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EL 1591 AND EL 1953

CALICO DAM

QUARTERLY, ANNUAL AND FINAL PROGRESS REPORTS FOR THE PERIOD 3/7/89 TO 23/7/99

Submitted by

CRA Exploration Pty Ltd
1999

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PRIMARY INDUSTRIES AND RESOURCES SA

CRA EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)

Z.C. MINES, EYRE STREET,
P.O. BOX 683,
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AUSTRALIA

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IN REPLY PLEASE QUOTE

26th September, 1989

South Australia Department
of Mines and Energy
191 Greenhill Road
PARKSIDE SA 5063

Dear Sir,

Exploration Licence 1591 (Calico Dam)
Expenditure Statement

Total expenditure on the Licence area from 3rd July, 1989 to 3rd August, 1989, the nearest accounting period amounts to $30,683. Details as follows:

Salaries and Wages	$ 827
Supplies	$ 462
Travel and Accommodation	$ 1,149
Rent and Property	$ 320
Tenements	$ 355
Contracts	$27,123
Overheads	$ 445
TOTAL	**$30,683**

This money being payment of airborne survey just completed.

This data is supplied in compliance with Condition 2 and Schedule B of the Licence.

Yours faithfully

Rick Nelson
Principal Geologist

CRA EXPLORATION PTY. LIMITED
BROKEN HILL
NEW SOUTH WALES

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND OCTOBER, 1989
OLARY, SOUTH AUSTRALIA

Author : R.W. Nelson

Date : September, 1989

Submitted to : Chief Geologist - NSW

Copies to : Department of Mines & Energy, SA
CRAE - CIS, Canberra
CRAE - Gordon
CRAE - Broken Hill
CRAE - Adelaide

Submitted by :

Accepted by :

Report No. 16093

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LIST OF PLANS

Plan No.	Title	Scale
SAb 151	Calico Dam EL 1591 Location Plan	1:1 000 000
SAb 129	Calico Dam EL 1591 - 1989 Airborne Magnetic and Radiometric Survey Flight Line Diagram	1:250 000

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND OCTOBER, 1989
OLARY, SOUTH AUSTRALIA

1. SUMMARY

Exploration Licence EL 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 31st July, 1989.

The application for Calico Dam was made to explore the area for copper, gold and hard rock uranium.

Elsewhere in the Olary Block copper mineralisation is associated with iron formation units, while uranium is associated with the granites and the granite, sedimentary sequence contact. Much of the EL is under thin alluvial/colluvial cover.

Exploration within the three month period ending 2nd October, 1989 included flying a detailed airborne radiometric and magnetometry survey within the EL. The survey was flown to outline magnetic and radiometric targets (base metals and uranium respectively) for ground follow-up under this thin cover.

Final radiometric and magnetic plots have yet to be received from the contractor.

Follow-up exploration of the anomalies generated by the survey will consist of:

a) Traversing with a spectrometer, and sampling of all significant radiometric anomalies.

b) Traversing and sampling of all magnetic units associated with ironstones located on the ground.

2. INTRODUCTION

Exploration Licence EL 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July, 1989 for a term of one year with an expenditure commitment of $35,000.

The 148 sq. km. Licence is located approximately 38 km. north of Olary in the vicinity of the Kalabity Station Homestead.

3. GEOLOGY

Mapped geology (Curnamona SH54-14) within the EL consists of early Proterozoic rocks tentatively correlated with the Willyama Supergroup of Broken Hill. Outcrop exists in approximately 40% of the area.

These rocks are:

1. Medium to coarse grained migmatites and gneiss, which are in places anatectic granitoids and pegmatoids.

2. Undifferentiated schists with minor quartzites.

The Willyama Supergroup rocks have been intruded by middle Proterozoic granites.

The remaining 60% of the area is covered by aeolian, alluvial and colluvial material.

4. EXPLORATION TO 2ND OCTOBER, 1989

During the three months to 2nd October, 1989 a detailed airborne magnetic/radiometric survey was flown over EL 1591 as part of a larger survey in the Kalabity area. (Plan SAb 129).

This detailed airborne magnetic/radiometric survey was flown by Geoterrex with the following specifications.

Flying Specifications

Area name	KALABITY
Approx. Survey Size	10500 line km.
Flight line direction	90-270° AMG North
Flight line spacing	100 metres
Tie line direction	0-180° AMG North
Tie line spacing	1000 metres
Sensor terrain clearance	60 metres
Sample interval (Magnetics)	< 9 metres
(Radiometrics)	<70 metres

Navigation was by radio navigation methods with at least three ground based beacons.

Equipment

AIRCRAFT	-	Twin engined Rockwell Shrike Commander 500S
MAGNETOMETER	-	Scintrex Optically Pumped Alkali (Cesium) Vapour Magnetometer Stringer Mounted
SPECTROMETER	-	Nuclear Data 256 Channel NaI (Thallium activated)
	-	Detector Volume 33 litres
ACQUISITION SYSTEM	-	MADACS Digital System
	-	9 Track Tape Drive
	-	RMS Matrix Printer Analogue Recorder
ALTIMETER	-	Sperry Stars AA200
CAMERA	-	Sony Video
NAVIGATION	-	One Syledis STR4 Mobile and pair Syledis B4 Beacons
	-	Two aircraft Antennae and ancillary equipment
PROCESSING	-	Compaq (in-field) Computer
	-	Zeta Plotter
	-	Digidata Tape Drive

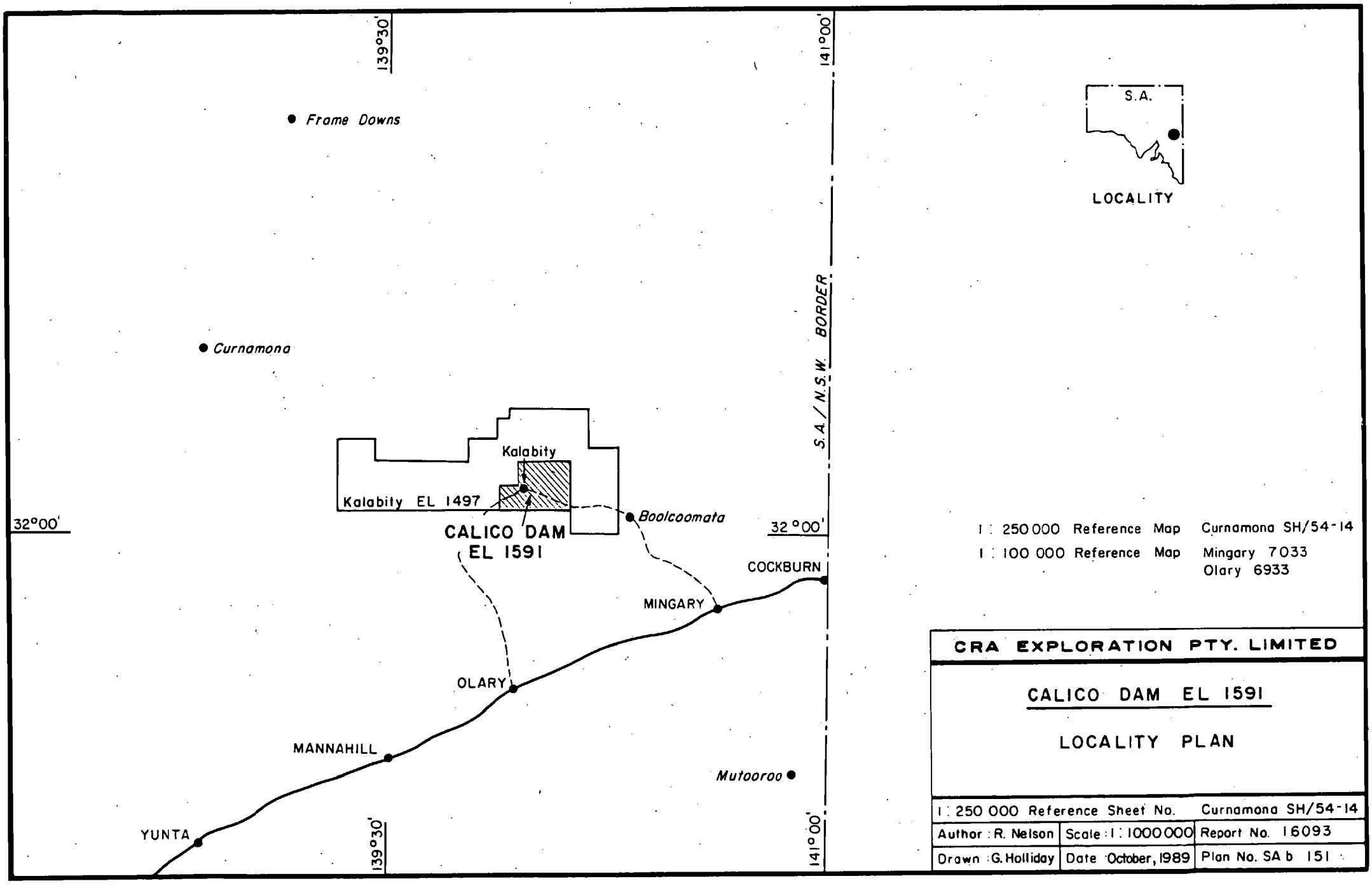
The processing is not yet complete so no plans or image processed products can be submitted. These will be submitted when received.

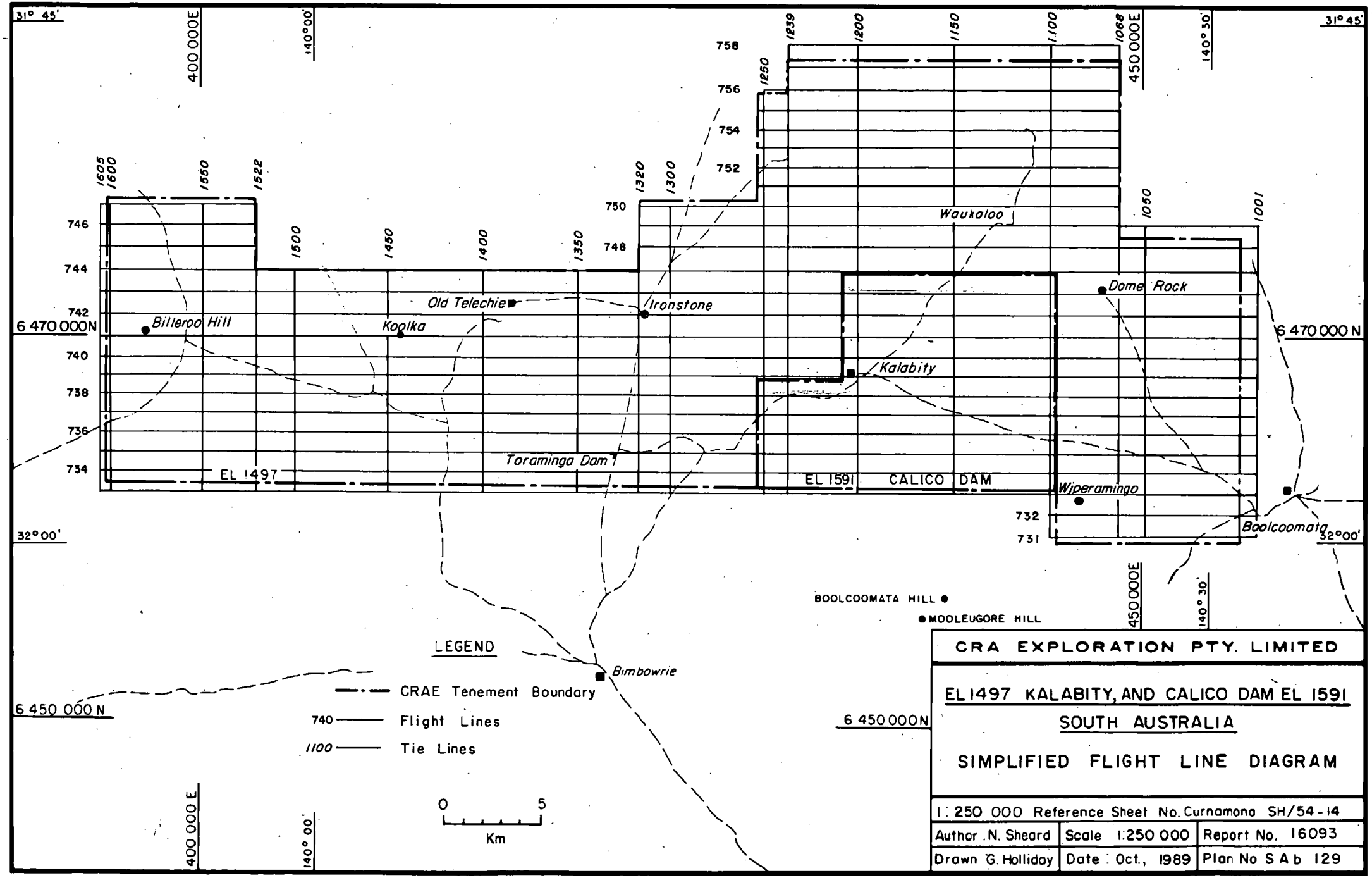
5. KEYWORDS

Calico Dam EL 1591, geophys magnetics, geophys radiometric.

6. LOCATION

Curnamona SH5415 (1:250 000)


139°30'
141°00'
Frame Downs
Curnamona
S.A./N.S.W. BORDER
Kalabity
Kalabity EL 1497
Boolcoomata
32°00'
32°00'
CALICO DAM
EL 1591
COCKBURN
MINGARY
OLARY
MANNAHILL
Mutooroo
YUNTA
139°30'
141°00'
S.A.
LOCALITY
1 : 250 000 Reference Map Curnamona SH/54-14
1 : 100 000 Reference Map Mingary 7033
Olary 6933
CRA EXPLORATION PTY. LIMITED
CALICO DAM EL 1591
LOCALITY PLAN
1 : 250 000 Reference Sheet No. Curnamona SH/54-14
Author : R. Nelson
Scale : 1 : 1000 000
Report No. 16093
Drawn : G. Holliday
Date : October, 1989
Plan No. SA b 151



CRA EXPLORATION PTY. LIMITED

EL 1497 KALABITY, AND CALICO DAM EL 1591
SOUTH AUSTRALIA
SIMPLIFIED FLIGHT LINE DIAGRAM

1 : 250 000 Reference Sheet No. Curnamona SH/54 - 14		
Author .N. Sheard	Scale 1:250 000	Report No. 16093
Drawn G. Holliday	Date : Oct., 1989	Plan No S A b 129

CRA EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)

69 RAKOW STREET,
P.O. BOX 683,
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TELEGRAMS: "CRAEX"
TELEPHONE: (080) 88 2536
FAX: (080) 88 3384

IN REPLY PLEASE QUOTE

29th January, 1990

South Australian Department of
Minerals and Energy
191 Greenhill Road
PARKSIDE SA 5063

Dear Sir,

Exploration licence 1591 (Calico Dam)
Expenditure Statement

Total expenditure on the Licence area from 3rd October, 1989 to 3rd January, 1990, the nearest accounting period (31st December, 1989) amounts to $12,316. Details as follows:

Salaries and Wages	$ 3,567
Supplies	$ 1,749
Travel and Accommodation	$ 1,374
Rent and Property	$ 766
Tenements	$ 1,161
Contracts	$ 1,335
Overheads	$ 2,364
TOTAL	$12,316

Total spent to date by CRAE - $42,999.

This data is supplied in compliance with Condition 2 and Schedule B of the Licence.

Yours faithfully

Richard Nelson
Principal Geologist

CRA EXPLORATION PTY. LIMITED
BROKEN HILL
NEW SOUTH WALES

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND JANUARY, 1990
OLARY, SOUTH AUSTRALIA

Author : S.N. Sheard

Date : January, 1990

Submitted to : Chief Geologist - NSW District

Copies to : CRAE - Canberra
SA Department Mines & Energy
CRAE - Sydney
CRAE - Broken Hill
CRAE - Adelaide

Submitted by : S.N. Sheard

Accepted by : N Welsh for D.M.R.

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CRAE Report No. 16352

LIST OF PLANS

Plan No.	Title	Scale
SAb 151	Calico Dam EL 1591 Location Plan	1:1 000 000
SAb 163	Calico Dam EL 1591 Total Field - Preliminary Airborne Data	1:250 000±
SAb 164	Calico Dam EL 1591 Coloured Total Field - Preliminary Airborne Data	1:250 000±
SAb 165	Calico Dam EL 1591 Preliminary Coloured Total Field on North Derivative Relief Enhanced	1:250 000±
SAb 166	Calico Dam EL 1591 Preliminary Total Field North Derivative	1:250 000±
SAb 167	Calico Dam EL 1591 Preliminary Total Field Second N/S Derivative	1:250 000±

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6.	LOCATION	2

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND JANUARY, 1990
OLARY, SOUTH AUSTRALIA

1. SUMMARY

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 31st July, 1989.

The application for Calico Dam was made to explore the area for copper, gold and uranium.

Elsewhere in the Olary Block copper mineralisation is associated with iron formation units, while uranium is associated with the granites and the granite-sedimentary sequence contact. Much of the EL is under thin alluvial/colluvial cover.

Exploration within the three month period ending 2nd January, 1990 was confined to outlining discrete radiometric anomalies for ground follow up.

Final radiometric and magnetic plots still have not been received from the Contractor, although preliminary located data has been received.

2. INTRODUCTION

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July, 1989 for a term of one year with an expenditure commitment of $35,000.

The 148 sq km Licence is located approximately 38km north of Olary in the vicinity of the Kalabity Station Homestead.

3. GEOLOGY

Mapped geology (Curnamona SH54-14) within the EL consists of early Proterozoic rocks tentatively correlated with the Willyama Supergroup of Broken Hill. Outcrop exists in approximately 40% of the area.

There rocks are:

1. Medium to coarse grained migmatites and gneiss, which are in place anatectic granitoids and pegmatoids.

2. Undifferentiated schists with minor quartzites.

The Willyama Supergroup rocks have been intruded by middle Proterozoic granites.

The remaining 60% of the area is covered by aeolian, alluvial and colluvial material.

4. EXPLORATION TO 2ND JANUARY, 1990

Preliminary airborne magnetic data has been received. This data is part of a larger data set flown over the Kalabity area. (Described by Nelson, 1989).

Final magnetic contour maps and flight path maps at 1:10,000 scale will be presented next quarter if they are received from the contractor.

A preliminary located data set has been received and image processed by CRAE in Brisbane. The data over the Calico EL 1591 is presented in colour at approximately 1:250,000 scale is shown in Plans SAb 163 to SAb 167. These images were produced off slides and are purely for reference purposes only.

The radiometric data has been viewed on a profile basis and five significant anomalies have been noted. See Table 1.

Table 1

Anomaly	Line No.	East	North	Amps (cps)	Width (sec)	Priority	Comments
KR3	11021	445000	6463850	15	4	1	U only 3 lines
KR26	12471	430500	6474000	8	2	3	On flank Th
KR27	12481	430380	6464040	10	1	2	On flank K
KR28	12171	433200	6468500	19	broad	2	Over lines 12141 to 12261
KR42	11671	438500	6462200	11	1	3	Assoc Th

Only one of these anomalies - KR3 is considered a priority target.

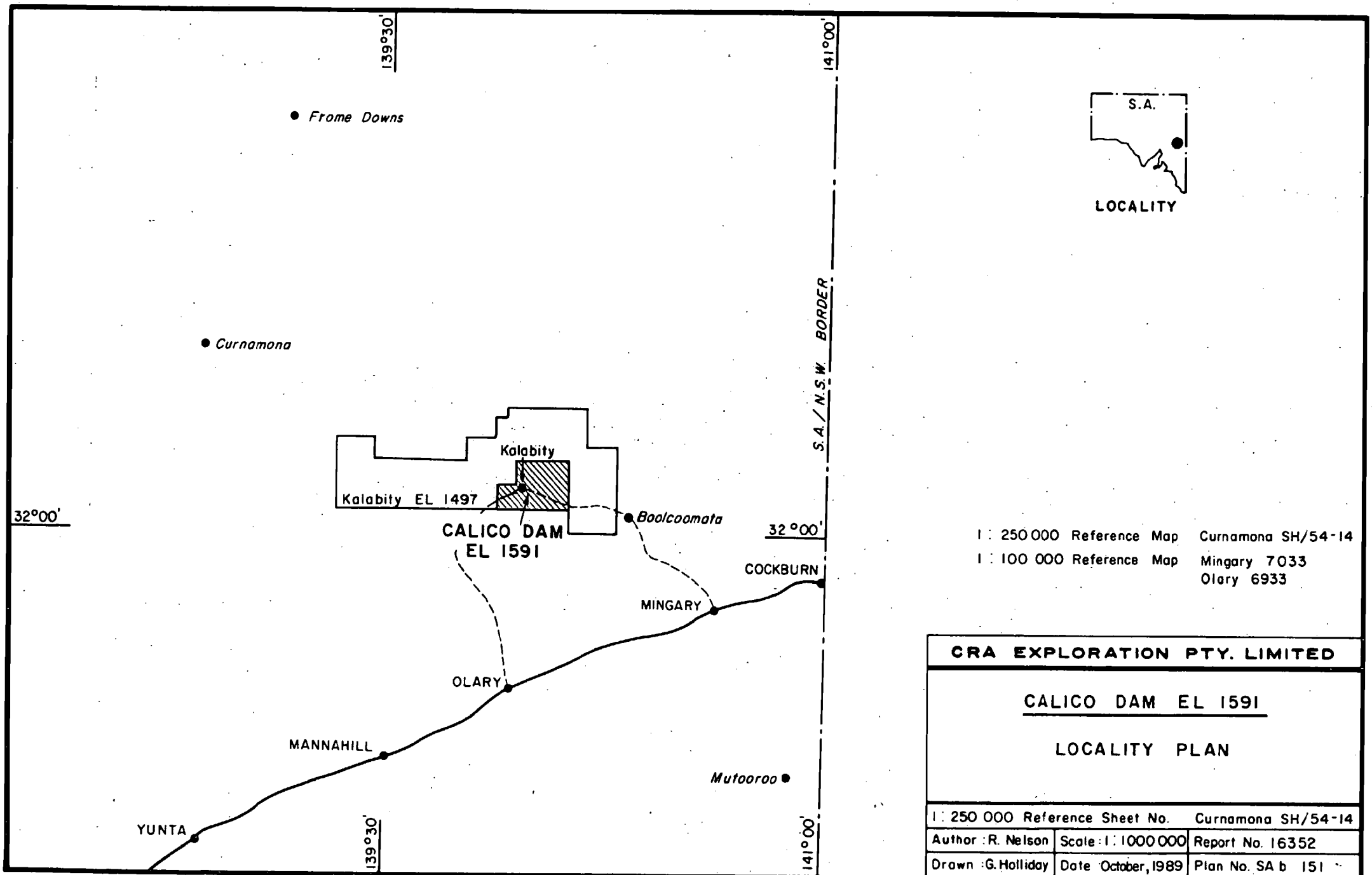
No ground checking has yet been undertaken.

5. KEYWORDS

Calico Dam EL 1591, geophys magnetics, geophys radiometric, image processing.

6. LOCATION

Curnamona SH5415 (1:250,000)


139°30'
141°00'
Frome Downs
Curnamona
S.A./N.S.W. BORDER
S.A.
LOCALITY
Kalabity
Kalabity EL 1497
CALICO DAM
EL 1591
Boolcoomata
32°00'
32°00'
COCKBURN
MINGARY
OLARY
MANNAHILL
Mutooroo
YUNTA
139°30'
141°00'
1 : 250 000 Reference Map Curnamona SH/54-14
1 : 100 000 Reference Map Mingary 7033
Olary 6933
CRA EXPLORATION PTY. LIMITED
CALICO DAM EL 1591
LOCALITY PLAN
1 : 250 000 Reference Sheet No. Curnamona SH/54-14
Author : R. Nelson
Scale : 1 : 1000 000
Report No. 16352
Drawn : G. Holliday
Date October, 1989
Plan No. SA b 151

ELIMINARY AIRBORNE MAGNETI DA

TOTAL FIELD

CRA

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PTY LTD 1989



CRAE BRISBANE, IMAGE COMPILED BY V.KISSITCH DECEMBER, 1989
GRID MESH SIZE 50 X 50 METRES
CURNAMONA SH51-14 1:250,000 MAP SHEET

CALICO DAM EL 1591

KALABITY
PRELIMINARY AIRBORNE MAGNETIC DATA
TOTAL FIELD

CRA

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CRA EXPLORATION
PTY LTD 1989



CRAE BRISBANE, IMAGE COMPILED BY V.KISSITCH DECEMBER, 1989
GRID MESH SIZE 50 X 50 METRES
CURNAMONA SH54-14 1:250,000 MAP SHEET

CALICO DAM EL 1591

CRAE Report No. 16352 CRAE Plan No. SA b 164

KALA[illegible] P.A

PRELIMINARY AIRBORNE MAGNETIC DATA

COLOURED TOTAL FIELD ON NORTH DERIVATIVE

RELIEF ENHANCED

CRA

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CRAE BRISBANE, IMAGE COMPILED BY V.KISSITCH DECEMBER, 1989

GRID MESH SIZE 50 X 50 METRES

CURNAMONA SH54-14 1:250,000 MAP SHEET

CALICO DAM EL 1591

CRAE Report No. 16352 CRAE Plan No. SAb 165

KALABITY
PRELIMINARY AIRBORNE MAGNETIC DATA

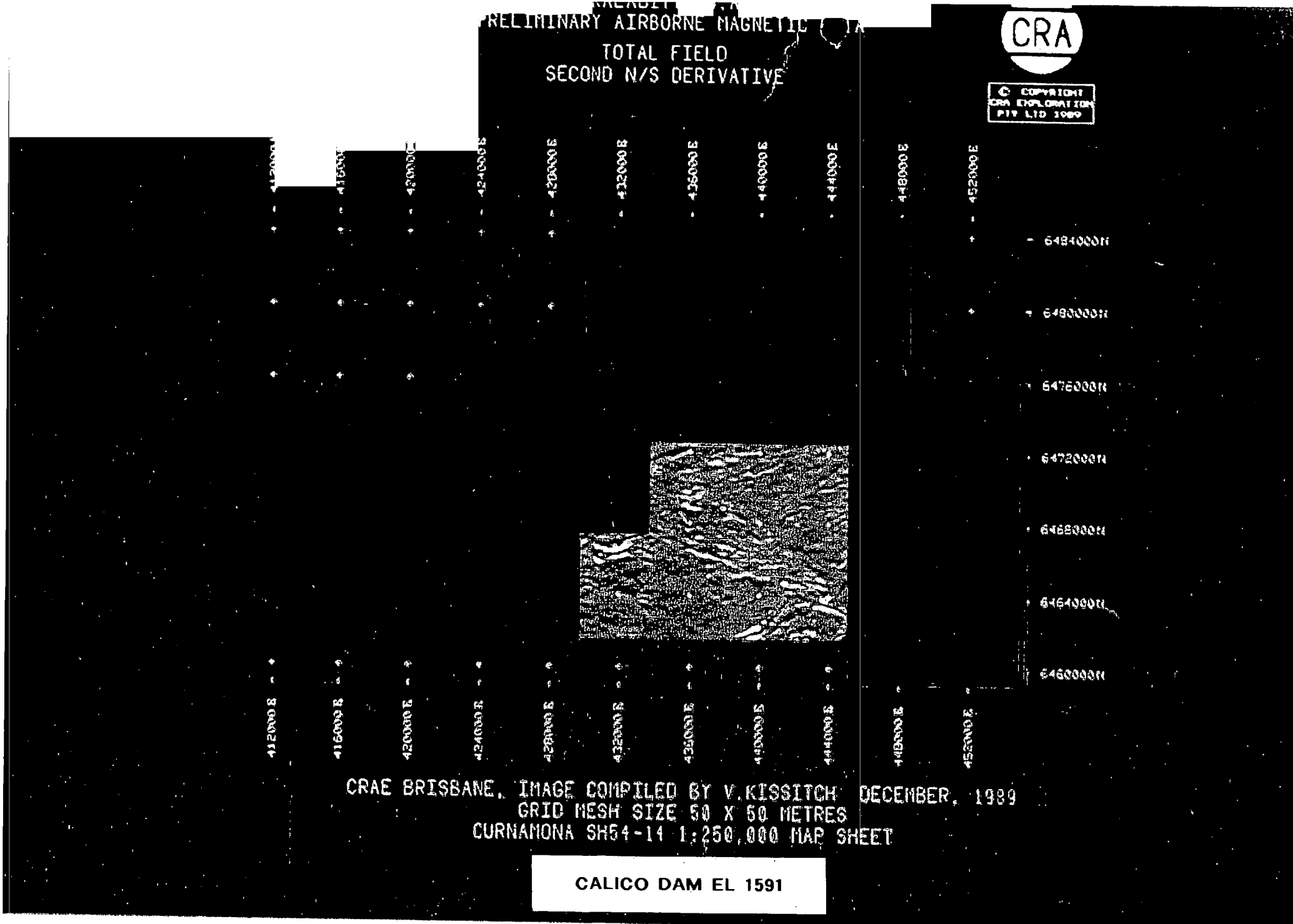
TOTAL FIELD
NORTH DERIVATIVE

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CRA EXPLORATION
PTY LTD 1989



CRAE BRISBANE. IMAGE COMPILED BY V.KISSITCH DECEMBER, 1989
GRID MESH SIZE 50 X 50 METRES
CURNAMONA SH54-14 1:250,000 MAP SHEET

CALICO DAM EL 1591


RELIMINARY AIRBORNE MAGNETIC
TOTAL FIELD
SECOND N/S DERIVATIVE
CRA
© COPYRIGHT
CRA EXPLORATION
PTY LTD 1989
6484000N
6480000N
6476000N
6472000N
6468000N
6464000N
6460000N
412000E
416000E
420000E
424000E
428000E
432000E
436000E
440000E
444000E
448000E
452000E
CRAE BRISBANE. IMAGE COMPILED BY V.KISSITCH DECEMBER, 1989
GRID MESH SIZE 50 X 50 METRES
CURNAMONA SH54-14 1:250,000 MAP SHEET
CALICO DAM EL 1591

4th April 1990

South Australian Department of
Minerals and Energy
191 Greenhill Road
PARKSIDE SA 5063

Dear Sirs,

Exploration Licence 1591 (Calico Dam)
Progress Report for Quarter Ended 2nd April 1990.
Olary, South Australia

Please find enclosed quarterly CRAE report No. 16475 titled as above.

A statement of expenditure to the nearest accounting period is also submitted.

Yours faithfully

Richard Nelson
Principal Geologist

Copy: CRAE - Adelaide

4th April 1990

South Australian Department of Minerals
and Energy
191 Greenhill Road
PARKSIDE SA 5063

Dear Sir,

Exploration Licence 1591 (Calico Dam)
Expenditure Statement

Please find enclosed CRAE Report No. 16475 titled "Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd April 1990. Olary, South Australia".

Total expenditure on the Licence area from 2nd January 1990 to 31st March 1990. the nearest accounting period is $ 9,308.

	EL 1591 Calico Dam
Salaries & Wages	$ 2,669
Supplies	$ 160
Vehicles	$ 234
Contracts	$ 3,836
Overheads	$ 2,409
Total	$ 9,308

Total expenditure to date by CRAE is $52,307

This data is supplied in accordance with conditions 111 (a) and (b) of the Authority.

Yours faithfully

R.W. Nelson
Principal Geologist

CRA EXPLORATION PTY. LIMITED
BROKEN HILL
NEW SOUTH WALES

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND APRIL, 1990
OLARY, SOUTH AUSTRALIA

Author : R.W. Nelson

Date : April, 1990

Submitted to : Chief Geologist - NSW District

Copies to : CRAE - Canberra
SA Department Mines & Energy
CRAE - Sydney
CRAE - Broken Hill
CRAE - Adelaide

Submitted by : R W Nelson

Accepted by : OMR in consultation with RSW

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CRAE Report No. 16475

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SAb 189	Kalabity - Calico Dam EL 1591 Contours of Total Magnetic Intensity - Sheet 21 of 42	1:10 000
SAb 190	Kalabity - Calico Dam EL 1591 Contours of Total Magnetic Intensity - Sheet 22 of 42	1:10 000
SAb 191	Kalabity - Calico Dam EL 1591 Contours of Total Magnetic Intensity - Sheet 23 of 42	1:10 000
SAb 198	Kalabity - Calico Dam EL 1591 Contours of Total Magnetic Intensity - Sheet 30 of 42	1:10 000
SAb 199	Kalabity - Calico Dam EL 1591 Contours of Total Magnetic Intensity - Sheet 31 of 42	1:10 000
SAb 200	Kalabity - Calico Dam EL 1591 Contours of Total Magnetic Intensity - Sheet 32 of 42	1:10 000
SAb 207	Kalabity - Calico Dam EL 1591 Contours of Total Magnetic Intensity - Sheet 39 of 42	1:10 000
SAb 208	Kalabity - Calico Dam EL 1591 Contours of Total Magnetic Intensity - Sheet 40 of 42	1:10 000
SAb 209	Kalabity - Calico Dam EL 1591 Contours of Total Magnetic Intensity - Sheet 41 of 42	1:10 000
SAb 231	Kalabity - Calico Dam EL 1591 Flight Path - Sheet 21 of 42	1:10 000
SAb 232	Kalabity - Calico Dam EL 1591 Flight Path - Sheet 22 of 42	1:10 000
SAb 233	Kalabity - Calico Dam EL 1591 Flight Path - Sheet 23 of 42	1:10 000
SAb 240	Kalabity - Calico Dam EL 1591 Flight Path - Sheet 30 of 42	1:10 000
SAb 241	Kalabity - Calico Dam EL 1591 Flight Path - Sheet 31 of 42	1:10 000

LIST OF PLANS

Plan No.	Title	Scale
SAb 242	Kalabity - Calico Dam EL 1591 Flight Path - Sheet 32 of 42	1:10 000
SAb 249	Kalabity - Calico Dam EL 1591 Flight Path - Sheet 39 of 42	1:10 000
SAb 250	Kalabity - Calico Dam EL 1591 Flight Path - Sheet 40 of 42	1:10 000
SAb 251	Kalabity - Calico Dam EL 1591 Flight Path - Sheet 41 of 42	1:10 000

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND APRIL, 1990
OLARY, SOUTH AUSTRALIA

1. SUMMARY

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 31st July, 1989.

The application for Calico Dam was made to explore the area for copper, gold and uranium.

Elsewhere in the Olary Block copper mineralisation is associated with iron formation units, while uranium is associated with the granites and the granite-sedimentary sequence contact. Much of the EL is under thin alluvial/colluvial cover.

No field work was undertaken during the three months.

The final airborne magnetic plots were received. The radiometric plots are still awaited.

2. INTRODUCTION

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July, 1989 for a term of one year with an expenditure commitment of $35,000.

The 148 sq km Licence is located approximately 38km north of Olary in the vicinity of the Kalabity Station Homestead.

3. GEOLOGY

Mapped geology (Curnamona SH54-14) within the EL consists of early Proterozoic rocks tentatively correlated with the Willyama Supergroup of Broken Hill. Outcrop exists in approximately 40% of the area.

There rocks are:

1. Medium to coarse grained migmatites and gneiss, which are in place anatectic granitoids and pegmatoids.

2. Undifferentiated schists with minor quartzites.

The Willyama Supergroup rocks have been intruded by middle Proterozoic granites.

The remaining 60% of the area is covered by aeolian, alluvial and colluvial material.

4. EXPLORATION TO 2ND APRIL, 1990

4.1 Airborne Magnetics and Radiometrics

No field work was undertaken during the quarter.

Final magnetic contour maps and flight diagrams at 1:10 000 were received from Geoterrex as shown. (See List of Plans).

The radiometric plots are still awaited.

The table below lists the survey specifications.

MAGNETOMETER:	Cesium Vapour optical absorption Sensitivity: 0.05 nT
RECORDING INTERVAL:	0.1 sec (approx 7m sampling) at mean ground speed of 220km/hour
SPECTROMETER:	Nuclear Data 256 channel ADC Volume: 33.5 litres
TOTAL COUNT WINDOW:	0.8 - 3.00 MeV
POTASSIUM WINDOW:	1.36 - 1.56 MeV
URANIUM WINDOW:	1.66 - 1.86 MeV
THORIUM WINDOW:	2.42 - 2.82 MeV
RECORDING INTERVAL:	1.0 sec (approx 70m sampling) at mean ground speed of 220km/hour
DATA RECORDING:	Geoterrex MADACS acquisition system Digital to magnetic tape
NOMINAL TERRAIN CLEARANCE:	both detectors in aircraft at 60m
NOMINAL LINE SPACING:	Traverse lines 100m Tie Lines 1.0km
FLIGHT PATH NAVIGATION:	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD:	Real time calculation of AMG coordinates

RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 54

Magnetics:	Tie Line Levelled
IGRF (1985):	Removed. Datum 2000 nT added
Grid Mesh Size:	25 x 25 metres
Grid filter:	9 point triangular, 2nT threshold
Contour Interval:	5,50,500 nT

4.2 Topographic Bases

A series of 1:25 000 standard topographic bases have been produced by Peter Livings and Associates in Perth W.A.

These bases will be used in the compilation of all existing data.

5. KEYWORDS

Calico Dam EL 1591, geophys magnetics, geophys radiometrics.

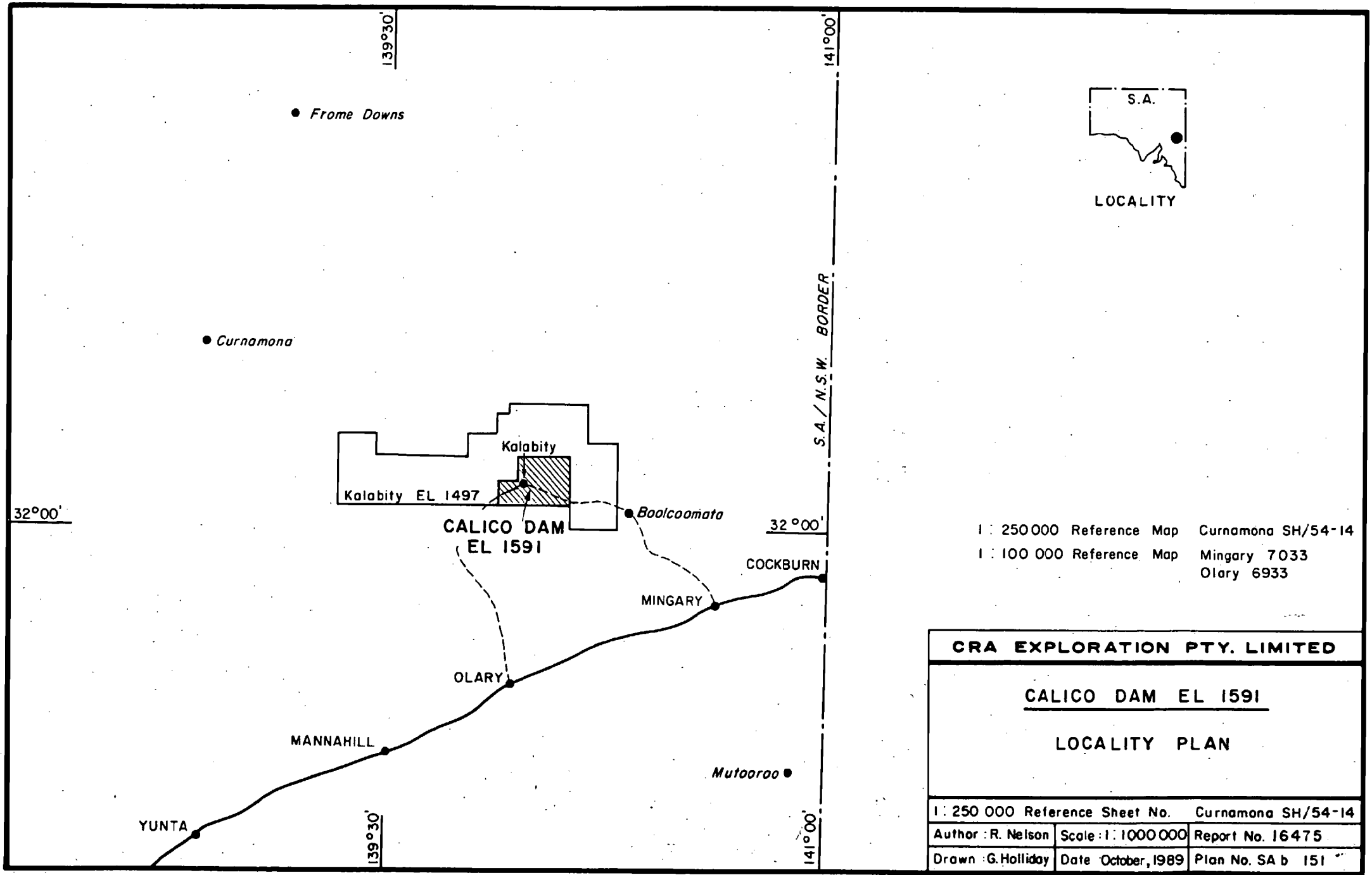
6. LOCATION

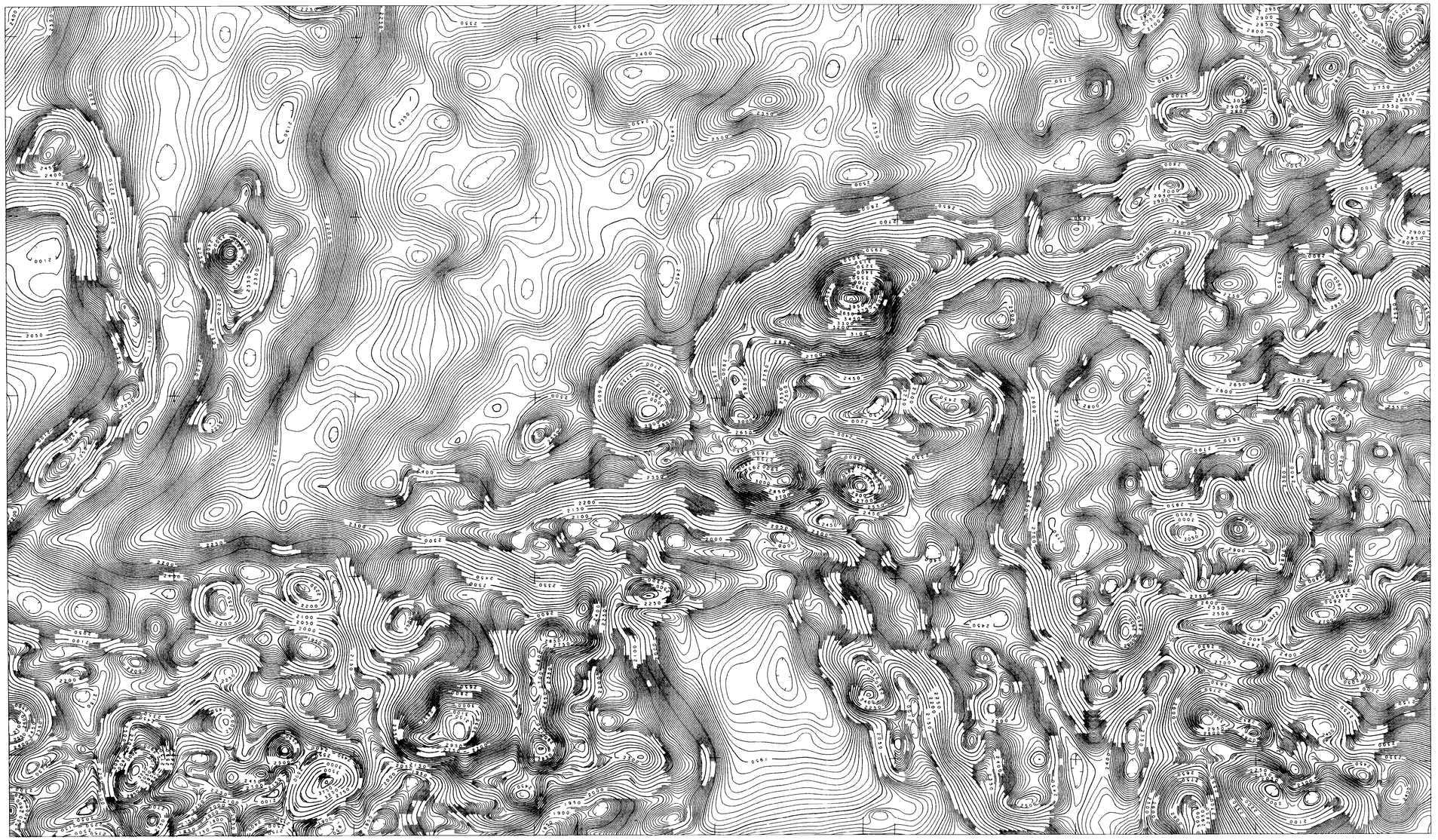
Curnamona SH5415 (1:250,000)

7. REFERENCES

Nelson R.W. 1989 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1989. Olary, South Australia. CRAE Report No. 16093.

Sheard S.N. 1989 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1990. Olary, South Australia. CRAE Report No. 16352.


139°30'
141°00'
Frome Downs
Curnamona
S.A./N.S.W. BORDER
Kalabity
Kalabity EL 1497
CALICO DAM
EL 1591
Boolcoomata
32°00'
32°00'
COCKBURN
MINGARY
OLARY
MANNAHILL
YUNTA
Mutooroo
139°30'
141°00'
S.A.
LOCALITY
1 : 250000 Reference Map Curnamona SH/54-14
1 : 100 000 Reference Map Mingary 7033
Olary 6933
CRA EXPLORATION PTY. LIMITED
CALICO DAM EL 1591
LOCALITY PLAN
1 : 250 000 Reference Sheet No. Curnamona SH/54-14
Author : R. Nelson
Scale : 1 : 1000 000
Report No. 16475
Drawn : G. Holliday
Date October, 1989
Plan No. SA b 151



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines : 0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system.
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 54

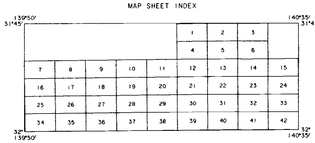
Magnetics :	Tie Line Levelled.
IGRF (1985) :	Removed. Datum 2000 nT added.
Grid mesh size :	25 x 25 metres.
Grid filter :	9 point triangular. 2nT threshold.
Contour interval :	5,50,500 nT.

N

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX



8200-2

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

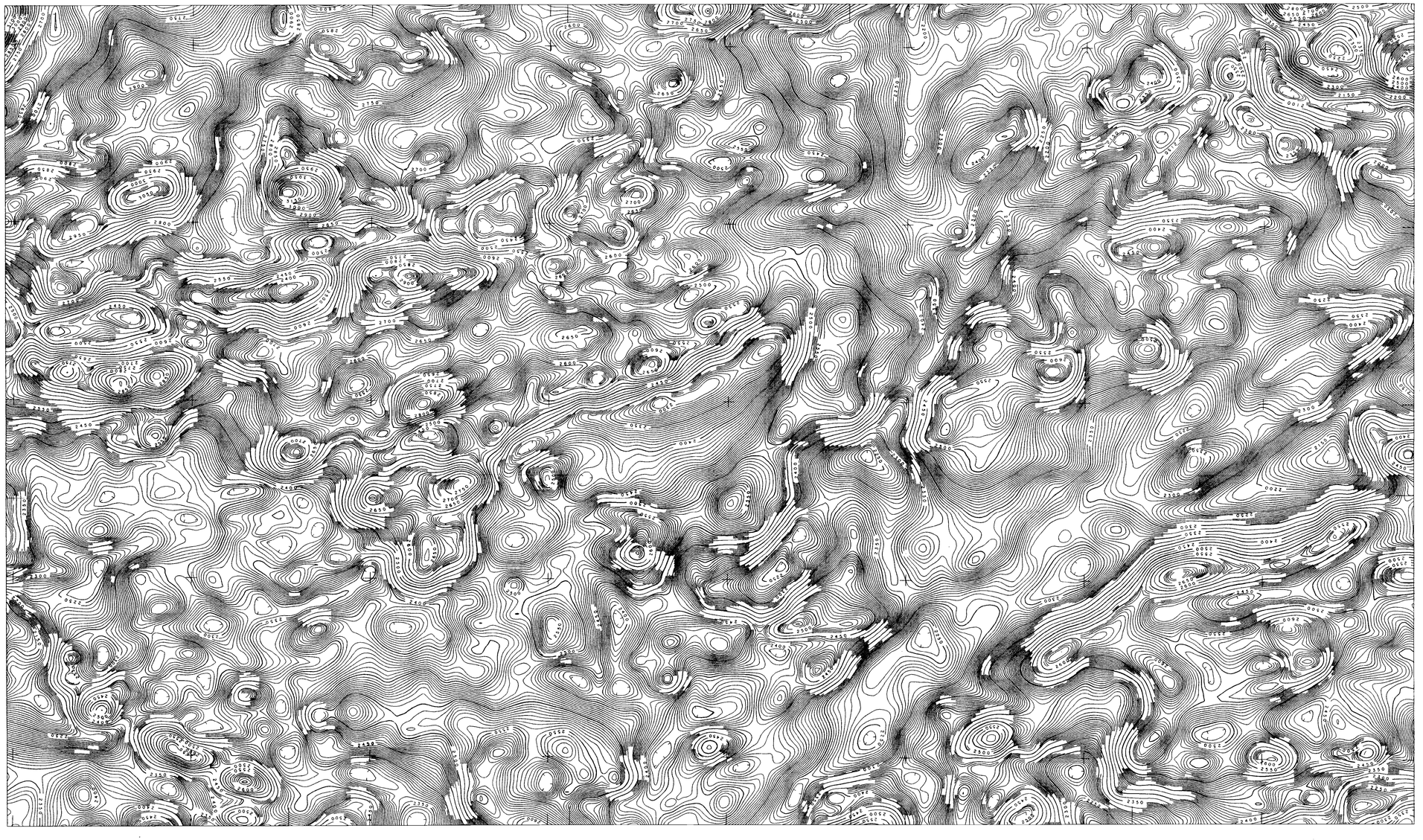
KALABITY

SHEET 21 OF 42

RESIDUAL MAGNETIC CONTOURS

CURNAMONA SH54-14

Geo		Revised	Report 16475
Drawn GTX		Date 6-MAR-1990	Drg SAb 189



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption.
	Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling)
	at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC
	Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling)
	at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquisition system
	Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors on aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m.
	Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates
	from the SYLEDIS STR4 navigation system

RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 54

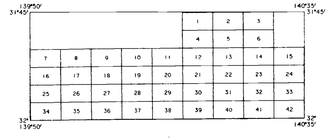
Magnetics :	Tie Line Levelled.
IGRF (1985) :	Removed. Datum 2000 nT added.
Grid mesh Size :	25 x 25 metres.
Grid filter :	9 point Triangular, 2nT threshold.
Contour Interval :	5,50,500 nT.

N

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX



8200-3

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

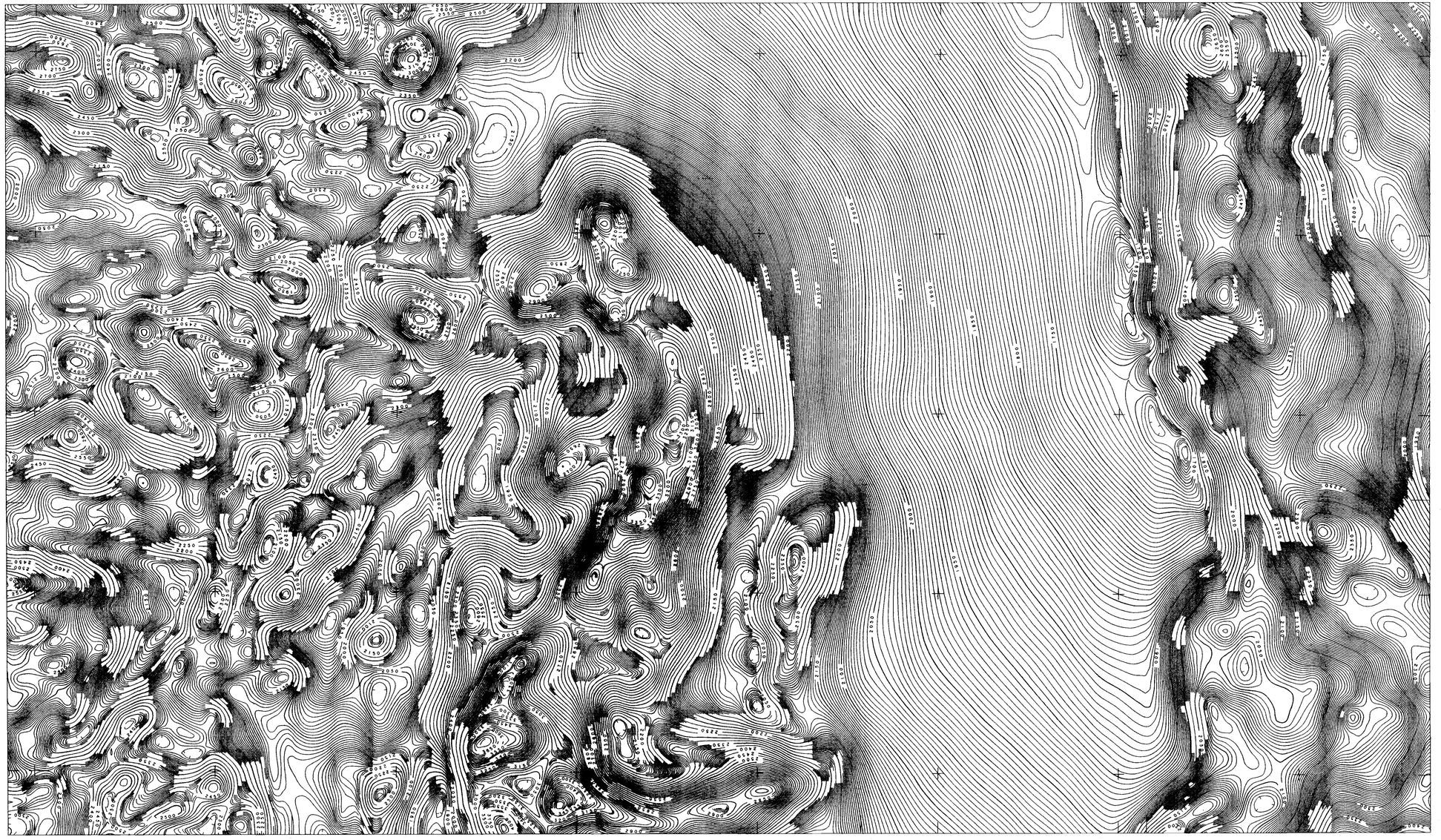
KALABITY

SHEET 22 OF 42

RESIDUAL MAGNETIC CONTOURS

CURNAMONA SH54-14

Geo	Revised	Report 16475
Drawn GTX	Date 6-MAR-1990	Drg SAB 190



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC volume : 33.6 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 54

Magnetics :	Tie Line Levelled.
IGRF (1985) :	Removed. Datum 2000 nT added.
Grid mesh size :	25 x 25 metres
Grid filter :	9 point triangular, 2nT threshold.
Contour interval :	5,50,500 nT.

N

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX

139°50' 31°45' 140°35' 31°45'

				1	2	3		
				4	5	6		
7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33
34	35	36	37	38	39	40	41	42

35' 139°50' 35' 140°35'

8200-4

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

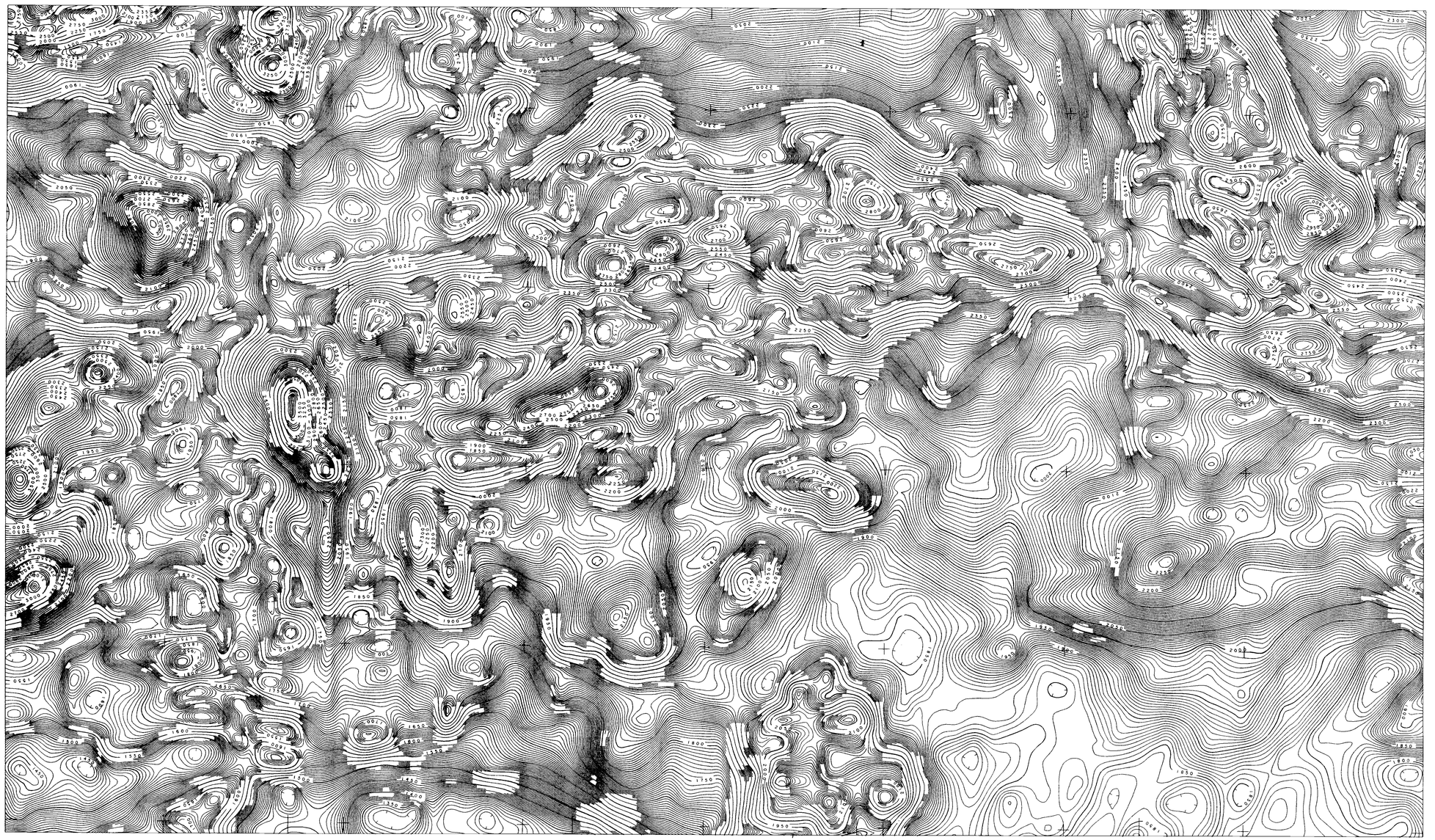
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SHEET 23 OF 42

RESIDUAL MAGNETIC CONTOURS

CURNAMONA SH54-14

Geo	Revised	Report 16475
Drawn GTX	Date 6-MAR-1990	Drg SAb 191



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nucleor Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquistion system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

RESIDUAL MAGNETIC CONTOURS

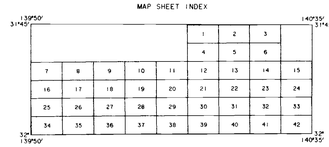
Grid notation refers to Australian Map Grid Zone 54

Magnetics :	Tie Line Levelled,
IGRF (1985) :	Removed, Datum 2000 nT added.
Grid mesh size :	25 x 25 metres.
Grid filter :	9 point triangular, 2nT threshold.
Contour Interval :	5, 50, 500 nT.

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX



8200-5

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

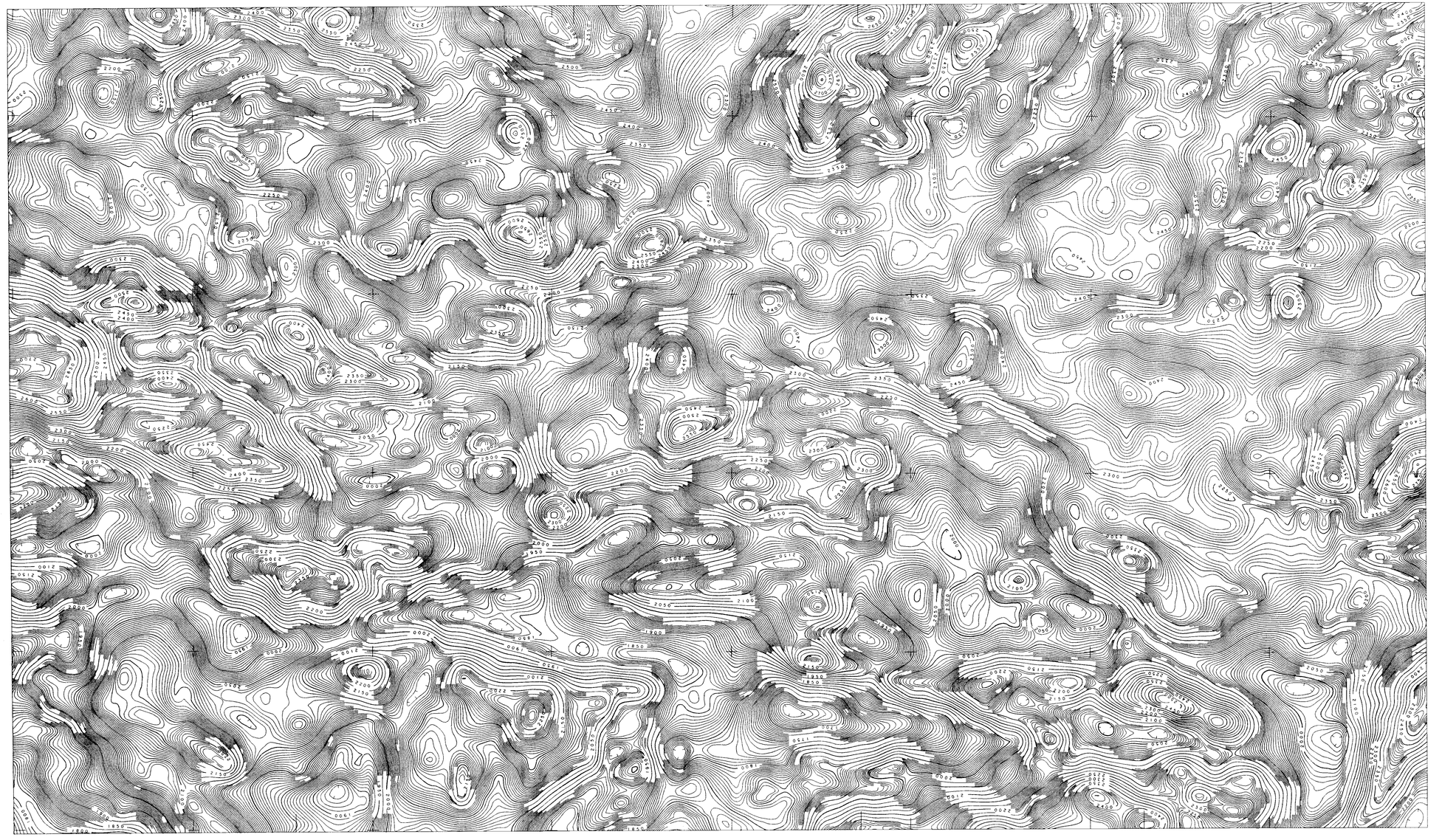
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SHEET 30 OF 42

RESIDUAL MAGNETIC CONTOURS

CURNAMONA SH54-14

Geo.	Revised.	Report 16475
Drawn GTX	Date 6-MAR-1990	Drg SAb 198



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx. 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADAC5 acquisition system Digital to magnetic tape
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

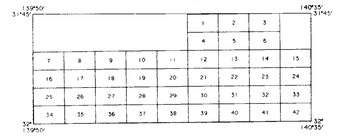
RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 54
Magnetics : Tie Line Levelled.
IGRF (1985) : Removed. Datum 2000 nT added.
Grid mesh size : 25 x 25 metres.
Grid filter : 9 point triangular. 2nT threshold.
Contour interval : 5,50,500 nT.

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX



8200-6

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

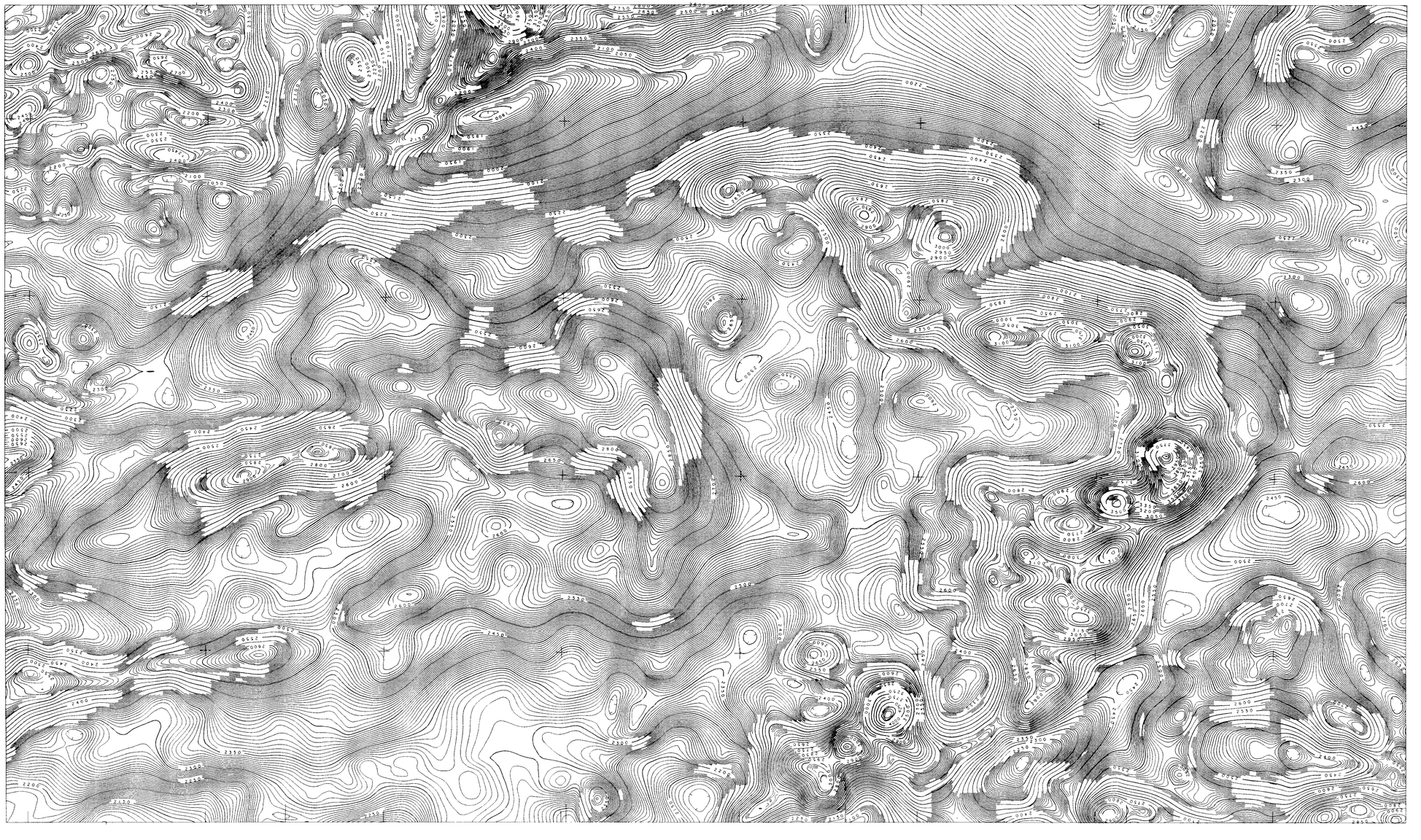
KALABITY

SHEET 31 OF 42

RESIDUAL MAGNETIC CONTOURS

CURNAMONA SH54-14

Geo.	Revised	Report 16475
Drawn GTX	Date 6-MAR-1990	Drg SAb 199



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADAS acquisition system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

RESIDUAL MAGNETIC CONTOURS

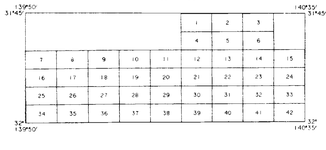
Grid notation refers to Australian Map Grid Zone 54
Magnetics : Tie Line Levelled.
IGRF (1985) : Removed. Datum 2000 nT added.
Grid mesh size : 25 x 25 metres.
Grid filter : 9 point triangular. 2nT threshold
Contour interval : 5, 50, 500 nT.

N

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX



8200-7

JOB NO : 1-402
Flown by GEOTERREX PTY LTD - Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

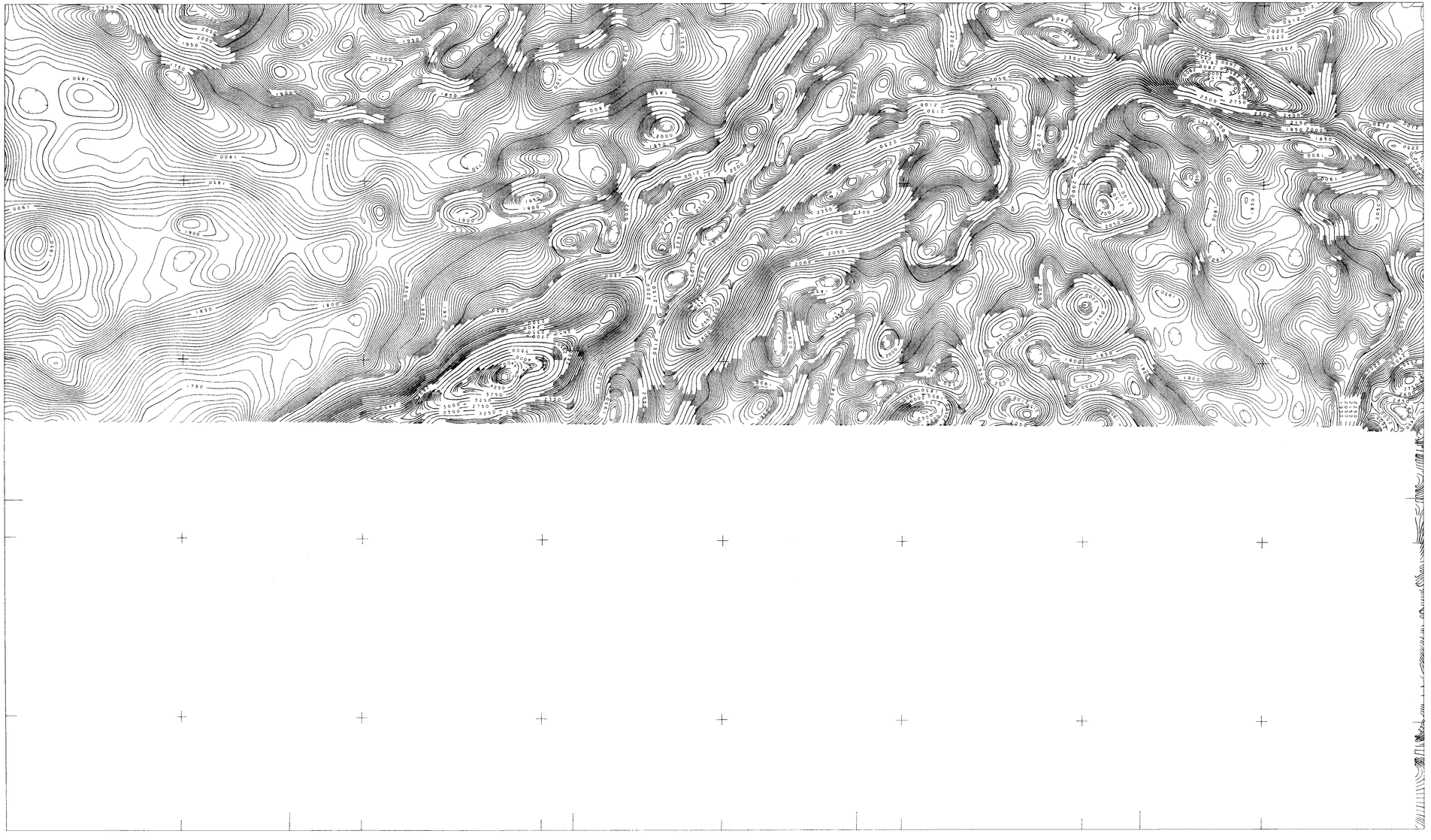
KALABITY

SHEET 32 OF 42

RESIDUAL MAGNETIC CONTOURS

CURNAMONA SH54-14

Geo.	Revised.	Report 16475
Drawn GTX	Date 6-MAR-1990	Dis SAb 200



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 225 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.40 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour Geoterrex MADACS acquistion system
DATA RECORDING :	Digital to magnetic tape
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 54

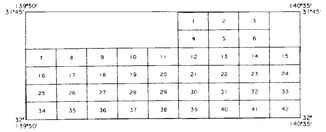
Magnetics (IGRF 1985) :	Tie Line Levelled. Removed. Datum 2000 nT added.
Grid mesh size :	25 x 25 metres.
Grid filter :	9 point triangular, 2nT threshold.
Contour Interval :	5, 50, 500 nT.

N

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX



8200-8

JOB NO : 1-402
Flown by GEOTERREX PTY LTD - Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

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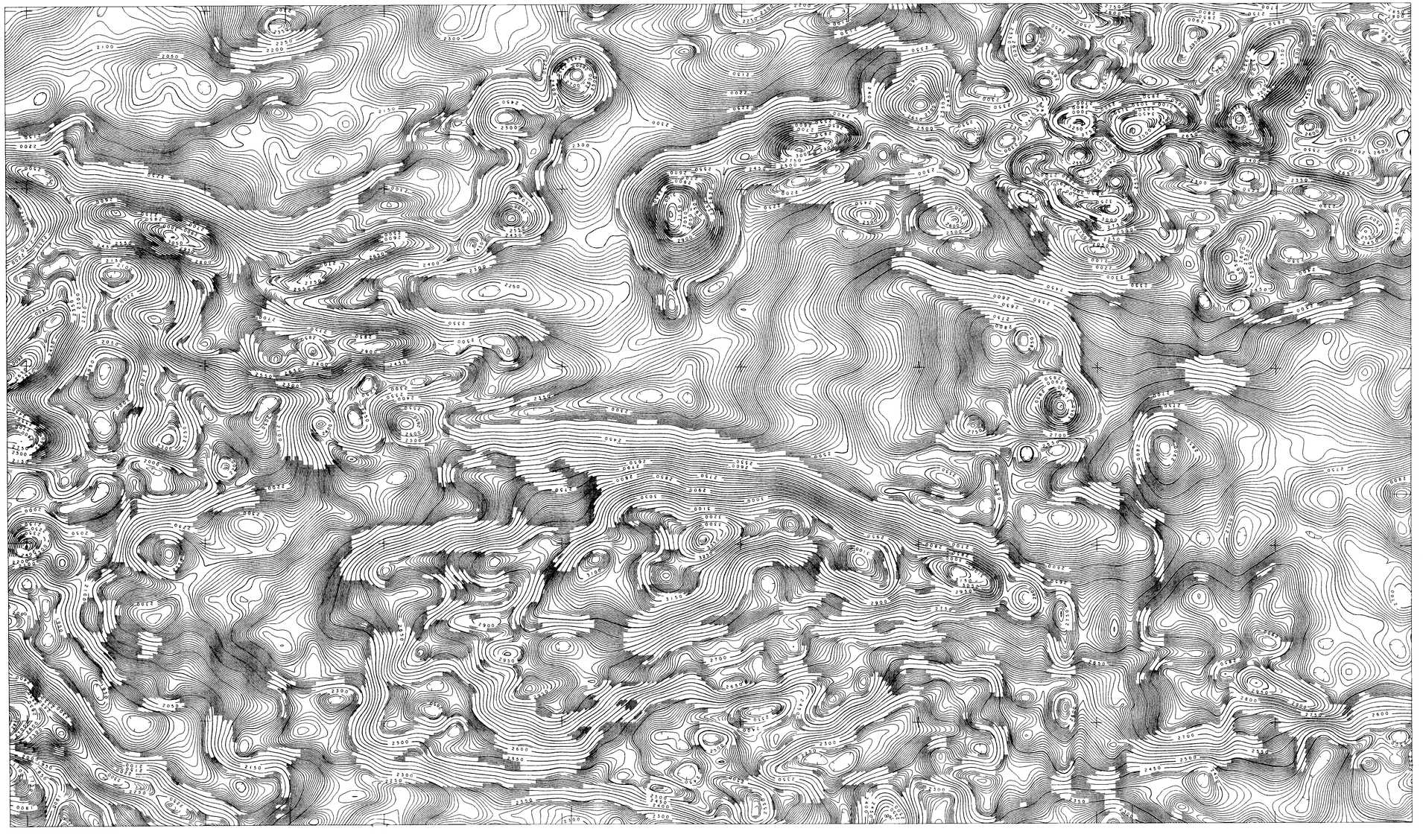
KALABITY

SHEET 40 OF 42

RESIDUAL MAGNETIC CONTOURS

CURNAMONA SH54-14

Geo	Revised	Report 16475
Drawn GTX	Date 6-MAR-1990	Dig SAB 208



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC
TOTAL COUNT WINDOW :	Volume : 33.5 litres 0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 54

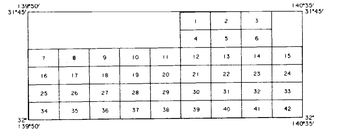
Magnetics (GRF 1985) :	Tie Line Levelled. Removed. Datum 2000 nT added.
Grid mesh size :	25 x 25 metres.
Grid filter :	9 point triangular. 2nT threshold.
Contour Interval :	5,50,500 nT.

N

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX



8200-9

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

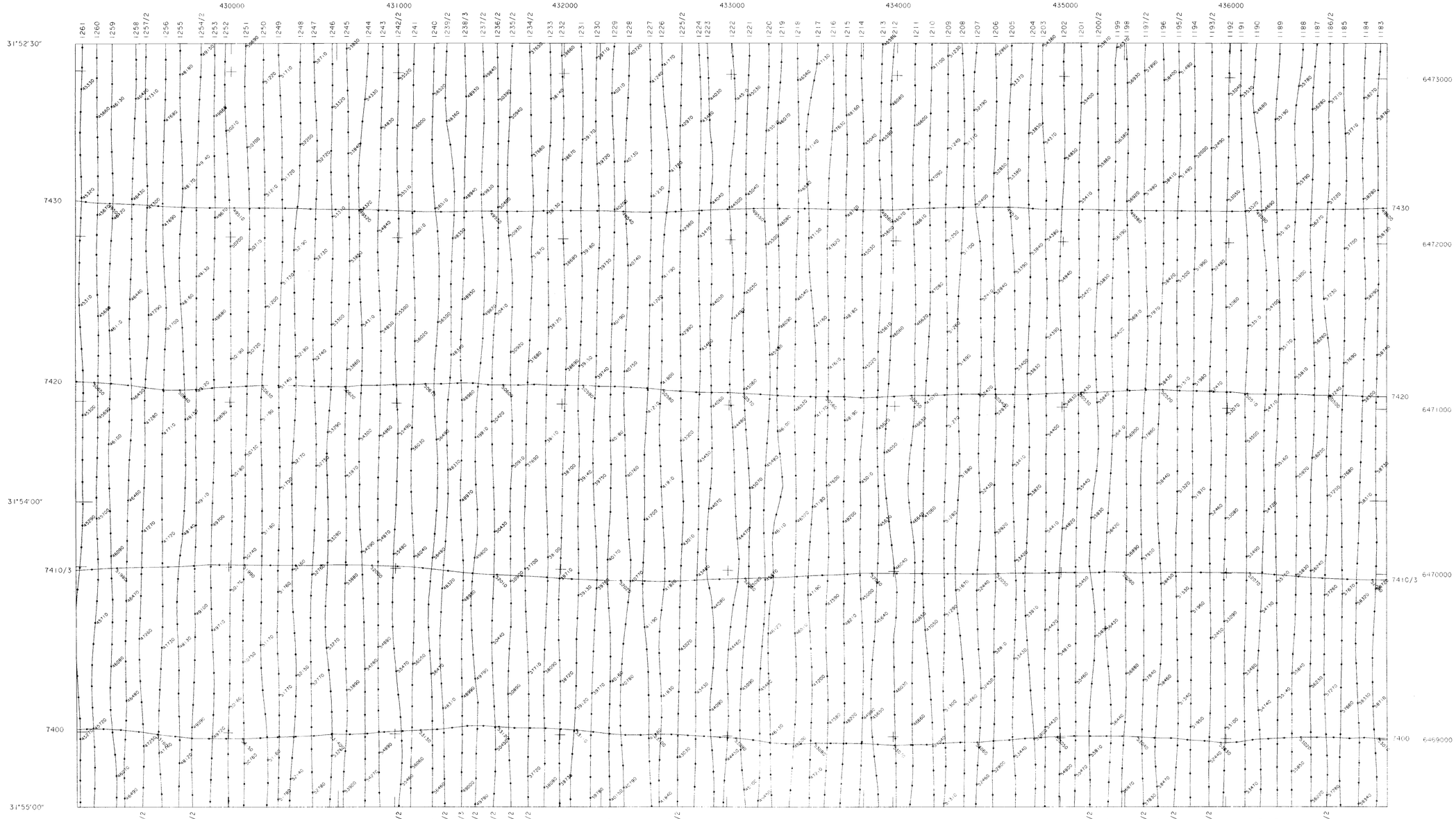
KALABITY

SHEET 41 OF 42

RESIDUAL MAGNETIC CONTOURS

CURNAMONA SH54-14

Geo	Revised	Report 16475
Drawn GTX	Date 6-MAR-1990	Drg SAb 209



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie lines 1.0 km
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

FLIGHT PATH MAP

Grid notation refers to Australian Map Grid Zone 54
Syledis navigation fix
327e8

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX

				1	2	3		
				4	5	6		
7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33
34	35	36	37	38	39	40	41	42

8200-10

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

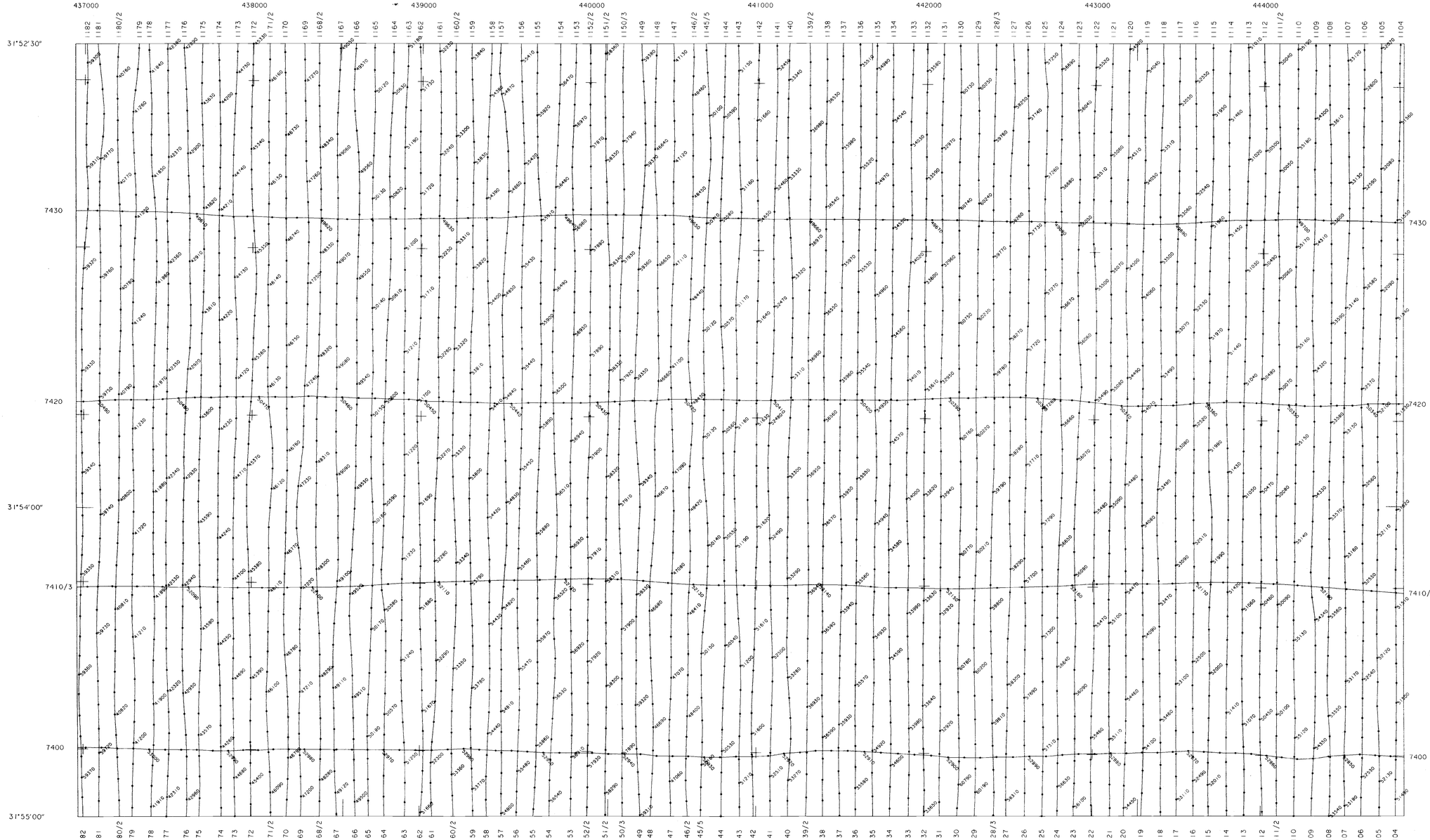
KALABITY

SHEET 21 OF 42

FLIGHT PATH MAP

CURNAMONA SH54-14

Geo	Revised	Report 16475
Drawn GTx	Date 6-MAR-1990	Dr. SAB 231



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

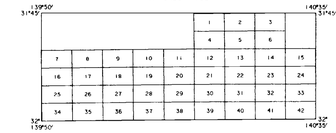
FLIGHT PATH MAP

Grid notation refers to Australian Map Grid Zone 54
Syledis navigation fix 32768

SCALE 1:10000

-200 0 200 400 600 800 m.

