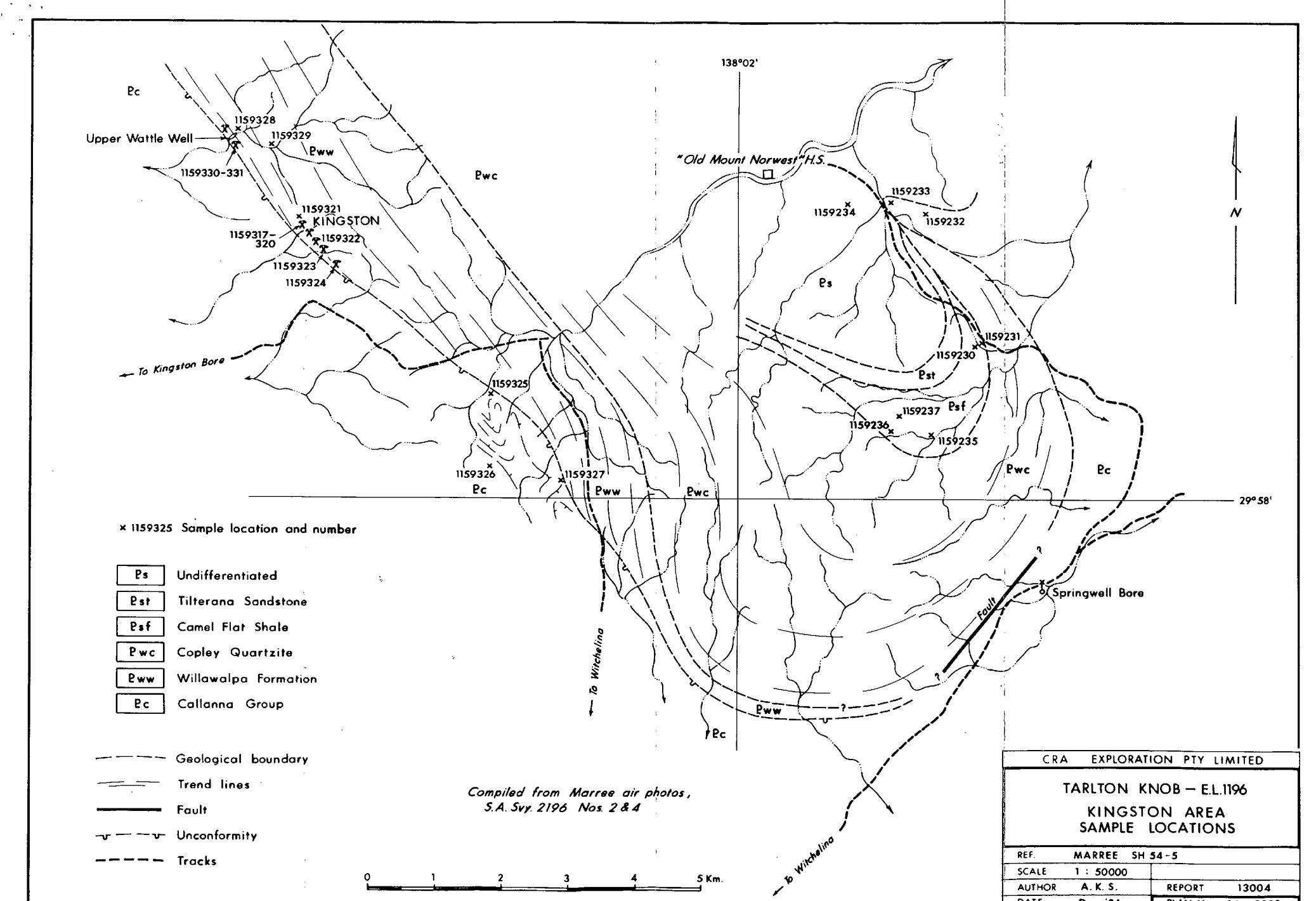
Track

Compiled from Marree air photo, S.A. Svy. 2196 No. 4

CRA EXPLORATION PTY LIMITED

TARLTON KNOB – E.L. 1196
DELUSION HILL
SAMPLE LOCATIONS

REFERENCE	MARREE SH 54 – 5		
SCALE	1 : 50000		
AUTHOR	A.K.S.	REPORT	13004
DATE	Dec. 84	PLAN No	SAa 3027



CRA EXPLORATION PTY LIMITED

TARLTON KNOB – E.L.1196

KINGSTON AREA SAMPLE LOCATIONS

REF.	MARREE SH 54-5		
SCALE	1 : 50000		
AUTHOR	A. K. S.	REPORT	13004
DATE	Dec. '84	PLAN No	SAo 3028

0072

APPENDIX I

PETROGRAPHIC DESCRIPTIONS

Pontifex & Associates Pty. Ltd. 0074

TEL. 332 6744
A.H. 31 3816

26 KENSINGTON ROAD, ROSE PARK
SOUTH AUSTRALIA

P.O. BOX 91, NORWOOD
SOUTH AUSTRALIA 5067

MINERALOGICAL REPORT NO. 4364

16th August, 1984

TO: Mr. A.K. Scott,
CRA Exploration Pty. Ltd.,
PO Box 254
NORWOOD S.A. 5067

COPY TO: The Administrator,
CRA Exploration Pty. Ltd.,
PO Box 254
NORWOOD S.A. 5067

The Manager,
Information Services
CRA Exploration Pty. Ltd.,
PO Box 656
FYSHWICK A.C.T. 2069

YOUR REFERENCE: Order No. 0628

MATERIAL: Rock samples, Callana Group Rocks in Willouran Ranges

IDENTIFICATION: ~~1159183 - 187~~,
1159202 - 204
1159218 - 219

WORK REQUESTED: Initially, all to be cut as thin sections and described. Later samples 1159183 to 187 were withdrawn from petrographic description.

SAMPLES & SECTIONS: Returned to you with this report.

PONTIFEX & ASSOCIATES PTY. LTD.

RISCHBIETH FELSIC

1159202 : quartz-syenite;
minor interstitial carbonate, opaque oxides,
accessory scattered apatite and zircon.

Perthitic alkali felspar crystals (80%), 0.5 - 4 mm in size are randomly interlocked to form an idiomorphic granular aggregate which forms the bulk of this rock. These felspar crystals are euhedral, and incorporate minor, relatively irregular, interstitial crystals of quartz and carbonate, also patches of interstitial opaque oxides, now mainly limonite.

Accessory zircon occurs as subhedral to euhedral crystals, up to 0.5 mm in length, in places enclosing small rutile grains. Larger rutile grains to 0.5 mm in length, accessory muscovite, biotite, and apatite are also scattered throughout

RISCHBIETH MAFIC DYKE

1159203 : massive (quartz) phlogopite-albite rock, with a heterogeneous texture;
possibly a phlogopite altered albitite;
accessory rutile and apatite, and complex fluid inclusions in quartz.

This is a massive crystalline rock, composed mainly of a heterogeneous aggregate of loosely, randomly interlocking crystals of albitic plagioclase (55%), locally concentrated into clusters, with a "matrix" of decussate greenish phlogopite.

Minor quartz, accessory fine rutile and apatite are randomly scattered, although apatite tends to occur in quartz, which occurs as patches to 4 mm across. The rutile occurs in the micaceous matrix.

The albite has commonly a checkerboard texture and may have replaced microcline. Crystals of albite up to 2 mm in length occur in clusters to 5 mm in size, with accessory apatite, and smaller albite grains are abundantly scattered through the phlogopite matrix.

The quartz contains complex primary (negative crystal) fluid inclusions, with up to 5 phases including isotropic anisotropic and opaque daughter minerals. These suggest that saline hydrothermal fluids were probably important in the genesis of the rock.

The genesis of the rock is uncertain however. It may be an albitite, enriched and permeated by phlogopite. It may have been syenitic/rhyolitic with phenocrysts of K-spar (now albitised), and rarer quartz, also pervasively enriched in phlogopite.

MUNTU MAFIC

1159204 : uralitised dolerite or coarse basalt, in contact with an epidote-rich "metadomain", derived from the same rock type.

Small areas in this thin section consist of dolerite or coarse basalt with plagioclase laths about 1 mm long. Uralite replicas of subophitic pyroxene grains, minor leucoxenised/ oxidised magnetite and minor granular to prismatic epidote are scattered.

Sharp contact occur between these areas and more extensive domains in which all of the felspar is replaced by epidote. The uralite replicas of augite grains, and the oxidised/leucoxenised magnetite grains are present in both lithologies. The epidote-rich areas (or metadomain) also contains large amoeboid vesicles, about 4 - 10 mm in diameter, filled by fibrous epidote.

MAFIC NEAR EAST MOUNT DAM

1159218 : uralitised ophitic basalt, with vesicles filled by epidote.

This is a finer grained version of 1159204, with abundant uralitic amphibole replicas of ophitic clinopyroxene grains about 0.7 mm in size, and plagioclase laths about 0.3 mm long, partly altered to albite and epidote. Oxidised small opaque grains are scattered.

Numerous vesicles, up to 5 mm in diameter are scattered, and are largely filled by epidote with a granular to fibrous texture. Minor to accessory actinolite and chlorite occur variously in these vesicles.

MAFIC NEAR EAST MOUNT DAM

1159219 : uralitised, chloritised;
hypohyaline, subophitic basalt.

This is an altered basalt with plagioclase laths 0.2 - 0.5 mm in length randomly oriented in a loose mesh work, and set in uralitised subophitic pyroxene grains in subequal abundance. Also they extend into areas of chlorite ± quartz, apparently replacing glass.

The chlorite is mostly an optically negative, fine grained variety, with blue anomalous interference colours, but patches of courser, optically positive (more aluminous) chlorite are also present.

Flakes of possible vermiculite are common, and may have replaced biotite. Rare opaques and chlorite, in patchy interstitial areas may have replaced rare olivine, more extensive oxidised opaque grains (probably magnetite) occur throughout.

Pontifex & Associates Pty. Ltd.

TEL. 332 6744
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26 KENSINGTON ROAD, ROSE PARK
SOUTH AUSTRALIA

P.O. BOX 91, NORWOOD
SOUTH AUSTRALIA 5067

0080

MINERALOGICAL REPORT NO. 4380

31st August, 1984

TO: Mr. A.K. Scott,
CRA Exploration Pty. Ltd.,
P.O. Box 254,
NORWOOD, S.A. 5067

COPY TO: The Administrator,
CRA Exploration Pty. Ltd.,
P.O. Box 254,
NORWOOD, S.A. 5067

The Manager, Information Services,
CRA Exploration Pty. Ltd.,
P.O. Box 656,
FYSHWICK, A.C.T. 2069

YOUR REFERENCE: Order No. B0631

MATERIAL: Rock samples, Callana Group rocks, Willauran Ranges

IDENTIFICATION: 1159294
1159305

WORK REQUESTED: Thin section preparation and description

SAMPLES & SECTIONS: Returned to you with this report

PONTIFEX & ASSOCIATES PTY. LTD.

WEST WILLOURAN FELSIC

1159294 : weakly, microporphyritic "albitite",
which may be regarded as an "albite-diorite",
or "soda-syenite";
accessory quartz, muscovite, apatite,
oxidised pyrite and/or magnetite

At least 85% of this rock consists of a compact crystalline aggregate of randomly interlocking subhedral crystals of plagioclase, which range in size from 1 mm, to larger crystals 1 x 4 mm. These differences in crystal size give the rock an incipiently porphyritic texture.

The plagioclase is essentially albite, with polysynthetic and rarer Carlsbad-type twinning, but whether this is primary albite, or originally a more calcic plagioclase which has been albitised is not certain. Some untwinned albite grains, which tend to be anhedral, and with weakly sutured intergranular margins partly invading twinned crystals, are probably secondary albite. Minor sericite alteration flecks are disseminated through the plagioclase.

Interstitial areas are largely occupied by very small irregular voids stained by limonite, and also include extremely fine granular clouded leucoxene and trace possible jarosite. Very small (0.1 mm but rarely to 0.3 mm) oxidised crystals of magnetite and/or pyrite, (2 - 3% of the whole rock), are scattered commonly associated with the voids.

Other accessory phases are quartz (3 - 5%), single small muscovite flakes (1 - 2%) and apatite crystals (1%); all in interstitial areas within the albite aggregate. Extremely small apatite crystals also occur as inclusions in many albite (or albitised) crystals.

This rock may be classified as an "albitite" on the basis of the pronounced dominance of albite (although it lacks the "aplitic texture" of normal albitites). It may be regarded as an "albite-diorite" or indeed, a "soda-syenite", i.e. a diorite or syenite which has been extensively soda-metasomatised.

NORTH BUNGARIDER "FELSIC"

1159305 : coarse diorite or leucogabbro;
modified by extensive metasomatism, involving
albitisation, chlorite-epidote alteration;
K-spar and tourmaline through interstitial areas,
and leucoxenisation of coarse skeletal magnetite

About 70% of this rock consists of a "loose" crystalline aggregate of randomly interlocked, subhedral crystals of albitic plagioclase, average size about 5 mm. These crystals are crowded with clusters of quite coarse granular/prismatic epidote, and with patches of finer chlorite, alteration phases.

Interstitial areas between plagioclase crystals are partly occupied by fine aggregates of epidote and chlorite (15 - 20% of the rock) ± chloritic clays, and all conceivably representing completely altered primary ferromagnesian crystals (?hornblende).

Minor clusters of blue, fine prismatic tourmaline (5 - 7%) also occurs interstitially, and are incorporated in some of the coarse plagioclase crystals. Coarse (2 - 4 mm) skeletal magnetite crystals (2 - 3%), are locally intergrown with plagioclase, as original components, but are now completely leucoxenised.

Late-stage, deuteric, potash felspar is widespread through intergranular areas between plagioclase crystals, to form up to 12% of the rock, and commonly invades the plagioclase crystals around their margins. This K-spar is highlighted, stained yellow, on the thin section offcut.

This rock is interpreted as a diorite (or possible leucogabbro as characterised by the coarse skeletal magnetites), in which extensive metasomatism has caused albitisation of the primary plagioclase, induced chlorite-epidote alteration, and finally has produced K-spar and more localised tourmaline interstitially and partly as replacement phases.

Pontifex & Associates Pty. Ltd.

TEL. 332 6744
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26 KENSINGTON ROAD, ROSE PARK
SOUTH AUSTRALIA

P.O. BOX 91, NORWOOD
SOUTH AUSTRALIA 5067

0083

MINERALOGICAL REPORT NO. 4424

24th October, 1984

TO: Mr. A.K. Scott,
CRA Exploration Pty. Ltd.,
PO Box 254
NORWOOD S.A. 5067

COPY TO: The Administrator,
CRAE
PO Box 254
NORWOOD S.A. 5067

Manager Information Services
CRA Exploration Pty. Ltd.,
PO Box 656
FYSHWICK A.C.T. 2069

YOUR REFERENCE: Order No. B0633

MATERIAL: Rock samples, Callana Group rocks,
Willauran Ranges S.A.

IDENTIFICATION: 1159317, 318, 330, 335

WORK REQUESTED: Thin section, petrographic report.

SAMPLES & SECTIONS: Returned to you with this report.

PONTIFEX & ASSOCIATES PTY.LTD.

CUPRIFEROUS QUARTZITE, KINGSTON

1159317 : weakly felspathic quartzite, incorporating minor clasts/lenses of siltstone and shale;
accessory chrysocolla, cuprite, malachite and limonite;
cut by veins of chrysocolla.

The bulk of this sample is a quartzite, with quartz grains 0.6 mm in size cemented largely by optically continuous intergranular overgrowth, which are also partly sutured due to metamorphic recrystallisation. This quartz aggregate includes accessory detrital felspar grains, also minor lenses and ?fragments of siltstone, sandy siltstone, and shale to 2 x 20 mm in size.

These fine clasts/lenses are dominated by sericite, with minor siltsize quartz and graphite. Accessory detrital tourmaline is scattered.

Irregular patches of bright red cuprite, and malachite, apparently as pseudomorphs after sparse small grains of sulphide occur in the sandstone, together with patches of chrysocolla.

The siltstone-shale lenses are commonly followed by veinlets of chrysocolla.

CUPRIFEROUS SANDSTONE/SILTSTONE, KINGSTON

1159318 : low-grade metamorphosed, interbedded, and fine graded, sandstone, siltstone and silty-pelite, (with interfingering lenses);
accessory malachite and limonite pseudomorphs after fine pyrite disseminated.

A fine graded-bedded sandstone-siltstone-shale sequence with beds 2 to 5 mm thick is apparently overlain by a thicker bed (10mm) of sandstone, with minor intercalated lenses and shreds of siltstone and shale. The graded sequence is cut by a contorted sandstone dyke, up to 10 mm wide.

The sandstone layers consist of very loosely packed grains of quartz and minor to accessory plagioclase and alkali felspar, 0.3 - 1 mm in size, together with accessory biotite and rare lithic fragments, generally composed of quartz silt and minor sericite. These grains have a fine grained quartz-sericite matrix, with relatively sparse patches of chlorite.

Accessory small former crystals of scattered pyrite are replaced by malachite and limonite. Patches of zoned limonite to 3 x 1 mm occur in both the sandstone layer and the dyke and are probably after pyrite.

The siltstone-shale units have various amounts of fine quartz, decreasing from siltstone to shale, with sharp contacts or graded contacts. Biotite is considerably more abundant (10%) than in the sandstone, but sericite is dominant in the shale. There are rare grains of zircon and tourmaline, and small pyrite grains in these layers are represented by leached, limonite-lined cavities.

Cupriferous Quartzite, Upper Wattle Well

1159330 : coarse grained weakly felspathic quartzite, incorporating accessory scattered carbonate and rarer oxidised pyrite.

This is a deformed quartzite with a grainsize of about 0.8 mm. Original detrital grains are no longer distinguishable from their overgrowths due to strongly micro-sutured intergranular contacts and subgrain development.

As in the other metasandstones in this batch, minor (7%) detrital alkali felspar are scattered through the quartz aggregate.

Also, minor carbonate (3%) is scattered as ragged grains to 1 mm, with some rhombohedral faces, and locally replaced by limonite.

Accessory (1%) limonite pseudomorphs after sulphides, probably pyrite, are randomly scattered, and a single minute grain of chalcpyrite is enclosed in limonite.

ALBITITE, NORTH BUNGARIDER

1159335 : partly albitised quartz-syenite;
accessory zircon, sphene, rutile, clinozoisite,
chlorite and sericite.

This sample is similar to 1159202 (in previous Pontifex Report 4364), and possibly to 1159294 in Report 4380. It consists essentially of weakly flow-oriented felspar laths 0.5 - 2 mm long, with very minor (5%) interstitial quartz.

Much of the felspar is albite but there are some cores of residual alkali felspar in many of the grains, as shown on the stained off-cut (yellow coloured). Most of the albite is probably derived from plagioclase, it is commonly lightly dusted with sericite and clinozoisite.

Interstitial chlorite is widespread in small amounts, together with accessory zircon and sphene. The sphene has locally, cores of rutile.

There are rare small cavities faced by euhedral albite, or more rarely, alkali felspar.

APPENDIX II

GEOCHEMICAL LEDGER SHEETS - ROCK SAMPLES

C.R.A. EXPLORATION PTY. LTD.- ROCK SAMPLE FIELD DATA SHEET.

0089

Area: TARLTON KNOB EL 1196. Collected: AKS. Analysed by COMLABS
Map ref: Date collected Date anal. rec.
Photo name Date to lab: Plan no:
Run No: D.P.O. No: B 0625 Report no:

Less than detection limit [-]

Sample Type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

ANALYSIS METHOD	FIRE
DETECTION LIMIT (ppm)	0.01

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No. CHIPS	TEST		Metal Content (ppm) Au
1159095			1				1	Douglas Gully Vein of quartz - limonite - malachite	-
1159096			1				1	Douglas Gully. Quartz - limonite - malachite vein	3.4
1159097			1				1	Douglas Gully. Quartz - limonite vein	0.1
1159098			1				1	Douglas Gully. Quartz - limonite - malachite vein.	0.35
1159099			1				1	Douglas Gully. Quartz - siderite - limonite vein 75 cm wide.	-
1159100			1				1	Douglas Gully. Quartz - limonite - malachite material in pit.	2.1
1159101			1				1	1 km north of Douglas Gully Vein of brecciated quartz - limonite 2 cm wide.	-
1159102			1				1	1 km N of Douglas Gully Similar to 1159101 but 25 cm wide.	-

C.R.A. EXPLORATION PTY. LTD. - ROCK SAMPLE FIELD DATA SHEET

Area: TARLTON KNOB EL 1196 | Collected: AKS | Analysed by COMLABS
Map ref: | Date collected | Date anal. rec.
Photo name | Date to lab: | Plan no:
Run No: | D.P.O. No: B 0625 | Report no:

Less than detection limit [-]

Sample type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No CHIPS	TEST		Metal Content (ppm) Au
								ANALYSIS METHOD	
								DETECTION LIMIT (ppm)	
1159112			1				1	4.5 km SW of Douglas Gully. Quartz blow with minor limonite.	-
1159140			1				1	Rischbieth Well. Quartz-limonite vein material in thin bedded shales and f.gr. felspathic sandstone in Rischbieth Ck.	-
1159141			1				1	Rischbieth Well. Quartz-limonite veins in m.gr. quartzite on top of hill 200 m S Rischbieth Well.	-
1159142			1				1	Rischbieth Well. Quartz-malachite-chalcocite veins in grey shale.	-
1159143			1				1	Rischbieth Well. Quartz-limonite vein.	-
1159144			1				1	Rischbieth Well. Crosscutting hematitic "vein" about 200 m S of Rischbieth workings.	-
1159145			1				1	Euramimma. Massive hematite at WD 33.	-

C.R.A. EXPLORATION PTY. LTD.- ROCK SAMPLE FIELD DATA SHEET

PAGE N°: 1 c

Area: TARLTON KNOB
Map ref:
Photo name
Run No:

Collected: AKS
Date collected
Date to lab:
D.P.O. No: B 0625

Analysed by COMLABS
Date anal. rec.
Plan no:
Report no:

Less than detection limit [-]

Sample type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No. CHIPS	TEST		ANALYSIS METHOD / DETECTION LIMIT (ppm)	Metal Content (ppm) Au
										Au
1159146			1				1	Euramimna. C.gr. diorite(?) minor pyrite.		-
1159147			1				1	Euramimna. Massive hematite on eastern side.		-
1159148			1				1	Euramimna. Quartz porphyry.		-
1159149			1				1	Duma's Mine. Limonite - quartz vein with minor malachite in slate, ss(-, dolomite.		0.4
1159150			1				1	Duma's Mine. As above, 500 m S of 1159149.		0.25

C.R.A. EXPLORATION PTY. LTD.- ROCK SAMPLE FIELD DATA SHEET.

PAGE N° 1d

Area: TARLTON KNOB | Collected: AKS | Analysed by COMLABS
Map ref: EL 1196. | Date collected | Date anal. rec.
Photo name | Date to lab: | Plan no:
Run No: | D.P.O. No: B 0626 | Report no:

Less than detection limit [-]

Sample type: 1. Chip. 3. Channel. 2. Float 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

Sample Number	COORDINATES AM.G/Long./Lat./Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No. CHIPS	TEST		Cu	Pb	Zn	Ag	Au	Hg	Ba	Ce	As
								ANALYSIS METHOD	AAS	AAS	AAS	AAS	AAS	AAS	XRF	XRF	XRF
								DETECTION LIMIT (ppm)	2	4	2	1	0.01	0.05	10	20	2
1159178	Breaden Run 2,	Hill area 6030.	1				1	Banded m gr. gy-bn marble. Some hard white material (silica ?) in fractures.	22	8	3	-	-	-	35	-	
1159179	Breaden Hill South Run 4,	5995	1				1	Hard gy dolomitic shale c̄ gypsum pseudomorphs of silica (thin plates).	38	6	10	-	-	-	135	20	
1159180	"		1				1	Laminated black shale.	14	4	8	-	-	-	470	60	
1159181	"		1				1	Laminated dk gy shale c̄ Fe oxides in blebs and spots.	16	10	65	-	-	-	280	40	
1159182	"		1				1	Laminated black shale c̄ 2-3 cm thick ferruginous bands every 15-20 cm.	210	20	110	-	-	-	240	60	
1159183	Breaden Run 5,	Hill South 5963	1				1	Laminated f.gr. dolomitic sst c̄ yellow coating.	18	6	6	-	-	-	500	50	12
1159184	"		1				1	Red orange and brown cellular oxidised shale. (Black when fresh).	44	-	5	-	-	-	185	-	44
1159185	"		1				1	Laminated black shale.	22	6	55	-	-	-	520	40	4
1159186	"		1				1	Dark dolomitic sltst.	24	6	70	-	-	-	480	50	16
1159187	Breaden [illegible]	Hill [illegible]	1				1	Calcreted(?) Callanna breccia.	14	-	7	-	-	-	720	60	10

C.R.A. EXPLORATION PTY. LTD. - ROCK SAMPLE FIELD DATA SHEET

PAGE N°: 2

Area: TARLTON KNOB EL 1196 | Collected: AKS | Analysed by COMLABS
Map ref: | Date collected | Date anal. rec.
Photo name | Date to lab: + B 0628 | Plan no:
Run No: | D.P.O. No: B 0626 | Report no:

Less than detection limit [-]

Sample Type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

	ANALYSIS METHOD											
	DETECTION LIMIT (ppm)											

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No. CHIPS	TEST		Metal Content (ppm) Cu	Pb	Zn	Ag	Au	Hg	Ba	Ce
1159188	WEST WILLOURRANS Run 5,	5966	1				1	Grey dolomite with "raspberry" textures.	9	8	6	-	-	-	120	-
1159189	"		1				1	Yellow-grey jaspery material.	24	32	6	-	-	-	140	20
1159190	"		1				1	Black chert, 5 cm thick.	14	10	4	-	-	-	570	-
1159191	"		1				1	Weathered earthy form of 1159189	490	140	135	-	-	-	65	30
1159192	"		1				1	Yellow-brn weathering dolomite & some leaching, soft white mineral.	70	55	90	-	-	-	145	20
1159193	KERSANTITE Run 4,	5992	1				3	Dk gy-gn f.gr. basic volcanic, 5m from albitite	7	4	16	-	-	-	95	50
1159194	"		1				3	Albitite, 5m from contact	18.	-	10	-	-	-	460	150
1159195	"		1				3	Amygdaloidal f.gr. dk. gy-gn volcanic, about 30 m from albitite contact.	5	-	42	-	-	-	230	50
1159196	"		1				3	M.gr. mafic.	7	6	20	-	-	-	670	130
1159197	BUNGARIDGER NTH Run 6,	8002	1				3	C.gr. plag-diops(?)-dolerite(?) & some hematite.	6	4	24	-	-	-	190	30

C.R.A. EXPLORATION PTY. LTD. - ROCK SAMPLE FIELD DATA SHEET.

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Area: TARLTON KNOB EL 1196 | Collected: AKS | Analysed by COMLABS
Map ref: | Date collected | Date anal. rec.
Photo name | Date to lab: | Plan no:
Run No: | D.P.O. No: B 0626/0628 | Report no:

Less than detection limit [-]

Sample type: 1. Chip. 3. Channel. 2. Float 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No. CHIPS	TEST		Metal Content (ppm) Cu	Pb	Zn	Ag	Au	Hg	Ba	Ce
								ANALYSIS METHOD								
								DETECTION LIMIT (ppm)								
1159198	WARRA WARRA NTH		1				1	Grey dolomitic shale and dolomite float from bed T1. 3m thick	5	8	9	-	-	-	480	-
1159199	"		1				1	Grey dolomite and dolomitic shale. Laminated. 3m thick From T1.	6	10	7	-	-	-	360	20
1159200	"		1				1	F.gr. sst, somewhat brecciated. Finely banded. BI shale on N side. Some malachite in sst.	660	4	5	-	-	-	110	40
1159201	"		1				1	Dk gy shale and gy. v. f.gr. laminated sst in Cu pit. Adjacent to brecciated qtz-Cu vein and brecciated shale and qtzite on N side.	8050	20	9	-	-	-	45	50
1159202	RISCHBIETH WINDOW		1				3	Albitite (top of hill)								
1159203	"		1				3	Dk lustitic dyke material cutting albitite & Callanna.								
1159204	MUNTU		1				3	Dk gn volcanics containing much diopside & epidote near WD38.								

C.R.A. EXPLORATION PTY. LTD.- ROCK SAMPLE FIELD DATA SHEET

PAGE N°: 4

Area: TARLTON KNOB EL 1196 | Collected: AKS | Analysed by COMLABS
Map ref: | Date collected | Date anal. rec.
Photo name | Date to lab: | Plan no:
Run No: | D.P.O. No: B 0626 | Report no:

Less than detection limit [-]

Sample type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

Sample Number	COORDINATES A.M.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (equal)	No. CHIPS	TEST		Metal Content (ppm) Cu	Pb	Zn	Ag	Au	Hg	Ba	Ce
ANALYSIS METHOD																
DETECTION LIMIT (ppm)																
1159205	TOP MOUNT AREA		1				1	Laminated black shale.	55	8	6	-	-	-	510	80
1159206	"		1				1	Laminated black shale with fer. oxidised zones.	200	-	3	-	-	-	430	80
1159207	MT. NORWEST		1				1	Porous f.gr. grey rst, ± much soft white mineral on outcrop.	28	4	2	-	-	-	340	-

C.R.A. EXPLORATION PTY. LTD. - ROCK SAMPLE FIELD DATA SHEET

PAGE N°: 5

Area: TARLTON KNOB EL 1196 | Collected: AKS | Analysed by COMLABS.
Map ref: | Date collected | Date anal. rec.
Photo name | Date to lab: | Plan no:
Run No: | D.P.O. No: B 0627 | Report no:

Less than detection limit [-]

Sample Type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No CHIPS	TEST		ANALYSIS METHOD	Col.	Vol.	Vol.	AAS	Grav.
									DETECTION LIMIT (ppm)					
								All samples of magnesite from Skillogalee Dolomite.	Metal Content (%)					
									SiO_2	MgO	CaO	Fe_2O_3	L.O.I.	
1159208	SCREECH	OWL CK.	1				1	1m thick; 50% intraclasts, 50% lt gy. matrix.	2.80	42.7	3.35	0.54	49.0	
1159209	"		1				1	40cm thick. Few thin shale partings. Appears fairly pure.	7.60	36.8	6.85	0.53	43.9	
1159210	"		1				1	0.55m thick. Fairly pure. 70% intraclasts, 30% matrix.	7.40	42.4	1.61	0.50	46.0	
1159211	"		1				1	0.30m thick. Large lt. gy. intraclasts up to 50 mm.	10.8	39.3	3.00	1.07	43.4	
1159212	"		1				1	0.65m thick. Fine intraclasts, gy matrix.	10.5	34.1	11.4	0.55	41.8	
1159213	"		1				1	2.5m thick. Appear impure.	1.83	41.4	6.10	0.23	48.8	
1159214	"		1				1	3m thick. F.gr. intraclasts & low matrix content.	3.90	42.8	2.95	0.07	46.8	
1159215	"		1				1	As above.	2.35	40.1	7.65	0.12	47.5	
1159216	"		1				1	3m thick. Thin beds & many shale partings.	6.15	42.5	3.65	0.07	46.3	
1159217	"		1				1	2m thick. Fine material, & much gy. matrix.	6.05	32.1	14.8	0.23	45.5	

C.R.A. EXPLORATION PTY. LTD. - ROCK SAMPLE FIELD DATA SHEET.

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Area: TARLTON KNOB EL 1196. Collected: AKS Analysed by PONTIFEX
Map ref: Date collected Date anal. rec.
Photo name Date to lab: Plan no:
Run No: D.P.O. No: B 0628 Report no:
Less than detection limit [-]

Sample type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

ANALYSIS METHOD												
DETECTION LIMIT (ppm)												

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No. CHIPS	TEST		Metal Content (ppm)
1159 218	Between	West-	1				3	Mafic volcanic in Callanna	
	Mount	Hut and						N side of track.	
	Berlina	Dam.							
1159 219	"		1				3	Mafic volcanic in Callanna	
								S side of track.	

C.R.A. EXPLORATION PTY. LTD. - ROCK SAMPLE FIELD DATA SHEET.

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Area: TARLTON KNOB EL. 1196. Collected: AKS. Analysed by COMLABS
Map ref: Date collected Date anal. rec.
Photo name MARREE SVY 2196 Date to lab: Plan no:
Run No: 004 D.P.O. No: B 0629 Report no:
Less than detection limit [-]

Sample type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No. CHIPS	TEST		Cu	Pb	Zn	Ag	Au	Hg	As	Ba	Ce
ANALYSIS METHOD									AAS	AAS	AAS	AAS	AAS	AAS	XRF	XRF	XRF
DETECTION LIMIT (ppm)									2	4	2	1	0.01	0.05	2	10	20
									Metal Content (ppm)								
1159220			1				1	Ferruginised shale with white soft earthy oxide material. Grey shale to W.	2000	-	36	-	-	-	155	970	40
1159221			1				1	Dk. gy. dolomitic shale — brecciated — with much drusy qtz. Fragments 1-2 cm, angular. Some open space.	22	4	12	-	-	-	5	300	30
1159222			1				1	As above. Several metres E of above sample.	50	6	4	1	-	-	6	290	20
1159223			1				1	Similar breccia to above, but no qtz. Some open spaces	12	4	7	-	-	-	7	390	70
1159224			1				1	Dk. gy. shale breccia, similar to above & minor qtz. Some silicification.	115	6	6	-	-	-	14	400	40
1159225			1				1	Ferruginous shale with qtz and soft white mineral.	36	-	14	-	-	-	90	580	-
1159226			1				1	Ferr. shale with white sulphate(?) and calcite.	1250	6	40	-	-	-	44	340	-
1159227			1				1	Ferr. shale with brecciated Hematitic qtz.	1550	6	12	-	-	-	14	4250	20

C.R.A. EXPLORATION PTY. LTD.- ROCK SAMPLE FIELD DATA SHEET.