MAP SHEET INDEX



8200-11

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

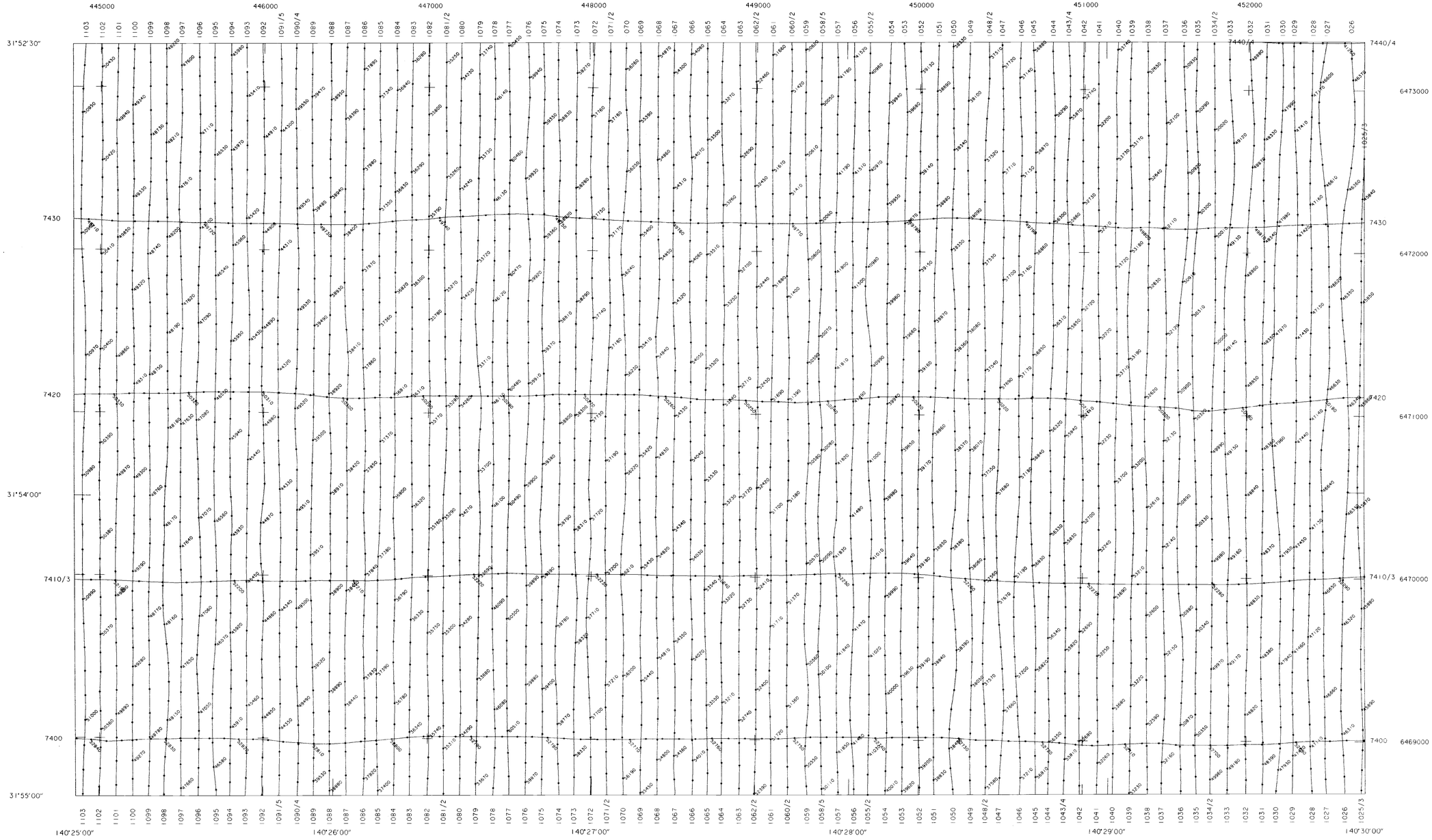
KALABITY

SHEET 22 OF 42

FLIGHT PATH MAP

CURNAMONA SH54-14

Geo	Revised	Report 16475
Drawn GTX	Date 6-MAR-1990	Drg SAb 232



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquistion system
NOMINAL TERRAIN CLEARANCE :	Digital to magnetic tape. Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines : 100 m. Tie lines : 1.5 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

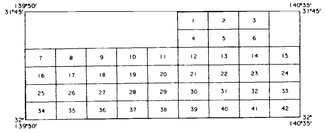
FLIGHT PATH MAP

Grid notation refers to Australian Map Grid Zone 54
Syledis navigation fix 32768

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX



8200-12

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

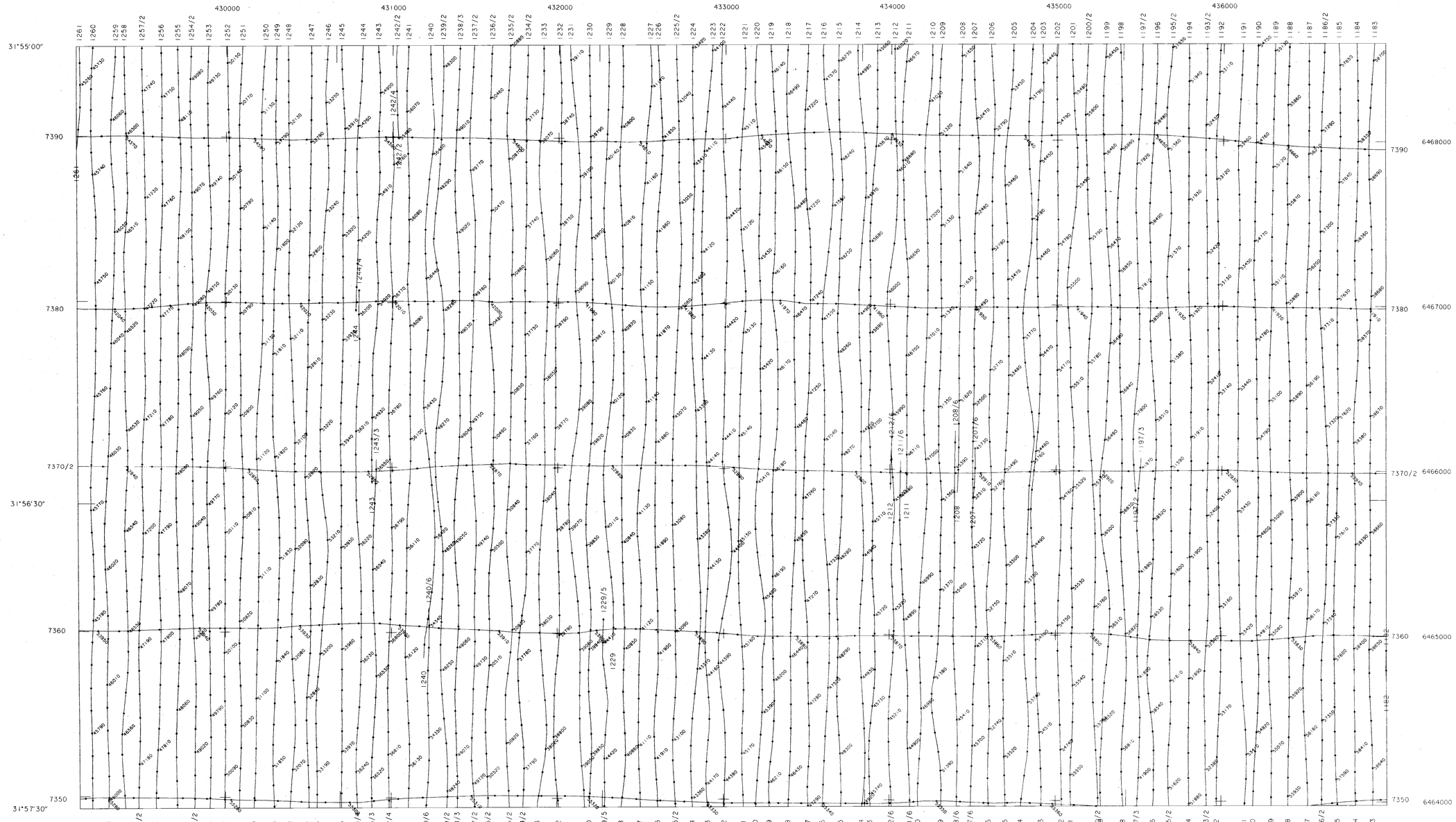
KALABITY

SHEET 23 OF 42

FLIGHT PATH MAP

CURNAMONA SH54-14

Geo	Revised	Report 16475
Drawn GTX	Date 6-MAR-1990	Drg SAb 233



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.6 Litres
TOTAL COUNT WINDOW :	0.8 - 3.05 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines : 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

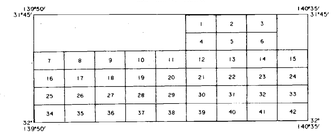
FLIGHT PATH MAP

Grid notation refers to Australian Map Grid Zone 54
Syledis navigation fix 32768

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX



8200-13

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

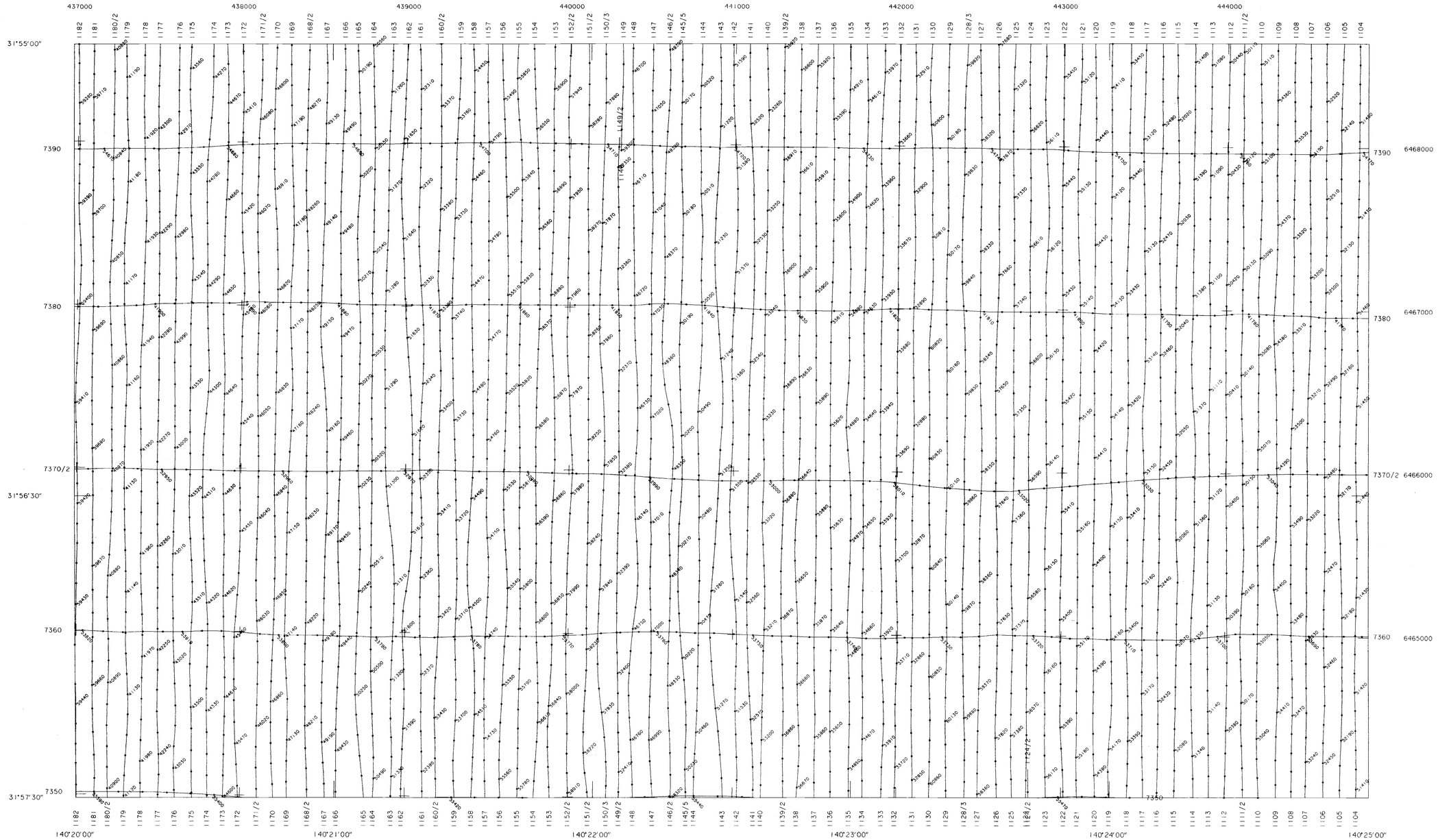
KALABITY

SHEET 30 OF 42

FLIGHT PATH MAP

CURNAMONA SH54-14

Geo	Revised	Report 16475
Drawn GTX	Date 6-MAR-1990	Drg SAb 240



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MAGACS acquisition system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time correction of AMG coordinates from the SYLEDIS STR4 navigation system

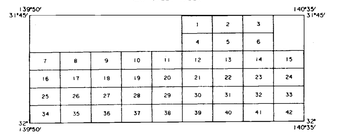
FLIGHT PATH MAP

Grid notation refers to Australian Map Grid Zone 54
Syledis navigation fix 32768

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX



8200-14

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD. SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

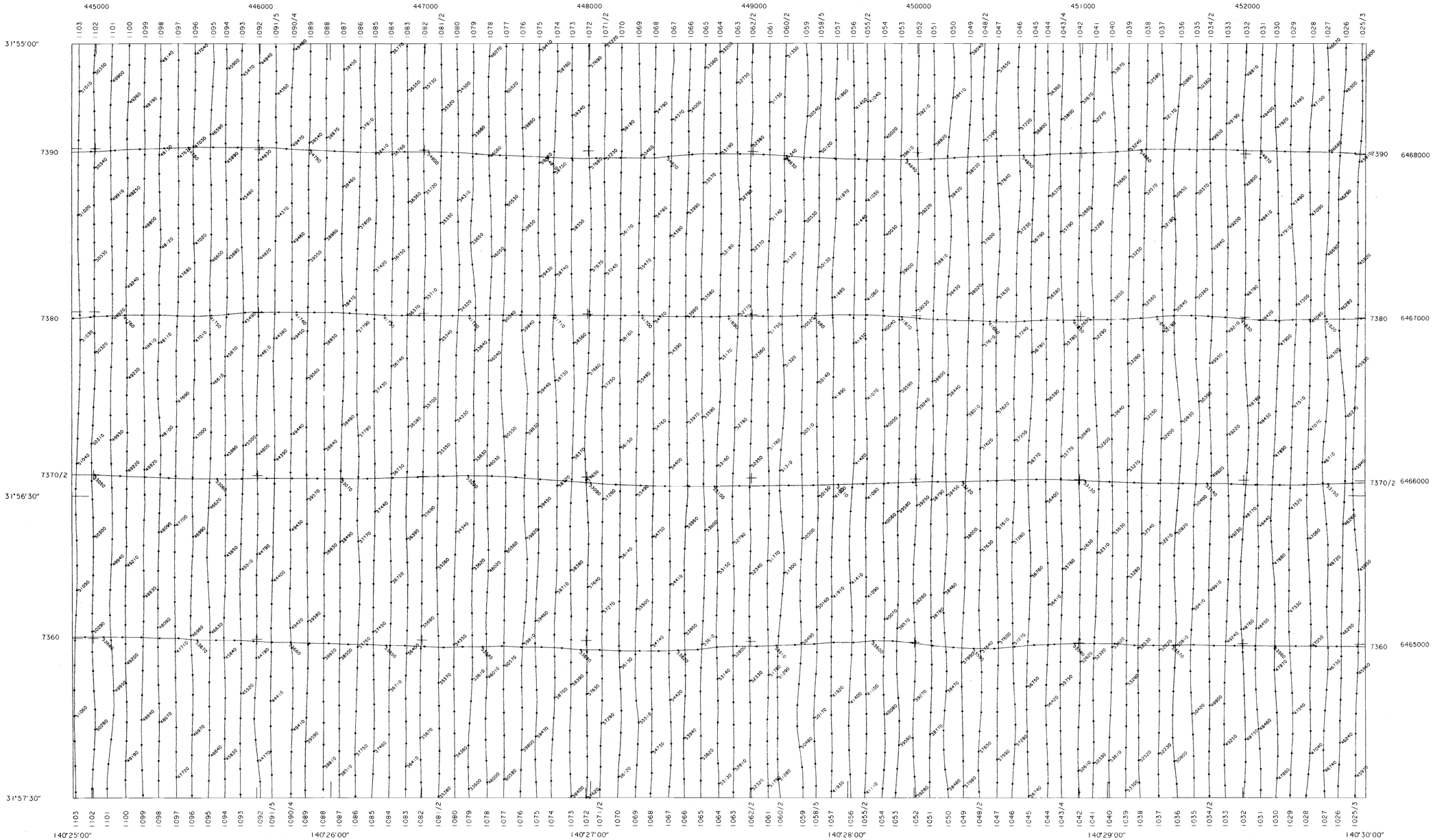
KALABITY

SHEET 31 OF 42

FLIGHT PATH MAP

CURNAMONA SH54-14

Geo.	Revised.	Report 16475
Drawn GTX	Date 6-MAR-1990	Drg SAb 241



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC
TOTAL COUNT WINDOW :	Volume : 33.5 litres 0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquistion system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines : 2.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

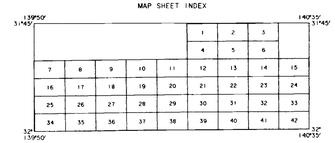
FLIGHT PATH MAP

Grid notation refers to Australian Map Grid Zone 54
Syledis navigation fix
32768

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX



8200-15

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

KALABITY

SHEET 32 OF 42

FLIGHT PATH MAP

CURNAMONA SH54-14

Geo	Revised	Report 16475
Drawn GTX	Date 6-MAR-1990	Drg SAb 242



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

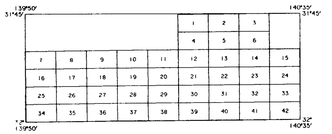
FLIGHT PATH MAP

Grid notation refers to Australian Map Grid Zone 54
Syledis navigation fix 32768

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX



8200-16

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

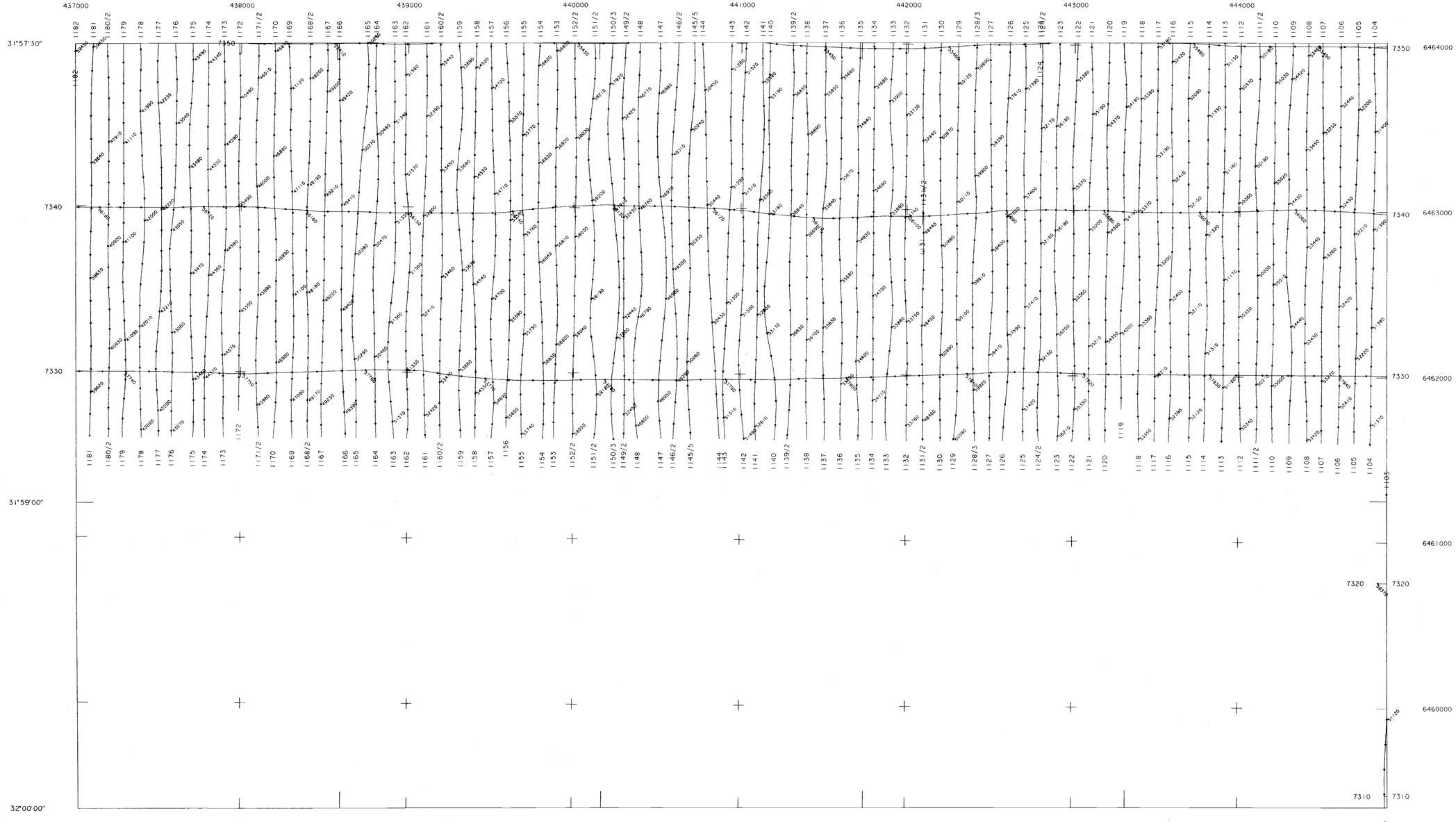
KALABITY

SHEET 39 OF 42

FLIGHT PATH MAP

CURNAMONA SH54-14

Geo.	Revised	Report 16475
Drawn GTX	Date 6-MAR-1990	Drg SAb 249



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

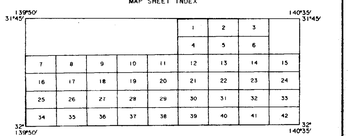
FLIGHT PATH MAP

Grid notation refers to Australian Map Grid Zone 54
Syledis navigation fix 32768

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX



8200-17

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

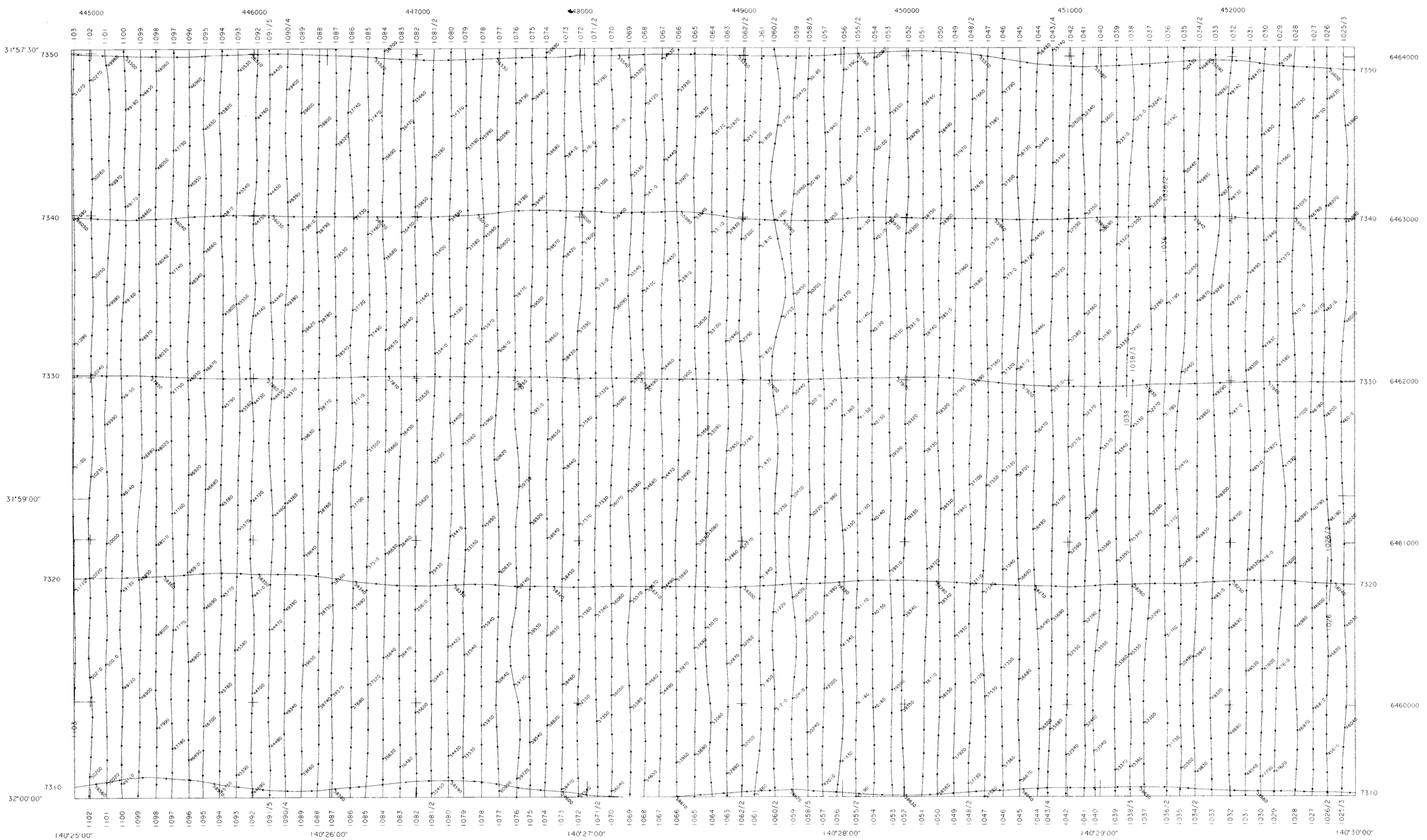
KALABITY

SHEET 40 OF 42

FLIGHT PATH MAP

CURNAMONA SH54-14

Geo	Revised	Report 16475
Drawn GTX	Date 6-MAR-1990	Drg SAb 250



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 1m sampling) at mean ground speed of 225 km/hour
SPECTROMETER	Nucleor Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS ST84 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS ST84 navigation system

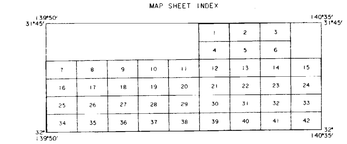
FLIGHT PATH MAP

Grid notation refers to Australian Map Grid Zone 54
Syledis navigation fix : 32768

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX



8200-18

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

KALABITY

SHEET 41 OF 42

FLIGHT PATH MAP

CURNAMONA SH54-14

Geo	Revised	Report 16475
Drawn GTX	Date 6-MAR-1990	Drg SAb 251

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND APRIL 1990.
OLARY, SOUTH AUSTRALIA

1. SUMMARY

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July, 1989.

The EL was renewed for a further term of twelve months from the 3rd July 1990.

The application for Calico Dam was made to explore the area for copper, gold and uranium.

Elsewhere in the Olary Block copper mineralisation is associated with iron formation units, while uranium is associated with the granites and the granite-sedimentary sequence contact. Much of the EL is under thin alluvial/colluvial cover.

No field work was undertaken during the three months.

The final airborne radiometric plots are still awaited.

Preliminary radiometric results were received with Plan SAb 279 showing the four radiometric anomalies plotting near or within the EL.

2. INTRODUCTION

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July, 1989 for a term of one year with an expenditure commitment of $35,000. The EL was renewed for a further 12 months with a further expenditure commitment of $40,000, i.e., the licence conditions stipulate that a total of $75,000 is required to be spent over the two year period. NO IT DOESN'T. $40,000 to be spent in 2nd year.

To date a total of $66,683 has been spent.

The 148 sq km Licence is located approximately 38km north of Olary in the vicinity of the Kalabity Station Homestead.

3. GEOLOGY

Mapped geology (Curnamona SH54-14) within the EL consists of early Proterozoic rocks tentatively correlated with the Willyama Supergroup of Broken Hill. Outcrop exists in approximately 40% of the area.

These rocks are:

1. Medium to coarse grained migmatites and gneiss, which are in place anatectic granitoids and pegmatoids.

2. Undifferentiated schists with minor quartzites.

The Willyama Supergroup rocks have been intruded by middle Proterozoic granites.

The remaining 60% of the area is covered by aeolian, alluvial and colluvial material.

4. EXPLORATION TO 2ND JULY, 1990

4.1 Airborne Radiometrics

The final radiometric plots have yet to be received from Geoterrex.

Preliminary plots have been received and interpreted.

A total of 45 priority 1, 2 and 3 radiometric anomalies have been recognised within the complete survey of EL 1591 and EL 1497.

Four of these 45 anomalies are within or on the boundary of EL 1591.

Table 1 lists these anomalies.

TABLE 1
RADIOMETRIC ANOMALIES

Anomaly	Line No	East	North	AMP (cps)	Width (sec)	Priority	Comments
KR3	11021	445000	6463850	15	4	1	U only 3 lines
KR27	12481	430380	6464040	10	1	2	On flank K
KR28	12171	433200	6468500	19	broad	2	Over lines 12141 to 12261
KR42	11671	438500	6462200	11	1	3	Assoc Th

These anomalies will be located in the field and sampled in due course.

5. KEYWORDS

Calico Dam EL 1591, geophys radiometrics.

6. LOCATION

Curnamona SH5415 (1:250,000)

7. REFERENCES

Nelson R.W. 1989 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1989. Olary, South Australia. CRAE Report No. 16093.

Sheard S.N. 1989 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1990. Olary, South Australia. CRAE Report No. 16352.

Nelson S.N. 1990 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd April 1990. Olary, South Australia. CRAE Report No. 16475.

CRA EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)

69 RAKOW STREET,
P.O. BOX 683,
BROKEN HILL, NEW SOUTH WALES 2880
AUSTRALIA

TELEGRAMS: "CRAEX"
TELEPHONE: (080) 88 2536
FAX: (080) 88 3384

IN REPLY PLEASE QUOTE

6 July 1990

South Australian Department of Minerals
and Energy
191 Greenhill Road
PARKSIDE SA 5063

Dear Sir,

Exploration Licence 1591 (Calico Dam)
Expenditure Statement

Please find enclosed CRAE Report No. 16622 titled "Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd July 1990. Olary, South Australia".

Total expenditure on the Licence area from 1st April 1990 to 30th June 1990, the nearest accounting period is $14,378.

	EL 1591 Calico Dam
Salaries & Wages	$ 4,317
Supplies	$ 1,322
Tenements	$ 7
Overheads	$ 8,732
Total	$14,378

Total expenditure to date by CRAE is $66,685

This data is supplied in accordance with conditions 111 (a) and (b) of the Authority.

Yours faithfully

R.W. Nelson
Principal Geologist



CRA EXPLORATION PTY. LIMITED
BROKEN HILL
NEW SOUTH WALES

EXPLORATION LICENCE 1591 (CALICO DAM) PROGRESS REPORT FOR QUARTER ENDED 2ND JULY 1990. OLARY, SOUTH AUSTRALIA

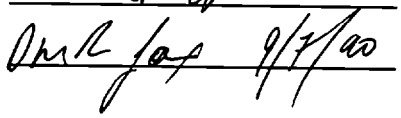
Author : R.W. Nelson

Date : July, 1990

Submitted to : Chief Geologist - NSW District

Copies to : SA Department Mines & Energy
CRAE - Canberra
CRAE - Sydney
CRAE - Broken Hill
CRAE - Adelaide

Submitted by : 

Accepted by : 

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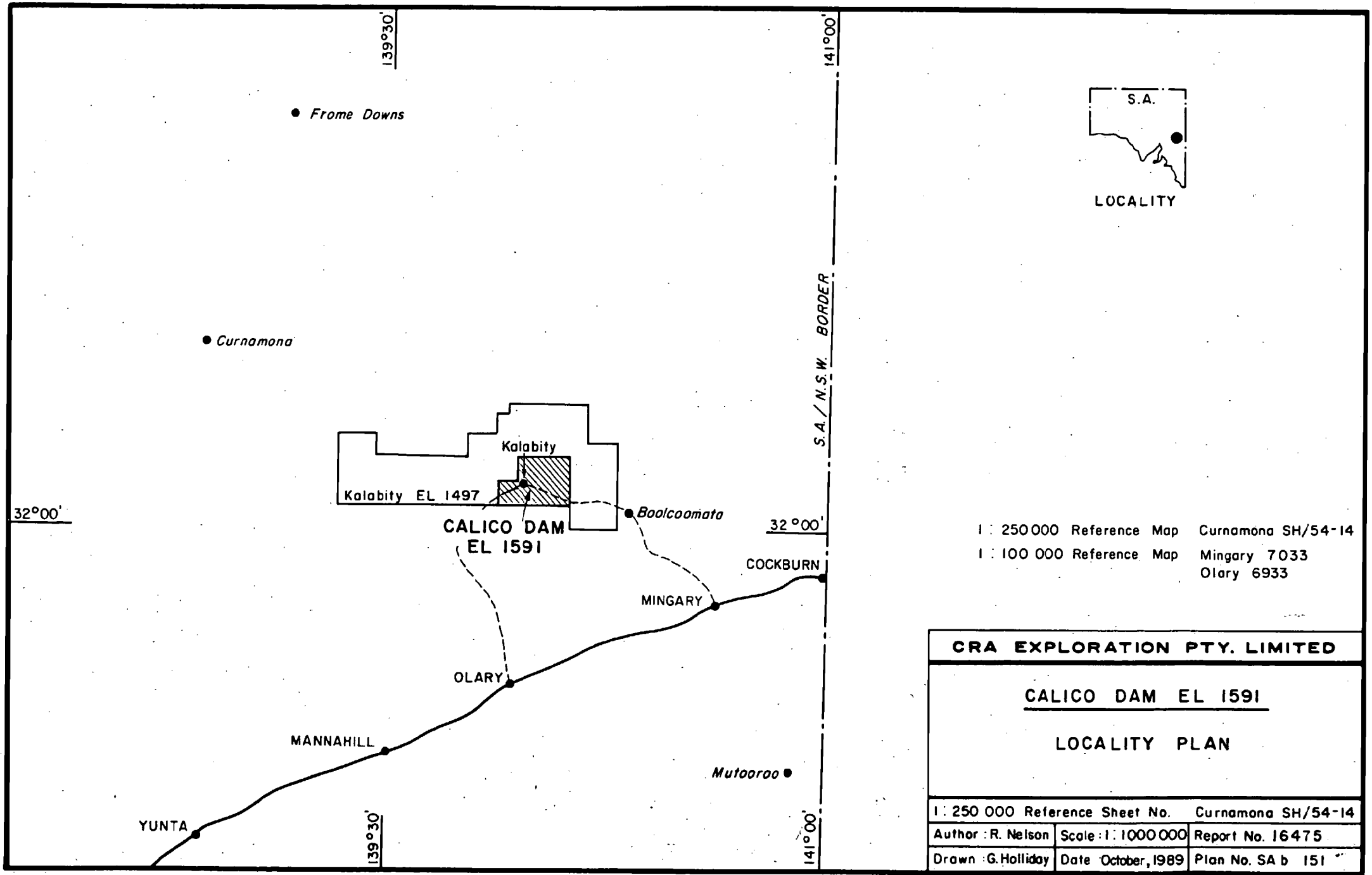
CRAE Report No. 16622

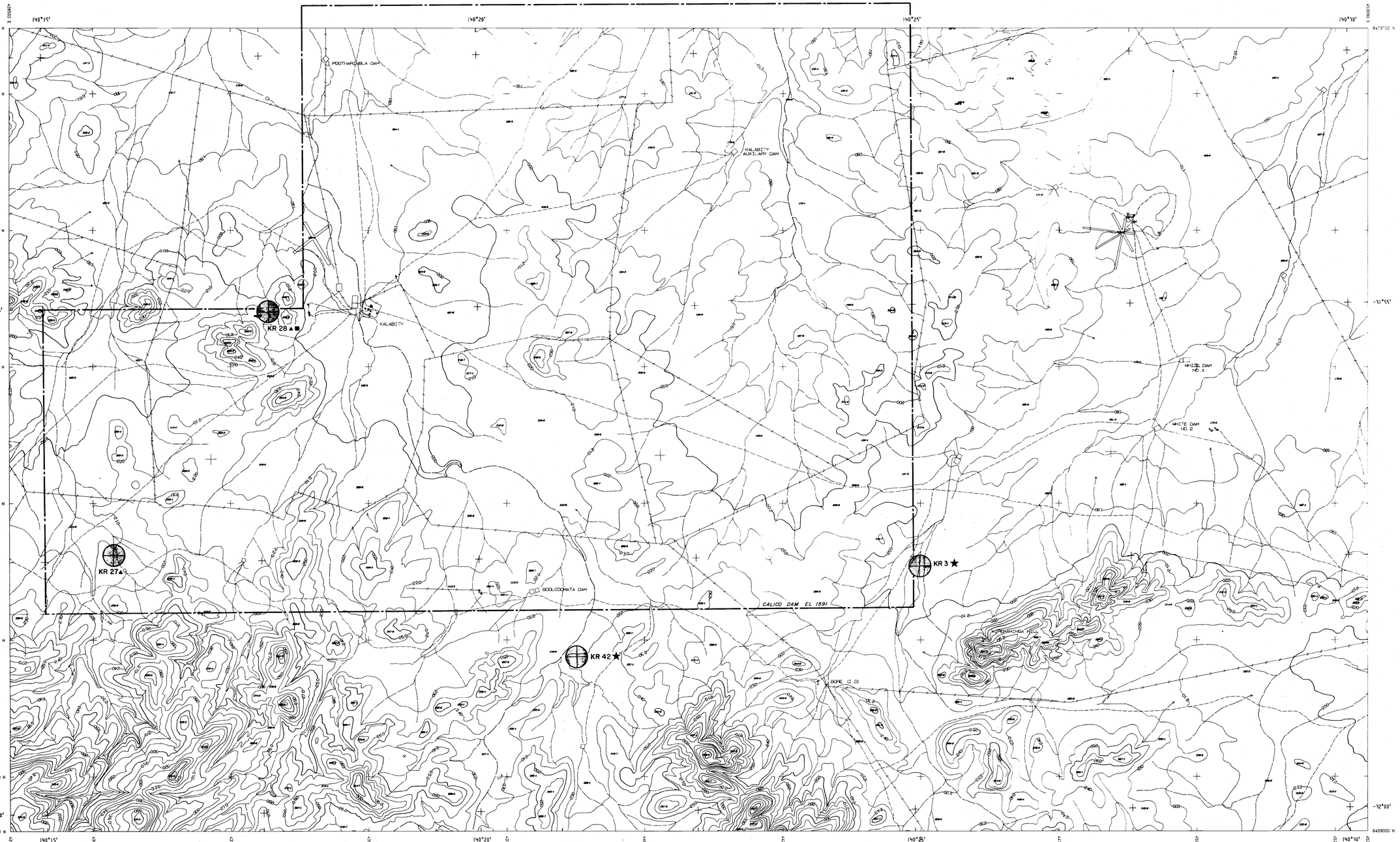
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4.	EXPLORATION TO 2ND JULY, 1990	2
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5.	KEYWORDS	3
6.	LOCATION	3
7.	REFERENCES	3

LIST OF PLANS

Plan No.	Title	Scale
SAb 151	Kalabity - Calico Dam EL 1591 Location Plan	1:1 000 000
SAb 279	Kalabity - Calico Dam EL 1591 Radiometric Anomaly Locations	1:25 000


139°30'
141°00'
Frome Downs
Curnamona
S.A./N.S.W. BORDER
Kalabity
Kalabity EL 1497
CALICO DAM
EL 1591
Boolcoomata
32°00'
32°00'
COCKBURN
MINGARY
OLARY
MANNAHILL
YUNTA
Mutooroo
139°30'
141°00'
S.A.
LOCALITY
1 : 250000 Reference Map Curnamona SH/54-14
1 : 100 000 Reference Map Mingary 7033
Olary 6933
CRA EXPLORATION PTY. LIMITED
CALICO DAM EL 1591
LOCALITY PLAN
1 : 250 000 Reference Sheet No. Curnamona SH/54-14
Author : R. Nelson
Scale : 1 : 1000 000
Report No. 16475
Drawn : G. Holliday
Date October, 1989
Plan No. SA b 151



KR 27 RADIOMETRIC ANOMALY

PRIORITY

1 ★

2 ▲

3 ■

WALTHERGO 6834-11-NE	DEEP WELL 6934-111-NW/NE	WAUKALOO 6934-11-NW/NE	KALKAROO 7034-111-NW
BILLEROO 6834-11-SE	KOOLKA 6934-111-SW/SE	KALABITY 6934-11-SW/SE	BOOLCOOMATA 7034-111-SW

PREPARED BY PETER LIVINGS AND ASSOCIATES
2 RAGLAN ROAD, MT LAWLEY, 6050
TELEPHONE : 3287088.

1:100000 MAP CONTROL SUPPLIED BY AUSLIG

8200-1

CRA EXPLORATION PTY LIMITED

CALICO DAM EL 1591

RADIOMETRIC ANOMALY LOCATIONS

SHEET N° 6934-11-SW/SE-KALABITY

SCALE: 1:25000	AUTHOR : R. NELSON	DRAWN : G. HOLLIDAY
DATE OF PHOTOGRAPHY : 5-1982		PLAN NO. SAb 279
DATE : APRIL, 1990	CRAE REPORT N°:	16622

MAIN REPORT MISSING

CRA EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)
69 RAKOW STREET,
P.O. BOX 683,
BROKEN HILL, NEW SOUTH WALES 2880
AUSTRALIA

TELEGRAMS: "CRAEX"
TELEPHONE: (080) 88 2536
FAX: (080) 88 3384

IN REPLY PLEASE QUOTE

9 October 1990

Department of Mines and Energy -
South Australia
191 Greenhill Road
PARKSIDE SA 5063

Dear Sir,

Exploration Licence 1591 (Calico Dam)
Expenditure Statement

Please find enclosed CRAE Report No. 16833 titled "Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd October 1990. Olary, South Australia".

Total expenditure on the Licence area by CRAE from 1st July 1990 to 30th September 1990, the nearest accounting period is $ 8,627.

	EL 1591 Calico Dam
Salaries & Wages	$ 3,605
Supplies	$ 27
Vehicles	$ 338
Tenements	$ 377
Overheads	$ 4,280
Total	$ 8,627

Total expenditure to date by CRAE is $ 75,312

This data is supplied in accordance with conditions 111 (a) and (b) of the Authority.

Yours faithfully

R.W. Nelson
Principal Geologist

CRA EXPLORATION PTY. LIMITED
BROKEN HILL
NEW SOUTH WALES

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND OCTOBER 1990.
OLARY, SOUTH AUSTRALIA

Author : S.N. Sheard

Date : October, 1990

Submitted to : Chief Geologist - NSW District

Copies to : Department Mines & Energy - S.A.
CRAE - Canberra
CRAE - Sydney
CRAE - Broken Hill
CRAE - Adelaide

Submitted by : S N SHEARD

Accepted by : M Nelson for DMR

"The contents of this report remain the property of CRA Exploration Pty. Limited and may not be published in whole or in part nor used in a company prospectus without the written consent of the Company."

CRAE Report No. 16833

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2.	INTRODUCTION	1
3.	GEOLOGY	2
4.	EXPLORATION TO 2ND OCTOBER, 1990	2
	4.1 Airborne Magnetic Survey Interpretation	2
5.	KEYWORDS	3
6.	LOCATION	3
7.	REFERENCES	3

LIST OF PLANS

Plan No.	Title	Scale
SAb 151	Kalabity - Calico Dam EL 1591 Location Plan	1:1 000 000
SAb 345	Kalabity - Calico Dam EL 1591 Magnetic Domain Map	1:50 000
SAb 346	Calico Dam EL 1591 Magnetic Interpretation of Total Magnetic Intensity - Kalabity 6934-II-SW/SE - Waukaloo (part) 6934-II-NW/NE	1:25 000

3. GEOLOGY

Mapped geology (Curnamona SH54-14) within the EL consists of early Proterozoic rocks tentatively correlated with the Willyama Supergroup of Broken Hill. Outcrop exists in approximately 40% of the area.

These rocks are:

1. Medium to coarse grained migmatites and gneiss, which are in place anatectic granitoids and pegmatoids.

2. Undifferentiated schists with minor quartzites.

The Willyama Supergroup rocks have been intruded by middle Proterozoic granites.

The remaining 60% of the area is covered by aeolian, alluvial and colluvial material.

4. EXPLORATION TO 2ND OCTOBER 1990

4.1 Airborne Magnetic Data Interpretation

In July 1989 a 100m spaced N-S flight line, 60m altitude airborne magnetic/radiometric survey was completed by Geoterrex over the Calico Dam EL. This survey was part of a larger survey which covered the adjacent Kalabity EL.

The data has been interpreted regionally as one entity and showed that the Calico Dam Licence area was dominated by disturbed high frequency magnetic anomalies with limited continuity having a magnetic pattern similar to that seen over gneissic terrains.

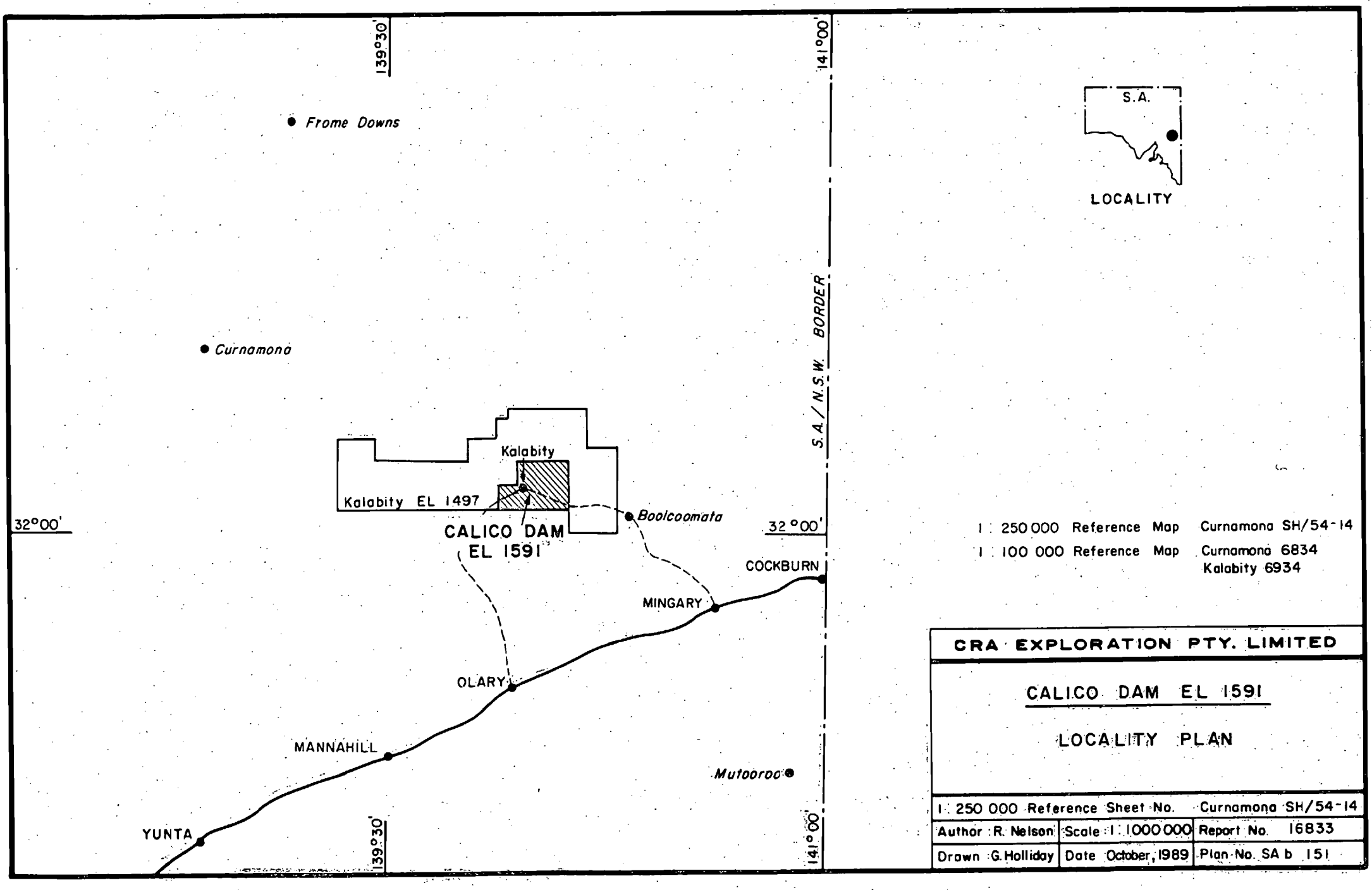
This area has been nominated as Domain 3 as shown in the accompanying 1:50 000 Magnetic Domain Map - Plan SAb 345.

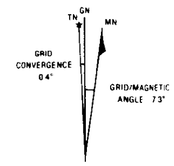
It is suggested that within this Domain, the country rocks have been metamorphosed possibly by some deep seated source to produce an anatectic granite.

On a more detailed scale, Plan SAb 346 at 1:25 000 shows that the area has been transected by NE and NW trending dislocations, possibly shear zones.

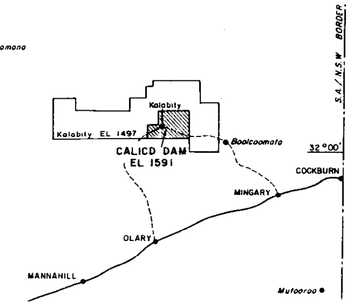
Within this zone it is considered that potential could exist for remobilised basemetal deposits, perhaps concentrated by the metamorphic event. No previous drilling has been noted.

It is very difficult to pinpoint areas of potential purely from the magnetics. Perhaps zones of intersection of faults or adjacent to the semi-continuous but contorted anomalies which


139°30'
141°00'
Frome Downs
Curnamona
S.A./N.S.W. BORDER
Kalabity
Kalabity EL 1497
CALICO DAM
EL 1591
Boolcoomata
32°00'
32°00'
COCKBURN
MINGARY
OLARY
MANNAHILL
Mutooroo
YUNTA
139°30'
141°00'
S.A.
LOCALITY
1 : 250 000 Reference Map Curnamona SH/54-14
1 : 100 000 Reference Map Curnamona 6834
Kalabity 6934
CRA EXPLORATION PTY. LIMITED
CALICO DAM EL 1591
LOCALITY PLAN
1 : 250 000 Reference Sheet No. Curnamona SH/54-14
Author R. Nelson
Scale 1 : 1000 000
Report No. 16833
Drawn G. Holliday
Date October, 1989
Plan No. SA b 151



True north, grid north and magnetic north are shown diagrammatically for the centre of the map. Magnetic north is correct for 1983 and moves easterly by 0.1° in about three years



LOCALITY PLAN

430 000 E

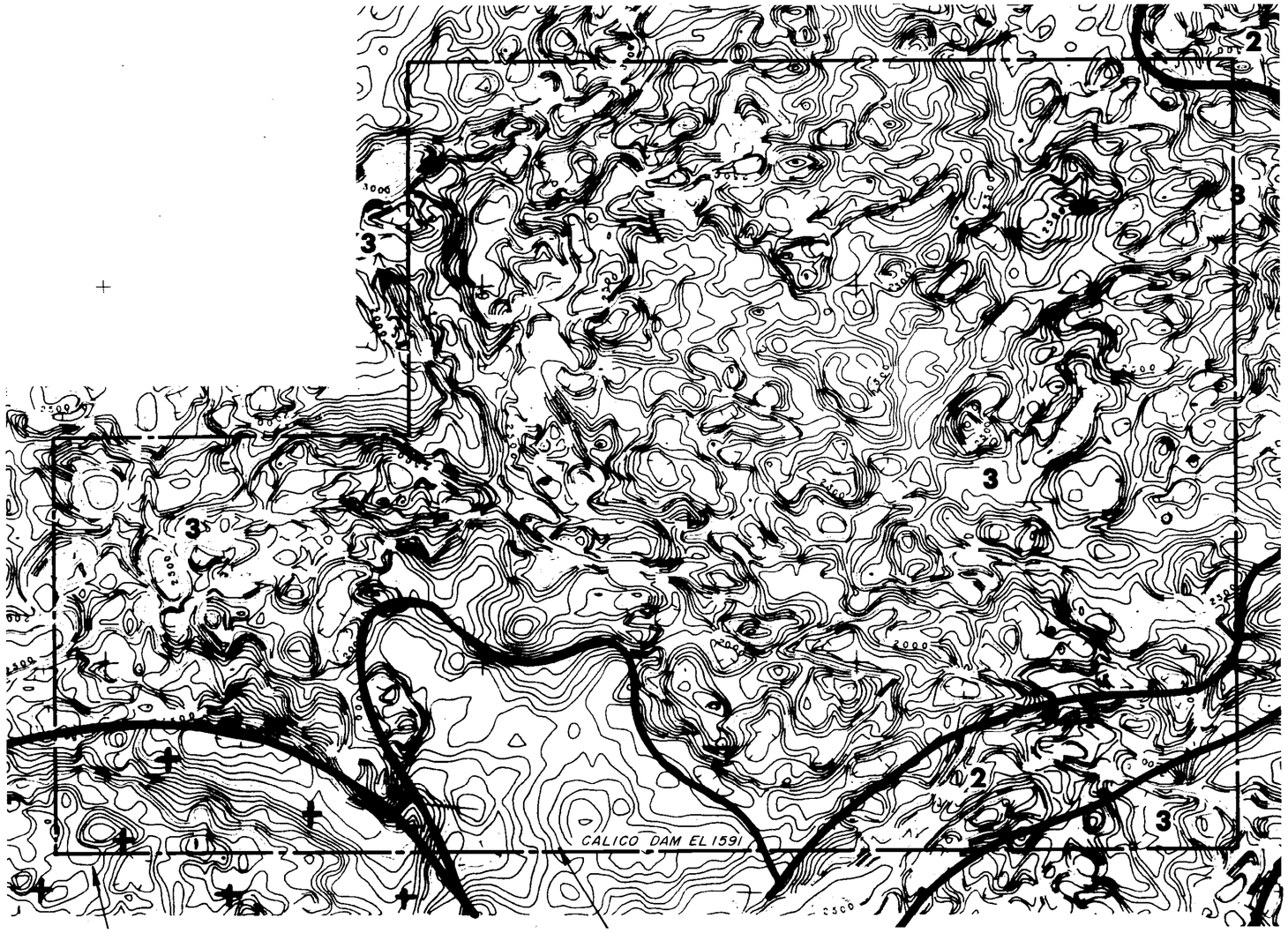
140°17'20"

440 000 E

140°22'20"

6 470 000 N

31°55'



6 460 000 N

32°00"

1989 KALABITY AIRBORNE SURVEY

AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 54
Magnetics : Tie Line Levelled.
IGRF (1985) : Removed. Datum 2000 nT added.
Grid mesh size : 125 x 125 metres.
Contour interval : 25,250,2500 nT.

PRELIMINARY DATA 1 : 50 000

LEGEND

POSSIBLE INCREASE IN METAMORPHIC GRAIN ↑↓

- DOMAIN 0 - No magnetic pattern - Low intensity.
- DOMAIN 1 - More continuous - longer wavelength anomalies (contains upper albite formation)
- DOMAIN T - Transition zone - bland magnetic zone generally between Domains 1 and 3.
- DOMAIN 2 - More disturbed magnetic unit than Domain 1 but still continuous.
- DOMAIN 3 - Disturbed - high frequency anomalies - possibly metamorphic / core of system.
- DOMAIN 4 - More discrete anomalies - not unlike Domain 2.

6 460 000 N

32°00"

430 000 E

140°17'20"

440 000 E

140°22'20"

8200-19

6 460 000 N

32°00"

CRA

CRA EXPLORATION PTY. LIMITED
BROKEN HILL - NEW SOUTH WALES

0 1 2 3 Km

PLAN N° SAb 345
1:250 000 Ref Sheet - Curnamona SH/54-14

PROJECT	KALABITY
AREA	CALICO DAM EL 1591
DATA	MAGNETIC DOMAIN MAP

COMPILED	DATE	DRAWN	SCALE	CRAE REPORT No.
Nick Sheard	October, 1990	Gay L. Holliday	1:50 000	16833

KALABITY EL 1497

CALICO DAM EL 1591

GRANITE ?

CALICO DAM EL 1591

GRANITE (RADIOMETRICS)

CM 1
POTASSIUM / URANIUM HIGH ON GRANITE MARGIN
- ZONE OF ALTERATION. ?

1989 KALABITY AIRBORNE SURVEY EXTENT

ANATECTIC GRANITE
POTENTIAL FOR REMOBILISED MINERALISATION
-USE STRUCTURE TO LOCALISE AREA FOR SEARCH

140°15' 140°28' 140°25' 140°30'

31°52'30" 31°55' 32°00'

6472500 N 6470000 N 6467500 N 6465000 N 6462500 N 6460000 N 6459000 N

435 000E 440 000E 445 000E 450 000E

6473°00 N 6465 000N 6460000N 6459000 N

AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
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THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADAC3 acquisition system Digital to magnetic tape
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m Tie lines 500 m
FLIGHT PATH NAVIGATION :	SYLEDIS ST84 radio navigation system
FLIGHT PATH RECORD :	Real time correction of AMG coordinates from the SYLEDIS ST84 navigation system

RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 54.
Magnetics : Tie Line Levelled.
IGRF (1985) : Removed. Datum 2000 nT added.
Grid mesh size : 25 x 25 metres.
Grid filter : 9 point triangular. 2nT threshold.
Contour Interval : 5,50,500 nT

GRID CONVERGENCE 0.4° — GRID NORTH — MAGNETIC NORTH — MAGNETIC ANGLE 13°

True north, grid north and magnetic north are shown diagrammatically for the centre of the map. Magnetic north is as for 1990 and shows secular variation by 0.1° in each three years.

LEGEND

- MAGNETIC DOMAIN
- AREAS OF INTEREST
- MAGNETIC UNIT BOUNDARY
- FAULTS - MAJOR / MINOR
- CRAE TENEMENT BOUNDARY

LEGEND

POSSIBLE INCREASE IN METAMORPHIC GRADE

- DOMAIN 0 - No magnetic pattern - Low intensity
- DOMAIN 1 - More continuous - longer wavelength anomalies (contains upper albite formation)
- DOMAIN T - Transition zone - blend magnetic zone generally between Domains 1 and 3
- DOMAIN 2 - More disturbed magnetic unit than Domain 1 but still continuous.
- DOMAIN 3 - Disturbed - high frequency anomalies - possibly metamorphic / core of system.
- DOMAIN 4 - More discrete anomalies - not unlike Domain 2.

WALTHERGO 6834-11-NE	DEEP WELL 6934-111-NW/NE	WAUKALOO 6934-111-NW/NE	KALKAROO 7034-111-NW
BILLEROO 6834-11-SE	KOOLKA 6934-111-SW/SE	KALABITY 6934-11-SW/SE	BOOLCOOMATA 7034-111-SW

NOTE : This base has an overlap

PREPARED BY PETER LIVINGS AND ASSOCIATES
2 RAGLAN ROAD, MT LAWLEY, 6050
TELEPHONE 3281088

1:100000 MAP CONTROL SUPPLIED BY AUSLIG

8200-20

CRA EXPLORATION PTY LIMITED

CALICO DAM EL 1591

MAGNETIC INTERPRETATION OF TOTAL MAGNETIC INTENSITY

KALABITY SURVEY 1989

SCALE: 1:25000	1:250 000 REF. SHEET: Curnamona SH/54-14
AUTHOR : NICK SHEARD	DRAWN G.HOLLIDAY | PLAN NO. SAb 346
DATE : OCTOBER, 1990	CRAE REPORT Nº. 16833

CRA EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)
69 RAKOW STREET,
P.O. BOX 683,
BROKEN HILL, NEW SOUTH WALES 2880
AUSTRALIA
A.C.N. 000 067 125

TELEGRAMS: "CRAEX"
TELEPHONE: (080) 88 2536
FAX: (080) 88 3384

IN REPLY PLEASE QUOTE

4 February 1991

Department of Mines and Energy -
South Australia
191 Greenhill Road
PARKSIDE SA 5063

Dear Sir,

Exploration Licence 1591 (Calico Dam)
Expenditure Statement

Please find enclosed CRAE Report No. 17067 titled "Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd January 1991. Olary, South Australia".

Total expenditure on the Licence area by CRAE from 1st October 1990 to 31st December 1990, the nearest accounting period is $2,284.

	EL 1591 Calico Dam
Salaries & Wages	$ 2,866
Supplies	$ 16
Contractors	$ (3,001)
Overheads	$ 2,403
TOTAL	$ 2,284

Total expenditure to date by CRAE is $ 77,596.

This data is supplied in accordance with conditions 111 (a) and (b) of the Authority.

Yours faithfully

R.W. Nelson
Principal Geologist

CRA EXPLORATION PTY. LIMITED
BROKEN HILL
NEW SOUTH WALES

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND JANUARY 1991.
OLARY, SOUTH AUSTRALIA

Author : D.C. Brewster

Date : January, 1991

Submitted to : Chief Geologist - NSW District

Copies to : Department Mines & Energy - S.A.
CRAE - Canberra
CRAE - Sydney
CRAE - Broken Hill
CRAE - Adelaide

Submitted by : Doug Brewster

Accepted by : D. Ryan - Fax 12.2.1991

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CRAE Report No. 17067

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5.	EXPLORATION DURING THE CURRENT REPORTING PERIOD	2
6.	FUTURE WORK PROGRAM	3
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8.	KEYWORDS	3
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APPENDIX I — Processes and Results of Anatexis in a High Grade Regional Metamorphic Domain: The Migmatites and Granitoids of the Olary Block, SA.

LIST OF PLANS

Plan No.	Title	Scale
SAb 151	Kalabity - Calico Dam EL 1591 Location Plan	1:1 000 000
SAb 345	Kalabity - Calico Dam EL 1591 Magnetic Domain Map	1:50 000
SAb 346	Calico Dam EL 1591 Magnetic Interpretation of Total Magnetic Intensity - Kalabity 6934-II-SW/SE - Waukaloo (part) 6934-II-NW/NE	1:25 000

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND JANUARY 1991.
OLARY, SOUTH AUSTRALIA

1. SUMMARY

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July, 1989.

The EL was renewed for a further term of twelve months from the 3rd July 1990.

The application for Calico Dam was made to explore the area for copper, gold and uranium.

Elsewhere in the Olary Block copper mineralisation is associated with iron formation units, while uranium is associated with the granites and the granite-sedimentary sequence contact. Much of the EL is under thin alluvial/colluvial cover.

No exploration has been undertaken during the reporting period.

A future work program involving recovery of radiometric anomalies identified from the airborne survey and reconnaissance stream sediment prospecting is proposed.

2. INTRODUCTION

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July, 1989 for a term of one year with an expenditure commitment of $35,000. The EL was renewed for a further 12 months with a further expenditure commitment of $40,000, i.e., the licence conditions stipulate that a total of $75,000 is required to be spent over the two year period.

To date a total of $75,312 has been spent.

The 148 sq km Licence is located approximately 38km north of Olary in the vicinity of the Kalabity Station Homestead. (Plan SAb 151).

3. GEOLOGY

Mapped geology (Curnamona SH54-14) within the EL consists of early Proterozoic rocks tentatively correlated with the Willyama Supergroup of Broken Hill. Outcrop exists in approximately 40% of the area.

These rocks are:

1. Medium to coarse grained migmatites and gneiss, which are in place anatectic granitoids and pegmatoids.

2. Undifferentiated schists with minor quartzites.

The Willyama Supergroup rocks have been intruded by middle Proterozoic granites.

The remaining 60% of the area is covered by aeolian, alluvial and colluvial material.

4. PREVIOUS EXPLORATION BY CRAE

Exploration carried out by CRAE during the past twelve months is detailed in reports by Nelson (1989 and 1990a & b) and Sheard (1990a & b). A brief summary of this work follows:

- An airborne magnetic and radiometric survey was completed over the entire area as part of a larger survey over the adjacent Kalabity (EL 1497) Licence. The survey was flown on 100m spaced N-S lines with a nominal 60m sensor altitude. Plan SAb 129 shows the location of the survey.

- Interpretation and analysis of the airborne magnetic and radiometric data (Sheard 1990a and 1990b).

5. EXPLORATION DURING THE CURRENT REPORTING PERIOD

No exploration has occurred within this Licence during the current period.

An abstract, dealing with migmatitic and granitic rocks within the licence, was obtained from a University of New England geology Honours student during the course of the reporting period. A copy of this abstract is shown in Appendix I.

6. FUTURE WORK PROGRAM

The following work program is proposed for the Licence.

- Recover and inspect radiometric anomalies identified from the airborne survey.

Perform a reconnaissance regional stream sediment geochemical survey over the Licence with a view to identifying areas for detailed surface geochemical prospecting.

7. REFERENCES

Nelson R.W. 1989 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1989. Olary, South Australia. CRAE Report No. 16093.

Sheard S.N. 1989a Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1990. Olary, South Australia. CRAE Report No. 16352.

Nelson R.N. 1990a Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd April 1990. Olary, South Australia. CRAE Report No. 16475.

Nelson R.N. 1990b Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd July 1990. Olary, South Australia. CRAE Report No. 16622.

Sheard S.N. 1990b Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd October 1990. Olary, South Australia. CRAE Report No. 16833.

8. KEYWORDS

Calico Dam EL 1591, geophys radiometrics, airborne magnetics/ radiometrics.

9. LOCATION

Curnamona SH5414 (1:250,000)

APPENDIX I

Processes and Results of Anatexis in a High Grade Regional Metamorphic Domain: The Migmatites and Granitoids of the Olary Block, SA.

Mr. David Harris
Department of Geology & Geophysics
University of New England, Armidale

DEPARTMENT OF GEOLOGY & GEOPHYSICS

UNIVERSITY OF NEW ENGLAND, ARMIDALE

MR DAVID HARRIS —

Processes and results of anatexis in a high grade regional metamorphic domain: the migmatites and granitoids of the Olary Block, SA

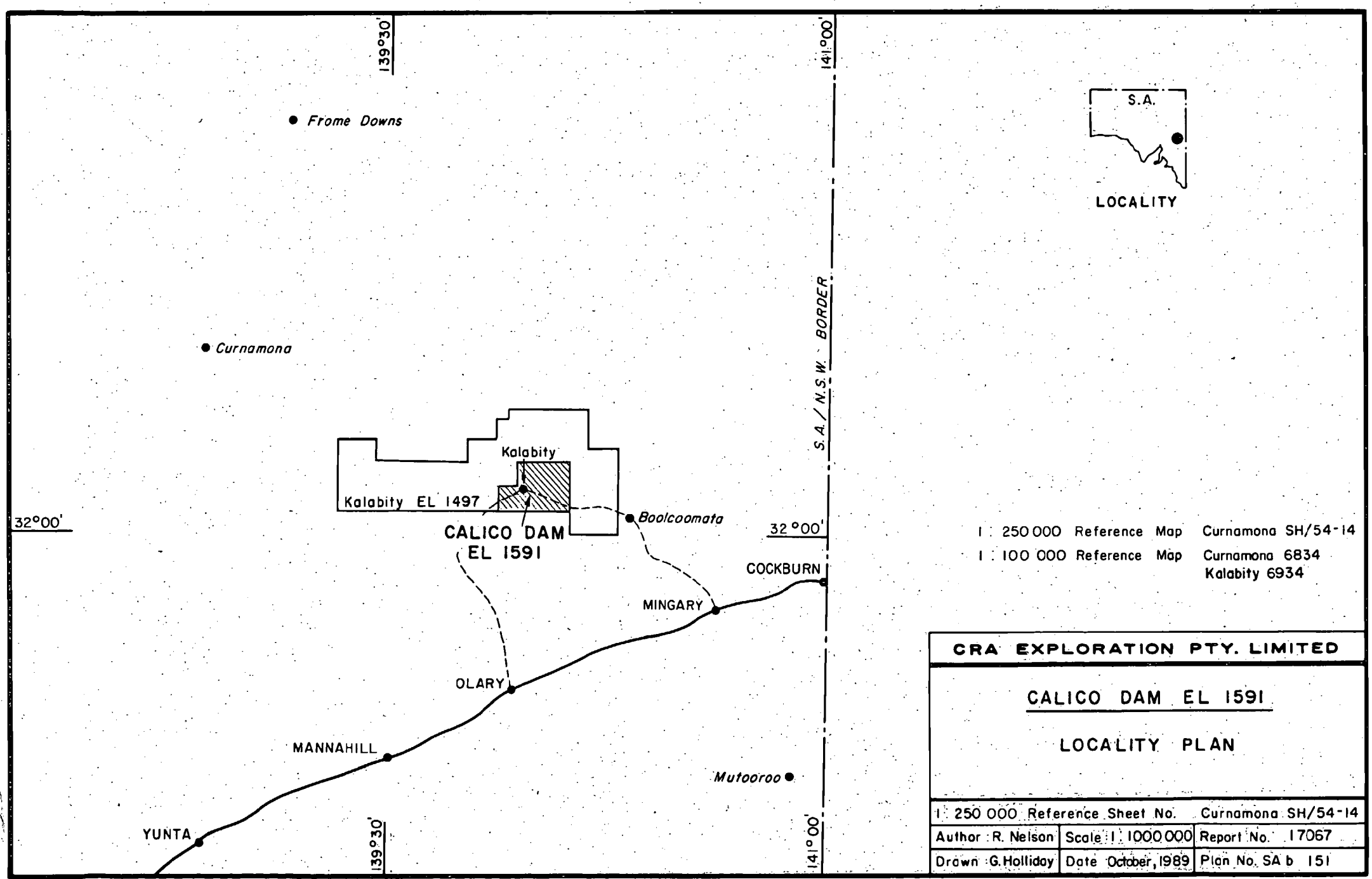
The Olary Block forms the western, or South Australian portion of the Willyama Supergroup and is closely associated with the Broken Hill Block of New South Wales. The geology consists of high grade metasediments and associated anatectic granitoids.

Minor mineralisation occurs in the Bimba Suite towards the north of the field area. It takes the form of Fe-Cu-rich pelites and rare marbles. The mineralisation is thought to be a stratiform Cu-type, because of its disseminated nature, widespread occurrence, and compatibility with the proposed evaporitic setting for the Calcsilicate and Bimba Suites.

Metamorphism in the region grades from lower amphibolite facies in the north to upper amphibolite facies in the south. As the grade has increased so has the occurrence of partial melting. In some areas transitions in grade are too large to be considered the result of thermal gradients and are believed to be the result of regional block tilting, faulting or of granitic emplacement.

The initial result of the anatexis caused by the low pressure, high temperature metamorphism is stromatic migmatites, with alternating bands of leucosome and mesosome, melanosome being relatively rare. Mass balance equations have shown that the system was closed during melting with the exception of Na, and anatexis is favoured as the mechanism because of minimum melt compositions of the leucosome. With increasing grade and melt percentage the migmatites lose consistency and form schlieren migmatites.

The final product of anatexis are the syn-tectonic, S-type granitoids of the area which are the result of melting of pelitic and psammopelitic metasediments. These granitoids have intruded through the migmatites and are probably the result of a later melting episode which occurred towards the end of the orogeny responsible for the metamorphism of the entire Olary Block.



1 : 250 000 Reference Map Curnamona SH/54-14

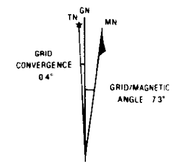
1 : 100 000 Reference Map Curnamona 6834
Kalabity 6934

CRA EXPLORATION PTY. LIMITED

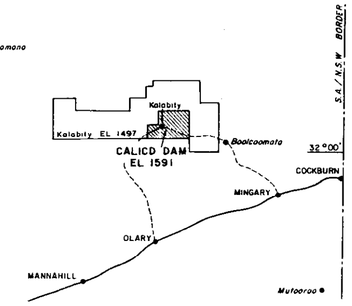
CALICO DAM EL 1591

LOCALITY PLAN

1 : 250 000 Reference Sheet No.		Curnamona SH/54-14
Author R. Nelson	Scale 1 : 1000 000	Report No. 17067
Drawn G. Holliday	Date October, 1989	Plan No. SA b 151



True north, grid north and magnetic north are shown diagrammatically for the centre of the map. Magnetic north is correct for 1983 and moves easterly by 0.1° in about three years



LOCALITY PLAN

430 000 E

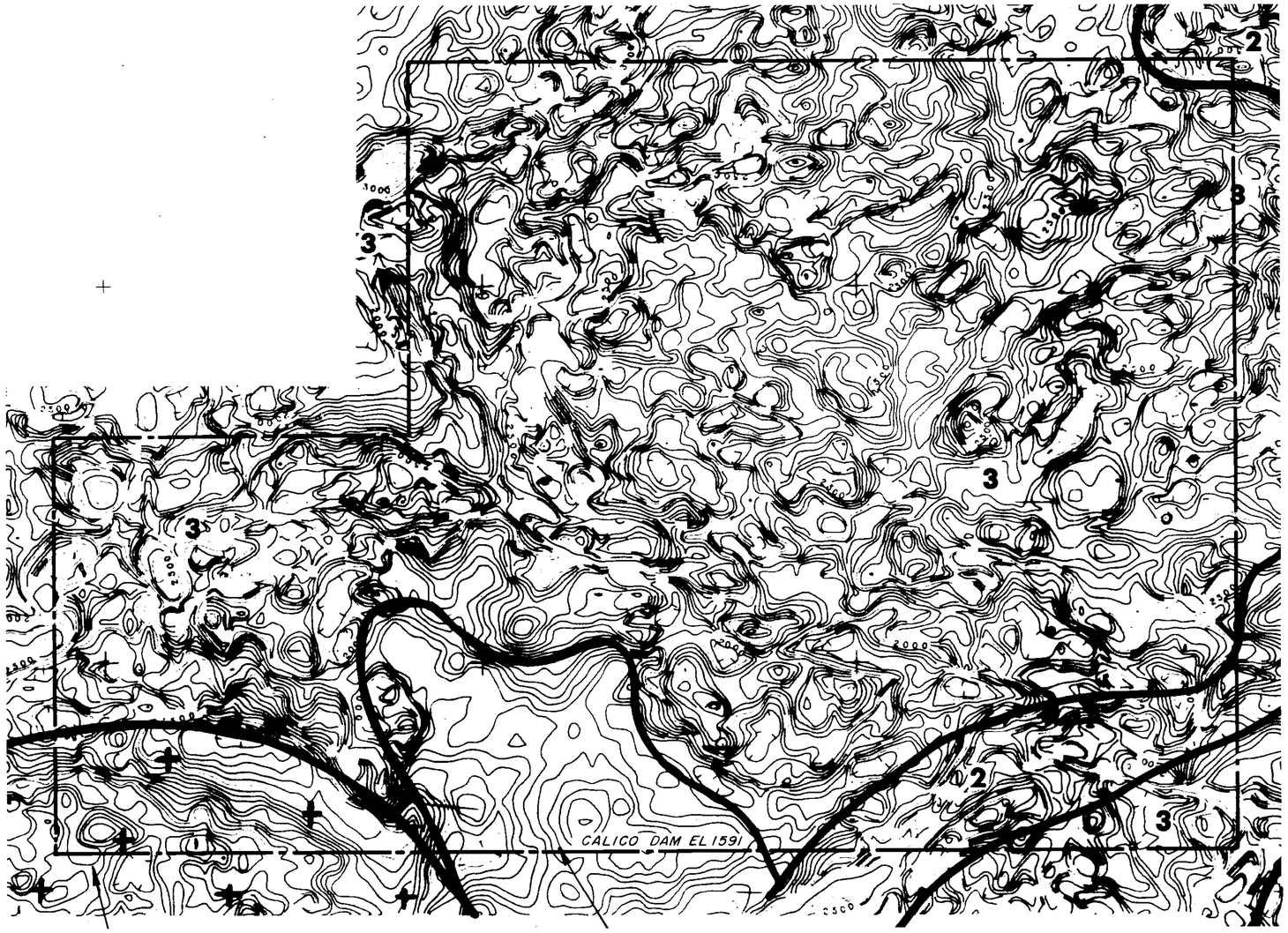
140°17'20"

440 000 E

140°22'20"

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6 460 000 N

32°00"

1989 KALABITY AIRBORNE SURVEY

AIRBORNE SURVEY SPECIFICATIONS

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SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
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POTASSIUM WINDOW :	1.36 - 1.56 MeV
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FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

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IGRF (1985) : Removed. Datum 2000 nT added.
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Contour interval : 25,250,2500 nT.

PRELIMINARY DATA 1 : 50 000

LEGEND

POSSIBLE INCREASE IN METAMORPHIC GRAIN ↑↓

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- DOMAIN 1 - More continuous - longer wavelength anomalies (contains upper albite formation)
- DOMAIN T - Transition zone - bland magnetic zone generally between Domains 1 and 3.
- DOMAIN 2 - More disturbed magnetic unit than Domain 1 but still continuous.
- DOMAIN 3 - Disturbed - high frequency anomalies - possibly metamorphic / core of system.
- DOMAIN 4 - More discrete anomalies - not unlike Domain 2.

6 460 000 N

32°00"

430 000 E

140°17'20"

440 000 E

140°22'20"

8200-19

6 460 000 N

32°00"

CRA

CRA EXPLORATION PTY. LIMITED
BROKEN HILL - NEW SOUTH WALES

0 1 2 3 Km

PLAN N° SAb 345
1:250 000 Ref Sheet - Curnamona SH/54-14

PROJECT	KALABITY
AREA	CALICO DAM EL 1591
DATA	MAGNETIC DOMAIN MAP

COMPILED	DATE	DRAWN	SCALE	CRAE REPORT No.
Nick Sheard	October, 1990	Gay L. Holliday	1:50 000	16833

KALABITY EL 1497

CALICO DAM EL 1591

GRANITE ?

CALICO DAM EL 1591

GRANITE (RADIOMETRICS)

CM 1
POTASSIUM / URANIUM HIGH ON GRANITE MARGIN
- ZONE OF ALTERATION. ?

1989 KALABITY AIRBORNE SURVEY EXTENT

ANATECTIC GRANITE
POTENTIAL FOR REMOBILISED MINERALISATION
-USE STRUCTURE TO LOCALISE AREA FOR SEARCH

140°15' 140°28' 140°25' 140°30'

31°52'30" 31°55' 32°00'

6472500 N 6470000 N 6467500 N 6465000 N 6462500 N 6460000 N 6459000 N

435 000E 440 000E 445 000E 450 000E

6473°00 N 6465 000N 6460000N 6459000 N

AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADAC3 acquisition system Digital to magnetic tape
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m Tie lines 500 m
FLIGHT PATH NAVIGATION :	SYLEDIS ST84 radio navigation system
FLIGHT PATH RECORD :	Real time correction of AMG coordinates from the SYLEDIS ST84 navigation system

RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 54.
Magnetics : Tie Line Levelled.
IGRF (1985) : Removed. Datum 2000 nT added.
Grid mesh size : 25 x 25 metres.
Grid filter : 9 point triangular. 2nT threshold.
Contour Interval : 5,50,500 nT

GRID CONVERGENCE 0.4° — GRID NORTH — MAGNETIC NORTH — MAGNETIC ANGLE 13°

True north, grid north and magnetic north are shown diagrammatically for the centre of the map. Magnetic north is as for 1990 and shows secular variation by 0.1° in each three years.

LEGEND

- MAGNETIC DOMAIN
- AREAS OF INTEREST
- MAGNETIC UNIT BOUNDARY
- FAULTS - MAJOR / MINOR
- CRAE TENEMENT BOUNDARY

LEGEND

POSSIBLE INCREASE IN METAMORPHIC GRADE

- DOMAIN 0 - No magnetic pattern - Low intensity
- DOMAIN 1 - More continuous - longer wavelength anomalies (contains upper albite formation)
- DOMAIN T - Transition zone - blend magnetic zone generally between Domains 1 and 3
- DOMAIN 2 - More disturbed magnetic unit than Domain 1 but still continuous.
- DOMAIN 3 - Disturbed - high frequency anomalies - possibly metamorphic / core of system.
- DOMAIN 4 - More discrete anomalies - not unlike Domain 2.

WALTHERGO 6834-11-NE	DEEP WELL 6934-111-NW/NE	WAUKALOO 6934-111-NW/NE	KALKAROO 7034-111-NW
BILLEROO 6834-11-SE	KOOLKA 6934-111-SW/SE	KALABITY 6934-11-SW/SE	BOOLCOOMATA 7034-111-SW

NOTE : This base has an overlap

PREPARED BY PETER LIVINGS AND ASSOCIATES
2 RAGLAN ROAD, MT LAWLEY, 6050
TELEPHONE 3281088

1:100000 MAP CONTROL SUPPLIED BY AUSLIG

8200-20

CRA EXPLORATION PTY LIMITED

CALICO DAM EL 1591

MAGNETIC INTERPRETATION OF TOTAL MAGNETIC INTENSITY

KALABITY SURVEY 1989

SCALE: 1:25000	1:250 000 REF. SHEET: Curnamona SH/54-14
AUTHOR : NICK SHEARD	DRAWN G.HOLLIDAY | PLAN NO. SAb 346
DATE : OCTOBER, 1990	CRAE REPORT Nº. 16833

CRA EXPLORATION PTY. LIMITED
BROKEN HILL
NEW SOUTH WALES

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND APRIL 1991.
OLARY, SOUTH AUSTRALIA

Author : D.C. Brewster

Date : April, 1991

Submitted to : Chief Geologist - NSW District

Copies to : Department Mines & Energy - S.A.
CRAE - Canberra
CRAE - Sydney
CRAE - Broken Hill
CRAE - Adelaide

Submitted by : Doug Brewster

Accepted by : Jan Dirk

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CRAE Report No. 17227

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6.	FUTURE WORK PROGRAM	3
7.	REFERENCES	3
8.	KEYWORDS	3
9.	LOCATION	3

LIST OF PLANS

Plan No.	Title	Scale
SAb 151	Kalabity - Calico Dam EL 1591 Location Plan	1:1 000 000
SAb 129	Kalabity - Calico Dam EL 1591 Simplified Flight Lines	1:250 000

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND APRIL 1991.
OLARY, SOUTH AUSTRALIA

1. SUMMARY

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July 1989.

The EL was renewed for a further term of twelve months from 3rd July 1990.

The application for Calico Dam was made to explore the area for copper, gold and uranium.

Elsewhere in the Olary Block copper mineralisation is associated with iron formation units, while uranium is associated with the granites and the granite-sedimentary sequence contact. Much of the EL is under thin alluvial/colluvial cover.

Exploration during the reporting period consisted of:

- Ground checking of geological mapping within the tenement by Honours Student (David Harris).

- Compilation of geology onto company plans are in progress.

A future work program involving recovery of radiometric anomalies identified from the airborne survey and reconnaissance stream sediment prospecting is proposed.

2. INTRODUCTION

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July 1989 for a term of one year with an expenditure commitment of $35,000. The EL was renewed for a further 12 months with a further expenditure commitment of $40,000, i.e., the licence conditions stipulate that a total of $75,000 is required to be spent over the two year period.

To date a total of $86,436 has been spent.

The 148 sq km Licence is located approximately 38 km north of Olary in the vicinity of the Kalabity Station Homestead. (Plan SAb 151).

3. GEOLOGY

Mapped geology (Curnamona SH54-14) within the EL consists of early Proterozoic rocks tentatively correlated with the Willyama Supergroup of Broken Hill. Outcrop exists in approximately 40% of the area.

These rocks are:

1. Medium to coarse grained migmatites and gneiss, which are in place anatectic granitoids and pegmatoids.

2. Undifferentiated schists with minor quartzites.

The Willyama Supergroup rocks have been intruded by middle Proterozoic granites.

The remaining 60% of the area is covered by aeolian, alluvial and colluvial material.

4. PREVIOUS EXPLORATION BY CRAE

Exploration carried out by CRAE during the past twelve months is detailed in reports by Nelson (1989 and 1990a & b) and Sheard (1990a & b). A brief summary of this work follows:

- An airborne magnetic and radiometric survey was completed over the entire area as part of a larger survey over the adjacent Kalabity (EL 1497) Licence. The survey was flown on 100m spaced N-S lines with a nominal 60m sensor altitude. Plan SAb 129 shows the location of the survey.

- Interpretation and analysis of the airborne magnetic and radiometric data (Sheard 1990a and 1990b).

- Support on Geology Honours students mapping in the area.

5. EXPLORATION DURING THE CURRENT REPORTING PERIOD

Work during the current period consisted of:

- Ground checking of geological mapping within the tenement by Honours Student (David Harris).

- Compilation of geology onto company plans are in progress.

6. FUTURE WORK PROGRAM

The following work program is proposed for the Licence.

- Recover and inspect radiometric anomalies identified from the airborne survey.
- Perform a reconnaissance regional stream sediment geochemical survey over the Licence with a view to identifying areas for detailed surface geochemical prospecting.

7. REFERENCES

Nelson R.W. 1989 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1989. Olary, South Australia. CRAE Report No. 16093.

Sheard S.N. 1989a Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1990. Olary, South Australia. CRAE Report No. 16352.

Nelson R.W. 1990a Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd April 1990. Olary, South Australia. CRAE Report No. 16475.

Sheard S.N. 1990b Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1990. Olary, South Australia. CRAE Report No. 16833.

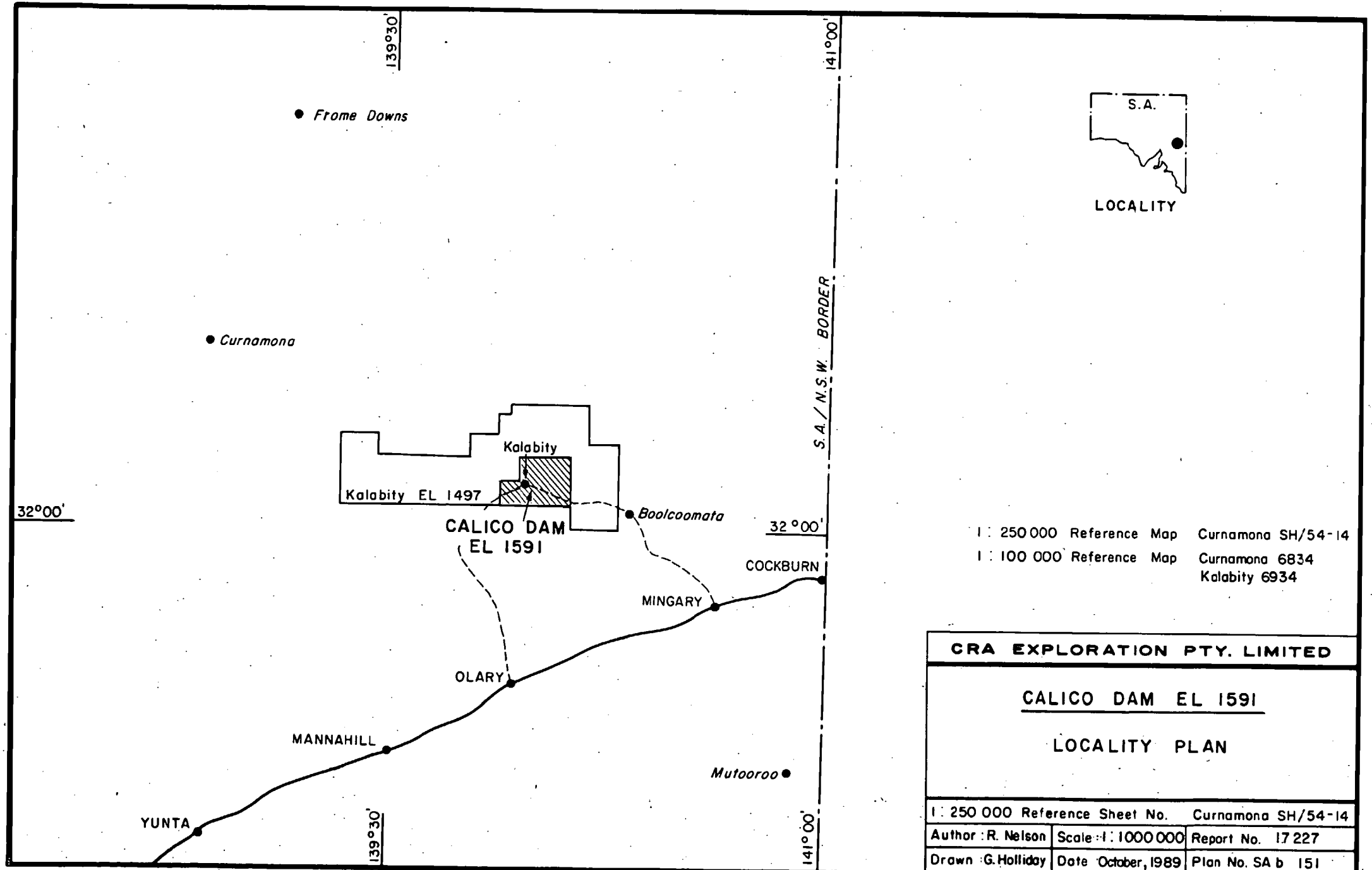
Brewster D.C. 1991 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1991. Olary, South Australia. CRAE Report No.17067.