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Area: TARLTON KNOB Collected: AKS. Analysed by COMLABS
Map ref: EL 1196 Date collected Date anal. rec.
Photo name MARREE Date to lab: Plan no:
Run No: SVY 2196/004 D.P.O. No: B 0629 Report no:

Less than detection limit [-]

Sample type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

	ANALYSIS METHOD											
	DETECTION LIMIT(ppm)											

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No. CHIPS	TEST		Metal Content (ppm) Cu	Pb	Zn	Ag	Au	Hg	As	Ba	Ce
1159228			1				1	Brecciated ferr. shale and dolomite. Sulphate(?) present. W of bed sampled above.	200	-	40	-	-	-	26	310	50
1159229			1				1	Laminated black shale & oxidised pyrite(?) framboids.	24	10	4	-	-	-	12	340	80
1159230			1				1	Brown weathering black dol^{c} siltstone. ~~Just above~~ Part of Camel Flat Shale.	6	6	28	-	-	-	6	210	60
1159231			1				1	Basal 50 m of Camel Flat Shale. Laminated gy to gy/gn slaty shale. Black towards bed sampled above.	18	-	26	-	-	-	10	2600	50
1159232			1				1	Yellow-bn dolomitic matrix from Callanna breccia.	18	6	12	-	-	-	6	70	-
1159233			1				1	Black shale. Some sulphated(?)	6	8	8	-	-	-	6	145	20
1159234			1				1	Black shale and dolomitic shale. Some sulphate(?).	7	4	10	-	-	-	5	15	-
1159235			1				1	Gy-gn shale, with some pyrite. ESF.	24	10	60	-	-	-	6	1650	60

C.R.A. EXPLORATION PTY. LTD.- ROCK SAMPLE FIELD DATA SHEET.

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Area: TARLTON KNOB EL 1196 Collected: AKS Analysed by COMLABS.
Map ref: Date collected Date anal. rec.
Photo name MARREE Date to lab: Plan no:
Run No: SUY 2196/004 D.P.O. No: B 0629 Report no:

Less than detection limit [-]

Sample type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

	ANALYSIS METHOD											
	DETECTION LIMIT (ppm)											

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No CHIPS	TEST		Metal Content (ppm) Cu	Pb	Zn	Ag	Au	Hg	As	Ba	Ce
1159236			1				1	Cy-gn shale (no pyrite) near base of Esf unit.	70	6	60	-	-	-	5	2200	60
1159237			1				1	Leached black shale with sulphate (?). Esf.	22	14	65	-	-	-	4	830	60

C.R.A. EXPLORATION PTY. LTD. - ROCK SAMPLE FIELD DATA SHEET

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Area: TARLTON KNOB LEL 1196 | Collected: AKS | Analysed by COMLABS.
Map ref: BHP | Date collected | Date anal. rec.
Photo name ~~FAIRFIELD~~ | Date to lab: | Plan no:
Run No: 4/5994 | D.P.O. No: B 0629 | Report no:

Less than detection limit [-]

Sample type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

	ANALYSIS METHOD											
	DETECTION LIMIT (ppm)											

Sample Number	COORDINATES AMG/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No. CHIPS	TEST		Metal Content (ppm) Cu	Pb	Zn	Ag	Au	Hg	As	Ba	Ce
1159238			1				1	Laminated black shale and dolomitic shale. Topmost black shale unit in Burnas. Approx 5 m thick.	4	20	22	-	-	-	7	95	20
1159239			1				1	As above, but 9 m below top unit. 5 m thick.	5	6	16	-	-	-	10	130	30
1159240			1				1	Laminated black shale ± minor limonite. Probably near base of Umberatana.	12	6	48	-	-	-	9	300	40
1159241			1				1	As above but 5 m stratigraphically above.	12	6	26	-	-	-	6	370	50
1159242			1				1	As above, but about 25 m stratigraphically above.	22	6	28	-	-	-	4	400	50
1159243			1				1	Black shaly dolomite. 10 m above 1159242.	10	10	90	-	-	-	6	190	20
1159244			1				1	Black shale within above dol.	46	6	50	-	-	-	6	300	40
1159245			1				1	Black shale. Beneath 1 m thick cgl.	28	10	80	-	-	-	10	510	50
1159246			1				1	V. fgn. shale (and minor cgl)	40	80	115	-	-	-	210	660	50

C.R.A. EXPLORATION PTY. LTD. - ROCK SAMPLE FIELD DATA SHEET

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Area: TARLTON KNOB LL 1196. Collected: AKS Analysed by COMLABS
Map ref: Date collected Date anal. rec.
Photo name BHP Date to lab: Plan no:
Run No: 1/6037 D.P.O. No: B 0629 Report no:

Less than detection limit [-]

Sample Type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No. CHIPS	TEST		Metal Content (ppm) Cu	Pb	Zn	Ag	Au	Hg	As	Ba	Ce
ANALYSIS METHOD																	
DETECTION LIMIT (ppm)																	
1159247			1				1	Black dolomitic shale or shaly dolomite in unit Lco (Boorloo Siltstone)	36	4	12	-	-	-	8	280	30
1159248			1				1	Black shale just below (to W) of previous sample.	40	-	7	-	-	-	6	790	70
1159249			1				1	Dark siliceous shale with mica	9	-	18	-	-	-	4	230	60
1159250			1				1	Albitite area W of The Dome. Lt. gy. dolomite/lst with nodular and bedded chert (some red) and shaly beds.	5	-	10	-	-	-	4	55	-
1159288			1				1	Sample of albitite. Contains interstitial hematite.	12	6	14	-	-	-	7	1000	70
															7	260	40
1159289	BHP Run	2/6027	1				1	Wd black shale with some sulphate (?). Umberatana.	16	6	42	-	-	-			
1159290			1				1	Dk. gy. shale with limonite. (Site of Dampier's 930 ppm Zn).	36	4	40	-	-	-	3	410	30
~~TEST~~																	

C.R.A. EXPLORATION PTY. LTD.- ROCK SAMPLE FIELD DATA SHEET.

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Area: TARLTON KNOB EL 1196. Collected: AKS Analysed by COMLABS
Map ref: Date collected Date anal. rec.
Photo name Date to lab: Plan no:
Run No: D.P.O. No: B 0629 Report no:

Less than detection limit [-]

Sample type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

	ANALYSIS METHOD											
	DETECTION LIMIT(ppm)											

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sqcm)	No. CHIPS	TEST		Metal Content (ppm) Cu	Pb	Zn	Ag	Au	Hg	As	Ba	Ce
1159291	Dunn's Mine area		1				1	Multicoloured shales with much Fe. Base of WR3.	190	8	42	-	-	-	44	1300	60
1159292	West Rocks area		1				1	As for 1159291. Base of WR3.	24	-	150	1	-	-	26	450	50
1159293	BHP 4/	5993	1				1	Fern shale in WU 3. Approx location of 1100 Zn/600 Pb. of Dampier Mining.	9	-	16	-	-	-	22	230	20
1159294			1				1	Alkitite in Kersantite area. Contains many hematitic veins.	16	-	16	-	-	-	4	490	60
1159295			1				1	Sheared fern. shale and volcanic (?) wall rock from Kersantite alkaitite	8	6	125	-	-	-	9	115	20
1159296	BHP 1/	6037	1				1	Black shale (Eco) - Boorloo Siltstone.	12.	-	7	-	-	-	4	870	40

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Area: THARLTON KNOB EL 1196 | Collected: AKS | Analysed by COMLABS
Map ref: | Date collected | Date anal. rec.
Photo name CUEDIMURKA | Date to lab: | Plan no:
Run No: SVY 2092/039 | D.P.O. No: B 0629 | Report no:

Less than detection limit [-]

Sample Type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

	ANALYSIS METHOD											
	DETECTION LIMIT (ppm)											

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No CHIPS	TEST		Metal Content (ppm) Cu	Pb	Zn	Ag	Au	Hg	As	Ba	Ce
1159297	CLARA-St. DORA		1				1	Grey limestone (?) with veins of chalcocite & malachite	9.1%	6	6	7	0.18	-	16	990	-
1159298			1				1	White mineral. Minor calcite	2150	4	8	-	-	-	160	30	-
1159299			1				1	Soft white mineral forming 1 cm thick botryoidal coating on yellow-brown lst. From small pit 500 m ESE of main workings.	1550	4	10	-	-	-	8	135	-
1159300			1				1	Same location as above. Gossanous lst with some white mineral.	3.1%	24	12	-	-	-	2850	270	30
1159301			1				1	Grey lst with chalcocite and malachite. From main workings (dump).	1.8%	-	6	-	-	-	9	25	-
1159302			1				1	Gy-gn shale at base of Tapley Hill Fm.	165	6	95	-	-	-	14	360	50
1159303			1				1	Wd gy-gn shale in Tapley Hill or Amberoona Sst.	125	20	70	-	-	-	6	410	50

C.R.A. EXPLORATION PTY. LTD.- ROCK SAMPLE FIELD DATA SHEET.

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Area: TARLTON KNOB EL 1196 | Collected: AKS | Analysed by COMLABS.
Map ref: | Date collected | Date anal. rec.
Photo name | Date to lab: | Plan no:
Run No: | D.P.O. No: B 0629 | Report no:

Less than detection limit [-]

Sample type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No. CHIPS	TEST		Metal Content (ppm) Cu	Pb	Zn	Ag	Au	Hg	As	Ba	Ce
ANALYSIS METHOD																	
DETECTION LIMIT (ppm)																	
1159304			1				1	Albitite from Rischbieth Window.	48	4	12	-	-	-	4	510	80
1159305			1				1	Albitite (?) from North Bemganidar Window.	22	4	30	-	-	-	7	360	40
1159306			1				1	Albitite from Chintapanna Window.	12	-	4	-	-	-	6	220	150

C.R.A. EXPLORATION PTY. LTD. - ROCK SAMPLE FIELD DATA SHEET.

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Area: TARLTON KNOB EL 1196. Collected: AKS Analysed by COMLABS
Map ref: Date collected 20.9.84 Date anal. rec.
Photo name MARABLE Date to lab: Plan no:
Run No: SVY 2196/002 (B&W) D.P.O. No: B0633/0634 Report no:

Less than detection limit [-]

Sample type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

Sample Number	COORDINATES A.M.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (equal)	No CHIPS	TEST		Cu	Pb	Zn	Co	Ag	Au	As	Ba	Ce
ANALYSIS METHOD									AAS	AAS	AAS	AAS	AAS	AAS	XRF	XRF	XRF
DETECTION LIMIT (ppm)									2	4	2	4	0.1	0.02	2	10	20
									Metal Content (ppm)								
1159317	KINGSTON	WORKINGS	1				3	M.gr. quartzite with thin slaty partings. Malachite on joints and cleavage.									
1159318	"	"	1				3	Thin bedded grey siltstone and f.gr. sandstone. Contains malachite									
1159319	"	"	1				1	as for 1159317	1.45%	30	60	-	-	0.12	1200	195	-
1159320	"	"	1				1	as for 1159318	4850	28	10	-	-	0.02	195	540	60
1159321	"	"	1				1	Laminated carbonaceous shale, about 75 m above Cu workings.	50	28	44	4	-	-	16	500	50
1159322	"	"	1				1	Thinly undulose bedded f.gr. sst. and slst. with malachite on cleavage planes.	1.35%	16	9	-	-	0.35	85	530	30
	250 m S of main	south workings															
1159323	"	"	1				1	M.gr. slightly felspathic sst. with blebs of chalcocite/malachite on joints.	1.20%	8	28	-	-	0.33	42	30	-
	500 m south of main workings.																
1159324	"	"	1				1	Qtz. vein material with chalcocite and malachite.	3.90%	36	55	-	-	0.85	260	2400	-
	750 m S of main	south workings															

C.R.A. EXPLORATION PTY. LTD. - ROCK SAMPLE FIELD DATA SHEET

PAGE N°: 16

Area: TARLTON KNOB EL 1196. Collected: AKS Analysed by COMLABS
Map ref: Date collected 20.9.84 Date anal. rec.
Photo name MARREE Date to lab: Plan no:
Run No: SVY 2196/002 D.P.O. No: B0633/0634 Report no:

Less than detection limit ⊟

Sample Type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No. CHIPS	TEST		Cu	Pb	Zn	Co	Ag	Au	As	Ba	Ce
								ANALYSIS METHOD									
								DETECTION LIMIT (ppm)									
									Metal Content (ppm)								
1159325			1				1	F-m/gr mafic igneous(?) rock with large pale orange spots of felspathic composition	85	-	32	14	-	-	7	50	40
1159326			1				1	Laminated black shale with many pyrite cavities.	65	4	10	-	-	-	9	1050	50
1159327			1				1	Soft grey shale; bedding indistinct.	14	8	5	6	-	-	9	60	50
1159328	UPPER WATTLE WELL		1				1	Laminated black shale with limonitic spots. About 200 m E of unconformity.	18	8	24	-	-	0.04	10	260	30
1159329	"	"	1				1	Laminated black slate. Rather dense.	14	14	34	-	-	-	12	300	20
1159330	"	"	1				3	M.gr. glassy pale grey with numerous cavities after sulphide. Pyrite (and cpy?) visible.									
1159331	"	"	1				1	As for 1159330.	860	10	18	-	-	0.07	12	35	-
1159332	Small pit 750 m NE of "Witchelina"		2				1	Earthy and laminated hematitic rock - purplish colour. No malachite.	10	-	18	50	-	-	55	30	-

C.R.A. EXPLORATION PTY. LTD.- ROCK SAMPLE FIELD DATA SHEET

PAGE N°: 17

Area: TARLTON KNOB EL 1196. Collected: AKS Analysed by COMLABS
Map ref: Date collected 21-9-84 Date anal. rec.
Photo name Date to lab: Plan no:
Run No: D.P.O. No: B 0633/0634 Report no:

Less than detection limit [-]

Sample type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

	ANALYSIS METHOD											
	DETECTION LIMIT (ppm)											

Sample Number	COORDINATES A.M.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (1sq.m)	No. CHIPS	TEST		Metal Content (ppm) Cu	Pb	Zn	Co	Ag	Au	As	Ba	Ce
1159333	2.0 km NW of Chintapanna Dam		1				1	M. gr. grey (?) crystalline rock of qtz-felspar composition ± large laths of felspar. Veined by Rematite. 240 cps (2× bgd).	12	4	5	-	0.2	-	26	1300	80
1159334	200 m NW of tank situated 5.4 km NW of Chintapanna.		1				1	Breccia. Angular and sub-rounded fragments of slate and qtzite in matrix of finely crystalline Rematite. 120-150 cps.	14	6	9	6	-	-	8	370	20
1159335	0.7 km SE of Nth. Bungarider Dam.		1				3	F-m. gr. leucocratic rock of albite and sericite. R/a 60-80 cps.									
1159336	1.5 km NW of Nth Bungarider Dam.		1				1	Yellow-brown jasper and quartz. 50 cps.	10	6	8	-	-	-	9	410	-
1159337	1.5 km WSW of Warra Warra mine.		1				1	Silicified laminated contorted shale about 50 m from Callanna unconformity. This is immediate footwall unit to mineralised bed at Warra Warra.	20	8	6	-	-	-	10	120	30

C.R.A. EXPLORATION PTY. LTD. - ROCK SAMPLE FIELD DATA SHEET

Area: TARLTON KNOB EL 1196. Collected: AKS Analysed by COMLABS
Map ref: Date collected Date anal. rec.
Photo name Date to lab: Plan no:
Run No: BHP 4/5993 D.P.O. No: B 0634 Report no:

Less than detection limit [-]

Sample type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (square)	No. CHIPS	TEST		Cu	Pb	Zn	Co	Ag	Au	As	Ba	Ce
								ANALYSIS METHOD									
								DETECTION LIMIT (ppm)									
1159338	BHP Run 4/5993		1				1	Pyritic siltstone and ferr. sandstone. 170 cps.	360	8	48	30	-	-	9	420	50
1159339	BHP Run 3/6006		1				1	Brecciated f. gr. pale silicified rock with many cavities after py. All weathered surfaces coated with limonite, minor limonite in matrix. Essentially a tectonic breccia. Base of Rwt. 200 cps.	18	8	14	-	-	-	10	530	40
1159340	Horseshoe area		1				1	Siliceous thin bedded dark slate. Basal Bungarider Fm.	200	8	10	8	-	-	14	470	20
1159341	"	"	1				1	Pyritic siliceous slate. Near Callanna unconformity.	120	-	6	4	-	-	22	320	50
1159342	Top Mount Diggings		1				1	Grey shale with minor sst. and calcareous sst. ~40cm away from 15 cm thick siderite - qtz - limonite - mal vein.	2700	60	12	12	-	0.31	180	250	20
1159343	"	"	1				1	F/gr fawn sandstone / sandy siltstone, close to another cupriferous vein as above. (about 1 m away).	560	-	8	6	-	0.04	10	420	20

C.R.A. EXPLORATION PTY. LTD. - ROCK SAMPLE FIELD DATA SHEET.

Area: TARLTON KNOB EL 1196. Collected: AKS Analysed by COMCABS
Map ref: Date collected Date anal. rec.
Photo name Date to lab: Plan no:
Run No: D.P.O. No: B 0634 Report no:

Less than detection limit [-]

Sample type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

	ANALYSIS METHOD											
	DETECTION LIMIT (ppm)											

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No. CHIPS	TEST		Metal Content (ppm) Cu	Pb	Zn	Co	Ag	Au	As	Ba	Ce
1159344	BHP Run 4/5983		1				1	Brecciated f-m.gr. limonitic silicified quartzite. 130 cps.	16	6	12	4	-	-	10	290	-
1159345	"	"	1				1	Leached laminated dolomitic stst. and f.gr. sandy stst, with limonite spots throughout - Some thin carbonate-limonite veins. 200 cps.	10	4	14	6	-	-	10	80	50
1159346	"	"	1				1	Pale f.gr. quartzite with many cavities after (?) gypsum. Brecciated in "porphyry" type manner. 130 cps.	8	-	14	-	-	-	6	340	20
1159347	Warra	Warra	1				1	Grey m.gr. dolomitic shaly dol.	590	6	24	4	-	-	36	200	20
1159348	"	"	1				1	F.gr. pale grey slightly felspathic sst.	950	12	24	-	-	0.02	24	670	30
1159349	"	"	1				1	M.gr. somewhat felspathic lt. grey sst with some limonite cavities after pyrite. Minor brecciation in places.	18	-	10	-	-	-	7	240	-

C.R.A. EXPLORATION PTY. LTD.- ROCK SAMPLE FIELD DATA SHEET.

Area: TARLTON KNOB Collected: AKS Analysed by COMLABS
Map ref: EL 1196 Date collected Date anal. rec.
Photo name Date to lab: Plan no:
Run No: D.P.O. No: B 0634 Report no:

Less than detection limit [-]

Sample Type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

Sample Number	COORDINATES AM.G/Long./Lat/Local EAST	NORTH	SAMPLE TYPE	WIDTH (m)	AREA (sq.m)	No CHIPS	TEST		Cu	Pb	Zn	Co	Ag	Au	As	Ba	Ce
								ANALYSIS METHOD									
								DETECTION LIMIT (ppm)									
									Metal Content (ppm)								
115-9350	Warra	Warra	1				1	Brecciated m.gr. sst. with matrix of sst, g/z, minor dolomite and limonite.	24	4	320	10	-	-	14	160	20
11593353	"	"	1				1	F.gr., pale gy, flaggy sst, with cross-cutting g/z veins. Unit T2.	24	6	6	-	-	-	10	510	20

APPENDIX III

GEOCHEMICAL LEDGER SHEETS - STREAM SEDIMENT SAMPLES

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C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

Page: 1

Tenement: TARLTON KNOB EL 1196 | D.P.O. No: B 0624

Area / Prospect: DOUGLAS GULLY | Sample Nos.: 1159103 – 115 | Geologist: AKS | Date: 3.5.84

Plan / Photo Ref: CURIMURKA SVY 2091/98 | Mesh Size: | Analysed by: COMLABS

Sample Number	H.M. Trap / Random	Channel						Sediment					Mesh Size	Metal Content in p.p.m.									Geological Observations
		Wet / Dry	Width	Banks	Grad.	Alluv.	Colluv.	Grav %	Sand %	Silt %	Mud %	Org %		Ag	Mo	Au①	Au②						
1159103			12					50	30	20			-20 +40	<1	<4	<0.01	<0.01						Float: shale, qtzite,
104													-40 +80	<1	<4	<0.01	<0.01						qtz-limonite, malachite
105													-80	<1	<4	<0.01	<0.01						Same site as R/m
																							sample 917441.
1159106			15										-20 +40	<1	<4	<0.01	<0.01						Taken from point
107													-40 +80	<1	<4	<0.01	<0.01						bar. Same site as
108													-80	<1	<4	<0.01	<0.01						R/m sample 917442.
1159109			40										-20 +40	<1	<4	<0.01	<0.01						Taken from point
110													-40 +80	<1	<4	<0.01	<0.01						bar. Same site as
111													-80	<1	<4	<0.01	<0.01						R/m sample 917443.
1159113			12										-20 +40	<1	<4	<0.01	<0.01						Same site as
114													-40 +80	<1	<4	<0.01	<0.01						R/m sample 917444.
115													-80	<1	<4	<0.01	<0.01						

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

Tenement: TARLTON KNOB EL 1196 | D.P.O. No: B 0624

Area / Prospect: ROOKS MINE | Sample Nos.: 1159116 – 1159139 | Geologist: AKS | Date: 3.5.84

Plan / Photo Ref.: CURDIMURKA SVY 2092/47 | Mesh Size: | Analysed by: COMLABS

Sample Number	~~Auger~~ / Random	Channel: Dry	Channel: Width	Channel: Banks	Channel: Grad.	Channel: Alluv.	Channel: Colluv.	Sediment: Grav %	Sediment: Sand %	Sediment: Silt %	Sediment: Mud %	Sediment: Org %	Mesh Size	Metal Content in p.p.m.: Ag	Mo	Au①	Au②	Geological Observations
1159116			3					70	20	10			-20 +40	<1	<4	<0.01	<0.01	Float: limonitic q/z,
117													-40 +80	<1	<4	<0.01	<0.01	shale, qtzite
118													-80	<1	<4	<0.01	<0.01	
1159119			5					70	25	5			-20 +40	<1	<4	<0.01	<0.01	Float: Qtzite, black
120													-40 +80	<1	<4	<0.01	<0.01	shale.
121													-80	<1	<4	<0.01	<0.01	
1159122			6					60	30	10			-20 +40	<1	<4	<0.01	<0.01	Float: Qtzite, black
123													-40 +80	<1	<4	<0.01	<0.01	shale, limonitic stst-
124													-80	<1	<4	<0.01	<0.01	Outcrop: Black shales.
1159125			2					70	10	20			-20 +40	<1	<4	<0.01	<0.01	Fl: Qtz - limonite,
126													-40 +80	<1	<4	<0.01	<0.01	black shale, qtzite
127													-80	<1	<4	<0.01	<0.01	
1159128			8					65	25	10			-20 +40	<1	<4	<0.01	<0.01	Fl: Qtzite, bl. shale,
129													-40 +80	<1	<4	<0.01	<0.01	limonite
130													-80	<1	<4	<0.01	<0.01	

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

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Tenement: TARLTON KNOB EL 1196 | D.P.O. No: B0624

Area / Prospect: ROOKS MING | Sample Nos.: | Geologist: AKS | Date: 3.5.84

Plan / Photo Ref: CURSIMURKA SVY 2092/47 | Mesh Size: | Analysed by: COMLABS

Sample Number	H.M. Trap/ Random	Channel: Wet/Dry	Channel: Width	Channel: Banks	Channel: Grad.	Channel: Alluv.	Channel: Colluv.	Sediment: Grav %	Sediment: Sand %	Sediment: Silt %	Sediment: Mud %	Sediment: Org %	MESH SIZE	Metal Content in p.p.m.: Ag	Mo	Au①	Au②	Geological Observations
1159131			2					55	20	25			-10 +40	<1	<4	<0.01	<0.01	O/c: Grey shale
132													-40 +80	<1	<4	<0.01	<0.01	FT: limonite, shale
133													-80	<1	<4	<0.01	<0.01	
1159134			20					75	20	5			-10 +40	<1	<4	<0.01	<0.01	O/c: Black shale.
135													-40 +80	<1	<4	<0.01	<0.01	FT: Qtzite, shale, limonite
136													-80	<1	<4	<0.01	<0.01	
1159137			5					20	40	40			-10 +40	<1	<4	<0.01	<0.01	FT: Qtzite, shale.
138													-40 +80	<1	<4	<0.01	<0.01	
139													-80	<1	<4	<0.01	<0.01	

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GEOCHEMICAL DRAINAGE SAMPLING LEDGER

Tenement: TARLTON KNOB EL 1196 — D.P.O. No: B 0624

Area / Prospect: DUNNS MINE — Sample Nos.: 1159151 – 1159177 — Geologist: AKS — Date: 3.5.84

Plan / Photo Ref: CURRAMURKA SUY 2092/47 — Mesh Size: — Analysed by: COMLABS

Sample Number	H.M. Trap / Random	Channel: Wet / Dry	Width	Banks	Grad.	Alluv.	Colluv.	Sediment: Grav %	Sand %	Silt %	Mud %	Org %	Mesh Size	Metal Content in p.p.m.: Ag	Mo	Au ①	Au ②	Geological Observations
1159151			1.5					90	5	5			-20 +40	<1	<4	<0.01	<0.01	FI: Qtzite, shale,
152													-40 +80	<1	<4	<0.01	<0.01	minor gossan.
153													-80	<1	<4	<0.01	<0.01	
1159154			2					85	10	5			-20 +40	<1	<4	<0.01	<0.01	FI: Qtzite, qtz-limonite
155													-40 +80	<1	<4	<0.01	<0.01	shale.
156													-80	<1	<4	<0.01	<0.01	
1159157			2					90	5	5			-20 +40	<1	<4	<0.01	<0.01	o/c: Grey shale.
158													-40 +80	<1	<4	<0.01	<0.01	FI: Qtzite, shale,
159													-80	<1	<4	<0.01	<0.01	qtz-limonite.
1159160			1.5					90	5	5			-20 +40	<1	<4	<0.01	<0.01	FI: Qtzite, shale,
161													-40 +80	<1	<4	<0.01	<0.01	Hematite, qtz-limonite
162													-80	<1	<4	<0.01	<0.01	
1159163			3					80	10	10			-20 +40	<1	<4	<0.01	<0.01	FI: Qtzite, shale,
164													-40 +80	<1	<4	<0.01	<0.01	limonitic rocks.
165													-80	<1	<4	<0.01	<0.01	

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GEOCHEMICAL DRAINAGE SAMPLING LEDGER

Tenement: TARLTON KNOB EL 1196 — D.P.O. No: 80624

Area / Prospect: DUNNS MINE — Sample Nos.: — Geologist: AKS — Date: 3.5.84

Plan / Photo Ref: CLONDIMURRA SVY 2082/47 — Mesh Size: — Analysed by: COMLABS

Sample Number	H.M. Trap / Random	Channel: Wet / Dry	Channel: Width	Channel: Banks	Channel: Grad.	Channel: Alluv.	Channel: Colluv.	Sediment: Grav %	Sediment: Sand %	Sediment: Silt %	Sediment: Mud %	Sediment: Org %	MESH SIZE	Metal Content in p.p.m.: Ag	Mo	Au①	Au②	Geological Observations
1159166			4					80	10	10			-20 +40	<1	<4	<0.01	<0.01	FI: Qtzite, shale, limonite
167													-40 +80	<1	<4	<0.01	<0.01	
168													-80	<1	<4	<0.01	<0.01	
1159169								85	10	5			-20 +40	<1	<4	<0.01	<0.01	FI: Qtzite, shale
170													-40 +80	<1	<4	<0.01	<0.01	
171													-80	<1	<4	<0.01	<0.01	
1159172			3					70	15	15			-20 +40	<1	<4	<0.01	<0.01	FI: Qtzite, shale
173													-40 +80	<1	<4	<0.01	<0.01	
174													-80	<1	<4	<0.01	<0.01	
1159175			2					75	15	10			-20 +40	<1	<4	<0.01	<0.01	FI: Qtzite, shale,
176													-40 +80	<1	<4	<0.01	<0.01	limonitic qtz.
177													-80	<1	<4	<0.01	<0.01	
										METHODS:				Ag, Mo by AAS				
														Au① by FIRE ASSAY				
														Au② by AAS				

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Tenement: TARLTON KNOB
Area / Prospect: EL 1196
Plan / Photo Ref.:

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

Sample Nos.: 1159251 - 264
Mesh Size: -80 MESH

D.P.O. No.: B 0630
Geologist: AKS Date: 8.8.84
Analysed by: COMLABS

Sample Number	~~Auger~~ / Random	Channel: ~~Wet~~/Dry	Channel: Width	Channel: Banks	Channel: Grad.	Channel: Alluv.	Channel: Colluv.	Sediment: Grav %	Sediment: Sand %	Sediment: Silt %	Sediment: Mud %	Sediment: Org %	pH	Metal Content in p.p.m.: AAS Cu	AAS Pb	AAS Zn	AAS Ag	AAS Au	XRF As	XRF Ba	XRF U	Geological Observations
1159251			25					90	7	3				80	18	34	<0.1	<0.01	8	400	<4	Fl: Qtzite, black slate.
252			3					85	10	5				95	16	38	<0.1	<0.01	12	280	<4	Fl: Qtzite, minor dolomite, black shale.
253			2					70	10	20				22	16	46	<0.1	<0.01	8	330	<4	Fl: Qtzite, black shale, dolomitic shale.
254			3					80	10	10				28	14	42	<0.1	<0.01	9	320	4	o/c: Black shale. Fl: Qtzite, black shale.
255			10					-	-	100				22	10	55	<0.1	<0.01	12	360	<4	o/c: Black dolomitic shale.
256			15					90	8	2				26	26	40	<0.1	<0.01	12	440	<4	Fl: Qtzite, minor dolomite, black shale.
257			2					70	20	10				22	16	50	<0.1	<0.01	10	320	4	Fl: Black shale, dolomite.
258			1					20	10	70				26	14	55	<0.1	<0.01	12	360	4	
259			3					80	10	10				16	8	40	<0.1	<0.01	10	320	<4	Fl: Qtzite, black shale.
260			1					30	30	40				16	10	38	<0.1	<0.01	9	310	4	Fl: Black shale, qtz.
261			4					90	5	5				20	16	50	<0.1	<0.01	10	350	<4	Fl: Qtzite, black shale, qtz.
262			4					80	10	10				12	18	50	<0.1	<0.01	5	310	<4	Fl: Qtzite, dolomite, black shale.
263			5					85	10	5				12	16	44	<0.1	<0.01	8	260	<4	o/c: Cgl. Fl: Qtzite, dolomite, qtz.
264			5					85	10	5				18	18	60	<0.1	<0.01	8	320	<4	As for previous sample.

C.R.A. EXPLORATION PTY. LIMITED

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

Tenement: TARLTON KNOB
Area / Prospect: EL 1196
Plan / Photo Ref.:
Sample Nos.: 1159265 - 274
Mesh Size: -80 #
D.P.O. No: B 0630
Geologist: AKS Date: 8.8.84
Analysed by: COMLABS

Sample Number	~~HM Trap~~ / Random	Channel: ~~Wet~~ / Dry	Channel: Width	Channel: Banks	Channel: Grad.	Channel: Alluv.	Channel: Colluv.	Sediment: Grav %	Sediment: Sand %	Sediment: Silt %	Sediment: Mud %	Sediment: Org %	pH	Metal Content in p.p.m.: Cu	Pb	Zn	Ag	Au	As	Ba	U	Geological Observations
1159265			3					80	5	15				20	16	42	<0.1	<0.01	10	360	< 4	o/c: Cgl. Fl: Qtzite, shale, dolomite
266			6					65	30	5				24	20	65	<0.1	<0.01	9	370	< 4	o/c: Black shale. Fl: Qtzite, black shale.
267			4					90	7	3				20	20	70	<0.1	<0.01	10	370	< 4	o/c: Black shale. Fl: Qtzite, black shale.
268			3					80	5	15				20	14	42	<0.1	<0.01	14	320	< 4	o/c: Black shale, cgl Fl: Qtzite, black shale, dolomite
269			4					60	20	20				26	18	60	<0.1	<0.01	14	390	< 4	o/c: Black dolomitic shale. Fl: Qtzite, black shale, cgl., qtz.
270			10					80	10	10				20	14	42	<0.1	<0.01	14	340	< 4	Fl: Qtzite, black shale, qtz.
271			5					80	15	5				22	16	50	<0.1	<0.01	10	320	< 4	o/c: Dk. gy. shale. Fl: Qtzite, black shale
272			5					90	5	5				20	16	42	<0.1	<0.01	10	370	< 4	o/c: Dark shale.
273			8					90	8	2				22	24	44	<0.1	<0.01	9	260	< 4	Fl: Qtzite, minor cgl, calcite, black shale.
274			6					85	10	5				22	14	28	<0.1	<0.01	10	210	< 4	Fl: Qtzite, black shale, qtz-limonite

C.R.A. EXPLORATION PTY. LIMITED

Page: 3

Tenement: TARLTON KNOB

GEOCHEMICAL DRAINAGE SAMPLING LEDGER

D.P.O. No: B.0630

Area / Prospect: EL 1196

Sample Nos.: 1159275 - 287

Geologist: AKS Date: 8.8.84

Plan / Photo Ref.:

Mesh Size: -80 #

Analysed by: COMLABS

Sample Number	~~Hand Comp~~ / Random	Channel						Sediment					pH	Metal Content in p.p.m.									Geological Observations
		~~Wet~~ / Dry	Width	Banks	Grad.	Alluv.	Colluv.	Grav %	Sand %	Silt %	Mud %	Org %		Cu	Pb	Zn	Ag	Au	As	Ba	U		
1159275			12					80	10	10				16	8	30	<0.1	<0.01	10	200	< 4		o/c: Black shale FI: Qtzite, black shale.
276			3					70	10	20				26	8	38	<0.1	<0.01	12	340	< 4		FI: Black shale, cgl, g/tz
277			2					30	50	20				42	10	50	<0.1	<0.01	16	340	< 4		o/c: Cgl, black shale
278			1					30	40	30				38	24	55	<0.1	<0.01	12	350	< 4		FI: Grit, black shale.
279			4					70	20	10				24	8	22	<0.1	<0.01	9	210	< 4		FI: Black shale, grit, g/tz, dolomite.
280			4					85	10	5				42	10	30	<0.1	<0.01	14	270	< 4		FI: Qtzite, cgl, black shale, g/tz-limonite, calcite
281			3					80	10	10				26	8	28	<0.1	<0.01	10	250	4		FI: Qtzite, black shale, grit.
282			8					80	10	10				36	10	26	<0.1	<0.01	12	230	< 4		FI: Qtzite, black shale, g/tz, cgl
283			8					60	30	10				30	16	28	<0.1	<0.01	10	240	< 4		o/c: Qtzite, grit FI: Qtzite, black shale
284			2					85	10	5				36	16	38	<0.1	<0.01	10	310	< 4		FI: Qtzite, black shale
285			4					70	15	15				32	14	48	<0.1	<0.01	12	280	< 4		o/c: Black shale. FI: Black shale, g/tzite, g/tz
286			5					70	20	10				32	18	44	<0.1	<001	14	300	< 4		o/c: Black shale. FI: Qtzite,
287			2					70	20	10				30	16	36	<0.1	<0.01	16	240	< 4		FI: Black shale, g/tzite.

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0121

CRA EXPLORATION PTY. LIMITED

FIFTH QUARTERLY REPORT ON

TARLTON KNOB E.L. 1196, SOUTH AUSTRALIA

FOR THE PERIOD ENDING 4TH MARCH, 1985.

AUTHOR: J.P. HOWARD

COPIES TO: CIS CANBERRA
SADME

DATE: 16TH APRIL, 1985

SUBMITTED BY:

ACCEPTED BY:

130499

CONTENTS

1. SUMMARY

Assay results from float samples collected during regional gravel sampling indicate anomalous values of gold, copper, arsenic, uranium, barium, tin and tungsten.

Heavy mineral kimberlitic indicator results are awaited.

2. INTRODUCTION

E.L. 1196 of 2399 squ.km. was granted on 5th December 1983, for 12 months and was renewed on 5th December 1984, for a further 12 months. The E.L. covers most of the Willouran Ranges southwest of Marree (plan no. SAa 2230).

Previous CRAE quarterly reports summarise the results of work by other companies in the Willouran Ranges.

CRAE's field investigations have included the collection of rock, float and stream sediment samples for geochemistry and the collection of gravel samples for observation for kimberlitic indicator minerals.

No field work was carried out during the quarter. This report gives the results of assays received for float samples.

3. CONCLUSIONS AND RECOMMENDATIONS

Float samples gave the following maximum assays: gold - 0.58 ppm; copper - 4.89%; arsenic - 595 ppm; silver - 4 ppm; uranium - 36 ppm; tin - 24 ppm and tungsten - 38 ppm.

Further work is recommended in the vicinity of Rook's, Dunn's and Rischbieth Well Mines looking for gold and uranium, near Witchelina for tin and tungsten and near Chintapanna Dam for base metals.

4. PREVIOUS CRAE EXPLORATION

4.1 Geochemistry

Sample Type	No.	Elements Assayed
Rock chip	20	Au
Rock chip	116	Cu, Pb, Zn, Ag, Au, Hg, Ba, Ce, As
Rock chip	10	SiO_2, MgO, CaO, Fe_2O_3, LOI
Stream sediment		
-20 + 40#	21	Ag, Mo, Au(1), Au(2)
-40 + 80#	21	
-80#	21	
Stream sediment		
-80#	36	Cu, Pb, Zn, Ag, Au, As, Ba, U
Float	9	Cu, Pb, Zn, Co, Mo, Bi, Ag, Au, As, Fe, Mn, Ba, Sn, W

4.2 Gravel Samples

Total (1984) 126.

5. GEOCHEMISTRY

Assay results from AMDEL for the nine iron-rich float samples collected during the gravel sampling program are included in Appendix I. The following elements were assayed: Au, Ag, As, Cu, Pb, Zn, Co, Bi, Mo, Fe, Mn (using AAS) and U, Sn, W, Ba (using XRF). Sample locations are plotted on plan SAa 2828.

Sample nos. 944149, 944150 and 944156 were taken in the Douglas Gully to Rooks to Dunn's Mine area in Callanna to lower Burra Group rocks. Anomalous copper, gold and arsenic values are as expected (max. 0.58 ppm Au and 4.89% Cu) in the southern part of this area which has known copper and gold occurrences. However, the high arsenic values in sample 944149, (262 ppm As) suggest the gold zone may extend further than previously known, into the Dunn's Mine area. Silver (max. 4 ppm) and uranium (max. 36 ppm) are also anomalous in this area.

Sample no. 944153 is from a catchment area to the west of Rischbieth Well in Callanna and Burra Group rocks. This sample indicates the copper occurrences in the area are anomalous also in gold (0.24 ppm) and uranium (16 ppm).

Sample no. 944157 from a drainage in Callanna Group rocks is anomalous in tin (24 ppm) and tungsten (38 ppm).

Barium anomalism (1.06% Ba) at Chintapinna Dam in sample no. 944154, which is goethite-specular hematite-manganiferous rock, warrants follow-up for base metals.

6. DIAMOND EXPLORATION RESULTS

Heavy mineral observation results are awaited from CRAE's Perth laboratory.

R.S.L. Howe
for
J.P. HOWARD

JPH/dp

EXPENDITURE

Expenditure for the period ended 28th February, 1985, the nearest accounting period was $15 418.00, as listed below.

		$
Payroll		1 908
Supplies		5
Vehicle		234
Property		178
Tenement		3 593
Laboratory		8 424
Overheads		1 076
	Total	$15 418

APPENDIX I

Rock Sample Ledger

1984 Circus

C.R.A. EXPLORATION PTY. LTD. - ROCK SAMPLE FIELD DATA SHEET

PAGE N°

Area: 46 Witchelina Collected: Analysed by: Amdel Lab. report no: AC 3073/85
Map ref: 149-156 Cudlin. 157 Copley Date collected: Date anal. rec: 4/3/85
Photo name: Date to lab: 24/1/85 Plan no:
Run No: D.P.O. No: 81006 C.R.A. report no:

Less than detection limit [-]

Sample type: 1. Chip. 2. Float 3. Channel. 4. Panel.
Test: 1. Chemistry 2. Duplicate 3. Thin section 4. Polished section.

Sample Number	COORDINATES AM.G/Long. EAST	COORDINATES /Lat/Local NORTH	SAMPLE TYPE	WIDTH (m)	AREA (square)	No. CHIPS	TEST	Gravel Sample No	DESCRIPTION
944148	785300	6713200						1233168R	QTZ-GEOTHITE-HEM.
944149	785700	6708400						1233171R	SPECULAR HEM.
944150	780600	6699600						1233174R	IRONSTONE-FESTAIN+CU MINER?
944151	763600	6690700						1233197R	Fe-rich QTZ VEIN, ASSAY FOR AU
944152	761500	6705100						1233207R	QTZ-GEOTHITE ROCK
944153	761400	6704000						1233209R	1/2 DESCRIPTION
944154	733500	6680500						1233234R	GEOTHITE-HEM, MASSIVE SPEC. HEM, MASSIVE MD.
944155	783400	6684800						1233237R	QTZ. HEM.
944156	784400	6698200						1233245R	CREEK COBBLES OF SOLID SPECULAR HEM. (PROB. VEIN ORIGIN)
944157	714100	6671500						1233284R(B)	STRATIFORM MAGNETITE?

Metal Content (ppm)

ANALYSIS METHOD	A2/1	A1/1	A1/1	A1/1	A1/1	A1/1	A1/1	A1/2	A1/2	A1/2	A1/1	XRF	XRF	XRF	XRF
DETECTION LIMIT (ppm)	0.05	2	2	5	10	5	5	1	1	2	2	4	4	10	10
	Au	Cu	Zn	Co	Bi	Fe%	Mn	Mo	Ag	As	Pb	U	Sn	W	Ba
944148	-	35	25	26	-	20.3	1820	1	-	12	4	-	7	-	941
944149	-	1180	170	44	-	32.7	1060	6	-	262	31	9	-	-	484
944150	0.58	4.89%	78	20	-	42.8	500	38	4	259	84	36	8	-	791
944151	-	540	30	20	-	6.70	210	2	-	10	-	-	-	-	127
944152	-	240	28	24	-	20.0	610	8	-	97	6	-	-	-	453
944153	0.24	970	180	66	-	35.2	2580	13	-	595	15	16	-	15	627
944154	-	210	28	145	-	20.6	31.4%	14	-	57	31	-	-	18	1.06%
944155	-	175	66	66	-	33.9	3080	5	1	69	165	4	-	-	1573
944156	0.38	14	33	14	-	28.4	800	2	-	16	8	-	-	85	678
944157	-	21	9	-	-	19.3	350	6	-	14	5	-	24	38	232
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
											✓				

I

0130

CRA EXPLORATION PTY. LIMITED

SIXTH QUARTERLY REPORT ON

TARLTON KNOB E.L. 1196, SOUTH AUSTRALIA

FOR THE PERIOD ENDING 4TH JUNE, 1985

AUTHOR: J.P. HOWARD

COPIES TO: CIS CANBERRA
SADME

DATE: 9TH JULY, 1985

SUBMITTED BY: J P Howard

ACCEPTED BY:

130555

CONTENTS

1. SUMMARY

Heavy mineral kimberlitic indicator results are awaited.

2. INTRODUCTION

E.L. 1196 of 2399 squ.km. was granted on 5th December 1983, for 12 months and was renewed on 5th December 1984, for a further 12 months. The E.L. covers most of the Willouran Ranges southwest of Marree (plan no. SAa 2230).

Previous CRAE quarterly reports summarise the results of work by other companies in the Willouran Ranges.

CRAE's field investigations have included the collection of rock, float and stream sediment samples for geochemistry and the collection of gravel samples for observation for kimberlitic indicator minerals.

No field work was carried out during the quarter.

3. PREVIOUS CRAE EXPLORATION

3.1 Geochemistry

Sample Type	No.	Element Assayed
Rock chip	20	Au
Rock chip	116	Cu, Pb, Zn, Ag, Au, Hg, Ba, Ce, As
Rock chip	10	SiO_2, MgO, CaO, Fe_2O_3, LOI
Stream sediment		
-20 + 40#	21	
-40 + 80#	21	Ag, Mo, Au(1), Au(2)
-80#	21	
Stream sediment		
-80#	36	Cu, Pb, Zn, Ag, Au, As, Ba, U
Float	9	Cu, Pb, Zn, Co, Mo, Bi, Ag, Au, As, Fe, Mn, Ba, Sn, W

3.2 Gravel Samples

Total (1984) 126.

J.P. Howard

J.P. HOWARD

JPH/dp

EXPENDITURE

Expenditure for the period ending 31st May, 1985, the nearest accounting period was $23,747.00, as listed below.

Payroll	$ 570
Supplies	358
Vehicle	178
Travel	1,039
Rent	388
Laboratory	20,954
Overhead	260
TOTAL	$23,747

LOCATION

Marree	SH 53-5	1:250 000
Curdimurka	SH 53-8	1:250 000
Copley	SH 53-9	1:250 000
Andamooka	SH 53-12	1:250 000

KEYWORDS

Indicator minerals

LIST OF PLANS

Plan No.	Title	Scale
SAa 2230	Tarlton Knob E.L. 1196 - Location Plan	1:250 000

II

0136

CRA EXPLORATION PTY. LIMITED

SEVENTH QUARTERLY REPORT ON TARLTON KNOB E.L. 1196, SOUTH AUSTRALIA, FOR THE PERIOD ENDING 4TH SEPTEMBER, 1985

AUTHOR: J.P. HOWARD

COPIES TO: CIS CANBERRA
SADME

DATE: 2ND OCTOBER, 1985

SUBMITTED BY: J.P. Howard

ACCEPTED BY:

CONTENTS

1. SUMMARY

Heavy mineral kimberlitic indicator observation of the 126 gravel samples returned six positive results being three olivines, one picroilmenite, one phlogopite and one chromite.

Thirty three follow-up samples have been collected. Results are awaited.

2. INTRODUCTION

E.L. 1196 of 2399 squ.km. was granted on 5th December, 1983, for 12 months and was renewed on 5th December, 1984, for a further 12 months. The E.L. covers most of the Willouran Ranges southwest of Marree (plan no. SAa 2230).

Previous CRAE quarterly reports summarise the results of work by other companies in the Willouran Ranges.

CRAE's field investigations have included the collection of rock, float and stream sediment samples for geochemistry and the collection of gravel samples for observation for kimberlitic indicator minerals.

This report presents the results of observation of the gravel samples.

3. PREVIOUS CRAE EXPLORATION

Sampling

Sample Type	No.	Element Assayed
Rock chip	20	Au
Rock chip	116	Cu, Pb, Zn, Ag, Au, Hg, Ba, Ce, As
Rock chip	10	SiO_2, MgO, CaO, Fe_2O_3, LOI
Stream sediment		
-20 + 40#	21	
-40 + 80#	21	Ag, Mo, Au(1), Au(2)
-80#	21	
Stream sediment		
-80#	36	Cu, Pb, Zn, Ag, Au, As, Ba, U
Float	9	Cu, Pb, Zn, Co, Mo, Bi, Ag, Au, As, Fe, Mn, Ba, Sn, W
Gravel (HMC)	126	Kimberlitic indicators

4. GRAVEL SAMPLE RESULTS

Results are plotted on the attached plan no. SAa 3029.

Six samples contained possibly kimberlitic indicator minerals. These were:

1233207, 1233224 and 1233243 with 1 grain of olivine each
917444 with 1 grain of chromite
1233173 with 2-5 grains of phlogopite
1233269 with 1 grain of picroilmenite

5. PETROLOGY

Three samples were taken for thin section preparation and description (Appendix I) 1158393 of outcropping Noranda volcanics near the Munto Mine is a uralitised dolerite. It is unlikely to have contributed the olivines found in the gravel samples due to the extent of alteration.

Metasomatic alteration of dolerite or lamprophyre in two samples (1158394, 1158395) from gravel site 1234302 involves enrichment in CO_2, Mg and K. Phlogopite is also present. Similar rocks may be the source of phlogopite in sample no. 1233173.

6. GRAVEL SAMPLING

Thirty three follow-up samples have been collected. Locations are shown on plan SAa 3029. Results are awaited.

J.P. Howard.

J.P. HOWARD

JPH/dp

EXPENDITURE

Expenditure for the period ended 31st August 1985, the nearest accounting period was $5,758.00, as listed below.

Payroll	$ 2,546
Supply	67
Vehicle	309
Rent	604
Tenement	280
Contractors	120
Laboratory	100
Overheads	1,732
Total	$ 5,758

LOCATION

Marree	SH 53-5	1:250 000
Curdimurka	SH 53-8	1:250 000
Copley	SH 53-9	1:250 000
Andamooka	SH 53-12	1:250 000

KEYWORDS

Indicator minerals

LIST OF PLANS

Plan No.	Title	Scale
SAa 2230	Tarlton Knob E.L. 1196 - Location Plan	1:250 000
SAa 3029	Gravel Sample Locations and Results	1:100 000

LIST OF APPENDICES

Appendix I Petrology

APPENDIX I

Petrology

TARLTON KNOB
780100mE/6688300mN

1158395 : heterogeneous chlorite, brown-hornblende, tremolite rock;
metasomatically altered, pyroxenitic or possible doleritic/gabbroic rock

This rock consists of a heterogeneous crystalline aggregate of mainly ragged prisms of brown, strongly pleochroic hornblende (25%) with a chaotic distribution through a matrix of very fine decussate chlorite mixed with decussate phlogopite and minor scattered tremolite.

Small clusters of clear tremolite appear to replace former pyroxene, and is locally continuous with brown hornblende, whereby both phases appear to replace a pre-existing (?composite) pyroxene crystal.

Accessory opaque oxides, some extensively leucoxenised are scattered. Trace altered plagioclase is present.

This rock appears to have been an original pyroxenitic ultramafic (although the chlorite may be after plagioclase which would suggest an original basic igneous rock type). The primary rock has been retrograded and altered, probably mainly by metasomatic agencies.

TARLTON KNOB
780100 mE / 6688300 mN

1158394 : heterogeneous, massive "metasomatic breccia", dominated by a metasomatic eassemblage of rutile, quartz, carbonate, clinochlore, K-spar, phlogopite (? of doleritic or lamprophyric association)

This rock consists of a "background" of a diffuse, poorly-defined patchy mosaic on a scale of about 1 mm of secondary adularia K-spar, and rarer quartz, incorporating random blades of clinochlore.

This mosaic is more or less superimposed by extremely fine (0.03 mm) phlogopite mica, rarer muscovite, and even finer dispersed rutile. Patches of diffuse cryptocrystalline carbonate occur locally.

The aggregate described above appears to form breccia fragments, and areas between these are occupied by veins or metasomatic-breccia of partly oxidised carbonate incorporating subordinate quite coarse quartz grains, flakes of clinochlore and phlogopite. Rare minute inclusions of tourmaline occur in the quartz.

This entire aggregate is regarded as "metasomatic" involving enrichment in CO_2, Mg, Ki, and lesser quartz.

The nature of an original rock type is not evident, but was possibly of lamprophyric association; however, the aluminour components (clinochlore and K-spar) may include Al from original plagioclase, in which case the primary rock may have been doleritic.

There is no olivine or pyroxene.

TARLTON KNOB EL.
768700E/6693400N (AMG)

1158393 : uralitised dolerite;
minor interstitial chlorite and epidote;
accessory oxidised magnetite

This is a massive, homogeneous, holocrystalline rock with a subophitic texture, average grain size about 1 mm.

About 60% of it consists of randomly oriented and loosely interlocking plagioclase laths, which are essentially unaltered.

Mafic components which are more or less interstitial within this plagioclase aggregate are :-

1. subhedral to anhedral clinopyroxene completely altered (uralitised) to very fine fibrous actinolitic-hornblende 15 - 20%

2. irregular amoeboidal-shaped areas, apparently vesicle fillings of fine fibrous/radiating chlorite, enclosing very small grains of leucoxene 7 - 10%

3. small patches of very fine granular epidote, largely associated with chlorite (2) above, and both phases probably of deuteric origin 7 - 10%

4. accessory, disseminated, subhedral crystals of oxidised magnetite 5 - 7%

The exact identity of the primary pyroxene cannot be established. There is no olivine in this rock.

Elbow Peak

WW1

WW2·1

WW2·2

WW2·3

WW2·4

WW2·5

WW2·6

WW2·7

WW2·8

WW3

1159096 (3·40)

1159095 (<0·01)

919406 (1·52 gr Au)

1159097 (0·10)

WD 17 (251m)

1159098 (0·35)

1159099 (<0·01)

WP 76 (94m)

WD 40 (296m) (bearing uncertain)

919390 (Nil Au)

919389 (20 gr Au)

veins common

WP 70 (176m)

1159100 (2·10)

qlm scree

ql scree

qm scree

WD 12 (196m)

16 600 mN

16 500 mN

16 400mN

16300 mN

16 200 mN

26 300 mE

26 400 mE

26 500mE

26 600mE

26700 mE

26800mE UTAH GRID

MN

A

B

WD 40

Douglas Gully

WD 12

Edge of Elbow Shear

Edge of Elbow Shear

Au in ppm

Pyritic

0·10
0·18
0·04
0·12
0·06
0·05
2·3
0·15
0·03
0·03
0·03
0·03
0·02
0·02
0·02

196m

296 m

DRILL SECTION

LOOKING EAST

REFERENCE

BURRA GROUP	WW3	Quartz arenite, with chloritic carbonates and argillites
	WW2·8	Fine grained arenaceous argillites
	WW2·7	Fine to medium grained quartz arenite
	WW2·6	Fine to medium argillaceous arenite and quartz arenite
	WW2·5	Medium to coarse grained arenite
	WW2·4	Arenaceous argillite
	WW2·3	Fine grained quartz arenite
	WW2·2	Arenaceous argillite
	WW2·1	Fine to medium grained quartz arenite
	WW1	Fine to coarse grained quartz arenites with carbonate grits and argillites

(Geology after I. Tedder, 1977)

- Geological boundary
- Fault
- Strike and dip of overturned strata
- Strike and dip of joint
- Strike and dip of cleavage
- Pit
- Shaft
- Margin of Elbow Shear
- Vehicle track
- Creek
- q Quartz
- l Limonite
- m Malachite
- s Siderite
- 1159100 (2·10) CRAE Rock chip sample (Au ppm)
- WD40 Utah Diamond drill hole
- WP70 Utah Percussion drill hole
- 919389 (20 gr Au) CRAE Gravel Sample. (Au grains)

0 25 50 75 100
metres

5403 (I)-1

CRA EXPLORATION PTY LIMITED

TARLTON KNOB EL 1196 - S.A.
DOUGLAS GULLY PROSPECT
GEOLOGICAL MAP AND DRILL SECTION

REF	CURDIMURKA SH 53-8; MARREE SH 54-5;	COPLEY SH 54-9 ANDAMOOKA SH 53-12	
SCALE	1:1,000		
AUTHOR	AKS	REPORT No.	14885
DATE	Nov '87	PLAN No.	SAa 2829

REFERENCE

- EL Boundary
- Railway line
- Major road
- Secondary road or track
- Fence
- Stream
- Well or bore, windmill
- Waterhole
- Dam or tank
- Hill
- Homestead, hut
- Mine
- CRAE Rock chip sample
- CRAE Stream sediment sample
  - 1159103 -20 +40 mesh
  - 1159104 -40 +80 mesh
  - 1159105 -80 mesh
- CRAE float sample

Scale 1:100,000

0 2 4 6 8 10 kilometres

EL 1196

5403(I)-2

CRA EXPLORATION PTY LIMITED

TARLTON KNOB, EL 1196 – S.A.

GEOCHEMICAL SAMPLE SITES

REF CURDIMURKA SH 53-8, MARREE SH 54-5, COPLEY SH 54-9, ANDAMOOKA SH 53-12	
SCALE 1:100,000	REPORT 14885
AUTHOR AKS	PLAN No. SAa 2828
DATE Nov. '87	

REFERENCE

STREAM SEDIMENT SURVEYS

- Carpentaria Exploration Co. Pty Ltd. (Env.1145)-Cu(some Mo)
- Australian Selection Pty. Ltd. (Env. 599) - Cu
- Australian Selection Pty. Ltd. (Env. 389) - Cu
- Anaconda Australia Ltd. (Env. 637) - Cu, Pb, Zn
- Altarama Search Pty. Ltd (Env. 1328) - Pb, Zn, Ag, V

DETAILED EXPLORATION

CAMP — Utah Development Company (Env. 2915, 3507) (all areas mapped in detail; geochemistry and drilling in some areas. See table below.)

Note: Geochemistry has been carried out by other companies on a number of small areas, mostly around old mines.

GROUND GEOPHYSICAL SURVEYS

- Utah Gravity survey
- Utah Track Etch survey
- Above - background Radioactivity

MINERALIZATION

Rook's ⚒ Abandoned Cu workings

DRILLING

AREA	COMPANY	NON-CORED HOLES	CORED HOLES
Breaden Hill	Australian Selection	4	
	Noranda	53	
	Utah	4	
Breaden Hill South	Utah	4	
Boorloo	Australian Selection	68	2
	Utah	10	5
Dunn's	Utah	16	
Rook's	Utah	15	3
Callanna	Utah	29	10
Euraminna	Utah		3
West Willouran	Utah	13	9
Black Shale	Utah	14	2
Rischbieth	Utah	1	1
Tarlton North	Utah		1
Warra Warra	Utah	28	6
Bungarider/Chintapanna	Utah		1

ROCK CHIP SAMPLES

x 23110809	Anaconda Australia Ltd. (Env. 637)
x HRG 2109	HR Gillespie (Env. 2289)
x WLA 4520	Dampier Mining Co. Ltd. (Env. 2436)
x WR 8	SADME (R.B. 76/132)

Scale 1:100,000

0 2 4 6 8 10 kilometres

EL 1196

CRA EXPLORATION PTY LIMITED

TARLTON KNOB, EL 1196 – S.A.
PREVIOUS EXPLORATION;
LOCATION & TYPE

REF CURDIMURKA SH 53-8; MARREE SH 54-5, COPLEY SH 54-9, ANDAMOOKA SH 53-12	
SCALE 1:100,000	
AUTHOR AKS	REPORT 13004
DATE Dec. '84	PLAN No. SAa 2928

5403(I)-3

REFERENCE

- EL Boundary
- Railway line
- Major road
- Secondary road or track
- Fence
- Stream
- Well or bore, windmill
- Waterhole
- Dam or tank
- Hill
- Homestead, hut
- Mine

STREAM SEDIMENT SAMPLES

- Zn (ppm) } Anaconda Aust. Ltd. (Env. 637)
- Pb (ppm) }
- Zn (ppm) }
- Pb (ppm) } Altarama Search Pty. Ltd. (Env. 1328)
- Ag (ppm) }

ROCK CHIP SAMPLES

- ×53 Zn (ppm) } See plan SAa 2928 for companies involved
- ×180 Pb (ppm) }

Scale 1:100,000

0 2 4 6 8 10 kilometres

EL 1196

CRA EXPLORATION PTY LIMITED	
TARLTON KNOB, EL 1196 – S.A. PREVIOUS EXPLORATION; SIGNIFICANT GEOCHEMICAL VALUES	
REF CURDIMURKA SH.53-8; MARREE SH.54-5, COPLEY SH.54-9, ANDAMOOKA SH.53-12	
SCALE 1:100,000	REPORT 13004
AUTHOR AKS	PLAN No. SAa 2931
DATE Dec. '84	

5403(I)-4

REFERENCE

- EL Boundary
- Railway line
- Major road
- Secondary road or track
- Fence
- Stream
- Well or bore, windmill
- Waterhole
- Dam or tank
- Hill
- Homestead, hut
- Mine
- Fault
- Fault - inferred
- Trends
- Breccia

SVY 2196/78-86

SVY 2196/76-68

SVY 2196/0-12

SVY2487/66-70

SVY 2486/90-114

SVY 2095/20-40

SVY 2094/42-61

SVY 2092/27-48

SVY 2091/116-97

SVY 2091/73-93

SVY 2091/31-11

SVY 2285/52-72

SVY 2285/226-242

ADELAIDEAN STRATIGRAPHY

WILPENA GROUP

- BRACHINA SUB-GROUP
  - Pw — Undifferentiated

UMBERATANA GROUP

- YERELINA SUB-GROUP
  - Pfe — Enorama, Elatina, Yerelina Formations
- FARINA SUB-GROUP
  - Pfa — Amberoona Formation
  - Pft — Tapley Hill Formation
- YUDNAMUTANA SUB-GROUP
  - Pyb — Bolla Bollanna Formation

BURRA GROUP

- BUNGARIDER SUB-GROUP
  - Pb — Undifferentiated
  - Pbc — Chintapanna Formation
  - Pbb — Berlina Siltstone
  - Pbg — Gool Siltstone
  - Pbm — Myrtle Springs Formation
- SKILLOGALEE SUB-GROUP
  - Ps — Undifferentiated
  - Psc Psr Psm — Psm - Mirra Formation; Psr - Rischbieth Formation; Psc - Cadnawitana Formation
  - Pst — Tilterana Sandstone
  - Psf — Camel Flat Shale
- WITCHELINA SUB-GROUP
  - Pwc — Copley Quartzite
  - Pww — Willawalpa Formation
  - Pwt — Top Mount Sandstone

CALLANNA GROUP

- Pa — Albitised Intrusives
- Pcd — Dome Formation and others
- Pcn — Noranda Volcanics
- Pcb — Breaden Megabreccia

Geology after: B. Morrell (1977)
Utah Development Company (1981)
SADME (1965, 1966, 1970, 1973)
CRA Exploration Pty Limited (1984)

Aerial Photography: SVY 2091/73-93 — SADME
RUN 5/5979 — BHP

Scale 1:100,000

0 2 4 6 8 10 kilometres

EL 1196

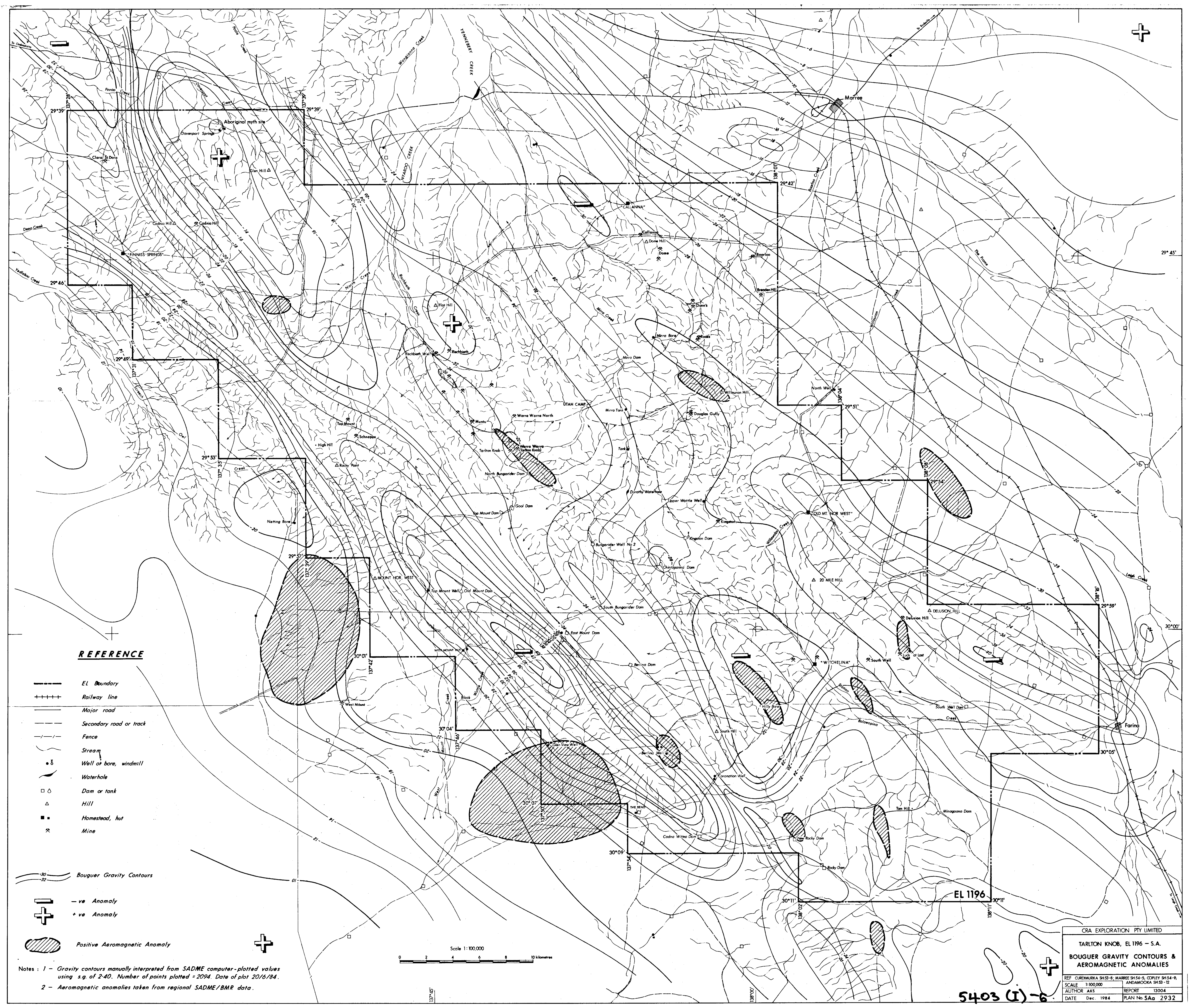
CRA EXPLORATION PTY LIMITED

TARLTON KNOB, EL 1196 — S.A.