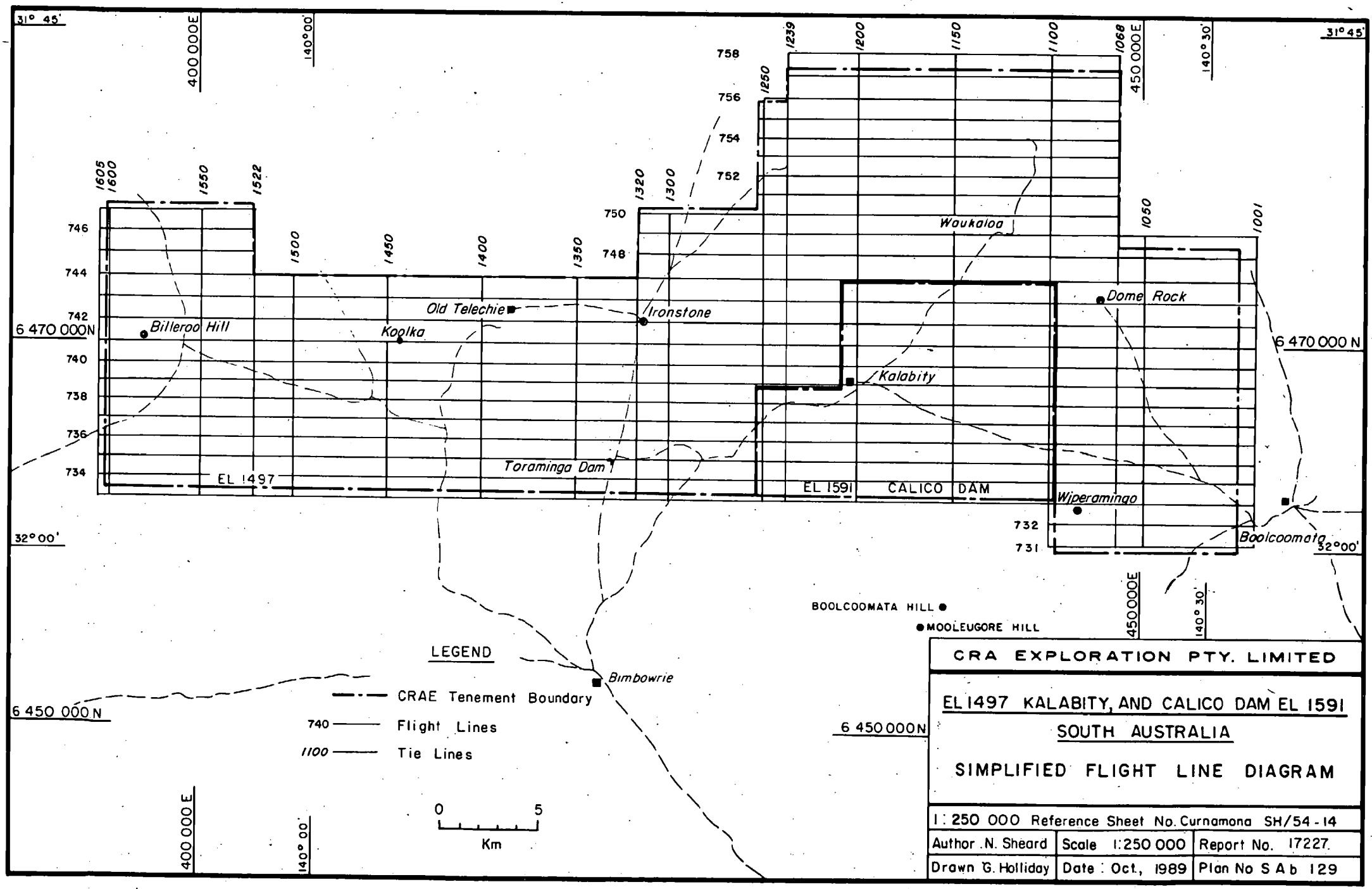
8. KEYWORDS

Calico Dam EL 1591, geophys radiometrics, airborne magnetics/ radiometrics.

9. LOCATION

Curnamona SH5414 (1:250,000)


139°30'
141°00'
Frome Downs
Curnamona
Kalabity
Kalabity EL 1497
CALICO DAM
EL 1591
Boolcoomata
32°00'
32°00'
S.A. / N.S.W. BORDER
COCKBURN
MINGARY
OLARY
MANNAHILL
YUNTA
Mutooroo
139°30'
141°00'
S.A.
LOCALITY
1 : 250 000 Reference Map Curnamona SH/54-14
1 : 100 000 Reference Map Curnamona 6834
Kalabity 6934
CRA EXPLORATION PTY. LIMITED
CALICO DAM EL 1591
LOCALITY PLAN
1 : 250 000 Reference Sheet No. Curnamona SH/54-14
Author : R. Nelson
Scale : 1 : 1000 000
Report No. 17227
Drawn : G. Holliday
Date October, 1989
Plan No. SA b 151



CRA EXPLORATION PTY. LIMITED

EL 1497 KALABITY, AND CALICO DAM EL 1591
SOUTH AUSTRALIA
SIMPLIFIED FLIGHT LINE DIAGRAM

1 : 250 000 Reference Sheet No. Curnamona SH/54 - 14		
Author N. Sheard	Scale 1:250 000	Report No. 17227.
Drawn G. Holliday	Date : Oct., 1989	Plan No S A b 129

CRA EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)
69 RAKOW STREET, A.C.N. 000 057 125
P.O. BOX 683,
BROKEN HILL, NEW SOUTH WALES 2880
AUSTRALIA

TELEGRAMS: "CRAEX"
TELEPHONE: (080) 88 2536
FAX: (080) 88 3384

IN REPLY PLEASE QUOTE

2 July 1991

Department of Mines and Energy -
South Australia
191 Greenhill Road
PARKSIDE SA 5063

Dear Sir,

Exploration Licence 1591 (Calico Dam)
Expenditure Statement

Please find enclosed CRAE Report No. 17371 titled "Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd July 1991. Olary, South Australia".

Total expenditure on the Licence area by CRAE from 1st April 1991 to 30th June 1991, the nearest accounting period is $7,335.

	EL 1591 Calico Dam
Contractors & Professionals	$ 397
Salaries & Wages	$ 5,362
Field Supplies & Vehicles	$ 1,077
Overheads	$ 499
TOTAL	$ 7,335

Total expenditure to date by CRAE is $93,771.

This data is supplied in accordance with conditions 111 (a) and (b) of the Authority.

Yours faithfully

R.W. Nelson
Principal Geologist

CRA EXPLORATION PTY. LIMITED
BROKEN HILL
NEW SOUTH WALES

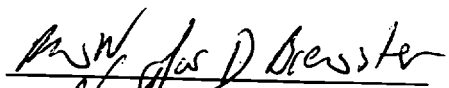
EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND JULY 1991.
OLARY, SOUTH AUSTRALIA

Author : D.C. Brewster

Date : July, 1991

Submitted to : Chief Geologist - NSW District

Copies to : Department Mines & Energy - S.A.
CRAE - Canberra
CRAE - Sydney
CRAE - Broken Hill
CRAE - Adelaide

Submitted by : 

Accepted by : 

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CRAE Report No. 17371

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7.	REFERENCES	3
8.	KEYWORDS	3
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LIST OF PLANS

Plan No.	Title	Scale
SAb 151	Kalabity - Calico Dam EL 1591 Location Plan	1:1 000 000
SAb 129	Kalabity - Calico Dam EL 1591 Simplified Flight Lines	1:250 000

CRA EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)
A.C.N. 000 057 125
69 RAKOW STREET,
P.O. BOX 683,
BROKEN HILL, NEW SOUTH WALES 2880
AUSTRALIA

TELEGRAMS: "CRAEX"
TELEPHONE: (080) 88 2536
FAX: (080) 88 3384

IN REPLY PLEASE QUOTE

14 October 1991

SA Department of Mineral Resources
191 Greenhill Road
PARKSIDE SA 5063

Dear Sir,

Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd October 1991. Olary, South Australia

Please find enclosed CRAE Report No. 17596 titled as above.

Total expenditure on the Licence area by CRAE from 1st July 1991 to 30th September 1991, the nearest accounting period is $9,074.

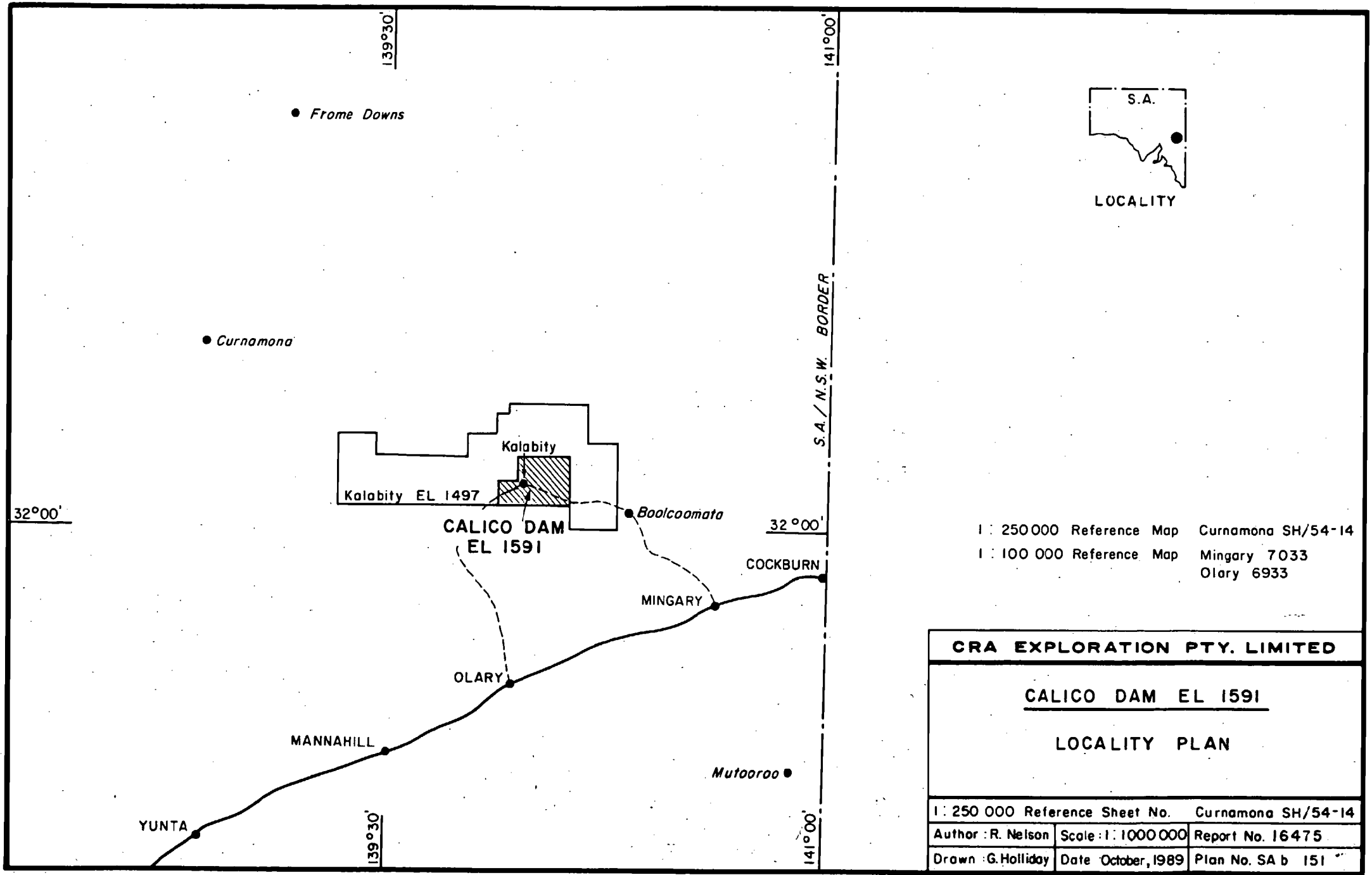
	EL 1591 CALICO DAM
Tenements	$ 385
Contractors & Professionals	$ 1,104
Salaries & Wages	$ 4,766
Field Supplies & Vehicles	$ 664
Office & Miscellaneous	$ 1,660
Rent & Property	$ 221
Computer Services	$ 274
TOTAL	$ 9,074

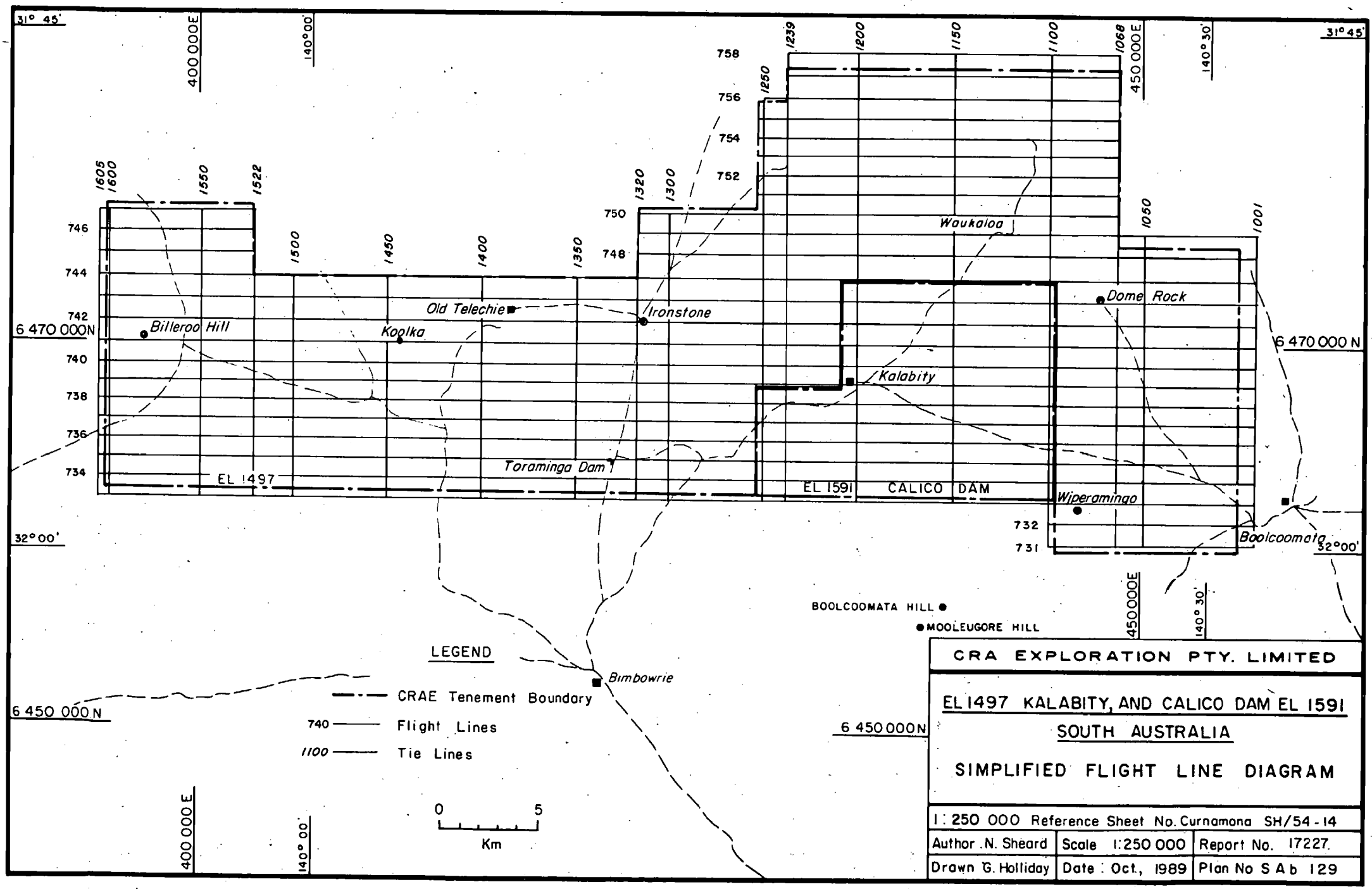
The total expenditure by CRAE to date is $102,845.

Yours faithfully

R. K. Sanderson for

Rick Nelson
Principal Geologist


139°30'
141°00'
Frome Downs
Curnamona
S.A./N.S.W. BORDER
Kalabity
Kalabity EL 1497
CALICO DAM
EL 1591
Boolcoomata
32°00'
32°00'
COCKBURN
MINGARY
OLARY
MANNAHILL
YUNTA
Mutooroo
139°30'
141°00'
S.A.
LOCALITY
1 : 250000 Reference Map Curnamona SH/54-14
1 : 100 000 Reference Map Mingary 7033
Olary 6933
CRA EXPLORATION PTY. LIMITED
CALICO DAM EL 1591
LOCALITY PLAN
1 : 250 000 Reference Sheet No. Curnamona SH/54-14
Author : R. Nelson
Scale : 1 : 1000 000
Report No. 16475
Drawn : G. Holliday
Date October, 1989
Plan No. SA b 151



CRA EXPLORATION PTY. LIMITED

EL 1497 KALABITY, AND CALICO DAM EL 1591
SOUTH AUSTRALIA
SIMPLIFIED FLIGHT LINE DIAGRAM

1 : 250 000 Reference Sheet No. Curnamona SH/54 - 14		
Author N. Sheard	Scale 1:250 000	Report No. 17227.
Drawn G. Holliday	Date : Oct., 1989	Plan No S A b 129

CRA EXPLORATION PTY. LIMITED
BROKEN HILL
NEW SOUTH WALES

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND OCTOBER 1991.
OLARY, SOUTH AUSTRALIA

Author : M.B. Humphries

Date : October 1991

Submitted to : Chief Geologist - NSW District

Copies to : Department Mines & Energy - S.A.
CRAE - Canberra
CRAE - Sydney
CRAE - Broken Hill
CRAE - Adelaide

Submitted by : M B Humphries

Accepted by : M W for DMR

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CRAE Report No. 17596

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7.	REFERENCES	3
8.	KEYWORDS	4
9.	LOCATION	4

LIST OF PLANS

Plan No.	Title	Scale
SAb 151	Kalabity - Calico Dam EL 1591 Location Plan	1:1 000 000
SAb 534	Kalabity - Calico Dam EL 1591 - CEC Rock Chip Samples, Locations and Results	1:25 000

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND OCTOBER 1991.
OLARY, SOUTH AUSTRALIA

1. SUMMARY

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July 1989.

The EL was renewed for a further term of twelve months from 3rd July 1990.

The application for Calico Dam was made to explore the area for copper, gold and uranium.

Elsewhere in the Olary Block copper mineralisation is associated with iron formation units, while uranium is associated with the granites and the granite-sedimentary sequence contact. Much of the EL is under thin alluvial/colluvial cover.

Exploration during the reporting period consisted of:

- Standardisation of geochemical data recovered from CEC and compilation onto company plans.
- Preliminary rock chip sampling to confirm geochemical anomalies obtained by CEC (in progress).
- Ground checking of geological mapping within the tenement by Honours Student (David Harris), and compilation onto company plans (in progress).

Rock chip sampling and ground checking will continue and future work will involve recovery of radiometric anomalies from the airborne survey.

2. INTRODUCTION

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July 1989 for a term of one year with an expenditure commitment of $35,000. The EL was renewed for a further 12 months with a further expenditure commitment of $40,000, i.e., the licence conditions stipulate that a total of $75,000 is required to be spent over the two year period.

To date a total of $102,845 has been spent.

The 148 sq km Licence is located approximately 38 km north of Olary in the vicinity of the Kalabity Station Homestead. (Plan SAb 151).

3. GEOLOGY

Mapped geology (Curnamona SH54-14) within the EL consists of early Proterozoic rocks tentatively correlated with the Willyama Supergroup of Broken Hill. Outcrop exists in approximately 40% of the area.

These rocks are:

1. Medium to coarse grained migmatites and gneiss, which are in place anatectic granitoids and pegmatoids.

2. Undifferentiated schists with minor quartzites.

The Willyama Supergroup rocks have been intruded by middle Proterozoic granites.

The remaining 60% of the area is covered by aeolian, alluvial and colluvial material.

4. PREVIOUS EXPLORATION BY CRAE

Exploration conducted over EL 1591 (Calico Dam) by CRAE is detailed in reports by Nelson (1989 and 1990a & b), Sheard (1990a & b) and Brewster (1991a, b & c). A brief summary of this work follows:

- An airborne magnetic and radiometric survey was completed over the entire area as part of a larger survey over the adjacent Kalabity (EL 1497) Licence. The survey was flown on 100m spaced N-S lines with a nominal 60m sensor altitude. Plan SAb 129 shows the location of the survey.

- Interpretation and analysis of the airborne magnetic and radiometric data (Sheard 1990a and 1990b).

- Support on Geology Honours students mapping in the area.

5. EXPLORATION DURING THE CURRENT REPORTING PERIOD

Results for 130 rock chip samples taken from within EL 1591 (Calico Dam) have been recovered from CEC. This data has been reviewed and standardised onto CRAE's 1:25 000 topographic base sheets (Plan SAb 534).

"Bimba Ironstones" exposed in the hills immediately south west of Kalabity homestead contain anomalous copper values of up to 2.05% Cu. Preliminary rock chip sampling and ground checking of geological maps in the vicinity of this area is currently in progress.

Copper anomalies were also noted from samples 422037, 422040 located at 441540E, 6469700N and 439500E, 6465360N respectively. These samples are roughly coincident with major structures interpreted from airborne magnetics and additional ground checking and sampling will be undertaken.

No results from the preliminary sampling program at Calico Dam have been received, hence details will be forwarded in the next statutory report.

6. FUTURE WORK PROGRAM

The following work program is proposed for the Licence.

- Continuation of the rock chip/ground checking program to follow up on areas of anomalous Cu geochemistry identified from CEC data.
- Recover and inspect radiometric anomalies identified from the airborne survey.

7. REFERENCES

Nelson R.W. 1989 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1989. Olary, South Australia. CRAE Report No. 16093.

Sheard S.N. 1989a Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1990. Olary, South Australia. CRAE Report No. 16352.

Nelson R.W. 1990a Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd April 1990. Olary, South Australia. CRAE Report No. 16475.

Sheard S.N. 1990b Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1990. Olary, South Australia. CRAE Report No. 16833.

Brewster D.C. 1991a Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1991. Olary, South Australia. CRAE Report No.17067.

Brewster D.C. 1991b Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd April 1991. Olary, South Australia. CRAE Report No. 16067.

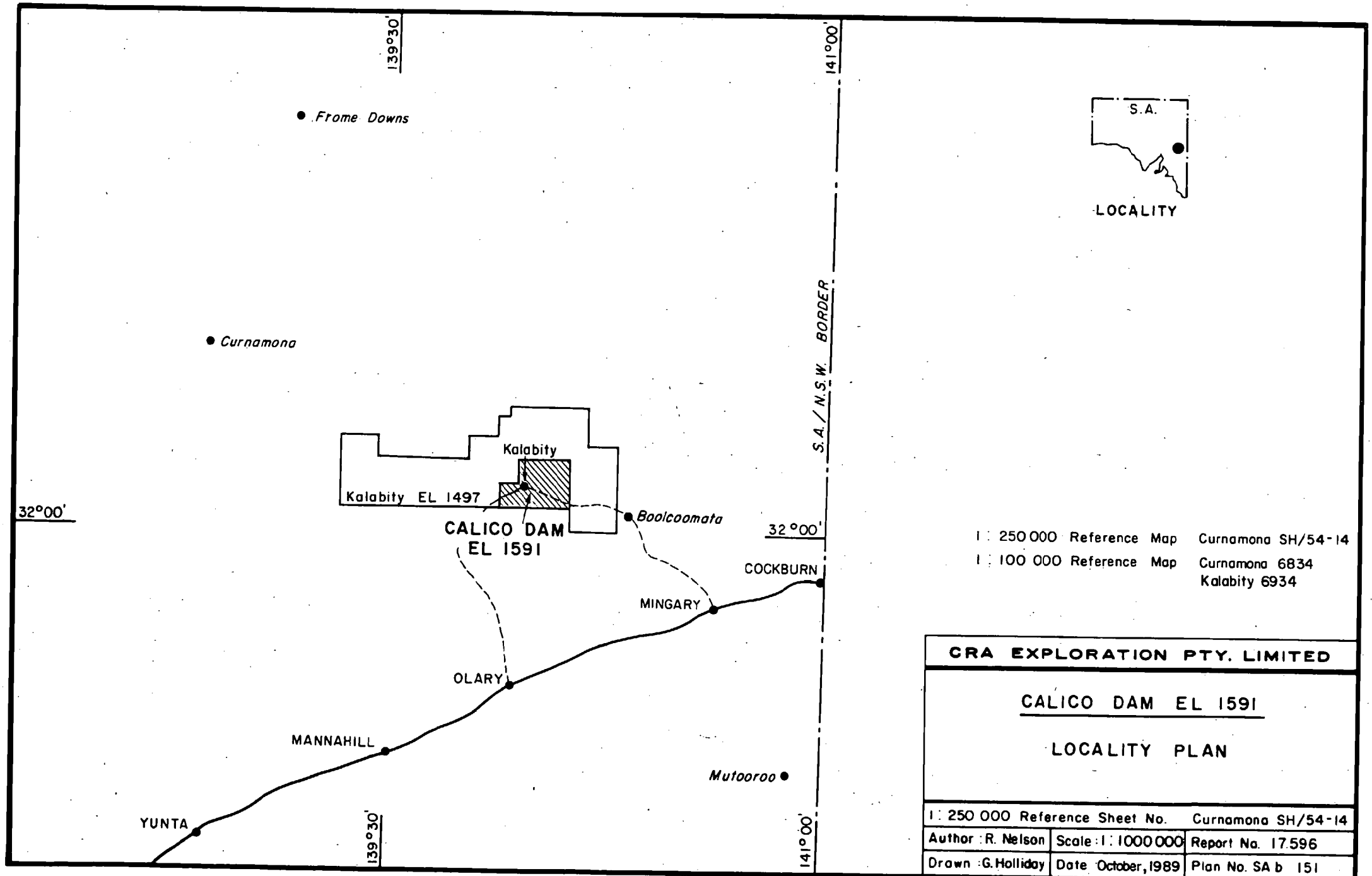
Brewster D.C. 1991c Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd July 1991. Olary, South Australia. CRAE Report 17371.

8. KEYWORDS

Calico Dam EL 1591, geophys radiometrics, airborne magnetics/ radiometrics.

9. LOCATION

Curnamona SH5414 (1:250,000)


139°30'
141°00'
Frome Downs
Curnamona
S.A./N.S.W. BORDER
S.A.
LOCALITY
Kalabity
Kalabity EL 1497
CALICO DAM
EL 1591
Boolcoomata
32°00'
32°00'
COCKBURN
MINGARY
OLARY
MANNAHILL
YUNTA
Mutooroo
139°30'
141°00'
1 : 250 000 Reference Map Curnamona SH/54-14
1 : 100 000 Reference Map Curnamona 6834
Kalabity 6934
CRA EXPLORATION PTY. LIMITED
CALICO DAM EL 1591
LOCALITY PLAN
1 : 250 000 Reference Sheet No. Curnamona SH/54-14
Author : R. Nelson
Scale : 1 : 1000 000
Report No. 17.596
Drawn : G. Holliday
Date : October, 1989
Plan No. SA b 151

140°15'
140°20'
140°25'
430 000E
435 000E
440 000E
6 470 000 N
6 465 000 N
31°55'

GRID CONVERGENCE 0.4
GRID MAGNETIC ANGLE 7.3°

True north, grid north and magnetic north are shown diagrammatically for the centre of the map. Magnetic north is correct for 1983 and moves eastward by 0.1° in about three years.

Waukaloo 6934-II-NW/NE
Kalabity 6934-II-SW/SE

POOTHARINGLA DAM
KALABITY
KALABITY AUXILIARY DAM
BOOLCOOMATA DAM
CALICO DAM EL 1591

QS 10860 20,2,5,6
QS 10861 10,<2,32,12
QS 12269 2,<2,<5,5
QS 12270 8,5,55,5
QS 12284 18,2,230,16
QS 12293 22,<2,60,3
QS 12286 110,33,35,3
QS 13975 422060 5,5,-,-
422050 12,5,-,-
QS 12277 5,15,20,<3
423178 15,12,-,-
423077 25,5,-,-
423076 15,8,-,-
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15,30,-,-
423563
423553 15,35,-,-
423581 12,45,-,-
423582 5,10,-,-

8200-23

ACN No 000 057 125

LEGEND

- CRAE TENEMENT BOUNDARY
- X 423583 ROCKCHIP SAMPLE N° & LOCATION
- 20,30,-,- ANALYSES : Cu, Zn, Co, Mo
- * QS 15389 THIN SECTION LOCATION

1 : 25 000 Reference Sheet : - KALABITY 6934-II-SW/SE
1 : 100 000 Reference Sheet : - CURNAMONA 6834, KALABITY 6934

TOPOGRAPHIC BASE :-

PREPARED BY PETER LIVINGS AND ASSOCIATES
2 RAGLAN ROAD, MT LAWLEY, 6050
TELEPHONE : 3287088.

1:100000 MAP CONTROL SUPPLIED BY AUSLIG

CRA

CRA EXPLORATION PTY. LIMITED
BROKEN HILL - NEW SOUTH WALES

0 500 1000 1500 Metres — PLAN N° SAb 534 — 1:250 000 Ref. Sheet - Curn.SH/54-14

PROJECT	KALABITY. S.A.
AREA	CALICO DAM EL 1591
DATA	CEC EXPLORATION ROCK CHIP SAMPLES, LOCATIONS AND RESULTS.

COMPILED	DATE	DRAWN	SCALE	CRAE REPORT No.
Michael B Humphries	November, 1991	Gay L Holliday	1:25 000	17596

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND OCTOBER 1991.
OLARY, SOUTH AUSTRALIA

1. SUMMARY

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July 1989.

The EL was renewed for a further term of twelve months from 3rd July 1990.

The application for Calico Dam was made to explore the area for copper, gold and uranium.

Elsewhere in the Olary Block copper mineralisation is associated with iron formation units, while uranium is associated with the granites and the granite-sedimentary sequence contact. Much of the EL is under thin alluvial/colluvial cover.

Exploration during the reporting period consisted of preliminary ground checking of anomalies identified from CEC geochemical data.

A program of ground checking and rock chip sampling will continue in 1992.

2. INTRODUCTION

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July 1989 for a term of one year with an expenditure commitment of $35,000. The EL was renewed for a further 12 months with a further expenditure commitment of $40,000, i.e., the licence conditions stipulate that a total of $75,000 is required to be spent over the two year period.

To date a total of $113,596 has been spent.

The 148 sq km Licence is located approximately 38 km north of Olary in the vicinity of the Kalabity Station Homestead. (Plan SAb 151).

3. GEOLOGY

Mapped geology (Curnamona SH54-14) within the EL consists of early Proterozoic rocks tentatively correlated with the Willyama Supergroup of Broken Hill. Outcrop exists in approximately 40% of the area.

These rocks are:

1. Medium to coarse grained migmatites and gneiss, which are in place anatectic granitoids and pegmatoids.

2. Undifferentiated schists with minor quartzites.

The Willyama Supergroup rocks have been intruded by middle Proterozoic granites.

The remaining 60% of the area is covered by aeolian, alluvial and colluvial material.

4. PREVIOUS EXPLORATION BY CRAE

Exploration conducted over EL 1591 (Calico Dam) by CRAE is detailed in reports by Nelson (1989 and 1990a & b), Sheard (1990a & b), Brewster (1991a, b & c) and Humphries (1991). A brief summary of this work follows:

- An airborne magnetic and radiometric survey was completed over the entire area as part of a larger survey over the adjacent Kalabity (EL 1497) Licence. The survey was flown on 100m spaced N-S lines with a nominal 60m sensor altitude. Plan SAb 129 shows the location of the survey.

- Interpretation and analysis of the airborne magnetic and radiometric data (Sheard 1990a and 1990b).

- Standardisation of geochemical data recovered from CEC and compilation onto company plans.

5. EXPLORATION DURING THE CURRENT REPORTING PERIOD

Ground investigation of anomalies produced from a review of CEC rock chip data is in progress. No results of work are available.

6. FUTURE WORK PROGRAM

The following work program is proposed for the Licence.

- Continuation of the rock chip/ground checking program to follow up on areas of anomalous Cu geochemistry identified from CEC data.

- Recover and inspect radiometric anomalies identified from the airborne survey.

7. REFERENCES

Nelson R.W. 1989 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1989. Olary, South Australia. CRAE Report No. 16093.

Sheard S.N. 1989a Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1990. Olary, South Australia. CRAE Report No. 16352.

Nelson R.W. 1990a Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd April 1990. Olary, South Australia. CRAE Report No. 16475.

Sheard S.N. 1990b Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1990. Olary, South Australia. CRAE Report No. 16833.

Brewster D.C. 1991a Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1991. Olary, South Australia. CRAE Report No.17067.

Brewster D.C. 1991b Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd April 1991. Olary, South Australia. CRAE Report No. 16067.

Brewster D.C. 1991c Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd July 1991. Olary, South Australia. CRAE Report 17371.

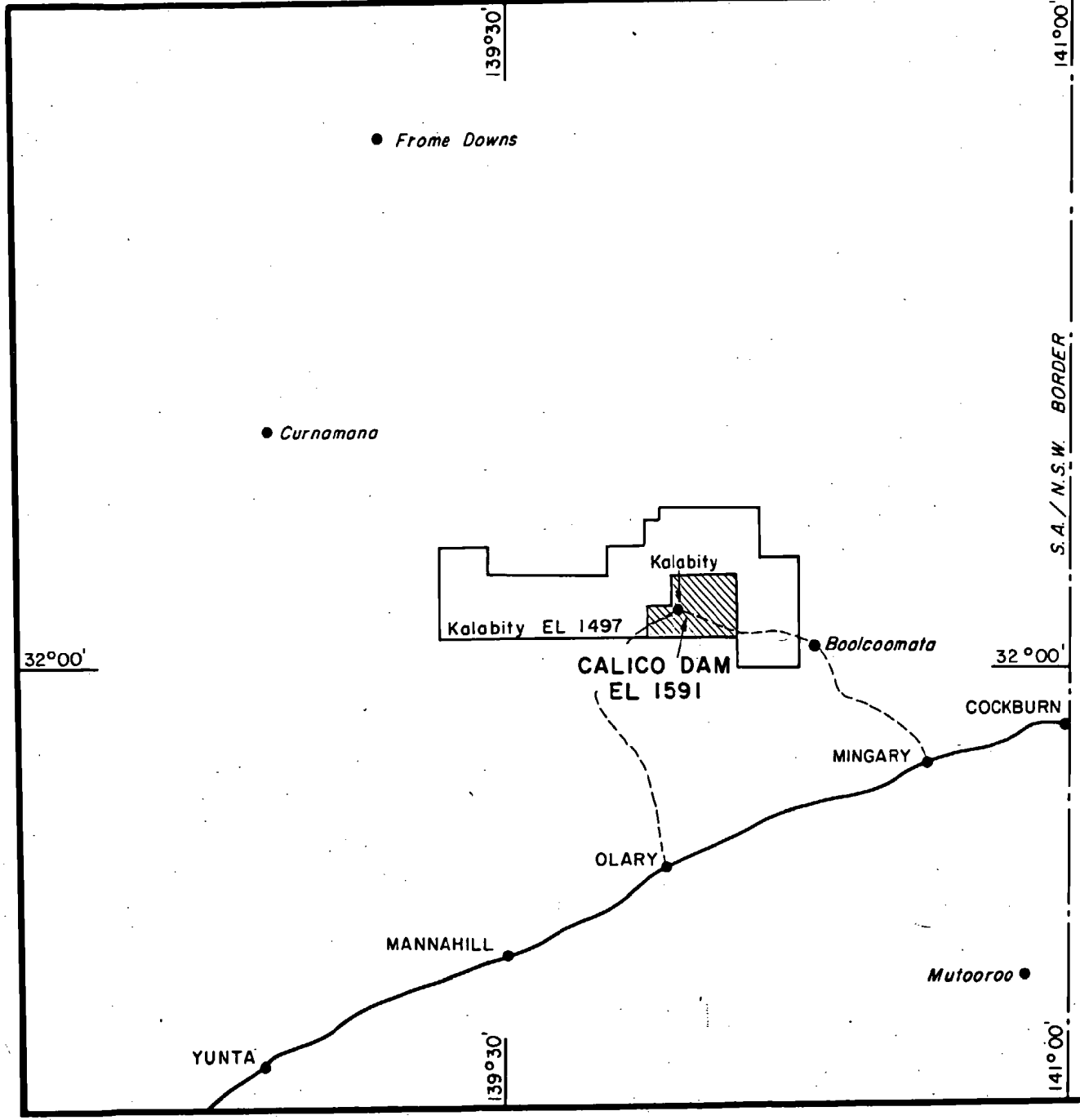
Humphries M.B. 1991 Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd October 1991, Olary, South Australia. CRAE Report 17596.

8. KEYWORDS

Calico Dam EL 1591, geophys radiometrics, airborne magnetics/ radiometrics.

9. LOCATION

Curnamona SH5414 (1:250,000)





LOCALITY

1 : 250 000 Reference Map Curnamona SH/54-14

1 : 100 000 Reference Map Curnamona 6834
Kalabity 6934

CRA EXPLORATION PTY. LIMITED

CALICO DAM EL 1591

LOCALITY PLAN

1 : 250 000 Reference Sheet No.		Curnamona SH/54-14
Author : R. Nelson	Scale : 1 : 1000 000	Report No. 17850
Drawn : G. Holliday	Date October, 1989	Plan No. SA b 151

CRA EXPLORATION PTY. LIMITED
(INC. IN N.S.W.) A.C.N. 000 057 125
69 RAKOW STREET,
P.O. BOX 683,
BROKEN HILL, NEW SOUTH WALES 2880
AUSTRALIA

TELEGRAMS: "CRAEX"
TELEPHONE: (080) 88 2536
FAX: (080) 88 3384

IN REPLY PLEASE QUOTE

6 February 1992

SA Department of Mineral Resources
191 Greenhill Road
PARKSIDE SA 5063

Dear Sir,

Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd January 1992. Olary, South Australia

Please find enclosed CRAE Report No. 17850 titled as above.

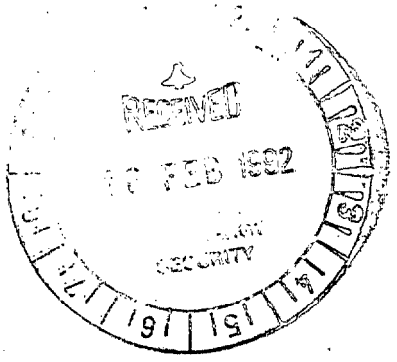
Total expenditure on the Licence area by CRAE from 1st October 1991 to 31st December 1991, the nearest accounting period is $10,751.

	EL 1591 CALICO DAM
Contractors & Professionals	$ 1,584
Salaries & Wages	$ 5,249
Field Supplies & Vehicles	$ 1,518
Office & Miscellaneous	$ 1,776
Rent & Property	$ 190
Computer Services	$ 434
TOTAL	$10,751

The total expenditure by CRAE to date is $113,596.

Yours faithfully

Rick Nelson
Principal Geologist



CRA EXPLORATION PTY. LIMITED
BROKEN HILL
NEW SOUTH WALES

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND JANUARY 1992.
OLARY, SOUTH AUSTRALIA

Author : S. Andrews

Date : January 1992

Submitted to : Chief Geologist - NSW District

Copies to : Department Mines & Energy - S.A.
CRAE - Canberra
CRAE - Sydney
CRAE - Broken Hill
CRAE - Adelaide

Submitted by : S. Andrews.

Accepted by : _____

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CRAE Report No. 17850

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2.	INTRODUCTION	1
3.	GEOLOGY	1
4.	PREVIOUS EXPLORATION BY CRAE	2
5.	EXPLORATION DURING THE CURRENT REPORTING PERIOD	2
6.	FUTURE WORK PROGRAM	2
7.	REFERENCES	3
8.	KEYWORDS	3
9.	LOCATION	3

LIST OF PLANS

Plan No.	Title	Scale
SAb 151	Kalabity - Calico Dam EL 1591 Location Plan	1:1 000 000

CRA EXPLORATION PTY. LIMITED
(INC. IN N.S.W.) A.C.N. 000 057 125
69 RAKOW STREET,
P.O. BOX 683,
BROKEN HILL, NEW SOUTH WALES 2880
AUSTRALIA

TELEGRAMS: "CRAEX"
TELEPHONE: (080) 88 2536
FAX: (080) 88 3384

IN REPLY PLEASE QUOTE

7 April 1992

SA Department of Mineral Resources
191 Greenhill Road
PARKSIDE SA 5063

Dear Sir,

Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd April, 1992. Olary, South Australia

Please find enclosed CRAE Report No. 17847 titled as above.

Total expenditure on the Licence area by CRAE from 1st January 1992 to 31st March 1992, the nearest accounting period is $ 7,143.

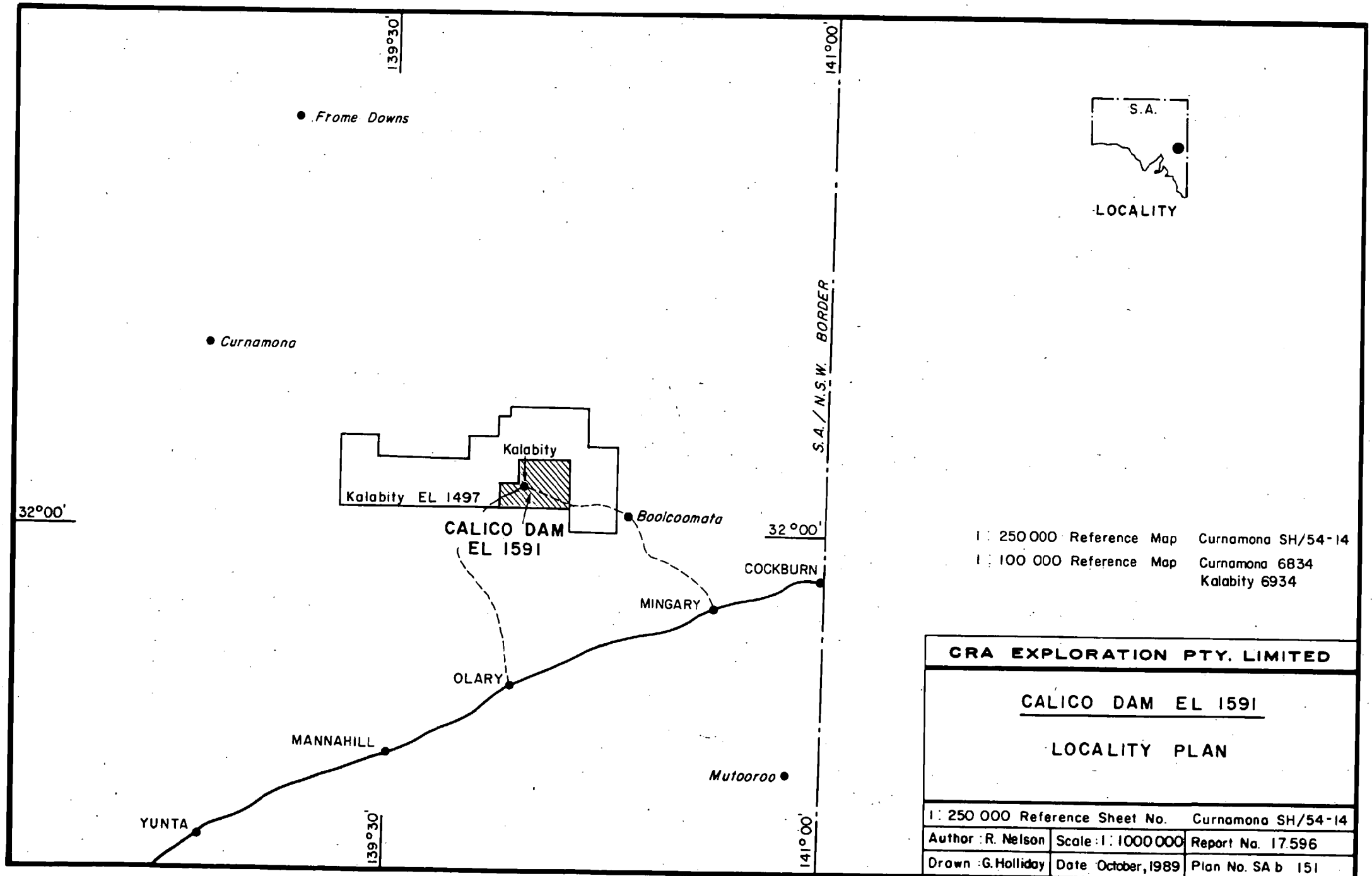
	EL 1591 CALICO DAM
Contractors & Professional	$ 2,356
Salaries & Wages	$ 3,269
Field Supplies & Vehicles	$ 457
Office & Miscellaneous	$ 1,061
TOTAL	$ 7,143

The total expenditure by CRAE to date is $120,739.

Yours faithfully

Rick Nelson
Principal Geologist




139°30'
141°00'
Frome Downs
Curnamona
S.A./N.S.W. BORDER
S.A.
LOCALITY
Kalabity
Kalabity EL 1497
CALICO DAM
EL 1591
Boolcoomata
32°00'
32°00'
COCKBURN
MINGARY
OLARY
MANNAHILL
YUNTA
Mutooroo
139°30'
141°00'
1 : 250 000 Reference Map Curnamona SH/54-14
1 : 100 000 Reference Map Curnamona 6834
Kalabity 6934
CRA EXPLORATION PTY. LIMITED
CALICO DAM EL 1591
LOCALITY PLAN
1 : 250 000 Reference Sheet No. Curnamona SH/54-14
Author : R. Nelson
Scale : 1 : 1000 000
Report No. 17.596
Drawn : G. Holliday
Date : October, 1989
Plan No. SA b 151

CRA EXPLORATION PTY. LIMITED
WEST NEW SOUTH WALES

EXPLORATION LICENCE 1591 (CALICO DAM) PROGRESS REPORT FOR QUARTER ENDED 2ND APRIL 1992 OLARY, SOUTH AUSTRALIA

Author	: S. Munroe
Date	: May 1992
Submitted to	: Chief Geologist - NSW District
Copies to	: CRAE - Canberra CRAE - Sydney CRAE - Broken Hill CRAE - Adelaide SA Department of Minerals & Energy
Submitted by	: _____
Accepted by	: _____

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CRAE Report No. 17847

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LIST OF PLANS

Plan No.	Title	Scale
SAb 151	Calico Dam EL 1591 Locality Plan	1:1 000 000
SAb 618	Kalabity EL 1497 Airborne Survey Selected U Channel Anomaly No. 2 Kalabity Line 1224-1N Fiducial 43415	No Set Scale
SAb 619	Kalabity EL 1497 Airborne Survey Selected U Channel Anomaly No. 2 Kalabity Line 1226-1S Fiducial 41847	No Set Scale
SAb 620	Kalabity EL 1497 Airborne Survey Selected U Channel Anomaly No. 3 Kalabity Line 1176-1S Fiducial 42976	No Set Scale
SAb 693	Kalabity EL 1497 1992 Detailed Radiometric Anomaly Locations - Kalabity 6934-11-SW/SE	1:25 000
SAb 707	Kalabity EL 1497 Uranium Channel Radiometric Anomaly Location on Flight Lines - Anomaly 1 Sheet 21 Kalabity	1:10 000
SAb 708	Kalabity EL 1497 Uranium Channel Radiometric Anomaly Location on Flight Lines - Anomaly 4 Sheet 22 Kalabity	1:10 000
SAb 713	Kalabity EL 1497 Uranium Channel Radiometric Anomaly Location on Flight Lines - Anomaly 1 & 2 Sheet 30 Kalabity	1:10 000
SAb 714	Kalabity EL 1497 Uranium Channel Radiometric Anomaly Location on Flight Lines - Anomaly 3 Sheet 31 Kalabity	1:10 000
SAb 736	Calico Dam (EL 1591) Rock Chip Analysis (Cu ppm) - Kalabity 6934-11-S, Waukaloo 6934-11-N (Part)	1:25 000

LIST OF APPENDICES

APPENDIX I : Calico Dam EL 1591 - CEC Rock Chip Data

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND APRIL 1992
OLARY, SOUTH AUSTRALIA

1. SUMMARY

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July 1989.

The EL was renewed for a further term of twelve months from 3rd July 1991.

The application for Calico Dam was made to explore the area for copper, gold and uranium.

Elsewhere in the Olary Block copper mineralisation is associated with iron formation units, while uranium is associated with the granites and the granite-sedimentary sequence contact. Much of the EL is under thin alluvial/colluvial cover.

Exploration during the reporting period consisted of:

- Interpretation of geochemical data recovered from CEC geochemical data after compilation onto company plans.
- Identification of radiometric anomalies over EL 1591 (Calico Dam) as part of a larger survey over EL 1497 (Kalabity).
- Correlation of geochemical anomalies with radiometric anomalies.

2. INTRODUCTION

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July 1989 for a term of one year with an expenditure commitment of $35,000. The EL was renewed for a further 12 months with a further expenditure commitment of $40,000, i.e., the licence conditions stipulate that a total of $75,000 is required to be spent over the two year period.

To date a total of $120,739 has been spent.

The 148 sq. km. Licence is located approximately 38 km north of Olary in the vicinity of the Kalabity Station Homestead. (Plan SAb 151).

3. GEOLOGY

Mapped geology (Curnamona SH54-14) within the EL consists of Early Proterozoic rocks tentatively correlated with the Willyama Supergroup of Broken Hill. Outcrop exists in approximately 40% of the area.

These rocks are:

1. Medium to coarse grained migmatites and gneiss, which are in place anatectic granitoids and pegmatoids.

2. Undifferentiated schists with minor quartzites.

The Willyama Supergroup rocks have been intruded by middle Proterozoic granites.

The remaining 60% of the area is covered by aeolian, alluvial and colluvial material.

4. PREVIOUS EXPLORATION BY CRAE

Exploration conducted over EL 1591 (Calico Dam) by CRAE is detailed in reports by Nelson (1989 and 1990a & b), Sheard (1990a & b), Brewster (1991a, b & c), Humphries (1991) and Andrews (1992). A brief summary of this work follows:

- An airborne magnetic and radiometric survey was completed over the entire area as part of a larger survey over the adjacent Kalabity (EL 1497) Licence. The survey was flown on 100m spaced N-S lines with a nominal 60m sensor altitude. Plan SAb 129 shows the location of the survey.

- Interpretation and analysis of the airborne magnetic and radiometric data (Sheard 1990a and 1990b).

- Support on Geology Honours students mapping in the area.

- Standardisation of geochemical data recovered from CEC and compilation onto company plans.

5. EXPLORATION DURING THE CURRENT REPORTING PERIOD

An anomaly plan for copper has been generated for the EL 1591 (Calico Dam) area using the rock chip data recovered from CEC and standardised onto CRAE company plans. The CEC rock chip results for EL 1591 are shown in Appendix I.

The 'Bimba Formation' outcropping to the southwest of the Kalabity Homestead contains anomalous copper values of 1.55% and 2.05% in samples 423114 and

423148 respectively. Ground investigation of these anomalies is currently in progress.

The EL 1591 area is shown at 1:25 000 scale (Plan SAb 693) and contains radiometric anomalies, Kalabity 2 (Plan SAb 618, 619) and Kalabity 3 (Plan SAb 620). Detailed flight diagrams at 1:10 000 scale which are relevant to the Calico Dam area are shown in Plans SAb 707, 708, 713, 714.

Anomalous copper values in the 'Bimba Formation' are coincident with the Kalabity 2 radiometric anomaly. The Kalabity 3 radiometric anomaly does not coincide with any known geochemical anomalies. Further ground investigation of the geology in the vicinity of these radiometric anomalies is currently in progress.

6. FURTHER WORK PROGRAM

The following work program is proposed for the Licence.

- Continuation of the rock chip/ground checking program to follow up on areas of anomalous Cu geochemistry identified from CEC data.

7. REFERENCES

Nelson R.W. 1989 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1989. Olary, South Australia. CRAE Report No. 16093.

Sheard S.N. 1989a Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1989. Olary, South Australia. CRAE Report No. 16352.

Nelson R.W. 1990a Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd April 1990. Olary, South Australia. CRAE Report No. 16475.

Sheard S.N. 1990b Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1990. Olary, South Australia. CRAE Report No. 16833.

Brewster D.C. 1991a Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1991. Olary, South Australia. CRAE Report No. 17067.

Brewster D.C. 1991b Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd April 1991. Olary, South Australia. CRAE Report No. 17227.

Brewster D.C. 1991c Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd July 1991. Olary, South Australia. CRAE Report No. 17371.

Humphries M.B. 1991 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1991. Olary, South Australia. CRAE Report No. 17596.

Andrews S. 1992 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1992. Olary, South Australia. CRAE Report No. 17850.

8. KEYWORDS

Calico Dam EL 1591, geophys radiometrics, airborne magnetics/radiometrics.

9. LOCATION

Curnamona SH5414 (1:250 000)

APPENDIX I

Calico Dam EL 1591 - CEC Rock Chip Data

Calico Dam EL 1591 - CEC Rockchip Data

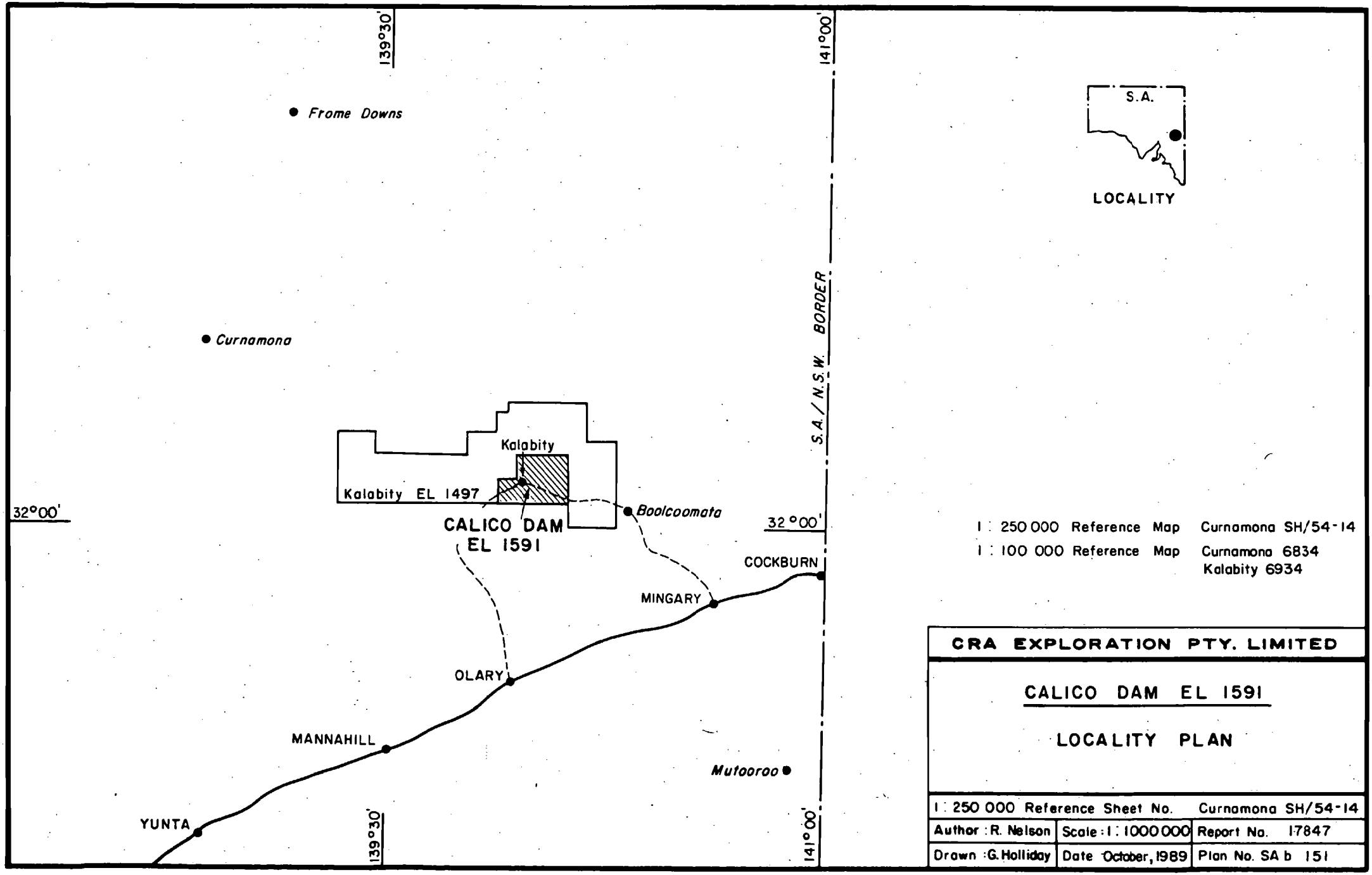
Sample	AMG East	AMG North	Cu ppm	Zn ppm	Co ppm	Mo ppm
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10861	436650	6471700	10	1	32	12
12268	438200	6467450	15	65	15	1
12269	438600	6472200	2	1	2	5
12270	439150	6472200	8	5	55	5
12271	433600	6468250	15	80	10	3
12272	440100	6468400	50	18	20	3
12274	439200	6469050	5	18	2	1
12275	439150	6468200	5	42	2	3
12276	439150	6470300	5	5	2	1
12277	437800	6471250	15	15	20	1
12278	436800	6470400	5	12	2	3
12279	439750	6467100	75	90	22	1
12280	440150	6468450	10	15	5	4
12281	440150	6467600	5	5	2	1
12282	436000	6470000	85	8	18	1
12283	436050	6470000	10	15	12	3
12284	437300	6471600	18	2	230	16
12286	439400	6471750	110	33	35	3
12286	440800	6469100	530	120	15	1
12287	440600	6470050	5	10	2	1
12288	439000	6468400	5	5	2	1
12289	436750	6467550	8	50	5	3
12290	438200	6468400	22	1	240	5
12291	438250	6468400	8	52	45	1
12292	438200	6469200	12	15	2	1
12293	437800	6471600	22	1	60	3
12295	436000	6469500	5	8	8	40
12296	434550	6467950	20	110	8	3
12297	434550	6467900	25	230	20	3
12299	433600	6468200	22	5	5	3
12300	439100	6467200	25	75	15	6
13971	438500	6470050	12	18	2	1
13971	433650	6468200	20	50	15	6
13973	437400	6466400	40	18	5	3
13974	438800	6469350	5	5	2	1
422037	439300	6465350	110	8	•	•
422038	441150	6466150	22	5	•	•
422039	441750	6468450	30	8	•	•
422040	441500	6469700	1420	15	•	•
422041	443400	6465900	5	8	•	•
422042	443250	6466600	5	8	•	•
422043	442600	6467050	5	8	•	•
422044	442350	6466900	5	8	•	•
422046	443200	6467550	2	5	•	•
422047	444200	6468350	2	8	•	•
422048	444900	6468950	5	8	•	•
422048	444250	6467500	2	8	•	•
422049	444350	6469750	2	18	•	•

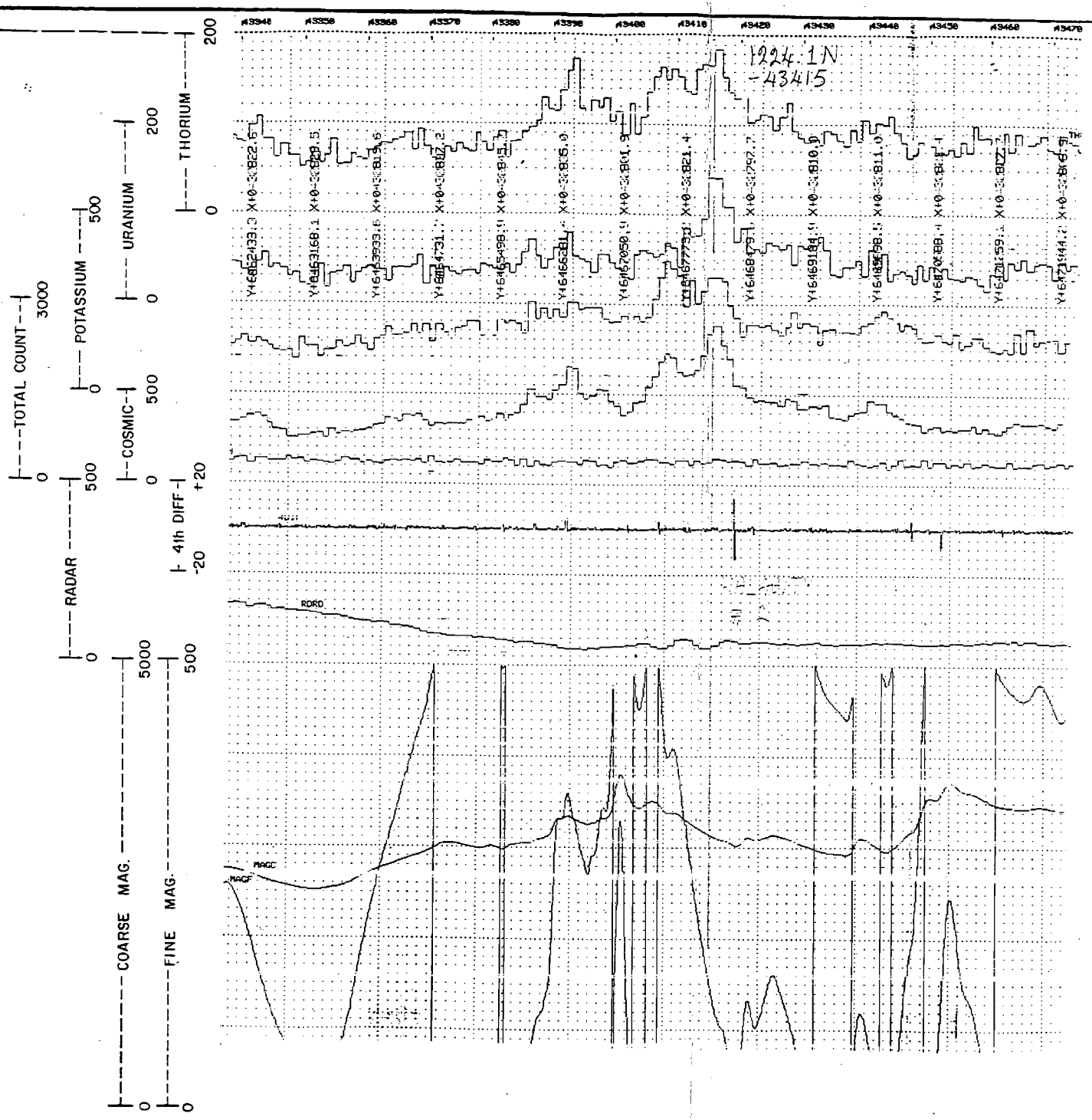
Calico Dam EL 1591 - CEC Rockchip Data

Sample	AMG East	AMG North	Cu ppm	Zn ppm	Co ppm	Mo ppm
422050	443300	6471750	12	5	•	•
422060	440300	6471600	5	5	•	•
422570	434250	6464850	18	45	•	•
423076	433700	6470800	15	8	•	•
423077	433750	6470950	25	5	•	•
423090	434100	6469400	10	38	•	•
423091	433850	6469600	8	5	•	•
423092	434500	6468900	10	58	•	•
423100	430900	6468600	2	12	•	•
423101	430850	6468300	5	10	•	•
423102	431400	6468400	5	10	•	•
423103	431650	6468600	55	0	•	•
423104	432350	6468100	8	100	•	•
423106	432300	6468550	35	110	•	•
423107	432400	6468400	25	42	•	•
423108	432550	6468200	25	10	•	•
423110	432100	6468350	12	22	•	•
423111	432100	6467950	22	35	•	•
423112	431600	6467750	8	28	•	•
423113	432200	6467700	320	250	•	•
423114	432300	6467750	15500	1800	•	•
423115	432450	6467600	20	70	•	•
423116	432900	6467050	55	65	•	•
423117	432600	6467750	45	22	•	•
423118	430500	6468450	12	12	•	•
423122	433750	6469100	15	22	•	•
423123	433700	6468600	38	10	•	•
423124	433200	6468300	15	600	•	•
423125	432600	6468150	18	90	•	•
423126	432700	6468100	45	22	•	•
423127	432550	6467900	48	75	•	•
423129	433650	6467500	78	45	•	•
423130	433900	6467550	5	8	•	•
423131	433900	6467550	60	120	•	•
423132	433700	6467200	35	25	•	•
423133	433300	6466800	45	25	•	•
423134	433300	6466800	12	5	•	•
423135	433300	6466800	5	8	•	•
423136	433050	6466500	45	80	•	•
423137	433050	6466450	25	5	•	•
423139	431550	6466450	12	18	•	•
423141	432250	6466300	8	12	•	•
423143	432300	6465750	10	38	•	•
423144	432600	6466000	8	30	•	•
423146	431800	6565800	12	42	•	•
423147	431750	6465600	10	22	•	•
423148	432800	6467750	20500	420	•	•
423148	431750	6465600	5	38	•	•
423148	431450	6465200	5	38	•	•

Calico Dam EL 1591 - CEC Rockchip Data

Sample	AMG East	AMG North	Cu ppm	Zn ppm	Co ppm	Mo ppm
423149	431550	6465300	5	38	•	•
423150	432550	6465000	8	18	•	•
423151	433550	6465000	38	15	•	•
423152	433550	6465000	5	15	•	•
423153	434250	6466000	8	15	•	•
423178	433900	6471350	15	12	•	•
423184	430400	6466300	750	35	•	•
423185	430400	6465800	120	22	•	•
423535	439300	6463900	8	170	•	•
423538	439700	6464800	38	15	•	•
423539	439850	6464750	25	15	•	•
423542	444400	6465200	5	15	•	•
423543	444300	6464200	5	10	•	•
423545	442500	6465100	8	12	•	•
423546	443450	6465250	5	15	•	•
423551	441300	6463500	10	28	•	•
423552	440550	6464200	15	55	•	•
423553	435150	6462900	15	32	•	•
423554	443250	6463500	8	12	•	•
423554	435550	6463450	12	42	•	•
423555	435750	6464100	15	35	•	•
423556	433500	6463050	5	55	•	•
423561	433200	6463100	5	5	•	•
423561	436650	6463750	10	42	•	•
423563	433950	6463350	15	30	•	•
423564	433050	6463550	5	8	•	•
423565	431200	6464150	10	5	•	•
423566	432500	6463500	5	10	•	•
423568	432900	6464250	12	12	•	•
423569	433750	6464650	160	170	•	•
423571	434550	6464550	10	45	•	•
423572	434750	6463250	15	15	•	•
423576	430150	6463450	12	5	•	•
423577	430500	6463400	8	5	•	•
423579	430300	6464850	32	10	•	•
423580	431100	6464900	70	15	•	•
423581	431150	6462950	12	45	•	•
423582	430600	6462850	5	10	•	•

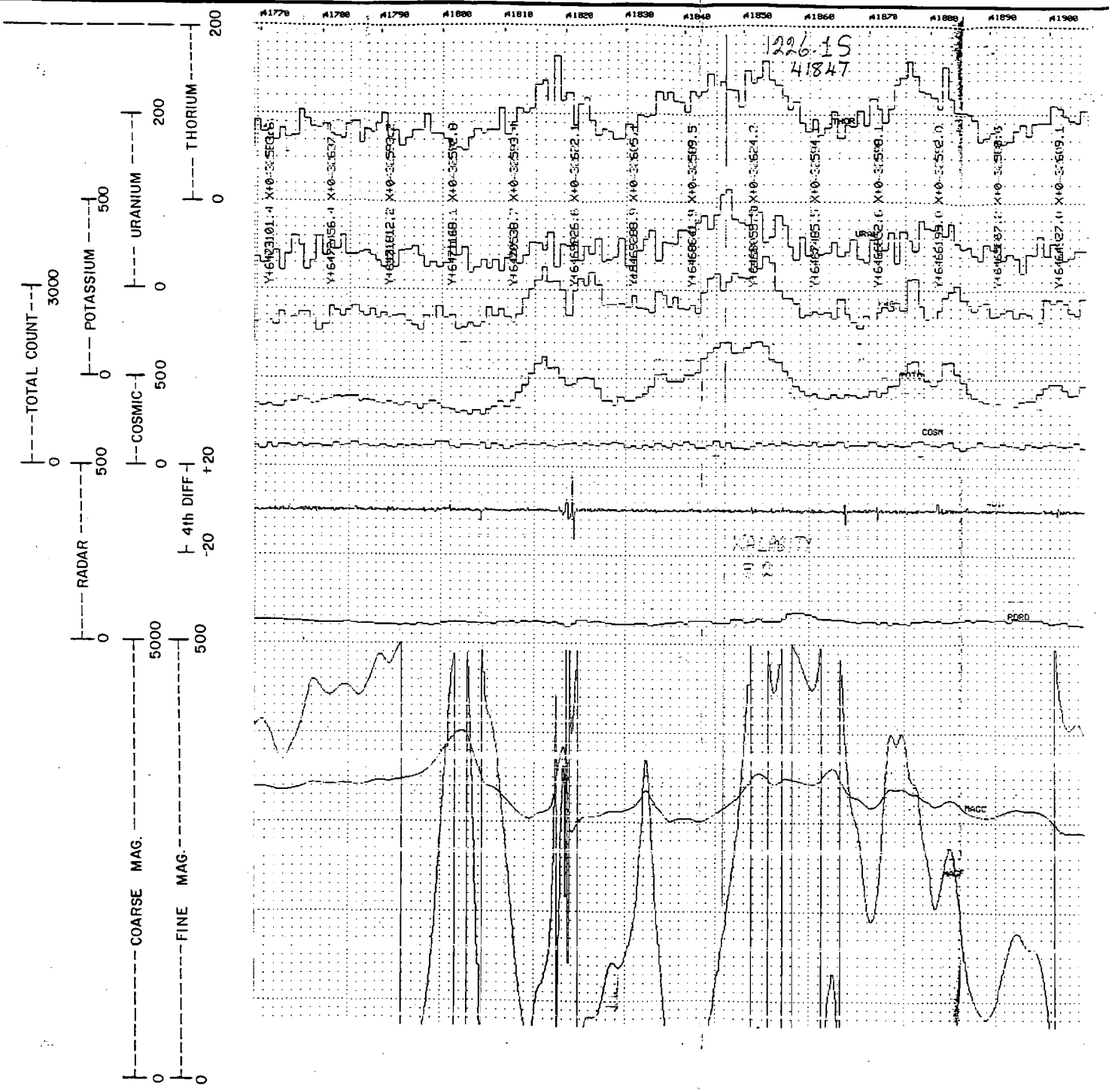

139°30'
141°00'
Frome Downs
Curnamona
S.A./N.S.W. BORDER
Kalabity
Kalabity EL 1497
CALICO DAM
EL 1591
Boolcoomata
32°00'
32°00'
COCKBURN
MINGARY
OLARY
MANNAHILL
Mutooroo
YUNTA
139°30'
141°00'
S.A.
LOCALITY
1 : 250 000 Reference Map Curnamona SH/54-14
1 : 100 000 Reference Map Curnamona 6834
Kalabity 6934
CRA EXPLORATION PTY. LIMITED
CALICO DAM EL 1591
LOCALITY PLAN
1 : 250 000 Reference Sheet No. Curnamona SH/54-14
Author : R. Nelson
Scale : 1 : 1000000
Report No. 17847
Drawn : G. Holliday
Date October, 1989
Plan No. SA b 151



CRA EXPLORATION PTY. LIMITED

KALABITY EL 1497
AIRBORNE SURVEY
SELECTED URANIUM CHANNEL
ANOMALY Nº 2 - KALABITY
LINE: 1224·1 N FIDUCIAL: 43415

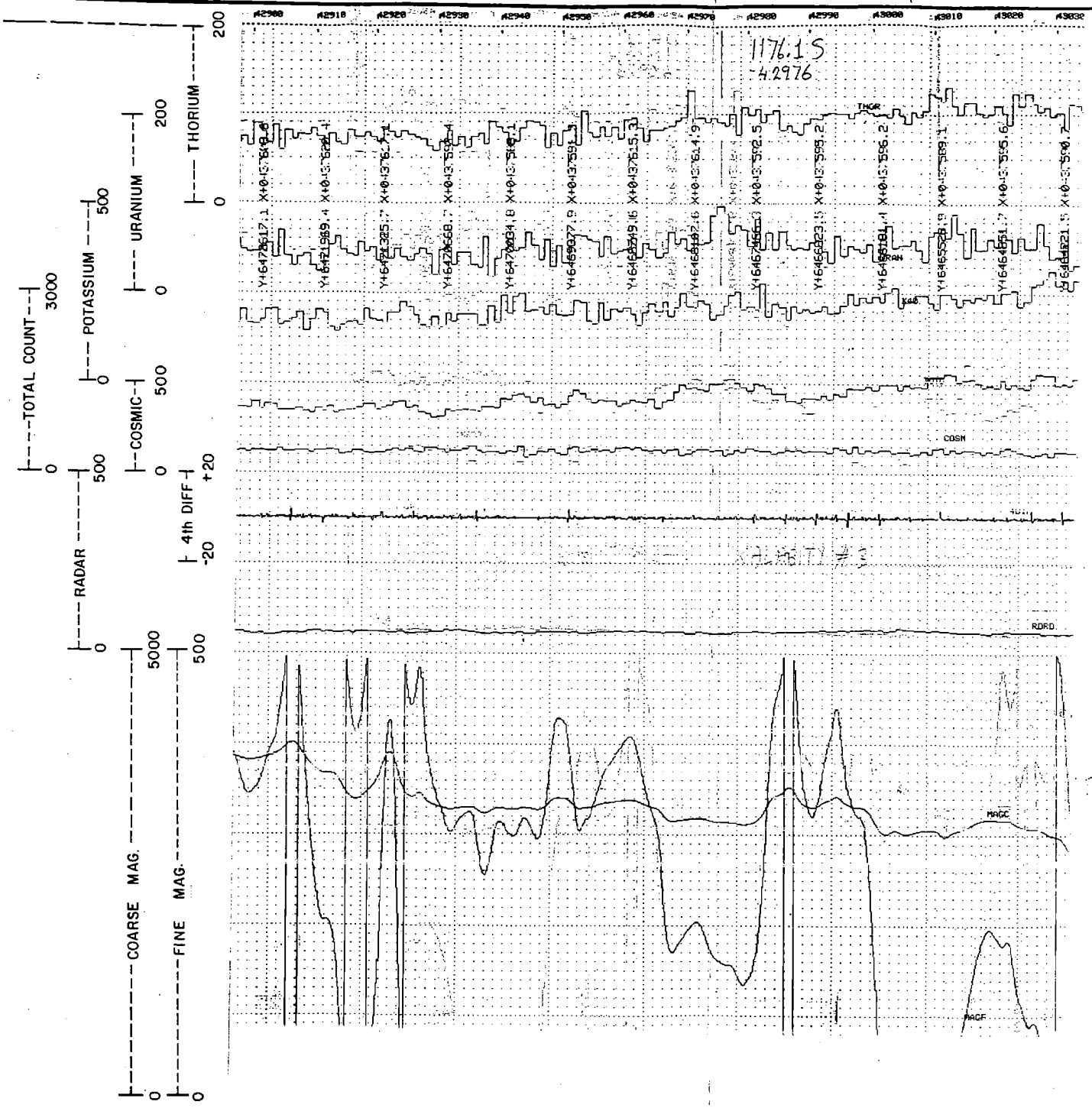
1 250 000 Reference Sheet No. Curnamona SH/54-14		
Author T. Doe	Scale:	Report No. 17847
Drawn T. Doe	Date March, 1992	Plan No. SAb 618



CRA EXPLORATION PTY. LIMITED

KALABITY EL 1497
AIRBORNE SURVEY
SELECTED URANIUM CHANNEL
ANOMALY Nº 2 - KALABITY
LINE: 1226·1S FIDUCIAL: 41847

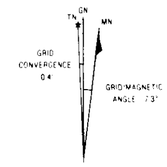
1 250 000 Reference Sheet No. Curnamona SH/54 - 14		
Author T. Doe	Scale:	Report No. 17847
Drawn T. Doe	Date March, 1992	Plan No. SAb 619



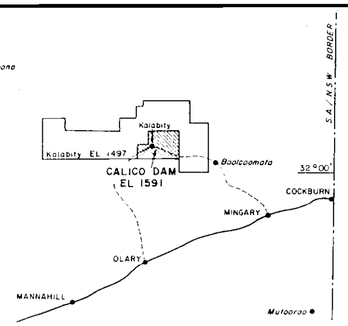
CRA EXPLORATION PTY. LIMITED

KALABITY EL 1497
AIRBORNE SURVEY
SELECTED URANIUM CHANNEL
ANOMALY Nº 3 - KALABITY
LINE: 1176·1 S FIDUCIAL: 42976

1: 250 000 Reference Sheet No. Curnamona SH/54 - 14		
Author T. Doe	Scale:	Report No. 17847
Drawn T. Doe	Date March, 1992	Plan No. SAb 620



True north, grid north and magnetic north are shown diagrammatically for the centre of the map. Magnetic north is correct for 1983 and moves easterly by 0.1° in about three years.



LOCALITY PLAN

430 000E

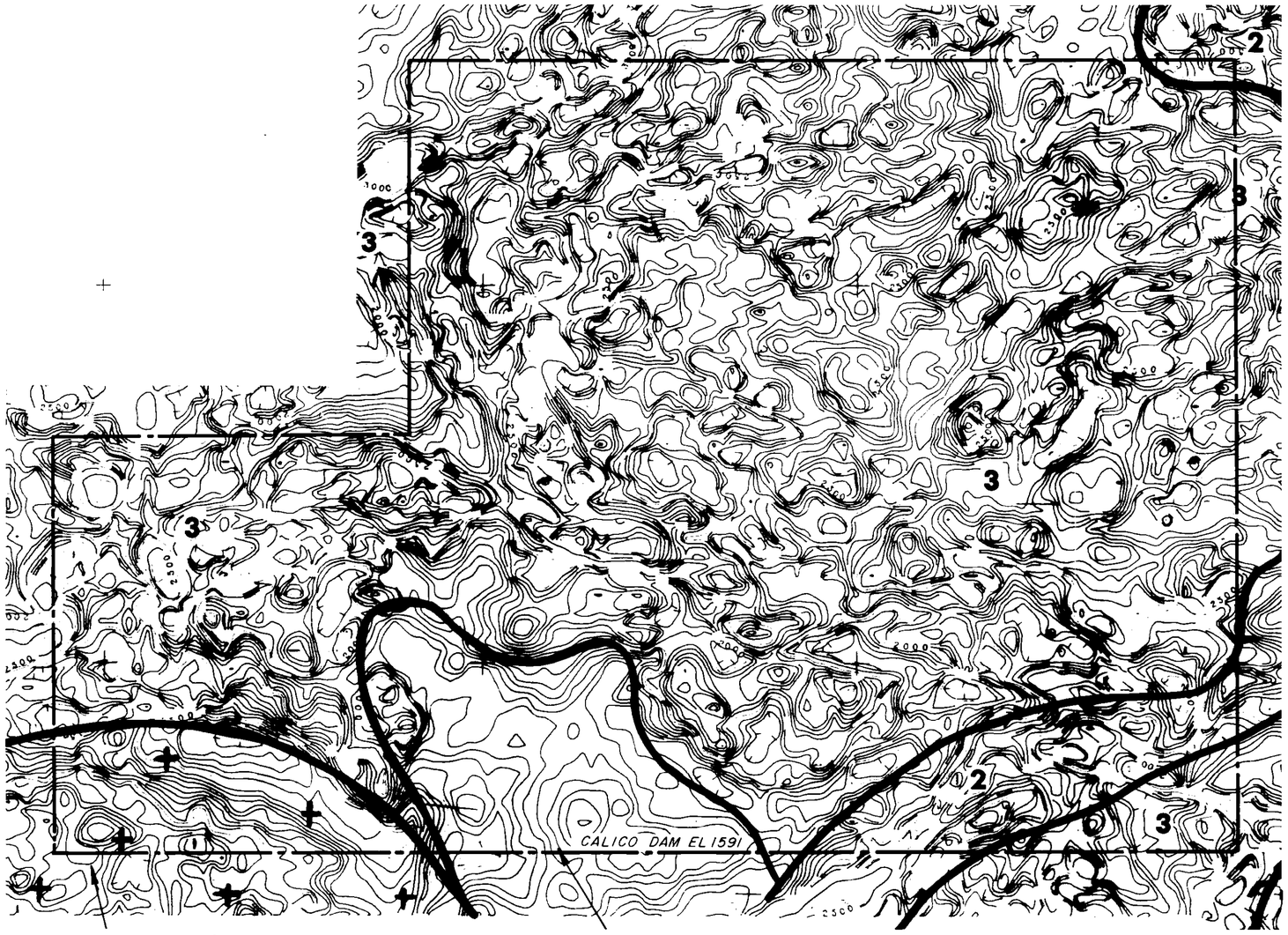
140°17'20"

440 000E

140°22'20"

6 470 000 N

31°55'



6 460 000 N

32°00"

1989 KALABITY AIRBORNE SURVEY

AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquistion system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 54

Magnetics :	Tie Line Levelled.
IGRF (1985) :	Removed. Datum 2000 nT added.
Grid mesh size :	125 x 125 metres.
Contour Interval :	25,250,2500 nT.

PRELIMINARY DATA 1 : 50 000

LEGEND

POSSIBLE INCREASE IN METAMORPHIC GRAIN

- DOMAIN 0 - No magnetic pattern - Low intensity.
- DOMAIN 1 - More continuous - longer wavelength anomalies (contains upper albite formation)
- DOMAIN T - Transition zone - bland magnetic zone generally between Domains 1 and 3.
- DOMAIN 2 - More disturbed magnetic unit than Domain 1 but still continuous.
- DOMAIN 3 - Disturbed - high frequency anomalies - possibly metamorphic / core of system.
- DOMAIN 4 - More discrete anomalies - not unlike Domain 2.

430 000 E

140°17'20"

440 000 E

140°22'20"

8200-21

6 460 000 N

32°00"

CRA

CRA EXPLORATION PTY. LIMITED

BROKEN HILL - NEW SOUTH WALES

0 1 2 3 Km

PLAN N° SAb 345

1:250 000 Ref Sheet - Curnamona SH/54-14

PROJECT	KALABITY
AREA	CALICO DAM EL 1591
DATA	MAGNETIC DOMAIN MAP

COMPILED	DATE	DRAWN	SCALE	CRAE REPORT No.
Nick Sheard	October, 1990	Gay L. Holliday	1:50 000	17067

KALABITY EL 1497

CALICO DAM EL 1591

GRANITE ?

CALICO DAM EL 1591

GRANITE (RADIOMETRICS)

CM 1
POTASSIUM / URANIUM HIGH ON GRANITE MARGIN.
- ZONE OF ALTERATION. ?

1989 KALABITY AIRBORNE SURVEY EXTENT

ANATECTIC GRANITE
POTENTIAL FOR REMOBILISED MINERALISATION
- USE STRUCTURE TO LOCALISE AREA FOR SEARCH

140°15' 140°20' 140°25' 140°30'

435000E 440000E 445000E 450000E

6473000 N

31°52'30"

6472500 N 6470000 N 6467500 N 6465000 N 6462500 N 6460000 N 6459000 N

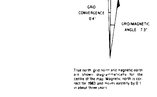
31°55' -32°00'

AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.6 litres
TOTAL COUNT WINDOW :	0.41 - 3.00 Mev
POTASSIUM WINDOW :	1.36 - 1.56 Mev
URANIUM WINDOW :	1.66 - 1.96 Mev
THORIUM WINDOW :	2.42 - 2.62 Mev
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geometrics MAGMAC acquisition system Digital to magnetic tape
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse : 400 m Tie : 1.5 km
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 nav-o navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

RESIDUAL MAGNETIC CONTOURS

Grid notation refers to Australian Map Grid Zone 54
Magnetics : Rice Cline Leven ed.
IGRF (1985) : Removed minimum 2000 nT based
Grid mesh size : 50 metres
Gridding : 9 point triangular. 2nT threshold.
Contour Interval : 5,50,500 nT



True north, grid north and magnetic north are shown. Magnetic data for the survey was recorded in 1989 and has been reduced to 1990 and multiplied by 0.7 to obtain total field.

LEGEND

- MAGNETIC DOMAIN
- AREAS OF INTEREST
- MAGNETIC UNIT BOUNDARY
- FAULTS - MAJOR / MINOR
- CRAE TENEMENT BOUNDARY

LEGEND

POSSIBLE INCREASE IN METAMORPHIC GRADE

- DOMAIN 0 - No magnetic pattern - Low intensity.
- DOMAIN 1 - More continuous - longer wavelength anomalies (contains upper albite formation)
- DOMAIN T - Transition zone - bland magnetic zone generally between Domains 1 and 3.
- DOMAIN 2 - More disturbed magnetic unit than Domain 1 but still continuous.
- DOMAIN 3 - Disturbed - high frequency anomalies - possibly metamorphic / core of system.
- DOMAIN 4 - More discrete anomalies - not unlike Domain 2.

WALTHERGO 6834-111-NE	DEEP WELL 6934-111-NW/NE	WAUKALOO 6934-111-NW/NE	KALKAROO 7034-111-NW
BILLEROO 6834-111-SE	KOOLKA 6934-111-SW/SE	KALABITY 6934-111-SW/SE	BOOLCOOMATA 7034-111-SW

NOTE : This base has an overlap

PREPARED BY PETER LIVINGS AND ASSOCIATES
2 RAGLAN ROAD, MT ILKLEY, 6050
TELEPHONE 2287088

1:100000 MAP CONTROL SUPPLIED BY AUSLIG

8200-22

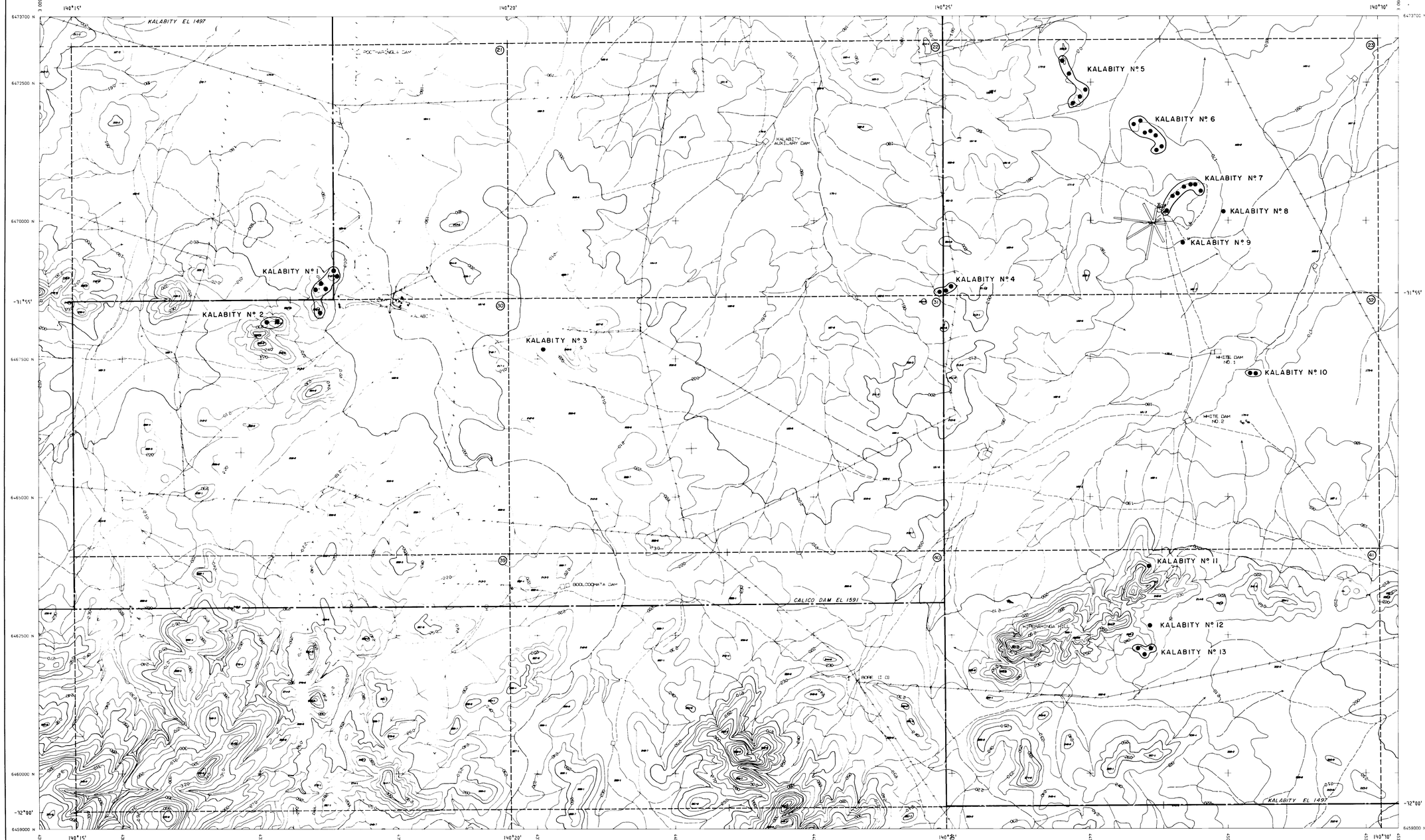
CRA EXPLORATION PTY LIMITED

CALICO DAM EL 1591

MAGNETIC INTERPRETATION OF TOTAL MAGNETIC INTENSITY

KALABITY SURVEY 1989

SCALE: 1:25000	1:250 000 REF. SHEET: Curnamona SH/54-14	
AUTHOR : NICK SHEARD	DRAWN G.HOLLIDAY	PLAN NO. SAb 346
DATE : OCTOBER, 1990	CRAE REPORT Nº 17067	





1989 AIRBORNE SURVEY KALABITY AREA
SHEET INDEX 1 - 42

LEGEND

- CRA EXPLORATION TENEMENT BOUNDARY
- RADIOMETRIC ANOMALY - NAME & NUMBER
- AIRBORNE SURVEY 1:10000 SHEET LOCATION & Nº

WALTHERGO 6834-II-NE	DEEP WELL 6934-III-NW/NE	WAUKALOO 6934-III-NW/NE	KALKAROO 7034-III-NW
BILLEROO 6834-II-SE	KOOLKA 6934-III-SW/SE	KALABITY 6934-II-SW/SE	BOOLOOMATA 7034-III-SW

PREPARED BY PETER LIVINGS AND ASSOCIATES
7 RAILWAY ROAD, MT LAWLEY, 6050
TELEPHONE : 3287086

1:100000 MAP CONTROL SUPPLIED BY AUSLIG

8200-24

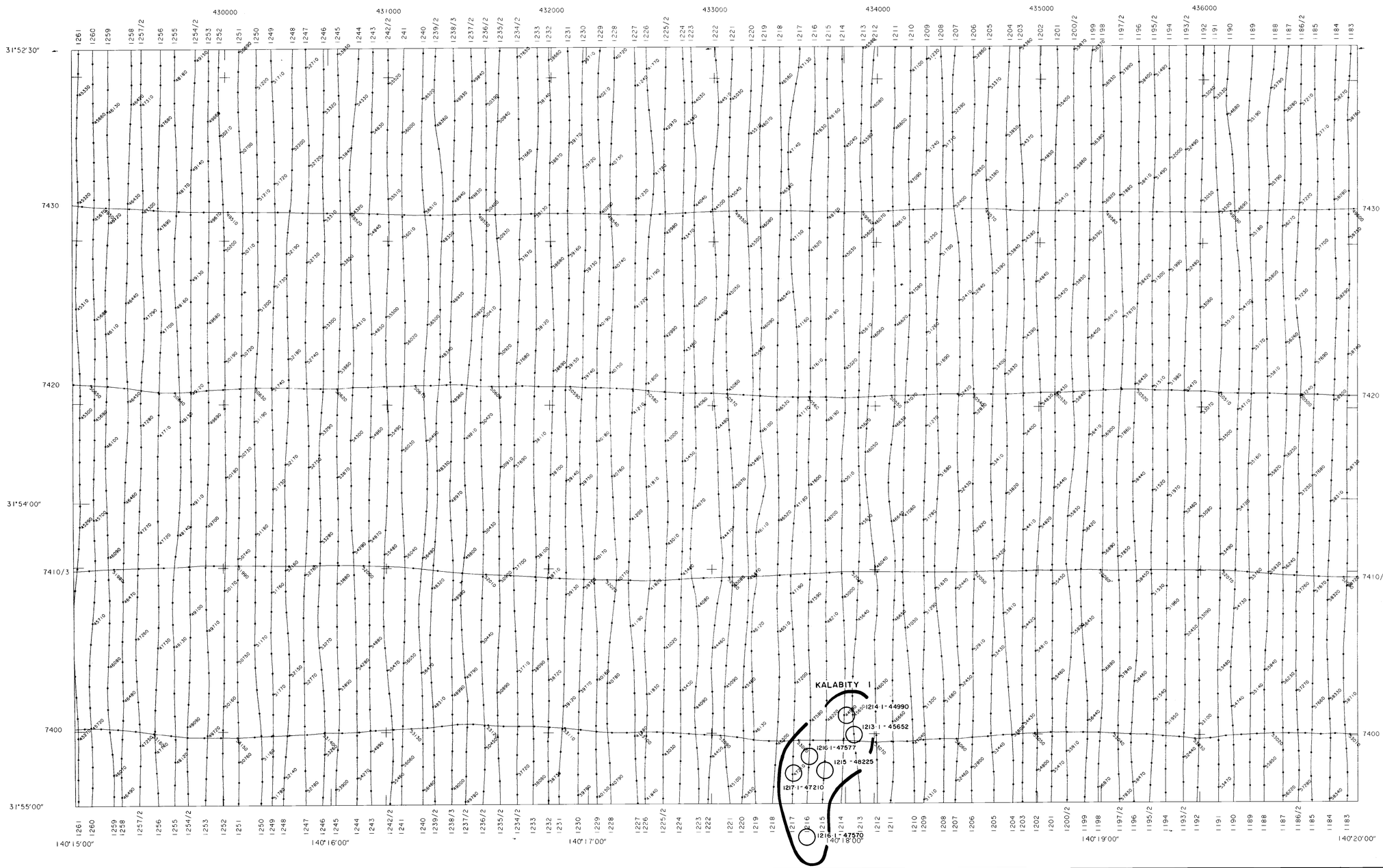
CRA EXPLORATION PTY LIMITED

KALABITY EL 1497

1992 DETAILED RADIOMETRIC ANOMALY LOCATIONS

SHEET Nº 6934-II-SW/SE - KALABITY

SCALE: 1:25000	AUTHOR : A.R.D. DOE	DRAWN : G. HOLLIDAY
DATE OF PHOTOGRAPHY : 5-1982		PLAN NO. Sab 693
DATE : MARCH, 1992		CRAE REPORT Nº 17847



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

FLIGHT PATH MAP

Grid notation refers to Australian Map Grid Zone 54
Syledis navigation fix 32768

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX

139°50' 31°45' 140°55' 31°45' 32° 139°50' 140°55' 32°

					1	2	3		
					4	5	6		
7	8	9	10	11	12	13	14	15	
16	17	18	19	20		22	23	24	
25	26	27	28	29	30	31	32	33	
34	35	36	37	38	39	40	41	42	

LEGEND

ANOMALY POSITION

ANOMALY CLUSTER BOUNDARY & NAME

1060-2-51366 FLIGHT LINE N° / FIDUCIAL

8200-25

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

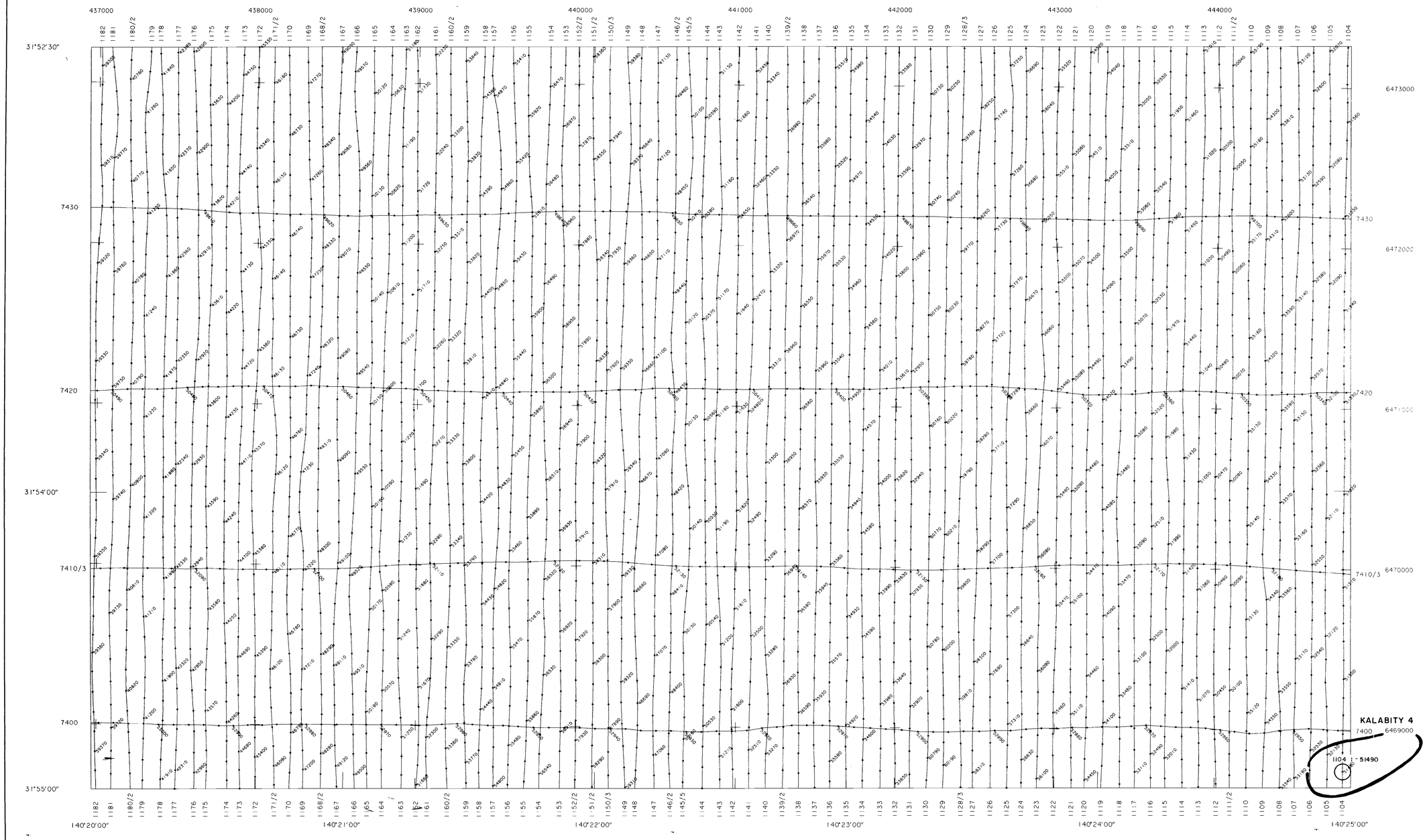
KALABITY EL 1497

URANIUM CHANNEL RADIOMETRIC ANOMALY LOCATIONS ON FLIGHT LINES

CURNAMONA SH54-14 Sheet 21

Geo. A.R.D. Doc	Revised:	Report 17947
Drawn G Holliday	Date March, 1992	Drg SAB 707

KALABITY 1



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

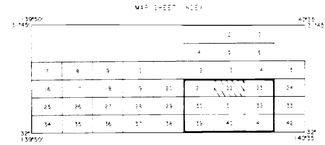
FLIGHT PATH MAP

Grid notes in reference to Australian 1st Mga Grid Zone 54
Spheroid Non Sat 20 ft = 32768

SCALE 1:

100 : 200 400 600 800 m

MAP SHEET INDEX



LEGEND

ANOMALY POSITION

ANOMALY CLUSTER BOUNDARY & NAME

1060-2-51366 FLIGHT LINE N° / FIDUCIAL

8200-26

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

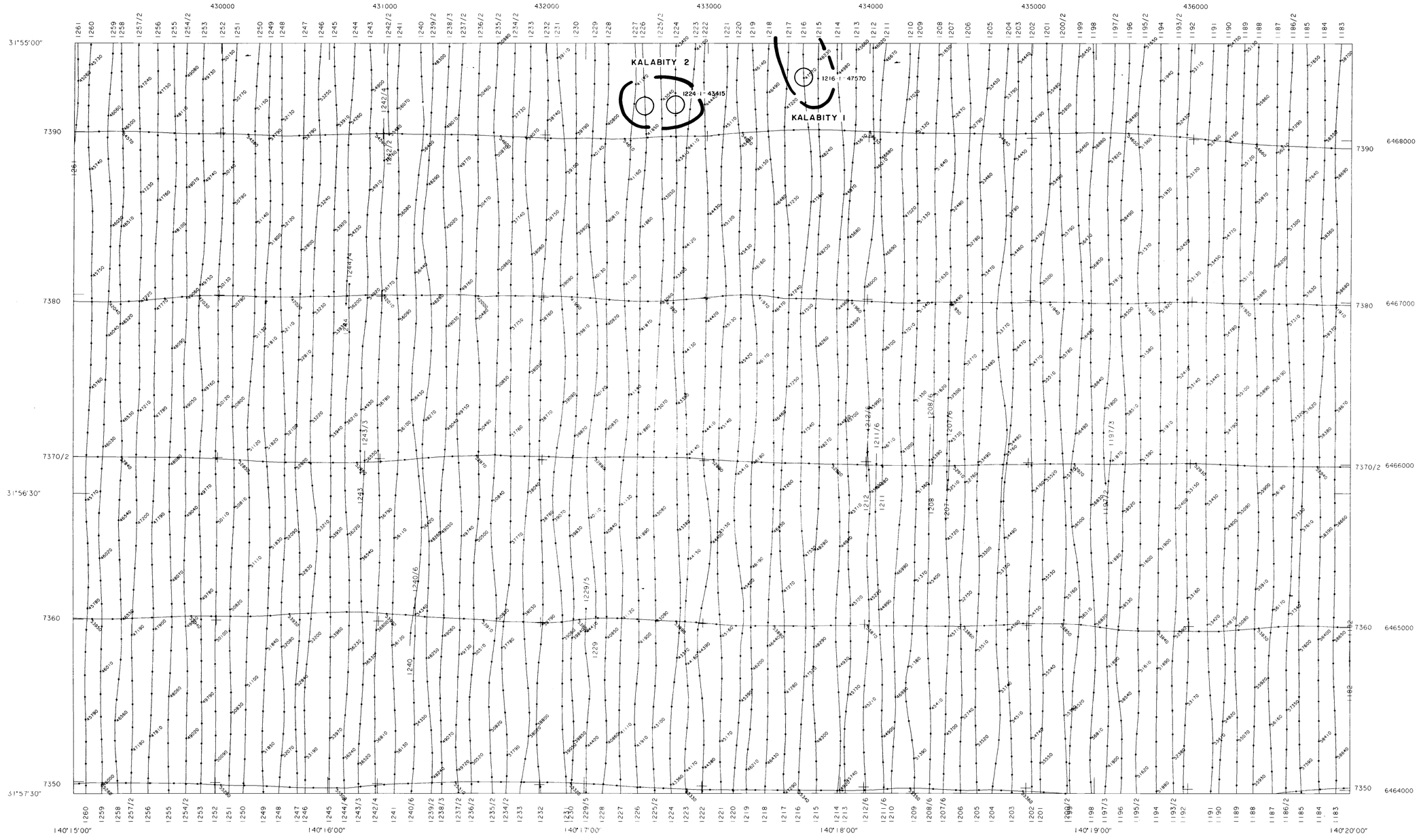
KALABITY EL 1497

URANIUM CHANNEL RADIOMETRIC ANOMALY LOCATIONS ON FLIGHT LINES

CURNAMONA SH54-14 Sheet 22

Geo A.R.D. Doe.	Revised	Report: 17847
Drawn: O Holiday	Date: March, 1992	Drg. SAb 708

KALABITY 4



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT.
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of AMG coordinates from the SYLEDIS STR4 navigation system

FLIGHT PATH MAP

Grid notation refers to Australian Map Grid Zone 54
Syledis navigation fix 32768

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX



LEGEND

ANOMALY POSITION

ANOMALY CLUSTER BOUNDARY & NAME

1060-2-51366 FLIGHT LINE No. / FIDUCIAL

8200-27

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

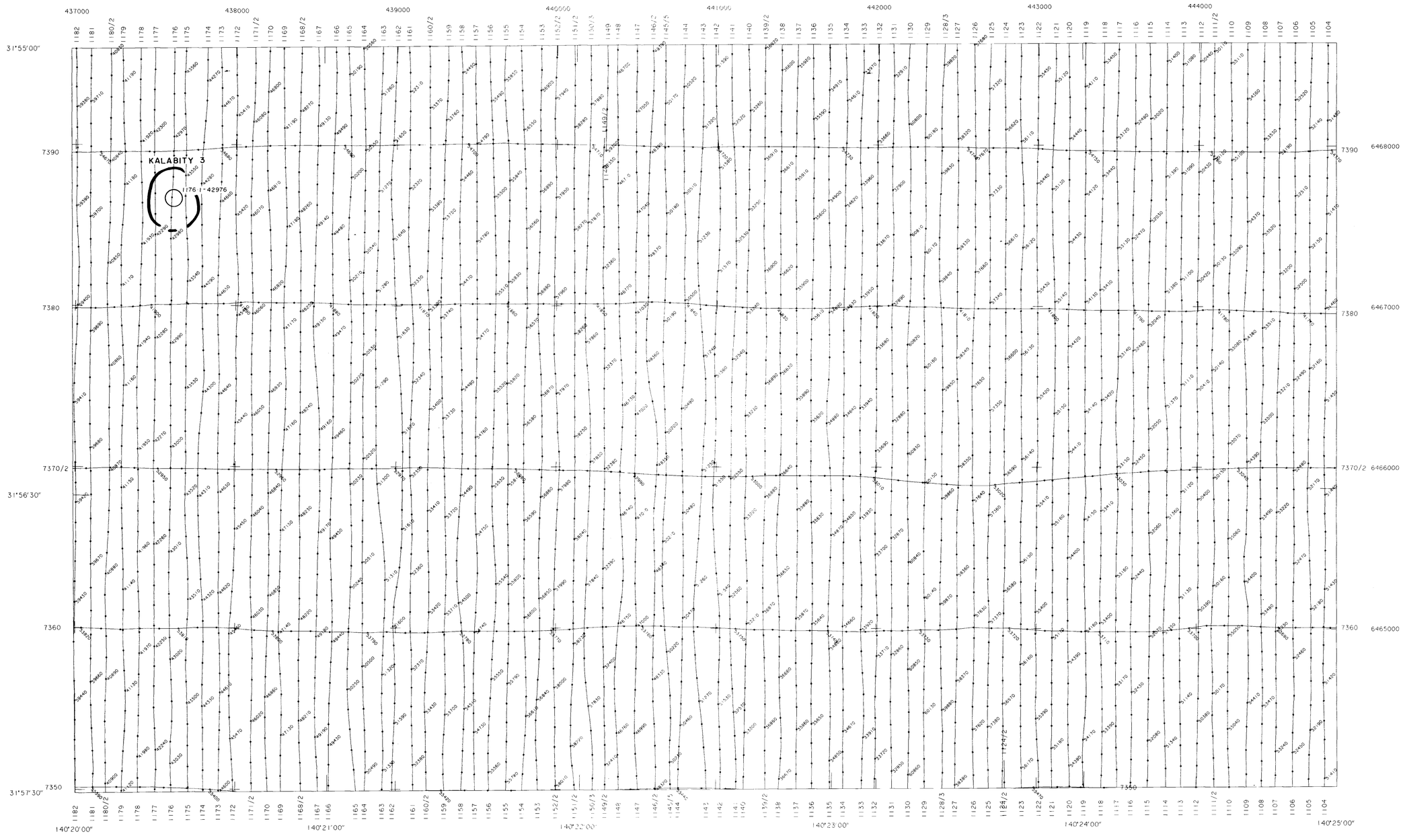
KALABITY EL 1497

URANIUM CHANNEL RADIOMETRIC ANOMALY LOCATIONS ON FLIGHT LINES

CURNAMONA SH54-14 Sheet 30

Geo. ARD Doe	Revised	Report 17-47	
Drawn G.Halliday	Date March, 1992	Drg. SAb 713	

KALABITY 182



AIRBORNE SURVEY SPECIFICATIONS

MAGNETOMETER :	Cesium Vapour optical absorption. Sensitivity : 0.05 nT
RECORDING INTERVAL :	0.1 sec (approx 7m sampling) at mean ground speed of 220 km/hour
SPECTROMETER :	Nuclear Data 256 channel ADC Volume : 33.5 litres
TOTAL COUNT WINDOW :	0.8 - 3.00 MeV
POTASSIUM WINDOW :	1.36 - 1.56 MeV
URANIUM WINDOW :	1.66 - 1.86 MeV
THORIUM WINDOW :	2.42 - 2.82 MeV
RECORDING INTERVAL :	1.0 sec (approx 70m sampling) at mean ground speed of 220 km/hour
DATA RECORDING :	Geoterrex MADACS acquisition system Digital to magnetic tape.
NOMINAL TERRAIN CLEARANCE :	Both detectors in aircraft at 60m
NOMINAL LINE SPACING :	Traverse lines 100 m. Tie Lines 1.0 km.
FLIGHT PATH NAVIGATION :	SYLEDIS STR4 radio navigation system
FLIGHT PATH RECORD :	Real time calculation of ANG coordinates from the SYLEDIS STR4 navigation system

FLIGHT PATH MAP

Grid notation refers to Australian Map Grid Zone 54
Syledis navigation fix 32768

SCALE 1:10000

200 0 200 400 600 800 m.

MAP SHEET INDEX



LEGEND

ANOMALY POSITION

ANOMALY CLUSTER BOUNDARY & NAME

1060 2-51366 FLIGHT LINE N° / FIDUCIAL

8200-28

JOB NO : 1-402
Flown by GEOTERREX PTY LTD : Jun 1989
Compiled by GEOTERREX PTY LTD, SYDNEY
Processed by GEOTERREX PTY LTD, SYDNEY

C.R.A. EXPLORATION PTY LIMITED

KALABITY EL 1497

URANIUM CHANNEL RADIOMETRIC ANOMALY LOCATIONS ON FLIGHT LINES

CURNAMONA SH54-14 Sheet 3:

Geo. & R.D. Doe	Revised	Report No.
Drawn: L. Holliday	Date: March, 1992	Drg. SAb 714

KALABITY 2

WAUKALOO 6934-II-NW/NE
KALABITY 6934-II-SW/SE

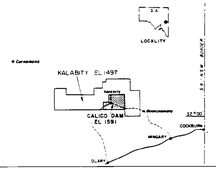
WAUKALOO 6934-II-NW/NE
KALABITY 6934-II-SW/SE

430000 E
435000 E
440000 E
445000 E
450000 E

6470000 N
6465000 N
6460000 N

CALICO DAM EL 1591

- ·5 ppm
- 5-10 ppm
- 10-20 ppm
- 20-50 ppm
- 50-200 ppm
- 200-500 ppm
- 500-800 ppm
- 800-1200 ppm
- 1200 ppm



jmap 100m

8200-29

ACN N° 000 057 125

CRA EXPLORATION PTY. LIMITED

Calico Dam EL 1591 / Kalabity 6934-II-S
Rock Chip Analysis (Cu ppm)

Geol: CEC	Scale: 1:25 000	Report: 17847
Drawn: SMM.JAYOE	Date: 10/4/92	Plan: SAb 736

CRA EXPLORATION PTY. LIMITED
(INC. IN N.S.W.) A.C.N. 000 057 125

69 RAKOW STREET,
P.O. BOX 683,
BROKEN HILL, NEW SOUTH WALES 2880
AUSTRALIA

TELEGRAMS: "CRAEX"
TELEPHONE: (080) 88 2536
FAX: (080) 88 3384

IN REPLY PLEASE QUOTE

3 July 1992

SA Department of Mineral Resources
191 Greenhill Road
PARKSIDE SA 5063

Dear Sir,

Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd July 1992. Olary, South Australia

Please find enclosed CRAE report No. 18143 titled as above.

Total expenditure on the Licence area by CRAE from 1st April 1992 to 30th June 1992, the nearest accounting period is $21,407.

	EL 1591 CALICO DAM
Travel & Accommodation	$ 648
Tenement Payment	$ 408
Contractors & Professional	$ 11,722
Salaries & Wages	$ 7,179
Field Supplies & Vehicles	$ 301
Office & Miscellaneous	$ 1,149
TOTAL	$ 21,407

The total expenditure by CRAE to date is $142,146.

Yours faithfully

Darcy Brenter
for

Rick Nelson
Principal Geologist



CRA EXPLORATION PTY. LIMITED
BROKEN HILL

EXPLORATION LICENCE 1591 (CALICO DAM) PROGRESS REPORT FOR QUARTER ENDED 2ND JULY 1992 OLARY, SOUTH AUSTRALIA

Author	:	S.M. Munroe
Date	:	July 1992
Submitted to	:	Chief Geologist - NSW District
Copies to	:	Department Mines & Energy - SA CRAE - Canberra CRAE - Sydney CRAE - Broken Hill CRAE - Adelaide
Submitted by	:	
Accepted by	:	

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CRAE Report No. 18143

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4.	PREVIOUS EXPLORATION BY CRAE	2
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6.	FURTHER WORK PROGRAM	3
8.	KEYWORDS	4
9.	LOCATION	4

LIST OF PLANS

Plan No.	Title	Scale
SAb 151	Calico Dam EL 1591 Locality Plan	1:1 000 000
SAb 818	Calico Dam EL 1591 Rock Chip Analysis [z log (x) Cu,Zn] - Kalabity 6934-ii-SW/SE Waukaloo 6934-ii-NW/NE (part)	1:25 000

LIST OF APPENDICES

APPENDIX I : Calico Dam EL 1591
Linear Regression (Cu-Zn)

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND JULY 1992
OLARY, SOUTH AUSTRALIA

1. SUMMARY

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July 1989.

The EL was renewed for a further term of twelve months from the 3rd July 1992 .

The application for Calico Dam was made to explore the area for copper, gold and uranium.

Elsewhere in the Olary Block copper mineralisation is associated with iron formation units, while uranium is associated with the granites and the granite-sedimentary sequence contact. Much of the EL is under thin alluvial/colluvial cover.

Exploration during the reporting period consisted of:

- Further interpretation of geochemical data recovered from CEC geochemical data after compilation onto company plans.
- The initiation of a photogeological study over the Calico Dam (EL 1591) area with the aim of producing:

  a) Geochemical amenability map
  b) Detailed outcrop/subcrop geology maps
  c) Solid geology map

2. INTRODUCTION

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July 1989 for a term of one year with an expenditure commitment of $35,000. The EL was renewed in 1990 and 1991 for further periods of 12 months each with further expenditure commitments of $40,000 and $35,000 respectively, i.e., the Licence conditions stipulate that a total of $110,000 is required to be spent over the three year period.

To date a total of ***$142,146*** has been spent.

The 148 sq. km. Licence is located approximately 38 km north of Olary in the vicinity of the Kalabity Station Homestead. (Plan SAb 151).

3. GEOLOGY

Mapped geology (Curnamona SH54-14) within the EL consists of Early Proterozoic rocks tentatively correlated with the Willyama Supergroup of Broken Hill. Outcrop exists in approximately 40% of the area.

These rocks are:

1. Medium to coarse grained migmatites and gneiss, which are in place anatectic granitoids and pegmatoids.

2. Undifferentiated schists with minor quartzites.

The Willyama Supergroup rocks have been intruded by middle Proterozoic granites.

The remaining 60% of the area is covered by aeolian, alluvial and colluvial material.

4. PREVIOUS EXPLORATION BY CRAE

Exploration conducted over EL 1591 (Calico Dam) by CRAE is detailed in reports by Nelson (1989 and 1990a & b), Sheard (1990a & b), Brewster (1991a, b & c), Humphries (1991), Andrews (1992) and Munroe (1992). A brief summary of this work follows:

- An airborne magnetic and radiometric survey was completed over the entire area as part of a larger survey over the adjacent Kalabity (EL 1497) Licence. The survey was flown on 100m spaced N-S lines with a nominal 60m sensor altitude. Plan SAb 129 shows the location of the survey.

- Interpretation and analysis of the airborne magnetic and radiometric data (Sheard 1990a and 1990b).

- Support on Geology Honours students mapping in the area.

- Standardisation of geochemical data recovered from CEC and compilation onto company plans.

- Interpretation of geochemical data recovered from CEC and correlation with airborne radiometric data (Munroe 1992)

5. EXPLORATION DURING THE CURRENT REPORTING PERIOD

A moderate correlation has been observed between copper and zinc rock chip geochemistry recovered from CEC geochemical data (Appendix I). A 1:25 000 scale copper-zinc plot has been generated by calculating the standard scores of the log raw data for both copper and zinc, and adding them. (Plan SAb 818). The resulting data has a normal distribution. Plotted cut offs represent the 40, 50, 60, 70, 80, 90, 95 and 98th percentiles respectively.

A photogeological study of the Calico Dam (EL 1591) area has been initiated during the current quarter with the aim of producing:

a) Geochemical amenability map
b) Detailed outcrop/subcrop geology maps
c) Solid geology map.

At this stage no results of this work are available.

6. FURTHER WORK PROGRAM

The following work program is proposed for the Licence.

- Continuation of the rock chip/ground checking program to follow up on areas of anomalous Cu, Cu-Zn geochemistry identified from CEC data.
- Completion of photogeological study.

7. REFERENCES

Nelson R.W.	1989	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1989. Olary, South Australia. CRAE Report No. 16093.
Sheard S.N.	1989a	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1990. Olary, South Australia. CRAE Report No. 16352.
Nelson R.W.	1990a	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd April 1990. Olary, South Australia. CRAE Report No. 16475.
Sheard S.N.	1990b	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1990. Olary, South Australia. CRAE Report No. 16833.
Brewster D.C.	1991a	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1991. Olary, South Australia. CRAE Report No. 17067.
Brewster D.C.	1991b	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd April 1991. Olary, South Australia. CRAE Report No. 17227.

Brewster D.C.	1991c	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd July 1991. Olary, South Australia. CRAE Report No. 17371.
Humphries M.B.	1991	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1991. Olary, South Australia. CRAE Report No. 17596.
Andrews S.	1992	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1992. Olary, South Australia. CRAE Report No. 17850.
Munroe S.M.	1992	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd April 1992. Olary, South Australia. CRAE Report No. 17847.

8. KEYWORDS

Calico Dam EL 1591, geophys radiometrics, airborne magnetics/radiometrics.

9. LOCATION

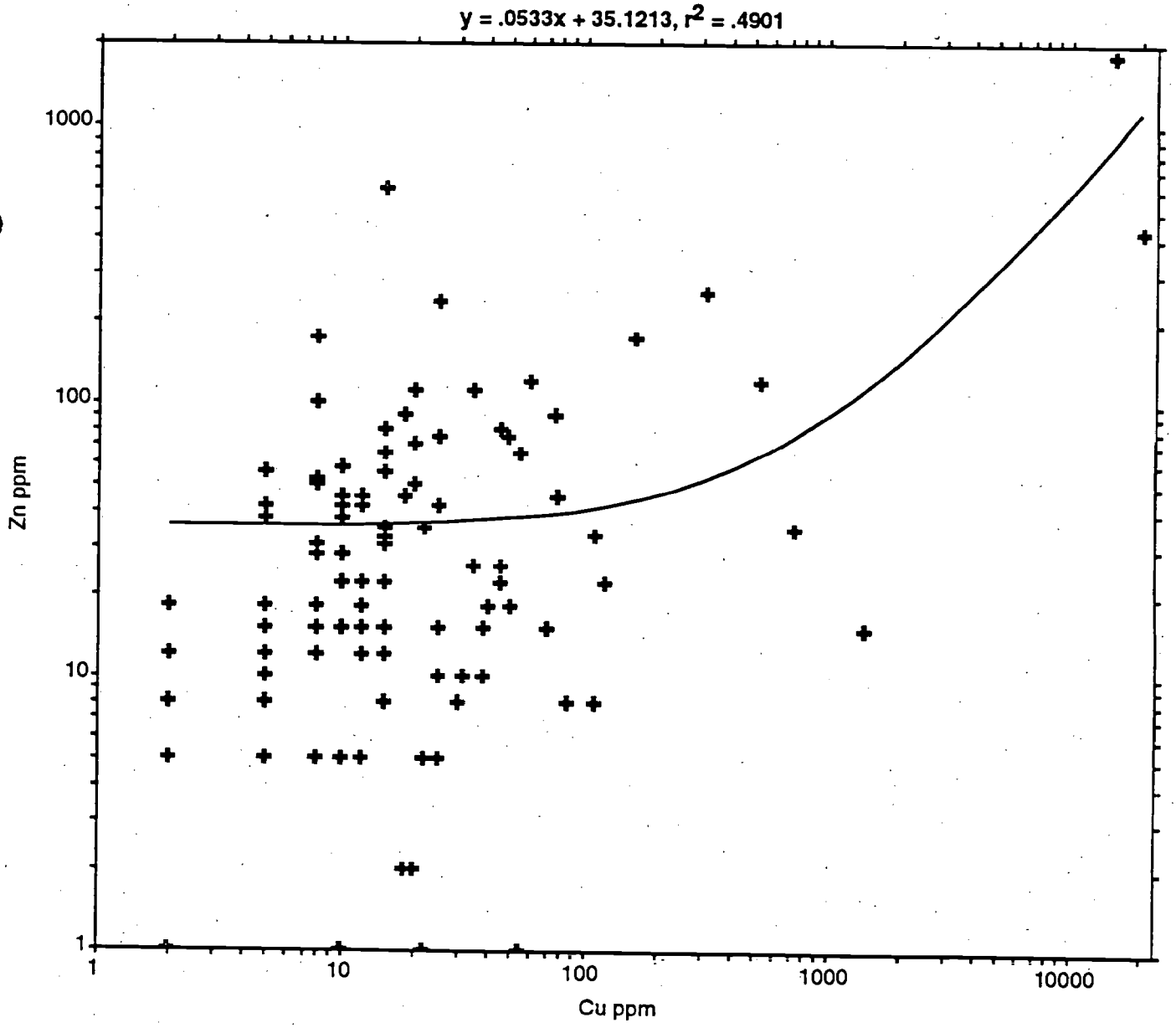
Curnamona SH5414 (1:250 000)

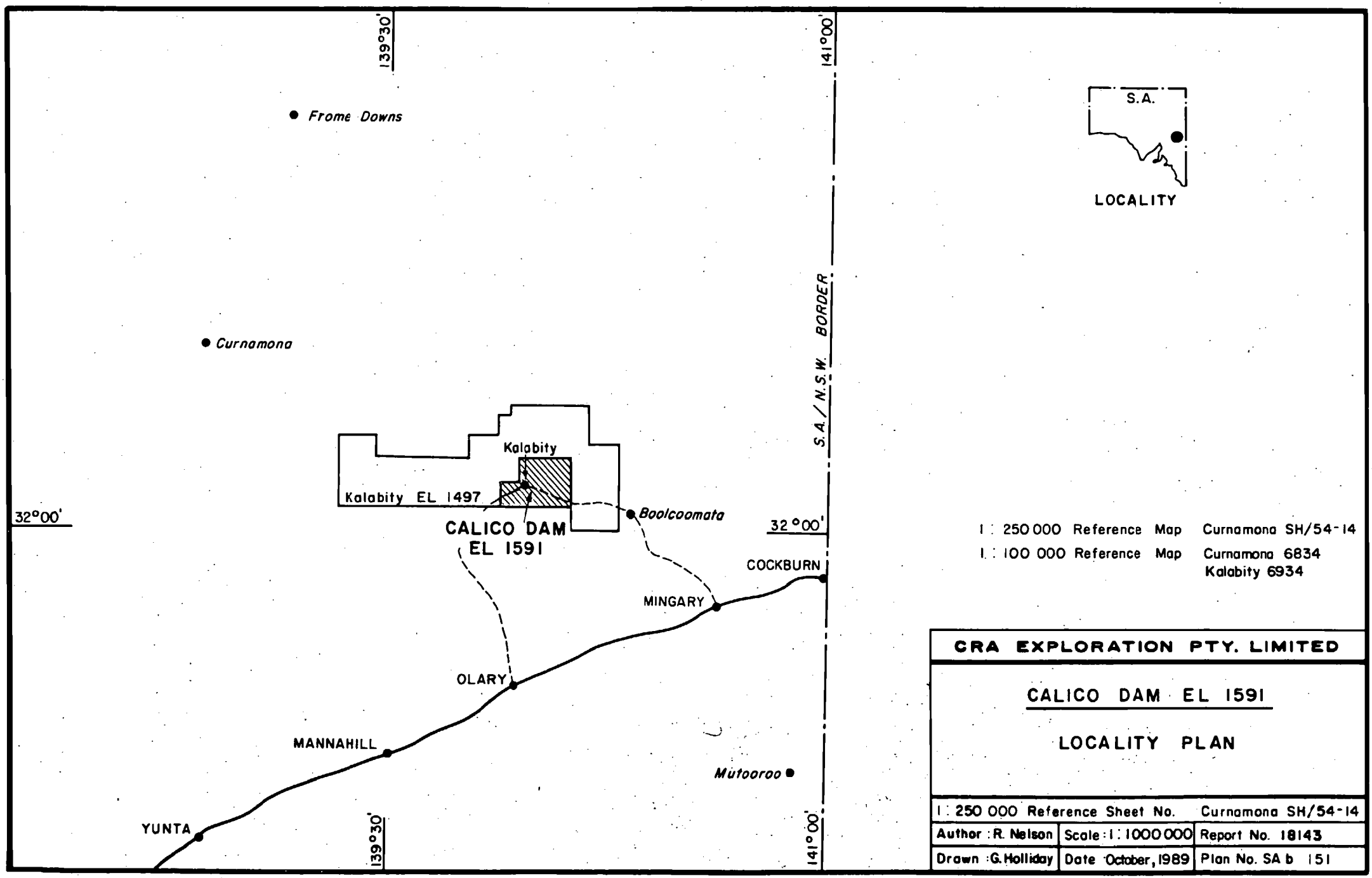
APPENDIX I

Calico Dam EL 1591

Linear Regression (Cu-Zn)

CALICO DAM EL 1591 - LINEAR REGRESSION (Cu-Zn)




139°30'
141°00'
Frome Downs
Curnamona
S.A./N.S.W. BORDER
Kalabity
Kalabity EL 1497
CALICO DAM
EL 1591
Boolcoomata
32°00'
32°00'
COCKBURN
MINGARY
OLARY
MANNAHILL
YUNTA
Mutooroo
139°30'
141°00'
S.A.
LOCALITY
1 : 250 000 Reference Map Curnamona SH/54-14
1 : 100 000 Reference Map Curnamona 6834
Kalabity 6934
CRA EXPLORATION PTY. LIMITED
CALICO DAM EL 1591
LOCALITY PLAN
1 : 250 000 Reference Sheet No. Curnamona SH/54-14
Author : R. Nelson
Scale : 1 : 1000 000
Report No. 18143
Drawn : G. Holliday
Date : October, 1989
Plan No. SA b 151

WAUKALOO 6934-II-NW/NE
KALABITY 6934-II-SW/SE

WAUKALOO 6934-II-NW/NE
KALABITY 6934-II-SW/SE

432000 436000 440000 444000 448000 452000

6472000

6468000

6464000

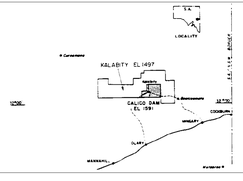
6460000

CALICO DAM EL 1591

PERCENTILES

<40th	40-50th	50-60th	60-70th
• -0.55	• -0.55-0.20	○ 0.20-0.25	○ 0.25-0.56

PERCENTILES	70-80th	80-90th	90-95th	95-98th	>98th
	○ 0.56-0.95	0.95-1.88	1.88-2.89	2.89-4.11	+4.11



100m

8200-30

"CRA EXPLORATION PTY LIMITED"

CALICO DAM EL 1591

Rockchip Analysis Sum(z log(x) Cu, Zn)

KALABITY 6934-II-SW/SE, WAUKALOO 6934-II-NW/NE (Part)

Geol:CEC	Scale: 1:25000	Report: 18143
Drawn:S. Munroe	Date: JUNE 1992	Plan: SA6 818

CRA EXPLORATION PTY. LIMITED
(INC. IN N.S.W.) A.C.N. 000 057 125
69 RAKOW STREET,
P.O. BOX 683,
BROKEN HILL, NEW SOUTH WALES 2880
AUSTRALIA

TELEGRAMS: "CRAEX"
TELEPHONE: (080) 88 2536
FAX: (080) 88 3384

IN REPLY PLEASE QUOTE

7 October 1992

SA Department of Mineral Resources
191 Greenhill Road
PARKSIDE SA 5063

Dear Sir,

Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd October 1992. Olary, South Australia

Please find enclosed CRAE report No. 18321 titled as above.

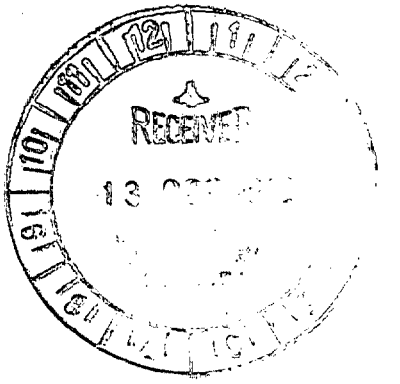
Total expenditure on the Licence area by CRAE from 1st July 1992 to 30th September 1992, the nearest accounting period is $6,817.

	EL 1591 CALICO DAM
Contractors & Professional	$ 1
Laboratory	$ 1,500
Payroll & Benefits	$ 3,730
Field & Transport	$ 100
Computer Services	$ 45
Office & Miscellaneous	$ 401
District & Administration	$ 585
Regional Overheads	$ 455
TOTAL	$ 6,817

The total expenditure by CRAE to date is $148,963

Yours faithfully

Rick Nelson
Principal Geologist

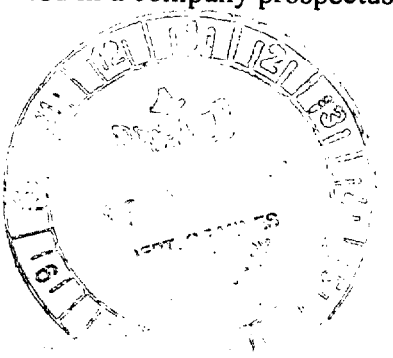


CRA EXPLORATION PTY. LIMITED
BROKEN HILL

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND OCTOBER 1992
OLARY, SOUTH AUSTRALIA

Author	:	S. Andrews
Date	:	October 1992
Submitted to	:	Chief Geologist - NSW District
Copies to	:	Department Mines & Energy - SA CRAE - Canberra CRAE - Sydney CRAE - Broken Hill CRAE - Adelaide
Submitted by	:	S. Andrews
Accepted by	:	

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CRAE Report No. 18321

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8.	KEYWORDS	4
9.	LOCATION	4

LIST OF PLANS

Plan No.	Title	Scale
SAb 151	Calico Dam EL 1591 Locality Plan	1:1 000 000
SAb 693	Kalabity EL 1497 - 1992 Detailed Radiometric Anomaly Locations	1:25 000

EXPLORATION LICENCE 1591 (CALICO DAM)
PROGRESS REPORT FOR QUARTER ENDED 2ND OCTOBER 1992
OLARY, SOUTH AUSTRALIA

1. SUMMARY

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July 1989.

The EL was renewed for a further term of twelve months from the 3rd July 1992 .

The application for Calico Dam was made to explore the area for copper, gold and uranium.

Elsewhere in the Olary Block copper mineralisation is associated with iron formation units, while uranium is associated with the granites and the granite-sedimentary sequence contact. Much of the EL is under thin alluvial/colluvial cover.

Exploration conducted during the present reporting period is described as follows:

- Ground reconnaissance investigation has led to the identification at surface of a davidite bearing pegmatite at Kalabity radiometric anomaly No. 4.
- Geoterrex has been commissioned to correct and represent CRAE radiometric data over Kalabity 1:25 000 sheet 6934-11-SW/SE.
- A photogeological study of the Calico Dam EL 1590 is in progress.

2. INTRODUCTION

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July 1989 for a term of one year with an expenditure commitment of $35,000. The EL was renewed in 1990 and 1991 for further periods of 12 months each with further expenditure commitments of $40,000 and $35,000 respectively, i.e., the Licence conditions stipulate that a total of $110,000 is required to be spent over the three year period.

To date a total of ***$148,963*** has been spent.

The 148 sq. km. Licence is located approximately 38 km north of Olary in the vicinity of the Kalabity Station Homestead. (Plan SAb 151).

3. GEOLOGY

Mapped geology (Curnamona SH54-14) within the EL consists of Early Proterozoic rocks tentatively correlated with the Willyama Supergroup of Broken Hill. Outcrop exists in approximately 40% of the area.

These rocks are:

1. Medium to coarse grained migmatites and gneiss, which are in place anatectic granitoids and pegmatoids.

2. Undifferentiated schists with minor quartzites.

The Willyama Supergroup rocks have been intruded by middle Proterozoic granites.

The remaining 60% of the area is covered by aeolian, alluvial and colluvial material.

4. PREVIOUS EXPLORATION BY CRAE

Exploration conducted over EL 1591 (Calico Dam) by CRAE is detailed in reports by Nelson (1989 and 1990a & b), Sheard (1990a & b), Brewster (1991a, b & c), Humphries (1991), Andrews (1992) and Munroe (1992a & b). A brief summary of this work follows:

- An airborne magnetic and radiometric survey was completed over the entire area as part of a larger survey over the adjacent Kalabity (EL 1497) Licence. The survey was flown on 100m spaced N-S lines with a nominal 60m sensor altitude. Plan SAb 129 shows the location of the survey.

- Interpretation and analysis of the airborne magnetic and radiometric data (Sheard 1990a and 1990b).

- Support on Geology Honours students mapping in the area.

- Standardisation of geochemical data recovered from CEC and compilation onto company plans.

- Interpretation of geochemical data recovered from CEC and correlation with airborne radiometric data (Munroe 1992)

5. EXPLORATION DURING THE CURRENT REPORTING PERIOD

- Surface examination of Kalabity radiometric anomaly No. 4 (Plan SAb 693) has resulted in the identification of a significant davidite vein host within anatectic pegmatite. Preliminary ground scintilometer traverses indicate that the davidite vein may possess a strike length of greater than 1000 metres. Vein thickness and attitude has not been established.

  Results of detailed scintillometer traversing will be presented in the next

quarterly report.

A single rock chip sample of davidite vein float submitted for assay yielded results of 4.45% U, 0.15% Th, 2.52% La, 1.45% Ce and 1.6% Pb.

A sample of davidite vein float has been submitted to Amdel for mineralogical identification. Amdel reports G6721/93 and G6744/93 (Appendix I) confirm that the uranium bearing mineral is amorphous davidite. Rutile, monazite, hematite, biotite, muscovite and quartz form intergrowths with the davidite.

A further 7.5 kg sample of davidite vein float has been submitted to Amdel for metallurgical testing. Results of work have not been received.

- Geoterrex has been commissioned to correct and represent as 1:25 000 scale profiles all CRAE radiometric data within the 1:25 000 Kalabity sheet 6934-11-SW/SE. The corrected data will provide a base for more accurate determination of further radiometric anomalies within Calico Dam EL 1590.

- A photogeological study of the Calico Dam EL 1591 area by Australian Photogeological Consultants Pty. Ltd is near completion.

6. FURTHER WORK PROGRAM

- The extent of further work at Kalabity radiometric anomaly No. 4 is likely to depend upon the results of preliminary metallurgical testing of the davidite vein material. Shallow costeaning across the ground scintillometer anomaly will provide the best means of establishing vein thickness and attitude at surface.

- Surface reconnaissance investigations about Calico Dam EL 1590 will expand during the next reporting period. The results of the photogeological study and Geoterrex radiometric data corrections will provide valuable aids to this investigation.

7. REFERENCES

Nelson R.W.	1989	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1989. Olary, South Australia. CRAE Report No. 16093.
Sheard S.N.	1989a	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1990. Olary, South Australia. CRAE Report No. 16352.
Nelson R.W.	1990a	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd April 1990. Olary, South Australia. CRAE Report No. 16475.

Sheard S.N.	1990b	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1990. Olary, South Australia. CRAE Report No. 16833.
Brewster D.C.	1991a	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1991. Olary, South Australia. CRAE Report No. 17067.
Brewster D.C.	1991b	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd April 1991. Olary, South Australia. CRAE Report No. 17227.
Brewster D.C.	1991c	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd July 1991. Olary, South Australia. CRAE Report No. 17371.
Humphries M.B.	1991	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd October 1991. Olary, South Australia. CRAE Report No. 17596.
Andrews S.	1992	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd January 1992. Olary, South Australia. CRAE Report No. 17850.
Munroe S.M.	1992	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd April 1992. Olary, South Australia. CRAE Report No. 17847.
Munroe S.M.	1992	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter ended 2nd July 1992. Olary, South Australia. CRAE Report No.18143.

8. KEYWORDS

Calico Dam EL 1591, geophys radiometrics, airborne magnetics/radiometrics.

9. LOCATION

Curnamona SH5414 (1:250 000)

APPENDIX I

Amdel Mineralogical Report for Davidite Sample

Mineral Services Laboratory
PO Box 338
Torrensville SA 5031
AUSTRALIA

31 Flemington Street
Frewville SA 5063
AUSTRALIA

amdel

Amdel Limited
A.C.N. 008 127 802

Telephone (08) 372 2700 Facsimile (08) 379 6623

9 September 1992

CRA Exploration Pty Ltd
PO Box 683
BROKEN HILL NSW 2880

Attention: Mr Steve Andrews/
Mr Doug Brewster

REPORT G6721/93
MINERALOGY OF A RADIOACTIVE ROCK SAMPLE

YOUR REFERENCE:	Letter, Mr S Andrews, 17 August 1992
IDENTIFICATION:	Unlabelled
MATERIAL:	Rock sample
LOCATION:	New South Wales
DATE RECEIVED:	18 August 1992
WORK REQUIRED:	Mineralogical identification
Investigation and Report by:	Dr Douglas R Mason

Frank Rolke
for

Dr Keith J Henley
Manager, Mineral Services Laboratory

The results contained in this report relate only to the sample(s) submitted for testing. Amdel Ltd accepts no responsibilities for the representivity of the sample(s) submitted.

cah

MINERALOGY OF A RADIOACTIVE ROCK SAMPLE

SUMMARY

1. The mineralogy of a rock sample has been determined using X-ray diffraction, optical microscopy, autoradiography and electron probe microanalysis methods.

2. The sample contains abundant davidite, the U-bearing Fe-Ti oxide. Rutile is present in lesser amount, and is accompanied by minor monazite, biotite, muscovite, quartz, and hematite.

3. All of the davidite occurs in metamict form. Thus it has suffered alteration since original crystallisation with the other phases. The alteration is likely to have been in response to radiation damage.

   Heating of portion of the sample at 1000°C for 25 hours caused recrystallisation of the davidite, allowing confirmation by XRD. This procedure also resulted in the identification of possible trace amounts of brannerite, as well as artificial pseudobrookite.

1. INTRODUCTION

One (1) rock sample was received from Mr. Steve Andrews (CRA Exploration Pty. Ltd., Broken Hill, NSW) on 18 August 1992.

It was indicated that the rock sample was brown-black in appearance, and gave a relatively high radioactive count. It occurs in association with pegmatoidal granitic rocks.

It was suggested that the sample may contain the mineral davidite. It was requested that the mineralogy of the sample be confirmed by appropriate methods.

Interim results were telephoned to Mr. Doug Brewster (CRAE, Broken Hill) on 2 September 1992, and on 8 September 1992.

This report contains the full results of this work.

2. METHODS

A portion of the sample was finely ground, mounted in a holder, and submitted to the X-ray beam in an X-ray diffractometer. The resulting trace was interpreted. This was repeated after the sample has been heated at 1000°C for 25 hours.

The sample was sectioned using a diamond saw, and a slice was prepared for polished thin section preparation (TSC58021). The polished thin section was examined in transmitted and reflected light.

An autoradiograph was prepared from one flat surface of the sectioned sample.

A wavelength-dispersive electron microprobe was used to determine the elements present in particular grains of the polished thin section. This aided mineral identification.

3. RESULTS

3.1 Mineralogy by X-ray Diffraction

The results of the XRD work are presented in Table 1.

In the sample as received, the XRD trace was characterised by very low peak heights accounting for only a minor proportion of the sample. Clearly, much of the sample is amorphous (i.e., lacks an ordered crystal structure).

In contrast, in the trace of the sample after heating, davidite is observed as a dominant phase. It is accompanied by significant pseudobrookite, which is considered to have

been generated by the heating process. The davidite, rutile and possible trace brannerite are considered to represent primary phases in the sample.

3.2 Autoradiography

The autoradiograph reveals a high level of radioactivity from all of the dark brownish black material in the rock sample, and no response from the paler brown areas that are rutile-rich.

3.3 Electron Probe Microanalysis

The results of the qualitative EPMA work are presented in Table 2. All of the minerals identified optically and by XRD were confirmed by the EPMA work.

3.4 Optical Microscopy

Sample: Unlabelled radioactive sample

Polished Thin Section: C58021

Rock Name:
Davidite-rutile rock

Hand Specimen:
The rock sample is fine-grained, massive, and black in colour. Dispersed through the rock are small ragged patches and thin veinlets filled by a paler brownish phase. The sample generates a strong radioactive response to a geiger counter.

Brief Petrography and Mineragraphy:

Mineral	Vol.%	Origin
Davidite	80	igneous/metamorphic vein filling
Rutile	10	igneous/metamorphic vein filling
Monazite	3	igneous/metamorphic vein filling
Biotite	1	igneous/metamorphic vein filling
Muscovite	1	igneous/metamorphic vein filling
Hematite	5	igneous/metamorphic vein filling
Quartz	Tr	igneous/metamorphic vein filling

Davidite occurs as a uniformly massive matrix that is pale grey in reflected light. Small hematite flecks are sparsely and irregularly distributed through the davidite.

Rutile forms subhedral crystals ~0.2-0.4 mm in size that display a deep yellow-brown colour in transmitted light.

Monazite forms stumpy small subhedral crystals. It invariably is closely associated with the rutile.

Muscovite forms colourless flakes and biotite forms pleochroic brown flakes. These, too, are closely associated with the rutile and monazite.

Quartz occurs as small optically continuous patches in thin veinlets with other phases (rutile, monazite, muscovite, biotite).

Interpretation:

This sample displays well-crystallised forms in rutile and monazite that are compatible with relatively slow crystallisation under igneous or high-grade metamorphic conditions. The massive texture of the davidite is a metamict (alteration) feature that occurred subsequent to its initial crystallisation together with the rutile, monazite, and other phases. The origin of the alteration is likely to have occurred in response to its own high level of radioactivity. Near-surface oxidation (i.e., weathering) is not considered to have caused the alteration, as the associated biotite is quite fresh and would be expected to have suffered some alteration under weathering conditions.

TABLE 1: MINERALOGY BY XRD

Mineral	Sample As Received	Sample After Heating
Amorphous	D	-
Davidite	-	D
Rutile	A	A
Quartz	A	-
Pseudobrookite	-	A
?Brannerite	-	Tr
Hematite	A	-

Semiquantitative abbreviations:

D = Dominant. Used for the component apparently most abundant, regardless of its probable percentage level.

A = Accessory. Components judged to be present between the levels of roughly 5 and 20%.

Tr = Trace. Components judged to be below about 5%.

TABLE 2: MINERAL IDENTIFICATION BY EPMA

Grain #	Elements Detected	Inferred Mineral
1	Ti	Rutile
2	Fe	Hematite
3	Ce, P	Monazite
4	Fe, U	Davidite
5	Fe	Hematite
6	Ti	Rutile

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amdel

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A.C.N. 008 127 802

Telephone (08) 372 2700 Facsimile (08) 379 6623

8 September 1992

CRA Exploration Pty Ltd
PO Box 683
BROKEN HILL NSW 2880

Attention: Mr D Brewster

REPORT G6744/93
URANIUM-BEARING MINERALS IN 3291110

YOUR REFERENCE:	DPO 68001
IDENTIFICATION:	3291110
MATERIAL:	Analytical pulp
DATE RECEIVED:	1 September 1992
WORK REQUIRED:	Identification of U-bearing minerals
Investigation and Report by:	Michael Till

Keith Henley

Dr Keith J Henley
Manager, Mineral Services Laboratory

The results contained in this report relate only to the sample(s) submitted for testing. Amdel Ltd accepts no responsibilities for the representivity of the sample(s) submitted.

cah

URANIUM-BEARING MINERALS IN 3291110

1. INTRODUCTION

A sample of analytical pulp was received from Mr D Brewster of CRA Exploration Pty Limited, Broken Hill with a request for identification of the uranium-bearing minerals.

2. PROCEDURE

The sample was analysed by X-ray diffraction. Due to the suspected presence of amorphous U-bearing minerals, the sample was heated at 1000°C for 24 hours, and then reanalysed by X-ray diffraction.

3. RESULTS

As received		After heating at 1000°C for 24 hours	
Amorphous	D	Davidite	D
Rutile	Tr	Rutile	A-SD
Hematite	Tr	Pseudobrookite	A
Quartz	Tr	Brannerite	Tr
Anatase	Tr	Quartz	Tr

Semiquantitative Abbreviations:

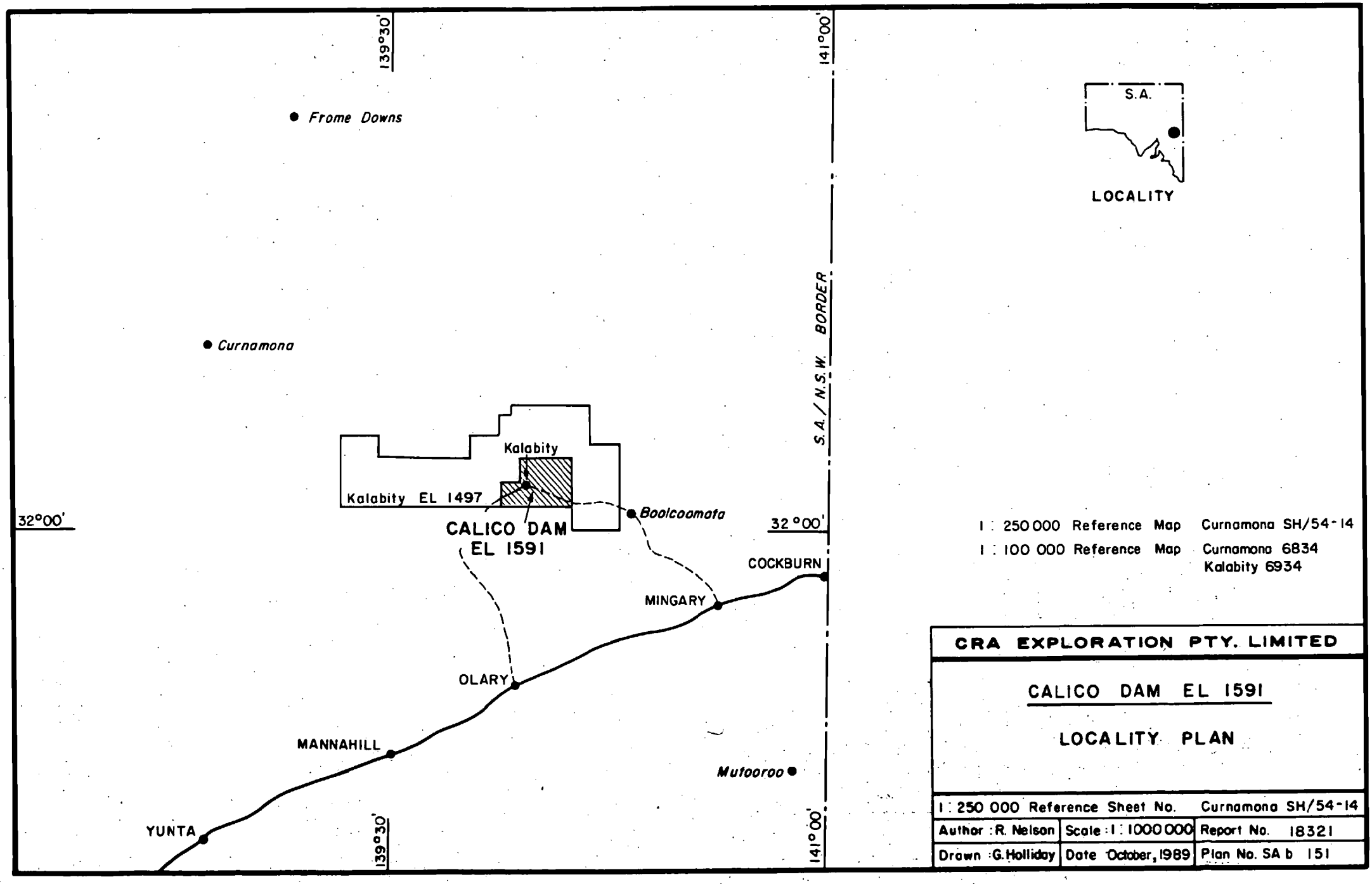
D = Dominant. Used for the component apparently most abundant, regardless of its probable percentage level.

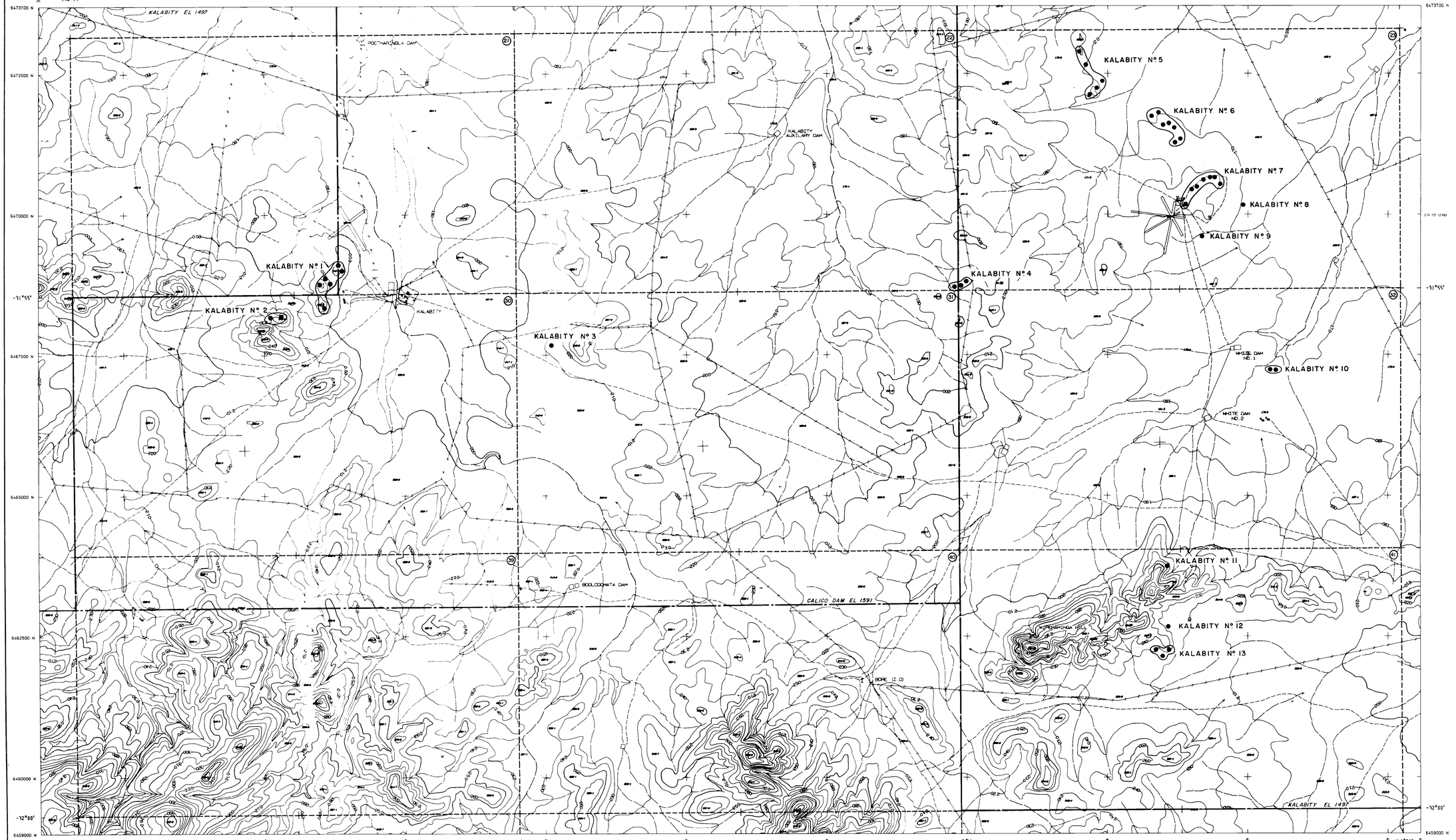
CD = Co-dominant. Used for two (or more) predominating components, both or all of which are judged to be present in roughly equal amounts.

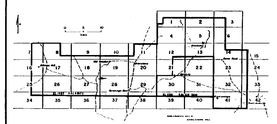
SD = Sub-dominant. The next most abundant component(s) providing its percentage level is judged above about 20.

A = Accessory. Components judged to be present between the levels of roughly 5 and 20%.

Tr = Trace. Components judged to be below about 5%.


139°30'
141°00'
Frome Downs
Curnamona
S.A./N.S.W. BORDER
Kalabity
Kalabity EL 1497
CALICO DAM
EL 1591
Boolcoomata
32°00'
32°00'
COCKBURN
MINGARY
OLARY
MANNAHILL
YUNTA
Mutooroo
139°30'
141°00'
S.A.
LOCALITY
1 : 250 000 Reference Map Curnamona SH/54-14
1 : 100 000 Reference Map Curnamona 6834
Kalabity 6934
CRA EXPLORATION PTY. LIMITED
CALICO DAM EL 1591
LOCALITY PLAN
1 : 250 000 Reference Sheet No. Curnamona SH/54-14
Author : R. Nelson
Scale : 1 : 1000 000
Report No. 18321
Drawn : G. Holliday
Date October, 1989
Plan No. SA b 151





1989 AIRBORNE SURVEY KALABITY AREA
SHEET INDEX 1 - 42

LEGEND

- CRA EXPLORATION TENEMENT BOUNDARY
- RADIOMETRIC ANOMALY - NAME & NUMBER
- AIRBORNE SURVEY 1:10000 SHEET LOCATION & Nº

WALTHERGO 6934-11-NE	DEEP WELL 6934-111-NW/NE	WAUKALOO 6934-11-NW/NE	KALKAROO 7034-111-NW
BILLEROO 6934-11-SE	KOOLKA 6934-111-SW/SE	KALABITY 6934-11-SW/SE	BOOLCOOMATA 7034-111-SW

PREPARED BY PETER LIVINGS AND ASSOCIATES
2 RAGLAN ROAD, MT LAWLEY, 6050
TELEPHONE : 3287088.

1:100000 MAP CONTROL SUPPLIED BY AUSLIG

8200-31

CRA EXPLORATION PTY LIMITED

KALABITY EL 1497

1992 DETAILED RADIOMETRIC ANOMALY LOCATIONS

SHEET Nº 6934-11-SW/SE - KALABITY

SCALE: 1:25000	AUTHOR A.R.D. DOE	DRAWN : G. HOLLIDAY
DATE OF PHOTOGRAPHY : 5-1982		PLAN NO. Sab 693
DATE : MARCH, 1992		CRAE REPORT Nº 18321

CRA Exploration Pty. Limited
New South Wales

First Annual Report
Calico Dam EL 1591
For the Period Ending 3rd July 1993

Author: R. Nelson
S. Andrews

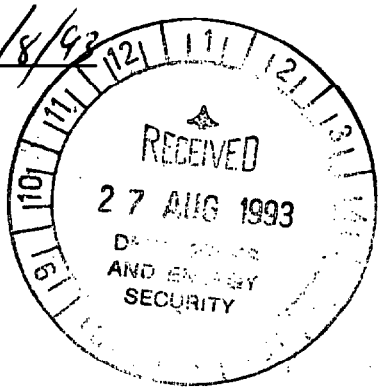
Date: 4 June 1993

Submitted to: Chief Geologist, NSW

Copies to: SA Department of Mines & Energy
CRAE - Canberra
CRAE - Gordon
CRAE - Broken Hill
CRAE - Adelaide

Submitted by: _____

Accepted by: DNL - FAX 4/8/93



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CRAE Report 18876

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Plans

Plan No.	Title	Scale
SAb 151	Calico Dam EL 1591 Locality Plan	1 : 1 000 000
SAb 914	Calico Dam EL 1591 KR4 Davidite Prospect - Geology and Scintillometer Contours	1 : 2 500
SAb 915	Calico Dam EL 1591 Stream Sediment Sample Locations KR4 Prospect	1 : 25 000
SAb 918	Kalabity EL 1497/Calico Dam EL 1591 KR4 Prospect Location Plan	1 : 250 000
SAb 963	Calico Dam EL 1591 KR4 Prospect - Mineralised Interval - Costean No. 1	1 : 25
SAb 964	Calico Dam EL 1591 KR4 Prospect - Mineralised Interval - Costean No. 2	1 : 25
SAb 965	Calico Dam EL 1591 KR4 Prospect - Mineralised Interval - Costean No. 3	1 : 25
SAb 966	Calico Dam EL 1591 KR4 Prospect - Mineralised Interval - Costean No. 5	1 : 25
SAb 967	Calico Dam EL 1591 KR4 Prospect - Mineralised Interval - Costean No. 6	1 : 25
SAb 968	Calico Dam EL 1591 KR4 Prospect - Mineralised Interval - Costean No. 7	1 : 25
SAb 969	Calico Dam EL 1591 KR4 Prospect - Mineralised Interval - Costean No. 8	1 : 25
SAb 970	Calico Dam EL 1591 KR4 Prospect - Mineralised Interval - Costean No. 9	1 : 25
SAb 971	Calico Dam EL 1591 Polar Projection of Structual Data - KR4 Prospect	1 : 25
SAb 1048	Calico Dam EL 1591 Reconnaissance Rock Chip Sample Location	1 : 25 000
SAb 1052	Calico Dam EL 1591 KR4 Prospect - Costeans No. 1.- 4 Total Count Measurements	No Set Scale
SAb 1053	Calico Dam EL 1591 KR4 Prospect - Costeans No. 5 - 9 Total Count Measurements	No Set Scale
SAb 1056	Calico Dam EL 1591 Radiometric Anomaly Location	1 : 25 000

Appendices

APPENDIX I - Previous Rock Chip Sampling - Carpentaria Exploration Rock Chip Locations and Results

APPENDIX II - Stream Sediment Orientation Sampling
Kalabity Radiometric Anomaly No. 4 (KR4 Prospect)
S. Andrews (1992)
BH File No. 2911

APPENDIX III - Amdel Report G6721/93 -
Mineralogy of a Radioactive Rock Sample

Amdel Report G7438/93 -
Leaching Uranium Ore (9/10/92)

APPENDIX IV - KR4 Prospect Costeans 1 - 9

- Radiometric Total Count Measurements
- Channel Sample Locations
- Vein Sample Ledgers
- Assay Results

APPENDIX V - KR4 Prospect - Possible Sampling Problem of the KR4 Uranium Prospect - Due to Nugget Effect

APPENDIX VI - Radiometric Bulk Samples -

- Ledgers
- Assay Results

APPENDIX VII - Rock Chip Sample Ledgers, Reconnaissance Sampling Program, Assay Results

Figures in Appendices

Appendix II - Figures 1 to 4

Note: Figure 1 as Plan SAb 915

Appendix V - Figure 1 (no plan nos.)
Figure 2 (no plan nos.)

Abstract

EL 1591 consisting of 148 sq km lying 38 km north of Olary was granted to CRA Exploration Pty. Limited (CRAE) on 3 July 1989.

CRAE took title to assess the area's potential to host:

- Copper-gold mineralisation
- Uranium mineralisation

Work by CRAE to date has consisted of:

- Literature review
- Previous data compilation
- Airborne magnetic and radiometric survey
- Rock chip and float sampling
- Ground scintillometer surveying KR4 prospect
- Orientation stream sediment sampling
- Metallurgical testing - Davidite
- Trenching - 9 costeans totalling 645m
- Costean vein and channel sampling
- Bulk sampling and assaying of quartz veins
- Costean rehabilitation

From the work completed at the KR4 prospect it is concluded that the area does not have the potential to host a significant uranium resource.

It is recommended:

- A stream sediment sampling program be completed of the southern exposed portion of the EL.
- Follow up of second order radiometric anomalies.

This work should be completed during 1993 to allow for planning and budgeting of any possible 1994 program.

CRAE's expenditure for the twelve months ending 30th June 1993, of $81,253 exceeded SADME minimum requirement of $40,000.

1. Conclusions and Recommendations

Work during the twelve month period ending 2nd July 1993 has concentrated on the KR4 davidite prospect.

This work consisting of float/rock chip sampling, geological mapping, scintillometer surveying, costeaning, channel sampling and metallurgical sampling failed to indicate that the prospect hosted significant uranium mineralisation.

No further work is recommended within the KR4 prospect.

An assessment of all previous data pertaining to the EL will be undertaken with the view to completing a stream sediment sampling program over the southern portion of the EL.

2. Introduction

Exploration Licence 1591 (Calico Dam) was granted to CRA Exploration Pty. Limited on 3rd July 1989. The EL was renewed for a further term of twelve months from the 3rd July 1993.

The 148 sq. km. of licence is located approximately 38 km. north of Olary in the vicinity of the Kalabity station homestead (Plan SAb 151).

The application for Calico Dam was made to explore the area for copper, gold and uranium.

Elsewhere in the Olary Block copper mineralisation is associated with iron formation units, while uranium is associated with the granites and the granite-sedimentary sequence contact. Much of the EL is under thin alluvial/colluvial cover.

This is the first annual report under the new (1993) SA Mines and Energy reporting requirements for EL 1591.

Exploration conducted during the twelve month period has consisted of:

- Appraisal of airborne radiometric multiplots from the Kalabity 1:25 000 sheet with a number of radiometric targets being noted.
- Rock chip/float sampling of above targets (28 samples).
- Detailed ground scintillometer traversing and definition at surface of the davidite anomaly at the KR4 prospect.
- Metallurgical testing of the davidite from the KR4 prospect.
- Trenching nine costeans with a total length of 645m over the KR4 prospect.

- Geological mapping, scintillometer traversing and channel sampling/rock chip sampling of the costean (67 samples).
- Orientation stream sediment sampling of 15 sites along a minor drainage that crosses the KR4 prospect.
- Bulk sampling of the davidite hosting quartz veins for radiometric operation and analysis.
- Rehabilitation of costeans by back filling and re-seeding.

3. Review of Previous Work During Current Tenement

This being the first full annual report for the Calico Dam EL, a review of CRAE's work within the tenement is summarised below:

- An airborne radiometric and magnetic survey was flown in late 1989 over the EL as part of the much larger Kalabity survey. CRAE Report 16093 details the survey's specifications.
- A series of standard 1:25 000 topographic maps were produced for the plotting of all compilations and future work.
- An interpretation of the airborne magnetics was made with no obvious anomalies visible. CRAE Report 16833.
- A preliminary interpretation of the airborne radiometrics highlighted four anomalies. CRAE Report 16622.
- Compilation of known geology including Honours Thesis mapping onto company 1:25 000 base plans.
- Compilation and interpretation of previous rock chip sampling (Carpentaria Exploration Company) onto company 1:25 000 base plans. CRAE Report 17596, 17847. (Appendix I lists results).
- A reinterpretation of the radiometric data reduced the anomalies worthy of follow up from four to three (Kalabity 2, 3, 4). CRAE Report 17847.

This report details the work carried out on one of these anomalies, i.e., KR4.

Geology

Mapped geology (Curnamona SH5414) within the EL consists of early Proterozoic rocks tentatively correlated with the Willyama Supergroup of Broken Hill. Outcrop exists in approximately 40% of the area.

These rocks are:

1. Medium to coarse grained migmatites and gneiss, which are in place anatectic granitoids and pegmatoids.

2. Undifferentiated schists with minor quartzites.

The Willyama Supergroup rocks have been intruded by middle Proterozoic granites.

The remaining 60% of the area is covered by aeolian, alluvial and colluvial material.

4. Exploration Completed in the Twelve Months Ending 3 July 1993

Field exploration during the twelve months has centred on follow up of the radiometric anomalies and in particular the KR4 (Kalabity Radiometric Anomaly 4) anomaly.

4.1 KR4 Prospect

- Follow up to an airborne radiometric anomaly during the previous reporting period (Andrews, 1992) has resulted in the identification at surface of scattered davidite float material approximately 9.5 km east of the Kalabity homestead (Plan SAb 918). The davidite occurrence is here termed the KR4 prospect.

- Detailed ground scintillometer traversing has been completed at the KR4 prospect. Plan SAb 893 shows the extent of the KR4 surface radiometric anomaly as described by the ground traverses.

- A greater than 300 count per second (cps) surface total count anomaly is coincident with a sparse fine davidite fragment field at surface. The greater than 300 cps anomaly has been distinguished over a strike length of approximately 2.2 km and bears at 40-50°m. The anomaly varies in width from less than 5 metres to 65 m. The anomaly is best distinguished over areas of slight topographic elevation and disperses along surrounding soil flats.

- A 7.5 kg sample of davidite float material was submitted to Amdel for metallurgical testing. Amdel report G7438/93, which details the metallurgical procedure and results, is attached in Appendix III.

  Conditions used for the tests were based on those used for leaching of the Radium Hill davidite ore. Leaching of davidite with a 3.3% U head grade in a 37.5% sulphuric acid solution at boiling point for 10 hours yielded uranium extractions of around 90%.

- A total of 9 costeans, with an aggregate metreage of 645 metres, have been completed across the strike of the davidite float field. Costean locations are shown in Plan SAb 893.

- Costeaning at all locations has proven successful in penetrating 0.25-2 metre thick transported soil cover to weathered bedrock. Costean depths vary between 0.5 and 3.5 metres.

- Total count radiation measurements have been collected in all costeans at 0.25 to 2 metre intervals. Appendix IV lists the total count measurements for each costean. Measurements from within costeans 1 - 3 (SAb 1052) and costeans 5 - 8 (SAb 1053) distinguish 2 to 6 metre wide intervals of elevated radioactivity that correspond accurately to davidite mineralisation in bedrock. Costean 4 (SAb 1052) failed to intercept davidite mineralisation. Costean 9 (SAb 1053) intercepted only trace mineralisation in bedrock. An offset of up to 40 metres of the surface anomaly to mineralisation in bedrock is apparent in most of the costeans and indicates a component of down slope transport of davidite at surface.

- 1:25 scale geologic mapping has been conducted over the mineralised interval in costeans 1 - 3 and 5 - 9. Plans SAb 963 to SAb 970 show geologic maps for each costean.

  The following points are forthcoming:

  - Visible davidite is present predominantly as fine to very coarse grains that are dispersed irregularly within quartz veins. The veins, which possess a distinctive clear granular texture, are often barren or may contain a visible davidite content of less than 1 to 20%.

    Minor davidite may also be present within the wall rock.

  - Mineralised veins are intercepted within each costean over a width of between 1 to 6 metres. An accurate assessment of vein density within the mineralised interval is difficult to make given poor exposure with the costean walls. However, it is unlikely that vein density exceeds 20% over the width of the mineralised interval. Visual estimates and scintillometer readings indicate that costean 1 provides the richest intersection of the mineralised interval.

  - The wall rock comprises interbanded quartz-feldspar psammite, quartz-feldspar-biotite-muscovite gneiss and minor pegmatite and granite. Compositional layering within the wall rock sequence bears parallel to the strike of the surface davidite anomaly (at approximately 45°m) and dips steeply to both the NW and SE (Plan SAb 971).

  - Davidite bearing quartz veins both transect and parallel compositional layering of the wall rock within the costean. Thirty three measurements taken within the costeans indicate an apparent preferred vein orientation of approximately 320°/30-50° (Plan SAb 971).

- A total of 34 wall channel and 33 quartz vein rock chip samples have been collected within costeans 1 - 9. Rock chip sampling ledgers containing locational data and descriptions of samples are provided in Appendix IV. Wall channel samples were taken over the width of each mineralised interval in order to ascertain the bulk rock uranium grade. Vein samples were taken in order to ascertain the distribution of uranium over the mineralised interval.

- Assay results from the 34 channel and 33 quartz vein samples were generally poor.

  - A high of 540 ppm U (2m in costean 1) was returned from the 34 channel samples. Only four of the samples assayed greater than 100 ppm U.

  - A high of 7600 U (costean 1) was returned from the 33 rock chip (quartz vein) samples collected from within the costean. Twelve of the samples assayed greater than 100 ppm.

  These results indicated the problems to be had with sampling inhomogeneous material, i.e., the nugget effect.

Appendix V - Memorandum from D. Brewster discusses the problems in detail.

In an attempt to get around this sampling problem a total of three bulk samples from the davidite mineralised zone in Costean 1 were submitted for analysis.

Sample 1: Approximately 20 kg. of sorted radiometrically anomalous (>350 cps) milky vein quartz ± davidite fragments. This "sub-sample" was derived from a larger sample of approximately 200 kg. of hand picked vein quartz. Quartz was selectively sampled as it forms veins which host davidite mineralisation.

Sample 2: Approximately 180 kg. of low radiometric response quartz. This represents the material remaining from radiometric sorting of the hand picked quartz.

Sample 3: Approximately 100 kg. of bulk unsorted spoil from the mineralised zone. This includes mineralised quartz veins and gneissic country rock.

An attempt was also made to quantify the content of vein quartz within the mineralised zone. This was done by measuring the linear metreage of quartz veins within the costean face (costean No. 1) transecting the mineralised zone. Approximately 24 linear metres of vein quartz was noted on $10m^2$ of costean face.

Applying an average quartz vein width of 3cm results in approximately 7% by area of the mineralised costean face being occupied by quartz.

Allowing for veins parallel to the costean face this calculation indicates that no more than a maximum of approximately 10% by volume quartz would be present within the mineralised zone.

Results from "bulk" sampling of mineralised material sourced from costean no. 1 are as follows:

	Sample Type	Mass (kg)	U (ppm)
1.	Hand picked radiometrically anomalous vein quartz (davidite mineralised)	20	280
2.	Non radiometric vein quartz	180	10
3.	Bulk costean spoil from the mineralised zone includes vein quartz and gneissic country rock	100	30

These results show that crude manual radiometric sorting of the vein quartz host to davidite mineralisation was not able to produce material with an economic U grade. As the sorted radiometric fraction was obtained from what was regarded to be a statistically significant total quartz mass (200kg), these results significantly downgrade the potential of the KR4 Uranium prospect.

The low total value of quartz to host the davidite further downgrades the prospect. Appendix VI contains the assay results of the bulk samples.

Rehabilitation

The costeans were subsequently rehabilitated by backfilling and reseeding (Blue Bush - Maireana brevifolia and Salt Bush - Enchylaena tomentose).

Stream Sediment Orientation Sampling - For Uranium

- Orientation sampling (45 samples) was completed at 15 sites along a drainage that crosses the surface radiometric anomaly at KR4 prospect. A detailed discussion of the method used and results of the orientation program are provided in Appendix II.

  This sampling was undertaken to ascertain whether or not stream sediment sampling could be used to search for uraniferous mineralisation under cover within the licence.

  The -20+60#, -60+200# and -200# stream sediment sample fractions collected over a 1.4 km length of the drainage below the prospect fail to provide any clear definition of the davidite occurrence.

  It is therefore considered unlikely that stream sediment sampling will provide an effective means of prospecting for uranium under cover within the Calico Dam licence.

Reconnaissance Rock Chip Sampling

- A total of 28 reconnaissance rock chip samples have been collected about the licence during the present reporting period. Plan SAb 1048 shows the location of rock chip samples. Rock chip sample ledgers and assay results are provided in Appendix VII. No significant results were obtained.

5. References

Nelson R W	1989	Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd October 1989 Olary, South Australia. CRAE Report 16093
Sheard S N	1990	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd January 1990 Olary, South Australia. CRAE Report 16352
Nelson R W	1990	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd April 1990 Olary, South Australia. CRAE Report 16475
Nelson R W	1990	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd July 1990 Olary, South Australia. CRAE Report 16622
Sheard S N	1990	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd October 1990 Olary, South Australia. CRAE Report 16833
Brewster D C	1991	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd January 1991 Olary, South Australia. CRAE Report 17067
Brewster D C	1991	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd April 1991 Olary, South Australia. CRAE Report 17227
Brewster D C	1991	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd July 1991 Olary, South Australia. CRAE Report 17371
Humphries M B	1991	Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd October 1991 Olary, South

Australia. CRAE Report 17596

Munroe S M 1992 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd April 1992 Olary, South Australia. CRAE Report 17847

Andrews S 1992 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd January 1992 Olary, South Australia. CRAE Report 17850

Munroe S M 1992 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd July 1992 Olary, South Australia. CRAE Report 18143

Andrews S 1992 Exploration Licence 1591 (Calico Dam) Progress Report for Quarter Ended 2nd October 1992 Olary, South Australia. CRAE Report 18321

6. Location

Curnamona SH5414
Kalabity 6934

7. Keywords

Calico Dam EL 1591, costean, geophys-airborne, radiometrics, magnetics, uranium.

8. DPO Register

68011, 68015, 68016, 68025, 68026, 68032

APPENDIX I

Previous Rock Chip Sampling
Carpentaria Exploration

Rock Chip Locations and Results

CARPENTARIA EXPLORATION ROCK CHIP ASSAY RESULTS						
CEC Sam/no	AMGEast.	AMGNorth.	Cu ppm.	Zn ppm.	Co ppm.	Mo ppm.
10860	434 700	6 472 050	20	2	5	6
10861	436 650	6 471 700	10	1	32	12
12268	438 200	6 467 450	15	65	15	1
12269	438 600	6 472 200	2	1	2	5
12270	439 150	6 472 200	8	5	55	5
12271	433 600	6 468 250	15	80	10	3
12272	440 100	6 468 400	50	18	20	3
12274	436 200	6 469 050	5	18	2	1
12275	439 150	6 468 200	5	42	2	3
12276	439 150	6 470 300	5	5	2	1
12277	437 800	6 471 250	15	15	20	1
12278	436 800	6 470 400	5	12	2	3
12279	439 750	6 467 100	75	90	22	1
12280	440 150	6 468 450	10	15	5	4
12281	440 150	6 467 600	5	5	2	1
12282	436 000	6 470 000	85	8	18	1
12283	436 050	6 470 000	10	15	12	3
12284	437 300	6 471 600	18	2	230	16
12286	439 400	6 471 750	110	33	35	3
12286	440 800	6 469 100	530	120	15	1
12287	440 600	6 470 050	5	10	2	1
12288	439 000	6 468 400	5	5	2	1
12289	436 750	6 467 550	8	50	5	3
12290	438 200	6 468 400	22	1	240	5
12291	438 250	6 468 400	8	52	45	1
12292	438 200	6 469 200	12	15	2	1
12293	437 800	6 471 600	22	1	60	3
12295	436 000	6 469 500	5	8	8	40
12296	434 550	6 467 950	20	110	8	3
12297	434 550	6 467 900	25	230	20	3
12299	433 600	6 468 200	22	5	5	3
12300	439 100	6 467 200	25	75	15	6
13971	438 500	6 470 050	12	18	2	1
13971	433 650	6 468 200	20	50	15	6
13973	437 400	6 466 400	40	18	5	3
13974	438 800	6 469 350	5	5	2	1
422037	439 300	6 465 350	110	8		
422038	441 150	6 466 150	22	5		
422039	441 750	6 468 450	30	8		
422040	441 500	6 469 700	1420	15		
422041	443 400	6 465 900	5	8		
422042	443 250	6 466 600	5	8		
422043	442 600	6 467 050	5	8		
422044	442 350	6 466 900	5	8		
422046	443 200	6 467 550	2	5		
422047	444 200	6 468 350	2	8		
422048	444 900	6 468 950	5	8		
422048	444 250	6 467 500	2	8		

CARPENTARIA EXPLORATION ROCK CHIP ASSAY RESULTS						
CEC Sam/no	AMGEast.	AMGNorth.	Cu ppm.	Zn ppm.	Co ppm.	Mo ppm.
422049	444 350	6 469 750	2	18		
422050	443 300	6 471 750	12	5		
422060	440 300	6 471 600	5	5		
422570	434 250	6 464 850	18	45		
423076	433 700	6 470 800	15	8		
423077	433 750	6 470 950	25	5		
423090	434 100	6 469 400	10	38		
423091	433 850	6 469 600	8	5		
423092	434 500	6 468 900	10	58		
423100	430 900	6 468 600	2	12		
423101	430 850	6 468 300	5	10		
423102	431 400	6 468 400	5	10		
423103	431 650	6 468 600	55	0		
423104	432 350	6 468 100	8	100		
423106	432 300	6 468 550	35	110		
423107	432 400	6 468 400	25	42		
423108	432 550	6 468 200	25	10		
423110	432 100	6 468 350	12	22		
423111	432 100	6 467 950	22	35		
423112	431 600	6 467 750	8	28		
423113	432 200	6 467 700	320	250		
423114	432 300	6 467 750	15500	1800		
423115	432 450	6 467 600	20	70		
423116	432 900	6 467 050	55	65		
423117	432 600	6 467 750	45	22		
423118	430 500	6 468 450	12	12		
423122	433 750	6 469 100	15	22		
423123	433 700	6 468 600	38	10		
423124	433 200	6 468 300	15	600		
423125	432 600	6 468 150	18	90		
423126	432 700	6 468 100	45	22		
423127	432 550	6 467 900	48	75		
423129	433 650	6 467 500	78	45		
423130	433 900	6 467 550	5	8		
423131	433 900	6 467 550	60	120		
423132	433 700	6 467 200	35	25		
423133	433 300	6 466 800	45	25		
423134	433 300	6 466 800	12	5		
423135	433 300	6 466 800	5	8		
423136	433 050	6 466 500	45	80		
423137	433 050	6 466 450	25	5		
423139	431 550	6 466 450	12	18		
423141	432 250	6 466 300	8	12		
423143	432 300	6 465 750	10	38		
423144	432 600	6 466 000	8	30		
423146	431 800	6 565 800	12	42		
423147	431 750	6 465 600	10	22		
423148	432 800	6 467 750	20500	420		

CARPENTARIA EXPLORATION ROCK CHIP ASSAY RESULTS						
CEC Sam/no	AMGEast.	AMGNorth.	Cu ppm.	Zn ppm.	Co ppm.	Mo ppm.
423148	431 750	6 465 600	5	38		
423148	431 450	6 465 200	5	38		
423149	431 550	6 465 300	5	38		
423150	432 550	6 465 000	8	18		
423151	433 550	6 465 000	38	15		
423152	433 550	6 465 000	5	15		
423153	434 250	6 466 000	8	15		
423178	433 900	6 471 350	15	12		
423184	430 400	6 466 300	750	35		
423185	430 400	6 465 800	120	22		
423535	439 300	6 463 900	8	170		
423538	439 700	6 464 800	38	15		
423539	439 850	6 464 750	25	15		
423542	444 400	6 465 200	5	15		
423543	444 300	6 464 200	5	10		
423545	442 500	6 465 100	8	12		
423546	443 450	6 465 250	5	15		
423551	441 300	6 463 500	10	28		
423552	440 550	6 464 200	15	55		
423553	435 150	6 462 900	15	32		
423554	443 250	6 463 500	8	12		
423554	435 550	6 463 450	12	42		
423555	435 750	6 464 100	15	35		
423556	433 500	6 463 050	5	55		
423561	433 200	6 463 750	5	5		
423561	436 650	6 463 350	10	42		
423563	433 950	6 463 100	15	30		
423564	433 050	6 463 550	5	8		
423565	431 200	6 464 150	10	5		
423566	432 500	6 463 500	5	10		
423568	432 900	6 464 250	12	12		
423569	433 750	6 464 650	160	170		
423571	434 550	6 464 550	10	45		
423572	434 750	6 463 250	15	15		
423576	430 150	6 463 450	12	5		
423577	430 500	6 463 400	8	5		
423579	430 300	6 464 850	32	10		
423580	431 100	6 464 900	70	15		
423581	431 150	6 462 950	12	45		
423582	430 600	6 462 850	5	10		

APPENDIX II

Stream Sediment Orientation Sampling

Kalabity Radiometric Anomaly No. 4 (KR Prospect)

S. Andrews (1992)
BH File No. 2911

CRA EXPLORATION PTY. LIMITED
WEST NSW

STREAM SEDIMENT ORIENTATION SAMPLING
KALABITY RADIOMETRIC ANOMALY NO. 4 (K4 PROSPECT)

CALICO DAM EL 1591

S. ANDREWS
November 1992

BH File No. 2911

LIST OF FIGURES

Figure 1 : Stream Sediment Sample Locations

Figure 2 : Drainage Quality and Width

Figure 3 : Assay Results U, Th, Ce, La, Nb, W, Pb, for -20+60#, -60+200# and -200# Stream Sediment Fraction.