ADELAIDEAN GEOLOGY

5403(I)-5

REF	CURDIMURKA SH 53-8; MARREE SH 54-5, COPLEY SH 54-9; ANDAMOOKA SH 53-12
SCALE	1:100,000
AUTHOR	AKS
REPORT	130690
DATE	Dec '86
PLAN No.	SAa 2929


REFERENCE
EL Boundary
Railway line
Major road
Secondary road or track
Fence
Stream
Well or bore, windmill
Waterhole
Dam or tank
Hill
Homestead, hut
Mine
Bouguer Gravity Contours
-ve Anomaly
+ve Anomaly
Positive Aeromagnetic Anomaly
Notes : 1 - Gravity contours manually interpreted from SADME computer-plotted values using s.g. of 2·40. Number of points plotted = 2094. Date of plot 20/6/84.
2 - Aeromagnetic anomalies taken from regional SADME/BMR data.
Scale 1:100,000
EL 1196
Marree
Farina
"CALLANNA"
"FINNISS SPRINGS"
"WITCHELINA"
"OLD MT. NOR' WEST"
MOUNT NOR' WEST
UTAH CAMP
Tarlton Knob
Warra Warra
DELUSION HILL
20 MILE HILL
Aboriginal myth site
CRA EXPLORATION PTY LIMITED
TARLTON KNOB, EL 1196 – S.A.
BOUGUER GRAVITY CONTOURS & AEROMAGNETIC ANOMALIES
REF CURDIMURKA SH53-8; MARREE SH54-5; COPLEY SH54-9; ANDAMOOKA SH53-12
SCALE 1:100,000
AUTHOR AKS
REPORT 13004
DATE Dec. 1984
PLAN No. SAa 2932
5403 (I) - 6

REFERENCE

- EL Boundary
- Railway line
- Major road
- Secondary road or track
- Fence
- Stream
- Well or bore, windmill
- Waterhole
- Dam or tank
- Hill
- Homestead, hut
- Mine
- CRAE Rock chip sample
- CRAE Stream sediment sample
  - 1159103 -20 +40 mesh
  - 1159104 -40 +80 mesh
  - 1159105 -80 mesh
- CRAE float sample

Scale 1:100,000

0 2 4 6 8 10 kilometres

EL 1196

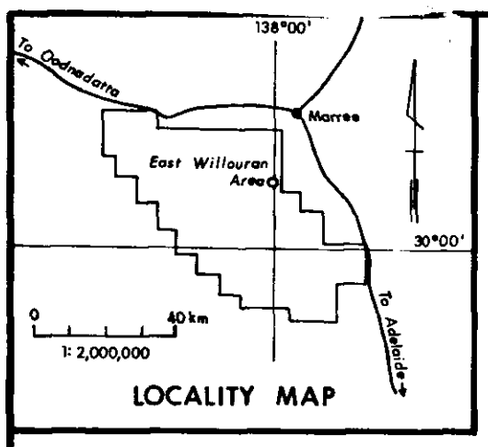
CRA EXPLORATION PTY LIMITED

TARLTON KNOB, EL 1196 – S.A.

GEOCHEMICAL SAMPLE SITES

REF CURDIMURKA SH.53-8, MARREE SH.54-5, COPLEY SH.54-9, ANDAMOOKA SH.53-12	
SCALE 1:100,000	
AUTHOR AKS	REPORT 130499
DATE March '85	PLAN No. SAa 2828

5403(I)-7



LOCALITY MAP

LEGEND

- Pu — Umberatana Group
- Pb — Burra Group
- Pc — Callanna Group
- Fault
- Stream
- 283 / 16,42 — Stream sediment sample and number - Pb, Zn values in ppm
- 245 / 16,42 — Rock chip sample and number - Pb, Zn values in ppm

All sample numbers prefixed by 1159

- 20 — Strike and dip of bedding
- Photo trends
- Conglomerate
- Brecciation
- Unconformity
- Facing

138°00'

29°50'

EAST WILLOURAN FAULT

E.L. Boundary

EL 1196

Growth fault

Conglomerate, shales, dolomite

Stramatolitic dolomite, fine grey sandstone

Conglomerate, shale, dolomite

N

0 400 800 1200 1600 2000 2400 2800 metres

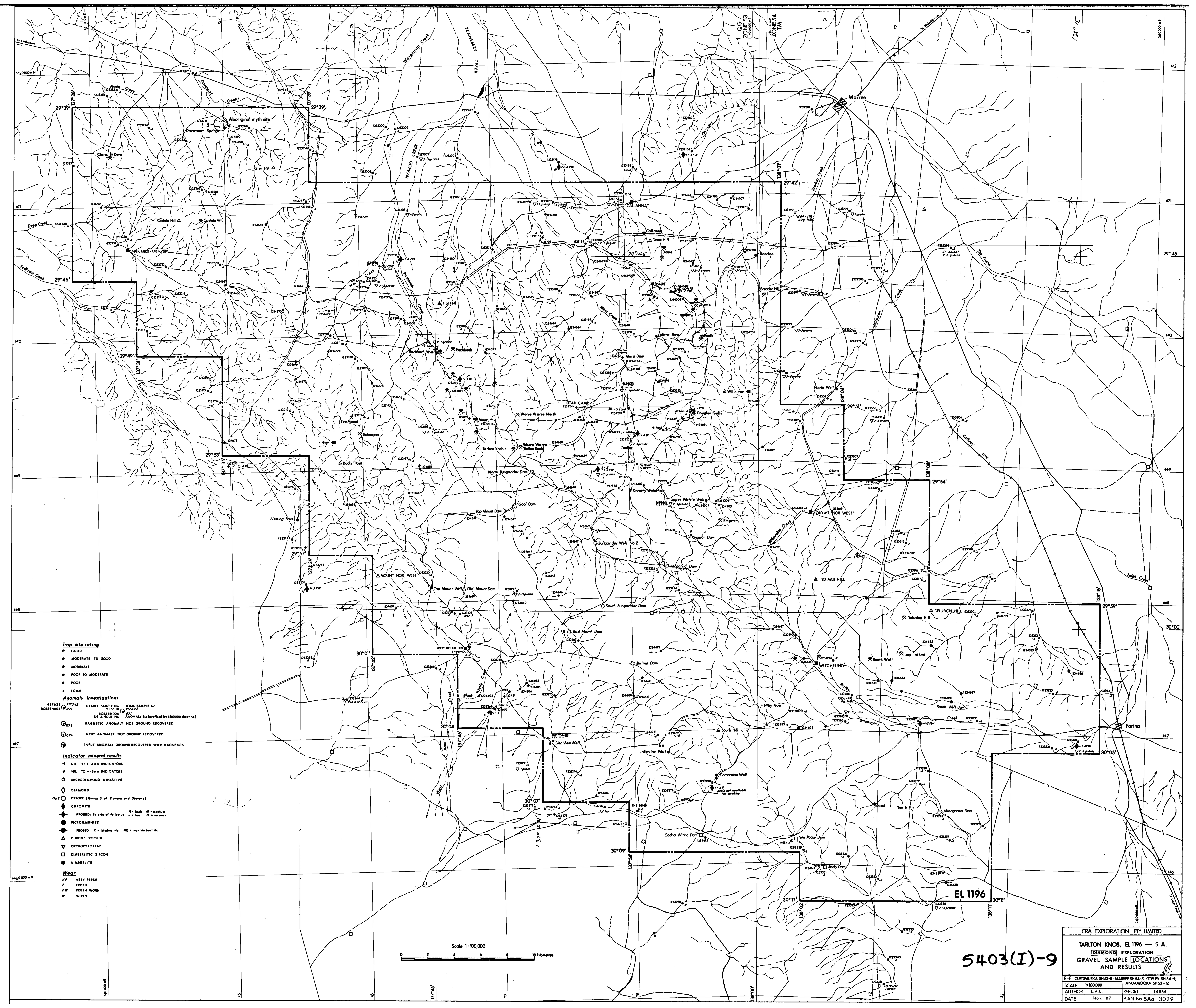
Compiled from BHP air photos, RUN 3, 6004 and RUN 4, 5994 - Scale 1:28,000 approx. LATS & LONGS approx only.

CRA EXPLORATION PTY LIMITED

TARLTON KNOB EL 1196 - S.A.
EAST WILLOURAN AREA
GEOCHEMICAL SAMPLING

Ref.	CURDIMURKA SH53-8		
Scale	1:28,000 approx		
Author	AKS	Report No.	13004
Date	Dec.'84	Plan No.	SAa 2924

5403 (I) -8



CRA EXPLORATION PTY LIMITED
TARLTON KNOB, EL 1196 — S.A.
DIAMOND EXPLORATION
GRAVEL SAMPLE LOCATIONS AND RESULTS
REF CURDIMURKA SH 53-8; MARREE SH 54-5; COPLEY SH 54-9; ANDAMOOKA SH 53-12
SCALE 1:100,000
AUTHOR L.A.L.
DATE Nov. '87
REPORT 14885
PLAN No. SAa 3029
5403(I)-9
Trap site rating
GOOD
MODERATE TO GOOD
MODERATE
POOR TO MODERATE
POOR
LOAM
Anomaly investigations
GRAVEL SAMPLE No. 917638
LOAM SAMPLE No. 917342
RCB4RH004 DRILL HOLE No.
071 ANOMALY No. (prefixed by 1:100000 sheet no.)
073 MAGNETIC ANOMALY NOT GROUND RECOVERED
074 INPUT ANOMALY NOT GROUND RECOVERED
INPUT ANOMALY GROUND RECOVERED WITH MAGNETICS
Indicator mineral results
·4 NIL TO + ·4mm INDICATORS
·5 NIL TO + ·5mm INDICATORS
MICRODIAMOND NEGATIVE
DIAMOND
Gp3 PYROPE (Group 3 of Dawson and Stevens)
CHROMITE
PROBED: Priority of follow up H = high M = medium L = low N = no work
PICROILMENITE
PROBED: K = kimberlitic NK = non kimberlitic
CHROME DIOPSIDE
ORTHOPYROXENE
KIMBERLITIC ZIRCON
KIMBERLITE
Wear
VF VERY FRESH
F FRESH
FW FRESH WORN
W WORN
Scale 1:100,000
0 2 4 6 8 10 kilometres
EL 1196
Marree
Farina
"FINNISS SPRINGS"
"CALLANNA"
"WITCHELINA"
"OLD MT. NOR WEST"
UTAN CAMP
Tarlton Knob
Warra Warra North
Aboriginal myth site
Davenport Springs
Glen Hill
Cadnia Hill
Flat Hill
Rocky Point
High Hill
Top Mount
Schnappa
Mirra Dam
Mirra Bore
Douglas Gully
Dome Hill
Breaden Hill
Boorloo
North Well
Willouran Hill
North Bungarider Dam
Top Mount Dam
Goat Dam
Bungarider Well No 2
South Bungarider Dam
Kingston Dam
20 MILE HILL
MOUNT NOR' WEST
Top Mount Well
Old Mount Dam
DELUSION HILL
West Mount Hut
East Mount Dam
Berlina Dam
South Well
Luck at Last
South Hill
Berlina Well
Glen View Well
Coronation Well
THE BEND
Codna Wirra Dam
New Rocky Dam
Rocky Dam
Minagoona Dam
Tom Hill
Hilly Bore
Netting Bore
West Mount
Dorothy Waterhole
Upper Wattle Well
Kingston
29°39'
29°42'
29°45'
29°46'
29°49'
29°51'
29°53'
29°54'
29°57'
29°59'
30°00'
30°01'
30°04'
30°05'
30°07'
30°09'
30°11'
137°28'
137°31'
137°35'
137°39'
137°42'
137°46'
137°54'
138°01'
138°02'
138°04'
138°08'
138°11'
138°16'
6660 000 mN
ZONE 53
ZONE 54

Elbow Peak

WW1

WW2·1

WW2·2

WW2·3

WW2·4

WW2·5

WW2·6

WW2·7

WW2·8

WW3

1159095 (<0·01)

1159096 (3·40)

1159097 (0·10)

1159098 (0·35)

1159099 (<0·01)

1159100 (2·10)

WD 17 (251m)

WD 40 (296m) (bearing uncertain)

WD 12 (196m)

WP 70 (176m)

WP 76 (94m)

veins common

qfm scree

ql scree

qm scree

16 600 mN

16 500 mN

16 400mN

16300 mN

16 200 mN

MN

26 300 mE

26 400 mE

26 500mE

26 600mE

26700 mE

26800mE UTAH GRID

A

B

WD 40

Douglas Gully

WD 12

Edge of Elbow Shear

Edge of Elbow Shear

Au in ppm

0·10

0·18

0·04

0·12

0·06

0·05

2·3

0·15

Pyritic

No Au assays. Cu <35 ppm

196m

296 m

DRILL SECTION

LOOKING EAST

REFERENCE

BURRA GROUP

- WW3 — Quartz arenite, with chloritic carbonates and argillites
- WW2·8 — Fine grained arenaceous argillites
- WW2·7 — Fine to medium grained quartz arenite
- WW2·6 — Fine to medium argillaceous arenite and quartz arenite
- WW2·5 — Medium to coarse grained arenite
- WW2·4 — Arenaceous argillite
- WW2·3 — Fine grained quartz arenite
- WW2·2 — Arenaceous argillite
- WW2·1 — Fine to medium grained quartz arenite
- WW1 — Fine to coarse grained quartz arenites with carbonate grits and argillites

(Geology after I. Tedder, 1977)

- Geological boundary
- Fault
- Strike and dip of overturned strata
- Strike and dip of joint
- Strike and dip of cleavage
- Pit
- Shaft
- Margin of Elbow Shear
- Vehicle track
- Creek
- q — Quartz
- l — Limonite
- m — Malachite
- s — Siderite
- 1159100(2·10)* — CRAE Rock chip sample (Au ppm)
- WD40 — Utah Diamond drill hole
- WP70 — Utah Percussion drill hole

0 25 50 75 100 metres

5403(I)-10

CRA EXPLORATION PTY LIMITED

TARLTON KNOB EL 1196 - S.A.
DOUGLAS GULLY PROSPECT
GEOLOGICAL MAP AND DRILL SECTION

REF	CURDIMURKA SH 53-8; MARREE SH 54-5;	COPLEY SH 54-9 ANDAMOOKA SH 53-12	
SCALE	1:1,000		
AUTHOR	AKS	REPORT No.	13004
DATE	Dec. '84	PLAN No.	SAa 2829

II

0147

CRA EXPLORATION PTY. LIMITED

EIGHTH QUARTERLY REPORT ON TARLTON KNOB E.L. 1196, SOUTH AUSTRALIA, FOR THE PERIOD ENDING 4TH DECEMBER, 1985.

AUTHOR: L.A. Le MESSURIER

COPIES TO: CIS CANBERRA
SADME

DATE: 27TH FEBRUARY, 1986

SUBMITTED BY: Lucille Le Messurier

ACCEPTED BY:

130635

CONTENTS

1. SUMMARY

During the three month period September, 1985 to December, 1985 no further field work was undertaken. A number of indicator mineral and microdiamond results were received. These are tabulated in Tables 1 and 2. Sixteen chromites, one picroilmenite and one microdiamond were observed. Further results are awaited.

2. INTRODUCTION

This is the eighth statutory report for E.L. 1196 which was granted to CRA Exploration Pty. Limited on the 5th December, 1983 for a period of twelve months. It was renewed in December, 1984 and 1985 for further twelve month periods. The area covers most of the Willouran Ranges south west of Marree and was originally taken up to search for Olympic Dam type deposits in areas of shallow basement, stratiform Pb-Zn in Callanna, Burra and Umberatana sediments, Copperbelt type stratiform Cu in Burra sediments and diamonds. Currently only diamond exploration is being carried out on the Tarlton Knob E.L. with results from the 1984 gravel sampling programme now becoming available. Further results are still awaited.

3. GEOLOGY

A composite geology map compiled by Scott (1984) incorporating both mapping by SADME and Murrell (1977) is available on plan SAa 2929. The area is dominantly covered by Adelaidean Stratigraphy composed of north westerly trending Callanna, Burra, Umberatana and Wilpena Group sediments. They constitute the Willouran Ranges and are disrupted by several major faults.

4. PREVIOUS EXPLORATION

A number of companies including Aust. Selection Pty. Ltd., Anaconda Aust., Noranda Aust., Carpentaria Ex. Co. Pty. Ltd., Sunhill Corp. Aust., Altarama Search Pty. Ltd., H.R. Gillespie, Dampier Mining Co. Pty. Ltd. and Utah Development Company have undertaken exploration activities in the Willouran Ranges. A summary of previous exploration compiled by Scott (1984) can be found in the fourth quarterly report on Tarlton Knob E.L. 1196.

5. PREVIOUS EXPLORATION BY CRA EXPLORATION PTY. LIMITED

Previous exploration was oriented to locate copper, lead and zinc mineralisation. Work on these commodities is summarised by A.K. Scott (1984) in the fourth quarterly report on Tarlton Knob E.L. 1196.

Diamond exploration has involved:

1. A regional gravel sampling programme using helicopter (129 samples).

2. The collection of rock and float samples for geochemistry.

3. Thin section preparation and description of rock samples which could have possibly had kimberlitic or lamprophyric affinities.

4. A follow up sampling programme (33 samples).

5. The receiving of observed indicator mineral results for a number of the samples.

6. CURRENT DIAMOND EXPLORATION

Sample locations are plotted on SAa 3029 and the results received in the last three months are tabulated on Tables 1 and 2. Results of interest were the observation of sixteen chromites, one picroilmenite and one microdiamond within the Tarlton Knob E.L.

Lucille Le Messurier

L.A. Le MESSURIER

LAL/pw

EXPENDITURE

Expenditure for the period ended 30th November, 1985, the nearest accounting period was $12 301.00, as listed below.

	$
Payroll	2 622
Supply	901
Vehicle	891
Travel	156
Rent	1 438
Contractors	335
Laboratory	5 284
Overheads	674
Total	$ 12 301

REFERENCES

Howard, J.P. 1985 — Seventh Quarterly Report on Tarlton Knob E.L. 1196, South Australia, for the period ending 4th September, 1985.

Murrell, B. 1977 — Stratigraphy and Tectonics across the Torrens Hinge Zone between Andamooka and Marree, South Australia. Ph.D. Thesis, University of Adelaide (unpub.)

Scott, A.K. 1984 — Fourth Quarterly Report on Tarlton Knob E.L. 1196, South Australia, for the period ending 4th December, 1984.

LOCATION

Marree	SH 53-5	1:250 000
Curdimurka	SH 53-8	1:250 000
Copley	SH 53-9	1:250 000
Andamooka	SH 53-12	1:250 000

KEYWORDS

Diamonds, Indicator Minerals

LIST OF PLANS

Plan No.	Title	Scale
SAa 2230	Tarlton Knob E.L. 1196, S.A. Location Plan	1:250 000
SAa 2929	Tarlton Knob E.L. 1196, S.A. Adelaidean Geology	1:100 000
SAa 3029	Tarlton Knob E.L. 1196, S.A. Location of Gravel Samples	1:100 000

LIST OF TABLES

TABLE 1

TARLTON KNOB E.L. 1196 - INDICATOR MINERAL RESULTS

4TH SEPTEMBER, 1985 - 4TH DECEMBER,1985

Sample Number	Indicator Results
1234289	Negative
1234290	Negative
1234295	Negative
1234299	Negative
1234297	Negative
1234305	Negative
1234308	Negative
1234288	Chromite 2 x +0.8
1234291	Chromite 3 x +0.8
	5 x +0.5
	1 x +0.4
1234292	Chromite 1 x +0.5
1234294	Negative
1234296	Chromite 1 x +0.5
1234298	Picroilmenite 1 x +0.5
1234300	Negative
1234306	Negative
1234310	Chromite 1 x +0.8
	1 x +0.5
1234311	Chromite 1 x +0.4

TABLE 2

TARLTON KNOB E.L. 1196 - MICRO DIAMOND RESULTS

4TH SEPTEMBER, 1985 - 4TH DECEMBER,1985

Sample Number	Micro Diamond Results
1233236	Negative
1233246	Negative
1233268	Negative
1233290	Negative
1233321	Negative
1233217	Negative
1233260	Negative
1233281	Negative
1233288	Negative
1233317	Negative
1233228	Negative
1233247	Negative
1233267	Negative
1233328	Negative
1233339	Negative
1233191	Negative
1233219	Negative
1233233	Negative
1233237	Negative
1233242	Negative
1233245	Negative
1233259	Negative
1233220	Negative
1233254	Negative
1233261	Negative
1233262	Negative
1233270	Negative
1233283	Negative
1233331	Negative
1233212	Negative
1233218	Negative
1233229	Negative
1233274	Negative
1233323	Negative
1233329	Negative
1233195	Negative
1233286	Negative
1233251	Negative
1233192	Negative
1233210	Negative
1233230	Negative
1233244	Negative
1233248	Negative
1233253	Negative
1233285	Negative
1233313	Negative

TABLE 2 (cont.)

TARLTON KNOB E.L. 1196 - MICRO DIAMOND RESULTS

4TH SEPTEMBER, 1985 - 4TH DECEMBER, 1985

Sample Number	Micro Diamond Results
1233330	Negative
1233180	Negative
1233185	Negative
1233194	Negative
1233209	Negative
1233241	Negative
1233332	Negative
1233205	Negative
1233207	Negative
1233211	Negative
1233325	Negative
1233326	Negative
1233269	One Diamond 0.45 x 0.35 mm
1233166	Negative
1233188	Negative
1233225	Negative
1233249	Negative
1233250	Negative
1233314	Negative

II

0156

CRA EXPLORATION PTY. LIMITED

NINTH QUARTERLY REPORT ON

TARLTON KNOB E.L. 1196, SOUTH AUSTRALIA,

FOR THE PERIOD ENDING 4TH MARCH, 1986.

AUTHOR: L.A. Le MESSURIER

COPIES TO: CIS CANBERRA
SADME

DATE: 27TH FEBRUARY, 1986

SUBMITTED BY: Lucille Le Messurier

ACCEPTED BY:

130636

CONTENTS

1. SUMMARY

No field work was carried out during the three month period from the 4th December, 1985 to 4th March, 1986. Microdiamond results from earlier sampling programmes were received. All results were negative. Further results are awaited.

2. INTRODUCTION

This is the ninth statutory report for E.L. 1196 which was granted to CRA Exploration Pty. Limited on the 5th December, 1983 for a period of twelve months and was renewed in December, 1984 and 1985 for further twelve month periods.

This report details microdiamond results received from gravel sampling programmes over the Tarlton Knob E.L.

3. CURRENT DIAMOND EXPLORATION

Results are still being received from both the initial regional sampling programme and a smaller follow up sampling programme over the Tarlton Knob E.L. Sample locations for both surveys are plotted on SAa 3029 and microdiamond results received in the last three months are tabulated on Table 1. Results for all samples were negative.

Lucille L Messurier

L.A. Le MESSURIER

LAL/pw

EXPENDITURE

Expenditure for the period ended 28th February, 1986 the nearest accounting period was $18 329.00, as listed below.

	$
Payroll	1 318
Supply	306
Rent	383
Tenement	4 444
Laboratory	11 594
Overheads	284
Total	$18 329

LOCATION

Marree	SH 53-5	1:250 000
Curdimurka	SH 53-8	1:250 000
Copley	SH 53-9	1:250 000
Andamooka	SH 53-12	1:250 000

KEYWORDS

Diamonds, Indicator Minerals

LIST OF PLANS

Plan No.	Title	Scale
SAa 2230	Tarlton Knob E.L. 1196, S.A. Location Plan	1:250 000
SAa 3029	Tarlton Knob E.L. 1196, S.A. Location of Gravel Samples	1:100 000

LIST OF TABLES

TABLE 1

TARLTON KNOB E.L. 1196 - MICRODIAMOND RESULTS

4TH December, 1985 - 4TH March,1986

Sample Number	Indicator Results
1233265	Negative
1233284	Negative
1233165	Negative
1233172	Negative
1233196	Negative
1233197	Negative
1233208	Negative
1233279	Negative
1233316	Negative
1233333	Negative
1233222	Negative
1233227	Negative
1233243	Negative
1233289	Negative
1233186	Negative
1233193	Negative
1233238	Negative
1233280	Negative
1233338	Negative
1233167	Negative
1233235	Negative
1234274	Negative
1233282	Negative
1233337	Negative
1233224	Negative
1233234	Negative
1233322	Negative
1233187	Negative
1233226	Negative
1233257	Negative
1233309	Negative
1233311	Negative
1233312	Negative
1233164	Negative
1233190	Negative
1233287	Negative
1233181	Negative
1233223	Negative
1233174	Negative
1233189	Negative
1233240	Negative
1233320	Negative
1233169	Negative
1233170	Negative
1233171	Negative

TABLE 1 (cont.)

TARLTON KNOB E.L. 1196 - MICRODIAMOND RESULTS

4TH December, 1985 - 4TH March,1986

Sample Number	Indicator Results
1233177	Negative
1233184	Negative
1233183	Negative
1233173	Negative
1233315	Negative
1233310	Negative
1233239	Negative
1233178	Negative
1233182	Negative
917445	Negative
917435	Negative
917438	Negative
917440	Negative
917433	Negative
917439	Negative
1234311	Negative
917441	Negative
917446	Negative

II

0163

CRA EXPLORATION PTY. LIMITED

TENTH QUARTERLY REPORT ON TARLTON KNOB E.L. 1196, SOUTH AUSTRALIA, FOR THE PERIOD ENDING 4TH JUNE, 1986.

AUTHOR: L.A. Le MESSURIER

COPIES TO: CIS CANBERRA
SADME

DATE: 3RD JUNE, 1986

SUBMITTED BY: Lucille Le Messurier.

ACCEPTED BY:

130662

CONTENTS

LIST OF TABLES

LIST OF PLANS

Plan No.	Title	Scale
SAa 2230	Tarlton Knob E.L. 1196, S.A. Location Plan	1:250 000
SAa 2929	Tarlton Knob E.L. 1196, S.A. Adelaidean Geology	1:100 000
SAa 3029	Tarlton Knob E.L. 1196, S.A. Location of Gravel Samples	1:100 000

1. SUMMARY

During the last quarter from March to June, 1986 the remainder of the microdiamond results were received. All results were negative.

2. INTRODUCTION

This is the tenth statutory report for E.L. 1196 which was granted to CRA Exploration Pty. Limited on the 5th December, 1983 and renewed in 1984 and 1985 for further twelve month periods.

The area covers most of the Willouran Ranges south west of Marree and was originally taken up to search for Olympic Dam type deposits in areas of shallow basement, stratiform Pb-Zn in Callanna, Burra and Umberatana sediments, Copperbelt type stratiform Cu in Burra sediments and diamonds. Currently only diamond exploration is being carried out on the Tarlton Knob E.L.'s with remainder of the results from the 1984 gravel sampling programme now available.

3. RECOMMENDATIONS

It is recommended that any catchments with positive indicator mineral results or microdiamonds be resampled using a closer sample spacing than that of the original regional gravel sampling programme.

4. GEOLOGY

A composite geology map compiled by Scott (1984) incorporating both mapping by SADME and Murrell (1977) is available on plan SAa 2929. The area is dominantly covered by Adelaidean Stratigraphy composed of north westerly trending Callanna, Burra, Umbertana and Wilpena Group sediments. They constitute the Willouran Ranges and are disrupted by several major faults.

5. PREVIOUS EXPLORATION

A number of companies including Aust. Selection Pty. Ltd., Anaconda Aust., Noranda Aust., Carpentaria Exploration Co. Pty. Ltd., Sunhill Corporation Australia, Altarama Search Pty. Ltd., H.R. Gillespie, Dampier Mining Co. Pty. Ltd. and Utah Development Company have undertaken exploration activities in the Willouran Ranges. A summary of previous exploration compiled by Scott (1984) can be found in the fourth quarterly report on Tarlton Knob E.L. 1196.

6. PREVIOUS EXPLORATION BY CRA EXPLORATION PTY. LIMITED

Previous exploration was oriented to locate copper, lead and zinc mineralisation. Work on these commodities is summarised by A.K. Scott (1984) in the fourth quarterly report on Tarlton Knob E.L. 1196.

Diamond exploration has involved:

1. A regional gravel sampling programme using helicopter (129 samples).

2. The collection of rock and float samples for geochemistry.

3. Thin section preparation and description of rock samples which could have possibly had kimberlitic or lamprophyric affinities.

7. CURRENT DIAMOND EXPLORATION

During the last quarter the remainder of the microdiamond results were received. They are tabulated on Table 1 and sample locations are plotted on SAa 3029. All results were negative.

L.A. LEMESSURIER

LAL/dp

EXPENDITURE

Expenditure for the period ended 31st May, 1986 the nearest accounting period was $18 329.00, as listed below.

previous quarter

	$
Payroll	1 252
Supplies	171
Vehicle	867
Travel	23
Rent	294
Contractors	91
Laboratory	2 956
Overheads	147
Total	$ 5 801

TABLE 1

Tarlton Knob E.L. 1196 - Microdiamond Results

4th March 1985 - 4th June 1986

Sample Number	Microdiamond Results
917448	Negative
917444	Negative
1234310	Negative
917443	Negative
1234296	Negative
1234294	Negative
1234299	Negative
1234295	Negative
1234305	Negative
1234298	Negative
1234308	Negative
1234290	Negative
1234304	Negative
1234288	Negative
1234293	Negative
1234300	Negative
1234302	Negative
1234287	Negative
1234291	Negative
1234297	Negative
1234303	Negative
1234306	Negative
1234292	Negative
1234289	Negative

LOCATION

Marree	SH 53-5	1:250 000
Curdimurka	SH 53-8	1:250 000
Copley	SH 53-9	1:250 000
Andamooka	SH 53-12	1:250 000

KEYWORDS

Diamonds

II

0172

CRA EXPLORATION PTY. LIMITED

ELEVENTH QUARTERLY REPORT ON

TARLTON KNOB E.L. 1196, SOUTH AUSTRALIA,

FOR THE PERIOD ENDING 4TH SEPTEMBER, 1986.

AUTHOR: L.A. Le MESSURIER

COPIES TO: CIS CANBERRA
SADME

DATE: 22ND AUGUST, 1986

SUBMITTED BY: Lucille Le Messurier

ACCEPTED BY:

130674

CONTENTS

LIST OF PLANS

Plan No.	Title	Scale
SAa 2230	Tarlton Knob E.L. 1196, S.A. Location Plan	1:250 000
SAa 2929	Tarlton Knob E.L. 1196, S.A. Adelaidean Geology	1:100 000
SAa 3029	Tarlton Knob E.L. 1196, S.A. Location of Gravel Samples	1:100 000

1. SUMMARY

Tarlton Knob E.L. 1196 is dominantly covered by Adelaidean Stratigraphy which constitute the Willouran Ranges. During the quarter from June to September, 1986 no field work was carried out, however, a regional infill gravel sampling programme is planned for October/November.

2. INTRODUCTION

This is the eleventh statutory report for E.L. 1196 which was granted to CRA Exploration Pty. Limited on the 5th December, 1983 and renewed in 1984 and 1985 for further twelve month periods.

The area covers most of the Willouran Ranges south west of Marree and was originally taken up to search for Olympic Dam type deposits in areas of shallow basement, stratiform Pb-Zn in Callanna, Burra and Umberatana sediments, Copperbelt type stratiform Cu in Burra sediments and diamonds. Currently only diamond exploration is being carried out on the Tarlton Knob E.L. with a regional infill sampling programme planned for October/November.

3. GEOLOGY

A composite geology map compiled by Scott (1984) incorporating both mapping by SADME and Murrell (1977) is available on plan SAa 2929. The area is dominantly covered by Adelaidean Stratigraphy composed of north westerly trending Callanna, Burra, Umberatana and Wilpena Group sediments. They constitute the Willouran Ranges and are disrupted by several major faults.

4. PREVIOUS EXPLORATION

A number of companies including Aust. Selection Pty. Ltd., Anaconda Aust., Noranda Aust., Carpentaria Exploration Co. Pty. Ltd., Sunhill Corporation Australia, Altarama Search Pty. Ltd., H.R. Gillespie, Dampier Mining Co. Pty. Ltd. and Utah Development Company have undertaken exploration activities in the Willouran Ranges. A summary of previous exploration compiled by Scott (1984) can be found in the fourth quarterly report on Tarlton Knob E.L. 1196.

5. PREVIOUS EXPLORATION BY CRA EXPLORATION PTY. LIMITED

Previous exploration was oriented to locate copper, lead and zinc mineralisation. Work on these commodities is summarised by A.K. Scott (1984) in the fourth quarterly report on Tarlton Knob E.L. 1196.

Diamond exploration has involved:

1. A regional gravel sampling programme using helicopter (129 samples).

2. The collection of rock and float samples for geochemistry.

3. Thin section preparation and description of rock samples which could have possibly had kimberlitic or lamprophyric affinities.

Laille Le Messurier

L.A. LEMESSURIER

LAL/pq

EXPENDITURE

Expenditure for the period ended 31st August, 1986 the nearest accounting period was $5104.00, as listed below.

	$
Payroll	1881
Supplies	706
Vehicle	736
Travel	640
Rent	577
Contractors	176
Overheads	388
Total	$5104

LOCATION

Marree	SH 53-5	1:250 000
Curdimurka	SH 53-8	1:250 000
Copley	SH 53-9	1:250 000
Andamooka	SH 53-12	1:250 000

KEYWORDS

Diamonds

II

0179

CRA EXPLORATION PTY. LIMITED

TWELFTH QUARTERLY REPORT ON

TARLTON KNOB E.L. 1196, SOUTH AUSTRALIA,

FOR THE PERIOD ENDING 4TH DECEMBER, 1986.

AUTHOR: S.P. SUGDEN
L.A. Le MESSURIER

COPIES TO: CIS CANBERRA
SADME

DATE: 1ST DECEMBER, 1986

SUBMITTED BY: Lucille Le Messurier

ACCEPTED BY:

CONTENTS

LIST OF TABLES

LIST OF PLANS

1. SUMMARY

Tarlton Knob E.L. 1196 is dominantly covered by Adelaidean Stratigraphy which constitute the Willouran Ranges.

A helicopter-borne infill sampling programme was completed during late September.

Results received from observation of the heavy mineral concentrate have been promising with a number of chromite grains observed. To date all microdiamond samples processed have been negative.

2. INTRODUCTION

This is the twelfth statutory report for E.L. 1196 which was granted to CRA Exploration Pty. Limited on the 5th December, 1983 and renewed in 1984 and 1985 for further twelve month periods. An application was made on the 17th October, 1986 for a further 12 month term of exploration.