Figure 4 : Assay Results Ti for -20+60#, -60+200# and -200# Stream Sediment Fraction.

LIST OF TABLES

Table 1 : K4 Prospect Orientation Stream Sediment Sample and Assay Results.

STREAM SEDIMENT ORIENTATION SAMPLING
KALABITY RADIOMETRIC ANOMALY NO. 4 (K4 PROSPECT)

CALICO DAM EL 1591

INTRODUCTION AND METHOD

Forty five orientation stream sediment samples have been collected at 15 sites along a drainage that crosses the davidite vein at Kalabity radiometric anomaly No. 4 (K4 prospect), Kalabity 1:25 000 sheet No. 693 4-11 SW/SE. Sampling was undertaken with an aim to assess the dispersion of davidite within the drainage downstream of the vein.

Figure 1 shows the location of stream sediment samples. Samples were collected at 50 and 100 metre intervals over a 1,400 metre length of drainage below the K4 davidite vein. In addition, samples were collected 50m above the vein and at a drainage junction 550 metres below the vein.

A 15kg unsieved bulk sample of alluvial sediment was collected across the channel at each site. Samples were submitted to Amdel to be sieved to -20+60#, -60+200# and -200# fractions. Individual fractions were then submitted for assay.

Figure 2 indicates the quality of samples collected at each site. Drainage quality is poor to unsatisfactory immediately below the vein but improves downstream.

RESULTS

A sample of davidite float material collected at the K4 prospect has previously yielded assay results as follows:

4.45% U, 0.15% Th, 1.45% Ce, 2.52% La, 0.04% Nb, 0.28% W, 1.6% Pb & 40.4% Ti.

The above elements have been chosen to provide an indicator suite for the occurrence of davidite in stream sediment.

Figure 3 shows assay results for U, Th, Ce, La, Nb, W and Pb obtained from -20+60#, -60+200# and -200# stream sediment sample fractions at intervals downstream of the K4 davidite vein. Figure 4 shows assay results for Ti obtained for the same fractions. Assay results and sampling details are provided in Table 1.

Several points are forthcoming:

- U, Th, Nb, W and Pb values are subdued in all fractions at all sample sites. Uranium values are consistently near or below detection level. Subtle peaks in the -20+60# and -60+200# fractions at 200m may be attributed to the presence of trace davidite.

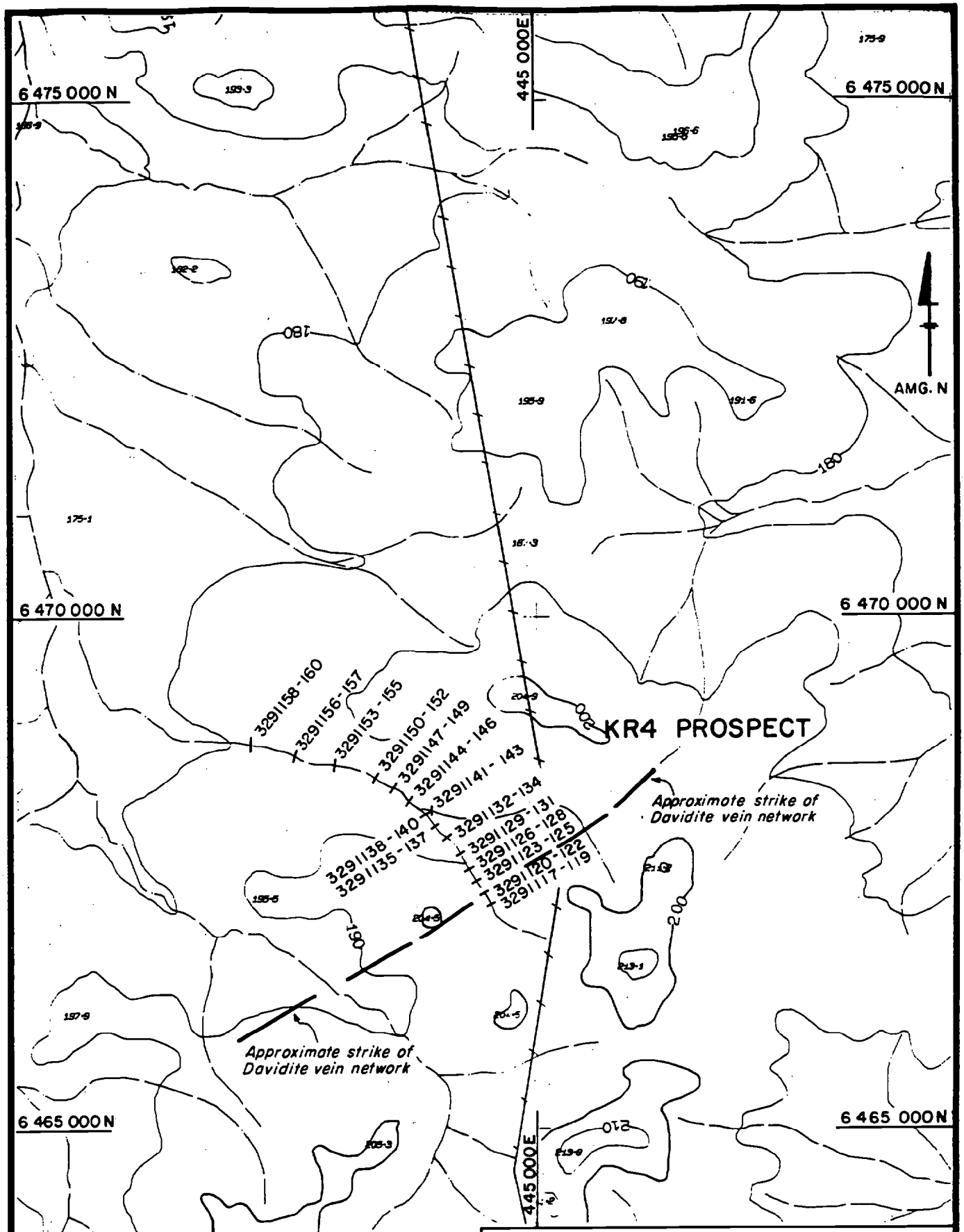
- Ce and La values are moderately elevated in the -20+60#, -60+200# fractions at 200m and in the -60+200# fractions at 1000m. Values obtained at 1000m may be of interest as an indicator of mineralisation outside of the K4 prospect.

- Ti values in the -20+60# show an overall decrease between 0 and 1,400m. Elevated Ti in the -60+200#, -200# fractions at 1,000m corresponds with the Ce, La anomaly observed here.

CONCLUSION

The U, Th, Ce, La, Nb, W, Pb, Ti suite fails to provide any clear definition of the K4 davidite vein occurrence. Unsatisfactory results may reflect (a) the poor quality of the drainage within which sampling was conducted and/or (b) poor or unknown mechanical/dispersion properties of the davidite within the sediment transport system.

Anomalous Ce, La, Ti results obtained at 1000m warrant further investigation.



CRA EXPLORATION PTY. LIMITED

CALICO DAM EL 1591

KR4 PROSPECT

STREAM SEDIMENT SAMPLE LOCATIONS

FIG. 1

1: 250 000 Reference Sheet No. Curnamona SH/54-15		
Author : S. Andrews	Scale : 1: 25 000	Report No. 18876
Drawn : G. Holliday	Date : Dec., 1992	Plan No. SA b 915

FIGURE 2: DRAINAGE QUALITY AND WIDTH

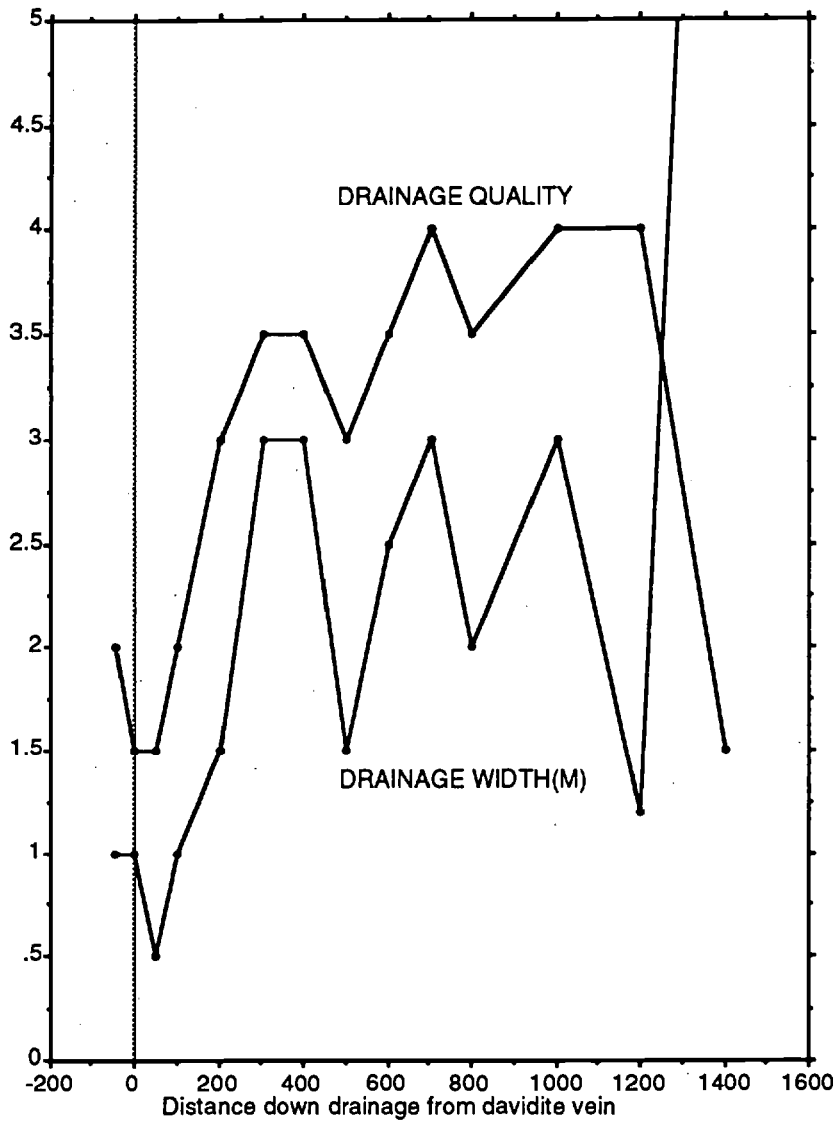
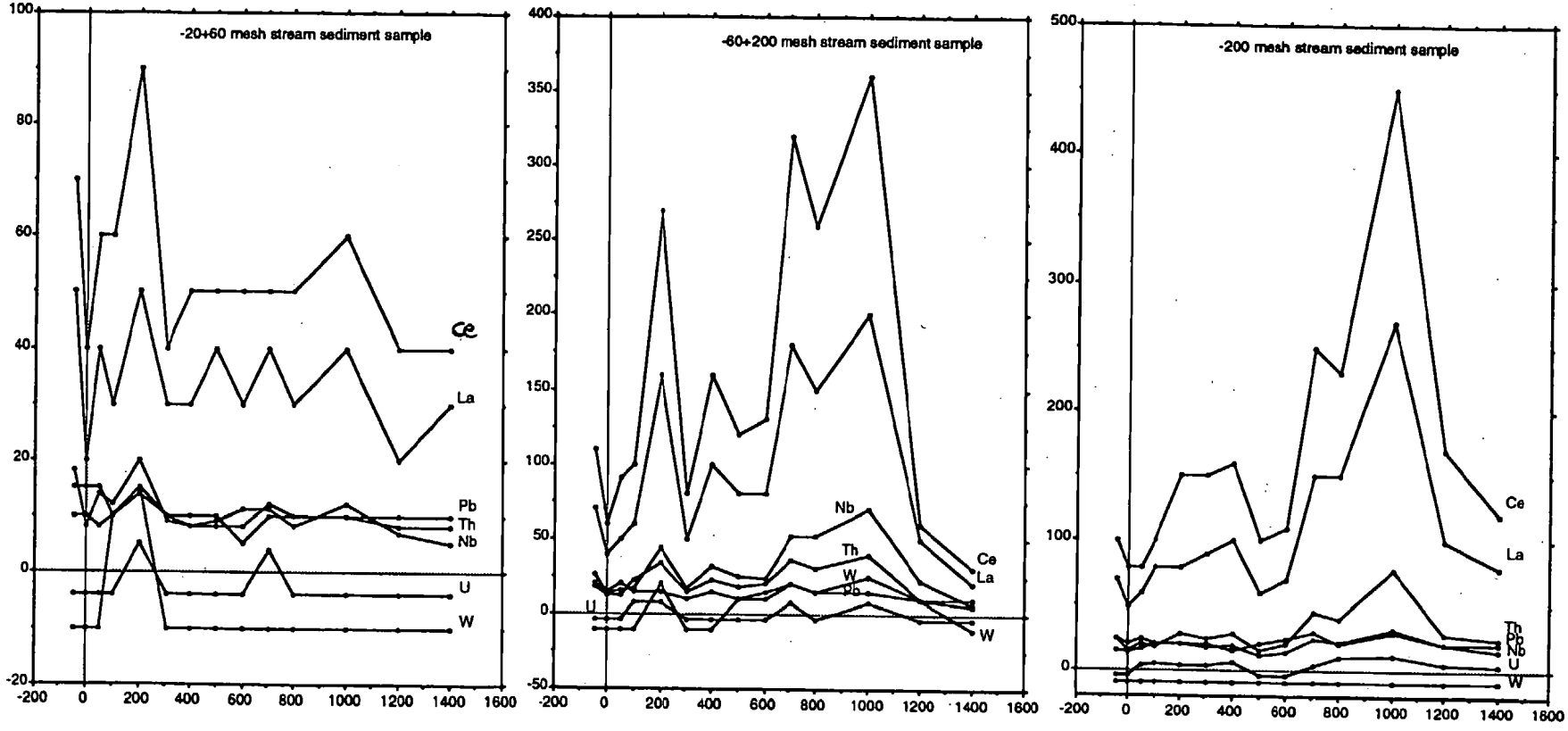
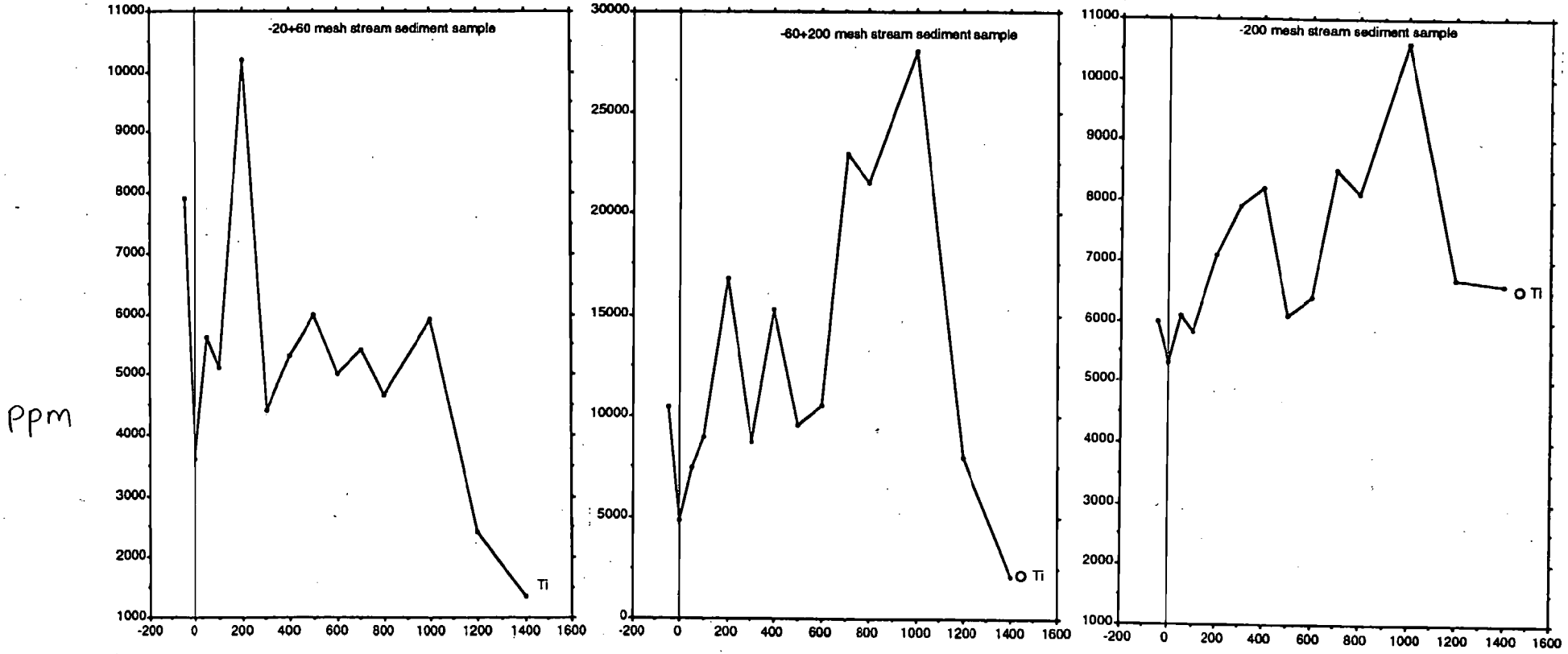


FIGURE 3: ASSAY RESULTS U, Th, Ce, La, Nb, W, Pb FOR -20+60#, -60+200# & -200# STREAM SEDIMENT SAMPLE FRACTIONS.



ppm

FIGURE 4: ASSAY RESULTS Ti FOR -20+60#, -60+200# & -200# SAMPLE FRACTIONS.



K4 Orientation Stream Sampling

Sam/No	DPO	Location	Fraction	Quality	Stream	Ba	U	Th	La	Ce	Bi	Nb	Sn	W	Ta	Cu
					Width(m)	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
3291117	68015	-50	-20	2	1	170	<4	10	50	70	<4	18	<4	<10	<10	20
3291118	68015	-50	-60	2	1	200	<4	18	70	110	<4	26	6	<10	<10	18
3291119	68015	-50	-200	2	1	310	<4	24	70	100	<4	16	4	<10	10	26
3291120	68015	0	-20	1.5	1	185	<4	10	20	40	<4	8	<4	<10	<10	13
3291121	68015	0	-60	1.5	1	210	<4	12	40	60	<4	13	4	<10	<10	14
3291122	68015	0	-200	1.5	1	290	<4	16	50	80	<4	14	<4	<10	<10	24
3291123	68015	50	-20	1.5	0.5	180	<4	8	40	60	<4	14	4	<10	<10	15
3291124	68015	50	-60	1.5	0.5	200	<4	12	50	90	<4	16	<4	<10	<10	15
3291125	68015	50	-200	1.5	0.5	300	4	20	60	80	<4	17	<4	<10	<10	28
3291126	68015	100	-20	2	1	170	<4	10	30	60	<4	12	<4	10	<10	15
3291127	68015	100	-60	2	1	300	8	22	60	100	<4	17	4	<10	<10	15
3291128	68015	100	-200	2	1	195	5	18	80	100	<4	20	<4	<10	10	28
3291129	68015	200	-20	3	1.5	150	5	14	50	90	<4	20	4	15	<10	19
3291130	68015	200	-60	3	1.5	160	8	34	160	270	<4	44	5	20	<10	20
3291131	68015	200	-200	3	1.5	270	4	28	80	150	<4	20	4	<10	<10	28
3291132	68015	300	-20	3.5	3	150	<4	10	30	40	<4	9	4	<10	<10	11
3291133	68015	300	-60	3.5	3	170	<4	15	50	80	<4	17	6	<10	<10	10
3291134	68015	300	-200	3.5	3	280	4	25	90	150	<4	18	4	<10	<10	28
3291135	68015	400	-20	3.5	3	145	<4	8	30	50	<4	8	<4	<10	<10	9
3291136	68015	400	-60	3.5	3	160	<4	22	100	160	<4	32	4	<10	<10	13
3291137	68015	400	-200	3.5	3	300	6	28	100	160	<4	19	4	<10	<10	24
3291138	68015	500	-20	3	1.5	170	<4	8	40	50	<4	9	6	<10	<10	10
3291139	68015	500	-60	3	1.5	190	<4	18	80	120	<4	25	4	10	10	11
3291140	68015	500	-200	3	1.5	330	<4	15	60	100	<4	12	4	<10	<10	24
3291141	68015	na	-20	3.5	2	190	6	15	60	80	<4	17	4	<10	10	11
3291142	68015	na	-60	3.5	2	200	8	32	150	250	<4	38	10	<10	10	16
3291143	68015	na	-200	3.5	2	340	5	22	80	120	<4	14	4	<10	<10	28
3291144	68015	600	-20	3.5	2.5	155	<4	8	30	50	<4	11	4	<10	<10	9
3291145	68015	600	-60	3.5	2.5	175	<4	20	80	130	<4	24	6	10	<10	13
3291146	68015	600	-200	3.5	2.5	280	<4	20	70	110	<4	14	<4	<10	<10	28

K4 Orientation Stream Sampling

Sam/No	DPO	Location	Fraction	Quality	Stream	Ba	U	Th	La	Ce	Bi	Nb	Sn	W	Ta	Cu	
					Width(m)	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
3291147	68015	700	-20	4	3	160	4	12	40	50	<4	11	<4	<10	<10	10	
3291148	68015	700	-60	4	3	150	8	36	180	320	<4	52	14	20	10	15	
3291149	68015	700	-200	4	3	300	4	46	150	250	<4	24	4	<10	<10	44	
3291150	68015	800	-20	3.5	2	155	<4	10	30	50	<4	8	5	<10	10	8	
3291151	68015	800	-60	3.5	2	160	<4	30	150	260	<4	52	12	15	15	16	
3291152	68015	800	-200	3.5	2	300	10	40	150	230	<4	22	10	<10	<10	28	
3291153	68015	1000	-20	4	3	160	<4	10	40	60	<4	12	8	<10	<10	11	
3291154	68015	1000	-60	4	3	145	8	40	200	360	4	70	10	25	15	17	
3291155	68015	1000	-200	4	3	290	12	78	270	450	<4	32	5	<10	<10	60	
3291156	68015	1200	-20	4	1.2	155	<4	8	20	40	<4	7	4	<10	<10	7	
3291157	68015	1200	-60	4	1.2	155	<4	10	50	60	<4	22	5	10	<10	10	
3291158	68015	1200	-200	4	1.2	290	5	28	100	170	<4	20	<4	<10	<10	24	
3291159	68015	1400	-20	1.5	10	165	<4	8	30	40	<4	5	4	<10	<10	6	
3291160	68015	1400	-60	1.5	10	185	<4	6	20	30	<4	7	<4	<10	<10	9	
3291161	68015	1400	-200	1.5	10	290	4	24	80	120	<4	16	<4	<10	<10	24	
DL						10	4	4	20	20	4	2	4	10	10	2	
Scheme						XRF1	XRF1	XRF1	XRF1	XRF1	XRF1	XRF1	XRF1	XRF1	XRF1	IC3E	

Sam/No	Pb	Zn	Co	Mo	Ag	Mg	Ca	As	Fe	Mn	Ni	Na	K	Al	Ti	Au
	ppm	ppm	ppm	ppm	ppm	%	%	ppm	%	ppm	ppm	%	%	%	ppm	ppb
3291117	15	20	13	<2	1	0.288	0.324	<3	10.5	250	22	2.44	1.48	5.6	7900	<2
3291118	20	34	12	2	2	0.416	0.306	3	7.15	440	20	2.32	1.18	5.85	10400	<2
3291119	25	68	14	<2	2	0.96	0.32	3	4.28	480	26	0.855	2.08	7.25	6000	<2
3291120	15	25	7	<2	1	0.398	0.282	<3	3.08	200	13	2.56	1.67	6.3	3600	<2
3291121	15	35	7	<2	<1	0.468	0.312	5	3.36	290	13	2.34	1.3	6.05	4800	<2
3291122	20	68	12	<2	2	0.965	0.36	<3	3.92	420	24	0.8	2.02	6.7	5300	<2
3291123	15	22	11	<2	2	0.26	0.232	<3	6.25	240	16	2.54	1.37	5.45	5600	<2
3291124	20	34	10	<2	2	0.41	0.296	<3	4.94	330	15	2.52	1.2	5.95	7400	<2
3291125	25	68	12	<2	1	0.94	0.334	4	4.14	460	24	0.915	2.08	7.15	6100	<2
3291126	10	22	9	<2	<1	0.3	0.242	<3	5.6	220	14	2.52	1.32	5.65	5100	<2
3291127	15	30	9	<2	<1	0.438	0.308	<3	6	340	15	2.46	1.14	5.9	8900	<2
3291128	20	62	11	<2	<1	0.935	0.334	<3	4.18	420	24	0.88	1.94	7.05	5800	<2
3291129	15	20	13	<2	<1	0.228	0.248	4	10.8	290	19	2.6	0.995	4.88	10200	<2
3291130	15	28	13	<2	<1	0.282	0.3	<3	11.7	450	22	2.7	0.73	5.15	16800	<2
3291131	20	56	10	<2	1	0.795	0.39	3	4.34	320	19	1.14	1.65	6.55	7100	<2
3291132	10	12	5	<2	<1	0.216	0.302	<3	3.6	120	9	3.36	1.28	6.1	4400	<2
3291133	10	19	6	<2	<1	0.32	0.386	<3	5.15	210	10	3.62	0.91	6.45	8700	<2
3291134	20	62	11	<2	<1	0.895	0.54	<3	4.56	400	20	1.06	1.73	6.95	7900	<2
3291135	10	10	5	<2	<1	0.189	0.356	<3	3.76	95	8	3.52	1.25	6.1	5300	<2
3291136	15	22	9	<2	1	0.262	0.45	3	8.9	290	14	3.48	0.73	5.9	15300	<2
3291137	15	56	10	<2	<1	0.955	1.12	5	4.88	360	18	1.03	1.66	6.95	8200	<2
3291138	10	14	6	<2	<1	0.254	0.35	<3	4.76	110	10	3.08	0.98	5.3	6000	<2
3291139	10	22	7	<2	<1	0.362	0.436	<3	6.1	240	12	2.88	0.76	5.35	9500	<2
3291140	20	60	12	<2	<1	0.95	0.705	<3	4.28	380	22	0.915	1.39	6.5	6100	<2
3291141	10	13	7	<2	<1	0.194	0.438	<3	6.8	155	14	2.56	1.07	4.84	6700	<2
3291142	15	25	11	<2	<1	0.346	0.66	<3	10.4	400	16	2.42	0.805	5	14100	<2
3291143	20	60	12	<2	<1	1.03	1.55	5	4.82	370	22	0.75	1.54	7	6700	<2
3291144	5	12	5	<2	<1	0.197	0.284	<3	3.82	100	8	3.14	1.03	5.55	5000	<2
3291145	15	24	9	<2	1	0.322	0.37	<3	6.7	310	15	3.02	0.78	5.7	10500	<2
3291146	25	72	12	<2	<1	0.99	0.62	<3	4.86	350	24	0.85	1.5	7.6	6400	<2

Sam/No	Pb	Zn	Co	Mo	Ag	Mg	Ca	As	Fe	Mn	Ni	Na	K	Al	Ti	Au
	ppm	ppm	ppm	ppm	ppm	%	%	ppm	%	ppm	ppm	%	%	%	ppm	ppb
3291147	10	8	5	<2	<1	0.123	0.242	<3	4.6	95	9	3	1.12	5	5400	<2
3291148	20	22	14	<2	<1	0.184	0.298	6	14.6	510	19	2.82	0.63	4.6	23000	<2
3291149	30	82	12	<2	<1	0.785	0.575	<3	5.35	450	22	1.02	1.58	6.5	8500	<2
3291150	10	9	5	<2	<1	0.124	0.212	<3	3.34	110	7	2.98	1.08	5.05	4650	<2
3291151	15	22	12	<2	1	0.185	0.31	<3	12.2	500	19	2.82	0.625	4.62	21500	<2
3291152	20	58	10	<2	<1	0.655	0.416	4	4.8	380	17	0.985	1.45	5.55	8100	<2
3291153	10	8	5	<2	<1	0.124	0.218	<3	4.96	105	9	2.82	1.06	4.78	5900	2
3291154	15	22	15	<2	1	0.168	0.292	<3	16.9	620	22	2.54	0.545	4.2	28000	<2
3291155	30	60	11	<2	1	0.565	0.37	6	6	490	18	0.99	1.29	5.15	10600	<2
3291156	10	6	4	<2	<1	0.122	0.194	<3	2.1	60	7	2.9	1.17	5	2400	<2
3291157	10	13	7	<2	<1	0.167	0.288	<3	4.48	240	12	3.22	0.725	5.1	7900	2
3291158	20	58	10	<2	<1	0.625	0.422	6	4.24	420	18	1.03	1.41	5.5	6700	<2
3291159	10	8	3	<2	<1	0.15	0.206	<3	1.18	65	6	2.9	1.32	5.35	1350	<2
3291160	10	18	4	<2	<1	0.256	0.288	<3	1.58	125	8	2.86	0.935	5.55	2150	4
3291161	20	55	10	<2	1	0.675	0.38	4	4	340	19	0.855	1.47	5.9	6600	2
DL	5	2	2	2	1	0.001	0.001	3	0.01	5	2	0.001	0.001	0.001	10	2
Scheme	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	AA9

APPENDIX III

(A) **Amdel Report G6721/93**
- **Mineralogy of a Radioactive Rock Sample**

(B) **Amdel Report G7438/93**
- **Leaching Uranium Ore (9/10/92)**

CRA EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)
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TELEPHONE: (080) 88 2536
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IN REPLY PLEASE QUOTE

17 August 1992

Amdel Ltd
31 Flemington Street
FREWVILLE SA 5063

ATTENTION : DOUG MASON

Dear Doug,

Please find enclosed a rock chip sample requiring mineralogical identification. The sample's brown-black appearance, high radioactive count (indicating a probable assay of up to 0.2% U) and occurrence in association with granitic/pegmatitic rocks would lead me to believe that the sample is probably davidite. However, I was hoping that you could confirm this or identify the mineral otherwise.

I look forward to your reply.

Yours sincerely

Steve Andrews

Mineral Services Laboratory
PO Box 338
Torrensville SA 5031
AUSTRALIA

31 Flemington Street
Frewville SA 5063
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amdel

Amdel Limited
A.C.N. 008 127 802

Telephone (08) 372 2700 Facsimile (08) 379 6623

9 September 1992

CRA Exploration Pty Ltd
PO Box 683
BROKEN HILL NSW 2880

Attention: Mr Steve Andrews/
Mr Doug Brewster

REPORT G6721/93
MINERALOGY OF A RADIOACTIVE ROCK SAMPLE

YOUR REFERENCE:	Letter, Mr S Andrews, 17 August 1992
IDENTIFICATION:	Unlabelled
MATERIAL:	Rock sample
LOCATION:	New South Wales
DATE RECEIVED:	18 August 1992
WORK REQUIRED:	Mineralogical identification
Investigation and Report by:	Dr Douglas R Mason

Frank Rolke
for

Dr Keith J Henley
Manager, Mineral Services Laboratory

The results contained in this report relate only to the sample(s) submitted for testing. Amdel Ltd accepts no responsibilities for the representivity of the sample(s) submitted.

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MINERALOGY OF A RADIOACTIVE ROCK SAMPLE

SUMMARY

1. The mineralogy of a rock sample has been determined using X-ray diffraction, optical microscopy, autoradiography and electron probe microanalysis methods.

2. The sample contains abundant davidite, the U-bearing Fe-Ti oxide. Rutile is present in lesser amount, and is accompanied by minor monazite, biotite, muscovite, quartz, and hematite.

3. All of the davidite occurs in metamict form. Thus it has suffered alteration since original crystallisation with the other phases. The alteration is likely to have been in response to radiation damage.

   Heating of portion of the sample at 1000°C for 25 hours caused recrystallisation of the davidite, allowing confirmation by XRD. This procedure also resulted in the identification of possible trace amounts of brannerite, as well as artificial pseudobrookite.

1. INTRODUCTION

One (1) rock sample was received from Mr. Steve Andrews (CRA Exploration Pty. Ltd., Broken Hill, NSW) on 18 August 1992.

It was indicated that the rock sample was brown-black in appearance, and gave a relatively high radioactive count. It occurs in association with pegmatoidal granitic rocks.

It was suggested that the sample may contain the mineral davidite. It was requested that the mineralogy of the sample be confirmed by appropriate methods.

Interim results were telephoned to Mr. Doug Brewster (CRAE, Broken Hill) on 2 September 1992, and on 8 September 1992.

This report contains the full results of this work.

2. METHODS

A portion of the sample was finely ground, mounted in a holder, and submitted to the X-ray beam in an X-ray diffractometer. The resulting trace was interpreted. This was repeated after the sample has been heated at 1000°C for 25 hours.

The sample was sectioned using a diamond saw, and a slice was prepared for polished thin section preparation (TSC58021). The polished thin section was examined in transmitted and reflected light.

An autoradiograph was prepared from one flat surface of the sectioned sample.

A wavelength-dispersive electron microprobe was used to determine the elements present in particular grains of the polished thin section. This aided mineral identification.

3. RESULTS

3.1 Mineralogy by X-ray Diffraction

The results of the XRD work are presented in Table 1.

In the sample as received, the XRD trace was characterised by very low peak heights accounting for only a minor proportion of the sample. Clearly, much of the sample is amorphous (i.e., lacks an ordered crystal structure).

In contrast, in the trace of the sample after heating, davidite is observed as a dominant phase. It is accompanied by significant pseudobrookite, which is considered to have

been generated by the heating process. The davidite, rutile and possible trace brannerite are considered to represent primary phases in the sample.

3.2 Autoradiography

The autoradiograph reveals a high level of radioactivity from all of the dark brownish black material in the rock sample, and no response from the paler brown areas that are rutile-rich.

3.3 Electron Probe Microanalysis

The results of the qualitative EPMA work are presented in Table 2. All of the minerals identified optically and by XRD were confirmed by the EPMA work.

3.4 Optical Microscopy

Sample: Unlabelled radioactive sample

Polished Thin Section: C58021

Rock Name:
Davidite-rutile rock

Hand Specimen:
The rock sample is fine-grained, massive, and black in colour. Dispersed through the rock are small ragged patches and thin veinlets filled by a paler brownish phase. The sample generates a strong radioactive response to a geiger counter.

Brief Petrography and Mineragraphy:

Mineral	Vol.%	Origin
Davidite	80	igneous/metamorphic vein filling
Rutile	10	igneous/metamorphic vein filling
Monazite	3	igneous/metamorphic vein filling
Biotite	1	igneous/metamorphic vein filling
Muscovite	1	igneous/metamorphic vein filling
Hematite	5	igneous/metamorphic vein filling
Quartz	Tr	igneous/metamorphic vein filling

Davidite occurs as a uniformly massive matrix that is pale grey in reflected light. Small hematite flecks are sparsely and irregularly distributed through the davidite.

Rutile forms subhedral crystals ~0.2-0.4 mm in size that display a deep yellow-brown colour in transmitted light.

Monazite forms stumpy small subhedral crystals. It invariably is closely associated with the rutile.

Muscovite forms colourless flakes and biotite forms pleochroic brown flakes. These, too, are closely associated with the rutile and monazite.

Quartz occurs as small optically continuous patches in thin veinlets with other phases (rutile, monazite, muscovite, biotite).

Interpretation:

This sample displays well-crystallised forms in rutile and monazite that are compatible with relatively slow crystallisation under igneous or high-grade metamorphic conditions. The massive texture of the davidite is a metamict (alteration) feature that occurred subsequent to its initial crystallisation together with the rutile, monazite, and other phases. The origin of the alteration is likely to have occurred in response to its own high level of radioactivity. Near-surface oxidation (i.e., weathering) is not considered to have caused the alteration, as the associated biotite is quite fresh and would be expected to have suffered some alteration under weathering conditions.

TABLE 1: MINERALOGY BY XRD

Mineral	Sample As Received	Sample After Heating
Amorphous	D	-
Davidite	-	D
Rutile	A	A
Quartz	A	-
Pseudobrookite	-	A
?Brannerite	-	Tr
Hematite	A	-

Semiquantitative abbreviations:

D = Dominant. Used for the component apparently most abundant, regardless of its probable percentage level.

A = Accessory. Components judged to be present between the levels of roughly 5 and 20%.

Tr = Trace. Components judged to be below about 5%.

TABLE 2: MINERAL IDENTIFICATION BY EPMA

Grain #	Elements Detected	Inferred Mineral
1	Ti	Rutile
2	Fe	Hematite
3	Ce, P	Monazite
4	Fe, U	Davidite
5	Fe	Hematite
6	Ti	Rutile

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Reception: Brown Street
Thebarton SA 5031

RECEIVED
14 OCT 1992

9 October 1992

Mr. Steve Andrews
CRA Exploration Pty Ltd
PO Box 683
BROKEN HILL NSW 2880

Mr. Bob Sanderson
CRA Exploration Pty Ltd
PO Box 683
BROKEN HILL NSW 2880

CRAE Information Systems
PO Box 3709
MANUKA ACT 2603

REPORT G7438/93
LEACHING URANIUM ORE

YOUR REFERENCE:	Order No. 68011
IDENTIFICATION:	Sample No 2320450
MATERIAL:	Uranium ore
LOCATION:	Broken Hill district
DATE RECEIVED:	28 September, 1992
WORK REQUIRED:	Leaching tests
Investigation and Report by:	J.R. Tuffley

for Dr Keith J Henley
Manager, Mineral Services Laboratory

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* The results contained in this report relate only to the sample(s) submitted for testing. Amdel Ltd accepts no responsibility for the representivity of the samples submitted.

LEACHING URANIUM ORE

1. INTRODUCTION

CRA Exploration Pty Ltd (CRAE) has discovered a uranium deposit in which the uranium is contained in the mineral davidite. A sample examined by the mineralogical section of Amdel Ltd showed that the davidite was metamict (non-crystalline) in form.

Davidite was the uranium-bearing mineral in the Radium Hill deposit, the ore from which was processed at the Port Pirie uranium treatment plant. The mineral is comparatively difficult to leach, but at Port Pirie the uranium was dissolved using a strong sulphuric acid solution maintained at boiling point for 10 hours. Details of the process are given in a paper enclosed in Appendix A.

CRAE requested Amdel to carry out preliminary leaching tests to determine whether the uranium can be extracted from their sample. Conditions used for the tests are based on those used at the Port Pirie treatment plant.

A 5 kg sample was received at Amdel on 28 September 1992. The activity of the sample as received was 2.1 m rad/hour (42 m Sv/year). The activity at 1 metre distance was 55 μ rad/hour.

2. PROCEDURE AND RESULTS

The whole sample was crushed to pass a 2 mm screen and a sample was riffled out for analysis. Two 1 kg samples were ground in a laboratory rod mill to 80% passing sizes of 75 and 53 microns respectively. The products were filtered and dried.

Leaching was carried out in spherical flasks fitted with reflux condensers and mechanical agitators. The material was leached in a 37.5% sulphuric acid solution at boiling point for 10 hours. Each grind size material was leached at two different acid/ore ratios, viz. 600 g of acid solution to 600 g and 400 g of solids respectively.

After 10 hours the slurries were filtered and the solids washed by repulping in water and refiltering. The head sample and each final residue were analysed for uranium. The results are listed in Table 1.

These show that the uranium can be dissolved using conditions similar to those used at Port Pirie. Extractions of around 90% were achieved with the higher acid/ore ratio. This suggests that even higher acid concentrations may be beneficial.

It is interesting to note similarities and differences between these results and the Port Pirie process. At Port Pirie, the feed contained only 10.5% davidite. This is in marked contrast to the present material which has a very high davidite content. Weight loss during leaching at Port Pirie was 15 to 20%. Weight losses in tests 3 and 4 were about 20%. At Port Pirie, the leach residue was washed by counter current decantation because it was extremely difficult to filter. The test leach residues were also very difficult to filter.

It is stressed that the conditions were not optimised in the present testwork. Optimisation would be required on a representative sample of the whole deposit when this has been delineated.

TABLE 1: LEACHING CONDITIONS AND RESULTS

Test No	Acid Wt, g	Ore*		Residue		U Recovery %	Free acid in final liquor, g/l
		P_{80}, μm	Wt, g	Wt, g	U_3O_8 %		
1	600	75	600	511.4	0.86	77.8	n.d.
2	600	53	600	501.1	0.95	76.0	3.3
3	600	75	400	323.3	0.39	90.4	45.0
4	600	53	400	317.6	0.47	88.7	43.3

* Head assay = 3.30% U_3O_8

APPENDIX IV

KR4 Prospect Costeans 1 - 9

- Radiometric Total Count Measurements
- Channel Sample Location
- Vein Sample Ledgers
- Assay Results

Costean	East	North	Cost tcps	Surf tcps
1	9945	9950	189	173
1	9945	9952	241	
1	9945	9954	237	
1	9945	9955		
1	9945	9956	296	
1	9945	9958	221	
1	9945	9960	128	177
1	9945	9962	225	
1	9945	9964	248	
1	9945	9965		158
1	9945	9966	274	
1	9945	9968	250	
1	9945	9970	254	172
1	9945	9972	195	
1	9945	9974	240	
1	9945	9975		188
1	9945	9976	173	
1	9945	9978	225	
1	9945	9980	170	206
1	9945	9982	143	
1	9945	9984	186	
1	9945	9985		193
1	9945	9986	194	
1	9945	9988	223	
1	9945	9990	230	200
1	9945	9992	241	
1	9945	9994	261	
1	9945	9995		201
1	9945	9996	233	
1	9945	9998	304	
1	9945	9999.5	503	
1	9945	9999.75	539	
1	9945	10000	622	603
1	9945	10000.25	700	
1	9945	10000.5	842	
1	9945	10000.75	1018	
1	9945	10001	1171	
1	9945	10001.25	1991	
1	9945	10001.5	2054	
1	9945	10001.75	1836	
1	9945	10002	6138	
1	9945	10002.25	2038	
1	9945	10002.5	2327	
1	9945	10002.75	2895	
1	9945	10003	4537	
1	9945	10003.25	5969	
1	9945	10003.5	5776	
1	9945	10003.75	5801	
1	9945	10004	7770	

Costean	East	North	Cost tcps	Surf tcps
1	9945	10004.25	5307	
1	9945	10004.5	4344	
1	9945	10004.75	3019	
1	9945	10005	3708	1359
1	9945	10005.25	2969	
1	9945	10005.5	2558	
1	9945	10005.75	4560	
1	9945	10006	4444	
1	9945	10006.25	3576	
1	9945	10006.5	1521	
1	9945	10006.75	935	
1	9945	10007	623	
1	9945	10008	273	
1	9945	10009	263	
1	9945	10010	311	1409
1	9945	10012	212	
1	9945	10014	197	
1	9945	10015		1708
1	9945	10016	185	
1	9945	10018	263	
1	9945	10020	328	390
1	9945	10022	356	
1	9945	10024	268	
1	9945	10025		556
1	9945	10026	279	
1	9945	10028	274	
1	9945	10030	195	334
1	9945	10032	227	
1	9945	10034	295	
1	9945	10035		344
1	9945	10036	305	
1	9945	10038	285	
1	9945	10040	332	638
1	9945	10042	318	
1	9945	10044	272	
1	9945	10045		444
1	9945	10046	233	
1	9945	10048	243	
1	9945	10050	208	424
1	9945	10052	338	
1	9945	10054	311	
1	9945	10055		420
1	9945	10056	273	
1	9945	10058	327	
1	9945	10060	291	266
1	9945	10062	290	
1	9945	10064	295	
1	9945	10065		328
1	9945	10066	237	

Costean	East	North	Cost tcps	Surf tcps
1	9945	10068	220	
1	9945	10070	284	250
1	9945	10072	268	
1	9945	10074	267	
1	9945	10075		235
1	9945	10076	294	
1	9945	10078	275	
1	9945	10080	334	292
1	9945	10082	321	
1	9945	10084	263	
1	9945	10085		203
1	9945	10086	280	
1	9945	10088	204	
1	9945	10090	253	218
1	9945	10092	259	
1	9945	10094	175	
1	9945	10095		315
1	9945	10096	216	
1	9945	10098	311	
1	9945	10100	300	240

Costean	East	North	Cost tcps	Surf tcps
2	9895	9972	110	
2	9895	9974	116	
2	9895	9975		167
2	9895	9976	194	
2	9895	9978	229	
2	9895	9980	239	203
2	9895	9982	243	
2	9895	9984	256	
2	9895	9985		197
2	9895	9986	249	
2	9895	9988	276	
2	9895	9990	270	186
2	9895	9992	133	
2	9895	9994	166	
2	9895	9995		194
2	9895	9996	166	
2	9895	9998	272	
2	9895	10000	278	197
2	9895	10001	320	
2	9895	10001.5	320	
2	9895	10001.75	340	
2	9895	10002	477	
2	9895	10002.25	501	
2	9895	10002.5	732	
2	9895	10002.75	1044	
2	9895	10003	830	
2	9895	10003.25	812	
2	9895	10003.5	1265	
2	9895	10003.75	577	
2	9895	10004	645	
2	9895	10004.25	1048	
2	9895	10004.5	1509	
2	9895	10004.75	1886	
2	9895	10005	1884	527
2	9895	10005.25	1535	
2	9895	10005.5	2316	
2	9895	10005.75	7238	
2	9895	10006	3135	
2	9895	10006.25	2907	
2	9895	10006.5	1832	
2	9895	10006.75	1403	
2	9895	10007	1634	
2	9895	10007.25	3217	
2	9895	10007.5	1634	
2	9895	10007.75	3217	
2	9895	10008	3021	
2	9895	10008.25	1474	
2	9895	10008.5	1527	
2	9895	10008.75	1583	

Costean	East	North	Cost tcps	Surf tcps
2	9895	10009	1165	
2	9895	10009.25	1044	
2	9895	10009.5	587	
2	9895	10009.75	481	
2	9895	10010	444	517
2	9895	10012	363	
2	9895	10014	410	
2	9895	10015		514
2	9895	10016	350	
2	9895	10018	310	
2	9895	10020	305	463
2	9895	10022	240	
2	9895	10024	238	
2	9895	10025		388
2	9895	10026	146	
2	9895	10028	196	
2	9895	10030	341	293
2	9895	10032	320	
2	9895	10034	327	
2	9895	10035		318
2	9895	10036	249	
2	9895	10038	285	
2	9895	10040	266	258
2	9895	10042	277	
2	9895	10044	229	
2	9895	10045		285
2	9895	10046	236	
2	9895	10048	257	
2	9895	10050	263	267

Costean	East	North	Cost tcps	Surf tcps
3	9795	9980	140	176
3	9795	9982	300	
3	9795	9984	474	
3	9795	9985		182
3	9795	9986	361	
3	9795	9988	326	
3	9795	9990	300	220
3	9795	9992	353	
3	9795	9994	308	
3	9795	9995		224
3	9795	9996	368	
3	9795	9997	400	
3	9795	9998	352	
3	9795	9998.25	176	
3	9795	9998.5	585	
3	9795	9998.75	755	
3	9795	9999	725	
3	9795	9999.25	702	
3	9795	9999.5	585	
3	9795	9999.75	515	
3	9795	10000	602	340
3	9795	10000.25	762	
3	9795	10000.5	883	
3	9795	10000.75	2123	
3	9795	10001	1505	
3	9795	10001.25	1482	
3	9795	10001.5	1273	
3	9795	10001.75	802	
3	9795	10002	778	
3	9795	10002.25	639	
3	9795	10002.5	940	
3	9795	10002.75	570	
3	9795	10003	700	
3	9795	10003.25	703	
3	9795	10003.5	591	
3	9795	10003.75	476	
3	9795	10004	364	
3	9795	10004.25	448	
3	9795	10004.5	422	
3	9795	10004.75	571	
3	9795	10005	1370	397
3	9795	10005.25	1406	
3	9795	10005.5	630	
3	9795	10005.75	452	
3	9795	10006	371	
3	9795	10006.25	349	
3	9795	10006.5	413	
3	9795	10007	405	
3	9795	10008	429	

Costean	East	North	Cost tcps	Surf tcps
3	9795	10009	564	
3	9795	10010	515	694
3	9795	10011	600	
3	9795	10012	554	
3	9795	10013	480	
3	9795	10014	466	
3	9795	10015	402	546
3	9795	10016	451	
3	9795	10017	480	
3	9795	10018	446	
3	9795	10019	335	
3	9795	10020	336	581
3	9795	10022	430	
3	9795	10024	401	
3	9795	10025		599
3	9795	10026	371	
3	9795	10028	392	
3	9795	10030	299	409
3	9795	10032	332	
3	9795	10034	340	
3	9795	10035		421
3	9795	10036	324	
3	9795	10038	325	
3	9795	10040	334	400
3	9795	10042	322	
3	9795	10044	359	
3	9795	10045		375
3	9795	10046	290	
3	9795	10048	324	
3	9795	10050	187	566
3	9795	10052	249	
3	9795	10054	295	
3	9795	10055		363
3	9795	10056	296	
3	9795	10058	389	
3	9795	10060	395	313
3	9795	10062	338	
3	9795	10064	399	
3	9795	10065		246
3	9795	10066	393	
3	9795	10068	367	
3	9795	10070	289	279

Costean	East	North	Cost tcps	Surf tcps
4	9695	9980	200	1792
4	9695	9982	306	
4	9695	9985		167
4	9695	9984	314	
4	9695	9986	322	
4	9695	9987	350	
4	9695	9987.25	360	
4	9695	9987.5	350	
4	9695	9987.75	360	
4	9695	9988	360	
4	9695	9988.25	380	
4	9695	9988.5	400	
4	9695	9988.75	450	
4	9695	9989	450	
4	9695	9989.25	476	
4	9695	9989.5	560	
4	9695	9989.75	560	
4	9695	9990	510	215
4	9695	9990.25	500	
4	9695	9990.5	450	
4	9695	9990.75	470	
4	9695	9991	460	
4	9695	9991.25	420	
4	9695	9991.5	450	
4	9695	9991.75	470	
4	9695	9992	530	
4	9695	9992.25	600	
4	9695	9992.5	600	
4	9695	9992.75	510	
4	9695	9993	455	
4	9695	9994	411	
4	9695	9996	417	
4	9695	9998	342	
4	9695	10000	315	211
4	9695	10002	389	
4	9695	10004	288	
4	9695	10005		264
4	9695	10006	343	
4	9695	10008	294	
4	9695	10010	280	235
4	9695	10012	254	
4	9695	10014	347	
4	9695	10015		276
4	9695	10016	356	
4	9695	10018	385	
4	9695	10020	367	293
4	9695	10022	370	
4	9695	10024	419	
4	9695	10025		791

Costean	East	North	Cost tcps	Surf tcps
4	9695	10026	331	
4	9695	10028	402	
4	9695	10030	397	732
4	9695	10032	371	
4	9695	10034	331	
4	9695	10035		5007
4	9695	10036	315	
4	9695	10037	361	
4	9695	10038	430	
4	9695	10039	385	
4	9695	10040	400	556
4	9695	10042	379	
4	9695	10044	373	
4	9695	10045		690
4	9695	10046	380	
4	9695	10048	370	
4	9695	10050	392	450
4	9695	10052	385	
4	9695	10054	420	
4	9695	10055		442
4	9695	10056	382	
4	9695	10058	399	
4	9695	10060	295	346
4	9695	10062	384	
4	9695	10064	319	
4	9695	10065		262
4	9695	10066	251	
4	9695	10068	244	
4	9695	10070	270	297

Costean	East	North	Cost tcps	Surf tcps
5	9495	9960	180	185
5	9495	9962	182	
5	9495	9964	300	
5	9495	9965		196
5	9495	9966	306	
5	9495	9968	269	
5	9495	9970	211	273
5	9495	9972	313	
5	9495	9974	269	
5	9495	9975		314
5	9495	9976	235	
5	9495	9978	279	
5	9495	9980	370	298
5	9495	9982	272	
5	9495	9984	264	
5	9495	9985		423
5	9495	9986	312	
5	9495	9987	345	
5	9495	9987.25	374	
5	9495	9987.5	371	
5	9495	9987.75	393	
5	9495	9988	585	
5	9495	9988.25	884	
5	9495	9988.5	1302	
5	9495	9988.75	906	
5	9495	9989	1154	
5	9495	9989.25	1267	
5	9495	9989.5	1424	
5	9495	9989.75	3153	
5	9495	9990	1759	500
5	9495	9990.25	1112	
5	9495	9990.5	1084	
5	9495	9990.75	832	
5	9495	9991	556	
5	9495	9991.25	544	
5	9495	9991.5	478	
5	9495	9991.75	390	
5	9495	9992	390	
5	9495	9992.25	346	
5	9495	9992.5	322	
5	9495	9992.75	308	
5	9495	9993	324	
5	9495	9994	318	
5	9495	9995		391
5	9495	9996	234	
5	9495	9998	311	
5	9495	10000	346	364
5	9495	10002	259	
5	9495	10004	308	

Costean	East	North	Cost tcps	Surf tcps
5	9495	10005		291
5	9495	10006	229	
5	9495	10008	243	
5	9495	10010	259	228

Costean	East	North	Cost tcps	Surf tcps
6	9295	9958	300	
6	9295	9960	327	
6	9295	9962	205	
6	9295	9964	226	
6	9295	9965		
6	9295	9966	272	
6	9295	9968	228	
6	9295	9970	299	137
6	9295	9972	272	
6	9295	9974	205	
6	9295	9975		205
6	9295	9976	159	
6	9295	9978	152	
6	9295	9980	244	252
6	9295	9982	308	
6	9295	9984	275	
6	9295	9984.25	280	
6	9295	9984.5	324	
6	9295	9984.75	444	
6	9295	9985	402	345
6	9295	9985.25	332	
6	9295	9985.5	384	
6	9295	9985.75	408	
6	9295	9986	416	
6	9295	9986.25	468	
6	9295	9986.5	1110	
6	9295	9986.75	1590	
6	9295	9987	721	
6	9295	9987.25	369	
6	9295	9987.5	720	
6	9295	9987.75	280	
6	9295	9988	203	
6	9295	9988.25	268	
6	9295	9988.5	452	
6	9295	9988.75	267	
6	9295	9989	327	
6	9295	9989.25	427	
6	9295	9989.5	810	
6	9295	9989.75	578	
6	9295	9990	297	184
6	9295	9990.25	292	
6	9295	9990.5	278	
6	9295	9990.75	245	
6	9295	9991	252	
6	9295	9992	273	
6	9295	9994	282	
6	9295	9995		179
6	9295	9996	317	
6	9295	9998	291	

Costean	East	North	Cost tcps	Surf tcps
6	9295	10000	257	198

Costean	East	North	Cost tcps	Surf tcps
7	8345	9850	285	
7	8345	9852	301	
7	8345	9854	270	
7	8345	9856	442	
7	8345	9858	344	
7	8345	9860	324	
7	8345	9862	283	
7	8345	9864	300	
7	8345	9866	462	
7	8345	9868	345	
7	8345	9870	254	
7	8345	9872	276	
7	8345	9874	357	
7	8345	9875	475	
7	8345	9875.25	448	
7	8345	9875.5	401	
7	8345	9875.75	445	
7	8345	9876	431	
7	8345	9876.25	447	
7	8345	9876.5	408	
7	8345	9876.75	602	
7	8345	9877	1948	
7	8345	9877.25	1607	
7	8345	9877.5	1212	
7	8345	9877.75	846	
7	8345	9878	738	
7	8345	9878.25	807	
7	8345	9878.5	1136	
7	8345	9878.75	1706	
7	8345	9879	4273	
7	8345	9879.25	5915	
7	8345	9879.5	7875	
7	8345	9879.75	2750	
7	8345	9880	1253	
7	8345	9880.25	625	
7	8345	9880.5	494	
7	8345	9880.75	420	
7	8345	9881	295	
7	8345	9881.25	360	
7	8345	9881.5	303	
7	8345	9881.75	306	
7	8345	9882	274	
7	8345	9884	248	
7	8345	9886	205	
7	8345	9888	233	
7	8345	9890	238	
7	8345	9892	296	
7	8345	9894	245	
7	8345	9896	285	

Costean	East	North	Cost tcps	Surf tcps
7	8345	9898	269	
7	8345	9900	170	

Costean	East	North	Cost tcps	Surf tcps
8	10145	10025	377	166
8	10145	10027	251	
8	10145	10029	259	
8	10145	10030	377	176
8	10145	10030.25	383	
8	10145	10030.5	395	
8	10145	10030.75	416	
8	10145	10031	411	
8	10145	10031.25	445	
8	10145	10031.5	615	
8	10145	10031.75	643	
8	10145	10032	712	
8	10145	10032.25	694	
8	10145	10032.5	741	
8	10145	10032.75	947	
8	10145	10033	956	
8	10145	10033.25	1228	
8	10145	10033.5	1253	
8	10145	10033.75	1471	
8	10145	10034	2032	
8	10145	10034.25	1543	
8	10145	10034.5	1263	
8	10145	10034.75	1001	
8	10145	10035	1156	203
8	10145	10035.25	1030	
8	10145	10035.5	996	
8	10145	10035.75	983	
8	10145	10036	811	
8	10145	10036.25	718	
8	10145	10036.5	821	
8	10145	10036.75	750	
8	10145	10037	607	
8	10145	10037.25	503	
8	10145	10037.5	509	
8	10145	10037.75	480	
8	10145	10038	506	
8	10145	10039	556	
8	10145	10040	440	227
8	10145	10042	413	
8	10145	10044	435	
8	10145	10045		213
8	10145	10046	422	
8	10145	10048	351	
8	10145	10050	450	217
8	10145	10052	427	
8	10145	10054	476	
8	10145	10055		308
8	10145	10056	427	
8	10145	10058	391	

Costean	East	North	Cost tcps	Surf tcps
8	10145	10060	635	241
8	10145	10062	461	
8	10145	10064	510	
8	10145	10065		221
8	10145	10066	518	
8	10145	10068	402	
8	10145	10070	315	242

Costean	East	North	Cost tcps	Surf tcps
9	10495	10100	138	
9	10495	10102	158	
9	10495	10104	167	
9	10495	10105	172	
9	10495	10105.25	151	
9	10495	10105.5	187	
9	10495	10105.75	191	
9	10495	10106	174	
9	10495	10106.25	183	
9	10495	10106.5	185	
9	10495	10106.75	226	
9	10495	10107	288	
9	10495	10107.25	428	
9	10495	10107.5	272	
9	10495	10107.75	218	
9	10495	10108	186	
9	10495	10108.25	205	
9	10495	10108.5	227	
9	10495	10108.75	189	
9	10495	10109	173	
9	10495	10109.25	185	
9	10495	10109.5	186	
9	10495	10110	205	
9	10495	10112	258	
9	10495	10114	204	
9	10495	10116	184	
9	10495	10118	209	
9	10495	10120	235	
9	10495	10122	252	
9	10495	10124	251	
9	10495	10126	284	
9	10495	10128	262	
9	10495	10130	272	
9	10495	10132	290	
9	10495	10134	246	
9	10495	10136	244	
9	10495	10138	293	
9	10495	10140	330	
9	10495	10142	271	
9	10495	10144	242	
9	10495	10146	163	
9	10495	10148	149	
9	10495	10150	155	

KR4 CHANNEL SAMPLES

KR4 CHANNEL SAMPLE LOCATIONS					
SAMPLE	DPO	COSTEAN	GRID E(m)	FR GRID N(m)	TO GRID N(m)
3292747	68026	1	9945	10000	10001.25
3292748	68026	1	9945	10001.25	10003.25
3292749	68026	1	9945	10003.25	10005.25
3292750	68026	1	9945	10005.25	10007.25
3292751	68026	2	9895	10002.5	10004
3292752	68026	2	9895	10004	10006
3292753	68026	2	9895	10006	10008
3292754	68026	2	9895	10008	10009.5
3292755	68026	3	9795	9999	10000.5
3292756	68026	3	9795	10000.5	10002
3292757	68026	3	9795	10002	10004
3292758	68026	3	9795	10004	10005.5
3292759	68026	4	9695	9986	9988
3292760	68026	4	9695	9988	9990
3292761	68026	4	9695	9990	9992
3292762	68026	5	9495	9987	9988
3292763	68026	5	9495	9988	9990
3292764	68026	5	9495	9990	9991
3292765	68026	6	9295	9985	9986
3292766	68026	6	9295	9986	9987
3292767	68026	6	9295	9987	9988.5
3292768	68026	6	9295	9988.5	9990
3292769	68026	6	9295	9990	9991
3292770	68026	7	8345	9976	9977
3292771	68026	7	8345	9977	9978.5
3292772	68026	7	8345	9978.5	9980
3292773	68026	7	8345	9980	9981
3292774	68026	8	10145	10031.5	10032.5
3292775	68026	8	10145	10032.5	10034.5
3292776	68026	8	10145	10034.5	10036.5
3292777	68026	8	10145	10036.5	10037.5
3292778	68026	9	10495	10105	10106
3292779	68026	9	10495	10106	10108
3292780	68026	9	10495	10108	10109

SAMPLE	DPO	COSTEAN	GRID E	GRID N	VEIN THICKNESS (cm)	ORIENTATION	DAVIDITE CONTENT	COMMENTS
3292801	68026	1	9950E	10004N		?/40/S	15%	QUARTZ VEIN R/C SAMPLE
3292802	68026	1	9950E	1004.5N		310/45/NE		QUARTZ VEIN R/C SAMPLE
3292803	68026	1	9950E	10003N		320/45/E	5%	QUARTZ VEIN R/C SAMPLE
3292804	68026	1	9950E	10002-10003N	1-2 CM	330/40/NE	1%	NO TC VARIATION TO BACKGROUND
3292805	68026	1	9950E	10001.75N		090/40/NE	1-2%	VISIBLE DAVIDITE
3292806	68026	2	9895E	10004N		150/80/NE		NO VISIBLE DAVIDITE
3292807	68026	2	9895E	10005N	1-2 CM	320/50/NE		NO VISIBLE DAVIDITE
3292808	68026	2	9895E	10005.5-10006N	2-5 CM	120/70/N	1%	QUARTZ VEIN ROCK CHIP SAMPLE
3292809	68026	2	9895E	10007-10009N	2-3 CM	330/20/E	1%	WEATHERED VEIN
3292810	68026	2	9895E	10007N	0.5 CM STRINGER VEINS	030/75/S		STRINGER VEINS PARALLEL TO HOST ROCK BANDING OVER 15 CM ZONE
3292811	68026	7	8345E	9979.5N	10-20 CM	010/90		UP TO 8000 CPS INTERGROWN VEIN QUARTZ WITH BANDED HOST ROCK
3292812	68026	7	8345E	9980N	1-2 CM			DISCONTINUOUS VEINS IN DECOMPOSED QZ-FSPR-MICA MAY BE MIGMATITE SWEATS
3292813	68026	7	8345E	9977.5N	<2CM		1%	VERY WEATHERED
3292814	68026	7	8345E	9979N	NO VEINS			FINE GRAINED WALL ROCK QZ/FSPR/MICA MIGMATITE ROCK
3292815	68026	5	9495E	9986N	10 CM	210/80/E		WELL EXPOSED VEIN NO DAVIDITE
3292816	68026	5	9495E	9990-9989N	10-30 CM	208/40/E	10%	QZ VEIN SPLITS INTO TWO VEINS
3292817	68026	5	9495E	9989-9988N		220/70/E		QZ+FSPR VEIN NO DAVIDITE
3292818	68026	3	9795E	10004.5-10001N	2 CM AND 10-15 CM	320/35/NE	1%	WEATHERED QZ VEIN AT SOIL-BEDROCK INTERFACE WITH ASSOC SMALLER VEINS
3292819	68026	3	9795E	10000-10001N	10 CM		1%	WEATHERED QZ VEIN
3292820	68026	3	9795E	10004N			20%	WEATHERED QZ VEIN AT SOIL-BEDROCK INTERFACE POSSIBLY PART OF STOCKWORK
3292821	68026	3	9795E	10005.5N	2CM	320/80/NE		THIN WEATHERED VEIN
3292822	68026	3	9795E	9999N	5-7 CM	260/60/NW	1%	WEATHERED VEIN
3292823	68026	3	9795E	9997-9998N	5CM	230/60/NW		WEATHERED VEIN
3292824	68026	6	9495E	9987N	2CM	180/50/E	1%	FRESH VEIN TWO ORIENTATION SETS 180/50/E AND 325/65/NE
3292825	68026	6	9495E	9986N	3MM	VERTICAL	1%	QZ VEINS PARALLEL TO ROCK FABRIC
3292826	68026	6	9495E	9985N		340/65/E	DISSEMINATED	QZ VEINS + POSSIBLY DISSEMINATED DAVIDITE THROUGH HOST ROCK
3292827	68026	6	9495E	9990N	1 CM AND 3 CM	323/90		STOCKWORK VEINS CROSSCUT FABRIC 323/90 AND 340/70/NE
3292828	68026	8	10145E	10035N	1-2 CM			QZ VEINS IN WEATHERED SANDY CLAY
3292829	68026	8	10145E	10034N	1-2 CM	340/85/E		QZ VEINS IN WEATHERED SANDY CLAY
3292830	68026	8	10145E	10034.5-33N	1-2 CM	320/25/NE		OPEN SPACE TEXTURE QZ CRYSTALS
3292831	68026	8	10145E	10034.25N			DISSEMINATED	WALL ROCK SAMPLE NO QZ VEINS WHITE POWDER WITH DISSEMINATED DAVIDITE?
3292832	68026	9	10495E	10107N	1CM	050/80/N		NO VISIBLE DAVIDITE
3292833	68026	9	10495E	10107N	1CM			NO VISIBLE DAVIDITE

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ANALYTICAL SERVICES

Amdel Laboratories Limited
Brown Street, Thebarton, 5031
Telephone: (08) 416 5300 Facsimile: (08) 234 0321

RECEIVED
29 DEC 1992

Mr D C Brewster
CRA Exploration Pty Limited
PO BOX 683
BROKEN HILL
NSW 2880

F I N A L A N A L Y S I S R E P O R T

Your Order No: 68026 Our Job Number : 2AD3627

Samples received : 04-DEC-1992 Results reported : 24-DEC-1992
No. of samples : 67
Report comprises a cover sheet and pages 1 to 10

This report relates specifically to the samples tested in so far as that the samples as supplied are truly representative of the sample source.

Please note due to high mineralisation the following samples for XRF have higher detection limits and therefore the results are as follows:-

Sample	Nb	W	Ta
3292801	<250	<250	<100
3292803	<50	<50	<50
3292805	<50	<50	<50
3292809	<20	<50	<50
3292816	<10	<150	<50
3292820	<10	<50	<50
3292822	<10	<50	<50

Note:
If you have any enquiries please contact Miss Anne Reed quoting the above job number.

Approved Signatory:

for John Waters
Laboratory Manager - Adelaide

MM Mr D C Brewster NSW
CC Mr B Sanderson NSW
CC CRA Exploration ACT

Report Codes:
N.A. - Not Analysed.
L.N.R. - Listed But Not Received.
I.S. - Insufficent Sample.

Distribution Codes:
CC - Carbon Copy
EM - Electronic Media
MM - Magnetic Media

ANALYTICAL REPORT

Job: 2AD3627
O/N: 68026

Sample	Cu ✓	Pb ✓	Zn ✓	Co ✓	Mo ✓	Ag ✓	Mg ✓
3292747	3	15	6	<2	2	<1	0.755
3292748	2	40	5	<2	<2	<1	0.442
3292749	4	150	6	<2	<2	<1	0.103
3292750	5	25	5	<2	<2	<1	0.316
3292751	5	30	6	<2	2	<1	0.442
3292752	<2	10	4	<2	2	<1	0.222
3292753	3	25	5	3	<2	<1	0.715
3292754	5	15	5	4	<2	<1	0.765
3292755	4	15	4	<2	<2	<1	0.150
3292756	5	60	6	<2	<2	<1	0.222
3292757	6	15	7	<2	<2	<1	0.260
3292758	8	20	12	<2	<2	<1	0.360
3292759	17	<5	9	9	<2	<1	0.486
3292760	64	<5	16	24	2	<1	1.62
3292761	105	<5	24	42	2	1	2.78
3292762	4	<5	7	<2	<2	<1	0.173
3292763	3	<5	5	<2	<2	<1	0.206
3292764	3	<5	6	<2	<2	<1	0.336
3292765	6	<5	8	2	<2	<1	0.348
3292766	3	<5	6	3	<2	<1	0.416
3292767	3	<5	7	3	<2	<1	0.360
3292768	3	10	7	4	2	<1	1.52
3292769	3	<5	6	3	<2	<1	0.705
3292770	7	15	14	3	<2	<1	0.450
3292771	6	20	14	4	<2	<1	0.590
3292772	5	30	12	3	<2	<1	0.448
3292773	8	5	17	4	3	<1	0.805
3292774	6	45	9	<2	<2	<1	0.308
3292775	7	150	7	<2	3	<1	0.137
3292776	8	145	10	<2	4	1	0.262
3292777	5	20	15	3	<2	<1	0.376
3292778	12	5	28	4	<2	<1	0.765
3292779	12	10	26	4	<2	<1	0.770
3292780	12	5	28	5	<2	<1	0.810
3292801	32	2400	35	<2	6	<1	0.164
3292802	4	85	10	<2	<2	<1	0.041
3292803	12	710	22	<2	<2	<1	0.172
3292804	3	20	9	<2	2	<1	0.163
3292805	14	930	22	<2	2	<1	0.206
3292806	<2	10	10	<2	<2	<1	0.077
3292807	<2	10	12	<2	<2	<1	0.074
3292808	<2	25	15	<2	<2	<1	0.113
3292809	3	180	19	<2	<2	2	0.525
3292810	<2	10	15	<2	<2	<1	0.190
3292811	<2	35	24	3	<2	<1	0.438
Units	ppm	ppm	ppm	ppm	ppm	ppm	%
DL	2	5	2	2	2	1	0.001
Scheme	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E

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Job: 2AD3627
O/N: 68026

ANALYTICAL REPORT

Sample	Cu	Pb	Zn	Co	Mo	Ag	Mg
3292812	<2	15	28	4	<2	<1	0.650
3292813	<2	30	18	<2	<2	<1	0.158
3292814	4	15	25	7	<2	<1	0.975
3292815	<2	10	18	2	<2	<1	0.402
3292816	17	1480	62	<2	4	<1	0.182
3292817	<2	20	17	<2	<2	<1	0.196
3292818	<2	35	18	<2	<2	<1	0.224
3292819	4	300	25	<2	<2	<1	0.286
3292820	10	930	36	<2	<2	<1	0.366
3292821	<2	30	16	<2	<2	<1	0.220
3292822	<2	250	22	<2	<2	2	0.380
3292823	<2	15	14	<2	<2	<1	0.228
3292824	<2	10	18	<2	<2	<1	0.266
3292825	<2	10	16	<2	<2	<1	0.390
3292826	<2	15	17	<2	<2	<1	0.240
3292827	<2	15	18	<2	<2	<1	0.157
3292828	<2	140	35	<2	4	2	0.166
3292829	<2	70	14	<2	<2	<1	0.112
3292830	6	220	13	<2	4	2	0.214
3292831	8	450	12	<2	3	2	0.150
3292832	10	10	20	3	<2	<1	0.448
3292833	5	10	13	<2	3	<1	0.296
Units	ppm	ppm	ppm	ppm	ppm	ppm	%
DL	2	5	2	2	2	1	0.001
Scheme	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E

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ANALYTICAL REPORT

Job: 2AD3627
O/N: 68026

Sample	Ca	As	Fe	Mn	Ni	Na	K
3292747	1.09	3	0.97	70	14	5.10	1.54
3292748	0.725	<3	0.89	65	14	5.50	1.48
3292749	0.615	8	0.94	60	4	5.65	0.935
3292750	0.655	<3	1.16	50	10	5.35	1.11
3292751	5.70	5	1.34	40	9	4.56	0.380
3292752	1.01	3	1.09	35	5	4.74	0.344
3292753	2.54	5	1.42	40	13	5.40	0.890
3292754	1.60	4	1.91	45	17	5.20	1.29
3292755	1.27	<3	0.58	30	3	5.35	0.870
3292756	1.95	5	0.65	30	4	3.82	0.815
3292757	4.12	3	0.72	40	4	3.24	0.995
3292758	3.28	5	1.15	55	5	3.20	0.965
3292759	0.975	3	3.24	50	16	5.50	0.565
3292760	0.890	4	8.25	100	34	3.66	0.995
3292761	1.36	3	13.3	230	52	2.72	1.45
3292762	2.70	<3	0.93	40	4	5.90	0.404
3292763	1.26	<3	0.76	40	5	5.30	0.474
3292764	1.66	<3	0.89	40	6	4.50	0.605
3292765	0.278	4	2.12	50	11	5.00	0.575
3292766	0.440	<3	1.32	45	14	6.10	0.760
3292767	0.422	<3	1.15	45	11	6.05	0.735
3292768	2.92	3	1.31	50	28	5.50	1.21
3292769	1.73	<3	1.17	40	19	5.95	0.870
3292770	0.535	5	1.91	55	11	3.68	2.62
3292771	0.440	4	1.91	80	14	4.00	2.54
3292772	1.30	4	1.60	100	12	4.78	1.90
3292773	6.95	<3	1.70	130	14	2.72	2.04
3292774	3.54	4	1.30	25	8	3.64	0.630
3292775	3.34	10	0.67	15	3	4.46	0.362
3292776	3.86	10	0.99	35	4	3.44	0.416
3292777	2.70	4	1.15	35	11	3.50	0.550
3292778	11.5	11	1.76	110	11	2.20	0.492
3292779	10.2	48	1.78	110	11	1.81	0.490
3292780	6.15	10	2.70	105	15	3.20	0.835
3292801	0.635	96	5.35	370	16	2.08	0.675
3292802	0.466	<3	0.66	30	5	4.48	1.20
3292803	1.99	38	1.66	115	7	3.52	0.815
3292804	1.22	4	0.45	25	6	2.14	0.675
3292805	0.775	52	1.79	140	9	1.47	0.434
3292806	0.680	<3	0.38	15	8	4.86	0.288
3292807	0.224	<3	0.32	120	7	5.95	0.304
3292808	0.440	4	0.47	20	8	2.80	0.137
3292809	5.80	12	0.95	30	12	3.06	0.378
3292810	1.62	<3	0.61	5	7	4.86	0.254
3292811	0.308	5	1.66	100	15	4.08	1.74
Units	%	ppm	%	ppm	ppm	%	%
DL	0.001	3	0.01	5	2	0.001	0.001
Scheme	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E

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ANALYTICAL REPORT

Job: 2AD3627
O/N: 68026

Sample	Ca	As	Fe	Mn	Ni	Na	K
3292812	1.19	4	1.66	105	18	2.50	2.62
3292813	0.145	3	0.87	25	10	1.32	1.54
3292814	0.700	<3	2.36	130	24	4.38	2.40
3292815	0.565	5	0.82	15	22	1.51	0.112
3292816	0.306	88	3.02	300	16	1.94	0.187
3292817	1.34	<3	0.54	20	8	2.46	0.188
3292818	1.93	4	0.41	10	7	1.61	1.14
3292819	1.47	18	1.19	35	10	2.30	0.745
3292820	3.92	48	1.79	125	12	1.73	0.790
3292821	0.975	<3	0.48	<5	10	3.46	0.755
3292822	1.25	13	0.86	35	13	2.48	1.06
3292823	0.560	<3	0.56	5	10	2.12	0.600
3292824	0.106	<3	0.92	25	14	1.83	0.292
3292825	0.286	<3	1.30	20	16	6.25	0.585
3292826	0.154	3	2.12	15	13	4.48	0.336
3292827	0.180	<3	0.65	5	14	4.66	0.370
3292828	3.64	8	0.57	<5	11	2.82	0.177
3292829	1.31	<3	0.52	<5	9	2.82	0.570
3292830	5.70	18	0.74	15	7	2.70	0.352
3292831	1.52	20	0.72	<5	6	4.78	0.364
3292832	6.20	7	1.76	65	10	0.985	0.595
3292833	3.42	5	0.88	40	10	0.408	0.120
Units	%	ppm	%	ppm	ppm	%	%
DL	0.001	3	0.01	5	2	0.001	0.001
Scheme	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E

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Job: 2AD3627
O/N: 68026

ANALYTICAL REPORT

Sample	Al	Ti	Au Avg	Au	Au Rpl	Au SS1
3292747	8.20	2850	<2	<2	--	<2
3292748	8.40	2400	<2	<2	--	--
3292749	7.90	6600	<2	<2	--	--
3292750	7.80	2450	<2	<2	--	--
3292751	6.25	2600	<2	<2	--	--
3292752	5.95	2000	<2	<2	--	--
3292753	7.85	5700	<2	<2	--	--
3292754	8.10	3450	<2	<2	--	--
3292755	7.75	1340	<2	<2	--	--
3292756	5.80	4200	<2	<2	--	--
3292757	5.45	1800	<2	<2	--	--
3292758	5.80	4500	<2	<2	--	--
3292759	8.90	4200	<2	<2	--	--
3292760	7.10	1.04%	<2	<2	--	--
3292761	7.10	1.85%	<2	<2	--	--
3292762	7.95	2300	<2	<2	--	--
3292763	7.10	2150	<2	<2	--	--
3292764	6.25	3000	<2	<2	--	--
3292765	7.75	2650	<2	<2	--	--
3292766	8.80	3050	<2	<2	--	--
3292767	8.85	2400	<2	<2	--	<2
3292768	8.45	5600	2	2	--	--
3292769	8.60	3550	<2	<2	--	--
3292770	7.65	2950	<2	<2	--	--
3292771	8.00	3250	<2	<2	--	--
3292772	8.70	4300	<2	<2	--	--
3292773	6.80	2550	<2	<2	--	--
3292774	9.90	4250	<2	<2	--	--
3292775	9.25	1.33%	<2	<2	--	--
3292776	8.30	1.15%	<2	<2	--	--
3292777	8.45	2650	<2	<2	--	--
3292778	5.50	2800	<2	<2	--	--
3292779	4.78	2700	<2	<2	--	--
3292780	7.45	4250	<2	<2	--	--
3292801	3.46	6.05%	<2	<2	--	--
3292802	6.45	3350	<2	<2	--	--
3292803	5.20	2.20%	<2	<2	--	--
3292804	3.18	1280	<2	<2	--	--
3292805	2.34	2.70%	<2	<2	--	--
3292806	6.00	4850	<2	<2	--	--
3292807	7.50	960	<2	<2	--	<2
3292808	3.56	990	<2	<2	--	--
3292809	4.32	7800	2	2	--	--
3292810	6.05	850	<2	<2	--	--
3292811	7.65	4400	<2	<2	--	--
Units	%	ppm	ppb	ppb	ppb	ppb
DL	0.001	10	2	2	2	2
Scheme	IC3E	IC3E	AA9	AA9	AA9	AA9

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Job: 2AD3627
O/N: 68026

ANALYTICAL REPORT

Sample	Al	Ti	Au Avg	Au	Au Rpl	Au SS1
3292812	6.45	1820	<2	<2	--	--
3292813	3.26	1220	<2	<2	--	--
3292814	8.85	3650	<2	<2	--	--
3292815	2.44	1400	<2	<2	--	--
3292816	2.66	4.05%	<2	<2	--	--
3292817	3.40	1360	<2	<2	--	--
3292818	3.24	4700	<2	<2	--	--
3292819	3.76	1.24%	<2	<2	--	--
3292820	3.18	2.70%	<2	<2	--	--
3292821	5.45	2300	<2	<2	--	--
3292822	4.42	5900	<2	<2	--	--
3292823	3.60	710	<2	<2	--	--
3292824	3.14	3150	<2	<2	--	--
3292825	8.70	3000	<2	<2	--	--
3292826	6.30	1860	<2	<2	--	--
3292827	6.35	2600	<2	<2	--	<2
3292828	5.80	9900	<2	<2	--	--
3292829	6.60	920	<2	<2	--	--
3292830	6.60	1.42%	<2	<2	--	--
3292831	11.0	2.60%	<2	<2	--	--
3292832	2.92	1950	<2	<2	--	--
3292833	1.31	1000	<2	<2	--	--
Units	%	ppm	ppb	ppb	ppb	ppb
DL	0.001	10	2	2	2	2
Scheme	IC3E	IC3E	AA9	AA9	AA9	AA9

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Job: 2AD3627
O/N: 68026

ANALYTICAL REPORT

Sample	Ba ✓	U ✓	Th	La	Ce	Bi	Nb
3292747	110	16	12	70	70	<4	14
3292748	105	125	10	110	80	<4	9
3292749	110	540	30	430	270	4	42
3292750	150	30	12	100	70	<4	11
3292751	240	40	10	80	70	<4	9
3292752	80	4	8	40	30	<4	8
3292753	200	62	14	120	90	<4	16
3292754	250	24	14	90	80	<4	12
3292755	160	20	<4	40	30	<4	10
3292756	230	125	8	120	80	<4	32
3292757	240	12	<4	30	30	5	10
3292758	270	24	6	70	60	<4	25
3292759	100	10	18	70	100	<4	16
3292760	125	12	10	60	80	<4	11
3292761	175	20	<4	40	70	<4	11
3292762	190	6	4	40	20	<4	8
3292763	95	10	<4	30	20	<4	7
3292764	145	6	4	30	20	<4	11
3292765	220	4	10	50	60	<4	8
3292766	220	6	10	50	50	<4	10
3292767	200	6	6	40	50	<4	7
3292768	230	8	10	50	50	<4	15
3292769	230	6	8	40	60	<4	12
3292770	320	12	18	50	70	<4	13
3292771	430	12	12	70	80	<4	10
3292772	430	55	12	110	90	<4	26
3292773	620	4	12	40	50	<4	11
3292774	110	28	20	180	160	<4	18
3292775	105	96	30	430	290	<4	72
3292776	120	120	45	380	280	<4	52
3292777	125	18	10	80	70	<4	7
3292778	1100	5	8	40	60	<4	8
3292779	900	10	14	40	60	<4	9
3292780	830	6	14	50	80	<4	13
3292801	260	7600	350	5400	3250	<4	240
3292802	165	240	15	220	130	<4	8
3292803	330	2000	110	1480	910	<4	44
3292804	65	32	10	90	60	<4	7
3292805	145	2750	135	1820	1080	<4	44
3292806	65	8	4	<20	<20	<4	30
3292807	25	<4	4	<20	<20	<4	4
3292808	45	22	6	60	40	<4	3
3292809	155	730	42	280	160	<4	15
3292810	50	5	34	20	20	<4	2
3292811	220	100	22	170	130	<4	46
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DL	10	4	4	20	20	4	2
Scheme	XRF1	XRF1	XRF1	XRF1	XRF1	XRF1	XRF1

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ANALYTICAL REPORT

Job: 2AD3627
O/N: 68026

Sample	Ba	U	Th	La	Ce	Bi	Nb
3292812	300	6	10	30	40	<4	11
3292813	145	58	5	60	50	<4	3
3292814	470	5	15	70	90	<4	11
3292815	180	18	6	30	30	<4	5
3292816	190	4750	220	3500	2150	5	10
3292817	95	8	<4	20	<20	<4	5
3292818	280	38	<4	50	40	<4	40
3292819	380	780	56	550	340	<4	22
3292820	760	1940	105	1740	1080	8	<2
3292821	120	15	5	50	40	4	28
3292822	250	590	34	400	270	<4	5
3292823	120	6	5	30	20	<4	4
3292824	120	<4	<4	20	20	<4	10
3292825	250	4	10	70	100	<4	9
3292826	95	<4	10	30	50	<4	5
3292827	70	5	6	50	40	<4	7
3292828	105	140	44	320	230	<4	40
3292829	90	16	8	120	80	<4	3
3292830	150	175	44	580	380	<4	50
3292831	260	190	48	870	480	<4	155
3292832	1000	12	10	30	30	<4	6
3292833	730	16	16	20	50	<4	3
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DL	10	4	4	20	20	4	2
Scheme	XRF1	XRF1	XRF1	XRF1	XRF1	XRF1	XRF1

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Job: 2AD3627
O/N: 68026

ANALYTICAL REPORT

Sample	Sn	W	Ta
3292747	14	10	<20
3292748	5	10	<20
3292749	8	25	<20
3292750	8	10	<20
3292751	6	<10	<20
3292752	4	<10	<20
3292753	6	<10	<20
3292754	4	10	<20
3292755	4	10	<20
3292756	8	10	<20
3292757	5	10	<20
3292758	8	10	<20
3292759	8	<10	<20
3292760	6	<10	<20
3292761	6	<10	<20
3292762	<4	<10	<20
3292763	6	<10	<20
3292764	<4	<10	<20
3292765	12	<10	<20
3292766	6	10	<20
3292767	4	<10	<20
3292768	6	<10	<20
3292769	6	<10	<20
3292770	10	<10	<20
3292771	8	10	<20
3292772	8	<10	<20
3292773	5	10	<20
3292774	14	10	<20
3292775	10	<10	<20
3292776	10	10	<20
3292777	5	<10	<20
3292778	<4	<10	<20
3292779	4	<10	<20
3292780	6	<10	<20
3292801	58	250	<20
3292802	5	<10	<20
3292803	18	55	<20
3292804	<4	<10	<20
3292805	22	65	<20
3292806	6	<10	<20
3292807	<4	<10	<20
3292808	<4	<10	<20
3292809	6	30	<20
3292810	<4	<10	<20
3292811	6	10	<20
Units	ppm	ppm	ppm
DL	4	10	20
Scheme	XRF1	XRF1	XRF1

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Job: 2AD3627
O/N: 68026

ANALYTICAL REPORT

Sample	Sn	W	Ta
3292812	4	<10	<20
3292813	<4	10	<20
3292814	6	<10	<20
3292815	10	<10	<20
3292816	36	150	<20
3292817	<4	<10	<20
3292818	6	20	<20
3292819	8	20	<20
3292820	25	55	<20
3292821	4	10	<20
3292822	6	15	<20
3292823	<4	<10	<20
3292824	4	<10	<20
3292825	15	10	<20
3292826	12	<10	<20
3292827	6	<10	<20
3292828	8	15	<20
3292829	<4	<10	<20
3292830	8	15	<20
3292831	20	10	<20
3292832	4	10	<20
3292833	5	<10	<20
Units	ppm	ppm	ppm
DL	4	10	20
Scheme	XRF1	XRF1	XRF1

APPENDIX V

KR4 Prospect

Possible Sampling Problems of the KR4 Uranium Prospect - Due to Nugget Effect

MEMORANDUM amended Text

TO : R.J. Rebek

COPY TO ; D.M. Ryan
R. W. Nelson

FROM : D. Brewster

Date : 13 January 1993

Possible Sampling Problems of the KR4 Uranium Prospect Due to Nugget Effect

Introduction

Costeaning of the KR4 radiometric anomaly has revealed U mineralisation occurring as coarse grained davidite [$(Fe^{2+}, Ce, U)_2 (Ti, Fe^{3+}, V, Cr)_5 O_{15}$] hosted by an array of narrow quartz veins (10 - 30 cm) developed within quartz-feldspar-biotite gneisses. The mineralised quartz vein array is constrained to a zone approx. 5m thick normal to the strike of the radiometric anomaly.

The occurrence of this mineralisation as very coarse, discrete, irregularly distributed grains within a vein network presents a considerable sampling problem.

It is intuitive in this situation that a series of small "rock chip" samples could easily present a biased picture of the bulk average grade of mineralisation and therefore a larger sample is probably required. The obvious question then arises: What sized sample is required in order to be confident that the resulting estimate of average grade is reasonable?

Method and Assumptions

I have attempted to consider the sampling requirements at KR4 in a very simple minded fashion assuming homogeneous distribution of davidite grains within the mineralised zone. This assumption is obviously incorrect but it does provide a starting point for consideration of the problem. I have considered the following two situations.

1. How many davidite grains, at various grain volumes, would there be in a tonne of material if that material had a fixed grade of 1500 ppm U and the davidite grains were distributed evenly? Figure 1 displays a graph describing this situation. 1500 ppm has been used assuming it would represent a minimum economic U grade.

2. What weight of host material would contain twenty davidite grains, at various davidite grain volumes, at a fixed average U grade. Twenty grains have been chosen as this is considered to be a reasonable sub-sample size of the U bearing mineral for a grade estimate.

   Once again an even distribution is assumed. However a situation where a small percentage of the bulk material occurs as quartz which contains all the U grade is also considered. The consideration of a clustering of grade into a small part of the whole starts to give a more realistic estimate of sample the weight required to adequately estimate the grade of mineralisation like that encountered at KR4. Figure 2 displays a graph of this situation.

Discussion

Situation 1

Figure 1 clearly highlights the effect of grain volume on the number of grains in a fixed weight of material at a fixed grade. The resulting function is hyperbolic. The graph shows for a grain volume of 25 cm^3, which is estimated to be the upper "grain size" volume at KR4, that there would be 240 grains in a tonne. This of course assumes an even distribution of grains.

This result highlights the fact that although coarse grain size results in the need for larger samples that this problem is not as critical with Uranium as it is for gold. With gold economic grades are three orders of magnitude lower than economic uranium grades and there is a very real chance that one grain (or less) per tonne could produce economic grades on a average per tonne basis. The problem is further accentuated with gold because an individual grain is likely to be 100% gold, not just a gold bearing phase. However in the case of the uranium bearing material at KR4 a maximum of 15 wt% of the davidite grain is actually Uranium. Therefore many more Davidite grains will be required on average per tonne to make a economic grade on the basis of its mineralogically constrained "low" uranium content.[1] Despite the above discussion it is obvious even with homogeneous distributions that a significant weight of material would be required to contain in excess of say 20 davidite grains. This is the problem addressed by Situation 2.

Situation 2

Figure 2 clearly highlights both;

i) The weight of sample required to contain 20 davidite grains, with an even distribution, to obtain a bulk average grade of 1500 ppm U and;

ii) The weight of sample required to contain 20 davidite grains in a barren "host rock" with 5 wt% quartz and if that quartz has a grade of 1500 ppm U.

This translates to a bulk average grade of 75 ppm assuming the non quartz host to have a 0 ppm Uranium grade.

This represents a situation in which grade is clustered (high cv) selectively into a small portion of the whole and is therefore more geological realistic. It is not totally realistic, as there will be Uranium grade variability within the quartz and variability in the quartz content of the host. The situation is however a simple "first order"model of the KR4 mineralisation.

Examination of the graph displaying these cases shows that the uranium grade in quartz only situation would require a sample of weight 1666 kg to contain twenty davidite grains, at a grain volume of 25 cm^3. The graph also shows that if the davidite is distributed evenly throughout the host rock a sample of only 83 kg would be required under the same grain volume conditions.

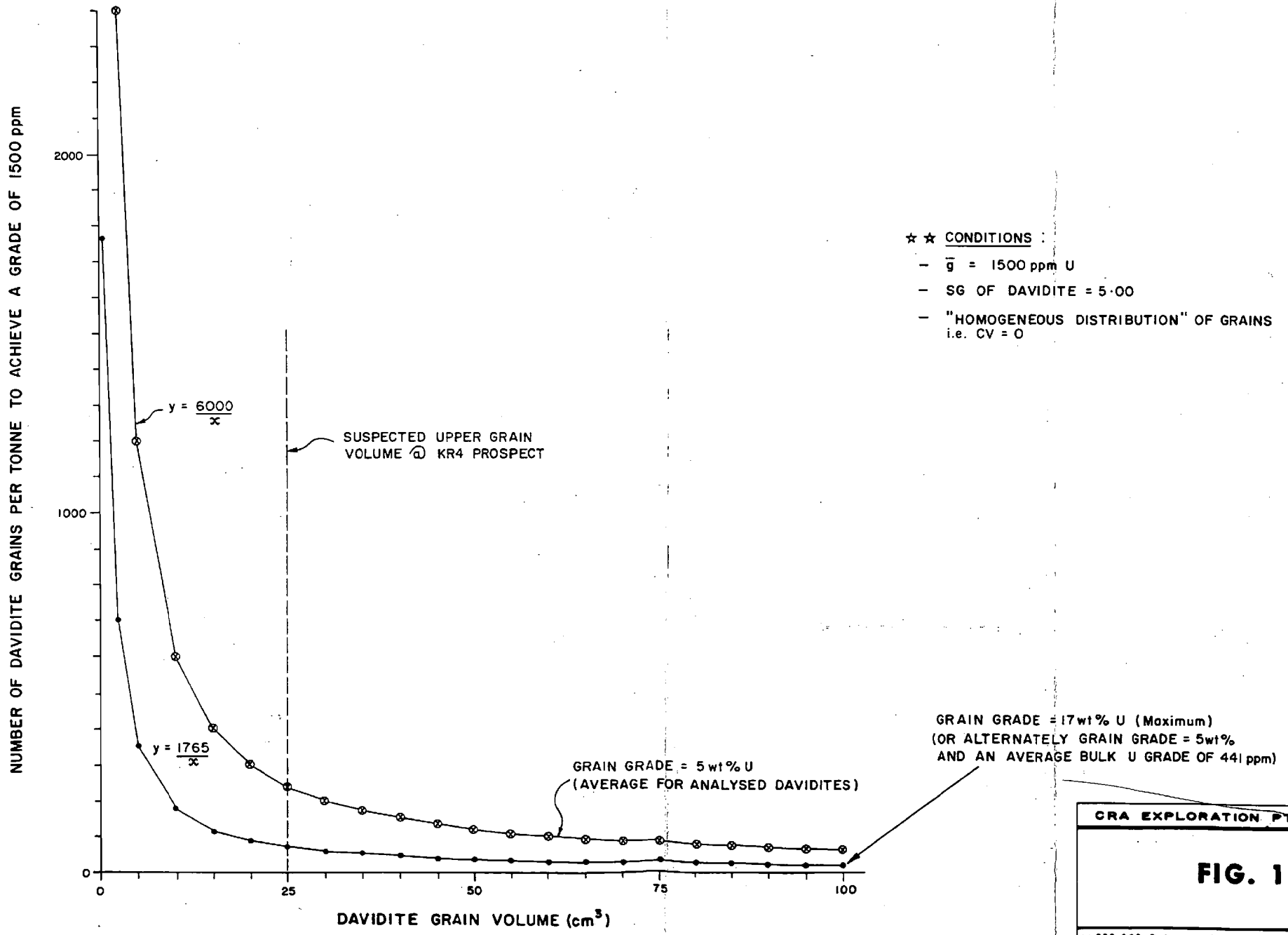
Conclusions

Without carrying out grade sampling experiments at KR4 and without considering sophisticated statistics such as the central limit theorem it would seem that a sample in the order of 1.6 tonnes would be required from KR4 to establish if potential for economic grades exist at this prospect.

Assuming a spoil SG of 2 for the material costeaned at KR4, a sample of weight 1.6 tonnes would be contained in four 200L drums.

---

[1]This has implications for concentrates. A davidite concentrate has a much lower total U grade than say, a pitchblende concentrate



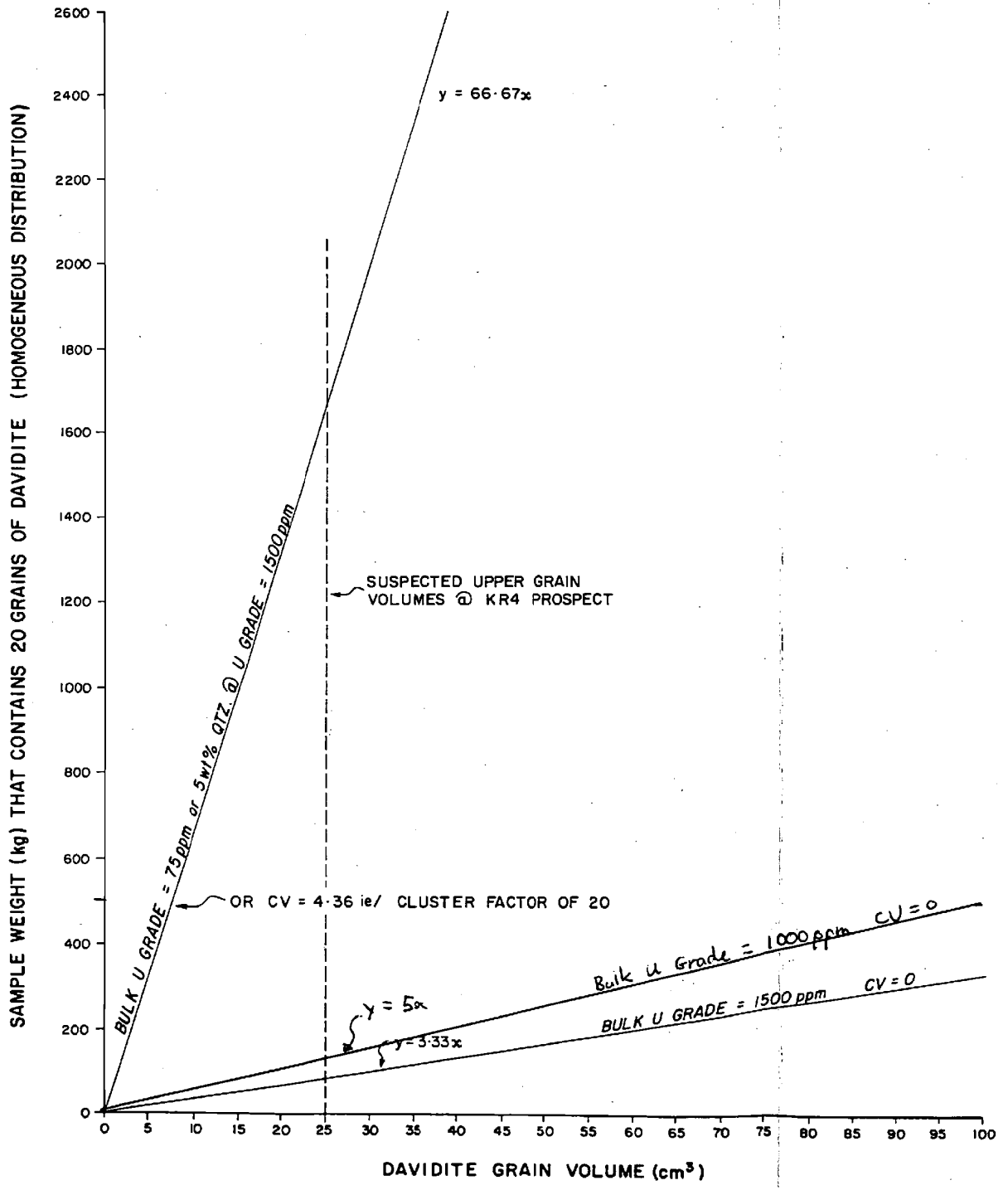
☆☆ CONDITIONS :

- $\bar{g}$ = 1500 ppm U
- SG OF DAVIDITE = 5·00
- "HOMOGENEOUS DISTRIBUTION" OF GRAINS i.e. CV = 0

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FIG. 1

1 : 250 000 Reference Sheet No.		
Author D.Brewster	Scale :	Report No.
Drawn G.Holliday	Date Feb., 1993	Plan No. NSW b



☆☆ CONDITIONS :

- SG OF DAVIDITE = 5·00
- DAVIDITE U CONTENT = 5 wt%
- "HOMOGENEOUS DISTRIBUTION" WITHIN MEDIA OF CONSIDERATION.

5 wt% Quartz = 1 Vein 5cm wide with 50 x 50 cm continuity per tonne of rock (i.e. per cube of rock with 70cm sides @ SG = 3)

CRA EXPLORATION PTY. LIMITED

FIG. 2

1 : 250 000 Reference Sheet No.		
Author D. Brewster	Scale :	Report No.
Drawn G. Holliday	Date Feb., 1993	Plan No. NSW b

APPENDIX VI

Radiometric Bulk Samples

Ledgers
Assay Results

CRA EXPLORATION PTY. LTD. BROKEN HILL
SOIL & GRAB SAMPLE SHEET

KR4 Davidite Prospect.
COSTEAN No 1.

Tenement: EL 1591 Calico Dam
Date: 22/2/93

Grid: KR4
DPO: 68032
Geol: DCB/EWN
Lab: AMDEL

Costean Spoil samples

Sample No.	AMG LOCAL East	AMG LOCAL North	Sample Type	Code	Comments	Analyses-ppm
3291230	9950E x 1	9995-10005 Drum (20L)	N		Sorted "High radiometric grade" (T.C.P.S > 350) vein quartz (+ davidite). Quartz Hand Picked from Costean Spoil	
3291231	9950E x 7	9995-10005 Drums (20L)	N		Sorted "Low radiometric grade" (T.C.P.S < 350) vein quartz. Quartz Hand Picked from Costean Spoil	
3291232	9950E x 4	9995-10005 Drums (20L)	N		Bulk Unsorted Costean Spoil includes, vein qtz, gneiss, schist, davidite xtals ect.	

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Mr D C Brewster
CRA Exploration Pty Limited
PO BOX 683
BROKEN HILL
NSW 2880

F I N A L A N A L Y S I S R E P O R T

Your Order No: 68032 Our Job Number : 3AD0912

Samples received : 08-MAR-1993 Results reported : 29-MAR-1993
No. of samples : 3
Report comprises a cover sheet and pages 1 to 4

This report relates specifically to the samples tested in so far as that the samples as supplied are truly representative of the sample source.

Note:
If you have any enquiries please contact Miss Anne Reed quoting the above job number.

Approved Signatory:

John Waters
Laboratory Manager - Adelaide

MM	Mr D C Brewster	NSW
CC	CRA Exploration	ACT
CC	Mr Bob Sanderson	NSW

Report Codes:
N.A. - Not Analysed.
L.N.R. - Listed But Not Received.
I.S. - Insufficent Sample.

Distribution Codes:
CC - Carbon Copy
EM - Electronic Media
MM - Magnetic Media

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ANALYTICAL REPORT

Job: 3AD0912
O/N: 68032

Sample	U	Th	La	Ce	Nb	Pb	Sn
3291230/1	280	20	280	180	76	145	12
3291230/2	280	20	280	180	76	140	12
3291230/3	280	20	280	180	76	140	11
3291230/4	290	20	280	175	76	145	11
3291230/5	290	20	280	180	78	140	11
3291230/6	290	20	280	180	78	145	12
3291230/7	290	19	280	180	78	145	12
3291230/8	290	20	280	180	76	145	12
3291230/9	300	20	280	180	78	145	10
3291230/10	290	20	280	180	78	140	11
3291231/1	9	2	45	30	12	13	4
3291231/2	7	3	45	30	12	14	3
3291231/3	8	2	40	30	11	14	3
3291231/4	10	3	45	30	11	15	3
3291231/5	9	3	40	30	12	12	3
3291231/6	9	4	40	30	12	12	4
3291231/7	9	3	40	30	11	13	3
3291231/8	10	2	40	30	12	14	2
3291231/9	9	3	45	30	12	15	4
3291231/10	9	2	40	30	11	14	2
3291232/1	32	15	95	110	19	20	14
3291232/2	30	16	100	115	19	22	15
3291232/3	26	18	95	110	18	22	15
3291232/4	32	16	95	115	18	22	15
3291232/5	28	15	95	115	18	20	15
3291232/6	32	18	100	115	18	22	15
3291232/7	32	17	100	110	18	22	14
3291232/8	30	17	100	115	17	24	15
3291232/9	30	17	95	115	18	22	15
3291232/10	28	16	100	115	18	20	14
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DL	2	2	10	10	1	1	2
Scheme	XRF1L	XRF1L	XRF1L	XRF1L	XRF1L	XRF1L	XRF1L

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Job: 3AD0912
O/N: 68032

ANALYTICAL REPORT

Sample	Ta	W
3291230/1	<4	20
3291230/2	<4	18
3291230/3	<4	20
3291230/4	<4	20
3291230/5	4	18
3291230/6	<4	20
3291230/7	<4	20
3291230/8	<4	22
3291230/9	<4	20
3291230/10	<4	16
3291231/1	<4	4
3291231/2	<4	5
3291231/3	<4	<4
3291231/4	<4	5
3291231/5	<4	6
3291231/6	<4	4
3291231/7	<4	5
3291231/8	<4	4
3291231/9	<4	4
3291231/10	<4	4
3291232/1	<4	10
3291232/2	<4	8
3291232/3	<4	8
3291232/4	<4	8
3291232/5	<4	10
3291232/6	<4	8
3291232/7	<4	8
3291232/8	<4	8
3291232/9	<4	5
3291232/10	<4	8
Units	ppm	ppm
DL	4	4
Scheme	XRF1L	XRF1L

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ANALYTICAL REPORT

Job: 3AD0912
O/N: 68032

Sample	Cu	Pb	Zn	Co	Mo	Ag	As
3291230/1	7	125	7	<2	5	<1	<3
3291230/2	7	125	6	<2	4	<1	3
3291230/3	8	125	6	<2	5	<1	5
3291231/1	5	15	3	<2	4	<1	<3
3291231/2	4	10	3	<2	4	<1	<3
3291231/3	5	15	3	<2	4	<1	<3
3291232/1	5	15	6	3	<2	<1	<3
3291232/2	5	15	5	3	<2	<1	<3
3291232/3	5	15	5	3	<2	<1	<3
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DL	2	5	2	2	2	1	3
Scheme	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E

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ANALYTICAL REPORT

Job: 3AD0912
O/N: 68032

Sample	Fe	Mn	Au Avg	Au	Au Rpl	Au SS1
3291230/1	0.76	55	<2	<2	--	--
3291230/2	0.80	65	<2	<2	--	--
3291230/3	0.87	75	<2	<2	--	--
3291231/1	0.48	40	<2	<2	--	--
3291231/2	0.49	50	<2	<2	--	--
3291231/3	0.52	45	<2	<2	--	--
3291232/1	0.93	70	<2	<2	--	--
3291232/2	0.92	65	<2	<2	--	--
3291232/3	0.91	65	4	4	--	--
Units	%	ppm	ppb	ppb	ppb	ppb
DL	0.01	5	2	2	2	2
Scheme	IC3E	IC3E	AA9	AA9	AA9	AA9

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ANALYTICAL REPORT

Job: 3AD0912
O/N: 68032

Unpulverised samples

Sample	Weight
3291230	17064.7
3291231	162034.2
3291232	130540.5
Units	g

After crushing, mixermilling

Sample	Weight
3291230	16771.7
3291231	159024.3
3291232	128921.4
Units	g

APPENDIX VII

Rock Chip Sample Ledgers, Reconnaissance Sampling Program

Assay Results

ROCK SAMPLE LEDGER

Tenement: Calico Dam EL 1591
Date: Oct-92

GRID:
DPO: 68016/68025
1:250000:
1:100000:
GEOLOGIST: S. Andrews
LABORATORY: Amdel

Sample No.	AMG East	AMG North	Sample Type	Geological Observation	Analyses - ppm								
3291114	444350	6468620	R/C	Kalabity 4 : Pale chert horizon, containing common Py and Fe									
				vugs. Occurs as interbed with mica schist, quartz sst and									
				pegmatite.									
3291115	443920	6467110	R/C	Granite. Total count 5-600 cps									
3291116	443920	6467110	R/C	Granite. Total count 5-600 cps									
3291168	433780	6469040	R/C	Kalabity 1 : Pale white quartz-rock (feldspar/pegmatite dyke?)									
				Total count >1000 cps									
3291169	433780	6469040	R/C	Kalabity 1 : As above ~600 cps									
3291170	433700	6468920	R/C	Kalabity 1 : Andalusite schist									
				Total count ~3-400 cps									
3291171	433600	6468780	R/C	Kalabity 1 : Andalusite schist									
				Total count ~400 cps									
3291172	403480	6468760	R/C	Kalabity 1 : Ferruginous schist horizon approx. 2m thick,									
				occurring behind satellite dish. Occurs within upper pelite suite									
				Total count ~6-700 cps									
3291173	403480	6468760	R/C	Kalabity 1 : As for 3291172									
3291174	433510	6468720	R/C	Kalabity 1 : Andalusite schist									
				Total count ~3-400 cps									

ROCK SAMPLE LEDGER

Tenement: Calico Dam EL 1591
Date: Oct-92

GRID:
DPO: 68016/68025
1:250000:
1:100000:
GEOLOGIST: S. Andrews
LABORATORY: Amdel

Sample No.	AMG East	AMG North	Sample Type	Geological Observation	Analyses - ppm								
3291175	433500	6468300	R/C	Kalabity 1 : Andalusite schist									
				Total count ~360 cps									
3291176	432710	6468260	R/C	Kalabity 2 : Muscovite bearing grey phyllite									
				Total count ~280-350 cps									
3291177	431020	6468840	R/C	Rich epidote bearing albite metasediment. Lighter massive									
				and darker banded lithologies. No visible breccia textures									
				(contrary to CEC mapping)									
3291178	432900	6466500	R/C	3 point Uc-UB anomaly : Granite									
				Total count 400 cps									
3291179	433640	6464000	R/C	3 point TCB anomaly : Granite									
				Total count +500 cps									
3291180	433900	6464800	R/C	1 point TCB anomaly: Granite									
				Total count + 400 cps									
3291181	433520	6465040	R/C	1 point TCB anomaly : Granite									
				Total count + 400 cps									
3291182	433420	6462220	R/C	Multi Point TCB Anomaly : Granite									
				Total count + 600-700 cps									
3291183	439140	6468000	R/C	Coarse anatectic granite. Good low lying exposure zone									
				Total count >1000cps.									

ROCK SAMPLE LEDGER

Tenement: Calico Dam EL 1591
Date: Oct-92

GRID:
DPO: 68016/68025
1:250000:
1:100000:
GEOLOGIST: S. Andrews
LABORATORY: Amdel

Sample No.	AMG East	AMG North	Sample Type	Geological Observation	Analyses - ppm								
3291184	441520	6469820	R/C	Quartz-feldspar pegmatite at approx site of CEC 1420 Cu R/C									
3291185	441520	6469720	R/C	Quartz-feldspar-biotite granite(?) pegmatite subcrops									
3291186	441500	6469640	R/C	Quartz vein float. Coarse quartz weakly Fe in part									
3291187	441260	6469360	R/C	Pegmatite vein									
3291188	441040	6469200	R/C	Pegmatite									
3291189	441020	6468840	R/C	Pegmatite with biotite-rich schist intrusions									
3291190	441020	6468660	R/C	Granite									
3291191	441020	6468480	R/C	Granite at hill peak									

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Mr Steve Andrews
CRA Exploration Pty Limited
PO BOX 683
BROKEN HILL
NSW 2880

F I N A L A N A L Y S I S R E P O R T

Your Order No: 68016 Our Job Number : 2AD2951

Samples received : 14-OCT-1992 Results reported : 29-OCT-1992
No. of samples : 16
Report comprises a cover sheet and pages 1 to 4

This report relates specifically to the samples tested in so far as that the samples as supplied are truly representative of the sample source.

Note:
If you have any enquiries please contact Miss Anne Reed quoting the above job number.

Approved Signatory:

for John Waters
Laboratory Manager - Adelaide

MM	Mr Steve Andrews	NSW
CC	Mr Bob Sanderson	NSW
CC	CRA Exploration	ACT

Report Codes:
N.A. - Not Analysed.
L.N.R. - Listed But Not Received.
I.S. - Insufficent Sample.

Distribution Codes:
CC - Carbon Copy
EM - Electronic Media
MM - Magnetic Media

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ANALYTICAL REPORT

Job: 2AD2951
O/N: 68016

Sample	Cu	Pb	Zn	Co	Mo	Ag	Mg
3291114	6	5	4	4	3	<1	0.022
3291115	9	30	24	2	<2	1	0.230
3291116	12	35	24	3	3	1	0.200
3291162	7	40	50	3	2	<1	0.236
3291163	910	25	610	7	62	3	0.144
3291164	12	5	38	10	<2	<1	0.860
3291165	22	35	20	2	<2	<1	0.204
3291166	150	35	40	22	<2	<1	0.280
3291167	4.05%	45	82	140	22	2	0.130
3291168	370	135	14	4	4	3	0.128
3291169	190	35	15	2	9	1	0.228
3291170	94	40	15	<2	7	<1	0.340
3291171	55	25	12	2	8	<1	0.332
3291172	260	15	135	40	17	2	0.545
3291173	195	15	230	30	9	2	0.550
3291174	50	25	15	<2	<2	<1	0.318
Units	ppm	ppm	ppm	ppm	ppm	ppm	%
DL	2	5	2	2	2	1	0.001
Scheme	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E

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ANALYTICAL REPORT

Job: 2AD2951
O/N: 68016

Sample	Ca	As	Fe	Mn	Ni	Na	K
3291114	0.030	<3	1.42	95	6	1.06	0.086
3291115	0.191	<3	1.21	85	5	2.64	3.76
3291116	0.202	5	1.35	95	6	2.84	3.92
3291162	0.258	3	1.21	75	5	2.28	4.94
3291163	0.985	105	35.8	370	11	0.226	0.494
3291164	3.42	7	3.50	2600	24	0.585	6.05
3291165	0.212	8	0.82	110	4	2.04	4.82
3291166	0.296	24	1.27	150	7	2.10	4.58
3291167	0.196	5700	2.46	45	11	0.715	3.26
3291168	0.290	9	4.04	45	16	2.74	4.00
3291169	0.580	12	2.54	60	11	2.84	1.99
3291170	0.340	15	0.79	100	6	0.605	2.90
3291171	0.244	8	1.02	115	13	0.476	2.90
3291172	0.149	18	13.2	270	240	0.222	2.70
3291173	0.081	17	17.0	260	270	0.220	2.64
3291174	0.163	12	1.03	65	5	0.488	3.74
Units	%	ppm	%	ppm	ppm	%	%
DL	0.001	3	0.01	5	2	0.001	0.001
Scheme	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E

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ANALYTICAL REPORT

Job: 2AD2951
O/N: 68016

Sample	Al	Ti	Ba	U	Sn	W
3291114	1.40	720	110	<4	<4	<10
3291115	7.25	1180	220	12	8	<10
3291116	7.65	1160	250	15	8	<10
3291162	7.40	1540	330	10	6	<10
3291163	1.32	380	150	240	<4	640
3291164	7.05	2950	2100	4	6	<10
3291165	7.35	1520	500	12	5	<10
3291166	7.10	1650	330	14	<4	<10
3291167	3.78	2100	2050	44	34	30
3291168	7.05	1050	2300	86	<4	<10
3291169	8.20	3500	730	16	<4	<10
3291170	7.70	3600	1380	36	<4	<10
3291171	7.80	4100	1300	26	<4	<10
3291172	9.10	3350	1020	75	<4	<10
3291173	7.20	3100	700	100	<4	<10
3291174	10.2	4100	970	16	<4	10
Units	%	ppm	ppm	ppm	ppm	ppm
DL	0.001	10	10	4	4	10
Scheme	IC3E	IC3E	XRF1	XRF1	XRF1	XRF1

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Job: 2AD2951
O/N: 68016

ANALYTICAL REPORT

Sample	Au Avg	Au	Au Rpl	Au SS1
3291114	<2	<2	--	<2
3291115	<2	<2	--	--
3291116	<2	<2	--	--
3291162	<2	<2	--	--
3291163	<2	<2	--	--
3291164	<2	<2	--	--
3291165	4	4	4	--
3291166	<2	<2	--	--
3291167	2020	2040	2000	--
3291168	<2	<2	--	--
3291169	<2	<2	--	--
3291170	<2	<2	--	--
3291171	2	2	--	--
3291172	<2	<2	--	--
3291173	<2	<2	--	--
3291174	2	2	--	--
Units	ppb	ppb	ppb	ppb
DL	2	2	2	2
Scheme	AA9	AA9	AA9	AA9

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15 DEC 1992

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Mr D C Brewster
CRA Exploration Pty Limited
PO BOX 683
BROKEN HILL
NSW 2880

FINAL ANALYSIS REPORT

Your Order No: 68025 Our Job Number : 2AD3626

Samples received : 04-DEC-1992 Results reported : 11-DEC-1992
No. of samples : 17
Report comprises a cover sheet and pages 1 to 4

This report relates specifically to the samples tested in so far as that the samples as supplied are truly representative of the sample source.

Note:
If you have any enquiries please contact Miss Anne Reed quoting the above job number.

Approved Signatory:

for John Waters
Laboratory Manager - Adelaide

MM	Mr D C Brewster	NSW
CC	Mr Bob Sanderson	NSW
CC	CRA Exploration	ACT

Report Codes:
N.A. - Not Analysed.
L.N.R. - Listed But Not Received.
I.S. - Insufficent Sample.

Distribution Codes:
CC - Carbon Copy
EM - Electronic Media
MM - Magnetic Media

amdel

ANALYTICAL REPORT

Job: 2AD3626
O/N: 68025

Sample	Cu	Pb	Zn	Co	Mo	Ag	Mg
3291175	30	25	44	2	<2	<1	0.580
3291176	30	10	9	6	8	<1	0.650
3291177	2	<5	17	11	<2	<1	1.92
3291178	15	30	28	4	<2	<1	0.442
3291179	24	20	48	4	<2	<1	0.680
3291180	6	30	44	<2	<2	<1	0.212
3291181	17	25	28	3	<2	<1	0.256
3291182	6	25	34	<2	<2	<1	0.141
3291183	12	35	24	<2	<2	<1	0.118
3291184	7	15	5	<2	<2	<1	0.029
3291185	17	15	7	<2	<2	<1	0.092
3291186	22	<5	2	<2	3	<1	0.012
3291187	10	15	8	<2	<2	<1	0.122
3291188	4	10	10	<2	<2	<1	0.149
3291189	5	5	22	3	<2	<1	0.392
3291190	7	15	11	<2	<2	<1	0.208
3291191	6	15	6	<2	<2	<1	0.093
Units	ppm	ppm	ppm	ppm	ppm	ppm	%
DL	2	5	2	2	2	1	0.001
Scheme	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E

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ANALYTICAL REPORT

Job: 2AD3626
O/N: 68025

Sample	Ca	As	Fe	Mn	Ni	Na	K
3291175	0.140	4	2.24	250	13	0.484	2.54
3291176	0.162	10	1.62	150	28	1.39	2.70
3291177	5.75	6	4.32	840	15	4.20	0.985
3291178	0.520	5	2.26	100	6	2.86	3.88
3291179	0.238	<3	2.84	120	13	1.75	4.84
3291180	0.342	<3	1.40	80	3	2.36	4.42
3291181	0.266	<3	1.90	120	7	2.60	3.86
3291182	0.292	6	1.60	115	<2	2.10	4.12
3291183	0.346	4	1.63	60	<2	2.44	4.48
3291184	0.091	<3	0.48	75	<2	0.400	12.8
3291185	0.157	<3	0.59	55	<2	2.72	4.98
3291186	0.020	<3	0.95	40	13	0.096	0.131
3291187	0.178	<3	0.92	70	4	2.18	3.96
3291188	0.124	<3	1.05	65	5	2.16	4.10
3291189	0.266	<3	1.74	110	9	3.14	2.34
3291190	0.194	4	1.19	75	2	2.88	4.44
3291191	0.254	<3	0.60	90	3	2.82	4.22
Units	%	ppm	%	ppm	ppm	%	%
DL	0.001	3	0.01	5	2	0.001	0.001
Scheme	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E	IC3E

amdel

ANALYTICAL REPORT

Job: 2AD3626
O/N: 68025

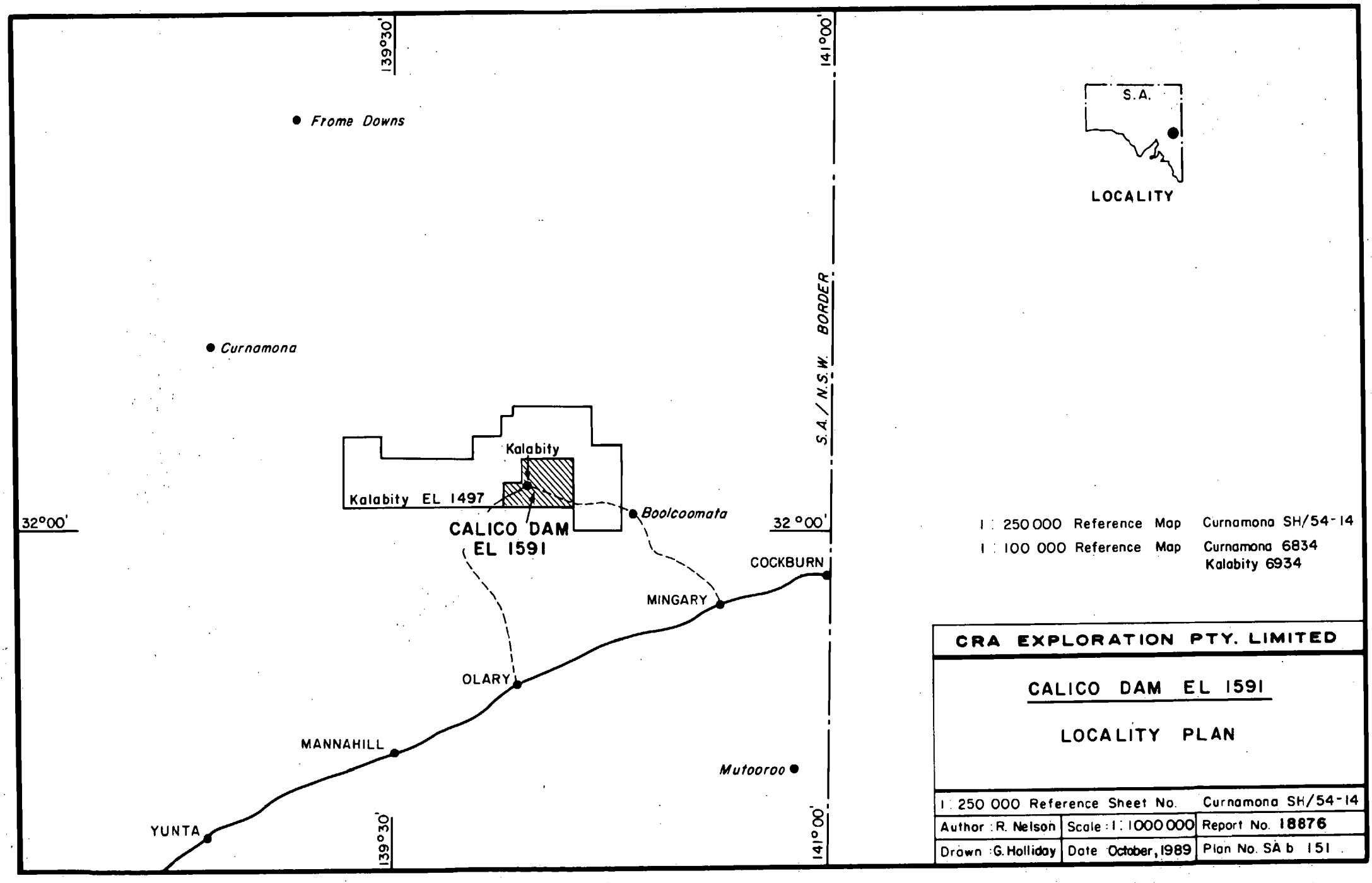
Sample	Al	Ti	Ba	U	Sn	W
3291175	9.40	3450	720	12	5	<10
3291176	8.10	3500	330	14	4	10
3291177	8.70	3450	280	8	5	<10
3291178	8.25	2850	750	12	8	<10
3291179	9.10	3850	640	10	8	<10
3291180	7.90	1420	310	8	6	<10
3291181	7.80	1650	430	8	6	<10
3291182	7.70	1380	360	8	6	<10
3291183	8.15	2450	300	35	14	<10
3291184	9.80	230	1100	6	<4	<10
3291185	7.70	520	250	5	6	<10
3291186	0.330	<10	20	<4	8	<10
3291187	6.80	530	380	6	6	<10
3291188	7.40	590	280	<4	8	10
3291189	7.80	1660	230	4	4	10
3291190	8.05	1360	350	10	6	<10
3291191	7.75	290	280	5	4	<10
Units	%	ppm	ppm	ppm	ppm	ppm
DL	0.001	10	10	4	4	10
Scheme	IC3E	IC3E	XRF1	XRF1	XRF1	XRF1

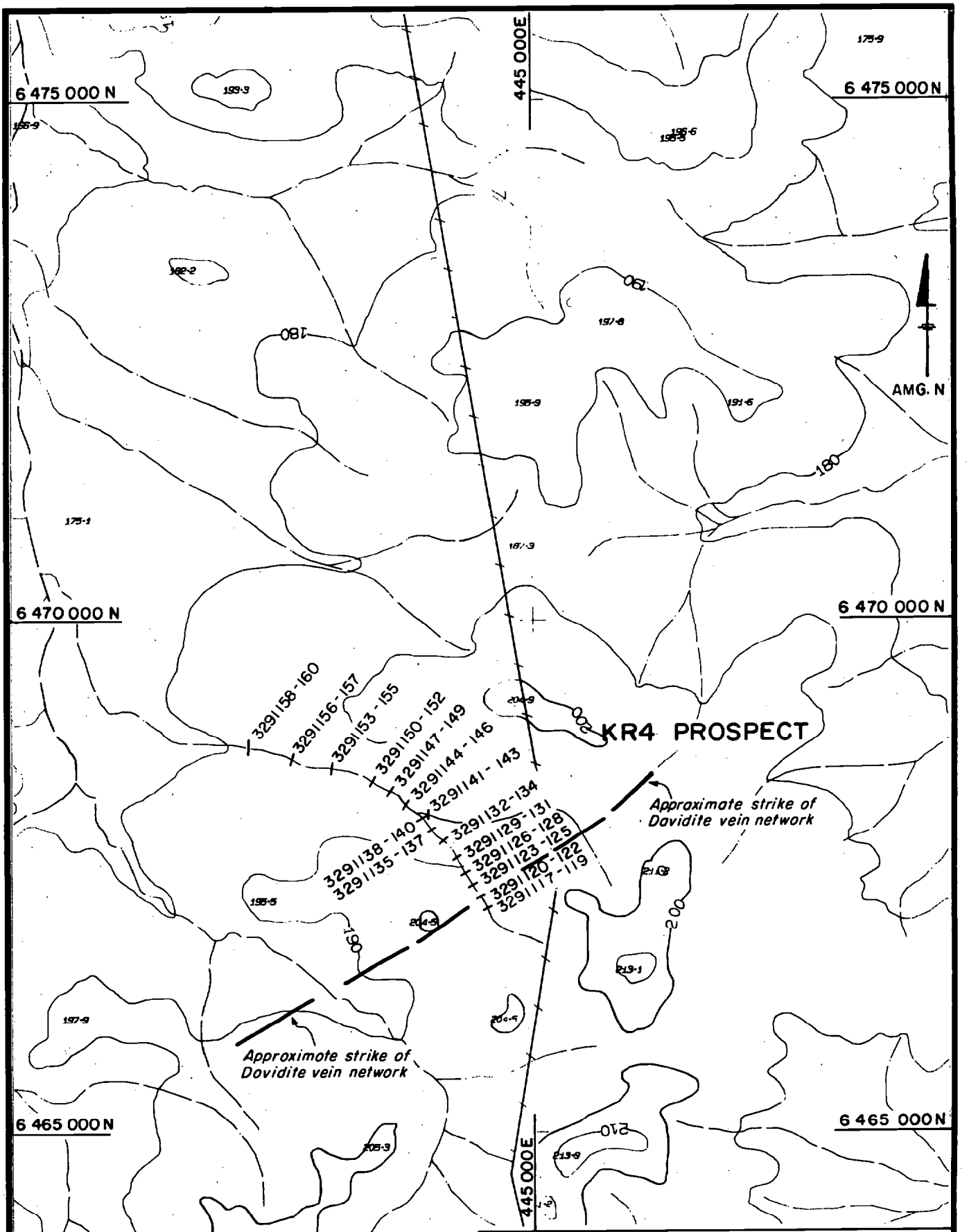
amdel

ANALYTICAL REPORT

Job: 2AD3626
O/N: 68025

Sample	Au Avg	Au	Au Rpl	Au SS1
3291175	<2	<2	--	<2
3291176	<2	<2	--	--
3291177	<2	<2	--	--
3291178	<2	<2	--	--
3291179	<2	<2	--	--
3291180	<2	<2	--	--
3291181	<2	<2	--	--
3291182	<2	<2	--	--
3291183	<2	<2	--	--
3291184	<2	<2	--	--
3291185	<2	<2	--	--
3291186	<2	<2	--	--
3291187	<2	<2	--	--
3291188	<2	<2	--	--
3291189	<2	<2	--	--
3291190	<2	<2	--	--
3291191	<2	<2	--	--
Units	ppb	ppb	ppb	ppb
DL	2	2	2	2
Scheme	AA9	AA9	AA9	AA9


139°30'
141°00'
Frome Downs
Curnamona
S.A./N.S.W. BORDER
S.A.
LOCALITY
Kalabity
Kalabity EL 1497
Boolcoomata
32°00'
32°00'
CALICO DAM
EL 1591
COCKBURN
MINGARY
OLARY
MANNAHILL
Mutooroo
YUNTA
139°30'
141°00'
1 : 250 000 Reference Map Curnamona SH/54-14
1 : 100 000 Reference Map Curnamona 6834
Kalabity 6934
CRA EXPLORATION PTY. LIMITED
CALICO DAM EL 1591
LOCALITY PLAN
1 : 250 000 Reference Sheet No. Curnamona SH/54-14
Author : R. Nelson
Scale : 1 : 1000 000
Report No. 18876
Drawn : G. Holliday
Date October, 1989
Plan No. SA b 151



1 : 25 000 Ref. Sheet : KALABITY 6934-II-SW/SE
1 : 100 000 Ref. Sheet : KALABITY 6934

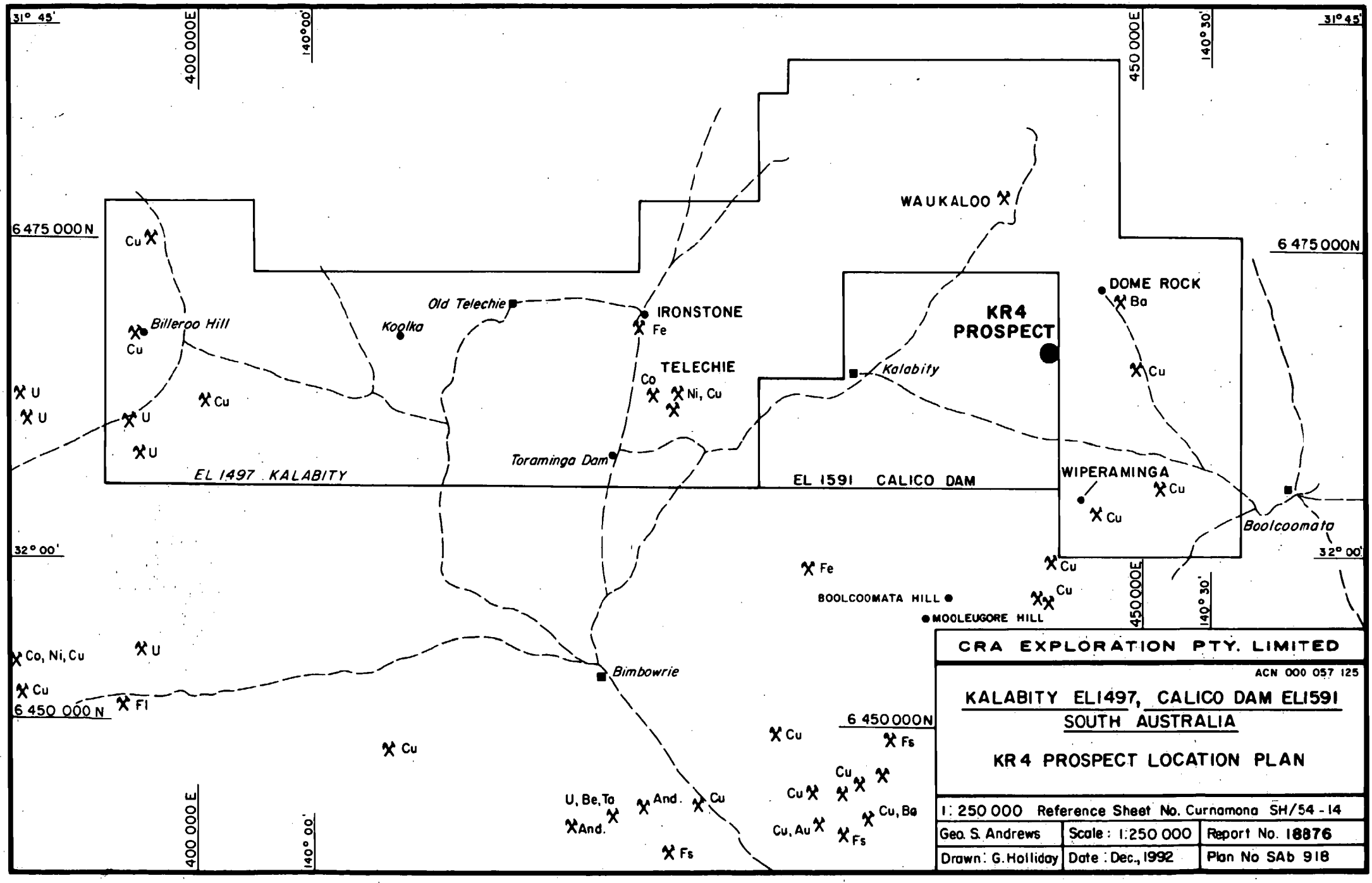
CRA EXPLORATION PTY. LIMITED

CALICO DAM EL 1591

KR4 PROSPECT

STREAM SEDIMENT SAMPLE LOCATIONS

1 : 250 000 Reference Sheet No. Curnamona SH/54-15		
Author : S. Andrews	Scale : 1 : 25 000	Report No. 18876
Drawn : G. Holliday	Date : Dec., 1992	Plan No. SA b 915



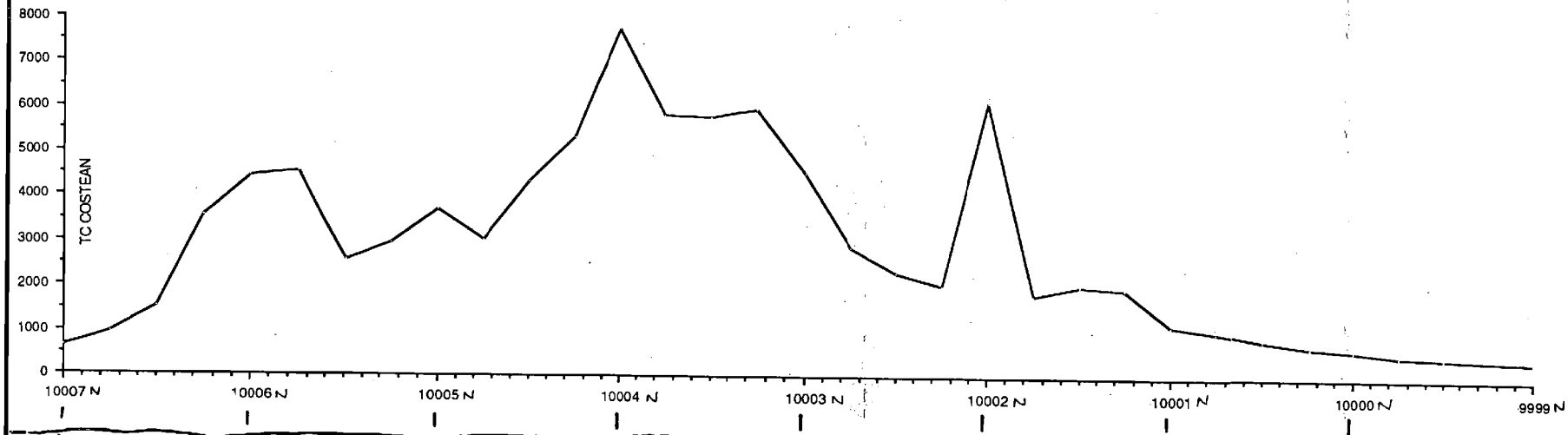
CRA EXPLORATION PTY. LIMITED

ACN 000 057 125

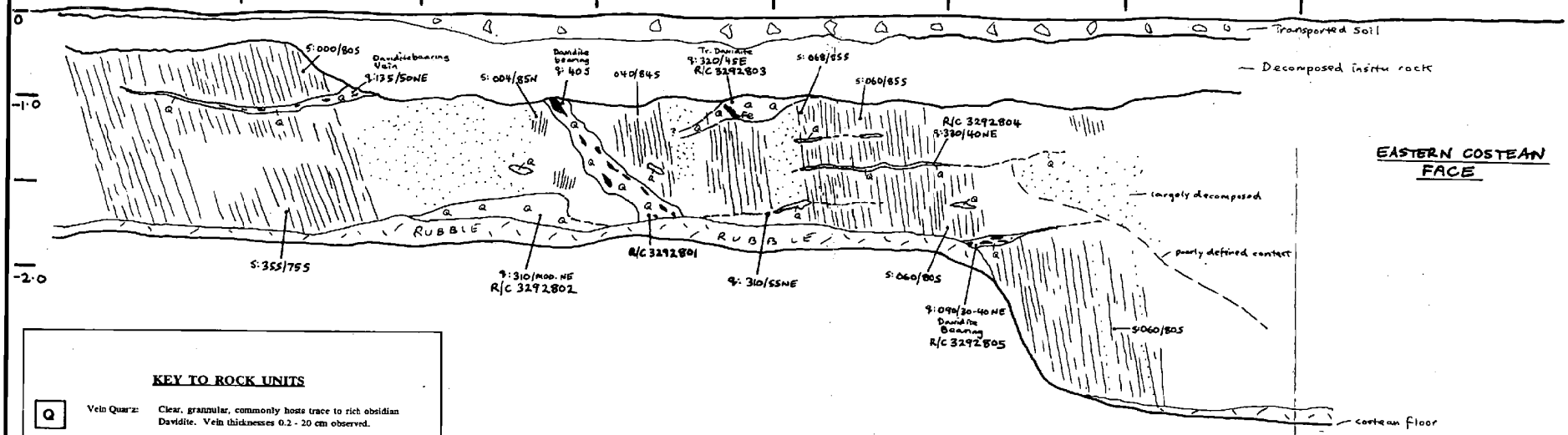
KALABITY EL1497, CALICO DAM EL1591
SOUTH AUSTRALIA

KR4 PROSPECT LOCATION PLAN

1: 250 000 Reference Sheet No. Curnamona SH/54 - 14		
Geo. S. Andrews	Scale : 1:250 000	Report No. 18876
Drawn: G. Holliday	Date : Dec., 1992	Plan No SAb 918



total count readings collected on costean floor adjacent to mapped face.



KEY TO ROCK UNITS

Q — Vein Quartz: Clear, grannular, commonly hosts trace to rich obsidian Davidite. Vein thicknesses 0.2 - 20 cm observed.

Quartz-Feldspar-Biotite-Muscovite Gneiss: Fine to coarse grained. Compositional layering of mica rich and poor bands

Quartz-Feldspar Psammite: Fine grained, very clean & bright white to pink. Contains biotite & muscovite

+ — Pegmatite/Granite: (Undifferentiated)

KEY TO SYMBOLS

Quartz Vein (q)

Compositional Layering (S)

Grid Co-ordinates refer to KR4 prospect grid, Kalabity 1:25 000 Sheet No. 6934-11-SW/SE

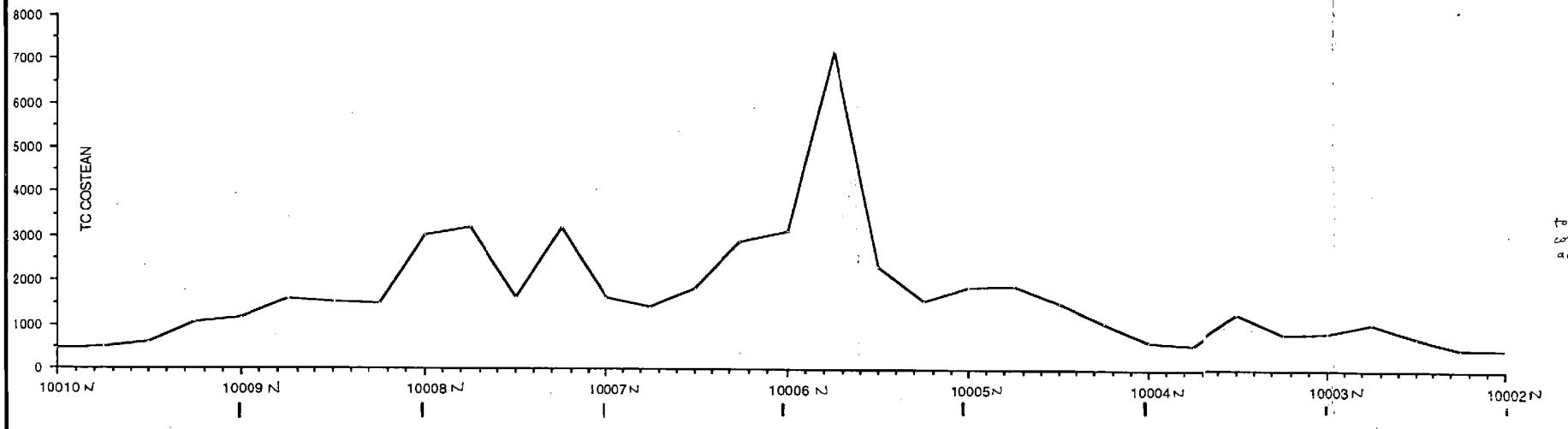
CRA EXPLORATION PTY. LIMITED

CALICO DAM EL 1591
KR4 PROSPECT

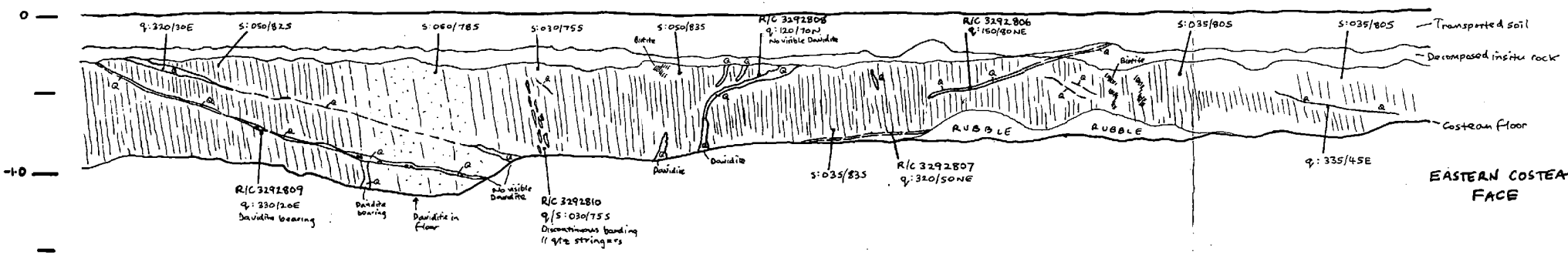
COSTEAN No 1
LINE 9945 E
MINERALISED INTERVAL

DPO 68026

Geo : S. Andrews	Scale: 1: 25	Report No: 18876
Drawn: S. Andrews	Date: Dec., 1992	Plan No: SAb963



total count readings collected on costean floor adjacent to mapped face.



KEY TO ROCK UNITS

Q — Vein Quartz: Clear, grannular, commonly hosts trace to rich obsidian Davidite. Vein thicknesses 0.2 - 20 cm observed.

Quartz-Feldspar-Biotite-Muscovite Gneiss: Fine to coarse grained. Compositional layering of mica rich and poor bands

Quartz-Feldspar Psammite: Fine grained, very clean & bright white to pink. Contains biotite & muscovite

\+ — Pegmatite/Granite: (Undifferentiated)

KEY TO SYMBOLS

Quartz Vein (q) · Compositional Layering (S)

Grid Co-ordinates refer to KR4 prospect grid, Kalabity 1:25 000 Sheet No. 6934-11-SW/SE

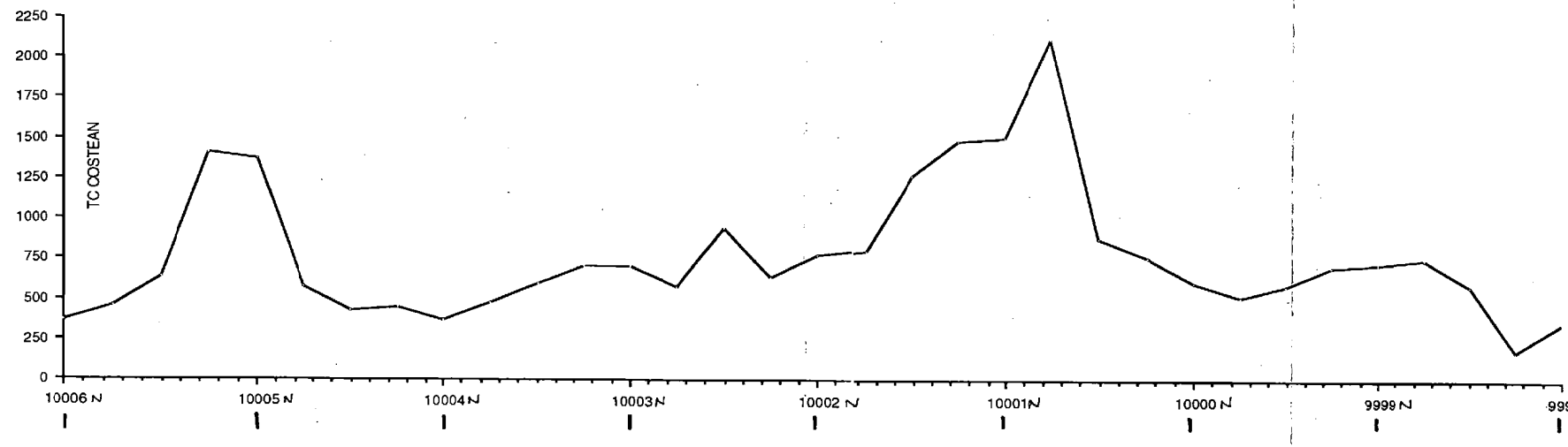
CRA EXPLORATION PTY. LIMITED

CALICO DAM EL 1591
KR4 PROSPECT

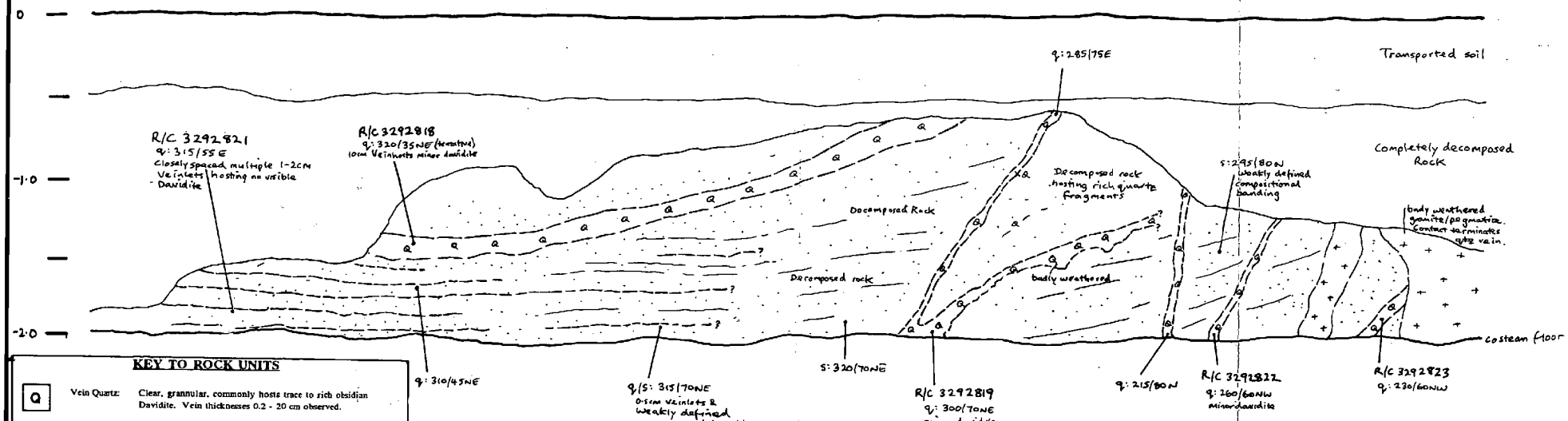
COSTEAN No 2
LINE 9895E
MINERALISED INTERVAL

DPO 68026

Geo : S. Andrews	Scale: 1: 25	Report No: 18876
Drawn: S. Andrews	Date: Dec., 1992	Plan No: SAb964



total count readings collected on costean floor adjacent to mapped face.



EASTERN COSTEAN FACE

KEY TO ROCK UNITS

- Q — Vein Quartz: Clear, grannular, commonly hosts trace to rich obsidian Davidite. Vein thicknesses 0.2 - 20 cm observed.
- Quartz-Feldspar-Biotite-Muscovite Gneiss: Fine to coarse grained. Compositional layering of mica rich and poor bands
- Quartz-Feldspar Psammite: Fine grained, very clean & bright white to pink. Contains biotite & muscovite
- \+ — Pegmatite/Granite: (Undifferentiated)

KEY TO SYMBOLS

Quartz Vein (q) — Compositional Layering (s)

Grid Co-ordinates refer to KR4 prospect grid, Kalabity 1:25 000 Sheet No. 6934-11-SW/SE

R/C 3292820: Western costean face 10004mN
Vein bears 20% Davidite.

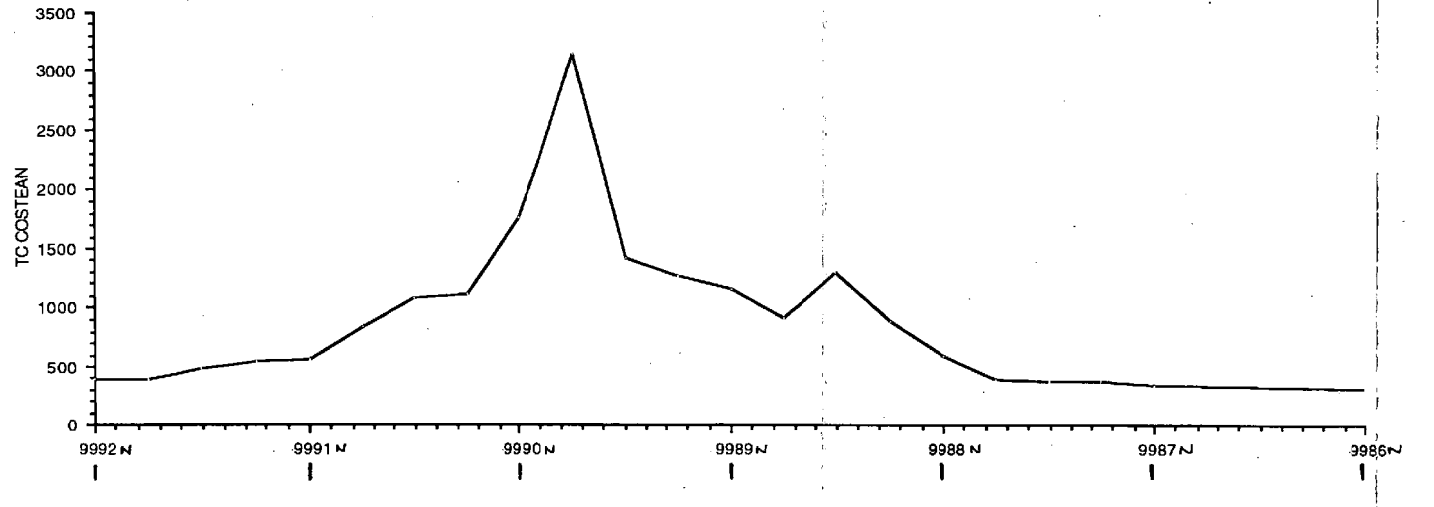
CRA EXPLORATION PTY. LIMITED

CALICO DAM EL 1591
KR4 PROSPECT

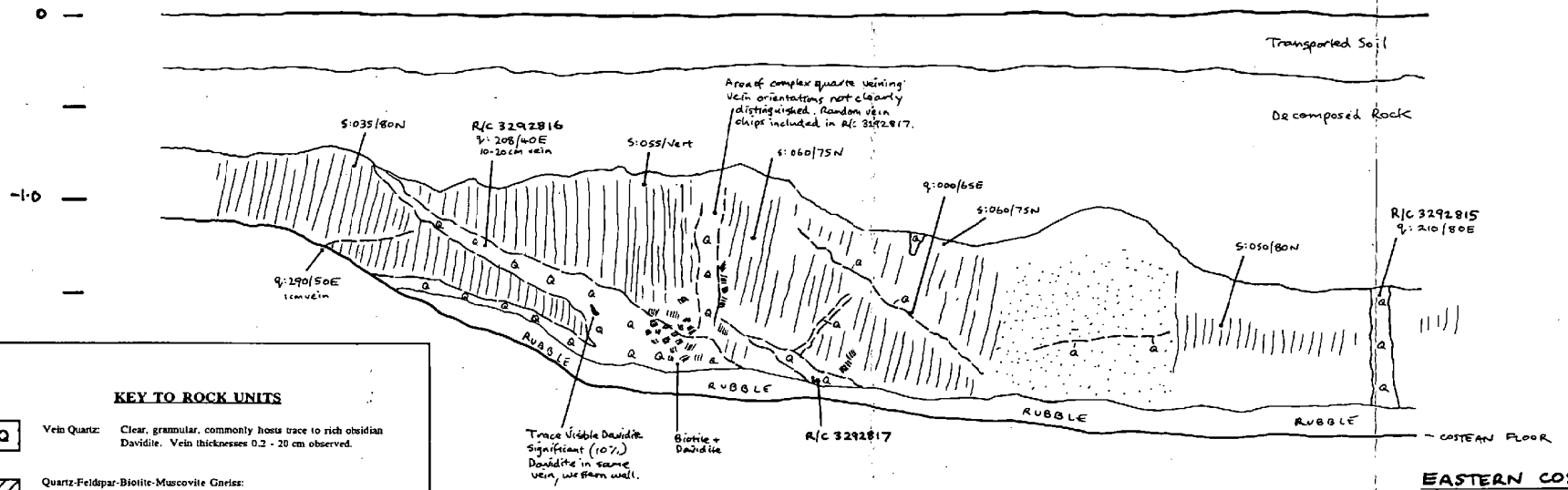
COSTEAN No 3
LINE 9795 E
MINERALISED INTERVAL

DPO 68026

Geo : S. Andrews	Scale: 1: 25	Report No: 18876
Drawn: S. Andrews	Date: Dec., 1992	Plan No: SAb965



total count readings collected on costean floor adjacent to mapped face.



EASTERN COSTEAN FACE

KEY TO ROCK UNITS

- Q — Vein Quartz: Clear, granular, commonly hosts trace to rich obsidian Davidite. Vein thicknesses 0.2 - 20 cm observed.
- Quartz-Feldspar-Biotite-Muscovite Gneiss: Fine to coarse grained. Compositional layering of mica rich and poor bands
- Quartz-Feldspar Psammite: Fine grained, very clean & bright white to pink. Contains biotite & muscovite
- \+ — Pegmatite/Granite: (Undifferentiated)

KEY TO SYMBOLS

Quartz Vein (q) Compositional Layering (S)

Grid Co-ordinates refer to KR4 prospect grid, Kalabity 1:25 000 Sheet No. 6934-11-SW/SE

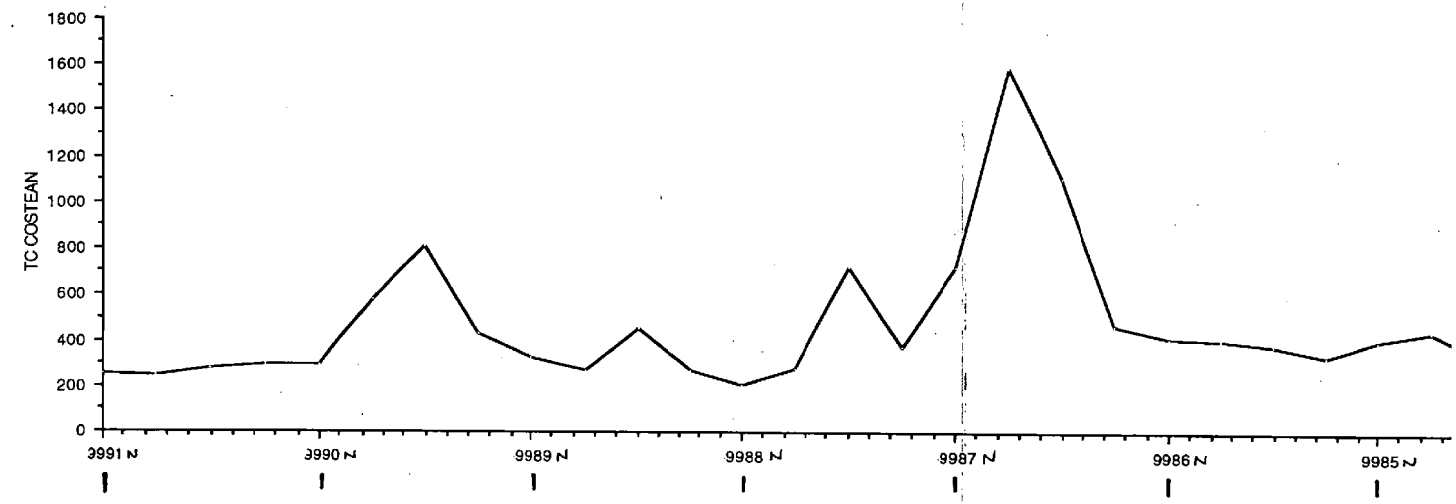
CRA EXPLORATION PTY. LIMITED

CALICO DAM EL 1591
KR4 PROSPECT

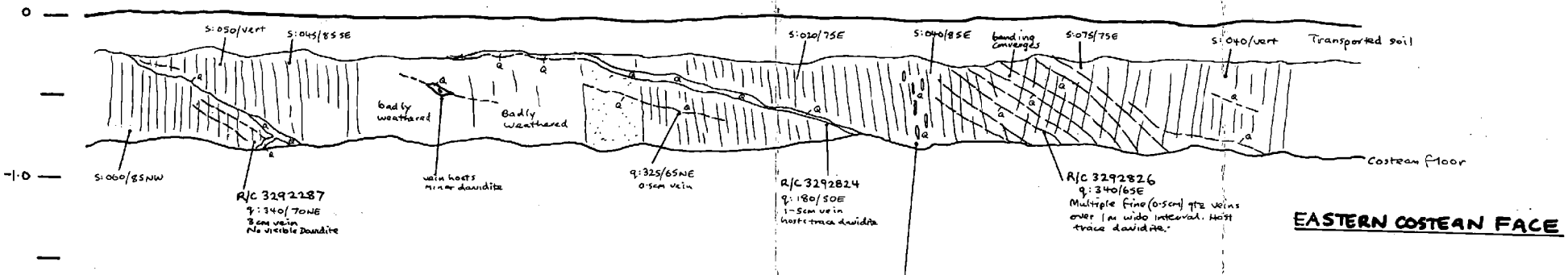
COSTEAN No 5
LINE 9495 E
MINERALISED INTERVAL

DPO 68026

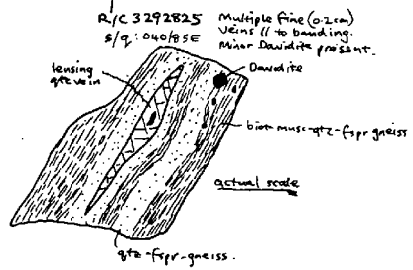
Geo : S. Andrews	Scale: 1: 25	Report No: 18876
Drawn: S. Andrews	Date: Dec., 1992	Plan No: SAb966



total count readings collected on costean floor adjacent to mapped face.



EASTERN COSTEAN FACE



-2.0

KEY TO ROCK UNITS

Q — Vein Quartz: Clear, granular, commonly hosts trace to rich obsidian Davidite. Vein thicknesses 0.2 - 20 cm observed.

Quartz-Feldspar-Biotite-Muscovite Gneiss: Fine to coarse grained. Compositional layering of mica rich and poor bands

Quartz-Feldspar Psammite: Fine grained, very clean & bright white to pink. Contains biotite & muscovite

Pegmatit..Granite: (Undifferentiated)

KEY TO SYMBOLS

Quartz Vein (q) Compositional Layering (S)

Grid-Co-ordinates refer to KR4 prospect grid, Kalability 1:25 000 Sheet No. 6934-11-SW/SE

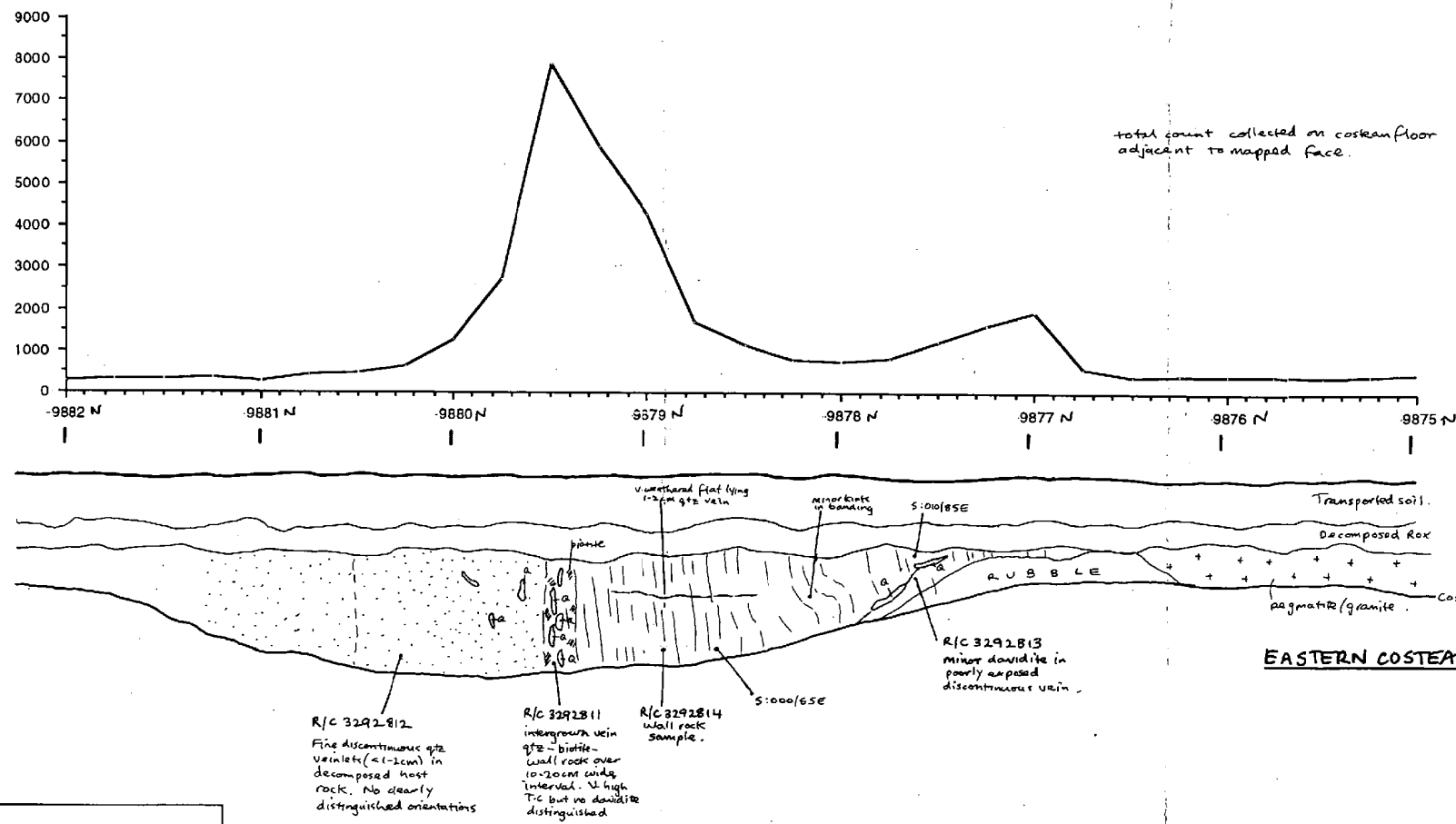
CRA EXPLORATION PTY. LIMITED

CALICO DAM EL 1591
KR4 PROSPECT

COSTEAN No 6
LINE 9295 E
MINERALISED INTERVAL

DPO 68026

Geo : S. Andrews	Scale: 1: 25	Report No: 18876
Drawn: S. Andrews	Date: Dec., 1992	Plan No: SAb967



EASTERN COSTEAN FACE

KEY TO ROCK UNITS

Q Vein Quartz: Clear, grannular, commonly hosts trace to rich obsidian Davidite. Vein thicknesses 0.2 - 20 cm observed.

Quartz-Feldspar-Biotite-Muscovite Gneiss: Fine to coarse grained. Compositional layering of mica rich and poor bands

Quartz-Feldspar Psammite: Fine grained, very clean & bright white to pink. Contains biotite & muscovite

Pegmatite/Granite: (Undifferentiated)

KEY TO SYMBOLS

Quartz Vein (q) Compositional Layering (S)

Grid Co-ordinates refer to KR4 prospect grid, Kalabity 1:25 000 Sheet No. 6934-11-SW/SE

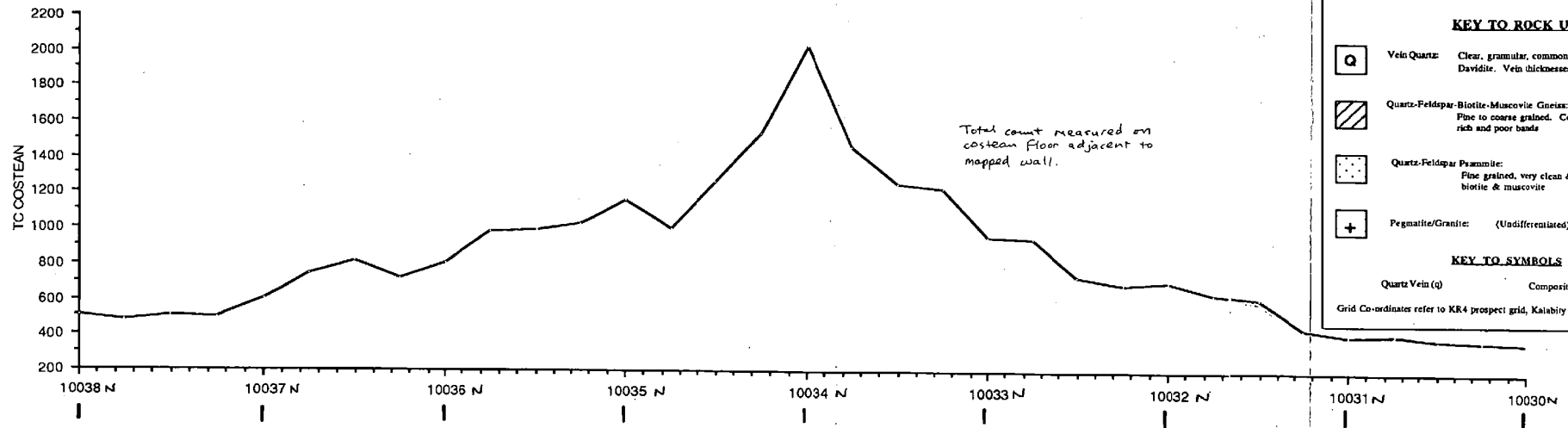
CRA EXPLORATION PTY. LIMITED

CALICO DAM EL 1591
KR4 PROSPECT

COSTEAN No 7
LINE 8345 E
MINERALISED INTERVAL

DPO 68026

Geo : S. Andrews	Scale: 1: 25	Report No: 18876
Drawn: S. Andrews	Date: Dec., 1992	Plan No: SAb968



KEY TO ROCK UNITS

Q — Vein Quartz: Clear, granular, commonly hosts trace to rich obsidian Davidite. Vein thicknesses 0.2 - 20 cm observed.

Quartz-Feldspar-Biotite-Muscovite Gneiss: Fine to coarse grained. Compositional layering of mica rich and poor bands

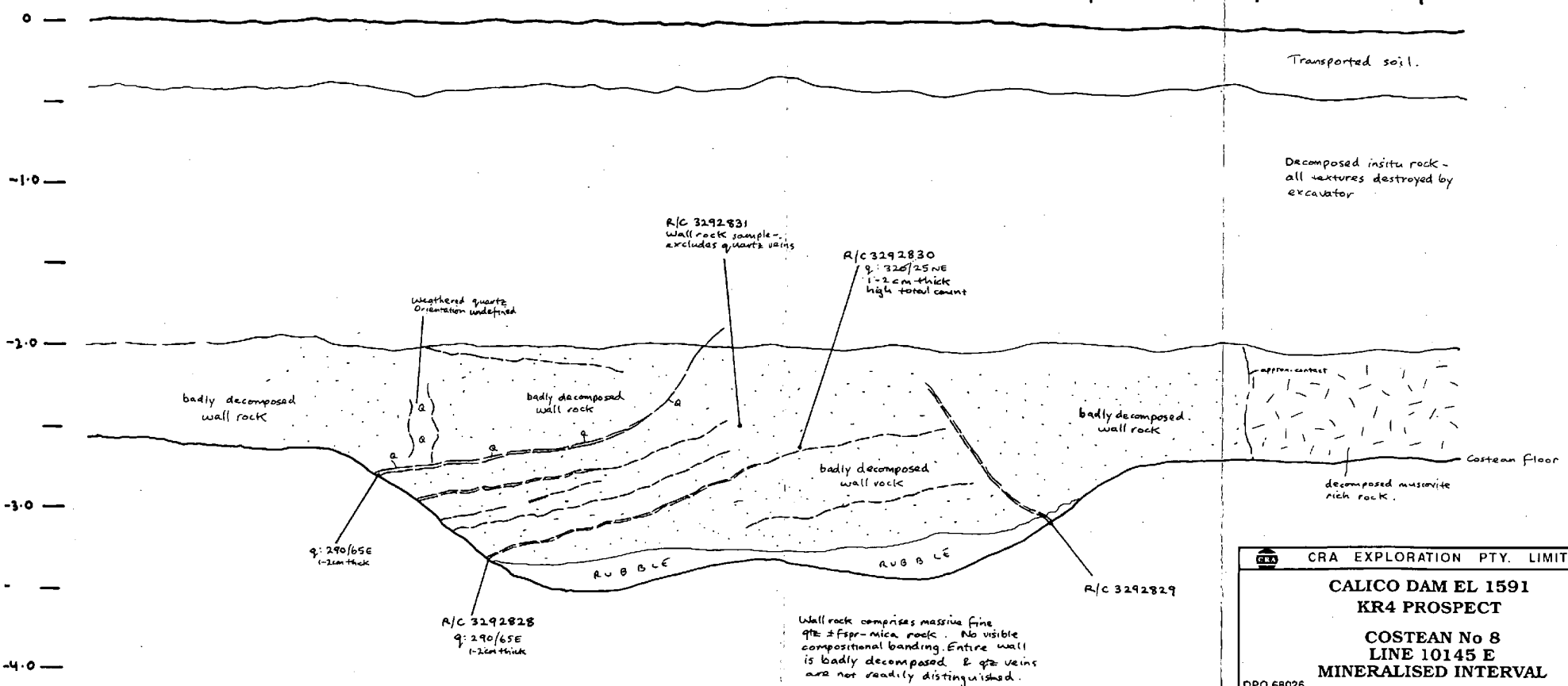
Quartz-Feldspar Psammite: Fine grained, very clean & bright white to pink. Contains biotite & muscovite

\+ — Pegmatite/Granite: (Undifferentiated)

KEY TO SYMBOLS

Quartz Vein (q) — Compositional Layering (S)

Grid Co-ordinates refer to KR4 prospect grid, Kalabity 1:25 000 Sheet No. 6934-11-SW/SE



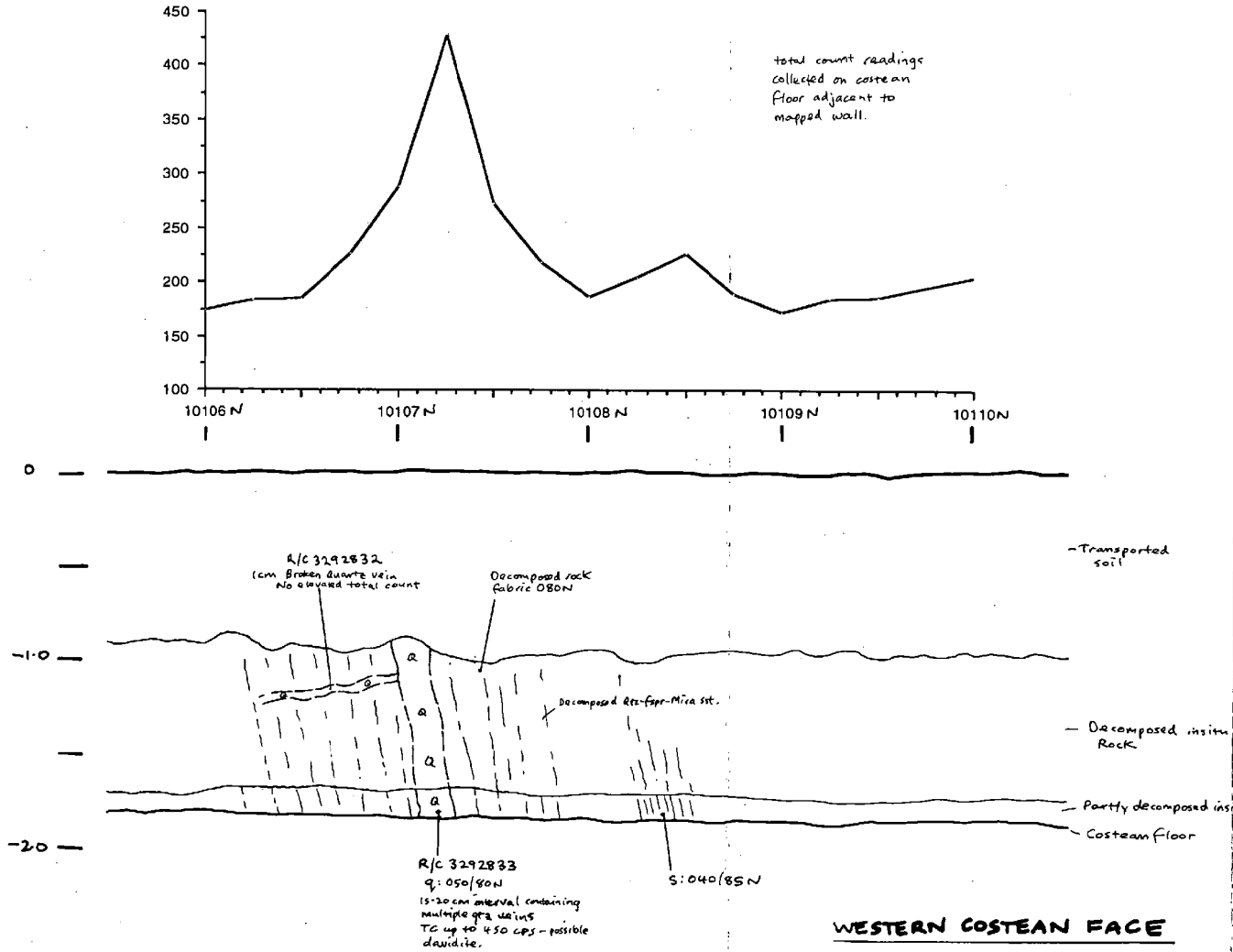
CRA EXPLORATION PTY. LIMITED

CALICO DAM EL 1591
KR4 PROSPECT

COSTEAN No 8
LINE 10145 E
MINERALISED INTERVAL

DPO 68026

Geo : S. Andrews	Scale: 1: 25	Report No: 18876
Drawn: S. Andrews	Date: Dec., 1992	Plan No: SAb969



WESTERN COSTEAN FACE

KEY TO ROCK UNITS

Q — Vein Quartz: Clear, granular, commonly hosts trace to rich obsidian Davidite. Vein thicknesses 0.2 - 20 cm observed.