The area covers most of the Willouran Ranges south west of Marree and was originally taken up to search for Olympic Dam type deposits in areas of shallow basement, stratiform Pb-Zn in Callanna, Burra and Umberatana sediments, Copperbelt type stratiform Cu in Burra sediments and diamonds. Currently only diamond exploration is being carried out on the Tarlton Knob E.L.

3. GEOLOGY

A composite geology map compiled by Scott (1984) incorporating both mapping by SADME and Murrell (1977) is available on plan SAa 2929. The area is dominantly covered by Adelaidean Stratigraphy composed of north westerly trending Callanna, Burra, Umberatana and Wilpena Group sediments. They constitute the Willouran Ranges and are disrupted by several major faults.

4. PREVIOUS EXPLORATION

A number of companies including Aust. Selection Pty. Ltd., Anaconda Aust., Noranda Aust., Carpentaria Exploration Co. Pty. Ltd., Sunhill Corporation Australia, Altarama Search Pty. Ltd., H.R. Gillespie, Dampier Mining Co. Pty. Ltd. and Utah Development Company have undertaken exploration activities in the Willouran Ranges. A summary of previous exploration compiled by Scott (1984) can be found in the fourth quarterly report on Tarlton Knob E.L. 1196.

5. PREVIOUS EXPLORATION BY CRA EXPLORATION PTY. LIMITED

Previous exploration was oriented to locate copper, lead and zinc mineralisation. Work on these commodities is summarised by A.K. Scott (1984) in the fourth quarterly report on Tarlton Knob E.L. 1196.

Diamond exploration has involved:

1. A regional gravel sampling programme using helicopter (129 samples).

2. The collection of rock and float samples for geochemistry.

3. Thin section preparation and description of rock samples which could have possibly had kimberlitic or lamprophyric affinities.

6. WORK COMPLETED IN THE TWELFTH QUARTER

A helicopter-borne infill and follow up sampling programme was completed during the quarter. Six follow up samples were collected following up two microdiamond occurrences (samples 1233269 & 1233294). Eighty four infill samples were also collected (see plan SAa 3029).

Results to date have been promising with five samples having chromite grains observed in them. Further results are awaited.

S.P. SUGDEN/L.A. Le MESSURIER

SPS/LAL/pq

EXPENDITURE

Expenditure for the period ended 30th November, 1986 the nearest accounting period was $63 044.00, as listed below.

	$
Payroll	12 821
Supplies	4 552
Vehicle	3 685
Travel	3 278
Rent	3 066
Contractors	17 148
Laboratory	10 039
Overheads	8 455
Total	$63 044

LOCATION

Marree	SH 53-5	1:250 000
Curdimurka	SH 53-8	1:250 000
Copley	SH 53-9	1:250 000
Andamooka	SH 53-12	1:250 000

KEYWORDS

Diamonds

TABLE 1 INDICATOR MINERAL RESULTS - TARLTON KNOB EL 1196

4th September - 4th December, 1986

Sample Number	Indicator Mineral Results
1234602	Negative
1234604	Negative
1234606	Negative
1234610	Negative
1234614	Negative
1234643	Negative
1234645	Negative
1234646	Negative
1234647	Negative
1234649	Negative
1234650	Negative
1234653	Negative
1234666	Negative
1234667	Negative
1234669	Chromite 1x(+0.4)
1234674	Negative
1234677	Negative
1234680	Negative
1234682	Negative
1234685	Negative
1234686	Negative
1234687	Negative
1234688	Negative
1234690	Negative
1234692	Negative
1234693	Negative
1234705	Negative
1234707	Negative
1234709	Negative
1234710	Negative
1234618	Negative
1234620	Negative
1234621	Negative
1234622	Chromite 1x(+0.5)
1234700	Negative
1234609	Negative
1234611	Negative
1234605	Negative
1234612	Negative
1234641	Negative
1234642	Negative
1234648	Chromite 2x(+0.5) 9x(+0.4)
1234657	Negative
1234676	Negative
1234679	Negative
1234691	Negative
1234694	Negative
1234706	Chromite 1x(+0.5)
1234668	Negative
1234637	Chromite 4x(+0.5) 8x(+0.4)
1234702	Negative
1234696	Negative

TABLE 2 MICRODIAMOND RESULTS - TARLTON KNOB EL 1196

4th September - 4th December, 1986

Sample Number	Microdiamond Results
1234670	Negative
1234678	Negative
1234609	Negative
1234624	Negative
1234638	Negative
1234667	Negative
1234671	Negative
1234674	Negative
1234675	Negative
1234679	Negative
1234604	Negative
1234605	Negative
1234606	Negative
1234607	Negative
1234608	Negative
1234610	Negative
1234613	Negative
1234621	Negative
1234622	Negative
1234637	Negative
1234639	Negative
1234640	Negative
1234642	Negative
1234645	Negative
1234646	Negative
1234651	Negative
1234654	Negative
1234655	Negative
1234656	Negative
1234665	Negative
1234666	Negative
1234668	Negative
1234672	Negative
1234676	Negative
1234677	Negative
1234680	Negative
1234603	Negative
1234612	Negative
1234614	Negative
1234615	Negative
1234619	Negative
1234620	Negative
1234641	Negative
1234647	Negative
1234648	Negative
1234649	Negative
1234652	Negative
1234653	Negative
1234657	Negative
1234660	Negative
1234669	Negative
1234682	Negative
1234686	Negative
1234687	Negative
1234693	Negative
1234694	Negative
1234695	Negative
1234700	Negative
1234602	Negative
1234611	Negative
1234643	Negative
1234644	Negative
1234658	Negative
1234684	Negative
1234689	Negative
1234696	Negative
1234697	Negative
1234699	Negative
1234705	Negative
1234707	Negative
1234708	Negative
1234709	Negative
1234710	Negative

II

0188

CRA EXPLORATION PTY. LIMITED

THIRTEENTH QUARTERLY REPORT ON TARLTON KNOB E.L. 1196, SOUTH AUSTRALIA, FOR THE PERIOD ENDING 4TH MARCH, 1987.

AUTHOR: L.A. Le MESSURIER

COPIES TO: CIS CANBERRA
SADME

DATE: 5TH MARCH, 1987

SUBMITTED BY: Lucille Le Messurier

ACCEPTED BY:

130722

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LIST OF PLANS

1. SUMMARY

Tarlton Knob E.L. 1196 is dominantly covered by Adelaidean Stratigraphy which constitute the Willouran Ranges.

A helicopter-borne infill sampling programme was completed during late September.

During the thirteenth quarter one positive microdiamond result was received.

2. INTRODUCTION

This is the thirteenth statutory report for E.L. 1196 which was granted to CRA Exploration Pty. Limited on the 5th December, 1983 and renewed in 1984, 1985 and 1986 for further twelve month periods.

The area covers most of the Willouran Ranges south west of Marree and was originally taken up to search for Olympic Dam type deposits in areas of shallow basement, stratiform Pb-Zn in Callanna, Burra and Umberatana sediments, Copperbelt type stratiform Cu in Burra sediments and diamonds. Currently only diamond exploration is being carried out on the Tarlton Knob E.L.

3. GEOLOGY

A composite geology map compiled by Scott (1984) incorporating both mapping by SADME and Murrell (1977) is available in the twelfth quarterly report. The area is dominantly covered by Adelaidean Stratigraphy composed of north westerly trending Callanna, Burra, Umberatana and Wilpena Group sediments. They constitute the Willouran Ranges and are disrupted by several major faults.

4. PREVIOUS EXPLORATION

A number of companies including Aust. Selection Pty. Ltd., Anaconda Aust., Noranda Aust., Carpentaria Exploration Co. Pty. Ltd., Sunhill Corporation Australia, Altarama Search Pty. Ltd., H.R. Gillespie, Dampier Mining Co. Pty. Ltd. and Utah Development Company have undertaken exploration activities in the Willouran Ranges. A summary of previous exploration compiled by Scott (1984) can be found in the fourth quarterly report on Tarlton Knob E.L. 1196.

5. PREVIOUS EXPLORATION BY CRA EXPLORATION PTY. LIMITED

Previous exploration was oriented to locate copper, lead and zinc mineralisation. Work on these commodities is summarised by A.K. Scott (1984) in the fourth quarterly report on Tarlton Knob E.L. 1196.

Diamond exploration has involved:

1. A regional gravel sampling programme using helicopter (129 samples).

2. The collection of rock and float samples for geochemistry.

3. Thin section preparation and description of rock samples which could have possibly had kimberlitic or lamprophyric affinities.

4. Infill helicopter bourne gravel sampling programme (100 samples).

6. CURRENT EXPLORATION

No further field work was carried out during the thirteenth quarter. Eleven microdiamond samples were received with a microdiamond observed in s.1234688. No indicator mineral results were received.

Lucille Le Messurier.

L.A. LEMESSURIER

LAL/dp

TABLE 1 MICRODIAMOND RESULTS - TARLTON KNOB EL 1196

4th December 1986 - 4th March, 1987

Sample Number	Microdiamond Results
1234688	1 Microdiamond 0.2x0.15mm
1234690	Negative
1234701	Negative
1234702	Negative
1234618	Negative
1234650	Negative
1234683	Negative
1234685	Negative
1234691	Negative
1234692	Negative
1234706	Negative

EXPENDITURE

Expenditure for the period ended 28th February, 1987 the nearest accounting period was $30,961.00, as listed below.

	$
Payroll	2 104
Supplies	364
Vehicle	119
Rent	182
Tenement	4 804
Laboratory	21 854
Overheads	1 534
Total	$30 961

LOCATION

Marree	SH 53-5	1:250 000
Curdimurka	SH 53-8	1:250 000
Copley	SH 53-9	1:250 000
Andamooka	SH 53-12	1:250 000

KEYWORDS

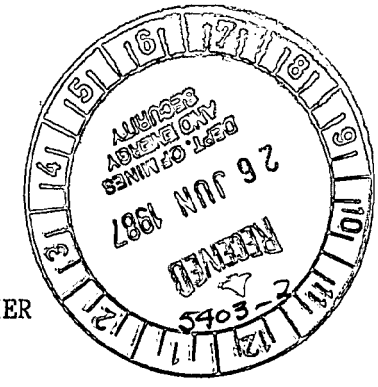
Diamonds, Indicator Minerals

II

0196

CRA EXPLORATION PTY. LIMITED

FOURTEENTH QUARTERLY REPORT ON TARLTON KNOB E.L. 1196, SOUTH AUSTRALIA, FOR THE PERIOD ENDING 4TH JUNE, 1987.



AUTHOR: L.A. LE MESSURIER

COPIES TO: CIS CANBERRA
SADME

DATE: 26TH MAY, 1987

SUBMITTED BY: L.A. Le Messurier

ACCEPTED BY:

CONFIDENTIAL

130733

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LIST OF TABLES

LIST OF PLANS

1. SUMMARY

Tarlton Knob E.L. 1196 is dominantly covered by Adelaidean Stratigraphy which constitute the Willouran Ranges.

A helicopter-borne infill sampling programme was completed during late September.

During the fourteenth quarter one positive indicator mineral result was received. Sample 1234665 contained one picroilmenite grain.

2. INTRODUCTION

This is the fourteenth statutory report for E.L. 1196 which was granted to CRA Exploration Pty. Limited on the 5th December, 1983 and renewed in 1984, 1985 and 1986 for further twelve month periods.

The area covers most of the Willouran Ranges south west of Marree and was originally taken up to search for Olympic Dam type deposits in areas of shallow basement, stratiform Pb-Zn in Callanna, Burra and Umberatana sediments, Copperbelt type stratiform Cu in Burra sediments and diamonds. Currently only diamond exploration is being carried out on the Tarlton Knob E.L.

3. GEOLOGY

A composite geology map compiled by Scott (1984) incorporating both mapping by SADME and Murrell (1977) is available in the twelfth quarterly report. The area is dominantly covered by Adelaidean Stratigraphy composed of north westerly trending Callanna, Burra, Umberatana and Wilpena Group sediments. They constitute the Willouran Ranges and are disrupted by several major faults.

4. PREVIOUS EXPLORATION

A number of companies including Aust. Selection Pty. Ltd., Anaconda Aust., Noranda Aust., Carpentaria Exploration Co. Pty. Ltd., Sunhill Corporation Australia, Altarama Search Pty. Ltd., H.R. Gillespie, Dampier Mining Co. Pty. Ltd. and Utah Development Company have undertaken exploration activities in the Willouran Ranges. A summary of previous exploration compiled by Scott (1984) can be found in the fourth quarterly report on Tarlton Knob E.L. 1196.

5. PREVIOUS EXPLORATION BY CRA EXPLORATION PTY. LIMITED

Previous exploration was oriented to locate copper, lead and zinc mineralisation. Work on these commodities is summarised by A.K. Scott (1984) in the fourth quarterly report on Tarlton Knob E.L. 1196.

Diamond exploration has involved:

1. A regional gravel sampling programme using helicopter (129 samples).
2. The collection of rock and float samples for geochemistry.
3. Thin section preparation and description of rock samples which could have possibly had kimberlitic or lamprophyric affinities.
4. Infill helicopter bourne gravel sampling programme (100 samples).

6. CURRENT EXPLORATION

No further field work was carried out during the fourteenth quarter. Two indicator mineral results were received. Sample 1234665 had a positive result of one picroilmenite grain.

Lialle Le Messurier

L.A. LE MESSURIER

LAL/pq

TABLE 1

INDICATOR MINERAL RESULTS - TARLTON KNOB E.L. 1196

4th March, 1987 - 4th June, 1987

Sample Number	Indicator Mineral Results
1234665	Picroilmenite 1 x +0.5
1234708	Negative

EXPENDITURE

Expenditure for the period ended 31st May, 1987, the nearest accounting period was $2560.00, as listed below.

	$
Payroll	1550
Supplies	159
Laboratory	278
Overheads	573
Total	$2560

EXPENDITURE

Expenditure for the period ended 31st May, 1987, the nearest accounting period was $2560.00, as listed below.

	$
Payroll	1550
Supplies	159
Laboratory	278
Overheads	573
Total	$2560

LOCATION

Marree	SH 53-05	1:250 000
Curdimurka	SH 53-08	1:250 000
Copley	SH 53-09	1:250 000
Andamooka	SH 53-12	1:250 000

KEYWORDS

Diamonds, Indicator Minerals

0205

CRA EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)
Adelaide Office: 31 OSMOND TERRACE, NORWOOD 5067
Head Office: 55 COLLINS STREET, MELBOURNE 3001

P.O. BOX 254 Norwood
TELEPHONE: 42 8871
TELEGRAMS: "EXPLORECO"
TELEX: AA88605

25th August, 1987

The Director General,
S.A. Department of Mines & Energy,
P.O. Box 151,
EASTWOOD. S.A. 5063

Dear Sir,

Re: Tarlton Knob E.L. 1196
Report for the Quarter Ending 4th September, 1987

During the quarter no field work was undertaken. Results from heavy mineral samples collected over the exploration licence highlighted an area at West Willouran which may be a prospective gold target.

Follow-up rock sampling, creek traversing and mapping is planned for the next three month period.

Expenditure for the two months to 31st July, 1987 amounted to $735.00.

Yours faithfully,

W.H. JOHNSTON
Chief Geologist

WHJ/dp

II

0206

CRA EXPLORATION PTY. LIMITED

SIXTEENTH & FINAL QUARTERLY REPORT ON TARLTON KNOB EL 1196, SOUTH AUSTRALIA, FOR THE PERIOD ENDING 4TH DECEMBER, 1987.

AUTHOR: S.P. SUGDEN

COPIES TO: CIS CANBERRA
SADME

DATE: 19TH NOVEMBER, 1987

SUBMITTED BY:

ACCEPTED BY:

14885

CONTENTS

LIST OF PLANS

Plan No.	Title	Scale
SAa 2230	Tarlton Knob EL 1196, S.A. - Location Plan	1:250 000
SAa 3029	Tarlton Knob EL 1196, S.A. - Location of Gravel Samples	1:100 000
SAa 2829	Tarlton Knob EL 1196, S.A. - Douglas Gully Prospect, Geological Map & Drill Section	1: 1 000
SAa 2828	Tarlton Knob EL 1196, S.A. - Geochemical Sample Sites	1:100 000
SAa 4850	Tarlton Knob EL 1196, S.A. - Douglas Gully Prospect. Utah Drill Hole WD012	1: 500
SAa 4851	Tarlton Knob EL 1196, S.A. - Douglas Gully Prospect. Utah Drill Hole WD017	1: 500

LIST OF APPENDICES

Appendix I Sample and Sample Result Ledger Diamond Samples
Appendix II Assay Results and Sample Ledger 1987 Field Trip
Appendix III Drill Logs and Assay Results - Utah Holes WD012 & WD017

1. SUMMARY

During the sixteenth quarter a field trip was made to field check three areas of possible mineralisation. From this it was concluded that:

i. the Black Wattle Creek microdiamond/indicator anomaly was due to reworking from the tillites within the catchment,
ii. that the gold mineralisation at Douglas Gully was only of a small scale with only a very low bulk grade; and
iii. magnesite near Coronation Bore, though of good grade was not of a size large enough to warrant further work.

Utah holes WD012 & WD017 were sampled and assayed for gold and 15 other elements.

A review of previous work in the licence was made and application for relinquishment made on the 21st November, 1987.

2. CONCLUSIONS

i. Investigations by CRA Exploration and other workers indicate that the area is unlikely to contain large scale economic base metal, gold or uranium mineralisation.

ii. Magnesite of good grade exists within the licence but due to location and potential size is considered unlikely to be economic.

iii. Systematic sampling & follow up for diamonds has proven that the area is unlikely to contain an economic diamond source. The tillites of the Umberatana group are strongly suspected to contain reworked kimberlitic indicators and microdiamonds.

iv. Gold mineralisation of Douglas Gully appears to have no great depth extent and as such no further work is recommended.

3. INTRODUCTION

This is the sixteenth & final statutory report for EL 1196 which was granted to CRA Exploration Pty. Limited on the 5th December, 1983 and renewed in 1984, 1985 and 1986 for further twelve month periods. The licence was surrendered on the 23rd November, 1987.

The area covers most of the Willouran Ranges south west of Marree and was originally taken up to search for Olympic Dam type deposits in areas of shallow basement, stratiform Pb-Zn in Callanna, Burra and Umberatana sediments, Copperbelt type stratiform Cu in Burra sediments and diamonds. The location of the licence is shown in plan SAa 2230.

4. GEOLOGY

A composite geology map compiled by Scott (1984) incorporating both mapping by SADME and Murrell (1977) is available in the twelfth quarterly report (CRAE Rpt. No. 13004). The area is dominantly covered by Adelaidean Stratigraphy composed of north westerly trending Callanna, Burra, Umberatana and Wilpena Group sediments. They constitute the Willouran Ranges and are disrupted by several major faults.

5. PREVIOUS EXPLORATION

A number of companies including Aust. Selection Pty. Ltd., Anaconda Aust., Noranda Aust., Carpentaria Exploration Co. Pty. Ltd., Sunhill Corporation Australia, Altarama Search Pty. Ltd., H.R. Gillespie, Dampier Mining Co. Pty. Ltd. and Utah Development Company have undertaken exploration activities in the Willouran Ranges. A summary of previous exploration compiled by Scott (1984) can be found in the fourth quarterly report on Tarlton Knob EL 1196.

6. PREVIOUS EXPLORATION BY CRA EXPLORATION PTY. LIMITED

Previous exploration by CRA Exploration has been orientated towards a number of commodities including base metals, gold & diamonds. A brief summary by commodity is presented below. For further details and plans refer to the fourth quarterly report (CRAE Rpt. No. 13004).

6.1 Base Metals and Gold

The search for the above commodities revolved around four target models, these being Roxby Dam type deposits, stratiform lead-zinc, stratiform copper and discordant hydrothermal mineralisation styles. CRA Exploration's activities involved studies of existing data with subsequent rock chip sampling and field mapping.

6.1.1 Roxby Downs Style Deposits

Mapped exposures of albitite which were considered to be windows to the pre-Adelaiden basement and a possible location of the above target were found to be intrusive into the Callana rocks. Rock chip sampling in the above areas contained no anomalous geochemistry. Utah also conducted limited gravity surveys in the area which did not reveal the presence of shallow Adelaidean basement.

It is therefore considered that the potential for a Roxby Downs style orebody is unlikely in the area.

6.1.2 Stratiform Pb-Zn

The search for stratiform Pb-Zn involved the delineation & sampling of black shale horizons, examination of the Reishbeith Dolomite and examination of other areas containing anomalous geochemistry reported by previous workers.

From the above work it was found that the Tapley Hill Formation and the base of the Umberatana Group were anomalous in zinc. No other anomalous Pb & Zn assays were noted and it was concluded that an economic sized resource was unlikely to occur.

6.1.3 Stratiform Cu

Utah extensively explored the area for stratiform copper and proved widespread copper anomalism in various units particularly the Callanna and lower Burra Groups.

From their work and rock samples collected by CRA Exploration, it is considered that there is no potential in the area for such a deposit.

6.1.4 Discordant Hydrothermal Mineralisation

Most areas of brecciation veining, etc. were noted by earlier workers and during CRA's field activities, were sampled and checked. No anomalous geochemistry or radioactivity was noted except for Douglas Gully, noted below.

6.1.5 Gold

Anomalous gold was noted in gravel and rock samples from the Douglas Gully area. The mineralisation was associated with quartz-sulphide-malchite veins and appeared to be patchy. Two Utah drill holes were sampled in this quarter to test the depth extent and continuity of the mineralisation (see section 7.2).

6.2 Magnesite

Magnesite bands are a common constituent of the Skillogalee sub group. In the Screech Owl Creek area, the magnesite bands were sampled with good grades being reported.

However, due to the location and the potential size of the resource, it was concluded that it was unlikely to be of interest to CRA at the present time.

Section 7.3 details investigations of a similar unit in the Coronation Bore area.

6.3 Diamonds

The location of the licence near the edge of the Stuart Shelf suggested that the area may be tectonically favourable for the emplacement of kimberlitic diatremes. The recognition of small albitite diatremes in the area also reinforced this view.

Regional stream gravel samples were collected throughout the areas with microdiamonds, Group 3 pyrope garnets, chromites & picro-ilmenites being found. Most anomalies were single indicator anomalies with Black Wattle Creek being the only main multi-indicator anomaly

(chromite, picroilmenite and microdiamond). Multi-indicator anomalies were rated above single indicator ones, in significance. Most anomalies were in the order of 1-2 grains and all <20 grains.

The chromites were considered non kimberlitic. MgO values for the picroilmenites suggested they were unlikely to be kimberlitic. No microdiamonds were able to be repeated.

A complete sample ledger is contained in Appendix I and sample locations are shown on plan SAa 3029.

From the above work and that reported in section 7.1, it is concluded that the licence has been adequately tested for the existence of economic diamondiferous diatremes. Tillites of the Umberatana Group are strongly suspected to contain reworked kimberlitic indicators (see section 6.1).

7. WORK COMPLETED DURING THE QUARTER

A short field trip was made to the licence to field check three areas for possible mineralisation. Three areas were visited as detailed below.

7.1 Black Wattle Creek

This creek is the site of a microdiamond/picro/chromite anomaly. Follow up programmes failed to repeat the microdiamond and narrowed down the potential source to a section of creek between samples 1234311 & 1234606 (approx. 1 km in length). A traverse up the creek bed from sample 1234311 to 1234606 revealed that the creek drained an impure sandstone/tillite unit and then a dolomitic siltstone/algal dolomite unit. Well rounded quartzite pebbles were found in the creek float and rarely a vuggy carbonate rock. Three samples were collected (919403-405). Whole rock and geochemical assays indicated that none of the samples were of kimberlitic or ultramafic affinity. Two samples were weathered dolomite (919403 & 404) and the third possibly a weathered arkosic sandstone (919405).

Assay results and sample locations are contained in Appendix II and plotted on plan SAa 2828.

It is concluded that due to the nature of the drainage train, well rounded pebbles and the tillites in the catchment, the indicators are a result of reworking into the tillites and not a primary source. Other creeks which drain the same horizon to the north west also have reported chromites. No further work is recommended.

7.2 Douglas Gully

A gravel sample immediately downstream of this prospect contained six grains of gold.

Utah has extensively prospected through the area and drilled numerous percussion and diamond drill holes in the immediate area. CRA Exploration's first investigations are reported in the second quarterly report (CRAE Rpt. No. 12711). A summary of the Utah exploration can also be found in this report and the fourth quarterly report (CRAE Rpt. No. 13004).

The workings in the area consist of shallow pits and a shaft over cross-cutting malachite-quartz-calcite veins and fracture fills within altered phyllitic siltstones on the limb of a drag fold. Minor quartz hematite breccia outcrops are also found with a similar orientation to the above. Samples of the malachite (919406) veining and the breccia (919407) were collected and assayed. Both samples were anomalous in Cu and Au, having values of 8.55% and 1370 ppm Cu and 1.52 ppm and 0.095 ppm Au, respectively. Geochemical sample locations are plotted on plans SAa 2828 and 2829.

The original gravel sample was collected next to the old treatment plant and the result could possibly be a result of contamination. Therefore it was decided to collect two repeat gravel samples (919389 & 919390) upstream at the junction of two creeks which drained the mineralised area. Twenty grains of gold were recovered in sample 919389 and none in 919390. Gravel sample locations are found on plans SAa 2829 & 3029.

Utah drill holes WD012 and WD017 (plan no. SAa 2829) were relogged and sampled at the SADME core library and assayed for 16 elements, including Au. The drill logs and sample results are contained in Appendix III.

No anomalous geochemistry was noted in the samples from WD012. Moderately anomalous patchy Au & Cu intervals were found in WD017 with the best Au assay being 0.56 ppm (sample 913219, 1.0 m) and Cu assay 1780 ppm (sample 949974, 1.5 m). Comparative lithology & selected element plots are shown in plans SAa 4850 & SAa 4851 for holes WD012 & WD017, respectively.

From the above it is concluded that the better Au & Cu results may be a result of supergene enrichment with only patchy non-economic grades at depth. No further work is recommended.

7.3 Coronation Bore Magnesite

The magnesite occurrence in this area was visited to check if it was possibly due to the weathering of a kimberlitic intrusion.

The magnesite was found to occupy a synclinal basin of sediments approximately 3 x 2 km in size. The magnesite occurs in conformable stratigraphic bands up to 3 m thick and is sub massive to pelletal (to 2 cm in size) in form. It is interbanded with limestone bands to 5 m thick. The beds dip at approximately 45 degrees to the centre of the basin.

Two areas have been previously worked for magnesite in the area. These are: firstly a bed on the northern side approximately 3 m wide and 700 m long and secondly, two bands and the western side 1-2 m wide and 700-1000 m long.

Five samples were collected from the western bands (919398-402) and were whole rock assayed. Assays are attached in Appendix I, and locations plotted on plan SAa 2828. From the results the percentage magnesite was calculated, firstly assuming that all the MgO was as magnesite and secondly that there was dolomite in the sample and that a proportion of the MgO was partitioned to balance the CaO. Proportions were calculated using percentages of MgO and CaO for dolomite and magnesite from Dana. Table 1 lists the range of percentage magnesite for each sample.

Table 1

Sample	% Magnesite	% Magnesite with Dolomite
919398	92.0	86.4
919399	93.3	89.5
919400	96.6	94.1
919401	94.5	93.6
919402	90.8	86.9

The magnesite is clearly stratigraphic in origin and not related to any ultramafic or kimberlitic body. Even though the magnesite is of good grade, the size and orientation of the beds make it unlikely to be a large enough resource to interest CRA.

S.P. SUGDEN

SPS/pq

EXPENDITURE

Expenditure for the period ended 30th November, 1987, the nearest accounting period was $15 405.00, as listed below.

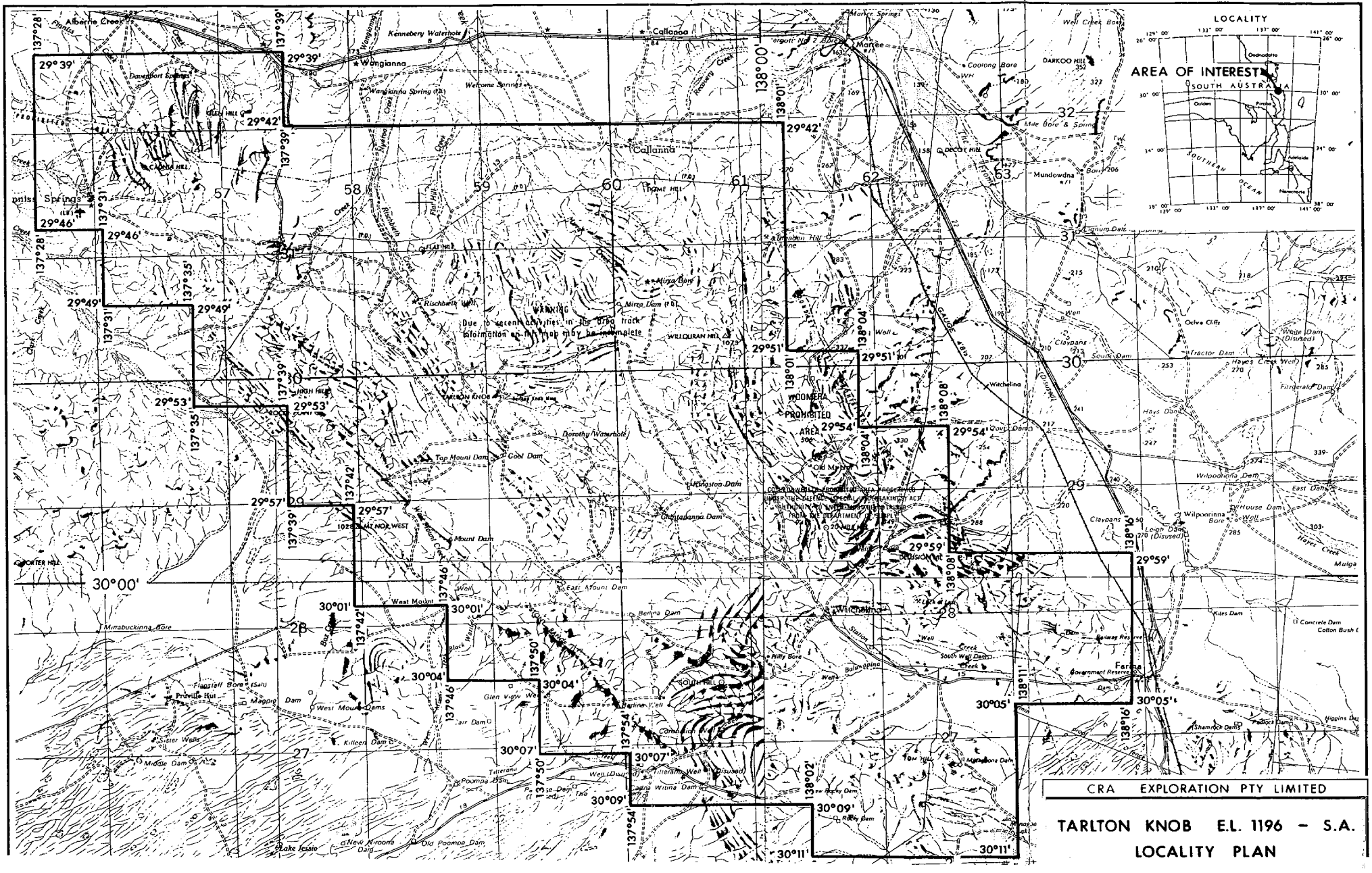
	$
Payroll	4 152
Supplies	1 641
Vehicles	1 193
Travel	609
Rent	944
Contractors	1 594
Laboratory	3 522
Sundry	200
Overheads	1 550
Total	$15 405

LOCATION

Marree	SH 54-05	1:250 000
Curdimurka	SH 53-08	1:250 000
Copley	SH 54-09	1:250 000
Andamooka	SH 53-12	1:250 000

KEYWORDS

Diamonds, Indicator Minerals, Base Metals, Gold, Magnesite


LOCALITY
AREA OF INTEREST
SOUTH AUSTRALIA
OCEAN
CRA EXPLORATION PTY LIMITED
TARLTON KNOB E.L. 1196 – S.A.
LOCALITY PLAN
WARNING
Due to recent activities in the area track information on this map may be incomplete
WOOMERA PROHIBITED AREA
Callanna
Wangianna
Mirra Bora
Mundowdna
Marree
Callanoo
Witchelina
Farina
Lake Jessie
Tarlton Knob
Willouran Hill
Flat Hill
Glen Hill
High Hill
Crater Hill
Table Hill
Dome Hill
Decoy Hill
Darkoo Hill
Mount Dam
Top Mount Dam
Goat Dam
Kingston Dam
Old Mount
Witchelina Dam
Berina Dam
Mundowdna Dam
Old Poompa Dam
Nevo Nirooma Dam
Mirra Dam
Rischbieth Well
Dorothy Waterhole
Kennebery Waterhole
Welcome Springs
Davenport Springs
Wangianna Spring
Coolong Bore
Mile Bore & Spring
Ochre Cliffs
Witchelina Bore
Wilpoorinna Bore
Minabuckinna Bore
Flagstaff Bore
Prieule Hill
Magpie Dam
West Mount Dams
Glen View Well
Killeen Dam
Middle Dam
Sister Wells
Poompa Dam
Tallaringa Well
Cadna Wilina Dam
Wilpoorinna Dam
Hayes Creek Well
Fitzgerald Dam
Shamrock Dams
Higgins Dam
Cotton Bush
Mulga
29°39'
29°42'
29°46'
29°49'
29°51'
29°53'
29°54'
29°57'
29°59'
30°00'
30°01'
30°04'
30°05'
30°07'
30°09'
30°11'
137°28'
137°31'
137°35'
137°39'
137°42'
137°46'
137°50'
137°54'
138°00'
138°01'
138°04'
138°08'
138°11'
138°16'

APPENDIX I

SAMPLE & SAMPLE RESULT LEDGER

DIAMOND SAMPLES

[redacted] EXPLORATION PTY. LTD. **SEQUENTIAL SAMPLE LEDGER** [redacted] COMMODITY [redacted]

0221

AMPLE No.	1:250,000 SHEET	1:100,000 SHEET	SAMPLE No. FOLLOWED UP	SITE QUALITY	GRID REFERENCE mE	GRID REFERENCE mN	PHOTO RUN/No.	DATE TAKEN	DPO	DPO DATE	SAMPLE TYPE	GEOLOGIST
117441	CURDIMURKA	WANGIANNA		G	784300	6693600	14/98	3-5-84	B686		Drainage 2x -2mm bags	
117442	"	"		M	783350	6695200	14/98	3-5-84	B686		Drainage 2x-2mm bags	
117443	"	"		M	782200	6692400	14/98	3-5-84	B686		"	
917444	"	"		G	780400	6692300	14/98	3-5-84	B686		"	
917445	"	"		Us	779400	6688200	14/091	3-5-84	B686		"	
917446	"	"		M	765200	6699450	/102	4-5-84	B686		"	
917447	"	"		M	774800	6709500	/058	4-5-84	B686		"	
917448	"	"		M6	785200	6709700	/59	4-5-84	B686		"	
917449	"	"		M	755200	6717900	/30	4-5-84	B686		"	
119389	"	"		M	785-150E	6693650	14/098	9/87	37574		2bags -2mm	
119390	"	"		PM	785-100E	6693700	14/098	"	"		" "	

[redacted]ERA[redacted]LO[redacted]ION[redacted]Y. L[redacted] [redacted] [redacted] [redacted]SE[redacted]EN[redacted]AL[redacted]AM[redacted]E L[redacted]G[redacted] [redacted] [redacted]ON[redacted]DI[redacted] [redacted] [redacted], [redacted]

SAMPLE No.	1:250,000 SHEET	1:100,000 SHEET	SAMPLE No. FOLLOWED UP	RESULT DATE W/E	GRID REFERENCE mE	GRID REFERENCE mN	PHOTO RUN/No.	DATE TAKEN	DPO	DPO DATE	SAMPLE TYPE	COMMENTS
1233162	CURDIMURKA			11/85	785400	6716600	S2095/R11/38	14.9.84.	B697			A2222
163				12/85	780800	6712100	S2094/R12/59	"	"			
164				6/85	779800	6709600	S2094/R12/59	"	"			
165				8/85	780200	6710200	S2094/R12/59	"	"			
166				6/85	776700	6702500	S2092/R13/44	"	"			
167				8/85	777400	6700600	S2092/R13/44	"	"			
168				12/85	785300	6713200	S2095/R11/38	"	"			
169				11/85	782100	6702400	S2092/R13/46	"	"			
170				9/85	789400	6708700	S2094/R12/61	"	"			
171				5/85	785700	6704400	S2092/R13/46	"	"			
172				4/85	788100	6704200	S2092/R13/48	"	"			
173				11/85	783400	6702700	S2092/R13/46	"	"			
174				10/85	780600	6699600	S2092/R13/46	"	"			
175				8/85	768900	6716500	S2095/R11/34	15.9.84	"			
176				13/85	775200	6712600	S2095/R11/36	"	"			
177				12/85	~~774700~~ 776700	~~6709600~~ 6702500	S2092/R13/42	"	"			
178				7/85	770000	6706200	S2092/R13/42	"	"			
179				8/85	771800	6706300	S2092/R13/42	"	"			
180				9/85	767800	6710100	S2094/R12/55	"	"			
181				11/85	767300	6703700	S2092/R13/42	"	"			
182				6/85	768000	6705000	S2092/R13/42	"	"			
183				11/85	773800	6707000	S2094/R12/57	"	"			
184				8/85	777100	6706400	S " /R12/57	"	"			
185				8/85	777500	6706500	" /R12/57	"	"			
186				6/85	768100	6700800	S2092/R13/42	"	"			
187				10/85	775000	6702800	S2092/R13/44	"	"			
188				8/85	759500	6698400	S2091/R14/105	"	"			
189				11/85	764400	6701100	S2092/R13/40	"	"			
190				10/85	760600	6697500	S2091/R14/105	"	"			
191				7/85	768000	6693600	S2091/R14/103	"	"			

[redacted]CRA[redacted]PLO[redacted]ION[redacted]Y. L[redacted] [redacted] [redacted] [redacted] SE[redacted]UE[redacted]AL [redacted]AM[redacted]E L[redacted]DGE[redacted] [redacted] [redacted]CO[redacted]DD[redacted] [redacted] [redacted] [redacted]

SAMPLE No.	1:250,000 SHEET	1:100,000 SHEET	SAMPLE No. FOLLOWED UP	RESULT DATE W/E	GRID REFERENCE mE	GRID REFERENCE mN	PHOTO RUN/No.	DATE TAKEN	DPO	DPO DATE	SAMPLE TYPE	COMMEN
1233192	CURDIMURKA			12/85	767400	6696200	S2091/R14/103	15/9/84	B697			0293
193	"			11/85	756800	6690000	S2091/R15/85	17/9/84	"			
194	"			9/85	760100	6693900	S2091/R14/105	"	"			
195	"			9/85	762200	6694600	S2091/R14/103	"	"			
196	"			12/85	765000	6693000	S2091/R14/103	"	"			
197	"			11/85	763500	6690700	S2091/R15/85	"	"			
198	"			12/85	754800	6688800	S2091/R15/83	"	"			
199	"			9/85	754500	6685000	S2091/R16/20	"	"			
200	"			7/85	762200	6715500	S2095/R11/32	18/9/84	"			
201	"			6/85	755300	6684200	S2091/R16/20	17/9/84	"			
202	"			12/85	762900	6715400	S2096/R11/32	18/9/84	"			
203	"			7/85	764500	6713300	S" /R11/34	"	"			
204	"			5/85	767500	6713200	S2094/R12/55	"	"			
205	"			4/85	763600	6709200	S2094/R12/55	"	"			
206	"			11/85	761100	6712100	S " /R12/53	"	"			
207	"			12/85	761500	6705100	S2092/R13/40	"	"			
208	"			12/85	763000	6705800	S2092/R13/40	"	"			
209	"			10/85	761400	6704000	S2092/R13/40	"	"			
210	"			11/85	757700	6700100	S2092/R13/40	"	"			
211	"			9/85	758600	6699400	S2092/R13/40	"	"			
212	"			7/85	754600	6694600	S2091/R14/105	"	"			
213	"			12/85	749800	6690500	S2091/R15/83	"	"			
214	"			9/85	749300	6695200	S2091/R14/107	"	"			
215	"			11/85	748300	6696200	S2091/R14/107	"	"			
216	"			9/85	748500	6697100	S2091/R14/107	"	"			
217	"			9/85	743900	6700700	S2092/R13/36	"	"			
218	"			12/85	746000	6703300	S2092/R13/36	"	"			
219	"			11/85	745100	6703200	S2092/R13/36	"	"			
220	"			11/85	749500	6705500	S " /R13/36	"	"			
221	"			12/85	741200	6702400	S " /R13/34	"	"			

[redacted] EXPLORATION PTY. LTD. [redacted] SEQUENTIAL SAMPLE LODGE [redacted] CODE [redacted]

SAMPLE No.	1:250,000 SHEET	1:100,000 SHEET	SAMPLE No. FOLLOWED UP	RESULT DATE W/E	GRID REFERENCE mE	GRID REFERENCE mN	PHOTO RUN/No.	DATE TAKEN	DPO	DPO DATE	SAMPLE TYPE	COMMEN
1233222	CURDIMURKA			4/85	745400	6705500	S2092/R13/36	18/9/84	B697			0224
223	"			11/85	780200	6691700	S2091/R15/91	19/9/84	"			
224	"			10/85	780600	6689900	S2091/R15/91	"	"			
225	"			11/85	780100	6688800	S2091/R15/91	"	"			
226	"			11/85	777100	6685200	S2091/R16/14	"	"			
227	"			11/85	771300	6680700	S2091/R16/16	"	"			
228	"			No sample received Bal.	767000	6679200	S2091/R16/18	"	"			Unsieved
229	"			9/85	766600	6679200	S2091/R16/18	"	"			
230	"			9/85	764800	6682100	S2091/R16/18	"	"			
231	"			9/85	755500	6681600	S2091/R16/20	"	"			
232	"			9/85	755900	6683000	S2091/R16/20	"	"			
233	"			11/85	784400	6681800	S2091/R16/12	"	"			
234	"			12/85	783500	6680500	S2091/R16/12	"	"			
235	"			9/85	781900	6682000	S2091/R16/14	"	"			
236	"			6/85	781700	6683300	S2091/R16/14	"	"			
237	"			9/85	783400	6684800	S2091/R15/91	"	"			
238	"			9/85	782900	6686700	S2091/R15/91	"	"			
239	"			9/85	782900	6688600	S2091/R15/91	"	"			
240	"			9/85	779600	6695700	S2091/R14/99	"	"			
241	"			9/85	778900	6695600	S2091/R14/99	"	"			
242	"			10/85	784000	6695200	S2091/R14/99	"	"			
243	"			10/85	779600	6697900	S2091/R14/99	"	"			
244	"			11/85	776100	6694300	S2091/R14/99	"	"			
245	"			11/85	784400	6698200	S2091/R14/99	"	"			
246	"			11/85	756400	6709600	S2094/R12/53	20.9.84	"			
247	"			11/85	756100	6710100	S2094/R12/53	"	"			
248	"			9/85	756400	6714000	S2095/R11/32	"	"			
249	"			9/85	751900	6715700	S2095/R11/30	"	"			
250	"			10/85	751500	6714500	S2095/R11/30	"	"			
251	"			11/85	748200	6716100	S2095/R11/30	"	"			

[redacted]RA[redacted]LO[redacted]ON[redacted]Y. L[redacted] [redacted] [redacted] [redacted]SE[redacted]EN[redacted]AL[redacted]AM[redacted]E L[redacted]GE[redacted] [redacted] [redacted]O M[redacted]D I[redacted] [redacted] [redacted] . [redacted]

SAMPLE No.	1:250,000 SHEET	1:100,000 SHEET	SAMPLE No. FOLLOWED UP	RESULT DATE W/E	GRID REFERENCE mE	GRID REFERENCE mN	PHOTO RUN/No.	DATE TAKEN	DPO	DPO DATE	SAMPLE TYPE	COMMENT
1233252	CURDIMURKA			9/85	747700	6719800	S2095/R11/28	20.9.84	B697			0225
253	"			10/85	747100	6714800	S2095/R11/28	"	"			
254	"			9/85	744300	6715800	S2095/R11/28	"	"			
255	"			9/85	742000	6718800	S2095/R11/28	"	"			
256	"			12/85	741300	6718300	S2095/R11/26	"	"			
257	"			9/85	738700	6713200	S2094/R12/49	"	"			
258	"			7/85	738100	6708700	S2094/R12/49	"	"			
259	"			11/85	741800	6707200	S2094/R12/49	"	"			
260	"			8/85	742600	6707600	S2094/R12/49	"	"			
261	"			12/85	748500	6711000	S2094/R12/51	"	"			
262	"			11/85	748200	6711000	S2094/R12/51	"	"			
263	ANDAMOOKA			9/85	755900	6676000	S2285/R2/56	21.9.84	"			
264	"			9/85	758400	6672900	S2286/R2/56	"	"			
265	"			9/85	767400	6676100	S2285/R2/64	"	"			
266	"			6/85	765100	6675100	S2285/R2/64	"	"			
267	"			9/85	775800	6676900	S2285/R2/64	"	"			
268	"			11/85	770200	6675500	S2285/R2/64	"	"			
269	"			Telex 7/6/85	769300	6672000	S2285/R2/64	"	"			
270	"			9/85	774000	6672800	S2285/R2/64	"	"			
271	"			11/85	771900	6667700	S2285/R2/64	"	"			
272	"			8/85	772300	6664500	S2285/R2/64	"	"			
273	"			11/85	773100	6664400	S2285/R2/64	"	"			
274	"			10/85	775700	6667000	S2285/R2/64	"	"			
275	"			10/85	773800	6664000	S2285/R2/64	22.9.84	"			
276	"			11/85	777500	6664500	S2285/R2/64	"	"			
277	"			8/85	779200	6663200	S2285/R2/64	"	"			
278	"			11/85	783300	6657100	S2285/R4/238	"	"			
279	"			8/85	782900	6665400	COPLEY S2487/R1/46	"	"			
280	"			8/85	785800	6666100	COPLEY S2487/R1/46	"	"			
281	"			Telex 7/6/85	781800	6669700	COPLEY S2487/R1/46	"	"			

CRA EXPLORATION PTY. LTD. **SEQUENTIAL SAMPLE LEDGER** COMMODITY

SAMPLE No.	1:250,000 SHEET	1:100,000 SHEET	SAMPLE No. FOLLOWED UP	RESULT DATE W/E	GRID REFERENCE mE	GRID REFERENCE mN	PHOTO RUN/No.	DATE TAKEN	DPO	DPO DATE	SAMPLE TYPE	GEOLOGIST
1233282	ANDAMOOKA			6/85	782400	6669600	COPLEY S2487/R1/46	22·9·84	B697			0226
283	COPLEY			8/85	213100	6670300	S2487/R1/46	22·9·84	B0697			
284	"			7/85	214100	6671500	S2487/R1/46	"	B0697			
285	"			11/85	217500	6671100	S2487/R1/46	"	"			
286	"			8/85	217400	6670800	S2487/R1/46	"	"			
287	"			10/85	222400	6670900	S2487/R1/46	"	"			
288	"			11/85	217400	6672700	S2487/R1/46	"	"			
289	"			8/85	216400	6675200	S2487/R1/46	"	"			
290	"			Telex 7/6/85	213600	6677000	S2487/R1/46	"	"			
291	MARREE			11/85	213700	6716300	S2992/R6/48	24·9·84	"			
292	"			10/85	212600	6704800	S2992/R6/48	"	"			
293	"			11/85	216700	6708700	S2992/R6/48	"	"			
294	"			10/85	216100	6706000	S2992/R6/48	"	"			
295	"			9/85	219400	6704400	S2992/R6/48	"	"			
296	"			10/85	218000	6703600	S2992/R6/48	"	"			
297	"			10/85	213100	6702700	S2992/R7/24	"	"			
298	"			8/85	224400	6706200	S2992/R6/48	"	"			
299	"			10/85	212700	6700000	S2993/R7/24	"	"			
300	"			9/85	212200	6696500	S2993/R7/24	"	"			
301	"			11/85	217300	6699800	S2993/R7/24	"	"			
302	"			8/85	218000	6699000	S2993/R7/24	"	"			
303	"			10/85	222300	6695500	S2993/R7/22	"	"			
304	"			9/85	225700	6693400	S2993/R7/22	"	"			
305	"			11/85	219700	6693400	S2993/R7/24	"	"			
306	"			11/85	219200	6694000	S2993/R7/24	"	"			
307	"			10/85	216400	6690300	S2993/R7/24	"	"			
308	"			12/85	215500	6694600	S2993/R7/24	"	"			
309	"			9/85	213400	6692400	S2993/R7/24	"	"			
310	"			11/85	212400	6693700	S2993/R7/24	"	"			
311	"			11/85	219200	6688600	S2993/R9/30	"	"			

CRA EXPLORATION PTY. LTD.

SEQUENTIAL SAMPLE LEDGER

COMMODITY

SAMPLE No.	1:250,000 SHEET	1:100,000 SHEET	SAMPLE No. FOLLOWED UP	RESULT DATE W/E	GRID REFERENCE mE	GRID REFERENCE mN	PHOTO RUN/No.	DATE TAKEN	DPO	DPO DATE	SAMPLE TYPE	GEOLOGIST
1233312	MARREE			11/85	219500	6688100	S 2993/R8/30	24·9·84	B697			0227
313	"			7/85	213800	6686300	S 2993/R8/32	"	"			
314	"			9/85	221200	6684900	S 2993/R8/32	"	"			
315	"			12/85	221600	6684200	S 2993/R8/32	"	"			
316	"			9/85	222700	6681900	S 2993/R8/32	"	"			
317	"			9/85	222900	6681400	S 2993/R8/32	"	"			
318	"			10/85	226800	6683700	S 2993/R8/32	"	"			
319	"			9/85	228200	6681600	S 2993/R8/32	"	"			
320	"			11/85	226900	6679000	S 2993/R8/32	"	"			
321	"			7/85	231300	6679400	COPLEY S 2487/R1/42	25·9·84	"			
322	COPLEY			11/85	231900	6677200	S 2487/R1/42	"	"			
323	"			11/85	233000	6673200	S 2487/R1/42	"	"			
324	"			11/85	237400	6673300	S 2487/R1/38	"	"			
325	"			8/85	235000	6669700	S 2487/R1/38	"	"			
326	"			9/85	233100	6669300	S 2487/R1/42	"	"			
327	"			Telex 7/6/85	227400	6671000	S 2487/R1/42	"	"			
328	"			8/85	223800	6667300	S 2487/R1/42	"	"			
329	"			9/85	223200	6666300	S 2487/R1/42	"	"			
330	"			8/85	214600	6661100	S 2486/R2/90	26·9·84	"			
331	"			9/85	215800	6659900	S 2486/R2/90	"	"			
332	"			11/85	217900	6660700	S 2486/R2/90	"	"			
333	"			10/85	220300	6659000	S 2486/R2/90	"	"			
334	"			Telex 7/6	218800	6657300	S 2486/R2/90	"	"			
335	"			7/85	222200	6655200	S 2486/R2/	"	"			
336	"			9/85	224400	6657400	S 2486/R2/94	"	"			
337	"			8/85	225500	6662000	S 2486/R2/94	"	"			
338	"			9/85	225200	6663900	S 2486/R2/94	"	"			
339	"			9/85	228000	6663300	S 2486/R2/94	"	"			
340	"			7/85	221300	6653100	S 2486/R2/92	"	"			
341	"			6/85	220900	6651200	S 2486/R2/92	"	"			

[redacted] EXPLORATION PTY LTD. [redacted] SEQUENTIAL SAMPLE LEDGER [redacted] COMMODITY [redacted]

MPLE No.	1:250,000 SHEET	1:100,000 SHEET	SAMPLE No. FOLLOWED UP	SITE QUALITY	GRID REFERENCE mE	GRID REFERENCE mN	PHOTO RUN/No.	DATE TAKEN	DPO	DPO DATE	SAMPLE TYPE	GEOLOGIST
34287	Curdimurka		1233243	MG	780000	6697600	14/99	23·8·85	B 1020		Drainage 4x4mm bags	
288	"		1233243	M	780100	6697000	4/99	23·8·85	"		Drainage 2x-4mm bags	0226
289	"		"	G	778900	6696800	"	"	"		"	
34290	"		1233240	G	789600	6695700	"	"	"		"	
291	"			M	779700	6694000	"	"	"		"	
292	"		917444	M	780400	6692200	"	"	"		Drainage 4x-4mm bags	
293	"	Wangiana	1233209	M	761400	6703800	13/40	24·8·85	"		"	
294	"	"	1233207	PM	760600	6703500	"	"	"		Drainage 2x-4mm bags	
295	"	"	"	PM	760300	6704000	"	"	"		"	
296	"	"	"	PM	761500	6705200	"	"	"		Drainage 4x-4mm bags	
297	"	"	1233209/207	M	762300	6702700	"	"	"		Drainage 2x-4mm bags	
298	"	"	1233207	PM	760400	6701800	"	"	"		"	
299	"	"	1233209	PM	763100	6701200	"	"	"		"	
34300	"	"	"	PM	763300	6701100	"	"	"		"	
301	"	"			768700	6693400		"			Rock Sample	
302	"	"	1234224	M	781000	6688300	15/91	25·8·85	"		Drainage 4x-4mm bags	
303	"	"	"	M	782800	6686300	"	"	"		Drainage 2x-4mm bags	
304	"	"	1233238	M	785000	6686700	"	"	"		"	
305	"	"	"	M	786700	6686800	"	"	"		"	
306	"	"	"	M	786500	6687000	"	"	"		"	
307	"	"	1233173	M	785000	6700800	13/146	"	"		Drainage 1x-4mm bag	
308	"	"		M	784200	6702000	"	"	"		"	
310	Andamooka		1233264	PM	769600	6672100	2/64	27·8·85	"		Drainage 4x-4mm bags	
34311	"		"	PM	770300	6672900	"	"	"		Drainage 2x-4mm bags	

[redacted] EXPLORATION PTY LTD [redacted] **SEQUENTIAL SAMPLE LEDGER** [redacted] COMMODITY [redacted]

SAMPLE No.	1:250,000 SHEET	1:100,000 SHEET	SAMPLE No FOLLOWED UP	SITE QUALITY	GRID REFERENCE mE	GRID REFERENCE mN	PHO RUN/No.	DATE TAKEN	DPO	DPO DATE	SAMPLE TYPE	GEOLOGIST
234601	Andamooka	Ediacara		Poor	762500	6675700	2/060	23 Sep 1986			Drainage 2x-2kg bags	
234602	"	"		"	768300	6672900	2/064	"			"	0225
234603	"	"	1233264	"	769400	6671900	"	"			Drainage 5x-2kg Bags.	
234604	"	"	"	Moderate	771900	6673800	"	"			Drainage 2x-2kg Bags.	
234605	"	"	"	P-m	772100	6673600	"	"			"	
234606	"	"	"	"	771500	6673400	"	"			"	
234607	"	"		"	773800	6669700	"	"			"	
234608	"	"		Poor	774000	6669800	"	"			"	
234609	"	"		"	779800	6662500	2/072	"			"	
234610	"	"		Mod	780200	6672600	"	"			"	
234611	"	"		Poor	780600	6674000	"	"			"	
234612	"	"		"	782000	6676000	"	"			"	
234613	"	"		P-m	783500	6664800	2/064	"			"	
234614	"	"		Unsat.	777000	6665100	2/072	"			"	
234615	"	"		Poor	785000	6661900	3/238	"			"	
234616	~~Copley~~ Copley	Leigh Ck		Poor	193700	6661500	2/090	"			"	
234617	"	"		"	195700	6659700	"	"			"	
234618	Maree	Maree		Mod.	216400	6689100	8/030	24 Sep 1986			"	
234619	"	"		"	215900	6686300	"	"			"	
234620	"	"		P-m	211600	6683800	"	"			"	
234621	"	"		Mod	218000	6683300	"	"			"	
234622	"	"		Poor	221300	6683300	"	"			"	
234623	"	"		P-m	226500	6680600	0/032	"			"	
234624	"	"		Unsat.	228600	6679000	"	"			"	
234625	Copley	Leigh Ck		Poor	231600	6676300	1/042	"			"	
234626	"	"		Poor	234000	6675300	"	"			"	
234627	"	"		P-m	226100	6673000	"	"			"	
234628	"	"		Poor	225400	6672200	"	"			"	
234629	"	"		P-m	225100	6659600	2/094	"			"	
234630	"	"		Poor	225300	6658900	"	"			"	

[redacted] EXPLORATION PTY [redacted] LTD [redacted] SEQUENTIAL SAMPLE LEDGER [redacted] COMMODITY [redacted]

SAMPLE No.	1:250,000 SHEET	1:100,000 SHEET	SAMPLE N FOLLOWED UP	SITE QUALITY	GRID REFERENCE mE	GRID REFERENCE mN	PHO RUN/...	DATE TAKEN	DPO	DPO DATE	SAMPLE TYPE	GEOLOGIST
234631	Copley	Leigh Ck		P-m	219800	6664400	1/042	24 Sep 1986			Drainage 2x-2m bags	0230
234632	~~Leigh Ck~~ "	"		"	214000	6670000	1/046	"			"	
234633	"	"		Unsat	219800	6673600	1/042	"			"	
234634	"	"		Poor	220800	6673800	"	"			"	
234635	"	"		"	223800	6676300	"	"			"	
234636	"	"		P-m	214200	6675100	1/046	"			"	
234637	moree	maree		"	21800	6677500	8/030	"			"	
234638	Cardimurka	Wangianna		"	762200	6679700	16/018	25 Sep 1986			"	
234639	"	"		mod	767500	6680700	16/016	"			"	
234640	"	"		Poor	771100	6680000	"	"			"	
234641	"	"		"	768000	6686600	15/087	"			"	
234642	"	"		"	770600	6686300	"	"			"	
234643	"	"		m-G	771800	6685000	16/016	"			"	
234644	"	"		P-m	772300	6683400	"	"			"	
234645	"	"		mod	773600	6682100	"	"			"	
234646	"	"		P-m	774500	6680400	"	"			"	
234647	"	"		Poor	776000	6684100	16/014	"			"	
234648	"	"		P-m	775700	6688200	15/089	"			"	
234649	"	"		Poor	775900	6690700	"	"			"	
234650	"	"		"	774500	6691400	14/101	"			"	
234651	"	"		Unsat	777000	6693100	"	"			"	
234652	"	"		"	776400	6693600	"	"			"	
234653	"	"		P-m	770300	6694700	"	"			"	
234654	"	"		mod	767600	6696100	14/103	"			"	
234655	"	"		Unsat	763100	6695200	"	"			"	
234656	"	"		"	764200	6690000	15/085	"			"	
234657	"	"		P-m	763400	6688400	"	"			"	
234658	"	"		mod	759500	6687600	"	"			"	
234659	"	"		Poor	751200	6717600	" 1030	26 Sep 1986			"	
234660	"	"		"	750600	6714700	"	"				

[redacted]A E[redacted]ORA[redacted]N P[redacted]LT[redacted] [redacted] [redacted] [redacted]EQUINTIAL SAMPLE LEDGER[redacted] [redacted] [redacted] [redacted] COMMODITY [redacted] [redacted] [redacted] [redacted]

SAMPLE No.	1:250,000 SHEET	1:100,000 SHEET	SAMPLE FOLLOWED UP	SITE QUALITY	GRID REFERENCE mE	GRID REFERENCE mN	PHOTO RUN/No.	DATE TAKEN	DPO	DPO DATE	SAMPLE TYPE	GEOLOGIST
234661	Cardimurka	Bopeechee		Poor	739000	6716800	11/026	26Sep1986			Drainage 2½-2m soil bags.	0231
234662	"	"		P-m	737800	6716200	"	"			"	
234663	"	"		"	736300	6708900	12/047	"			"	
234664	"	"		Poor	737100	6706500	"	"			"	
234665	"	"		"	740700	6710000	12/049	"			"	
234666	"	Wangianna		P-m	750200	6703400	13/036	"			"	
234667	"	"		Poor	750100	6703900	"	"			"	
234668	"	"		P-m	753100	6708400	12/051	"			"	
234669	"	"		Poor	759800	6709000	12/053	"			"	
234670	"	"		P-m	754200	6702000	13/038	"			"	
234671	"	"		Poor	756200	6703700	"	"			"	
234672	"	"		Unsat	749700	6692200	14/107	"			"	
234673	"	"		Poor	749300	6694300	"	"			"	
234674	"	"		"	754900	6695000	14/105	"			"	
234675	"	"		Mod	755100	6696800	"	"			"	
234676	"	"		P-m	755100	6698100	"	"			"	
234677	"	"		Unsat	760700	6696500	"	"			"	
234678	"	"		Poor	757600	6698900	"	"			"	
234679	"	"		P-m	757800	6701800	13/040	"			"	
234680	"	"		Poor	766500	6705400	13/042	"			"	
234681	"	"		"	764900	6711500	11/034	"			"	
234682	"	"		"	769300	6698500	13/042	28Sep1986			"	
234683	"	"		M-C	770300	6701900	"	"			"	
234684	"	"		"	774800	6700200	13/042	"			"	
234685	"	"		Poor	772300	6702300	"	"			"	
234686	"	"		P-m	775700	6700100	13/044	"			"	
234687	"	"		"	777400	6702600	"	"			"	
234688	"	"		Poor	779400	6700700	"	"			"	
234689	"	"		"	778700	6705100	12/059	"			"	
234690	"	"		"	780600	6704100	13/046	"			"	

[redacted] EX[redacted]RAT[redacted] PT[redacted]TD. [redacted] [redacted] [redacted] SEQUENTIAL SAMPLE LEDGER [redacted] [redacted] C[redacted]M[redacted]TY [redacted] [redacted] [redacted] [redacted]

AMPLE No.	1:250,000 SHEET	1:100,000 SHEET	SAMPLE N FOLLOWED UP	SITE QUALITY	GRID REFERENCE mE	GRID REFERENCE mN	PHO RUN/no.	DATE TAKEN	DPO	DPO DATE	SAMPLE TYPE	GEOLOGIST
34691	Curdimurka	Wangianna		Poor	780400	6704800	12/059	28Sep1988			Drainage 2x-2mm	Bags.
34692	"	"		"	782100	6703500	13/046	"			"	
34693	"	"		"	785100	6704700	12/059	"			"	
34694	"	"		"	783900	6697800	13/046	"			"	
34695	"	"		"	782100	6696800	14/099	"			"	
34696	"	"		unsat	782300	6696100	14/099	"			"	
34697	"	"		f-m	783200	6691700	"	"			"	
34698	"	"		Poor	780800	6684900	15/091	"			"	
34699	Maree	Maree		mod	210700	6690900	7/024	"			"	
34700	Curdimurka	Wangianna		Poor	789600	6694300	"	"			"	
34701	"	"		m-c	788700	6699800	"	"			"	
34702	"	"		Poor	789000	6705500	12/061	"			"	
234703	Maree	Maree	1233294	mod	214200	6705200	6/048	"			"	
234704	"	"	1233294	Poor	216700	6706400	"	"			Drainage 5x-2mm	bags.
234705	Curdimurka	Wangianna		"	785100	6706600	12/059	29Sep1988			Drainage 2x-2mm	bags.
34706	"	"		"	787100	6709500	12/061	"			"	
34707	"	"		"	788000	6709700	"	"			"	
34708	"	"		mod	773600	6706900	12/057	"			"	
34709	"	"		Poor	773000	6709700	"	"			"	
34710	"	"		"	774100	6708800	"	"			"	

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CRA EXPLORATION PTY. LTD.

SEQUENTIAL RESULT LEDGER

COMMODITY

SAMPLE No.	-0·4mm MICRODIAMOND RESULT	+0·4mm KIMBERLITIC INDICATORS	+0·4mm OTHER MINERALS OF INTEREST	COMMENTS
917441	Nil	Nil	Malachite (4-5 grains), Gold (6 grains)	0233
917442	Nil	Nil	Malachite (2-5 grains)	
917443	Nil	Nil		
917444	Nil	CHROMITE 1 +0·4 mm		
917445	Nil	Nil		
917446	Nil	Nil	Malachite (2-5 grains) Orthopyr (2-5 grains)	
917447	Nil	Nil	Orthopyr (2-5 grains)	
917448	Nil	Nil	Fresh Pyrite (1 grain)	
917449	Nil	Nil		
919389	not observed	not observed	20 grains Au	
919390	"	"	Nil	

CRA EXPLORATION PTY. LTD.

SEQUENTIAL RESULT LEDGER

COMMODITY

0234

SAMPLE No.	-0·4mm MICRODIAMOND RESULT	+0·4mm KIMBERLITIC INDICATORS	+0·4mm OTHER MINERALS OF INTEREST	COMMENTS
1233162	Nil	Nil	Clinopyrox, pyrite, barite	
3	Nil	Nil	Gold, orthopyroxene.	
4	Nil	Nil	Garnet, orthopyrox., florencite.	
5	Nil	Nil	Florencite.	
6	Nil	Nil	Barite, pyrite pseud.	
7	Nil	Nil	Pyrite pseudo.	
8	Nil	1+0·5 FW Chromite		
9	Nil	Nil		
70	Nil	Nil	Pyrite.	
1	Nil	Nil	Florencite, orthopyroxene.	
2	Nil	Nil	Orthopyr., pyrite pseud.	
3	Nil	Phlogopite 2x 0·4 FW	Orthopy, clinopy, garnet. Pyrite pseud.	
4	Nil	Nil	Barite, mica, pyrite pseud.	
5	Nil	Nil	Florencite	
6	Nil	2+·4 FW Chromite	Rutile (A),	
7	Nil	Nil	Orthopyrox, diopside,	
8	Nil	Nil	Pyrite, pseudos.	
9	Nil	Nil		
80	Nil	Nil	Barite, garnet.	
1	Nil	Nil	Pyrite. pseud.	
2	Nil	Nil	Pyrite pseud.	
3	Nil	Nil	Barite, pyrite pseudo.	
4	Nil	Nil	Florencite, orthopyr. MAGNESITE	
5	Nil	Nil	Co MINS, orthopy, clinopy	
6	Nil	Nil	Pyrite pseud.	
7	Nil	Nil	Pyrite pseud.	
8	Nil	Nil	Amph (Reibekite Series) Flor, Py.	
9	Nil	Nil	Barite, clinopyrox.	
90	Nil	Nil	Pyrite pseud.	
1	Nil	Nil	Garnet, pyrite pseudo.	

CRA EXPLORATION PTY. LTD.