Quartz-Feldspar-Biotite-Muscovite Gneiss: Fine to coarse grained. Compositional layering of mica rich and poor bands

Quartz-Feldspar Psammite: Fine grained, very clean & bright white to pink. Contains biotite & muscovite

\+ — Pegmatite/Granite: (Undifferentiated)

KEY TO SYMBOLS

Quartz Vein (q) — Compositional Layering (S)

Grid Co-ordinates refer to KR4 prospect grid, Kalabity 1:25 000 Sheet No. 6934-11-SW/SE

CRA EXPLORATION PTY. LIMITED

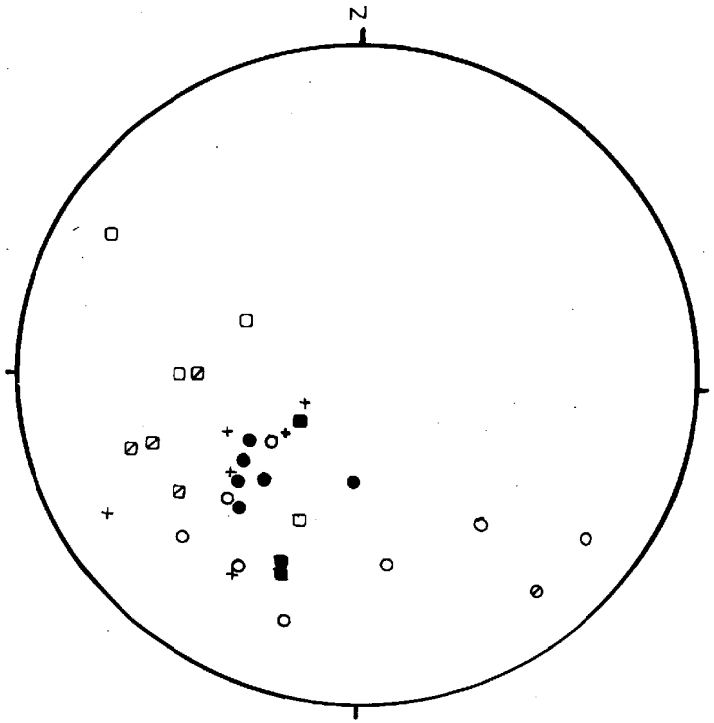
CALICO DAM EL 1591
KR4 PROSPECT

COSTEAN No 9
LINE 10495 E
MINERALISED INTERVAL

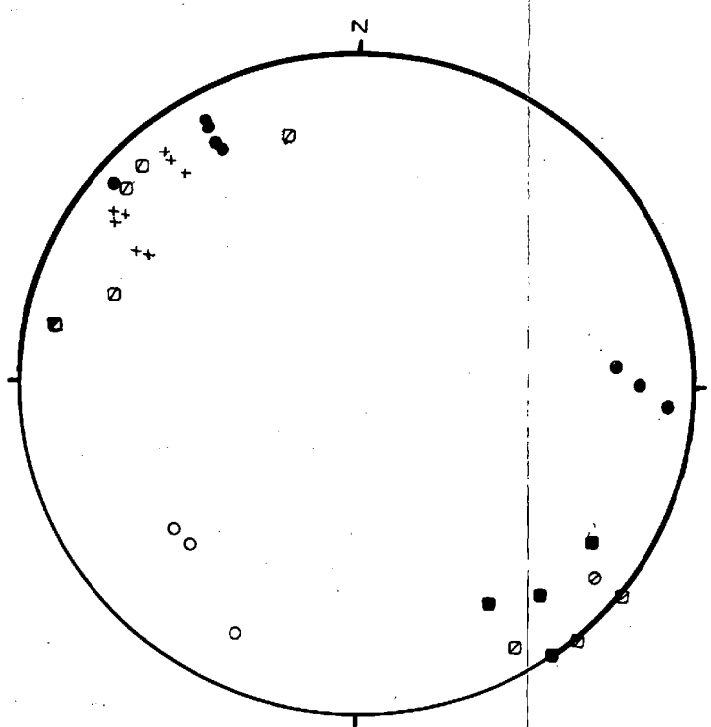
DPO 68026

Geo : S. Andrews	Scale: 1: 25	Report No: 18876
Drawn: S. Andrews	Date: Dec., 1992	Plan No: SAb970

POLAR PROJECTION OF STRUCTURAL DATA - KR4 PROSPECT COSTEANS



Quartz Vein (q)



Compositional banding (s)

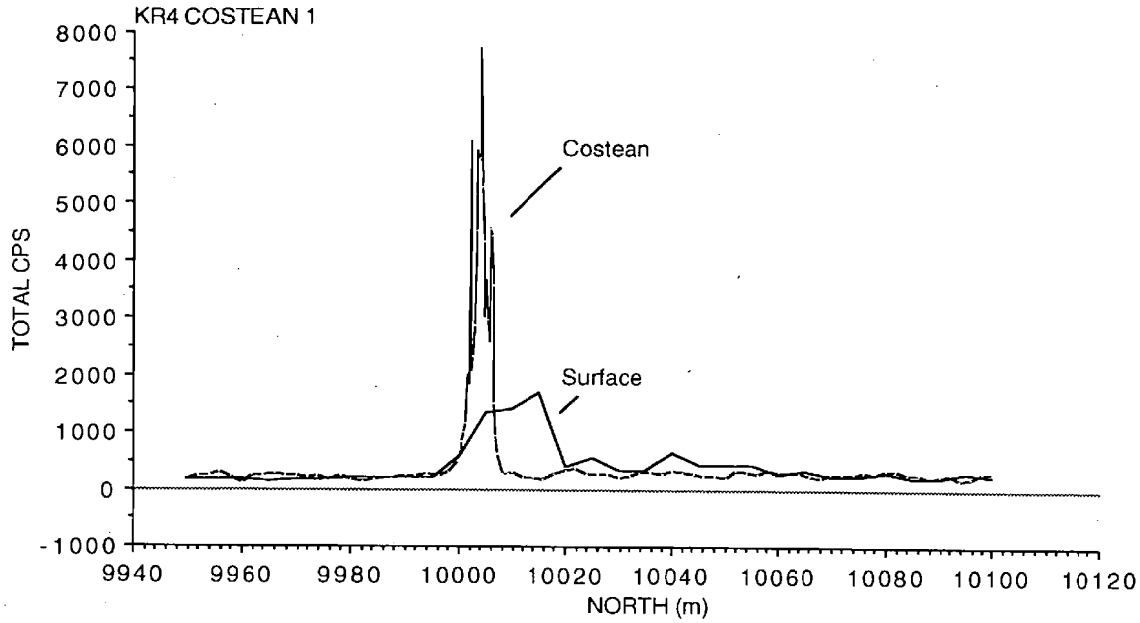
COSTEAN
- ● ... 1
- + ... 2
- ○ ... 3
- □ ... 4
- Ø ... 5
- ◙ ... 6
- ■ ... 7
- ⌀ ... 8

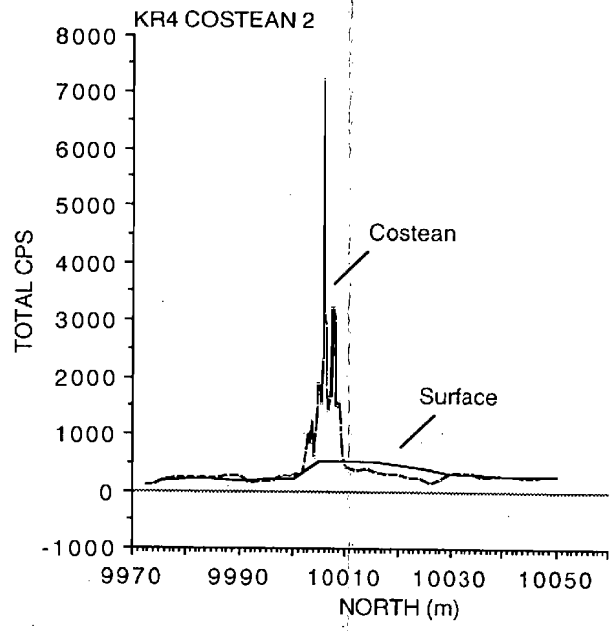
CRA EXPLORATION PTY. LIMITED

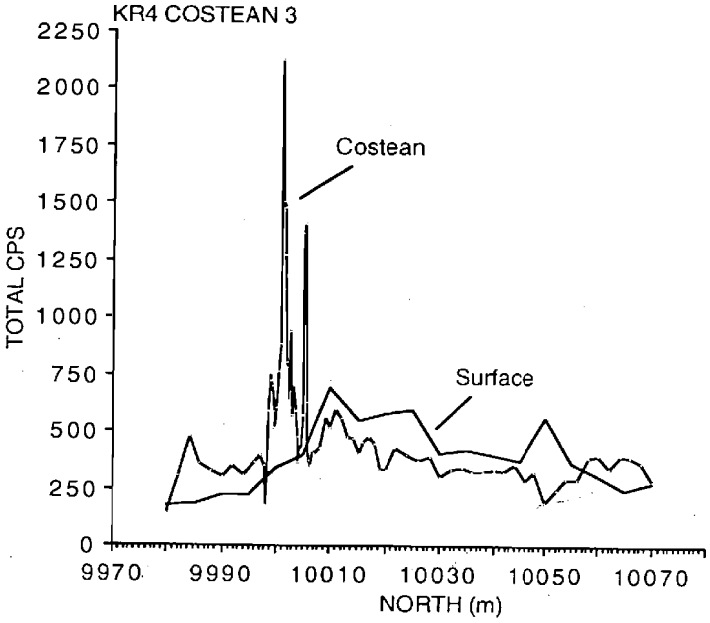
CALICO DAM EL 1591
KR4 PROSPECT

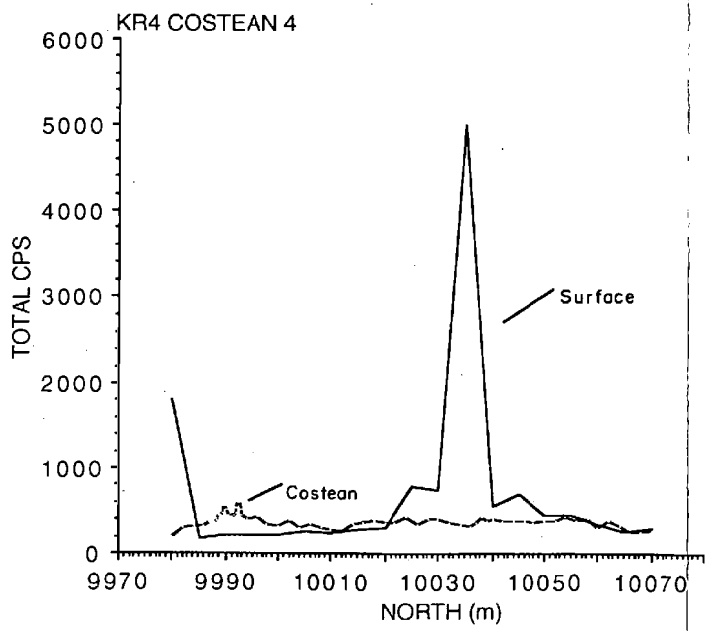
POLAR PROJECTION OF
STRUCTURAL DATA
KR4 PROSPECT COSTEANS

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Drawn: S. Andrews	Date: Dec., 1992	Plan No: SAb971









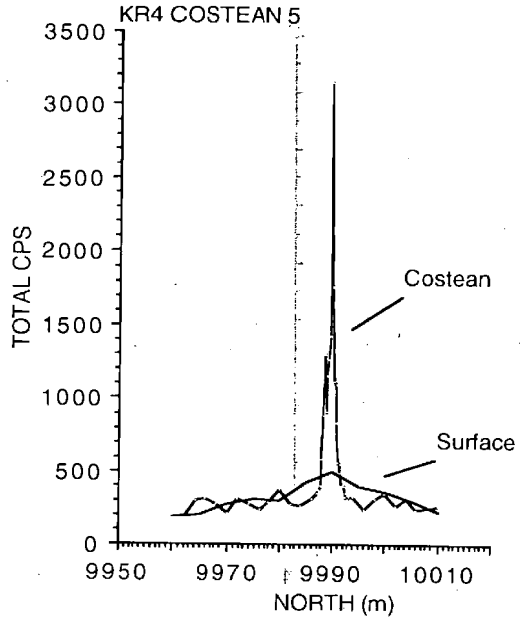
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1 : 100 000 REF. SHEET : KALABITY 6934

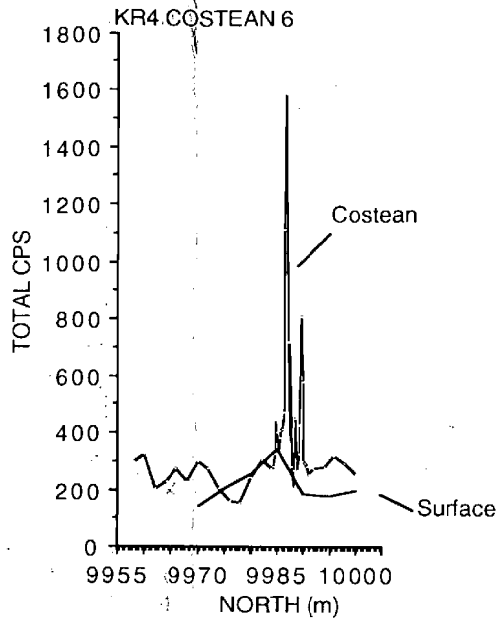
CRA EXPLORATION PTY. LIMITED

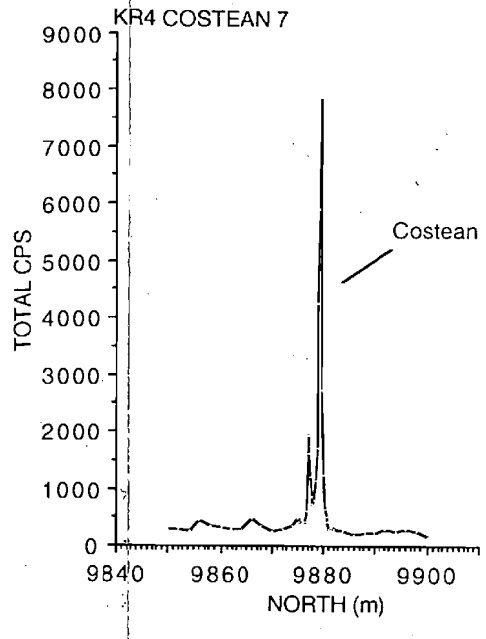
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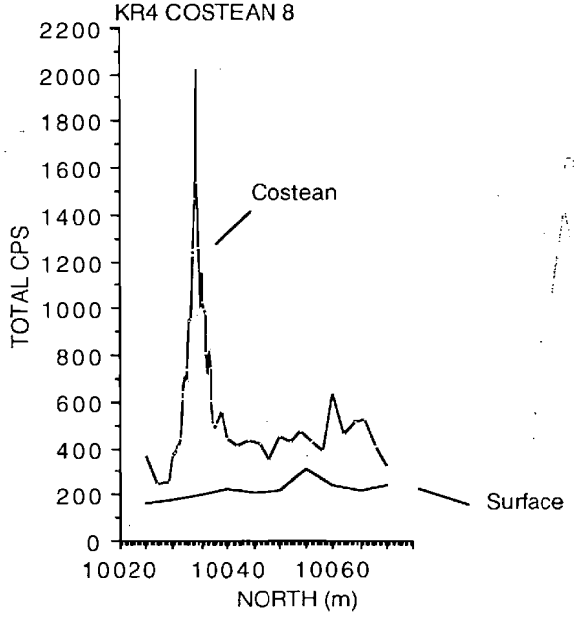
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TOTAL COUNT MEASUREMENTS

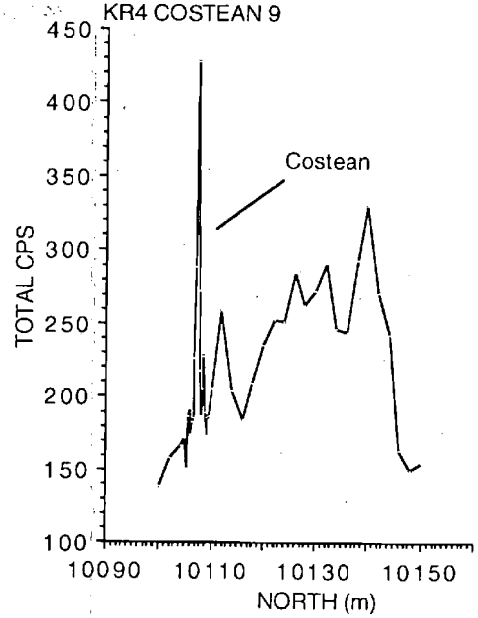
Geo : S. Andrews	Scale:	Report No: 18876
Drawn: S. Andrews	Date: Dec., 1992	Plan No: SAb1052











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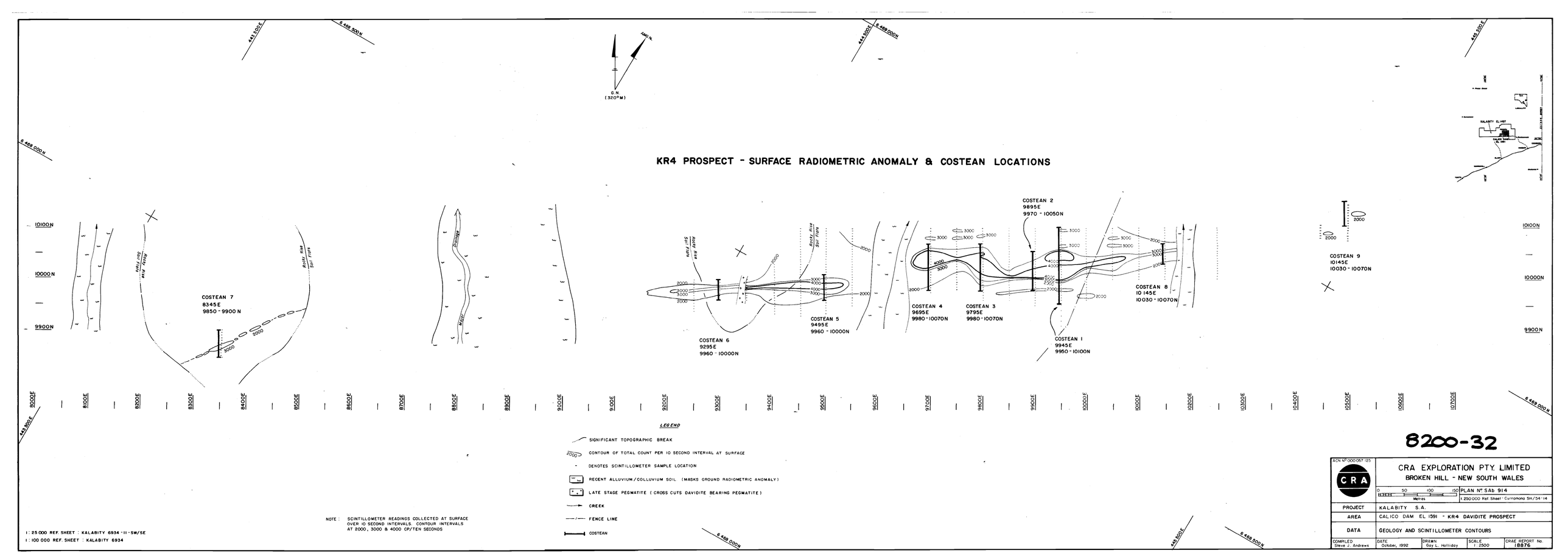
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CALICO DAM EL 1591
KR4 PROSPECT

COSTEAN No's 5 - 9
TOTAL COUNT MEASUREMENTS

Geo : S. Andrews	Scale:	Report No: 18876
Drawn: S. Andrews	Date: Dec., 1992	Plan No: SAb1053

KR4 PROSPECT - SURFACE RADIOMETRIC ANOMALY & COSTEAN LOCATIONS



LEGEND

- SIGNIFICANT TOPOGRAPHIC BREAK
- 2000 — CONTOUR OF TOTAL COUNT PER 10 SECOND INTERVAL AT SURFACE
- DENOTES SCINTILLOMETER SAMPLE LOCATION
- RECENT ALLUVIUM/COLLUVIUM SOIL (MASKS GROUND RADIOMETRIC ANOMALY)
- LATE STAGE PEGMATITE (CROSS CUTS DAVIDITE BEARING PEGMATITE)
- CREEK
- FENCE LINE
- COSTEAN

NOTE : SCINTILLOMETER READINGS COLLECTED AT SURFACE OVER 10 SECOND INTERVALS. CONTOUR INTERVALS AT 2000, 3000 & 4000 CP/TEN SECONDS

1 : 25 000 REF. SHEET : KALABITY 6934 - II - SW/SE
1 : 100 000 REF. SHEET : KALABITY 6934

8200-32

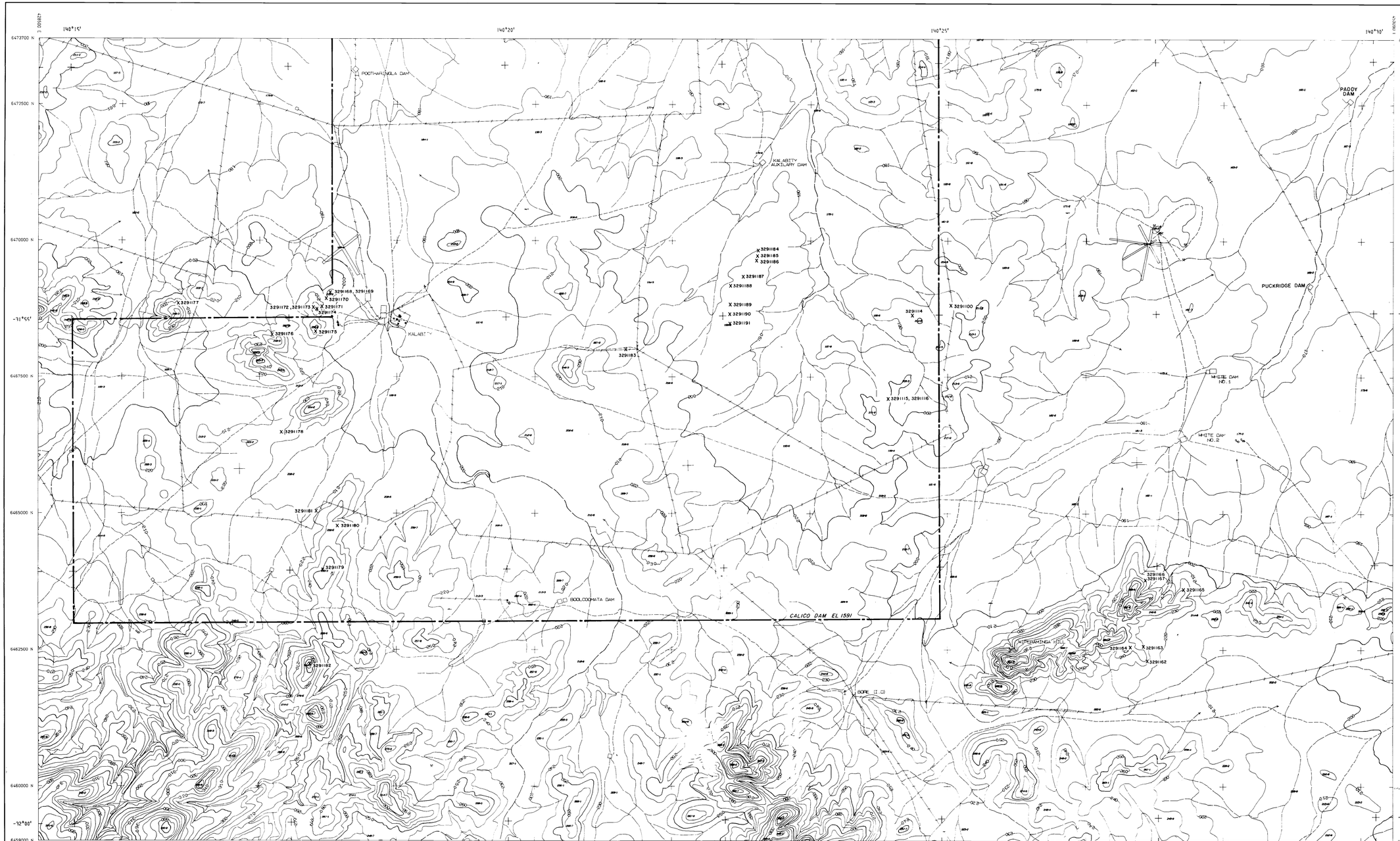
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CRA EXPLORATION PTY. LIMITED
BROKEN HILL - NEW SOUTH WALES

0 50 100 150 Metres — PLAN N° SAb 914
1 : 250 000 Ref. Sheet - Curnamona SH/54-14

PROJECT	KALABITY S.A.
AREA	CALICO DAM EL 1591 - KR4 DAVIDITE PROSPECT
DATA	GEOLOGY AND SCINTILLOMETER CONTOURS

COMPILED	DATE	DRAWN	SCALE	CRAE REPORT No.
Steve J. Andrews	October, 1992	Gay L. Holliday	1 : 2500	18876



X ROCK CHIP SAMPLE LOCATION

DPO 68016 - Sample N°s 3291114 - 3291116
3291162 - 3291174

DPO 68025 - Sample N°s 3291175 - 3291191

WALTHERGO 6934-11-NE	DEEP WELL 6934-111-NW/NE	WAUKALOO 6934-11-NW/NE	KALKAROO 7034-111-SW
BILLEROO 6934-11-SE	KOOLKA 6934-111-SW/SE	KALABITY 6934-11-SW/SE	BOOLCOOMATA 7034-111-SW

SCALE : 1:25000
0 0·5 1·0 1·5 2·0
Kilometres

1 : 250 000 Ref. Sheet : CURNAMONA SH/54-14
1 : 100 000 Ref. Sheet : KALABITY 6934

PREPARED BY PETER LIVINGS AND ASSOCIATES
7 RAGLAN ROAD, ST LAWRENCY, 6050
TELEPHONE : 3287088.

1:100000 MAP CONTROL SUPPLIED BY AUSLIG

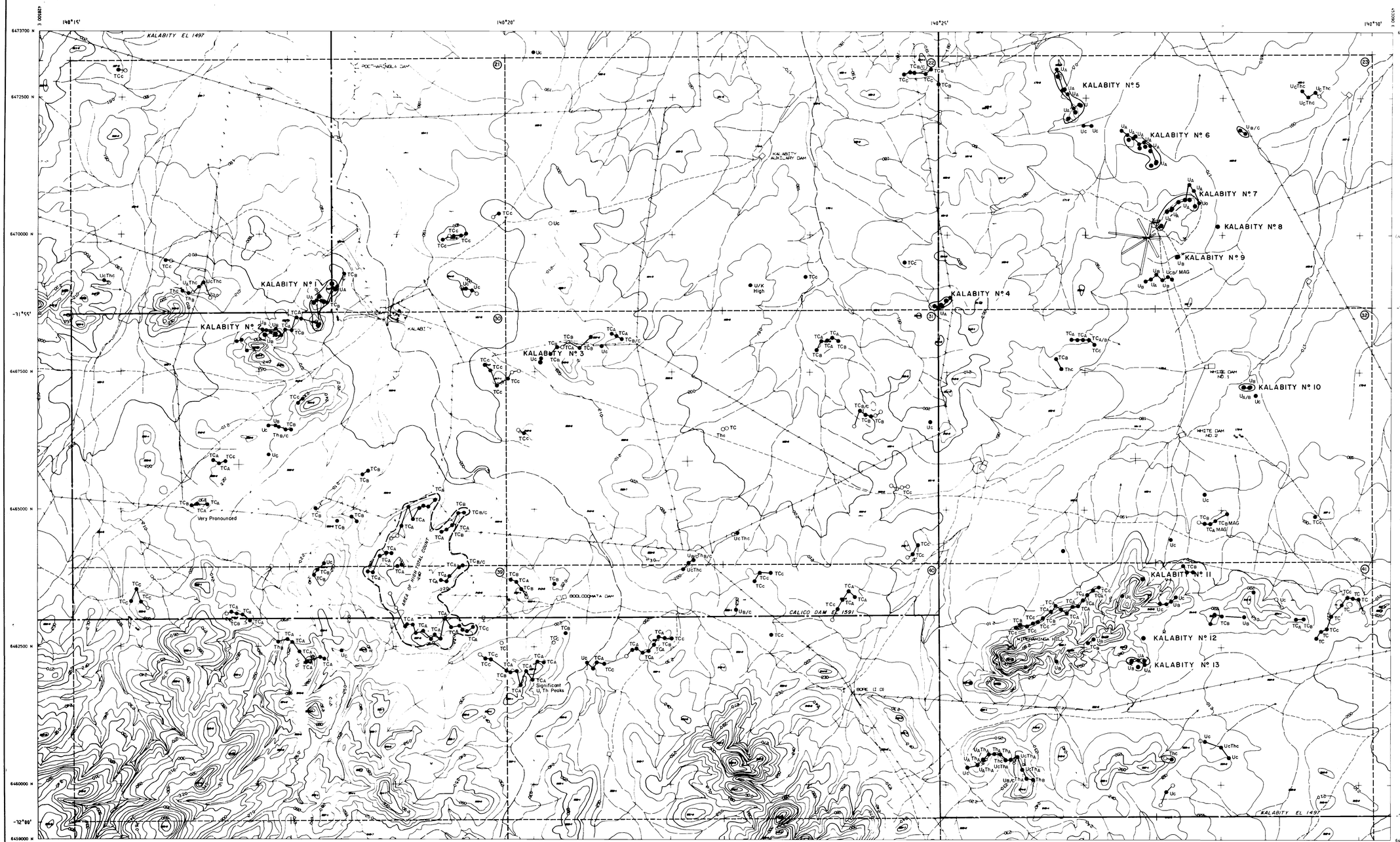
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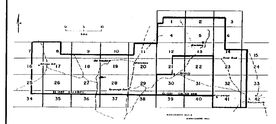
CRA EXPLORATION PTY LIMITED

CALICO DAM EL 1591

RECONNAISSANCE ROCK CHIP SAMPLE LOCATION

SCALE: 1:25000	AUTHOR : R. NELSON	DRAWN : G. HOLLIDAY
DATE OF PHOTOGRAPHY : 5-1982		PLAN NO. SAb1048
DATE : JUNE, 1993		CRAE REPORT N° 18876





1989 AIRBORNE SURVEY KALABITY AREA
SHEET INDEX 1 - 42

LEGEND

- CRA EXPLORATION TENEMENT BOUNDARY
- RADIOMETRIC ANOMALY - NAME & NUMBER
- AIRBORNE SURVEY 1:10000 SHEET LOCATION & N°
- TC_A TOTAL COUNT PRIORITY A
- U_A URANIUM PRIORITY A
- Th_A THORIUM PRIORITY A

WALTHERGO 6834-11-NE	DEEP WELL 6934-111-NW/NE	WAUKALOO 6934-11-NW/NE	KALKAROO 7034-111-NW
BILLEROO 6834-11-SE	KOOLKA 6934-111-SW/SE	KALABITY 6934-11-SW/SE	BOOLCOOMATA 7034-111-SW

SCALE 1:25000

0 0.5 1.0 1.5 2.0 Kilometres

1:250 000 Ref. Sheet : CURNAMONA SH/54-14
1:100 000 Ref. Sheet : KALABITY 6934

PREPARED BY PETER LIVINGS AND ASSOCIATES
2 RAGLAN ROAD, MT LAWLEY, 6050
TELEPHONE : 3287088

1:100000 MAP CONTROL SUPPLIED BY AUSLIG

8200-34

CRA EXPLORATION PTY LIMITED

CALICO DAM EL 1591

RADIOMETRIC ANOMALY LOCATIONS

SHEET N° 6934-11-SW/SE - KALABITY		
SCALE: 1:25000	AUTHOR: S. ANDREWS	DRAWN: G. HOLLIDAY
DATE OF PHOTOGRAPHY : 5-1982		PLAN NO. SAb1056
DATE : NOVEMBER, 1992		CRAE REPORT N° 18876

ENV 8200

CRA EXPLORATION PTY. LIMITED

CALICO DAM EL 1591, SOUTH AUSTRALIA

ANNUAL REPORT FOR THE PERIOD ENDING 3RD JULY, 1994

AUTHOR: A.R. HUGHES

COPIES TO: MESA
CIS CANBERRA

DATE: AUGUST, 1994

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LIST OF PLANS

Plan No	Title	Scale
SAa 5075	Calico Dam EL 1591, S.A. - Location Plan	1:250 000
SAa 6280	Calico Dam EL 1591, S.A. - Gravel Sample Locations	1:100 000

APPENDIX

Appendix I Drainage Sample Geochemical Results

1. SUMMARY

Drainage samples from 16 sites were collected to provide a reconnaissance assessment of diamond potential. Fine fraction (-80#) geochemical samples were collected at the same sites.

No diamonds or kimberlitic indicator minerals were detected. Sample density is too low to provide a definitive assessment of base and precious metal prospectivity. Elevated uranium values obtained are interpreted to be the result of high background radioactivity levels in granitoids.

2. INTRODUCTION

Exploration Licence 1591, Calico Dam, covering 148 km², was granted to CRA Exploration Pty. Limited on 3rd July, 1989. Title was renewed annually for a total for five years expiring in 1994.

Main exploration targets during this period have been copper, gold, uranium and diamonds. No significant discoveries were made during the currency of EL 1591.

3. INVESTIGATIONS

3.1 Previous Work

Investigations previously reported include:

- An airborne magnetic and radiometric survey
- Compilation of 1:25 000 topographic base plans
- Compilation of known geology plans onto 1:25 000 bases
- Compilation of previous company rock chip sampling
- Follow up of radiometric anomaly KR4 with 9 costeans totalling 645 m.

Details of the previous work are given or referenced in Nelson and Andrews, 1993.

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3.2 Current Period

Investigations reported for the year ending July, 1994 comprise a helicopter-supported drainage sampling survey. The programme resulted in collection at each of 16 sites of a -80# sample which was analysed for a suite of 22 elements and a -2 mm gravel sample. The heavy mineral fraction of each gravel sample was observed for diamonds and kimberlitic indicator minerals. No indicators were observed in the gravel samples. Some of the geochemical samples report elevated U, P and Ce values which are typical of the geochemical signature of high-background radioactive granitoids elsewhere in the Olary block. Current sampling density is too low to permit discrimination between a small high-grade occurrence and regional high background radioactivity levels. The detailed aeromagnetic and radiometric survey has not given any indication of an outcropping high-grade occurrence so the latter interpretation is favoured. More detailed geochemical sampling is required to assess the non-radioactive mineral potential of the area.

Detailed geochemical results are recorded in Appendix I.

A.R. HUGHES

ARH/pq

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REFERENCE

Nelson, R. & Andrews, S. 1993 — First Annual Report Calico Dam EL 1591, South Australia, for the period ending 3rd July, 1993. CRAE Report No. 18876

KEYWORDS

Geochem-drainage, uranium, gravel samples, Olary Block, granite.

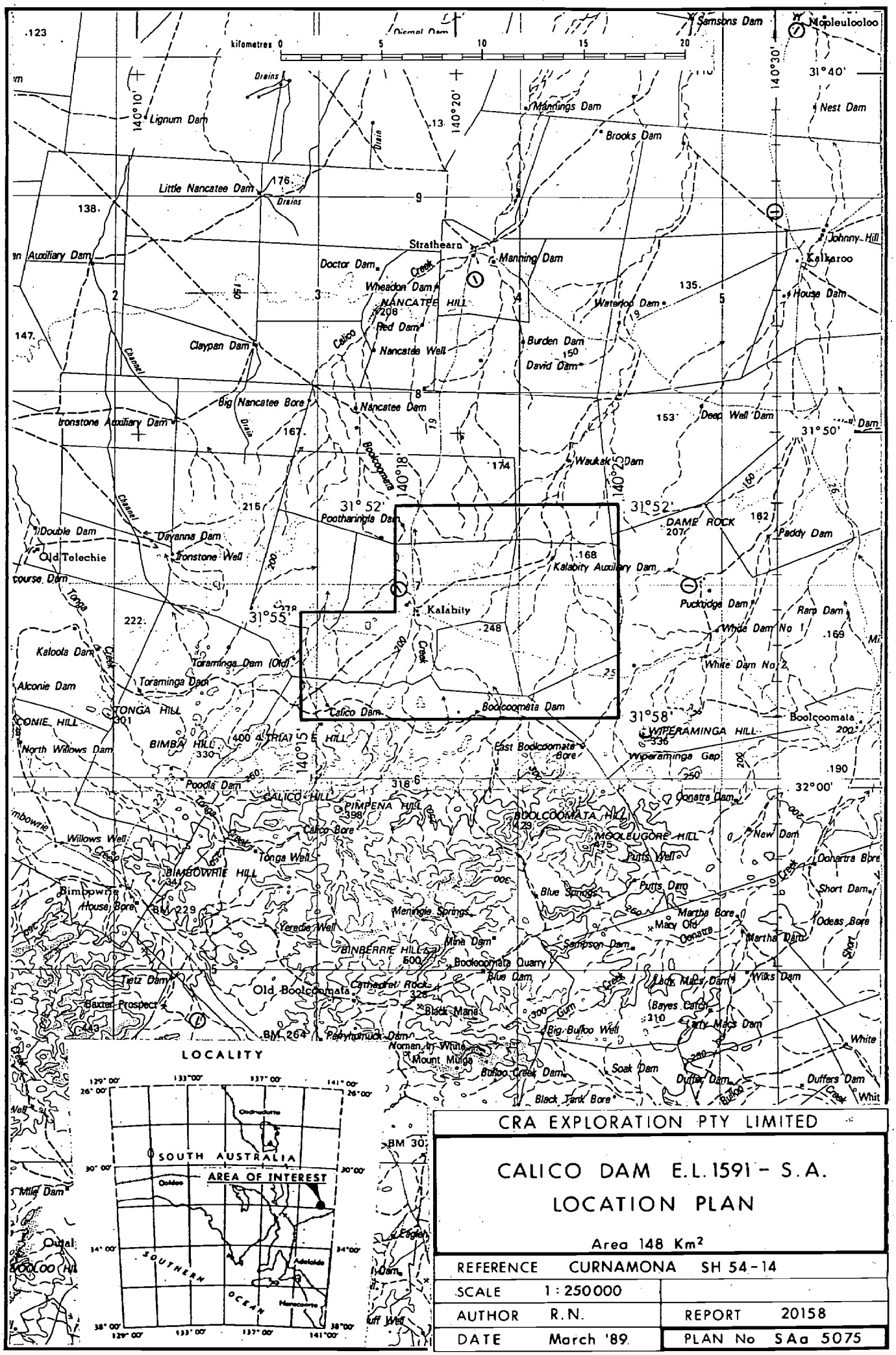
LOCATION

Curnamona SH54-14
Kalabity 6934

LIST OF DPO's

B000870, 53060

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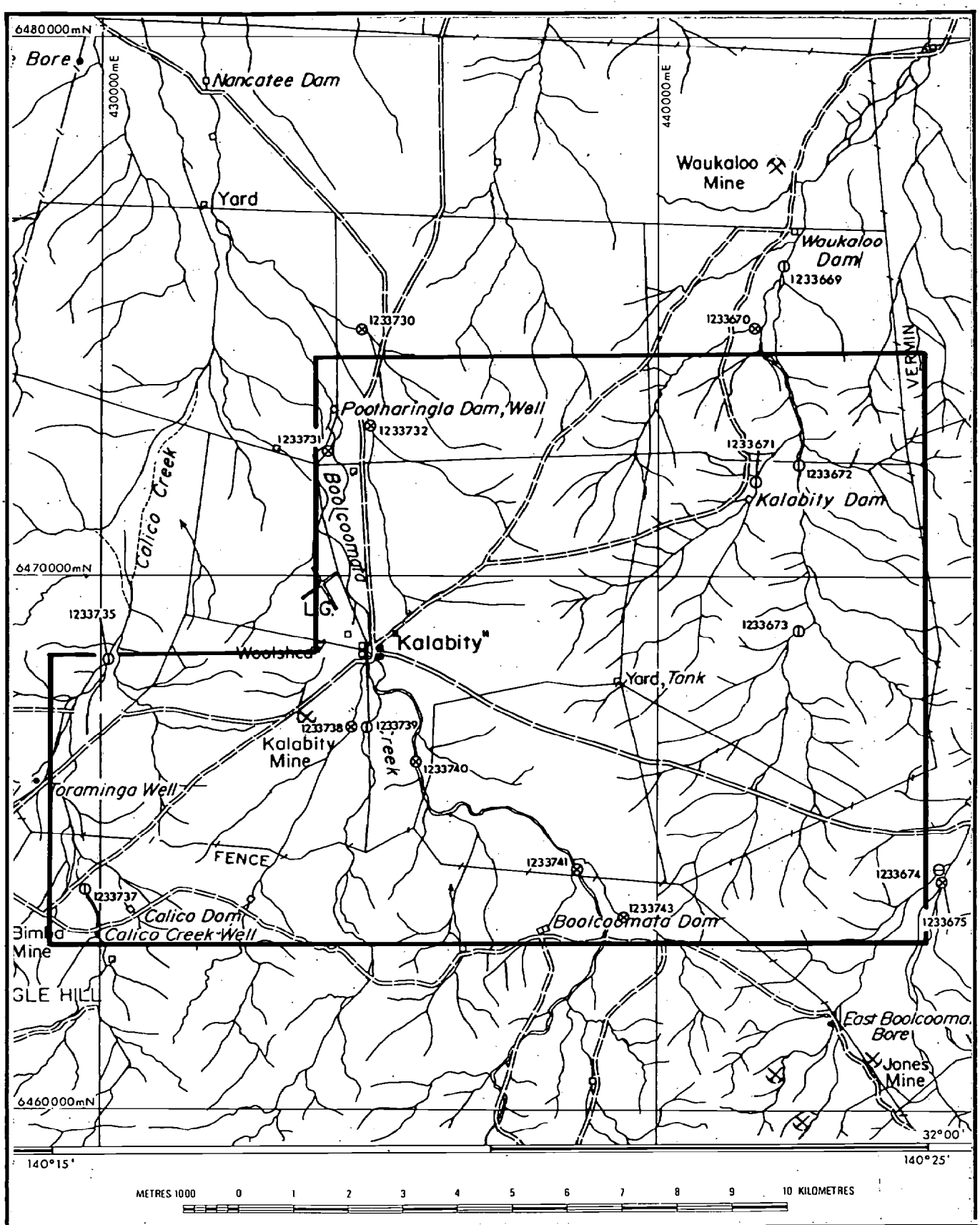
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CALICO DAM E.L. 1591 - S.A.

LOCATION PLAN

Area 148 Km²

REFERENCE	CURNAMONA SH 54-14		
SCALE	1 : 250000		
AUTHOR	R.N.	REPORT	20158
DATE	March '89	PLAN No	SAa 5075



1233740 Sample location and number.

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CALICO DAM EL1591 — S.A.
GRAVEL SAMPLE LOCATIONS

REFERENCE	CURNAMONA SH 54-14		
SCALE	1 : 100000		
AUTHOR	A.R.H.	REPORT	20158
DATE	Apr. '94	PLAN No	SAa 6280

APPENDIX I

DRAINAGE SAMPLE GEOCHEMICAL RESULTS

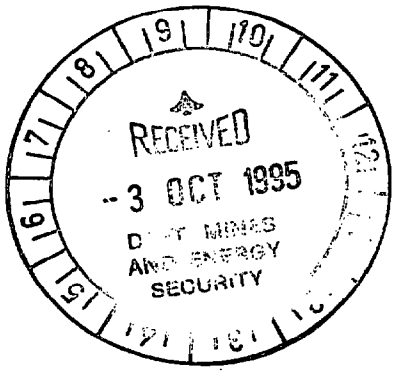
CALICO DAM EL 1591
REGIONAL -80# AND GRAVEL SAMPLE RESULTS

SAMPLE	Zone	EAST	NORTH	Ag PPM	As PPM	Au PPM	Ba PPM	Ce PPM	Co PPM	Cr PPM	Cu PPM	Fe PPM	La PPM	Mn PPM	Mo PPM	Nb PPM	NI PPM	P PPM	Pb PPM	Sb PPM	Sn PPM	Th PPM	U PPM	Zn PPM	Zr PPM
1233669	54	442400	6475600	0.5	0.5	0.011	314	362	12	59	20	71700	220	778	0.19	11.7	21	484	10	0.05	2.82	59	7.27	43	160
1233670	54	441700	6474700	0.25	3	0.008	259	933	21	112	25	171000	571	1500	0.05	2.41	29	463	25	0.025	1.68	146	18.7	53	153
1233671	54	442000	6472200	0.5	0.5	0.001	290	357	13	65	20	92800	218	902	0.05	15.1	21	462	10	0.025	2.88	63	9.44	43	159
1233672	54	442600	6472000	0.5	0.5	0.0005	266	704	9	66	16	79100	428	604	0.34	20.5	19	659	15	0.16	4.53	97	15.7	37	168
1233673	54	442500	6469200	0.5	0.5	0.003	280	216	6	30	13	38400	130	367	0.33	17.2	15	365	10	0.11	2.73	36	5.07	33	129
1233674	54	444800	6464400	0.5	3	0.007	402	102	12	39	30	44500	62	605	0.94	19.4	25	422	10	0.1	2.44	22	2.92	65	125
1233675	54	445200	6463800	0.25	2	0.001	422	206	12	59	29	67000	127	1120	0.8	12.1	23	421	10	0.64	2.98	40	5.62	65	132
1233730	54	434500	6474600	0.25	3	0.001	334	89	10	27	19	31500	46	572	0.82	8.07	20	314	10	0.8	1.82	14	2.68	46	105
1233731	54	434100	6472200	0.25	3	0.005	346	82	7	28	16	29500	44	363	0.79	12.2	16	453	5	0.43	2.07	15	3.25	43	101
1233735	54	429400	6467800	0.25	4	0.0005	399	76	11	39	25	40200	42	421	0.67	15	25	549	10	0.37	2.48	16	2.61	67	130
1233737	54	434400	6467200	0.25	7	0.002	258	2860	19	173	29	215000	1440	1050	1.51	31.9	32	1770	55	0.025	4.15	377	55.7	57	246
1233738	54	434800	6467200	0.25	2	0.002	302	169	9	41	19	46800	90	882	0.05	8.37	19	397	5	0.12	2.6	32	5.63	51	185
1233739	54	435700	6466600	0.25	2	0.0005	364	138	14	45	27	40100	70	493	0.61	10.3	26	522	10	0.78	2.72	27	5.29	65	128
1233740	54	438400	6464500	0.25	4	0.0005	350	130	12	42	31	48000	68	573	0.77	11.2	29	558	10	0.9	3.08	25	4.82	67	141
1233741	54	434800	6462300	0.25	2	0.0005	329	106	8	30	16	30200	57	333	0.94	13.2	17	405	5	0.46	2.35	21	4.49	42	131
1233743	54	437000	6459600	0.25	4	0.001	369	90	12	42	26	41000	48	485	0.57	7.9	26	483	10	0.2	2.47	18	2.66	62	125
GRAVEL SAMPLES WERE COLLECTED AT EACH LOCATION AND THE HEAVY MINERAL FRACTION OBSERVED FOR DIAMONDS AND INDICATOR MINERALS.																									
ALL RESULTS WERE NEGATIVE.																									

CRA EXPLORATION PTY. LIMITED

ANNUAL REPORT FOR CALICO DAM EL 1953, SOUTH AUSTRALIA, FOR THE PERIOD ENDED 26TH JULY, 1995

Curnamona SH5414, South Australia



AUTHOR: W.A. STEWART

COPIES TO: MESA
ET&I BOX HILL
CRAE ADELAIDE

DATE: 26TH SEPTEMBER, 1995

SUBMITTED BY:

ACCEPTED BY:

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4.3 Lag Sampling on Traverse Line	2
4.4 Regional Stream Sediment Sampling	2
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KEYWORDS	3
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Plan No	Title	Scale
SAa 5075	Calico Dam EL 1591, S.A. - Location Plan	1:250 000
SAa 6498	Calico Dam EL 1591, S.A. - Location of CSAMT/Ground Magnetic Traverse Lag Samples	1:100 000
SAa 6499	Calico Dam EL 1591, S.A. - Ground Magnetic Profile 7000N-8300N	1: 5 000
SAa 6505	Calico Dam EL 1591, S.A. - Location of Stream Sediment Samples	1:100 000
SAa 6500	Calico Dam EL 1591, S.A. - CSAMT Traverse 7000N-8300N Impedance Phase	1: 5 000
SAa 6501	Calico Dam EL 1591, S.A. - CSAMT Traverse 7000N-8300N Static-Corrected Resistivity	1: 5 000
SAa 6502	Calico Dam EL 1591, S.A. - CSAMT Traverse 7000N-8300N Cagniard Resistivity	1: 5 000

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Appendix I	Geochemical Results - Regional Lag
Appendix II	Geochemical Results - Traverse Line Lag
Appendix III	Geochemical Results - Regional Stream Sediments

1. SUMMARY

A 1.3 km traverse line of CSAMT and ground magnetics was completed. No significant anomalies were detected.

Regional, helicopter supported, high iron lag and stream sediment sampling programmes were completed across the tenement. Elevated Cu and Zn was returned from the regional lag sampling. Elevated Zn was returned from the regional stream sediment sampling.

Three lag samples were collected at 500m spacing along the CSAMT/ground magnetic traverse line. No significant results were returned.

2. INTRODUCTION

Exploration Licence 1953, Calico Dam, was granted over an area of 148 km² (plan SAa 5075) for a period of 1 year dating from 27th July, 1994. The area was previously held under EL 1591 which dated from 3rd July, 1989.

This report documents investigations completed during the reporting period ending 27th July, 1995.

3. CONCLUSIONS

Elevated geochemistry from the regional lag and stream sediment surveys require follow-up.

4. INVESTIGATIONS

4.1 CSAMT and Ground Magnetic Traverse

Approximately 1.3 km of scalar CSAMT was recorded in Calico Dam in conjunction with regional CSAMT surveying in the adjoining Kalabity EL. The survey line is shown in plan SAa 6498. Data acquisition and processing were undertaken by Zonge Engineering & Research Organization of Fullarton, S.A.

Electric field (E) measurements using 50m grounded dipoles were made parallel to the transmitter antenna. Four E-field and one orthogonal magnetic field measurement were made at each setup. The magnetic field measurement was made with an inductive coil while the electric field measurements were made with standard porous pots.

Sections of the Cagniard resistivity, impedance phase and static-corrected resistivity area presented in plans SAa 6500 to 6502. The static correction is a proprietary process of Zonge Engineering applied to the data to attenuate variations in the resistivity caused by near surface inhomogeneities and topographic effects.

Although the near field is not apparent on the phase section, data from 1 Hz to 2048 Hz appears to be in the transition field and the Cagniard resistivity section may not be strictly correct below 2048 Hz.

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The section shows that the near surface is fairly conductive with a resistivity of 5Ωm. There is a slight thickening of this unit to the south. Inversion puts the base of this layer at about 75m near station 8300 and 100m at station 7025.

Two near surface inhomogeneities effecting only the very high frequencies are evident in the phase data centred on 7900 and 8300.

Ground magnetics were carried out along the same line (plan SAa 6499).

4.2 Regional Lag Sampling

A helicopter supported ferruginous lag sampling programme was completed for a total of 36 samples (plan SAa 6498).

Lag samples were taken at a nominal density of one sample/4 km². At each sample site surficial lag was swept from within a radius of several metres. Each sample was sieved on site and the -7mm+2.5mm fraction retained for analysis. Up to 8 kg of sample was collected at each site and forwarded to Analabs Laboratory in Perth. The high iron portion was concentrated by TBE separation, and the sinks were analysed for a suite of 30 elements. Sampling aimed to collect enough to yield a minimum sink weight of 5g and a maximum of 100g.

A maximum of 756 ppm Cu and 469 ppm Zn was returned (Appendix I).

4.3 Lag Sampling on Traverse Line

A total of 3 samples were collected at 500m spacing along the CSAMT/ground magnetic traverse (plan SAa 6498). No significant results were returned (Appendix II).

4.4 Regional Stream Sediment Sampling

A helicopter supported stream sediment sampling programme was completed across the tenement for a total of 60 samples at a nominal drainage density of 2 km² (plan SAa 6505). A maximum of 94 ppm Zn was returned (Appendix III).

W.A. STEWART

WAS/dt Reports/Calico Dam

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LOCATION

Curnamona	SH5414	1:250 000 sheet
Kalabity	6934	1:100 000 sheet

KEYWORDS

Olary Block, Granite, Stream Sediment Sampling, Lag Sampling, Ground CSAMT Survey, Ground Magnetic Survey

LIST OF DPO'S

54359, 54361, 54364

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APPENDIX I

Geochemical Results - Regional Lag

Calico Dam EL 1953
Lag Sampling Results

SAMPLE NO	EAST	NORTH	ZONE	DPO	DESCRIPTION	RECOVERY	%LAG
3339875	434100	6468700	54	54359	Gravely silty plains.	VG	<1
3339884	431150	6466850	54	54359	Slight slope, clayey silty with patches of qtz gravel and scree.	M	1
3339885	432350	6466600	54	54359	Clayey silty plains with quartz gravel patches.	VG	1
3339886	434400	6467250	54	54359	Clayey silty plains with abundant quartz gravel.	VG	<1
3339887	436950	6467100	54	54359	Claypan within silty sandy plains.	G	1
3339888	439100	6466650	54	54359	Clayey silty plains with quartz gravel patches.	M-P	<1
3339889	440750	6466900	54	54359	Claypan within silty sandy plains. Sample from ants nest.	VG	<1
3339890	443150	6467050	54	54359	Clayey silty plains with abundant quartz gravel. Sample taken from ants nest.	VG	<<1
3339891	444750	6467550	54	54359	Clayey silty plains with abundant quartz gravel and scree.	M	<1
3339930	431900	6464950	54	54359	Claypan within silty sandy plains. Scattered quartz pebbles.	M	2
3339931	433900	6465100	54	54359	Top of hill. Outcropping gneissic rocks, scattered quartz pebbles.	M	<1
3339932	435750	6465400	54	54359	Claypan within silty sandy plains.	M	<1
3339933	437650	6464950	54	54359	Claypan within silty sandy plains.	G	<1
3339934	440100	6465150	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	VG	<1
3339935	442050	6464950	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	VG	<1
3339936	443550	6464800	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	VG	1
3339955	441300	6463200	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	P-M	<1
3339956	439400	6463450	54	54359	Quartz gravely claypan in sandy silty plain.	VG	<1
3339957	433600	6463100	54	54359	Top of hill. Abundant quartz scree. Outcrop of amphibolite.	VG	3
3339959	430100	6465050	54	54359	Gravely silty plains with patches of quartz scree.	M	5
3340027	443950	6473000	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	VG	<1
3340028	442050	6473000	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	M-P	<1
3340029	439700	6473150	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	VG	<1
3340030	437900	6472950	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	VG	1
3340031	436050	6473150	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	G	1
3340032	434500	6472300	54	54359	Clayey silty plains with patches of quartz gravel.	VG	<1
3340036	435650	6471300	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	VG	5
3340037	437100	6470950	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	VG	<1
3340038	438950	6471050	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	VG	<1
3340039	440950	6471100	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	VG	<1
3340040	443150	6470700	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	VG	<1
3340047	444000	6469150	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	VG	<1
3340048	442000	6469000	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	VG	<1
3340049	440100	6469050	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	VG	1
3340050	438100	6468750	54	54359	Clayey silty plains with abundant quartz gravel and scree. Sample taken from ants nest.	VG	2
3340051	436100	6468850	54	54359	Sandy silty plains with patches of quartz gravel and scree. Sample taken from ants nest.	VG	1

LAB: ANALABS Perth

Calico Dam EL 1953
Lag Sampling Results

SAMPLE NO	Ag	As	Au	Ba	Bi	Ca	Cd	Ce	Ce	Co	Cr	Cu	Eu	Fe	K	La	La
3339875	0.05	27	4	782	0.5	6550	0.2	78.1		22.5	71	109	1.03	173200	14850	37.7	
3339884	0.2	20	0.5	252	0.4	1960	0.7	107		23.6	1090	28	1.03	488800	1900	102	
3339885	0.3	24	6	733	1.8	1700	0.8	574		194	101	185	6.61	394200	13910	298	
3339886	0.2	38	6	1860	3.3	17230	0.3	279		90.7	210	341	3.04	155000	42970	151	
3339887	0.2	31	1	1300	2.8	4830	0.5	243		43	101	227	2.62	247600	29300	114	
3339888	0.2	62	5	419	3.1	8300	0.4	72		308	36	563	1.38	486900	4590	37.9	
3339889	0.3	50	-1	2130	1.2	3940	0.6	166		94.4	235	304	2.73	336500	19370	83.9	
3339890	0.2	35	-1	471	1.9	1230	0.4	380		108	215	83	4.45	280600	21220	218	
3339891	0.7	215	0.5	6040	3.9	908	0.8	359		45.2	337	94	6.28	528200	1160	301	
3339930	0.2	52	2	1640	1.3	10410	0.8	140		74.8	224	112	1.97	263900	23400	67.5	
3339931	0.3	35	0.5	788	2.4	9140	0.7	538		116	143	167	2.43	215100	48240	231	
3339932	0.2	38	0.5	926	5.2	10240	0.6	211		101	166	115	2.2	208800	37070	92.4	
3339933	0.1	19	0.5	1360	0.8	4890	0.5	311		22.6	157	68	2.65	141200	51280	182	
3339934	0.3	94	-1	1480	5.6	3010	0.5	244		269	139	436	3.15	420200	5620	129	
3339935	0.2	50	-1	1220	1.4	3610	0.4	144		60.5	313	86	2.18	346500	20300	77.9	
3339936	0.2	46	0.5	4760	2.7	3490	0.2	131		10.6	291	43	2.69	568900	710	67.1	
3339955	0.8	28	8	330	1.7	581	1.5		1090	41.2	341	35	6.27	510000	1310	474	
3339956	0.2	23	-1	774	0.5	4930	0.4	180		25.7	131	51	1.74	133000	25180	78.8	
3339957	0.05	6	0.5	143	0.2	29270	0.1		2240	153	153	100	5.03	278100	1830		1460
3339959	0.05	6	0.5	207	0.9	751	0.3	878		53.7	531	18	12	496600	250	411	
3340027	0.2	71	6	3000	6	928	0.3	228		54.1	165	204	3.5	475600	2830	120	
3340028	0.4	108	-1	3830	3.4	1210	0.3	270		835	204	454	5.53	590000	960	160	
3340029	0.2	165	-1	5150	2.6	935	0.4	168		21.9	252	143	3.31	508000	2690	94.1	
3340030	0.2	74	3	5160	2.1	775	0.3	131		31.6	298	207	2.61	488400	1730	74.2	
3340031	0.3	37	0.5	3580	2.5	662	0.2	110		33.1	346	66	2.33	499500	1480	68.7	
3340032	0.2	16	0.5	1140	0.9	16930	0.5	175		22.6	140	90	2.19	132700	41880	81.5	
3340036	0.05	34	0.5	2970	1.6	740	0.2	122		33	388	79	2.65	523200	1520	75.7	
3340037	0.2	76	-1	1480	1.7	1200	0.3	112		16.6	428	79	2.75	462900	4690	78.5	
3340038	0.05	52	-1	1500	1.8	1370	0.4	121		123	224	155	2.38	492500	2580	56.2	
3340039	0.1	72	-1	2260	3.1	3300	0.4	99.2		36.8	224	756	2.15	446800	7680	61.9	
3340040	0.1	92	2	4920	3.2	905	0.3	157		68.2	280	124	3.64	499000	3610	95.8	
3340047	0.3	73	-1	1780	3.6	1300	0.3	117		20.1	176	94	2.13	334700	18370	65.4	
3340048	0.05	44	-1	3450	1.8	1320	0.2		1600	107	295	305	8.1	557000	2420	920	
3340049	0.1	23	2	1250	1.4	1250	0.7	46		38.6	144	183	0.87	440000	6720	26.1	
3340050	0.05	10	1	372	0.5	1050	0.7	74.6		29.4	460	68	1.03	344400	8690	35	
3340051	0.05	9	2	266	1.1	1540	0.5	596		110	65	108	3.53	548500	7880	299	
METHOD	GS201	GS201	GS333	GI201	GS201	GI201	GS201	GS201	GI201	GS201	GI201	GI201	GS201	GI201	GI201	GS201	GI201
LDETECTION	0.1	1	1	5	0.1	50	0.1	0.05	15	0.2	10	5	0.05	100	500	0.05	5
UDETECTION	500	1000	1000	10000	1000	400000	1000	1000	10000	2000	20000	10000	500	999999	200000	1000	10000
UNITS	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm

LAB: ANALABS Perth

Calico Dam EL 1953
Lag Sampling Results

SAMPLE NO	Mg	Mn	Mo	Na	Ni	P	Pb	Pd	Pt	Sb	Th	Ti	U	W	Zn	+2mm	Sinks
3339875	2320	694	10.4	2640	90	1150	31	0.9	1.5	0.5	11.4	2070	37.4	1.9	93	3240	105.17
3339884	771	1160	1	450	48	158	32	0.25	0.25	0.1	10.8	35900	73	5	106	2322	34.81
3339885	3000	1670	11.6	2580	122	1640	30	1.5	1.5	0.6	50.9	13430	23.9	5.1	111	5905	126.48
3339886	5820	915	3	3090	52	602	27	0.8	0.8	0.7	41.1	15120	14.9	10.6	60	7308	55.17
3339887	7210	2450	15.3	2790	101	1750	94	2	1.5	1	29.2	3710	31.4	5.6	389	4842	39.66
3339888	2420	2170	7.8	1620	437	1190	27	2.8	2	0.5	6.6	31310	16.3	5	101	1637	41.93
3339889	2180	10350	12.2	1470	108	1580	68			1.9	36.8	6520	19.5	4	181	5120	6.66
3339890	1640	396	3.6	3190	41	1020	48			0.8	61.8	5530	22.6	10.8	121	3664	2.93
3339891	675	558	31.6	198	57	1020	89	0.8	1.2	2.9	44.3	13270	147	12.2	115	3277	57.18
3339930	2270	8980	11.4	2140	52	809	75	1.1	4.7	2.2	40.3	10520	13.1	4.3	469	4067	24.38
3339931	4070	519	39.4	2950	39	1360	72	0.8	1.2	0.5	132	9310	47.1	5.7	243	3142	37.16
3339932	2170	2100	14.2	2190	52	2880	70	2	2	1.2	78.9	14050	31.1	3.8	451	4393	16.36
3339933	4080	553	6.7	2850	42	629	30	0.7	0.7	0.7	48.8	7700	14.9	6.3	217	3093	22.28
3339934	3700	1150	29.9	1600	87	1600	72			1.5	25.6	22500	20.2	10.5	110	4164	9.31
3339935	2480	2120	12.5	1300	60	1040	156			1.7	42.8	34650	13	3	97	5268	7.48
3339936	687	600	7.5	131	27	714	60	0.6	1.6	2.5	92.4	7720	6.09	2.5	30	4450	82.38
3339955	818	936	7.4	363	46	849	78	0.9	0.7	0.8	537	32610	120	18	45	2962	18.79
3339956	4770	1540	4.5	2680	37	578	27			0.7	57.5	6620	15.8	5.2	304	4694	7.45
3339957	18230	3390	0.2	9800	96	531	25	1	1.8	0.05	71.1	51880	78	0.8	64	2633	140.58
3339959	936	3170	2.7	88	35	565	72	0.25	0.25	0.1	613	84640	102	2	45	2960	114.97
3340027	853	1620	8.9	312	74	1040	33	3	1.6	2.3	23.6	28560	21.7	5.3	50	4355	26.29
3340028	842	606	11.1	417	141	3140	57			1.7	33.5	5520	14.2	8.6	253	890	2.67
3340029	775	1540	11.8	257	76	1040	58			3.2	39	23100	10.2	9.1	52	4492	10.03
3340030	851	1550	8.1	377	51	787	43	1	1.8	1.9	32.5	36880	9.71	7.9	35	2568	22.61
3340031	643	1660	5.8	286	38	618	57	0.8	2.6	2.4	51.8	19500	9.12	2.8	35	4204	65.53
3340032	7500	2000	4.6	3860	47	819	30	0.6	0.8	0.7	35	6840	11.3	7.3	154	5378	50.73
3340036	691	1040	5	251	36	578	61	0.6	1.8	2	63	17930	3.63	5.3	34	5499	125.96
3340037	906	1260	10.1	301	28	626	54			3.2	41.5	29540	5.44	3.2	48	5300	15.75
3340038	1060	1190	12.5	430	107	1660	53			2.2	31	20700	19.1	3.6	80	5052	10.09
3340039	1360	1660	11.1	632	113	1170	63			3	38.9	30450	15.2	13.9	61	5086	7.88
3340040	887	475	15.6	503	66	981	77	3.4	2	3.7	57	5590	10.7	3.7	84	4201	19.01
3340047	1850	466	11.1	1730	44	693	38			1.4	38	5350	8.14	5.6	31	4798	8.18
3340048	911	763	6.4	340	69	2450	42			1.4	46	7260	46.9	2.4	41	5214	15.07
3340049	1310	2450	3.6	399	114	371	23	1.5	6.9	0.9	13.7	65700	5.55	4.6	67	5789	30.99
3340050	2110	2740	1.6	676	60	287	19	0.25	0.7	0.5	14	63330	6.23	3.2	99	4015	107.84
3340051	2220	981	4	2560	72	548	21	0.9	0.8	0.2	21.5	7630	9.48	2	136	5399	101.72
METHOD	GI201	GI201	GS201	GI201	GI201	GI201	GS201	GS333	GS333	GS201	GS201	GI201	GS201	GS201	GI201	MT830	MT830
LDETECTION	20	15	0.1	50	10	30	1	0.5	0.5	0.1	0.05	10	0.05	0.1	5	1	0.01
UDETECTION	400000	50000	1000	200000	10000	100000	2000	1000	1000	1000	1000	20000	1000	1000	10000	0	10000
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppb	ppm	ppm	ppm	ppm	ppm	ppm	g	g

LAB: ANALABS Perth

APPENDIX II

Geochemical Results - Traverse Line Lag

Calico Dam EL 1953
Traverse Line Lag Sampling

SAMPLENO	LOCAL EAST	LOCAL NORTH	EAST(AMG)	NORTH(AMG)	DPO	DESCRIPTION	RECOVERY	%LAG
3943264	5000	7000	437750	6473100	54361	Silty clayey plain with abundant quartz gravel and scree.	VG	2
3943265	5000	7500	438044	6473505	54361	Silty clayey plain with abundant quartz gravel and scree.	M-G	1
3943266	5000	8000	438338	6473909	54361	Silty clayey plain with abundant quartz gravel and scree. Sample from ants nest.	VG	1

LAB: ANALABS Perth

Calico Dam EL 1953
Traverse Line Lag Sampling

SAMPLENO	Ag	As	Au	Ba	Bi	Ca	Cd	Ce	Co	Cr	Cu	Eu	Fe	K	La	Mg	Mn	Mo	Na
3943264	0.1	37	-1	5140	3.4	693	0.4	138.00	88.6	323	192	3.65	549800	1130	83.70	634	1200	5.9	273
3943265	0.1	23	3	4620	14.0	562	0.3	87.60	125.0	320	162	2.28	486700	830	52.60	544	1480	10.0	323
3943266	-0.1	38	5	6320	1.3	1290	0.4	112.00	78.0	291	108	3.48	440000	1320	65.90	866	702	15.5	355
METHOD	GS201	GS201	GS333	GI201	GS201	GI201	GS201	GS201	GS201	GI201	GI201	GS201	GI201	GI201	GS201	GI201	GI201	GS201	GI201
LDETECTION	0.1	1	1	5	0.1	50	0.1	0.05	0.2	10	5	0.05	100	500	0.05	20	15	0.1	50
UDETECTION	500.0	1000	1000	10000	1000.0	400000	1000.0	1000.00	2000.0	20000	10000	500.00	999999	200000	1000.00	400000	50000	1000.0	200000
UNITS	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm

LAB: ANALABS Perth

Calico Dam EL 1953
Traverse Line Lag Sampling

SAMPLENO	Ni	P	Pb	Pd	Pt	Sb	Th	Ti	U	W	Zn	+2mm	Sinks
3943264	66	731	44	-0.5	3.5	1.0	36.20	26010	9.26	4.5	49	3924	69.06
3943265	93	839	49	1.2	2.7	0.5	24.40	28060	34.10	11.8	43	5422	73.68
3943266	50	2300	76	IS	IS	2.2	49.00	12780	97.00	2.7	56	3293	18.31
METHOD	GI201	GI201	GS201	GS333	GS333	GS201	GS201	GI201	GS201	GS201	GI201	MT830	MT830
LDETECTION	10	30	1	0.5	0.5	0.1	0.05	10	0.05	0.1	5	1	0.01
UDETECTION	10000	100000	2000	1000.0	1000.0	1000.0	1000.00	20000	1000.00	1000.0	10000	0	10000.00
UNITS	ppm	ppm	ppm	ppb	ppb	ppm	ppm	ppm	ppm	ppm	ppm	g	g

APPENDIX III

Geochemical Results - Regional Stream Sediments

Calico Dam El 1953
Stream Sediment Results

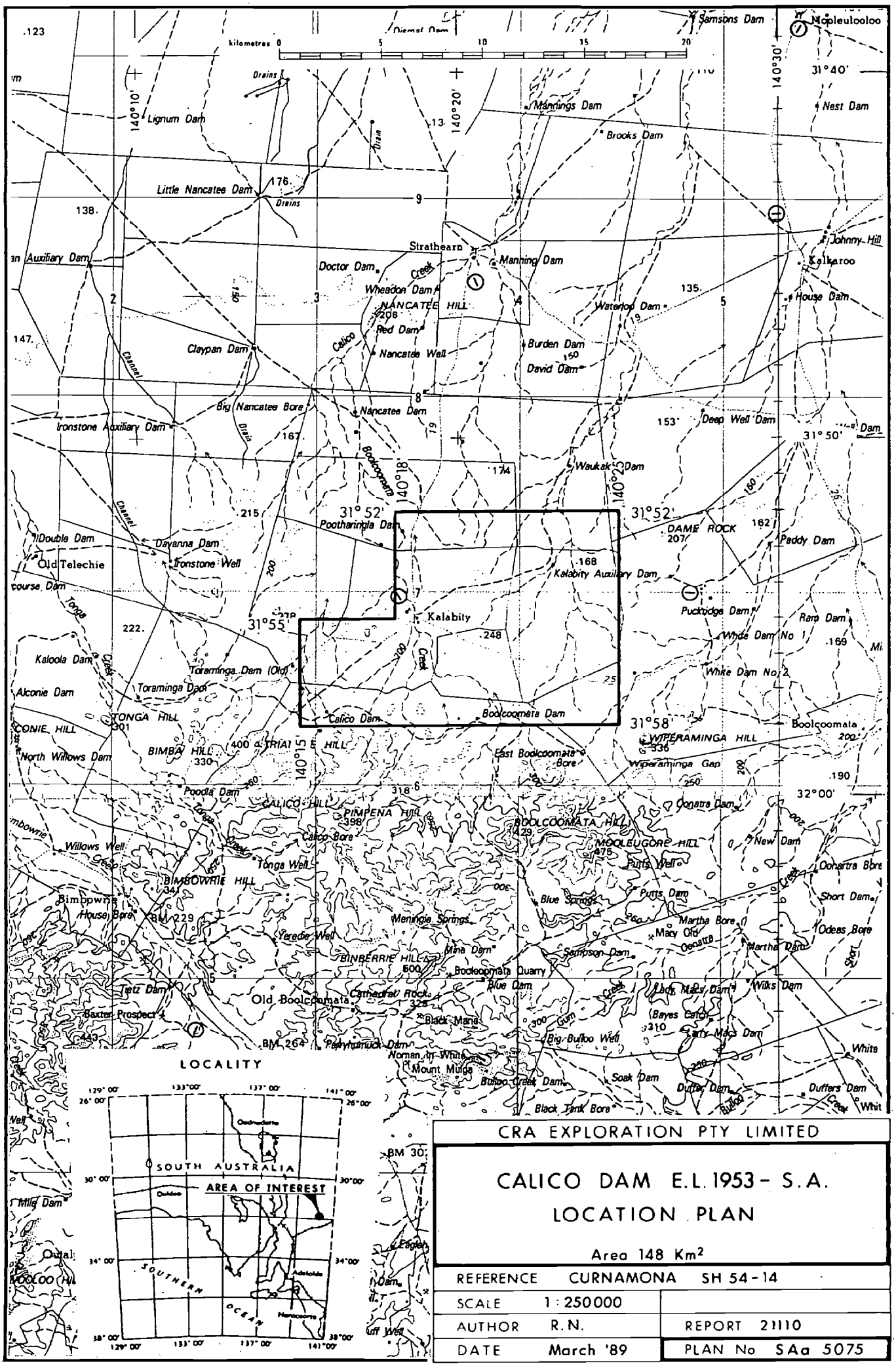
SAMPLENO	EASTING	NORTHING	ZONE	DPO	Ag	As	Au	Ba	Bi	Ca	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	Pb	Th	U	Zn
3943316	435612.21	6468963.55	54	54364	-0.1	2	2		0.3	2500	6	35	14	23500	11200	3600	300	0.4	9800	12	10	8	1.15	38
3943317	435454.68	6469656.79	54	54364	-0.1	-1	1		0.3	2500	6	35	16	22900	9900	3500	240	0.6	11200	13	10	5	0.95	35
3943318	436179.46	6471894.07	54	54364	-0.1	5	-1		0.3	6500	11	49	24	38800	19000	10700	480	0.4	7200	22	20	7.5	0.88	71
3943324	430538.95	6467955.2	54	54364	-0.1	-1	-1		0.2	4700	10	44	19	37300	12700	6600	520	0.3	11700	17	10	8	1.4	64
3943325	431137.66	6467261.96	54	54364	-0.1	2	-1		0.3	7200	9	41	21	35300	14000	6700	340	0.6	12600	18	10	7	0.76	48
3943326	430980.13	6467167.43	54	54364	-0.1	4	-1		0.3	4700	11	57	21	52700	9800	5200	480	0.6	11400	19	10	10	2.2	48
3943327	429814.23	6465339.79	54	54364	-0.1	2	-1		0.2	6900	9	48	23	37800	10800	6700	400	0.6	10300	20	10	9.5	1.4	48
3943328	429845.7	6464709.57	54	54364	-0.1	3	-1		0.2	10400	7	31	15	23800	13200	5100	280	0.3	11900	12	10	9.5	1.4	34
3943329	429373.05	6464646.55	54	54364	-0.1	4	-1		0.2	2800	10	44	26	32600	9800	5700	320	0.5	9400	18	10	10	1.1	47
3943330	429719.7	6464268.42	54	54364	-0.1	3	-1		0.2	12300	9	41	22	30200	18600	8600	300	0.5	11500	18	15	10	1.8	50
3943331	429467.58	6464173.89	54	54364	-0.1	4	-1		0.2	8700	6	34	17	23500	9600	3900	200	0.5	12300	12	10	6	0.89	27
3943332	432634.17	6463811.85	54	54364	-0.1	2	1		0.2	8500	9	39	21	29300	18200	8500	340	0.4	13600	19	10	12.5	2.4	48
3943333	433721.59	6465686.42	54	54364	-0.1	3	-1		0.2	4700	11	48	30	38100	20300	8500	460	0.8	10500	23	15	13	2.2	62
3943334	433185.87	6466096.05	54	54364	-0.1	-1	-1		0.2	4400	7	37	14	27400	11400	4100	400	0.3	12000	12	10	9.5	1.9	36
3943335	434635.37	6465560.37	54	54364	-0.1	2	-1		0.3	2900	17	56	37	41700	19700	7900	500	0.7	7300	27	20	19	3.6	83
3943336	435864.33	6465528.86	54	54364	-0.1	2	-1		0.2	6800	7	35	18	29200	8800	5600	260	0.4	11300	15	10	10	1.85	48
3943337	436715.11	6464898.63	54	54364	-0.1	1	-1		0.2	4100	7	34	17	25100	10000	4000	320	0.6	13900	14	10	12.5	2.4	41
3943338	436935.7	6464993.17	54	54364	-0.1	2	-1		0.3	4100	11	42	24	31700	18500	8800	500	0.3	9200	20	20	9.5	1.55	60
3943339	436021.86	6466694.76	54	54364	-0.1	1	-1		0.3	4800	10	50	24	44000	16200	6100	500	0.8	12300	18	15	22.5	3.8	52
3943340	438794.85	6464646.55	54	54364	-0.1	2	-1		0.3	2800	14	52	34	39800	11600	5800	440	0.8	7200	25	10	17	2.4	70
3943341	438479.72	6463921.8	54	54364	-0.1	4	-1		0.3	2700	11	41	22	30000	10300	5600	400	0.7	9100	18	10	11.5	1.55	50
3943342	439046.91	6463134.03	54	54364	-0.1	4	1		0.3	5400	11	42	25	29000	11700	6700	300	0.6	9900	19	10	15.5	2.8	52
3943343	440685.46	6464646.55	54	54364	-0.1	3	-1		0.3	5200	11	50	23	37800	14000	7100	380	0.5	10800	22	5	13	1.5	52
3943344	441819.9	6465528.86	54	54364	-0.1	2	-1		0.3	2600	11	47	22	34100	12400	6700	480	0.5	9700	20	15	20	1.85	61
3943345	441693.83	6465560.37	54	54364	-0.1	4	-1		0.2	4700	11	55	23	46100	13800	6800	420	0.5	12100	19	15	9.5	1.35	47
3943346	442922.73	6465654.9	54	54364	-0.1	-1	-1		0.2	16400	9	43	21	31000	13700	7600	320	0.4	12200	17	15	9.5	2.4	46
3943347	442765.2	6465591.87	54	54364	-0.1	2	-1		0.5	7600	10	64	18	61600	10200	3700	420	1.3	15100	19	5	16.5	3.5	37
3943348	442828.2	6466442.67	54	54364	-0.1	1	-1		0.3	4100	8	55	14	47400	11600	3800	400	0.6	12300	13	10	14.5	3.9	37
3943349	440307.34	6466442.67	54	54364	-0.1	4	2		0.4	2200	11	57	28	38200	14200	5400	340	0.6	8000	23	10	9	2	57
3943350	439992.22	6463386.12	54	54364	-0.1	2	1		0.3	5800	10	44	22	28200	15800	6200	280	0.5	12000	19	10	11	1.85	47
3943444	444372.29	6463890.28	54	54365	-0.1	2.5	-1	40	0.3	6100	12	54	27	33900	20300	9400	460	0.5	12200	20	20	12	2.5	76
3943445	444151.7	6463575.18	54	54365	0.1	6	-1	105	0.5	7500	18	79	40	48000	25400	12600	640	1.1	18400	30	20	23	4.3	93
3943476	443899.57	6472114.65	54	54365	-0.1	1	-1	55	0.2	3600	5	39	17	32700	12700	3600	320	0.2	14100	10	10	18	3.4	34
3943477	443868.11	6471957.09	54	54365	-0.1	1.5	-1	40	0.2	3400	8	45	18	33100	15100	4800	360	0.3	12400	12	15	22	3.8	47
3943478	442796.74	6472366.73	54	54365	-0.1	12	-1	145	0.2	4300	5	36	14	30100	11100	3100	300	0.3	13700	9	10	8.5	2.8	32
3943479	442733.67	6471106.29	54	54365	-0.1	8.5	-1	115	0.3	4300	8	65	16	55400	10200	2900	460	0.4	15200	13	10	11.5	3.4	46
3943480	442702.21	6471578.96	54	54365	-0.1	1.5	-1	70	0.2	4400	8	46	18	33300	14600	4200	440	0.2	17700	12	15	19	3.6	45
3943481	443300.92	6469404.7	54	54365	-0.1	2	-1	75	0.2	6600	7	43	17	36600	13200	5700	320	0.4	14500	12	10	21.5	2.8	48
3943482	442922.73	6469121.11	54	54365	-0.1	2.5	-1	65	0.2	10300	8	41	17	32900	13600	5500	320	0.3	20800	11	15	23	4	41
3943483	443615.98	6468490.88	54	54365	-0.1	31	-1	45	0.2	9800	7	40	16	29600	9400	4700	220	0.3	14800	11	10	3.5	2.1	35
3943484	443458.45	6468333.34	54	54365	-0.1	24	-1	20	0.2	7200	6	37	13	28100	9400	4100	240	0.4	12500	9	5	4.3	2.6	31
3943485	442859.74	6467734.63	54	54365	-0.1	17.5	-1	50	0.2	2700	6	50	12	43300	9700	2200	380	0.4	14000	9	5	4.9	2.8	31
3943486	442765.2	6467514.05	54	54365	-0.1	9.5	-1	65	0.2	7100	6	47	14	40500	10300	3600	340	0.4	15400	9	10	11.5	2.9	38
3943487	442166.49	6467419.51	54	54365	-0.1	9	-1	85	0.2	2900	8	44	16	32100	12000	3800	340	0.5	12700	11	15	9	2.5	40
3943488	441914.43	6468238.79	54	54365	-0.1	1.5	-1	40	0.2	4400	7	57	21	43500	12500	5000	380	0.4	14200	14	10	25	4.6	45

LAB: AMDEL

Calico Dam El 1953
Stream Sediment Results

SAMPLENO	EASTING	NORTHING	ZONE	DPO	Ag	As	Au	Ba	Bi	Ca	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	Pb	Th	U	Zn
3943489	440748.53	6469058.08	54	54365	0.1	3	-1	95	0.2	6200	8	49	19	38600	13000	5700	400	0.4	12500	14	15	24	4.5	47
3943490	440496.4	6469184.13	54	54365	-0.1	2.5	-1	80	0.2	4700	9	44	20	29200	14600	5900	340	0.3	12500	15	15	14	2.9	50
3943491	439645.63	6469782.84	54	54365	0.1	1	-1	40	0.2	9700	11	52	20	41100	13700	6400	400	0.3	10900	16	15	22	4.2	58
3943492	439582.63	6469908.88	54	54365	-0.1	3.5	-1	30	0.2	5100	7	39	15	30500	11300	3800	340	0.3	13600	11	10	12	3	40
3943493	441221.18	6471011.76	54	54365	-0.1	10.5	4	40	0.2	5600	8	35	16	25800	12000	4200	260	0.3	11700	12	10	5	1.6	36
3943494	441441.77	6470791.18	54	54365	-0.1	33.5	-1	70	0.2	5300	7	43	19	30800	8800	4600	220	0.4	11000	14	10	3	2.3	39
3943495	441662.3	6471894.07	54	54365	-0.1	39.5	-1	45	0.4	6400	10	52	23	55400	10400	4400	420	0.5	13300	14	-5	5.5	2.9	38
3943496	441693.83	6474162.86	54	54365	0.1	20.5	-1	35	0.3	2900	8	39	18	27600	11500	4100	400	0.4	11800	13	10	5	2.4	43
3943497	440086.81	6473847.75	54	54365	-0.1	9.5	2	50	0.2	3500	5	34	13	23000	10800	3700	300	0.2	11200	10	10	7	2.3	31
3943498	439456.56	6471894.07	54	54365	-0.1	30.5	2	35	0.3	5000	11	51	27	35900	9300	7400	360	0.8	8300	20	5	3.5	2.4	65
3943499	439267.5	6472083.14	54	54365	-0.1	45	-1	45	0.3	6700	11	53	26	37100	8900	8200	340	0.6	10400	20	10	3.5	1.85	63
3943593	434698.43	6468238.79	54	54365	-0.1	6.5	-1	55	0.2	4600	9	42	20	31000	14500	6300	400	0.5	13400	15	15	5.5	2.5	50
3943594	435076.55	6467734.63	54	54365	0.1	11.5	-1	130	0.3	6200	13	68	39	47400	10600	9200	440	1	7100	28	15	4.3	4.3	94
3943595	435202.62	6467860.67	54	54365	-0.1	5	1	55	0.2	4600	6	34	16	26300	13000	4500	240	0.4	14300	12	15	3.2	2.8	40
3943600	437156.29	6473658.68	54	54365	-0.1	3	-1	60	0.2	4200	11	51	20	41800	13300	5600	520	0.6	14800	15	15	10.5	3.5	46
				SCHEME	IC3M	IC3M	AA9	IC3EAR	IC3M	IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3EAR	IC3M	IC3EAR	IC3EAR	IC3EAR	IC3M	IC3M	IC3EAR
				DL	0.1	0.5	1	5	0.1	10	2	2	2	100	10	10	5	0.1	10	2	5	0.02	0.02	2
				UNITS	PPM	PPM	PPB	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM

LAB: AMDEL



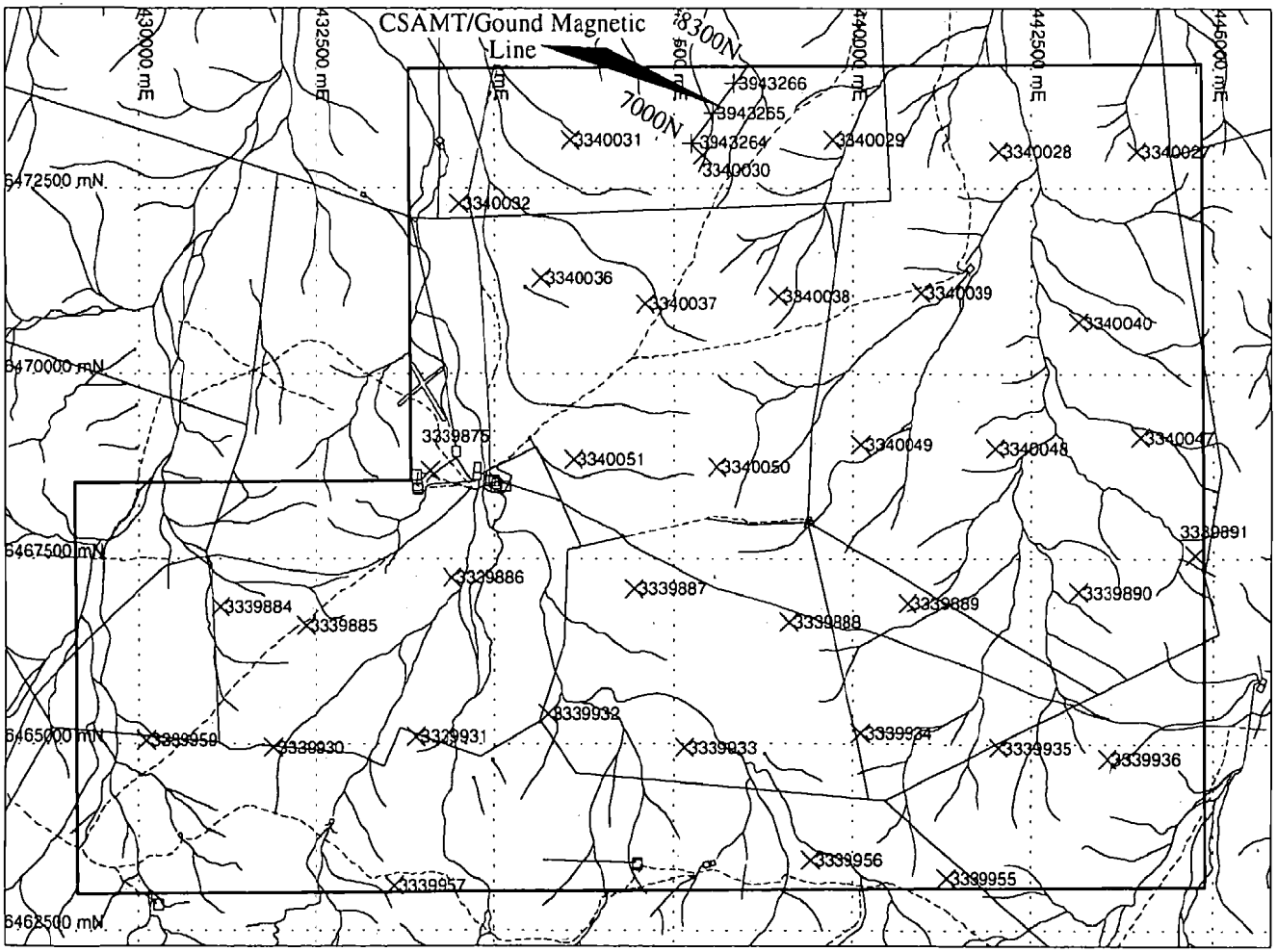
CRA EXPLORATION PTY LIMITED

CALICO DAM E.L. 1953 - S.A.