SEQUENTIAL RESULT LEDGER

COMMODITY

0235

SAMPLE No.	-0·4mm MICRODIAMOND RESULT	+0·4mm KIMBERLITIC INDICATORS	+0·4mm OTHER MINERALS OF INTEREST	COMMENTS
1233192	Nil	1+0·5 W Chromite	Clinopyr., pyrite pseudo.	
3	Nil	Nil	Pyrite pseud, barite.	
4	Nil	Nil		
5	Nil	Nil	Garnet.	
6	Nil	Nil	Orthopyr.(R), pyrite pseudo(F),	
7	Nil	Nil		
8	Nil	Nil	Pyrite pseud.(R)	
9	Nil	Nil	Pyrite pseudo.	
20C	Nil	Nil	Barite, pyrite pseudo, florencite.	
1	Nil	Nil	Barite, pyrite pseudo, garnet.	
2	Nil	Nil	Pyrite pseudo(R), & PYRITE(R)	
3	Nil	Nil	Garnet, orthopyr., florencite	
4	Nil	Nil	Florencite, xenotime, CASSITERITE(C)	
5	Nil	Nil	Clinopy, orthopy, garnet, pyrite pseud.	
6	Nil	Nil	Barite.	
7	Nil	Nil	Olivine,	
8	Nil	1+·4FW Chromite	Clinopyrox(S), pyrite pseud.(F) Chloritoid(R)	
9	Nil	Nil	Orthopyrox., barite.	
210	Nil	Nil	Barite, PYRITE.	
1	Nil	Nil		
2	Nil	Nil	Garnet, florencite.	
3	Nil	Nil	Pyrite pseud(F)	
4	Nil	Nil	Garnet, barite.	
5	Nil	Nil	Barite	
6	Nil	Nil	Barite, garnet.	
7	Nil	Nil	Barite, garnet.	
8	Nil	Nil	Barite(F),	
9	Nil	Nil	Barite.	
220	Nil	Nil	Barite	
1	Nil	Nil	Barite(A), Chloritoid(F),	

CRA EXPLORATION PTY. LTD. **SEQUENTIAL RESULT LEDGER** COMMODITY

SAMPLE No.	-0·4mm MICRODIAMOND RESULT	+0·4mm KIMBERLITIC INDICATORS	+0·4mm OTHER MINERALS OF INTEREST	COMMENTS 0236
1233222	Nil	Nil	Barite	
3	Nil	Nil	Clinopyr, orthopy, barite, diopside.	
4	Nil	Nil	Olivine, barite, breccia.	
5	Nil	5+5 1·4 FW Chromite	Barite Clinopy, orthopyr, CASSITERITE	
6	Nil	Nil	Pyrite pseud., barite, orthopyr.	
7	Nil	Nil	Orthopyrox.	
8	Nil			
9	Nil	Nil	Garnet, barite	
30	Nil	Nil	Barite, garnet.	
1	Nil	1+·5 FW Chromite	Garnet, pyrite pseud., barite.	
2	Nil	Nil	Garnet	
3	Nil	Nil	Barite, pyrite pseud.	
4	Nil	Nil	Barite(?)	
5	Nil	Nil	Garnet.	
6	Nil	Nil.		
7	Nil	Nil	Pyrite pseud, mica, barite.	
8	Nil	Nil	Orthopyroxene, barite, garnet	
9	Nil	Nil	Clinopyroxene, florencite	
40	Nil	Nil	Orthopyroxene, pyrite pseud	
1	Nil	Nil	Barite, garnet, pyrite pseud	
2	Nil	Nil	Barite mica Clinopyroxene, MALACHITE, pyr. pseud	
3	Nil	Nil	Olivine, clinopy, barite, pyr. pseud.	
4	Nil	Nil	Pyrite pseud.	
5	Nil	Nil	Ti-magnetite, barite, mica.	
6	Nil	Nil	PYRITE, barite.	
7	Nil	Nil	Pyrite pseud., barite	
8	Nil	Nil	Garnet, barite, mica, flor.	
9	Nil	Nil	Florencite, pyrite pseudos	
50	Nil	Nil	Barite	
1	Nil	Nil	Barite, pyrite pseud, clinopyrox.	

CRA EXPLORATION PTY. LTD. **SEQUENTIAL RESULT LEDGER** COMMODITY

SAMPLE No.	-0·4mm MICRODIAMOND RESULT	+0·4mm KIMBERLITIC INDICATORS	+0·4mm OTHER MINERALS OF INTEREST	COMMENTS
1233252	Nil	Neg	Garnet, pyrite pseud., barite	
3	Nil	Neg	Barite, pyrite pseud.	
4	Nil	Neg	Barite, pyrite pseud, garnet.	
5	Nil	Neg	Barite, CASSITERITE, garnet, pyrite pseud.	
6	Nil	Neg	Muscovite (T), Barite (C), Ti MAG (O)	
7	Nil	Neg	Barite, garnet.	
8	Nil	Neg	Corundum, florencite. Barite, garnet, orthopyroxene.	
9	Nil	Neg	Barite. Ti-magnetite.	
60	Nil	Neg.	Corundum, florencite.	
1	Nil	Neg.	PYRITE (O), pyrite pseud (O), Barite (S)	
2	Nil	Neg	Barite, pyrite pseud.	
3	Nil	Nil	Barite, mica	
4	Nil	Nil	Garnet	
5	Nil	Nil	Garnet, barite	
6	Nil	Nil	Garnet, Florencite, pyrite pseudo.	
7	Nil	Nil	Garnet, pyrite pseud.	
8	Nil	Nil		
9	1, 0·45x0·38 Transparent Irregular	1 +·4 6% MgO. Picroilmenite		
70	Nil	Nil	Barite	
1	Nil	Nil	Clinopyr, orthopyr, barite	
2	Nil	Nil	Barite, corundum, Florenite	
3	Nil	Nil		
4	Nil	Nil	Barite, SCHEELITE, garnet	
5	Nil	Nil	Garnet	
6	Nil	Nil	Orthopyr, pyrite pseud.	
7	Nil	Nil	Barite, Florencite.	
8	Nil	Nil		
9	Nil	Nil	Florencite	
80	Nil	1 +·4 F Chromite	CASSITERITE MAGNESITE Corundum, Florencite, barite	
1	Nil	Nil		

CRA EXPLORATION PTY. LTD. **SEQUENTIAL RESULT LEDGER** COMMODITY

0238

SAMPLE No.	-0·4mm MICRODIAMOND RESULT	+0·4mm KIMBERLITIC INDICATORS	+0·4mm OTHER MINERALS OF INTEREST	COMMENTS
1233282	Nil	Nil	Pyrite pseud., barite, florencite	
3	Nil	Nil	Florencite, barite	
4	Nil	Nil	Florencite, corundum	
5	Nil	Nil	Orthopyr., barite	
6	Nil	Nil	Florencite	
7	Nil	1 t·5 FW Chromite	Clinopyroxene, piedmontite (or ep. date) pyrite pseud.	
8	Nil	Nil	CASSITERITE, clinopy, orthopy. barite.	
9	Nil	Nil	Florencite.	
90	Nil	1t·4 Chromite		
1	Nil	Nil	Barite, pyrite pseud.	
2	Nil	Nil	Orthopyrox, diopside, barite, mica Pyrite pseud., SULPHIDES.	
3	Nil	Nil	Barite, orthopyr	
4	1, 0·475 x 045mm Frosted brown Irregular	Nil	Barite, pyrite, pseud	
5	Nil	Nil	Barite, mica	
6	Nil	Nil	Barite, mica	
7	Nil	Nil	Orthopyr, pyrite pseud, barite	
8	Nil	Nil	Cr-Spinel, Florencite	
9	Nil	Nil	Orthopyrox, barite, mica, pyrite pseud.	
300	Nil	Nil	Orthopyroxene, barite musc-biotite / pyrite pseud.	
1	Nil	Nil	Barite	
2	Nil	Nil	Florencite	
3	Nil	Nil	Barite, musc, mica, pyrite pseud.	
4	Nil	Nil	Garnet	
5	Nil	Nil	Orthopyrox.	
6	Nil	Nil	Barite	
7	Nil	Nil	Pyrite pseud.	
8	Nil	Nil	Barite(c), pyrite pseud (F) allanite(c)	
9	Nil	Nil	Pyrite pseud.	
10	Nil	Nil	Barite, pyrite pseud	
11	Nil	Nil	Pyrite pseud.	

CRA EXPLORATION PTY. LTD.

SEQUENTIAL RESULT LEDGER

COMMODITY

0239

SAMPLE No.	-0·4mm MICRODIAMOND RESULT	+0·4mm KIMBERLITIC INDICATORS	+0·4mm OTHER MINERALS OF INTEREST	COMMENTS
1233312	Nil	Nil	Ti-magnetite	
3	Nil	Nil	Florencite, pyrite pseudos	
4	Nil	Nil	Barite	
5	Nil	Nil	Muscovite (R)	
6	Nil	Nil	Pyrite pseud.	
7	Nil	Nil	Barite, Pyrite pseud.	
8	Nil	Nil	CASSITERITE, barite	
9	Nil	Nil	Barite.	
20	Nil	Nil		
1	Nil	Nil	Barite, pyrite pseudos.	
2	Nil	Nil	Pyrite pseud.	
3	Nil	Nil		
4	Nil	Nil	Barite	
5	Nil	lt·4 FW Chromite	Orthopyroxene, Florencite	
6	Nil	Nil	Barite, pyrite	
7	Nil	Nil		
8	Nil	Nil	Florencite	
9	Nil	Nil	Barite	
30	Nil	Nil	Florencite, pyrite pseudo.	
1	Nil	Nil	Barite	
2	Nil	Nil		
3	Nil	Nil	Barite	
4	Nil			
5	Nil	Nil	Barite, corundum, garnet Florencite	
6	Nil	Nil	Orthopyroxene, pyrite pseud., garnet, barite	
7	Nil	Nil	Florencite	
8	Nil	Nil	Barite	
9	Nil	Nil	Garnet	
40	Nil	Nil	Garnet	
1	Nil	Olivine	Barite, garnet Corundum, Rutile Zircon.	

CRA EXPLORATION PTY. LTD.

SEQUENTIAL RESULT LEDGER

COMMODITY 0240

SAMPLE No.	-0·4mm MICRODIAMOND RESULT	+0·4mm KIMBERLITIC INDICATORS	+0·4mm OTHER MINERALS OF INTEREST	COMMENTS
1234287	Nil	1t·5 Chromite		
288		1t·8 Chromite		
289	Nil	Nil		
290	Nil	Nil		
291		3t·8, 5t·5, 1t·4 Chromite		
292	Nil	1t·5 Chromite		
293	Nil	Nil		
294	Nil	Nil		
295	Nil	Nil		
296	Nil	1t0·5 chromite		
297	Nil	Nil		
298	Nil	1t·5 Picroilmenite.		
299	Nil	Nil		
1234 300	Nil	Nil		
301				
302	Nil	Nil		
303	Nil	Nil		
304	Nil	Nil		
305	Nil	Nil		
306	Nil	Nil		
307	Nil	Nil		
308	Nil	Nil		
310	Nil	1t·8, 1t·5 Chromite		
234 311	Nil	1t·4 Chromite		" " " " " " " "

CRA EXPLORATION PTY. LTD.

SEQUENTIAL RESULT LEDGER

COMMODITY 0241

SAMPLE No.	-0·4mm MICRODIAMOND RESULT	+0·4mm KIMBERLITIC INDICATORS	+0·4mm OTHER MINERALS OF INTEREST	COMMENTS
234601	NIL	NIL		
234602	NIL	NIL		
234603	NIL	NIL		
234604	NIL	NIL		
234605	NIL	NIL		
234606	NIL	NIL		
234607	NIL	NIL		
234608	NIL	NIL		
234609	NIL	NIL		
234610	NIL	NIL		
234611	NIL	NIL		
234612	NIL	NIL		
234613	NIL	NIL		
234614	NIL	NIL		
234615	NIL	NIL	Trace Cassiterite	
234616	NIL	NIL		
234617	NIL	NIL		
234618	NIL	NIL		
234619	NIL	NIL		
234620	NIL	NIL		
234621	NIL	NIL		
234622	NIL	Chromite 1+0.5 mm		
234623	NIL	NIL		
234624	NIL	NIL		
234625	NIL	NIL	Rare Pyrite	
234626	NIL	NIL		
234627	NIL	chromite 1+0.4 mm		
234628	NIL	Chromite 1+0.5 4+0.2 mm		
234629	NIL	NIL		
234630	NIL	NIL		

CRA EXPLORATION PTY. LTD.

SEQUENTIAL RESULT LEDGER

COMMODITY 0242

SAMPLE No.	-0·4mm MICRODIAMOND RESULT	+0·4mm KIMBERLITIC INDICATORS	+0·4mm OTHER MINERALS OF INTEREST	COMMENTS
1234631	NIL	NIL		
1234632	NIL	NIL		
1234633	NIL	NIL		
1234634	NIL	chromite 1 +0·4mm		
1234635	NIL	NIL		
1234636	NIL	NIL		
1234637	NIL	chromite 4 +0·5mm 6 +0·4mm		
1234638	NIL	NIL		
1234639	NIL	NIL		
1234640	NIL	NIL		
1234641	NIL	NIL		
1234642	NIL	NIL		
1234643	NIL	NIL		
1234644	NIL	NIL		
1234645	NIL	NIL		
1234646	NIL	NIL		
1234647	NIL	NIL		
1234648	NIL	chromite 2 +0·5 mm 9 +0·4 mm		
1234649	NIL	NIL		
1234650	NIL	NIL		
1234651	NIL	NIL		
1234652	NIL	NIL		
1234653	NIL	NIL	Rare Orthopyroxene	
1234654	NIL	NIL		
1234655	NIL	NIL		
1234656	NIL	NIL		
1234657	NIL	NIL		
1234658	NIL	NIL		
1234659	NIL	NIL		
1234660	NIL	NIL		

CRA EXPLORATION PTY. LTD.

SEQUENTIAL RESULT LEDGER

COMMODITY

0243

SAMPLE No.	-0·4mm MICRODIAMOND RESULT	+0·4mm KIMBERLITIC INDICATORS	+0·4mm OTHER MINERALS OF INTEREST	COMMENTS
1234661	NIL	1 +0.4 Chromite		
1234662	NIL	1 +0.5 Fe, Picroilmenite 6-8% MgO.		
1234663	NIL	NIL		
1234664	NIL	1 +0.5 mm chromite 1 +0.4 mm		
1234665	NIL	1 +0.4 mm Picroilmenite 10% MgO		
1234666	NIL	NIL		
1234667	NIL	NIL		
1234668	NIL	NIL		
1234669	NIL	Chromite 1 +0.4 mm		
1234670	NIL	NIL		
1234671	NIL	NIL		
1234672	NIL	NIL		
1234673	NIL	1 +0.8 mm 1 +0.5 mm Chromites.		
1234674	NIL	NIL		
1234675	NIL	NIL		
1234676	NIL	NIL		
1234677	NIL	NIL		
1234678	NIL	NIL		
1234679	NIL	NIL		
1234680	NIL	NIL		
1234681	NIL	2 +0.5 2 +0.4 Chromite		
1234682	NIL	NIL		
1234683	NIL	NIL		
1234684	NIL	NIL		
1234685	NIL	NIL		
1234686	NIL	NIL		
1234687	NIL	NIL		
1234688	1, 0.2 x 0.15 mm frosted white irreg.	NIL		
1234689	NIL	NIL		
1234690	NIL	NIL		

CRA EXPLORATION PTY. LTD.

SEQUENTIAL RESULT LEDGER

COMMODITY

SAMPLE No.	-0·4mm MICRODIAMOND RESULT	+0·4mm KIMBERLITIC INDICATORS	+0·4mm OTHER MINERALS OF INTEREST	COMMENTS
1234691	NIL	NIL		
1234692	NIL	NIL		
1234693	NIL	NIL		
1234694	NIL	NIL		
1234695	NIL	NIL		
1234696	NIL	NIL		
1234697	NIL	NIL		
1234698	NIL	NIL		
1234699	NIL	NIL		
1234700	NIL	NIL		
1234701	NIL	NIL		
1234702	NIL	NIL		
1234703	NIL	NIL		
1234704	NIL	NIL		
1234705	NIL	NIL		
1234706	NIL	chromite 1+0·5 mm		
1234707	NIL	NIL		
1234708	NIL	NIL		
1234709	NIL	NIL		
1234710	NIL	NIL		

APPENDIX II

ASSAY RESULTS & SAMPLE LEDGER

1987 FIELD TRIP

SAMPLE LEDGER - 1987 FIELD TRIP

SAMPLE	PHOTO NO.	GRID LOCATION	COMMENTS	DPO
919389	Curdimurka 14/098	Wagianna 785150E 693650N	Douglas Gully gravel samples. 40kg-2mm	37574
919390	" "	" 785100E 693700N	" " " " "	"
919398	Andamooka 2/072	Ediacara 787450E 664800N	Coronation Bore magnesite rock samples	37571
919399	" "	" " "	" " " " "	"
919400	" "	" " "	" " " " "	"
919401	" "	" " "	" " " " "	"
919402	" "	" " "	" " " " "	"
919403	" 2/076	" 771200E 673200N	Black Wattle Ck Float samples	37572
919404	" "	" " "	" " " " "	"
919405	" "	" " "	" " " " "	"
919406	Curdimurka 14/098	Wagianna 785050E 693800N	Douglas Gully malachite rock sample	37573
919407	" "	" 785000E 693600N	Douglas Gully qtz. hem. breccia sample	"

ANALABS

0247

A division of MacDonald Hamilton & Co. Pty. Ltd.

Phone (09) 458 7999 — 52 Murray Road, Welshpool, W.A. 6106 — Telex AA92560

ANALYTICAL REPORT No.

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

S.P.Sugden/W.H.Johnston
CRA Exploration Pty Limited
P.O.Box 254
Norwood
S.A. 5067

ORDER No.	PROJECT

DATE RECEIVED	RESULTS REQUIRED

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
1	01/10/87	1	

STATE OF SAMPLES	PRE-TREATMENT								ANALYSIS		
REFER BELOW	SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	REFER TO ANALYSIS SECTION	PREPARATION	METHOD
	919398/919402	ro	Prep: 005,009,013,018								
	919398/919402	ro	Prep: 005,009,013,018								

RESULTS TO

S.P.Sugden/W.H.Johnston
CRA Exploration Pty Limited
P.O.Box 254
Norwood
S.A. 5067

RESULTS TO

REMARKS

STATE OF SAMPLES		ANALYSIS — PREPARATION				ANALYSIS — METHOD	
whole core	WC	perchloric acid	A1	cold acid	CA	atomic absorbtion	AAS
split core	SC	hydrochloric acid	A2	specific sulphide	SS	x-ray fluorescence	XRF
cutting	CU	nitric acid	A3	other mixed acids	Ma	spectrophotometry	SPEC
rock	Ro	aqua regia	A4	alkaline attack	AA	colorimetry	COL
soil	SO	nitric-perchloric	A5	volatilization	VO	chromatography	CHR
pulp	PU	HF mixture	A6	ignition	IG	titration	TTN
water	WA	HF under pressure	A7	pressed powder (XRF)	PP	other chemicals means	CHEM
tissue	TI	fusion	A8	glass fusion (XRF)	GF	miscellaneous	MISC
stream sediment	SS					fluorescence	FLUOR
heavy mineral	HM					inductively coupled plasma	ICP

AUTHORISED OFFICER

ANALABS

A Division of Macdonald Hamilton & Co Pty Ltd

0248

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	15.6.86.00998	01/10/87	37571	1 OF 1

TUBE No.	SAMPLE No	P2O5	Al2O3	CaO	Fe2O3	K2O	MgO	MnO	SiO2	TiO2
1	919398	0.023	<0.10	3.75	0.50	0.02	44.0	0.01	6.50	<0.01
2	919399	0.007	<0.10	2.53	<0.05	0.03	44.6	<0.01	0.80	<0.01
3	919400	0.009	0.30	1.68	0.35	0.05	46.2	0.01	0.80	<0.01
4	919401	<0.007	0.10	0.64	0.09	0.08	45.2	0.01	1.80	<0.01
5	919402	0.030	<0.10	2.60	0.35	0.09	43.4	0.01	4.10	<0.01
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	0.007	0.10	0.01	0.05	0.01	0.1	0.01	0.05	0.01
24	UNITS	%	%	%	%	%	%	%	%	%
25	METHOD	401	405	405	405	405	405	405	405	405

Results in ppm unless otherwise specified
T = element present, but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

Phone (09) 458 7999 — 52 Murray Road, Welshpool, W.A. 6106 — Telex AA92560

ANALYTICAL REPORT No. [illegible]

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

0249

ORDER No.	PROJECT
77572	

[illegible]

DATE RECEIVED	RESULTS REQUIRED
15/09/87	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
1	07.10.87	1	3

STATE OF SAMPLES	PRE-TREATMENT								ANALYSIS			
REFER BELOW	SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE		REFER TO ANALYSIS SECTION	PREPARATION	METHOD
	919403/919405	ro	Prep: 005,009,013,018						Ni,Co,Cr,Nb,La,Ba,Zr,Th/20			
	919403/919405	ro	Prep: 005,009,013,018						P205/401			
	919403/919405	ro	Prep: 005,009,013,018						Na2O,MgO/104			

RESULTS TO

S.P. Sugden/W.H. Johnston
CRA Exploration Pty Limited
P.O. Box 254
Norwood
S.A. 5067

RESULTS TO

REMARKS

Samples pulverised in Cr- steel mill

STATE OF SAMPLES		ANALYSIS — PREPARATION				ANALYSIS — METHOD	
whole core	WC	perchloric acid	A1	cold acid	CA	atomic absorbtion	AAS
split core	SC	hydrochloric acid	A2	specific sulphide	SS	x-ray fluorescence	XRF
cutting	CU	nitric acid	A3	other mixed acids	Ma	spectrophotometry	SPEC
rock	Ro	aqua regia	A4	alkaline attack	AA	colorimetry	COL
soil	SO	nitric-perchloric	A5	volatilization	VO	chromatography	CHR
pulp	PU	HF mixture	A6	ignition	IG	titration	TTN
water	WA	HF under pressure	A7	pressed powder (XRF)	PP	other chemicals means	CHEM
tissue	TI	fusion	A8	glass fusion (XRF)	GF	miscellaneous	MISC
stream sediment	SS					fluorescence	FLUOR
heavy mineral	HM					inductively coupled plasma	ICP

AUTHORISED OFFICER M Dwyer

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

0250

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No	PAGE
	15.6.06.00999	04/10/87	37572	1 OF 3

TUBE No.	SAMPLE No	Cr	Co	Ni	Zr	Nb	Ba	La	Th	MgO
1	919403	32	14	<10	<5	<10	367	<5	<10	20.5
2	919404	<10	10	<10	7	<10	127	<5	<10	22.5
3	919405	49	6	18	34	<10	387	6	<10	8.5
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19	*	Samples pulverised in Cr-steel mill								
20										
21										
22										
23	DETECTION	10	5	10	5	10	5	5	10	0.5
24	UNITS	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	%
25	METHOD	201	201	201	201	201	201	201	201	104

Results in ppm unless otherwise specified
T = element present, but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER m. Dwyer

ANALABS

A Division of Macdonald Hamilton & Co Pty Ltd

0251

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	15.6.06.00999	04/10/87	37572	2 OF 3

TUBE No.	SAMPLE No.	Na2O	P2O5	Al2O3	CaO	Fe2O3	K2O	MgO	MnO	SiO2
1	919403	300	0.080	0.41	23.00	3.55	0.04	17.40	0.11	17.60
2	919404	300	0.053	1.03	27.40	0.80	0.09	20.50	0.04	5.25
3	919405	900	0.011	2.58	0.63	1.30	0.14	7.35	0.01	77.50
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	50	0.007	0.01	0.01	0.05	0.01	0.05	0.01	0.05
24	UNITS	PPM	%	%	%	%	%	%	%	%
25	METHOD	104	401	408	408	408	408	408	408	408

Results in ppm unless otherwise specified
T = element present, but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER m. Dwyer

ANALABS

A Division of Macdonald Hamilton & Co Pty Ltd

0252

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	15.6.06.00999	04/10/87	37572	3 OF 3

TUBE No.	SAMPLE No.	TiO2
1	919403	0.01
2	919404	0.03
3	919405	0.06
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23	DETECTION	0.01
24	UNITS	%
25	METHOD	408

Results in ppm unless otherwise specified
T = element present, but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER m. Dwyer

ANALABS

0253

A division of MacDonald Hamilton & Co. Pty. Ltd.
Phone (09) 458 7999 52 Murray Road, Welshpool, W.A. 6106 Telex AA92560

ANALYTICAL REPORT No.

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

S.P.Sugden/W.H.Johnston
CRA Exploration Pty Limited
P.O.Box 254
Norwood
S.A. 5067

ORDER No.	PROJECT

DATE RECEIVED	RESULTS REQUIRED

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
	04/10/87	1	

STATE OF SAMPLES REFER BELOW	SAMPLE NUMBERS	PRE-TREATMENT: DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS: REFER TO ANALYSIS SECTION	PREPARATION	METHOD
	919486/919487	ro	Prep: 005,009,013,018						Ba,Ce,La,Th,Mo,Co,Cu,Ni,Zn,Cr,Mn,Mg,Fe,Ca		
	919486/919487	ro	Prep: 005,009,013,018						Au/313		
	919486/919487	ro	Prep: 005,009,013,018						Cu/104		

RESULTS TO

S.P.Sugden/W.H.Johnston
CRA Exploration Pty Limited
P.O.Box 254
Norwood
S.A. 5067

RESULTS TO

REMARKS

STATE OF SAMPLES		ANALYSIS — PREPARATION				ANALYSIS — METHOD	
whole core	WC	perchloric acid	A1	cold acid	CA	atomic absorbtion	AAS
split core	SC	hydrochloric acid	A2	specific sulphide	SS	x-ray fluorescence	XRF
cutting	CU	nitric acid	A3	other mixed acids	Ma	spectrophotometry	SPEC
rock	Ro	aqua regia	A4	alkaline attack	AA	colorimetry	COL
soil	SO	nitric-perchloric	A5	volatilization	VO	chromatography	CHR
pulp	PU	HF mixture	A6	ignition	IG	titration	TTN
water	WA	HF under pressure	A7	pressed powder (XRF)	PP	other chemicals means	CHEM
tissue	TI	fusion	A8	glass fusion (XRF)	GF	miscellaneous	MISC
stream sediment	SS					fluorescence	FLUOR
heavy mineral	HM					inductively coupled plasma	ICP

AUTHORISED OFFICER M. Dwyer

ANALABS

A Division of Macdonald Hamilton & Co Pty Ltd.

ANALYTICAL DATA

025

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	15.6.06.01000	04/10/87	37573	1 OF 3

TUBE No.	SAMPLE No.	Cr	Mn	Fe	Co	Ni	Cu	Cu	Zn	As
1	919406	196	3160	4.12	254	21	8.550	–	61	4
2	919407	422	312	16.00	43	105	–	1370	227	85
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	10	15	0.01	5	10	0.002	5	5	2
24	UNITS	PPM	PPM	%	PPM	PPM	%	PPM	PPM	PPM
25	METHOD	201	201	201	201	201	104	201	201	401

Results in ppm unless otherwise specified.
T = element present but concentration too low to measure.
X = element concentration is below detection limit.
— = element not determined.

AUTHORISED OFFICER M. Doyle

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

0255

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No	PAGE
	15.6.06.01000	04/10/87	37573	2 OF 3

TUBE No.	SAMPLE No	Mo	Ag	Sn	Ba	La	Ce	W	Au	Pb
1	919406	<20	<5	<3	18	41	78	<20	1.520	20
2	919407	<20	<5	<3	6	13	25	<20	0.095	30
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	20	5	3	5	5	15	20	0.005	10
24	UNITS	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
25	METHOD	201	201	401	201	201	201	401	313	401

Results in ppm unless otherwise specified
T = element present, but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER M. Dwyer

ANALABS

A Division of Macdonald Hamilton & Co Pty. Ltd

0256

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No	PAGE
	15.6.06.01000	04/10/87	37573	3 OF 3

TUBE No.	SAMPLE No.	Th	U							
1	919406	18	10							
2	919407	<10	6							
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	10	3							
24	UNITS	PPM	PPM							
25	METHOD	201	401							

Results in ppm unless otherwise specified
T = element present, but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER M. Dwyer

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

Phone (09) 458 7999 | 52 Murray Road, Welshpool, W.A. 6106 | Telex AA92560

9.19 – Tarlton [illegible]

025 [illegible]

ANALYTICAL REPORT No. [illegible]

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

L.Kennedy
CRA Exploration Pty Limited
P.O.Box 254
Norwood
S.A. 5067

ORDER No.	PROJECT
[illegible]	

DATE RECEIVED	RESULTS REQUIRED
06/10/87	[illegible]

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
2	28/10/87	1	26

STATE OF SAMPLES REFER BELOW	SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	ANALYSIS	REFER TO ANALYSIS SECTION	PREPARATION	METHOD
	Various	pu							Na2O/104			

REMARKS

RESULTS TO:
S.P.Sugden/W.H.Johnston
CRA Exploration Pty Limited
P.O.Box 254
Norwood
S.A. 5067

RESULTS TO:
L.A. Le Messurier
CRA Exploration Pty Limited
P.O.Box 254
Norwood
S.A. 5067

STATE OF SAMPLES	
whole core	WC
split core	SC
cutting	CU
rock	Ro
soil	SO
pulp	PU
water	WA
tissue	TI
stream sediment	SS
heavy mineral	HM

ANALYSIS — PREPARATION			
perchloric acid	A1	cold acid	CA
hydrochloric acid	A2	specific sulphide	SS
nitric acid	A3	other mixed acids	Ma
aqua regia	A4	alkaline attack	AA
nitric-perchloric	A5	volatilization	VO
HF mixture	A6	ignition	IG
HF under pressure	A7	pressed powder (XRF)	PP
fusion	A8	glass fusion (XRF)	GF

ANALYSIS — METHOD	
atomic absorbtion	AAS
x-ray fluorescence	XRF
spectrophotometry	SPEC
colorimetry	COL
chromatography	CHR
titration	TTN
other chemicals means	CHEM
miscellaneous	MISC
fluorescence	FLUOR
inductively coupled plasma	ICP

AUTHORISED OFFICER M. Dwyer

0258

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	15.6.06.01097	28/10/87	37577	1 OF 2

TUBE No.	SAMPLE No.	Na20	H20							
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18	919398	<0.003	0.07							
19	919399	<0.003	0.10							
20	919400	0.040	0.15							
21	919401	<0.003	0.16							
22	919402	<0.003	0.11							
23	919403	0.006	0.15							
24	919404	0.006	0.41							
25	919405	0.084	2.85							

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER M. Dwyer

ANALABS

A Division of Macdonald Hamilton & Co. Pty. Ltd.

0259

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	15.6.06.01097	28/10/87	3577	2 OF 2

TUBE No.	SAMPLE No.	Na2O	H2O							
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	DETECTION	0.003	0.01							
24	UNITS	%	%							
25	METHOD	104	616							

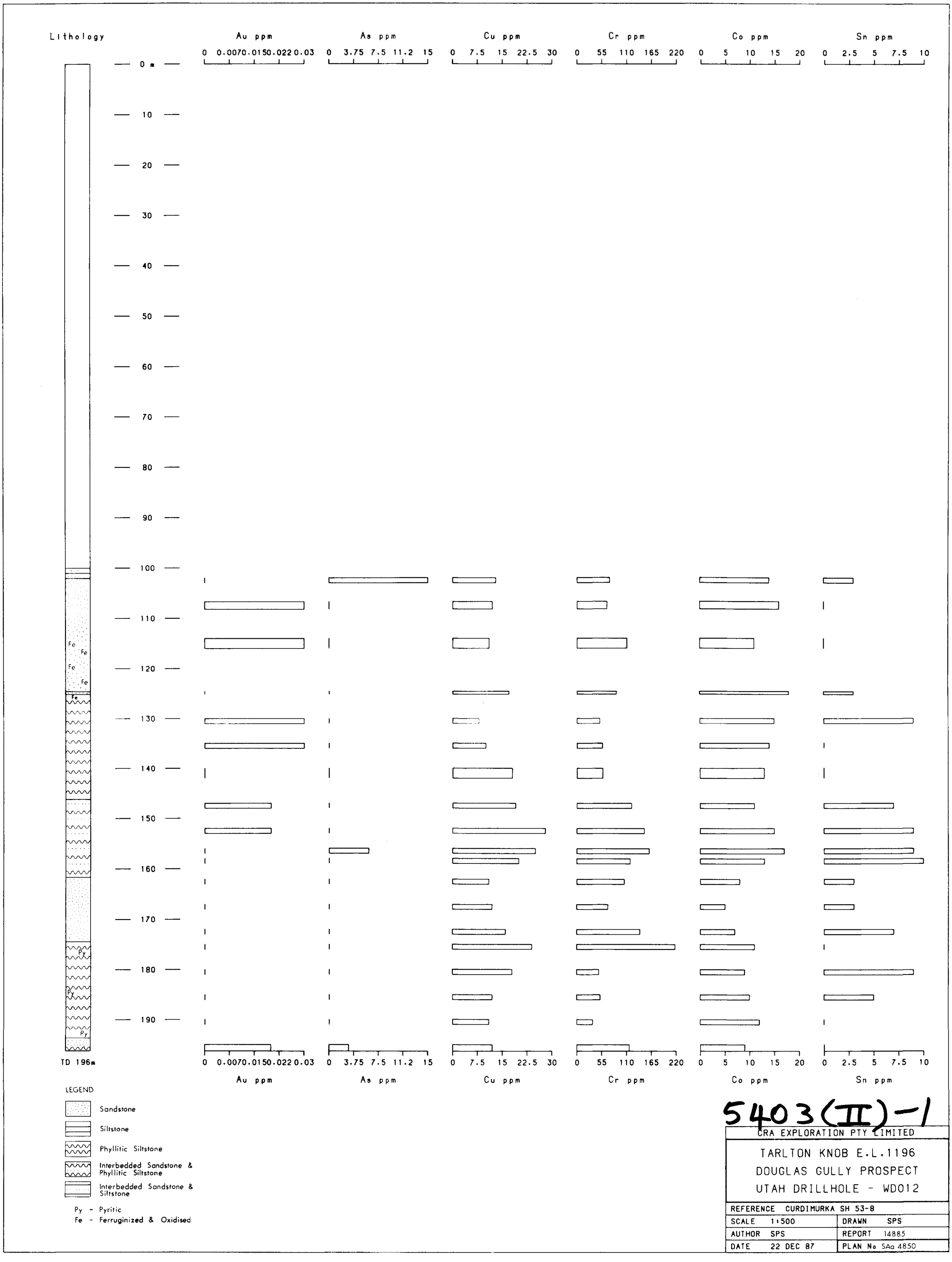
Results in ppm unless otherwise specified
T = element present, but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER M. Dwyer

APPENDIX III

DRILL LOGS & ASSAY RESULTS

UTAH HOLES - WD012 & WD017



5403(II)-1

CRA EXPLORATION PTY LIMITED

TARLTON KNOB E.L.1196
DOUGLAS GULLY PROSPECT
UTAH DRILLHOLE - WD012

REFERENCE CURDIMURKA SH 53-8	
SCALE 1:500	DRAWN SPS
AUTHOR SPS	REPORT 14885
DATE 22 DEC 87	PLAN No SAa 4850

Lithology

Au ppm 0 0.15 0.3 0.45 0.6

As ppm 0 3.75 7.5 11.2 15

Cu ppm 0 2250 4500 6750 9000

Co ppm 0 5 10 15 20

Cr ppm 0 125 250 375 500

Sn ppm 0 2.5 5 7.5 10

0 m
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250

TD 251m

M
S
Mc

LEGEND

- Sandstone
- Clayey Sandstone
- Interbedded Sandstone & Siltstone
- Veined, Brecciated or Sheared Sandstone
- Shear Zone

M - Micaceous
S - Sulphidic - Py & CPy
Mc - Malachitic

5403(II)-2

CRA EXPLORATION PTY LIMITED

TARLTON KNOB E.L. 1196
DOUGLAS GULLY PROSPECT
UTAH DRILLHOLE - WDO17

REFERENCE: CURDIMURKA SH53-8	
SCALE 1:500	DRAWN SPS
AUTHOR SPS	REPORT 14885
DATE 22 DEC.'87	PLAN No SAa 4851

CRA EXPLORATION PTY LIMITED

WD012 DRILL LOG

PROJECT TARLTON KNOB - DOUGLAS GULLY PROSPECT

CO-ORDINATES _____ AZIMUTH Mag. Nth. DRILLERS UTAH COMMENCED _____ DEPTH 196.3m HOLE No. WD012

RL COLLAR _____ INCLINATION -60° DRILL TYPE DIAMOND COMPLETED _____ CASING LEFT _____ DPO Nos. 37578

CRA EXPLORATION PTY LIMITED

GEOCHEMICAL RESULTS

SAMPLE Nos. 919951 - 919961 DEPTH FROM 102.0 TO 159.0m DPO Nos 37578 LABS ANALABS

PROJECT TARLTON KNOB - DOUGLAS GULLY PROSPECT HOLE No. WD012

DEPTH From	DEPTH To	CORE REC	CORE SIZE	LOG	GEOLOGY	SAMPLE NUMBER	FROM (m)	TO (m)	REC (m)	GEOPHYSICS
100.2	102.1				SANDSTONE AND SILTSTONE Dark grey med-fine grained finely banded, folded sandstone and siltstone. Minor to rare disseminated Py and rare Cpy. Sandstone feldspathic, siltstone phyllitic and slightly carbonaceous. Moderately defined cross cutting metamorphic cleavage. Structure: Bedding 40°-60° LCA Foliation 5°-10° LCA	919951	102.0	103.0		
102.1	113.0				SILICEOUS SANDSTONE Light grey mottled-poorly banded medium grained siliceous sandstone - moderately fractured and veined. Veins often ironstained with gossanish and sideritic material within. 109.8-113.0 - Thin discontinuous chloritic phyllitic siltstone bands. Structure: Bedding 30° LCA	919952	106.7	108.2		
113.0	124.6				FRACTURED SILICEOUS SANDSTONE As above but extensively fractured and ironstained. Rare traces disseminated py.	919953	114.0	116.0		
124.6	125.2				OXIDISED SANDSTONE AND SILTSTONE Grey green - red brown oxidised fine grained sandstone and phyllitic silstone. Structure: Bedding 30° LCA	919954	124.6	125.2		
125.2	139.0				PHYLLITIC SILSTONE Fine grained grey slightly carbonaceous siltstone, poor-moderately bedded with bedding folded and contorted with a poor axial plane foliation present. Core moderately fractured. Minor thin sideritic veinlets and gashes throughout. Rare traces disseminated Py. Structure: Bedding 20°-80° LCA Foliation 5° LCA	919955	130.0	131.0		
						919956	135.0	136.0		
139.0	146.0				PHYLLITIC SILTSTONE As above with slightly more coarser massive interbeds to 5cm thick. Rare minor thin veinlets of Py or Cpy? Bedding very contorted.	919957	140.0	142.0		
146.0	161.4				INTERBEDDED SANDSTONE AND SILTSTONE Moderately well bedded. Red-grey micaceous sandstone and sericitic phyllitic silstone. Thinly interbedded with beds to 2cm thick. Bedding after contorted and disrupted by thin chloritic veins, usually of irregular orientation. Weak axial plane foliation defined by chlorite wisps and blebs and FeO blebs. Rusty halo around chlorite veinlets, wisps and blebs.	919958	147.0	148.0		
						919959	152.0	153.0		
						919960	156.0	157.0		
						919961	158.0	159.0		

	Au	As	W	Sn	Ag	Pb	Zn	Cu	Ni	Co	Cr	Nb	La	U	Th	Ba
	<0.02	15	<20	3	<5	<10	33	13	22	14	72	<10	15	<3	<10	184
	0.03	<2	<20	<3	<5	<10	42	12	24	16	66	<10	27	<3	10	259
	0.03	<2	<20	<3	<5	<10	31	11	14	11	110	<10	13	<3	<10	78
	<0.02	<2	<20	3	<5	<10	66	17	23	18	87	<10	14	<3	<10	226
	0.03	<2	<20	9	<5	<10	34	8	20	15	50	11	9	<3	11	192
	0.03	<2	<20	<3	<5	<10	37	10	22	14	56	11	21	<3	12	239
	<0.02	<2	<20	<3	<5	<10	36	18	25	13	57	11	28	<3	15	387
	0.02	<2	<20	7	<5	<10	31	19	30	11	121	<10	46	<3	19	520
	0.02	<2	<20	9	<5	<10	24	28	30	15	149	12	43	<3	19	732
	<0.02	6	<20	9	<5	<10	29	25	42	17	160	14	46	5	21	855
	<0.02	<2	<20	10	<5	<10	23	20	34	13	118	11	46	<3	22	763
	Fire/AAS	XRF	XRF	XRF	ICP	XRF	ICP	ICP	ICP	ICP	ICP	ICP	ICP	XRF	ICP	ICP
	329 DET (0.02ppm)	2ppm	20ppm	3ppm	5ppm	10ppm	5ppm	5ppm	10ppm	5ppm	10ppm	10ppm	5ppm	10ppm	10ppm	5ppm

SUMMARY: _____

LOGGED BY S.P. SUGDEN DATE 23/10/87

SHEET 1 OF 2

5403 (III) -3 Sheet 1 of 2

CRA EXPLORATION PTY LIMITED.

WD012 DRILL LOG

PROJECT TARLTON KNOB - DOUGLAS GULLY PROSPECT

CO-ORDINATES _____ AZIMUTH Mag. Nth. DRILLERS UTAH COMMENCED _____ DEPTH 196.3m HOLE No. WD012

RL COLLAR _____ INCLINATION -60° DRILL TYPE DIAMOND COMPLETED _____ CASING LEFT _____ DPO Nos. 37578

DEPTH From	DEPTH To	CORE REC	CORE SIZE	LOG	GEOLOGY	SAMPLE NUMBER	FROM (m)	TO (m)	REC (m)	GEOPHYSICS
			HQ		Structure: Bedding 20°-60° LCA Foliation 5° LCA					
161.4	174.4				SILICEOUS SANDSTONE	919962	162.0	163.0		
					White-grey poorly bedded to disrupted siliceous quartz sandstone with minor dark green-black	919963	167.0	168.0		
					chloritic phyllitic siltstone interbeds (e.g. 162.4-162.9m). Minor thin chlorite wisps and veinlets	919964	172.0	173.0		
					throughout. Very rare traces disseminated py.					
174.4	193.9				PHYLLITIC SILTSTONE	919965	175.0	176.0		
					Medium-fine grained bedded, dark-medium grey phyllitic siltstone bedding strongly overprinted by	919966	180.0	181.0		
					metamorphic foliation which is subparallel to core axis. Foliation defined by chlorite wisps and	919967	185.0	186.0		
					rare elongate py blebs. Rare sandy beds from 189.0m	919968	190.0	191.0		
193.9	196.3				INTERBEDDED SANDSTONE AND SILTSTONE	919969	195.0	196.3		
					As above with interbedded micaceous sandstone beds to 3cm thick. Strongly folded with well					
					defined axial plane foliation. Rare traces disseminated py.					
					Structure: Foliation 5° LCA					
					E.O.H. 196.3m					

SUMMARY: _____

LOGGED BY S.P. SUGDEN DATE 23.10.87

SHEET 2 OF 2

CRA EXPLORATION PTY. LIMITED.

GEOCHEMICAL RESULTS

PROJECT TARLTON KNOB - DOUGLAS GULLY PROSPECT

HOLE No. WD012

SAMPLE Nos. 919962- 919969 DPO Nos 37578

DEPTH FROM 162.0m TO 196.3m LABS ANALABS

	Au	As	W	Sn	Ag	Pb	Zn	Cu	Ni	Co	Cr	Nb	La	U	Th	Ba
	<0.02	<2	<20	3	<5	<10	20	11	17	8	105	<10	57	<3	28	482
	<0.02	<2	<20	3	<5	10	12	12	16	5	69	<10	37	<3	17	287
	<0.02	<2	<20	7	<5	<10	18	16	14	7	140	<10	38	<3	19	388
	<0.02	<2	<20	<3	<5	<10	17	24	18	11	218	<10	36	<3	19	560
	<0.02	<2	<20	9	<5	<10	27	18	<10	9	49	<10	27	<3	12	472
	<0.02	<2	<20	5	<5	<10	36	12	12	10	52	<10	25	<3	11	369
	<0.02	<2	<20	<3	<5	<10	33	11	13	12	35	<10	24	<3	10	352
	0.02	3	<20	<3	<5	<10	28	12	<10	9	116	<10	31	<3	14	425
METHOD	AAS	XRF	XRF	XRF	ICP	XRF	ICP	ICP	ICP	ICP	ICP	ICP	ICP	XRF	ICP	ICP
DET	329 0.02ppm	2ppm	20ppm	3ppm	5ppm	10ppm	5ppm	5ppm	10ppm	5ppm	10ppm	10ppm	5ppm	10ppm	10ppm	5ppm

5403(III)-4 Sheet 2 of 2

Plan No. SAN 11876

CRA EXPLORATION PTY. LIMITED

WD017 DRILL LOG

PROJECT TARLTON KNOB - DOUGLAS GULLY PROSPECT

CO-ORDINATES _____ AZIMUTH 187° Mag. DRILLERS UTAH COMMENCED _____ DEPTH 251.0m HOLE No. WD017

RL COLLAR _____ INCLINATION -60° DRILL TYPE DIAMOND COMPLETED _____ CASING LEFT _____ DPO Nos 37578, 37524

SAMPLE Nos 919970 - 919983, 913239 - 913248

DEPTH FROM 54.0 TO 105.00

CRA EXPLORATION PTY. LIMITED.

GEOCHEMICAL RESULTS

DPO Nos 37578, 37524

LABS ANALABS

PROJECT TARLTON KNOB EL 1196 DOUGLAS GULLY PROSPECT

HOLE No. WD017 (UTAH DEVELOPMENT)

DEPTH From	DEPTH To	CORE REC	CORE SIZE	LOG	GEOLOGY	SAMPLE NUMBER	FROM (m)	TO (m)	REC (m)	GEOPHYSICS
50.0	56.0		HQ		BEDDED SANDSTONE	919970	54.0	55.0		
					Finely bedded medium-dark grey very fine grained sandstone. Beds to 2mm thick. Bedding often disrupted. Minor thin quartz veins with rare pyrite.					
					Structure: Bedding 40° LCA					
56.0	65.4				BEDDED CLAY SANDSTONE	919971	56.0	58.0		
					White to light grey thinly bedded very fine grained weathered clay quartz sandstone. Moderate thin malachite and chalcopyrite wisps often subparllel to bedding. Minor discordant quartz veins with rare cpy.	919972	58.0	60.0		
						919973	60.0	62.0		
						919974	62.0	63.5		
						919975	63.5	65.4		
65.4	77.6				SILICEOUS THICKLY BEDDED SANDSTONE	919976	65.4	67.0		
					Very fine grained thickly bedded clayey sandstone. Light brown to white in colour and silicified	919977	69.0	71.0		
					in parts. Minor folding. Core fractured by thin plagioclase? - tremolite blebs and veins	919978	73.0	75.0		
					which may be conformable to bedding. Tremolite needles occasionally found in siliceous sections.	919979	75.0	77.6		
					Minor to trace amounts cpy throughout interval as thin veinlets and disseminated grains. From 72.2m minor quartz veins with chlorite and chalcopyrite.					
					Structure: Bedding 50° LCA					
77.6	83.8				SILICEOUS SANDSTONE	913239	77.6	79.6		
					Dark grey-brown to white thinly bedded silicified very fine grained sandstone. Bedding slightly	913240	79.6	82.20		
					folded and contorted with thin carbonaceous? wisps parallel to bedding. Rare disseminated cpy	919980	82.2	83.8		
					and py in coarser sections. Minor quartz veini [illegible] usually subparallel to bedding.					
83.8	97.35				MICACEOUS SANDSTONE	913241	83.8	85.5		
					White slightly micaceous quartz sandstone. Massive to poorly bedded and moderately fractured	913242	85.5	85.75		
					with quartz and quartz carbonate veining which can contain rare cpy and malachite.	913243	85.75	87.75		
					85.5-85.75 quartz, carbonate vein with cpy and py.	913244	87.75	89.80		
						919981	89.8	91.0		
						919982	92.0	93.0		
						919983	95.0	96.5		
97.35	105.0				BEDDED SILICEOUS SANDSTONE	913245	97.35	99.35		
					Similar to above lithology but bedded and dark in colour more silicified. Bedding contorted,	913246	99.35	101.35		
					rare chlorite aligned 10° LCA.	913247	101.35	103.35		
						913248	103.35	105.00		

	Au	As	W	Sn	Ag	Pb	Zn	Ba	Cu	Ni	Co	Cr	Nb	La	U	Th
	<0.02	<2	<20	3	<5	<10	19	880	39	18	<5	74	<10	57	6	20
	0.02	<2	<20	3	<5	<10	30	1240	1230	37	8	90	10	53	3	20
	<0.02	<2	<20	8	<5	<10	33	888	2650	30	8	74	13	49	7	21
	0.28	<2	<20	6	<5	<10	17	936	3860	40	13	156	15	55	3	23
	0.08	3	<20	6	<5	<10	41	884	7220	34	11	89	13	55	3	22
	0.04	<2	<20	4	<5	<10	56	892	8560	30	9	122	13	54	6	20
	<0.02	<2	<20	5	<5	<10	33	861	1860	20	8	96	12	53	<3	18
	<0.02	<2	<20	7	<5	<10	38	539	190	26	10	107	12	49	10	22
	<0.02	<2	<20	8	<5	<10	22	612	256	15	5	76	<10	53	10	21
	<0.02	10	<20	<3	<5	<10	55	520	649	24	13	89	11	52	<3	25
	0.04	<2	<20	6	<5	10	33	353	27	<10	6	158	<10	28	3	12
	0.03	<2	<20	4	<5	15	30	426	52	10	8	193	<10	32	10	16
	0.10	3	<20	3	<5	<10	50	359	320	18	8	112	<10	34	25	15
	0.03	<2	<20	4	<5	15	20	465	237	<10	7	127	<10	23	<3	11
	0.05	<2	<20	<3	<5	25	40	465	245	<10	10	120	<10	7	<3	<10
	0.03	<2	<20	6	<5	10	19	542	172	<10	7	165	<10	28	<3	14
	0.11	<2	<20	<3	<5	<10	18	499	600	10	7	254	<10	21	<3	10
	0.05	<2	<20	<3	<5	<10	12	551	2830	25	<5	195	<10	17	<3	11
	<0.02	<2	<20	<3	<5	<10	12	776	280	14	<5	142	<10	35	<3	12
	<0.02	<2	<20	<3	<5	<10	11	912	67	10	5	153	<10	75	<3	26
	0.03	4	<20	<3	<5	<10	32	622	130	<10	6	120	<10	54	<3	26
	0.03	<2	<20	<3	<5	<10	33	624	301	11	5	263	<10	40	<3	18
	0.02	3	<20	<3	<5	<10	34	607	65	<10	5	102	<10	41	<3	18
	0.02	<2	<20	<3	<5	10	20	585	148	13	7	189	<10	45	<3	28
	FIRE ASS	XRF	XRF	XRF	ICP	XRF	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	XRF	ICP
	0.02ppm	2ppm	20ppm	3ppm	5ppm	10ppm	5ppm	5ppm	5ppm	10ppm	5ppm	10ppm	10ppm	5ppm	3ppm	10ppm
	(329)															

SUMMARY:

LOGGED BY S.P. SUGDEN DATE 26.10.87

SHEET 1 OF 4

SAo 4187a

5403(1)-5 Sheet 1 of 4

Plan No SAo 4187b

CRA EXPLORATION PTY. LIMITED.

WD017 DRILL LOG

PROJECT TARLTON KNOB - DOUGLAS GULLY PROSPEC'

CO-ORDINATES _____ AZIMUTH 187° Mag DRILLERS UTAH COMMENCED _____ DEPTH 251.0m HOLE No. WD017

RL COLLAR _____ INCLINATION -60° DRILL TYPE DIAMOND COMPLETED _____ CASING LEFT _____ DPO Nos. 37578, 37524

SAMPLE Nos. 919984-912000, 913211-913216, 949791 DEPTH FROM 105.0 TO 195.2

CRA EXPLORATION PTY. LIMITED.

GEOCHEMICAL RESULTS

DPO Nos 37578, 37524 LABS. ANALABS

PROJECT TARLTON KNOB E.L. 1196 DOUGLAS GULLY PROSPECT

HOLE No. WD017 (UTAH DEVELOPMENT)

DEPTH From	DEPTH To	CORE REC.	CORE SIZE	LOG	GEOLOGY	SAMPLE NUMBER	FROM (m)	TO (m)	REC. (m)	GEOPHYSICS
105.0	113.5				Grey-red very thinly bedded, very fine grained siliceous sandstone with rare thicker interbeds of	919984	105.0	107.0		
					white quartz sandstone. Rare traces cpy associated with discordant chloritic bands. Minor	919985	112.0	113.0		
					quartz veining and plagioclase - tremolite bands.					
113.5	126.3				As for 83.8-97.35	919986	113.5	115.0		
					115.4-115.6 coarsely crystalline quartz carbonate vein with py to 2%, rare cpy.	919987	115.0	117.0		
					118.0-119.1 coarse anhedral py, cpy, minor malachite in vuggy quartz, carbonate vein.	919988	117.0	119.0		
					119.1-126.3 very fine grained contorted (flow), banded sandstone (tuff?).	919989	119.0	121.0		
					120.7-120.85 py, cpy, minor associated with coarsely crystalline plag, K-feldspar, quartz vein.	919990	121.0	123.0		
					121.5-126.3 coarse anhedral cpy, py, <2% rare bornite associated with discordant veins.	919991	123.0	125.0		
						919992	125.0	126.3		
126.3	149.7				INTERBEDDED SANDSTONE AND SILTSTONE	919993	132.0	134.0		
					Interbedded units of white and dark grey thinly bedded siliceous sandstone and siltstone.	919994	145.0	146.0		
					Rare patches of tremolite and plagioclase, minor veining (qtz-carb), trace sulphide.					
149.7	157.3				SILICIFIED SANDSTONE	913249	149.70	151.00		
					White to white red strongly silicified sandstone strongly quartz veined and annealed.	913250	151.00	153.00		
					154.3 - cpy chlorite veining.	919995	153.0	155.0		
						949791	155.0	157.3		
157.3	164.7				SHEAR ZONE	919996	157.3	159.3		
					Strongly sheared and fractured interval, comprising sandstone and siltstone.	919997	159.3	161.2		
						919998	161.2	163.5		
						919999	163.5	164.7		
164.7	170.45				SANDSTONE	912000	164.7	166.0		
					White siliceous very fine grained sandstone with minor darker beds. Bedding disrupted in parts.					
					Minor quartz veining and rare chlorite throughout.					
170.45	187.5				BEDDED SANDSTONE	913211	171.0	173.0		
					White to grey red thinly bedded siliceous very fine grained sandstone extensively contorted and	913212	181.0	183.0		
					disrupted by veining and folding. Minor plagioclase and tremolite veining and rare traces cpy.					
187.5	194.2				FRACTURED AND SHEARED SANDSTONE	913213	187.5	189.7		
					As above but strongly fractured and sheared. Moderate quartz veining.	913214	189.7	191.3		
						913215	191.3	193.5		
						913216	193.5	195.2		

SAMPLE NUMBER	Au	As	W	Sn	Ag	Pb	Zn	Ba	Cu	Ni	Co	Cr	Nb	La	U	Th
919984	0.02	<2	<20	<3	<5	<10	34	658	107	20	5	117	<10	56	7	21
919985	<0.02	<2	<20	6	<5	<10	25	696	90	18	<5	136	<10	66	3	26
919986	<0.02	<2	<20	7	<5	<10	28	1020	687	11	<5	115	<10	78	<3	25
919987	<0.02	<2	<20	<3	<5	<10	12	655	1530	18	5	166	<10	50	<3	19
919988	0.11	<2	<20	9	<5	<10	64	893	3140	12	5	110	<10	36	<3	23
919989	0.03	2	<20	<3	<5	<10	29	1570	496	12	5	144	<10	76	<3	25
919990	<0.02	<2	<20	<3	<5	<10	38	1190	2040	20	6	125	10	48	<3	26
919991	<0.02	<2	<20	3	<5	<10	48	1490	244	19	7	117	12	93	<3	33
919992	0.06	8	20	<3	6	<10	42	2360	4600	113	17	105	<10	56	<3	24
919993	<0.02	<2	<20	3	<5	<10	28	1010	1210	21	6	125	10	50	<3	23
919994	<0.02	<2	<20	<3	<5	<10	28	767	811	30	8	95	13	38	<3	20
913249	0.03	<2	<20	<3	<5	15	16	1040	322	<10	<5	132	<10	58	<3	31
913250	0.03	<2	<20	5	<5	10	14	882	161	<10	5	114	<10	81	<3	34
919995	0.21	<2	<20	<3	<5	<10	12	734	1810	37	8	107	<10	75	<3	25
949791	0.03	<2	<20	<3	<5	10	13	701	453	<10	<5	89	<10	54	<3	21
919996	<0.02	<2	<20	<3	<5	<10	14	668	1990	32	6	138	<10	33	<3	21
919997	<0.02	2	<20	<3	<5	<10	13	637	205	15	5	169	<10	41	<3	19
919998	0.02	<2	<20	6	<5	<10	50	774	362	27	8	61	10	28	<3	23
919999	0.03	<2	<20	<3	<5	<10	17	846	308	19	6	105	11	19	<3	23
912000	0.02	<2	<20	<3	<5	15	21	1580	603	22	7	90	10	26	<3	27
913211	<0.02	<2	<20	<3	<5	<10	28	762	170	18	<5	299	11	47	6	26
913212	0.02	<2	<20	6	<5	<10	17	522	278	24	9	143	13	87	6	30
913213	0.03	<2	<20	<3	<5	<10	18	624	157	26	8	178	10	57	6	23
913214	0.04	<2	<20	<3	<5	<10	31	716	888	16	<5	185	<10	63	4	27
913215	0.03	<2	<20	<3	<5	15	34	838	570	25	5	220	<10	78	5	31
913216	0.03	<2	<20	3	<5	<10	29	678	78	16	6	190	<10	53	4	28
Precision (2σ)	XRF	XRF	XRF	ICP	XRF	ICP	ICP	ICP	ICP	ICP	ICP	ICP	16P	ICP	XRF	ICP
	0.02ppm	2ppm	20ppm	3ppm	5ppm	10ppm	5ppm	5ppm	5ppm	10ppm	5ppm	10ppm	10ppm	5ppm	3ppm	10ppm

SUMMARY:

LOGGED BY S.P. SUGDEN DATE 26.10.87

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Plan No SAo 4187b

CRA EXPLORATION PTY. LIMITED.

WD017 DRILL LOG

PROJECT TARLTON KNOB - DOUGLAS GULLY PROSPEC

CO-ORDINATES _____ AZIMUTH 187° Mag DRILLERS UTAH COMMENCED _____ DEPTH _____ HOLE No. WD017

RL COLLAR _____ INCLINATION ~60° DRILL TYPE DIAMOND COMPLETED _____ CASING LEFT _____ DPO Nos. 37578, 37524

SAMPLE Nos. 913217 - 913234 949792 - 949800 DEPTH FROM 195.2 TO 241.0m

CRA EXPLORATION PTY. LIMITED.

GEOCHEMICAL RESULTS

DPO Nos 37578, 37524 LABS ANALABS

PROJECT TARLTON KNOB E.L 1196 DOUGLAS GULLY PROSPECT

HOLE No. WD017 (UTAH DEVELOPMENT)

DEPTH From	DEPTH To	CORE REC	CORE SIZE	LOG	GEOLOGY	SAMPLE NUMBER	FROM (m)	TO (m)	REC (m)	GEOPHYSICS	Au	As	W	Sn	Ag	Pb	Zn	Ba	Cu	Ni	Co	Cr	Nb	La	U	Th
194.2	210.1				FRACTURED AND VEINED SANDSTONE	913217	195.2	196.2			0·05	<2	<20	<3	<5	<10	26	958	376	22	5	181	<10	47	<3	27
					As for 170.45-187.5 but moderately fractured with quartz and quartz-feldspar veins.	913218	196.2	198.0			0·03	<2	<20	<3	<5	<10	30	747	88	21	7	185	<10	79	<3	23
					Structure: Bedding 0-20° LCA	949792	198.0	200.4			0·04	<2	<20	3	<5	<10	32	793	382	12	7	131	<10	104	<3	27
						949793	200.4	202.8			0·02	<2	<20	<3	<5	15	32	835	608	<10	5	119	<10	56	<3	23
						913219	202.8	203.8			0·56	<2	<20	<3	<5	<10	36	1160	437	21	7	169	11	62	<5	30
						913220	203.8	206.3			0·02	<2	<20	5	<5	<10	33	769	1170	16	6	169	<10	60	4	25
						949794	206.3	206.8			0·05	<2	<20	<3	<5	<10	50	886	1780	22	9	145	10	63	3	26
						949795	206.8	208.0			0·02	2	<20	<3	<5	<10	34	653	266	17	8	119	10	56	8	28
						913221	208.0	209.0			0·08	<2	<20	4	<5	<10	24	786	910	34	8	153	14	70	5	36
						949796	209.0	210.1			0·03	<2	<20	4	<5	10	46	669	803	18	7	148	<10	56	<3	26
210.1	211.0				QUARTZ-PLAGIOCLASE VEINS	913222	210.1	211.0			0·03	<2	<20	<3	<5	<10	21	1270	376	16	7	145	10	202	7	46
					Vein replaces most of host lithology, trace cpy.																						
211.0	217.0				As for 194.2-210.2	949797	211.0	212.9			0·02	<2	<20	5	<5	10	26	925	296	<10	6	114	<10	38	<3	43
					212.9-213.5: Thin chlorite quartz carbonate veining with rare cpy.	913223	212.9	213.5			0·05	<2	<20	<3	<5	15	44	799	2070	18	8	198	<10	226	3	38
						949798	213.5	216.1			0·03	<2	<20	<3	<5	<10	26	751	211	<10	5	154	<10	69	<3	35
						913224	216.1	217.0			0·06	<2	<20	<3	<5	<10	17	798	166	23	9	135	11	108	<3	43
217.0	222.6				SILICEOUS SANDSTONE	949799	217.0	219.4			<0·02	10	<20	<3	<5	10	20	633	177	<10	12	133	<10	62	<3	33
					Very fine grained siliceous white sandstone. Bedding very contorted and often parallel to	949800	219.4	221.8			<0·02	4	<20	4	<5	<10	19	724	184	<10	7	138	<10	56	3	28
					core axis. Minor quartz veining. 70°-90° LCA	913225	221.8	223.1			0·04	<2	<20	<3	<5	<10	12	1050	107	21	<5	178	<10	60	5	28
					221.8-222.6: Rare traces disseminated cpy.																						
222.6	227.0				SHEAR ZONE	913226	223.1	225.4			0·03	2	<20	<3	<5	15	36	1100	1360	15	6	218	10	44	<3	25
						913227	225.4	227.4			0·02	3	<20	3	<5	<10	18	1750	313	38	8	248	10	29	<3	17
227.0	241.0				SANDSTONE	913228	227.4	229.0			0·02	<2	<20	6	<5	<10	27	992	384	23	7	298	<10	15	<3	28
					Pale cream green-red brown tinted siliceous fine grained bedded sandstone. Moderate quartz	913229	229.0	231.0			0·02	<2	<20	<3	<5	90	112	932	1570	16	5	234	<10	11	<3	17
					veining. Core fractured or brecciated in parts with quartz-plagioclase matrix. Minor chlorite	913230	231.0	233.0			<0·02	<2	<20	<3	<5	<10	31	772	267	31	<5	236	<10	12	<3	14
					with rare traces sulphides throughout associated with fracturing.	913231	233.0	235.0			<0·02	<2	<20	<3	<5	20	47	858	201	29	5	167	<10	11	<3	23
						913232	235.0	237.0			0·02	2	<20	<3	<5	<10	19	641	64	45	<5	175	<10	11	7	29
						913233	237.0	239.0			<0·02	2	<20	<3	<5	<10	21	1060	488	33	5	129	<10	11	3	24
						913234	239.0	241.0			0·02	4	<20	<3	<5	<10	29	879	30	31	<5	150	<10	7	7	29
											FACTOR 229	XRF	XRF	XRF	ICP	XRF	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	XRF	ICP
											0·02ppm	2ppm	20ppm	3ppm	5ppm	10ppm	5ppm	5ppm	10ppm	5ppm	10ppm	10ppm	5ppm	3ppm	10ppm	

SUMMARY: _____

LOGGED BY S.P. SUGDEN DATE 26.10.87

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Sheet 3 of 4

Plan No SAo 4187b

CRA EXPLORATION PTY. LIMITED.

WD017 DRILL LOG

PROJECT TARLTON KNOB - DOUGLAS GULLY PROSPEC

CO-ORDINATES _____ AZIMUTH 187° Mag DRILLERS UTAH COMMENCED _____ DEPTH _____ HOLE No. WD017

RL COLLAR _____ INCLINATION -60° DRILL TYPE _____ COMPLETED _____ CASING LEFT _____ DPO Nos. 37578, 37524

CRA EXPLORATION PTY. LIMITED.

GEOCHEMICAL RESULTS

SAMPLE Nos. 913235 - 913238 DPO Nos 37578, 37524

DEPTH FROM 241.0 TO 251.0 LABS ANALABS

PROJECT TARLTON KNOB E.L.1196 DOUGLAS GULLY PROSPECT

HOLE No. WD017 (UTAH DEVELOPMENT)

DEPTH From	DEPTH To	CORE REC	CORE SIZE	LOG	GEOLOGY	SAMPLE NUMBER	FROM (m)	TO (m)	REC (m)	GEOPHYSICS
241.0	245.0				SILICEOUS SANDSTONE White very fine grained sandstone with regular chloritic fracture set cross cutting core. Poorly bedded. Rare quartz veining and rare traces sulphide. Structure: Bedding 0-10° LCA Fractures 60° LCA	913235	241.0	242.0		
245.0	251.0				BRECCIATED SANDSTONE As above but fractured and brecciated with quartz carbonate veins. Core very broken.	913236	245.0	247.0		
						913237	247.0	249.0		
						913238	249.0	251.0		
					E.O.H. 251.0m					

	Au	As	W	Sn	Ag	Pb	Zn	Ba	Cu	Ni	Co	Cr	Nb	La	U	Th
	0.02	6	<20	5	<5	<10	13	804	32	23	<5	142	<10	8	3	14
	<0.02	15	<20	<3	<5	300	223	1440	37	48	8	494	<10	80	<3	15
	0.02	4	<20	<3	<5	35	20	1240	15	14	<5	324	<10	14	<3	<10
	0.04	7	<20	4	<5	<10	16	449	85	38	6	452	<10	15	4	12
FINISHED		XRF	XRF	XRF	ICP	XRF	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	XRF	ICP
	0.02ppm	2ppm	20ppm	3ppm	5ppm	10ppm	5ppm	5ppm	5ppm	10ppm	5ppm	10ppm	10ppm	5ppm	3ppm	10ppm

SUMMARY :

LOGGED BY S.P. SUGDEN DATE 26.10.87

SHEET 4 OF 4

SAo 4187a

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Sheet 4 of 4

Plan No SAo 4187b