LOCATION PLAN

Area 148 Km²

REFERENCE	CURNAMONA SH 54-14		
SCALE	1 : 250000		
AUTHOR	R.N.	REPORT	21110
DATE	March '89	PLAN No	SAa 5075



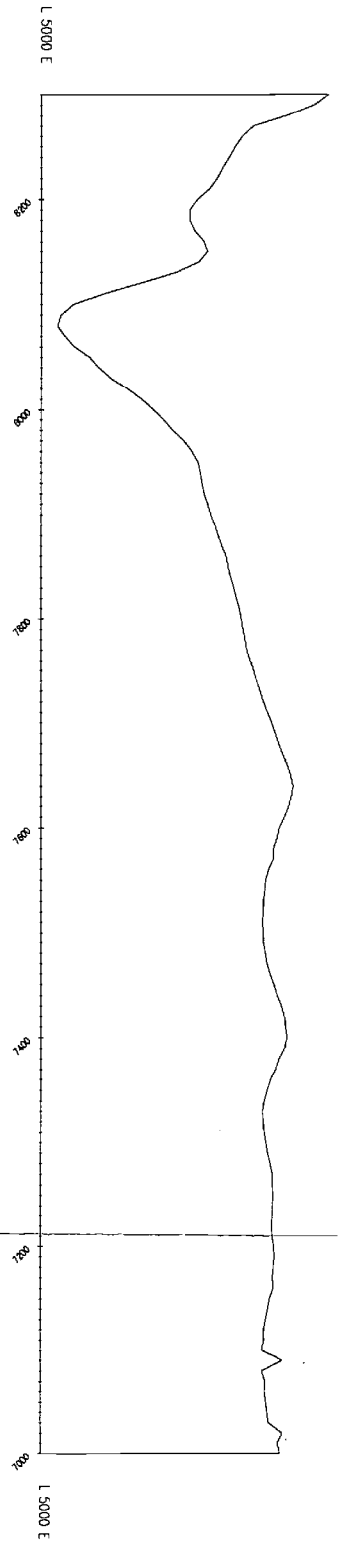
CRA EXPLORATION PTY LTD

CALICO DAM EL 1953

LOCATION OF CSAMT/GROUND MAGNETIC TRAVERSE AND LAG SAMPLES

Curnamona SH5414

Geol: W. Stewart	Scale: 1:100,000	Report: 21110
Drawn: W.Stewart	Date: September '95	Plan: SAa 6498



SPECIFICATIONS

Data:
Diurnal correction applied.
Data collected at 10 metre stations using Scintrex MP-3 Magnetometer.

Profile:
Amplitude scale - 250 nT/cm

Origin:
Local = 5000E / 7000N
AMG = 437750E / 6473100N
Local N = 036 deg. AMG N

Scale 1:5000
50 0 50 100
(meters)

CRA

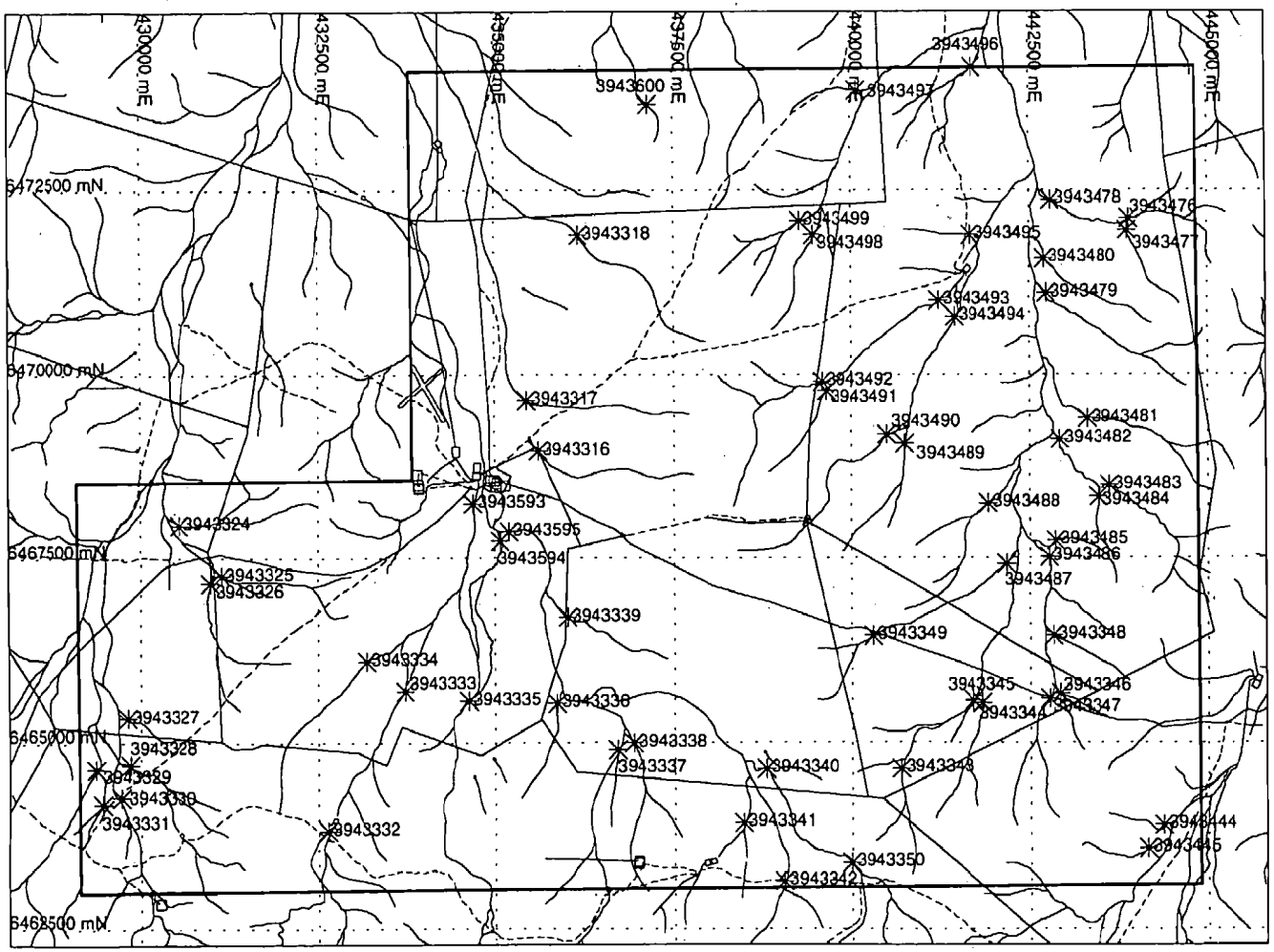
CRA EXPLORATION PTY LIMITED

CALICO DAM EL 1953 - S.A.

GROUND MAGNETIC PROFILE

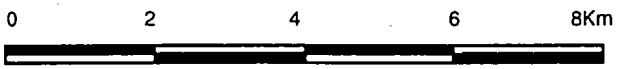
7000N - 8300N

REF. CURNAMONA SH54-14 SA	
SCALE 1:5000	DRAWN MDP
AUTHOR WAS	REPORT 21110
DATE SEPT '95	PLAN No 6499





✳ Regional Stream Sediment Samples



CRA EXPLORATION PTY LTD

CALICO DAM EL 1953

LOCATION OF STREAM SEDIMENT SAMPLES

Curnamona SH5414

Geol: W. Stewart	Scale: 1:100,000	Report: 21110
Drawn: W.Stewart	Date: September '95	Plan: SAa 6505

Line 5000 E
Kalabity
for
CRAE

Field Job 252
ZONCE ZPLOT 7.00
Plotted 22 Dec 94

CSAMT SURVEY DATA
IMPEDANCE PHASE

values in milliradians

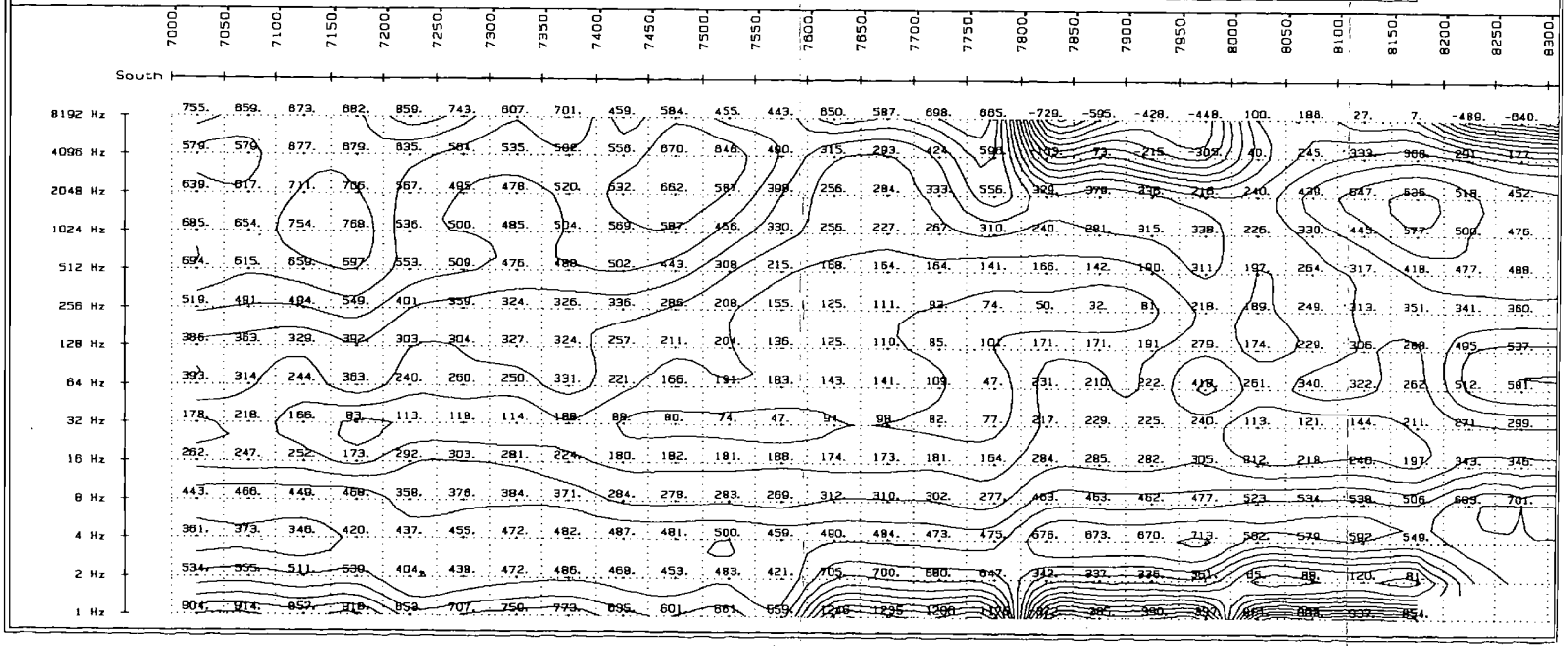
RECEIVER DATA
Length = 50 m Line = North
Spacing= 50 m Dipole= 026

Surveyed= 11/94

TRANSMITTER DATA
Length = 1500 m
Orient. = 026
Distance= 7000 m
Rx to Tx= 296

[Plot limits] and ARITHMETIC CONTOURS
(Interval: 100.00)

[-1039)	-100.	900.	1900
-1000	0.00	1000	2000
-900.	100.	1100	2100
-800.	200.	1200	2200
-700.	300.	1300	[2203)
-600.	400.	1400	
-500.	500.	1500	
-400.	800.	1600	
-300.	700.	1700	
-200.	800.	1800	

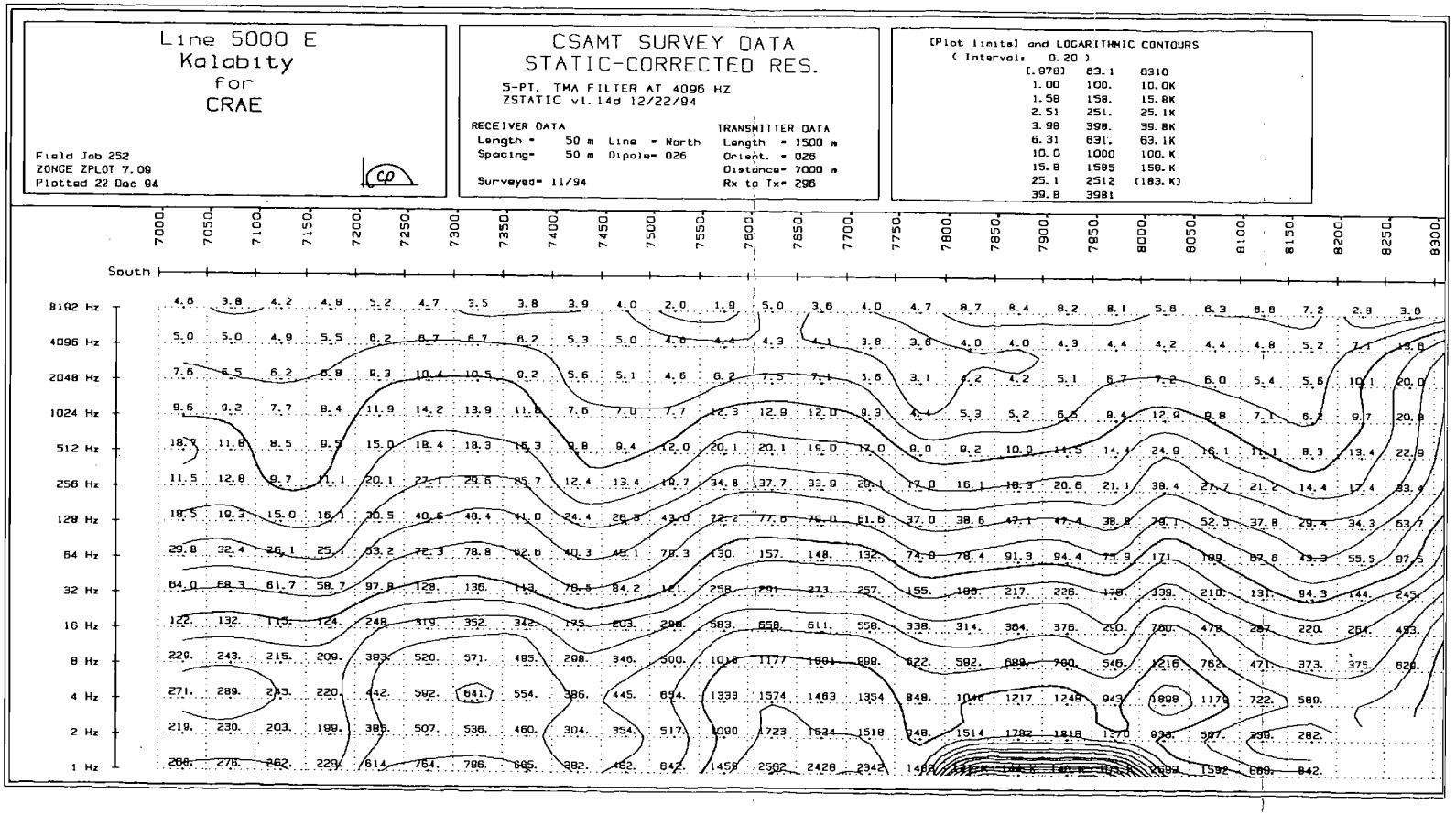


CRA EXPLORATION PTY LIMITED

CALICO DAM EL 1953 - S.A.

CSAMT Traverse 7000N - 8300N
Impedance Phase

REF.:	CURNAMONA SH54-14		
SCALE:	1 : 5 000	DRAWN	F.R.
AUTHOR:	W.A.S.	REPORT:	21110
DATE:	Sept. 1995	PLAN NO.:	SAa 6500

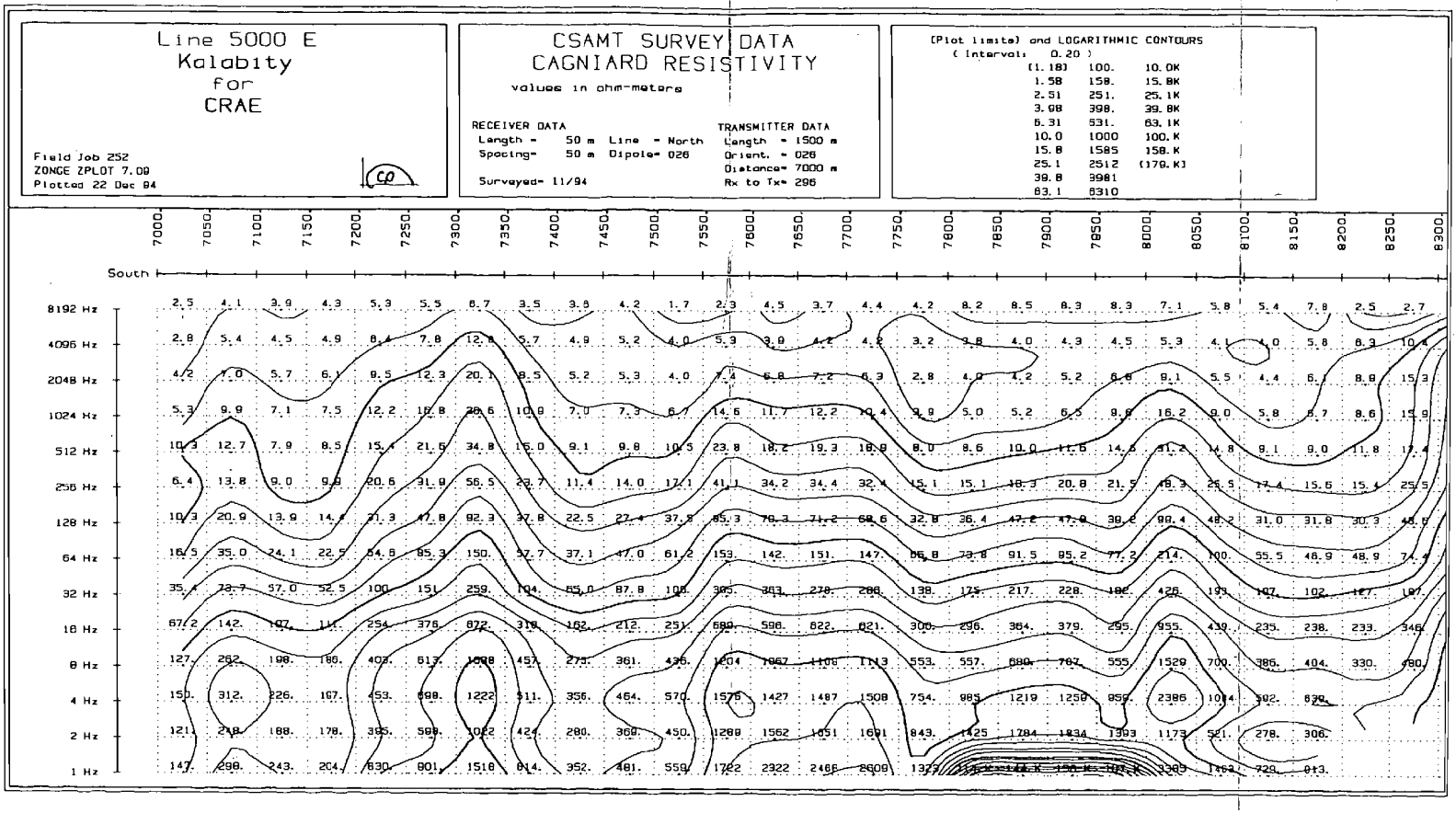


CRA EXPLORATION PTY LIMITED

CALICO DAM EL 1953 - S.A.

CSAMT Traverse 7000N - 8300N
Static-Corrected Resistivity

REF. :	CURNAMONA SH54-14		
SCALE :	1 : 5 000	DRAWN	F.R.
AUTHOR :	W.A.S.	REPORT :	21110
DATE :	Sept. 1995	PLAN NO. :	SAa 6501



CRA EXPLORATION PTY LIMITED

CALICO DAM EL 1953 - S.A.

CSAMT Traverse 7000N - 8300N
Cagniard Resistivity

REF.:	CURNAMONA SH54-14		
SCALE:	1 : 5 000	DRAWN	F.R.
AUTHOR:	W.A.S.	REPORT:	2110
DATE:	Sept. 1995	PLAN NO.:	SAa 6502

CRA EXPLORATION PTY. LIMITED
ACN 000 057 125

Annual Report
For The Period Ending 26 September, 1996
EL 1953 Calico Dam, South Australia

Author:	**T.C. Moody**
Date:	**October, 1996**
Licence Holder:	**CRA Exploration Pty. Limited**
Submitted to:	**Chief Geologist, SE District**
Copies to:	**Mines and Energy, South Australia (2)** **CRAE - SE District (Adelaide)** **CRAE - ETIG**
Submitted by:	
Accepted by:	

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CRAE Report No. 22500

Abstract

EL 1953 (Calico Dam) comprising 148 km², was granted to CRA Exploration Pty. Limited on 27th July, 1994 for a period of 1 year and replaced former EL 1591. Tenure has been renewed annually on the current licence to 26th July, 1997. EL 1953 overlies Kalabity Homestead, South Australia, approximately 38 kilometres north of Olary.

CRA Exploration applied for EL 1953 to assess the potential for base and precious metal mineralisation. Previous exploration within EL 1591 was for copper-gold and uranium.

Previous exploration by CRAE within EL 1953 and previously within EL 1591, included an airborne magnetics and radiometric survey, compilation of 1:25 000 base plans and previous CEC rock chip sampling and detailed follow up of radiometric anomaly KR4 with 9 costeans, rock chip sampling, scintillometer traverses and a metallurgical bulk sample. This work identified sub-economic uranium mineralisation.

Subsequent exploration included regional diamond gravel sampling, -80# stream sediment sampling and lag sampling, and a CSAMT, soil sample and ground magnetics traverse.

Exploration during the twelve months to 26th September 1996 included:

- Regional interpretation of magnetics, radiometrics, geology and mineralisation
- Processing of Geocoded Landsat TM
- Purchase of Broken Hill Exploration Initiative digital airborne magnetic/radiometric data

Stream sediment and high-iron lag sampling has outlined several areas of moderately anomalous zinc and copper geochemistry. Several of these anomalies are coincident with a major north west trending fault. Further potential exists for copper-gold mineralisation in the south of EL 1953.

Further exploration in EL 1953 should include a re-interpretation of airborne magnetics and radiometrics and follow up soil sampling, stream sediment sampling and geological mapping over areas of anomalous copper and zinc stream sediment and lag sample geochemistry. A review of exploration prior to EL 1591 is also required.

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List Of Plans

Plan No.	Title	Scale
SAa 5075	Calico Dam EL 1953, S.A. Location Plan	1:250 000
SAa 6669	Calico Dam EL 1953, S.A. Stream Sediment & Lag Sample Anomaly Locations	1:100 000

1. Conclusions and Recommendations

The geology and structural setting within Calico Dam EL 1953 indicates potential for base and precious metal mineralisation in zones of high-strain and adjacent to major basement faults.

Stream sediment and high-iron lag sampling has outlined several areas of moderately anomalous zinc and copper geochemistry. Several of these anomalies are coincident with a major north west trending fault. Further potential exists for copper-gold mineralisation in faults and alteration zones peripheral to a syn-tectonic mid Proterozoic granitoid in the south of EL 1953.

Previous exploration by CRAE identified sub-economic uranium mineralisation. Several additional radiometric targets were attributed to background levels of uranium typical of granites in the area.

Further exploration in EL 1953 should include complete re-interpretation of airborne magnetics and radiometrics in the Calico Dam EL and surrounding areas. Infill stream sediment sampling, geological mapping and soil sampling are recommended over areas of anomalous stream sediment and lag sample geochemistry. A review of exploration prior to EL 1591 is also required.

2. Introduction

Exploration Licence (EL) 1953, Calico Dam, comprising 148 km^2, was granted to CRA Exploration Pty. Limited (CRAE) on 27th July, 1992 for a period of one year and replaces former CRAE EL 1591. The current licence has been renewed annually to 26th July 1997.

EL 1953 overlies Kalabity Homestead, approximately 38 kilometres north of Olary, South Australia, on the Curnamona SH 54-14 1:250 000 sheet (Plan SAa 5075). The tenement is accessed via dirt roads leading north from Olary.

CRAE applied for EL 1953 to evaluate the potential for base and precious metal mineralisation associated with concealed basement structures.

This report documents the exploration undertaken in the Exploration Licence during the second year of tenure to 26th July 1996.

3. Geology

EL 1953 overlies Early Proterozoic lithologies of the Willyama Super Group. Approximately 60% of the licence is concealed by shallow cover. Outcrop geology is dominated by migmatite, anatectic granitoids and quartzo-felspathic gneiss and lesser ?overlying schists, calc-silicates and quartzites. These have been intruded by middle Proterozoic granites in the south of the licence area. Schists, gneiss and calc-silicate mostly occur flanking uplifted migmatitic and gneissic rocks near the perimeter of the EL and along major north west trending fault/shear.

Uranium has been identified in the region associated with granites or the granite-metasediment contact. Radiometric anomalies (e.g. KR4 prospect) have provided previous targets for exploration in the Calico Dam EL.

Minor copper, cobalt, copper-gold and zinc mineralisation occurs in or near the Bimba Unit or iron formations at several prospects and workings in the surrounding tenement at Bimba, Mt Howden, Waukaloo, Dome Rock, Wiperaminga and Boolcamata. The proximity of Calico Dam EL to these deposits, highlights the prospectivity of the area. Potential also exists for copper-gold mineralisation within the alteration halo and major structures adjacent a mid-Proterozoic granitoid in the south of the licence.

4. Review of Previous Work

4.1 Prior to Current Tenement

Exploration prior to EL 1591 is not included in previous reports for the Calico Dam Exploration Licence. A review of prior exploration is recommended over the term of the next annual report.

EL 1591 (3/7/89 - 26/7/92)

EL 1591 "Calico Dam" was replaced by current EL 1953 on 27th July, 1994. Exploration included:

- An airborne magnetic and radiometric survey
- Production of standard 1:25 000 topographic maps
- Airborne magnetic interpretation (no targets selected)
- Interpretation of airborne radiometrics (4 anomalies identified, 3 selected for follow-up)
- 1:25 000 compilations of company and student geological mapping
- 1:25 000 compilation and interpretation of Carpentaria Exploration Pty Limited (CEC) rock chip sampling (anomalous zinc geochemistry apparent in the north west of the tenement area)
- Rock chip and float sampling (28 samples) over the radiometric targets
- Detailed ground scintillometer traversing and identification of davidite mineralisation at the KR4 prospect
- Metallurgical testing of davidite from the KR4 prospect
- 9 costeans (total 645 m) over the KR4 prospect with accompanying costean mapping, scintillometer traverses and channel/rock chip sampling (67 samples)
- Orientation stream sediment sampling for uranium (various fractions collected at 16 sample sites)
- Bulk sampling of davidite mineralised quartz veins for radiometric analysis
- Diamond gravel and -80# sampling (16 sample sites, no base or precious metal anomalies were identified and no diamond indicator minerals recovered)

Exploration in EL 1591 identified sub-economic uranium mineralisation at the KR4 prospect near the north eastern margin of the licence area. Follow up of other uranium targets suggested the anomalies were due to background uranium in granites. Fine fraction stream sediment sampling was too wide-spaced to assess the base and precious metal potential of the licence area.

4.2 During Current Tenement

Exploration in current EL 1953 is summarised below.

1st year of tenure (4/7/94 - 26/7/95)

- 1.3 CSAMT and ground magnetics traverse (no anomalies detected)
- Regional helicopter-supported, high-iron lag sampling (36 samples)
- Lag sampling along the regional CSAMT traverse (3 samples)
- Regional -80# stream sediment sample survey (60 samples)
- Soil sampling (28 samples)

Elevated copper and zinc geochemistry were returned from the regional lag sampling, including values up to 756 ppm Cu and 469 ppm Zn. Anomalous zinc and weak copper - 80# stream sediment geochemistry has also been identified, with up to 94 ppm Zn and 40 ppm Cu.

5. Exploration completed in the 12 months ending 11 July 1996

5.1 Regional Interpretation

A regional interpretation of airborne magnetic, gravity, structure, geology and mineralisation commenced during the reporting period. This program aims to identify future targets for more detailed exploration throughout the Willyama Inlier.

5.2 Landsat TM

Geocoded Landsat TM data was purchased over EL 1953. Interpretation of this data is required.

5.3 Airborne Magnetics and Radiometrics

Airborne magnetics and radiometrics was flown over Calico Dam as part of the 1989 Kalabity Survey and recently incorporated in the Broken Hill Exploration Initiative (BHEI) data. BHEI Airborne magnetic and radiometric data was recently purchased over areas surrounding the Kalabity Survey part of a regional evaluation of the Willyama Inlier. Re-interpretation and processing of CRAE and BHEI airborne data commenced during the reporting period to identify new exploration targets in the area.

Preliminary interpretation of the data has defined a major north west trending shear south of Kalabity Homestead and passing through the south east corner of the licence area. This structure also coincides with several areas of elevated zinc and weak copper -80# stream sediment and lag sample geochemistry (Plan SAa 6669). Movement on this structure is dominantly dextral strike-slip and offsets the basal granite-migmatite lithologies. The shear also transgresses a major north-northeast trending structural corridor which hosts the Bimba and Telechie prospects/workings, west of EL 1953 and also forms the northern margin of a middle Proterozoic ?syn or anorogenic granite. A previous interpretation by Sheard (1990), also indicates potential for remobilised mineralisation adjacent major structures.

Processing of radiometric data over EL 1953 is required.



T.C. Moody

6. References

Nelson, R.W.	1989	Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd October 1989 Olary, South Australia. CRAE Report 16093
Sheard, S.N.	1990	Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd January 1990 Olary, South Australia. CRAE Report 16352
Nelson, R.W.	1990	Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd April 1990 Olary, South Australia. CRAE Report 16475
Nelson, R.W.	1990	Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd July 1990 Olary, South Australia. CRAE Report 16622
Sheard, S.N.	1990	Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd October 1990 Olary, South Australia. CRAE Report 16833
Brewster, D.C.	1991	Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd January 1991 Olary, South Australia. CRAE Report 17067
Brewster, D.C.	1991	Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd April 1991 Olary, South Australia. CRAE Report 17227
Brewster, D.C.	1991	Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd July 1991 Olary, South Australia. CRAE Report 17371
Humphries, M.B..	1991	Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd October 1991 Olary, South Australia. CRAE Report 17596
Munroe, S.M.	1992	Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd April 1992 Olary, South Australia. CRAE Report 17847
Andrews, S..	1992	Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd January 1992 Olary, South Australia. CRAE Report 17850
Munroe, S.M.	1992	Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd July 1992 Olary, South Australia. CRAE Report 18143
Andrews, S..	1992	Exploration Licence 1591 (Calico Dam) Progress Report for the Quarter Ended 2nd October 1992 Olary, South Australia. CRAE Report 18321
Hughes, A.R.	1994	Calico Dam EL 1591, South Australia Annual report for the period ending 3rd July, 1994. CRAE Report No. 20158
Nelson, R. & Andrews, S.	1993	First Annual Report, Calico Dam EL 1591, for the period ending 3rd July, 1994. CRAE Report No. 20158

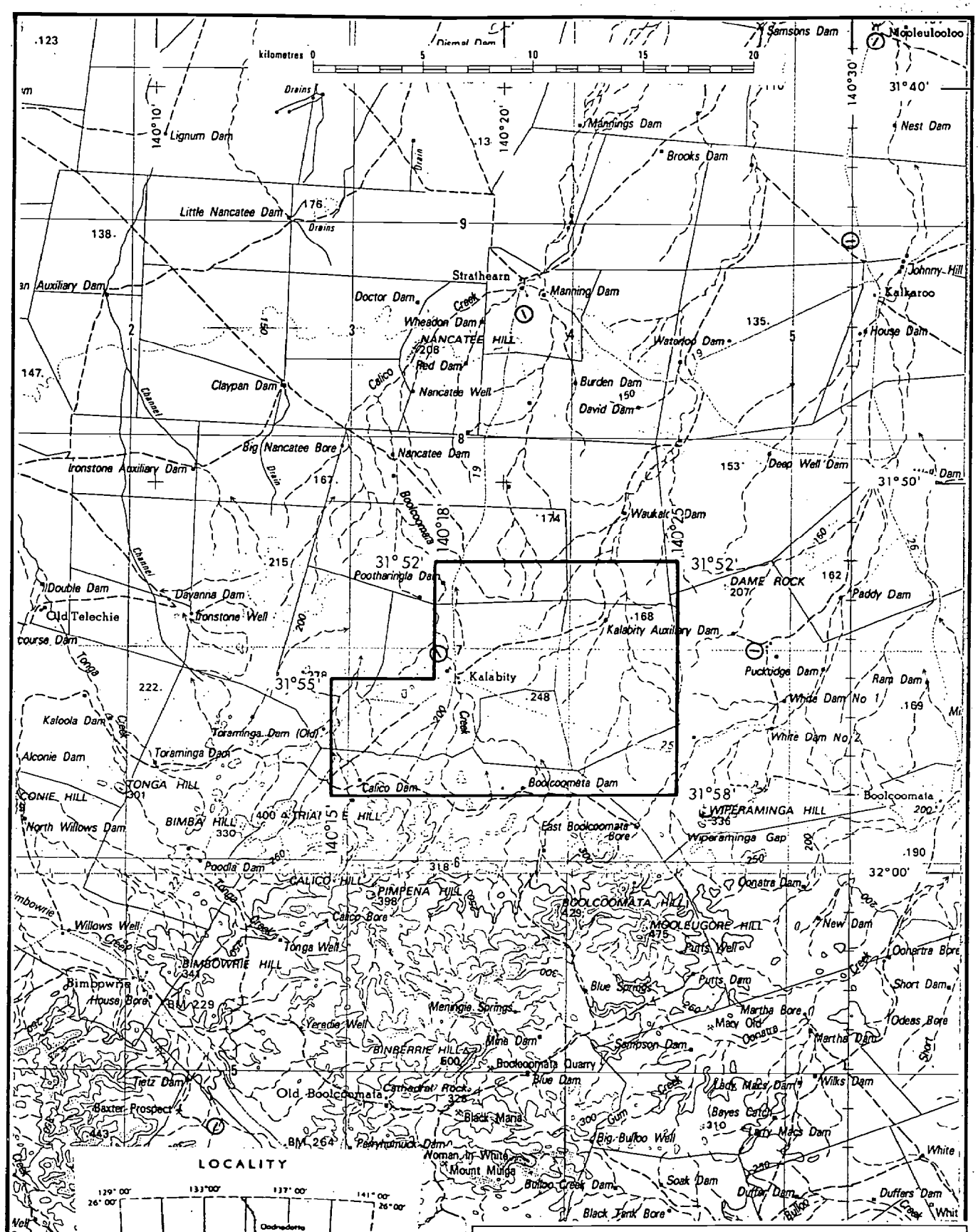
Stewart, W.A. 1995 Annual report for Calico Dam EL 1953, South Australia, for the period ending 3rd July, 1995. CRAE Report No. 21110

7. Location

Olary SI 54-02 1:250 000 sheet

8. Keywords

Copper, gold, base metals, Proterozoic, Willyama Inlier, stream sediment anomaly, lag sample anomaly



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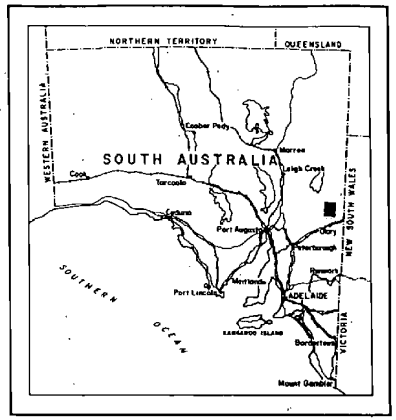
CALICO DAM E.L. 1953 - S.A.

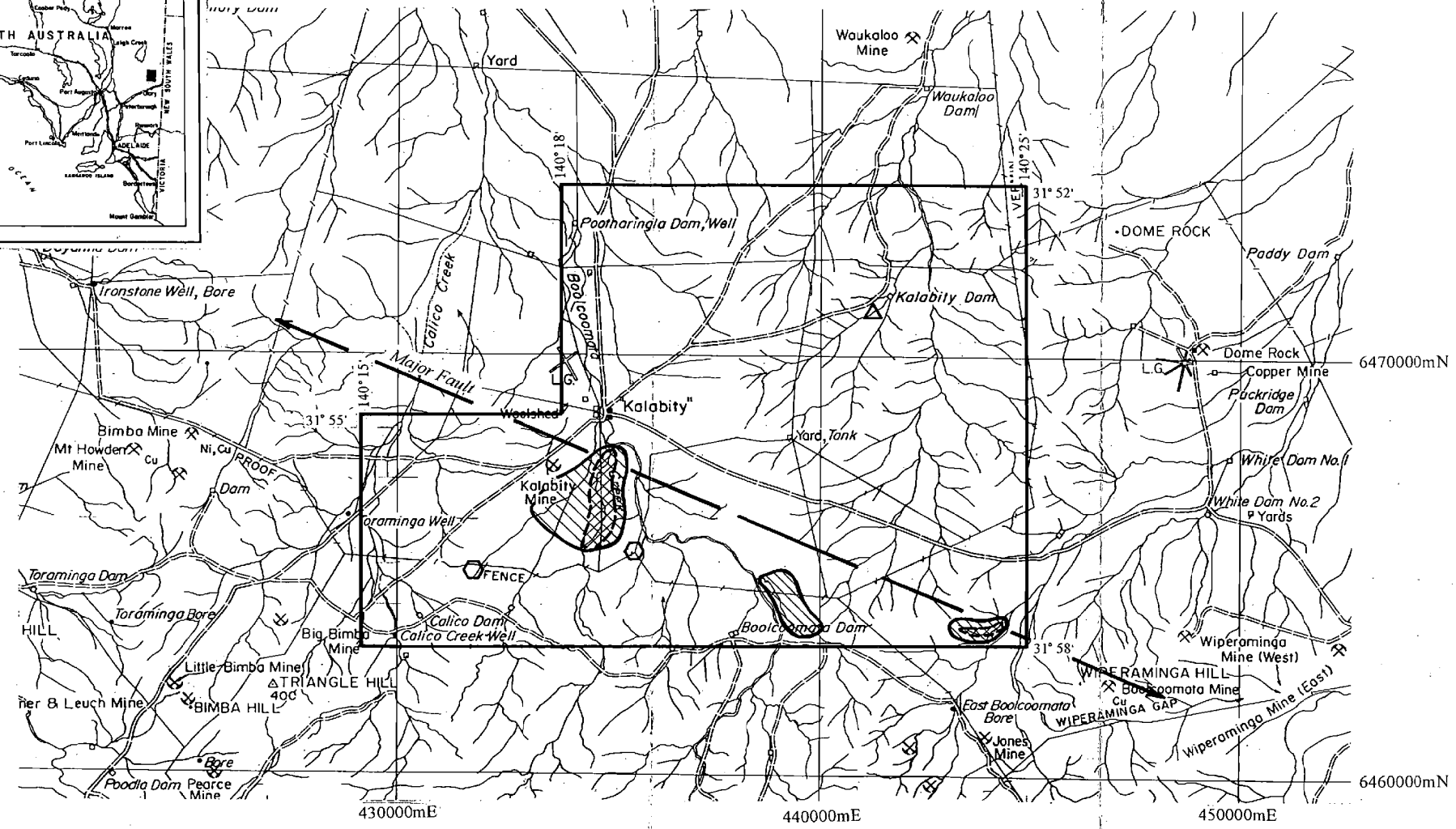
LOCATION PLAN

Area 148 Km²

REFERENCE	CURNAMONA SH 54-14		
SCALE	1 : 250000		
AUTHOR	T.C.M.	REPORT	22500
DATE	March '89	PLAN No	SAa 5075

LOCALITY PLAN





ANOMALY LOCATION

- △ Cu Lag Sample (>750ppm)
- ⬡ Zn Lag Sample (>450ppm)
- Cu -80#Stream Sediment Sample (>34ppm)
- Zn -80#Stream Sediment Sample (>90ppm)

SCALE 1:100 000

METRES 1000 0 1 2 3 4 5 6 7 8 9 10 KILOMETRES

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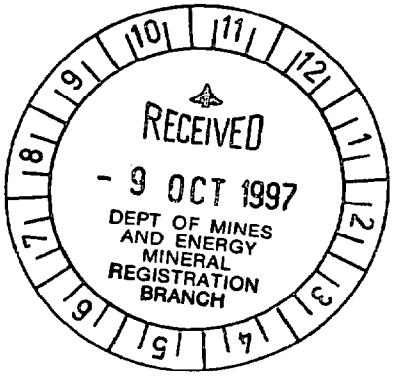
CALICO DAM EL 1953 - S.A.

Stream Sediment and Lag Sample Anomaly Locations

REF. :	Curnamona SH54-14		
SCALE :	1:100 000	DRAWN :	
AUTHOR :	T.C.M.	REPORT :	22500
DATE :	Nov..96	PLAN NO. :	SAa 6669

Mines & Energy SA
R97/00943
00150300

RIO TINTO



October 9, 1997

The Director General
Mines & Energy, South Australia
PO Box 151,
Eastwood. S.A. 5063.

Dear Sir,

Re: **EL 1953 Calico Dam, South Australia**

Enclosed please find Rio Tinto Exploration Report No. 23502 (in duplicate) entitled:

EL 1953 Calico Dam
Annual Report For The Period Ending 26 July 1997
Curnamona SH54-14
South Australia, Australia

written by R.G. Parkinson dated September 1997.

Yours faithfully,

Mrs Pru Quinn
Administration Officer

Enc.

Rio Tinto Exploration Pty. Limited (ACN 000 057 125) 31 Osmond Terrace Norwood SA 5067 Australia
Telephone +61 8 8362 8871 Facsimile +61 8 8363 1795
Postal Address: PO Box 254 Kent Town SA 5071 Australia

Rio Tinto Exploration Pty. Limited

A.C.N. 000 057 125

A member of the Rio Tinto Group

EL 1953 Calico Dam
Annual Report For The Period Ending 26 July 1997
Curnamona SH54-14
South Australia, Australia

Author: RG Parkinson

Date: September 1997

Submitted to: Chief Geologist - South East District

Copies to: Mines and Energy, South Australia (2)
Rio Tinto Exploration, GER - Melbourne
Rio Tinto Exploration, South East District - Adelaide

Submitted by: _____

Accepted by: _____

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Exploration Report No. 23502

Abstract

EL1953 "Calico Dam" comprising 148 km^2, was granted to Rio Tinto Exploration Pty. Limited (Rio Tinto Exploration) on July 27, 1994 replacing former EL1591. EL1953 overlies Kalabity Homestead, South Australia, approximately 38 kilometres north of Olary.

Rio Tinto Exploration applied for EL1953 to assess the potential for base and precious metal mineralisation. Previous exploration within EL1591 was for copper-gold and uranium.

Previous exploration by Rio Tinto Exploration within EL1953 and previously within EL1591, includes:-

- airborne magnetic and radiometric survey
- compilation of 1:25 000 base plans
- compilation of previous CEC rock chip sampling
- detailed follow up of radiometric anomaly KR4 with nine costeans, rock chip sampling, scintillometer traverses and a metallurgical bulk sample. This work identified sub-economic uranium mineralisation.
- regional diamond gravel sampling
- regional -80# stream sediment sampling
- regional lag sampling
- combined CSAMT, soil sample and ground magnetic traverse
- Regional interpretation of magnetics, radiometrics, geology and mineralisation
- Processing of Geocoded Landsat TM
- Purchase of Broken Hill Exploration Initiative digital airborne magnetic/radiometric data

"Calico Dam" EL1953 and prior licence EL1591 have been held by Rio Tinto Exploration since 1989. No field work has been undertaken within "Calico Dam" EL1953 for the past two tenement years. Current Rio Tinto Exploration strategy is to explore the upper parts of the Olary Domain stratigraphic sequence (i.e. Pelite Suite). As the Pelite Suite is not represented within "Calico Dam" there is no work plan in place for 1998.

It is recommended the licence be relinquished in full.

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2. Introduction 1
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4. Review of Previous Work 1
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   - 4.2 During Current Tenement 2
5. Exploration Completed in the 12 months ending July 26, 1997 2
6. References 3
7. Location 4
8. Keywords 4

List of Plans

Plan No.	Title	Scale
SAa 5075	Calico Dam EL 1953, S.A. Location Plan	1:250 000

1. Conclusions and Recommendations

"Calico Dam" EL1953 and prior licence EL1591 have been held by Rio Tinto Exploration since 1989. No field work has been undertaken within "Calico Dam" EL1953 for the past two tenement years. Current Rio Tinto Exploration strategy is to explore the upper parts of the Olary Domain stratigraphic sequence (i.e. Pelite Suite). As the Pelite Suite is not represented within "Calico Dam" there is no work plan in place for 1998.

It is recommended the licence be relinquished in full.

2. Introduction

Exploration Licence 1953 "Calico Dam", comprising 148 km^2, was granted to Rio Tinto Exploration Pty. Limited (Rio Tinto Exploration) on July 27, 1994 replacing former Rio Tinto Exploration EL1591.

EL1953 overlies Kalabity Homestead, approximately 38 kilometres north of Olary, South Australia (plan SAa 5075). The tenement is accessed via unsealed roads leading north from Olary.

Rio Tinto Exploration applied for EL1953 to evaluate the potential for base and precious metal mineralisation associated with concealed basement structures. This report documents the exploration undertaken on "Calico Dam" during the fourth year of tenure to July 26, 1996.

3. Geology

EL1953 overlies Early Proterozoic lithologies of the Willyama Super Group. Approximately 60% of the licence is concealed by shallow cover. Outcrop geology is dominated by migmatite, anatectic granitoids and quartzo-felspathic gneiss. These have been intruded by middle Proterozoic granites in the south of the licence area. Schists, gneiss and calc-silicate mostly occur flanking uplifted migmatitic and gneissic rocks near the perimeter of the EL and along major north west trending fault/shear.

Uranium has been identified in the region associated with granites or the granite-metasediment contact. Radiometric anomalies (e.g. KR4 prospect) have provided previous targets for exploration on "Calico Dam".

Minor copper, cobalt, copper-gold and zinc mineralisation occurs in or near the Bimba Suite or iron formations at several prospects and workings in surrounding tenements at Bimba, Mt Howden, Waukaloo, Dome Rock, Wiperaminga and Boolcamata, although no significant mineralisation is recorded within "Calico Dam".

4. Review of Previous Work

4.1 Prior to Current Tenement

Previous exploration is reviewed in Moody (1996).

4.2 During Current Tenement

Year 1 (27/7/94 - 26/7/95)

- 1.3 CSAMT and ground magnetics traverse (no anomalies detected)
- Regional helicopter-supported, high-iron lag sampling (36 samples)
- Lag sampling along the regional CSAMT traverse (3 samples)
- Regional -80# stream sediment sample survey (60 samples)
- Soil sampling (28 samples)

Elevated copper and zinc geochemistry were returned from the regional lag sampling, including values up to 756 ppm Cu and 469 ppm Zn. Anomalous zinc and weak copper - 80# stream sediment geochemistry has also been identified, with up to 94 ppm Zn and 40 ppm Cu.

Year 2 (27/7/95 - 26/7/96)

- A regional interpretation of airborne magnetic, gravity, structure, geology and mineralisation commenced.
- Geocoded Landsat TM data was purchased over EL1953.

5. Exploration Completed in the 12 months ending July 26, 1997

No field work has been undertaken within "Calico Dam" EL1953 during the past tenement year.

6. References

Nelson, R.W. 1989 Exploration Licence 1591 ("Calico Dam") Progress Report for the Quarter Ended 2nd October 1989 Olary, South Australia. CRAE Report 16093

Sheard, S.N. 1990 Exploration Licence 1591 ("Calico Dam") Progress Report for the Quarter Ended 2nd January 1990 Olary, South Australia. CRAE Report 16352

Nelson, R.W. 1990 Exploration Licence 1591 ("Calico Dam") Progress Report for the Quarter Ended 2nd April 1990 Olary, South Australia. CRAE Report 16475

Nelson, R.W. 1990 Exploration Licence 1591 ("Calico Dam") Progress Report for the Quarter Ended 2nd July 1990 Olary, South Australia. CRAE Report 16622

Sheard, S.N. 1990 Exploration Licence 1591 ("Calico Dam") Progress Report for the Quarter Ended 2nd October 1990 Olary, South Australia. CRAE Report 16833

Brewster, D.C. 1991 Exploration Licence 1591 ("Calico Dam") Progress Report for the Quarter Ended 2nd January 1991 Olary, South Australia. CRAE Report 17067

Brewster, D.C. 1991 Exploration Licence 1591 ("Calico Dam") Progress Report for the Quarter Ended 2nd April 1991 Olary, South Australia. CRAE Report 17227

Brewster, D.C. 1991 Exploration Licence 1591 ("Calico Dam") Progress Report for the Quarter Ended 2nd July 1991 Olary, South Australia. CRAE Report 17371

Humphries, M.B. 1991 Exploration Licence 1591 ("Calico Dam") Progress Report for the Quarter Ended 2nd October 1991 Olary, South Australia. CRAE Report 17596

Munroe, S.M. 1992 Exploration Licence 1591 ("Calico Dam") Progress Report for the Quarter Ended 2nd April 1992 Olary, South Australia. CRAE Report 17847

Andrews, S. 1992 Exploration Licence 1591 ("Calico Dam") Progress Report for the Quarter Ended 2nd January 1992 Olary, South Australia. CRAE Report 17850

Munroe, S.M. 1992 Exploration Licence 1591 ("Calico Dam") Progress Report for the Quarter Ended 2nd July 1992 Olary, South Australia. CRAE Report 18143

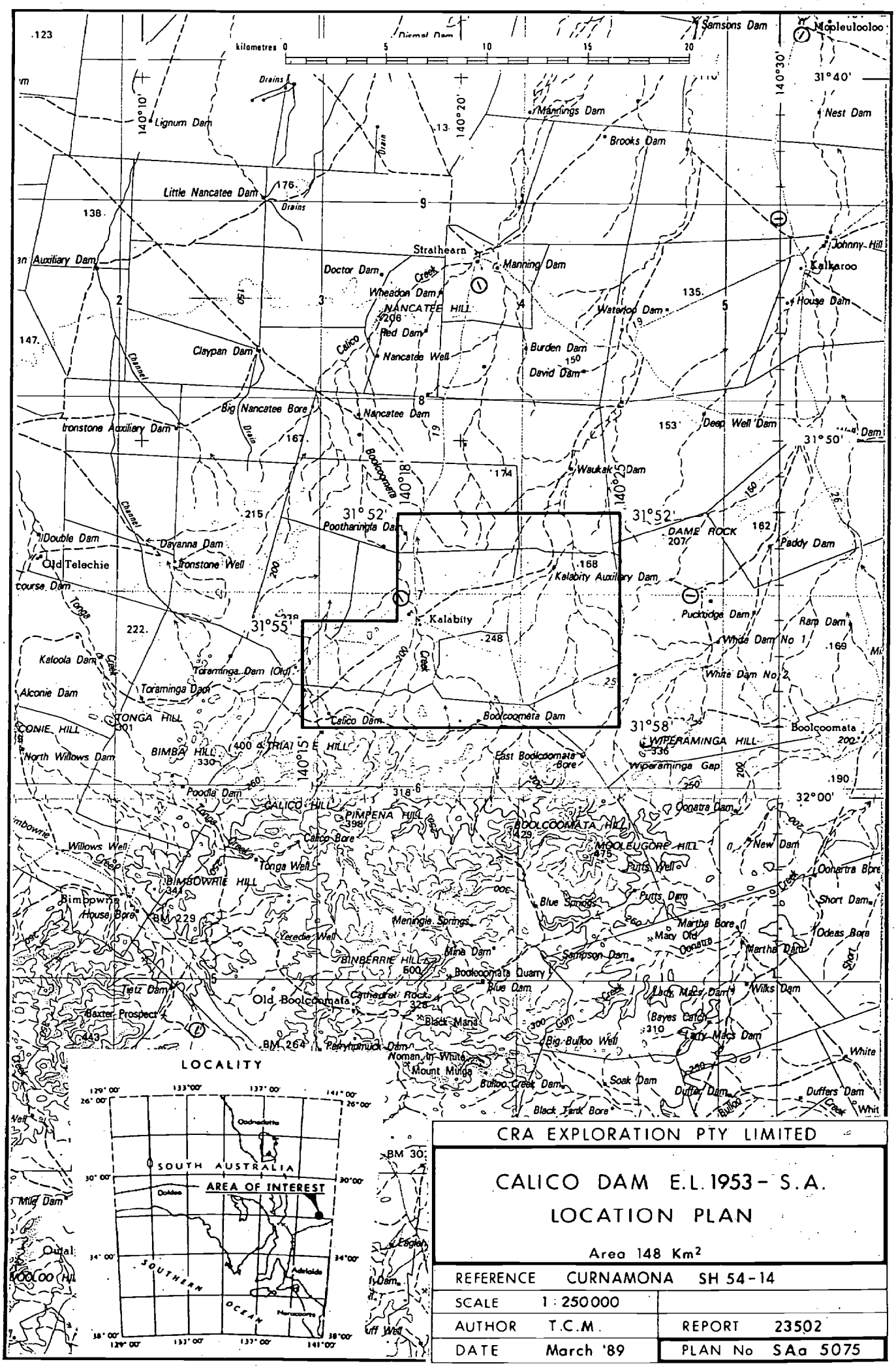
Andrews, S.	1992	Exploration Licence 1591 ("Calico Dam") Progress Report for the Quarter Ended 2nd October 1992 Olary, South Australia. CRAE Report 18321
Hughes, A.R.	1994	"Calico Dam" EL1591, South Australia Annual report for the period ending 3rd July, 1994. CRAE Report No. 20158
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Stewart, W.A.	1995	Annual report for "Calico Dam" EL1953, South Australia, for the period ending 3rd July, 1995. CRAE Report No. 21110
Moody, T.C.	1996	Annual report for the period ending 26 September, 1996. EL1953 "Calico Dam", South Australia. CRAE Report No. 22500

7. Location

Curnamona SH54-14 1:250 000 sheet

8. Keywords

Copper, gold, zinc, Proterozoic, Willyama Inlier



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CALICO DAM E.L. 1953 - S.A.

LOCATION PLAN

Area 148 Km²

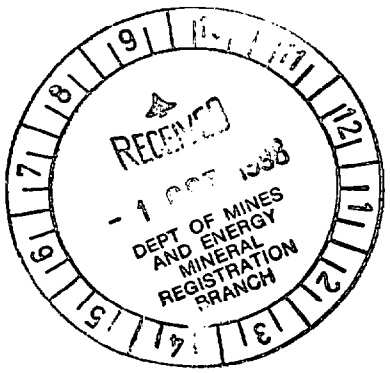
REFERENCE	CURNAMONA SH 54-14		
SCALE	1 : 250000		
AUTHOR	T.C.M.	REPORT	23502
DATE	March '89	PLAN No	SAa 5075

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EL 1953 – Calico Dam
Annual Report
for the Period Ending July 26 1998

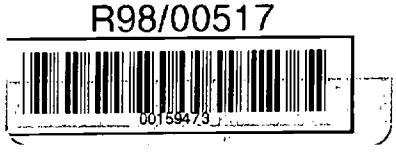
J. Madden
September 1998



Report No: 23942

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Mines & Energy SA
R98/00517



RIO TINTO EXPLORATION PTY. LIMITED

EL 1953 Calico Dam
Annual Report
for the Period Ending July 26 1998

J. Madden
September 1998

Distribution: Department of Mines and Energy, South Australia ✓
Rio Tinto Exploration Library, Brisbane
Rio Tinto Exploration Library, Perth

Date: September 1998

Report No.: 23942

Submitted By: J. Madden
Geologist

Accepted By: G.J. Drew
Chief Geologist
Eastern District

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ABSTRACT

EL 1953 "Calico Dam" comprising 148 km^2, was granted to Rio Tinto Exploration Pty. Limited (Rio Tinto Exploration) on July 27, 1994 replacing former EL1591. EL1953 overlies Kalabity Homestead, South Australia, approximately 38 kilometres north of Olary.

Rio Tinto Exploration applied for EL 1953 to assess the potential for base and precious metal mineralisation.

Previous exploration within EL 1591 was for copper-gold and uranium by Rio Tinto and includes:-

- airborne magnetic and radiometric survey.
- compilation of 1:25 000 base plans.
- compilation of previous CEC rock chip sampling.
- detailed follow up of radiometric anomaly KR4 with nine costeans, rock chip sampling, scintillometer traverses and a metallurgical bulk sample. This work identified sub-economic uranium mineralisation.
- regional diamond gravel sampling.
- regional -80# stream sediment sampling.
- regional lag sampling.
- combined CSAMT, soil sample and ground magnetic traverse.
- regional interpretation of magnetics, radiometrics, geology and mineralisation.
- processing of Geocoded Landsat TM.
- purchase of Broken Hill Exploration Initiative digital airborne magnetic/radiometric data.

"Calico Dam" EL 1953 and prior licence EL 1591 have been held by Rio Tinto Exploration since 1989. No field work has been undertaken within "Calico Dam" EL 1953 during the reporting period.

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3. Review of Previous Work 1

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   3.2 During Current Tenement 1

4. Exploration Completed in the 12 months ending July 26, 1998 2

5. References 2

6. Location 2

7. Keywords 2

LIST OF PLANS

Plan No.	Title	Scale
SAa 5075	EL 1953 - Calico Dam, S.A. Location Plan	1:250 000

1. CONCLUSIONS AND RECOMMENDATIONS

"Calico Dam" EL 1953 and prior licence EL 1591 have been held by Rio Tinto Exploration since 1989.

No field work has been undertaken within "Calico Dam" EL 1953 during the reporting period.

2. INTRODUCTION

Exploration Licence 1953 "Calico Dam", comprising 148 km^2, was granted to Rio Tinto Exploration Pty. Limited (Rio Tinto Exploration) on July 27, 1994 replacing former Rio Tinto Exploration EL 1591.

EL 1953 overlies Kalabity Homestead, approximately 38 kilometres north of Olary, South Australia (plan SAa 5075). The tenement is accessed via unsealed roads leading north from Olary.

Rio Tinto Exploration applied for EL 1953 to evaluate the potential for base and precious metal mineralisation associated with concealed basement structures. This report documents the exploration undertaken on "Calico Dam" during the fourth year of tenure to July 26, 1998.

3. REVIEW OF PREVIOUS WORK

3.1 Prior to Current Tenement

Previous exploration is reviewed in Moody (1996).

3.2 During Current Tenement

Year 1 (27/7/94 - 26/7/95)

- 1.3 CSAMT and ground magnetics traverse (no anomalies detected)
- Regional helicopter-supported, high-iron lag sampling (36 samples)
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Elevated copper and zinc geochemistry were returned from the regional lag sampling, including values up to 756 ppm Cu and 469 ppm Zn. Anomalous zinc and weak copper - 80# stream sediment geochemistry has also been identified, with up to 94 ppm Zn and 40 ppm Cu.

Year 2 (27/7/95 - 26/7/96)

- A regional interpretation of airborne magnetic, gravity, structure, geology and mineralisation commenced.

- Geocoded Landsat TM data was purchased over EL 1953.

Year 3 (27/7/96 - 26/7/97)

- No field work was undertaken within "Calico Dam" EL 1953 during the year.

4. EXPLORATION COMPLETED IN THE 12 MONTHS ENDING JULY 26, 1998

- No field work was undertaken within "Calico Dam" EL 1953 during year.

5. REFERENCES

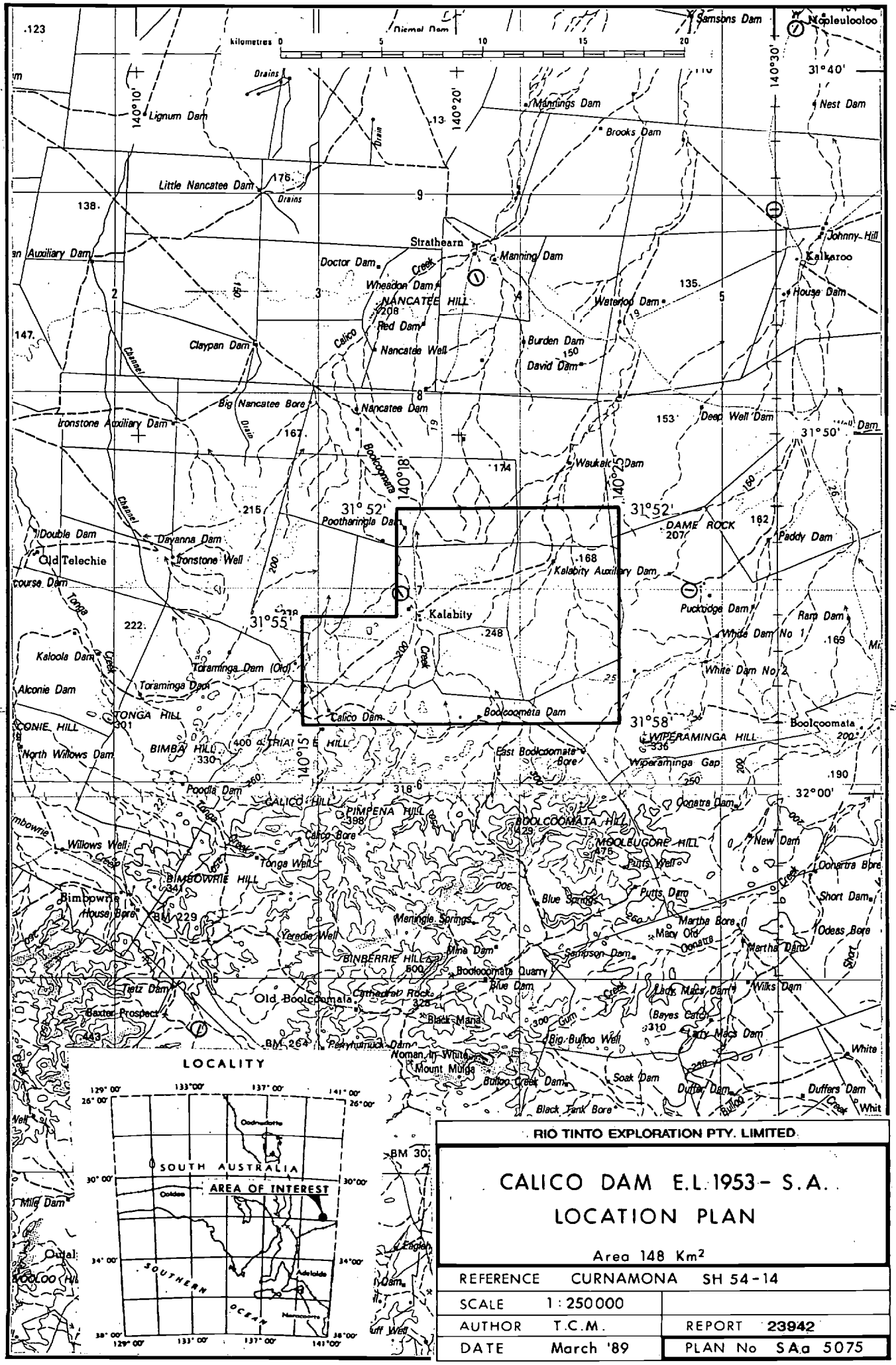
Moody, T.C.	1996	Annual Report for the Period Ending 26 September 1996. EL 1953 – Calico Dam South Australia CRAE Report No. 22500
Parkinson, R.G.	1997	Annaul Report for the Period Ending 26 September 1997. EL 1953 – Calico Dam South Australia CRAE Report No. 23502

6. LOCATION

Curnamona SH54-14 1:250 000 sheet

7. KEYWORDS

Copper, gold, zinc, Proterozoic, Willyama Inlier



RIO TINTO EXPLORATION PTY. LIMITED

CALICO DAM E.L. 1953 - S.A.

LOCATION PLAN

Area 148 Km²

REFERENCE	CURNAMONA SH 54-14		
SCALE	1 : 250000		
AUTHOR	T.C.M.	REPORT	23942
DATE	March '89	PLAN No	SA.a 5075

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EL 1953 Calico Dam, South Australia
Fifth Annual and Final Report
for the Period Ending 23rd June 1999

DC Palmer
September, 1999

Report No. 24183

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EL 1953 Calico Dam, South Australia
Fifth Annual and Final Report
for the Period Ending 23rd June 1999

DC Palmer
September, 1999

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Date: September, 1999

Tenure Holder: Rio Tinto Exploration Pty Limited

Mapsheet: Curnamona SH54-14

Scale: 1:250,000

Report No.: 24183

Submitted By: Dave Palmer
Senior Geologist

Accepted By: G. J. Drew
Exploration Manager
Eastern District

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Abstract

EL 1953 Calico Dam encompassing 148 km^2, was granted to Rio Tinto Exploration Pty. Limited on July 27, 1994. EL 1953 Calico Dam replaced EL 1591, which CRAE held for the previous five years.

EL 1953 Calico Dam is located approximately 38 kilometres north of Olary, in northeastern South Australia and was procured to cover Willyama Supergroup sequences considered prospective for basemetal and gold mineralisation.

Interpretation of regional geophysical data suggests that the tenement area mostly encompasses the Quartzo-feldspathic Suite to Composite Gneiss stratigraphic sequences. A small outlier of Bimba Formation and Pelite Suite stratigraphy occurs in the far-western portion of the EL.

Historical work programmes conducted within the tenement area have failed to identify any significant basemetal, uranium or precious metal mineralisation.

Interpretation of regional geophysical data has failed to highlight any additional target areas.

No fieldwork was undertaken within EL 1953 during the final period of tenure.

EL 1953 Calico Dam was relinquished on 23 June 1999.

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List of Plans

Plan No.	Plan Title	Plan Scale
SAa 5075	EL 1953 - Calico Dam, S.A. Location Plan	1:250,000
SAb 1354	EL 1953 Calico Dam Geophysical Interpretation	1:50,000

List of Tables

Table 1	Expenditure for EL 1953 Calico Dam for the period 1st August 1998 – 30th June 1999.

1. Conclusions and Recommendations

No fieldwork has been undertaken within EL 1953 Calico Dam during the reporting period.

Work programmes conducted previously within the tenement area have failed to identify any significant basemetal, uranium or precious metal mineralisation.

Interpretation of regional geophysical data failed to highlight any additional target areas.

It was recommended that EL 1953 Calico Dam is relinquished.

2. Introduction

EL 1953 Calico Dam encompassing 148 km^2, was granted to Rio Tinto Exploration Pty. Limited on July 27, 1994. EL 1953 Calico Dam replaced EL 1591, which CRAE held for the previous five years.

EL 1953 Calico Dam is located approximately 38 kilometres north of Olary in northeastern South Australia and was procured to cover Willyama Supergroup sequences considered prospective for basemetal and gold mineralisation.

This fifth annual and final report documents exploration undertaken within EL 1953 Calico Dam during the period of tenure 27th July 1994 to 23rd June 1999.

3. Geology

The following synopsis of the regional geology and mineralisation is modified from Parkinson (1997b).

EL 1953 Calico Dam is situated in the southern portion of the Paleoproterozoic-to-Mesoproterozoic Curnamona Province and encompasses Willyama Supergroup meta-sedimentary and meta-igneous rocks within the Olary Domain of the Curnamona Craton.

The Olary Domain rock sequence is correlated with the adjacent Broken Hill Domain, together the two Domains forming the Willyama Inlier (e.g. Laing, 1996; Clarke et al., 1986; Willis et al., 1983).

The Willyama Supergroup is interpreted to have been deposited within an ~1780-1680 Ma intracratonic rift and rift-platform basin. Geochronology of rock type emplacement, intrusive events, metamorphism and deformation are discussed in Clarke et al. (1986) and a further summary of the Olary Domain geology is provided by Plimer (1996).

3.1 Stratigraphy

Metamorphic lithologies in the Olary Block have been divided into five major rock suites (Clarke et al., 1986). These include:

Composite Gneiss Suite - basal unit consisting mostly of coarse-grained

and migmatitic gneiss grading to massive leucocratic granitoids with large areas of anatexis.

Quartzofeldspathic Suite ("QFS")- This forms a significant component of the exposed Olary Block and is considered equivalent to the Thackaringa Group in the Broken Hill Block. The lower portions of the suite include massive-layered albite-quartz rocks ("Lower Albite"), interpreted as felsic volcanics or volcaniclastic sediments and co-magmatic A-type granitic intrusives. The middle portion of the suite includes mostly psammopelitic and pelitic schist ("Middle Schist") and composite gneiss. Uppermost are finely laminated often magnetic albite-quartz rocks termed the "Upper Albite Suite". This unit is interpreted to occur in the south-western portion of the EL.

EL 1953 Calico Dam primarily encompasses rock types of the *Quartzofeldspathic Suite* and *Composite Gneiss Suite*.

Calc-silicate Suite - Possibly equivalent to the Ettlewood Calc-silicate Member of the Broken Hill Domain and laterally and vertically gradational from the upper portions of the Quartzofeldspathic Suite. Rock types in this suite are characterised by quartzofelspathic rocks with abundant calc-silicate minerals grading to well laminated calc-silicate rocks and strongly hydrothermal altered/albite-actinolite-diopside altered breccias with locally important sulphide mineralisation.

Bimba Suite - This suite forms an extensive marker horizon consisting of psammopelitic and pelitic schist grading to calc-silicate rocks, carbonate-rich rocks, quartz-albite rocks and local iron formations. Rock types in the Bimba Suite are typically laminated and strongly sulphidic with sulphide veins and occasional massive sulphide that are commonly represented by gossan at surface. The Bimba Suite typically overlies a prominent magnetic marker horizon at the top of the Calc-silicate Suite/"Upper Albite" and is interpreted to occur within an tight synform in the far-western portion of the EL.

Pelite Suite - The upper-most suite in the Olary Block, the Pelite Suite is characterised by pelitic-psammopelitic and psammitic sediments in the far-western portion of the EL.

The sharp contact between the Pelite Suite and underlying Bimba Suite may represent a regional unconformity (e.g. Plimer, 1996; Ashley et al., 1995). The basal parts of the Pelite Suite are commonly strongly graphitic, and contain distinctive chiastolites ± pyrrhotite. In addition, in the basal layers, manganese enriched zones, garnetiferous beds (grading to garnet sandstone) and tourmaline rich rocks are recorded.

A recent tectono-stratigraphic synthesis by Laing (1996) has introduced several new stratigraphic subdivisions and an alternative stratigraphic nomenclature. This interpretation subdivides the Olary Block in to several structural domains, each with contrasting stratigraphic assemblages, which are broadly correlatable. This suggests many of the domain-boundary faults were also important features of the early basin architecture, potentially important for controlling mineralisation and hydrothermal alteration.

3.2 Granites

At least three granite suites are recognised in the Olary Block.

The oldest granitoid suite occurs within the lower part of the Quartzofelspathic Suite. These have A-type affinity and are probably co-magmatic with interpreted felsic volcanics of the "Lower Albite". Dating zircons has returned ages of 1703±6 Ma, 1701±8 Ma and 1717±14 Ma (Cook et al., 1994).

A volumetrically minor I-type granite suite returned zircon ages of 1629±12 Ma and 1641±11 Ma (Cook et al., 1994). This suite is potentially genetically associated with Cu-Au mineralisation in the contact aureoles to these granites.

A third suite is generally referred to as regional S-type granitoids. These are typically leucocratic massive to foliated S-type or highly fractionated I-type 2-mica granitoids. These are common in the Olary Block and have returned zircon dates of ~1590 Ma. Pegmatites associated with these granites are locally associated with minor economic concentrations of uranium, beryl, feldspars, muscovite and columbite-tantalite (Plimer, 1996) and possibly associated with Cu-Au mineralisation in the northern and northeast portions of the Olary Block.

S-type sodic granites locally associated with U-Th mineralisation occur in the northwest portion of the Olary Block with ages of ~1580 Ma (Cook et al., 1994). More mafic granitoids also occur in the north west of the Olary Block (Plimer, 1996).

Delamerian granitoids possibly intrude the Olary Block but are unconfirmed.

3.3 Structure & Metamorphism

The area is characterised by intense multiple deformation and metamorphism which has significantly disturbed primary stratigraphy. Maximum metamorphic grade in the tenement area is upper greenschist to amphibolite facies.

Two major periods of deformation have been recognised in the Olary Block associated with the Paleoproterozoic Olarian Orogeny and Cambro-Ordovician Delamerian Orogeny (e.g. Clarke et al., 1986; Flint & Parker, 1994).

OD1, OD2 and OD3 are associated with the Olarian Orogeny at ~1590 ± 20 Ma (Plimer, 1996). These probably represent a progressive deformation style characterised by nappe development, refolding and prograde metamorphism during OD1 & OD2 and further refolding and extensive retrograde shearing and metamorphism during OD3. However, a possible younger age of 1500 ± 20 Ma for OD3 is referred to in Plimer (1996). Peak metamorphism in the Broken Hill Block has been dated at 1670-1600 Ma and coeval with the I-type granite suite (Flint & Parker, 1994). However, most of the foliated granite gneiss, migmatite, pegmatite and regional granitoids in the Olary Block are probably closely related to OD1 and OD2 (op cit.).

Two phases of deformation and fold development are associated with the Delamerian Orogeny (DD1 and DD2) with dates ranging from 450-550 Ma.Significant metal migration probably occurred during development of the rift-basin, burial and diagenesis and subsequently during the Olarian Orogeny. However, locally significant remobilisation of ore metals and development of structurally controlled base and precious metal mineralisation also occurred during Delamerian deformation.

3.4 Mineralisation

Mineralisation in the Olary Block is discussed in Cook & Ashley (1992) and Ashley et al. (1994). Numerous small copper and copper-gold, minor zinc-lead-silver and uranium workings/prospects throughout the Olary Block

Extensive epigenetic/fracture controlled chalcopyrite with minor gold mineralisation has been identified in brecciated magnetite-albite rocks in the upper part of the Quartzofeldspathic Suite at Waukaloo and in the Portia area.

The upper parts of the Calc-silicate Suite are associated with regionally anomalous low-grade zinc mineralisation over stratigraphic intervals up to 100 m thick (Flint & Parker, 1994). This suite typically exhibits regional-scale alteration including widespread albitisation, iron/calc-silicate alteration ± magnetite.

The Bimba Suite has been the focus of previous exploration activity. This unit is characterised by regional/strike extensive elevated base geochemistry and gossans. The Bimba Unit hosts the Cu-Co mineralisation at Mt. Howden within adjacent EL 1864 Kalabity and Cu-Zn-Ba (Pb-Ag) mineralisation at the "Old Boolcamata-Blue Dam area. Copper and minor zinc mineralisation at the Telechie and Telechie South prospects in adjacent EL 1864 are also interpreted to occur at the Bimba stratigraphic position.

Exploration has identified elevated base metal geochemistry in the Pelite Suite at a number of localities. At Hunter's Dam prospect, drilling has encountered stratabound zinc-lead mineralisation (106.9m @ 0.57% Zn, 0.12% Pb) within psammopelitic and pelitic sediments of the Pelite Suite and Bimba Unit

A variety of unusual quartz-magnetite-garnet-apatite banded iron formations and Mn-rich garnet-quartz rocks of probable hydrothermal origin have also been identified in the lower parts of the Pelite Suite (Lottermoser et al., 1994).

Ba and K anomalous horizons are also noted associated with variably magnetic horizons within the Quartzofeldspathic Suite and Pelite Suite.

Due to subdued/poor exposure, the Pelite Suite has received minor exploration focus. This suite is regarded as highly prospective for stratabound/sediment-hosted base metal mineralisation, akin to the Mt. Isa and Century Zn (Ag-Pb) deposits in the Mt. Isa Inlier.

Other mineralisation styles recognised within the Olary Block include;

- Copper-gold mineralisation associated with iron formations similar to deposits in the Mt. Isa Inlier (e.g. Starra) or in structurally-focused iron-rich alteration systems in the contact aureole around certain granites. Large disseminated/stratabound copper and/or gold deposits are also possible.

- supergene (enriched) copper-gold mineralisation in areas of deep weathering over large areas of low-grade sulphide copper-gold

mineralised basement (Portia-style)

- U, Th and REE mineralisation in veins, breccias and stockworks associated with granite and pegmatite (Plimer, 1996).

- Uranium mineralisation associated with a redox interface with Eocene Eyre Formation fluviatile sands at Honeymoon, East Kalkaroo and Yarramba prospects.

4. Review of Previous Work

4.1 Prior to Current Tenement

Previous exploration undertaken within EL 1591 is reviewed in Moody (1996).

4.2 During Current Tenement

Tenure Year One (27/7/94 - 26/7/95)

- 1.3 km CSAMT and ground magnetics traverse (no anomalies detected)
- Regional helicopter-supported, high-iron lag sampling (36 samples)
- Lag sampling along the regional CSAMT traverse (3 samples)
- Regional -80# stream sediment sample survey (60 samples)
- Soil sampling (28 samples)

Elevated copper and zinc geochemistry were returned from the regional lag sampling, including values up to 756 ppm Cu and 469 ppm Zn. Anomalous zinc and weak copper -80# stream sediment geochemistry has also been identified, with up to 94ppm Zn and 40ppm Cu (Stewart, 1995).

Year 2 (27/7/95 - 26/7/96)

- A regional interpretation of airborne magnetic, gravity, structure, geology and mineralisation commenced.
- Geocoded Landsat TM data was purchased over EL 1953.

Work programmes are documented in Moody (1996).

Year 3 (27/7/96 - 26/7/97)

- No field work was undertaken within EL 1953 Calico Dam during the year (Parkinson, 1997a).

Year 4 (27/7/97 - 26/7/98)

- No field work was undertaken within "Calico Dam" EL 1953 during the year (Madden, 1998).

5. Exploration Completed During the Period *27/7/98 - 23/6/99*

No field work was undertaken within EL 1953 Calico Dam during the period 27/7/97 - 23/6/99. Work undertaken comprised interpretation of regional geophysical data sets as outlined below.

5.1 Geophysical Interpretation

A basement geology interpretation from available geophysical data sets was completed and is shown on Plan SAb 1354.

Proterozoic basement interpretation is based on the generalisation that the Quartzo-Feldspathic Suite (QFS) stratigraphy is magnetic, the Pelite Suite is relatively non-magnetic, and the Bimba possesses a mixed magnetic response. The Pelite Suite is further characterised by gravity and EM. The Lower Pelite Suite has a low gravity and moderate EM response. The Middle Pelite is defined by a high gravity response. A graphite marker horizon within this unit is denoted by a low density / strong EM response. Weak magnetic anomalies within the Pelite Suite are interpreted to be sourced from pyrrhotite or possible minor BIF bands. Later granite intrusives are readily identified by strong gravity lows.

EL 1953 Calico Dam is interpreted to largely encompass complexly folded Albite Suite meta-sedimentary and meta-volcanic sequnces.

A small inlier of tightly folded Bimba Suite and Pelite Suite stratigraphy occurs in the far-western portion of EL 1953.

The metamorphic sequences are transected by a pervasive network of NW, NNE and NE oriented faults that often bound zones of diminished magnetic character (?alteration) within the Albite Suite sequence.

6. Rehabilitation

No surface disturbing exploration was undertaken within EL 1953 Calico Dam during the tenure period and no rehabilitation was required.

7. References

Ashley, P.M., Cook, N.D.J. & Plimer, I.R.	1994	Diversity of metallogenesis in the Willyama Supergroup, Olary Block, South Australia. *In* Australian research on ore genesis symposium. Australian Mineral Foundation, Adelaide, p18.1-18.5.
Ashley, P.M., Cook, N.D.J., Lawie, D.C., Lottermoser, B.G. & Plimer, I.R.	1995	Olary Block Geology and Field Guide to 1995 Excursion Stops. South Australian Department of Mines & Energy, Report 95/13.
Clarke, G.L., Burg, J.P. & Wilson, C.J.L.	1986	Stratigraphic and structural constraints on the Proterozoic tectonic history of the Olary Block, South Australia. *Precambrian Research*, 34, 107-137.
Cook, N.D.J. & Ashley, P.M.	1992	Meta-evaporite sequences, exhalative chemical sediments and associated rocks in the Proterozoic Willyama Supergroup, South Australia: implications for metallogenesis. *Precambrian Research* 56, p211-226.

Cook, N.D.J., Fanning, C.M. & Ashley, P.M.	1994	New geochronological results from the Willyama Supergroup, Olary Block, South Australia. *In* Australian research on ore genesis symposium. Australian Mineral Foundation, Adelaide, 19.1-19.5.
Flint, D.J. & Parker, A.J.	1994	Willyama Inliers. *In* Drexel, J.F., Preiss, W.V. and Parker, A.J. (Eds): *The geology of South Australia, volume 1: The Precambrian. Geological Survey of South Australia Bulletin* 54,. p82-93.
Laing, W.	1996	Stratigraphic subdivision of the Willyama Supergroup - Olary domain, South Australia. *Mesa Journal 2*, p39-48
Lottermoser, B.G., Ashley, P.M. & Plimer, I.R.	1994	Iron formations, barite rocks, and copper-gold mineralisation within the Willyama Supergroup, Olary Block, South Australia. *In* Australian research on ore genesis symposium. Australian Mineral Foundation, Adelaide, p20.1-20.5.
Madden, J	1998	EL 1953 – Calico Dam South Australia Annual Report for the Period Ending 26 July 1998 CRAE Report No. 23942
Moody, T.C.	1996	EL 1953 – Calico Dam South Australia Annual Report for the Period Ending 26 September 1996 CRAE Report No. 22500
Parkinson, R.G.	1997a	EL 1953 – Calico Dam South Australia Annual Report for the Period Ending 26 July 1997 CRAE Report No. 23502
Parkinson, R.G	1997b	Annual Report for the Period Ending 15th March, 1997 for Exploration Licence 1763 Yarramba, South Australia Rio Tinto Report No. 23226

Plimer, I.R.	1996	The Olary Block, South Australia - an insight into mineralisation in the adjacent Broken Hill Block. *In* Pongratz, J. & Davidson, G. (Eds), *New Developments in Broken Hill Deposits. University of Tasmania, CODES Special Publication 1*, p89-93.
Stewart, W.A	1995	EL 1953 – Calico Dam South Australia Annual Report for the Period Ending 26 July 1995 CRAE Report No. 21110
Willis, I.L. et al.	1983	The Early Proterozoic Willyama Supergroup stratigraphic subdivision and interpretation of high to low-grade metamorphic rocks in the Broken Hill Block, New South Wales. J. Geol. Soc. Aust., 30, 195-224.

8. Location

Curnamona	SH5415	1:250,000
Kalabity	6934	1;100,000

9. Keywords

Basemetals, Bimba Formation, Copper, Curnamona Province, Geophysical Interpretation, Olary Domain, Pelite Suite, Proterozoic, Uranium, Willyama Inlier, Zinc.

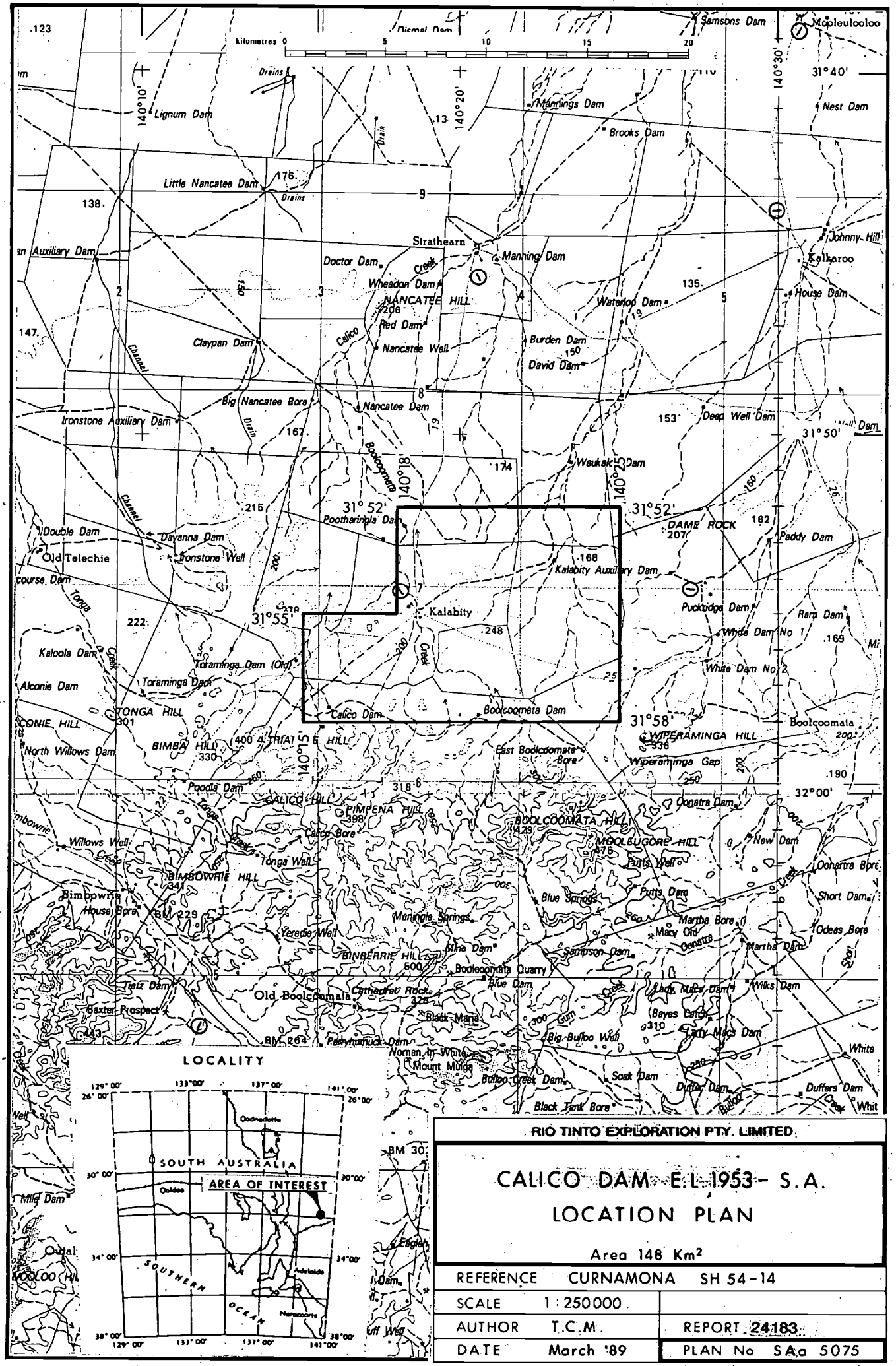
10. DPO Register

Nil	

11. Expenditure Statement

Table 1
Expenditure for EL 1953 Calico Dam for the period 1st August 1998 to 30th June 1999 - 23/6/99.

Drilling	0
Contract Exploration	262.62
Laboratory Analysis	0
Rent and Property	2,125.52
Payroll & Benefits	5,024.82
Field & Transport	1,967.47
Travel & Accommodation	208.36
Computer Services	677.10
Professional	155.91
Office Miscellaneous	696.56
District Indirects	0
Regional Indirects	3,235.15
Total	**$14,353.51**



RIO TINTO EXPLORATION PTY. LIMITED

CALICO DAM E.L. 1953 - S.A.

LOCATION PLAN

Area 148 Km²

REFERENCE	CURNAMONA SH 54-14		
SCALE	1 : 250000		
AUTHOR	T.C.M.	REPORT	24183
DATE	March '89	PLAN No	SA a 5075

6475000 mN

140°15'

140°20'

140°25'

-31°55'

EL boundary

6470000 mN

6465000 mN

430000 mE

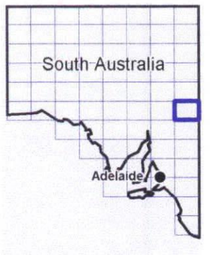
435000 mE

440000 mE

445000 mE

Legend

- Pelite Suite
  - low density package
  - high density package
- Bimba Suite
- Albite Suite
- Albite Suite - Middle Schist
- Negative magnetic character - alteration
- Fault / Break
- Trend (bedding)



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Pasmore 6835	Benagerie 6935	Lake Charles 7035
Curnamona 6834	Kalabity 6934	Mulyungarie 7034

Curnamona SH54-14

100,000 & **250,000** map sheets

N

1000 0 1000 2000 3000

Meters

Scale: 1:50,000

Projection: UTM, AMG Zone 54, Datum: AGD66

RIO TINTO EXPLORATION PTY LIMITED

Curnamona Project

Calico Dam EL 1953

Geophysical Interpretation

Author: D.Palmer	Ref: Curnamona, SH54-14
Drawn: Sun Drafting	File Name: SAb1354.wor
Date: 22-9-99	Report No.: 24183
Scale: 1:50 000	Plan No.: SAb1354