Open File Envelope No. 3462

EL 437

LAKE COONTAYUNTA

PROGRESS AND FINAL REPORTS TO LICENCE SURRENDER FOR THE PERIOD 4/1/1979 TO 18/12/1979

Submitted by
CRA Exploration Pty Ltd
1979

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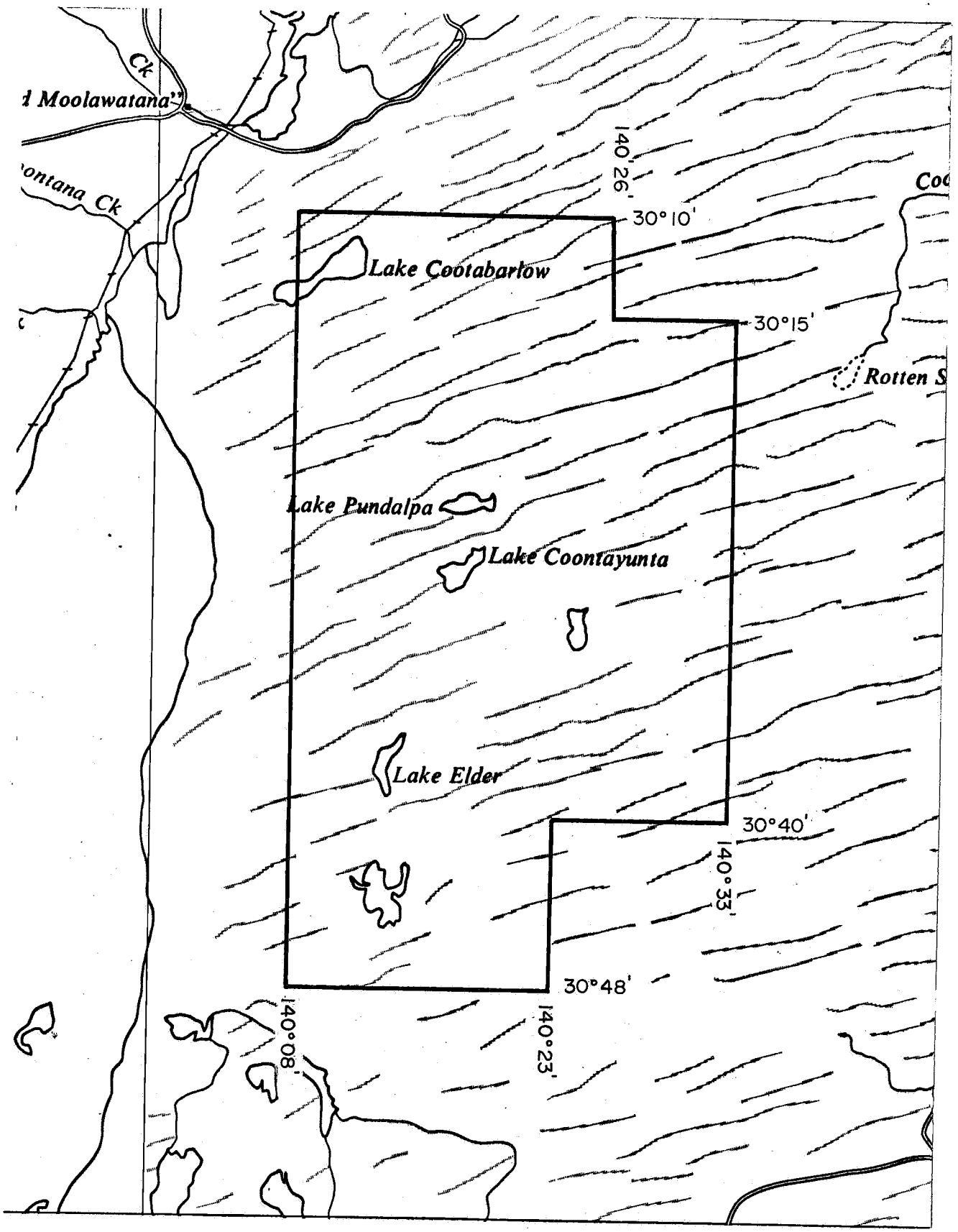
Government of South Australia
Primary Industries and Resources SA

SCHEDULE A



SCALE 1:500,000

KILOMETRES 10 0 10 20 30 40 50 KILOMETRES

SURRENDERED

APPLICANT: C.R.A. EXPLORATION PTY. LIMITED

DM: 414/78

AREA: 2469 square kilometres

1:250 000 PLANS: FROME

LOCALITY: LAKE COONTAYUNTA AREA - IMMEDIATELY EAST OF LAKE FROME

DATE GRANTED: 4.1.79 DATE EXPIRED: 3.1.80 EL No: 437

CONTENTS ENVELOPE 3462 E.L. NO. 437

TENEMENT: Exploration Licence 437

TENEMENT HOLDER: CRA Exploration Pty. Limited

Report of work done early 1980 during E.L. Applicat- DM 743/79
Applicat subsequently withdrawn

003

OIL SHALE POTENTIAL OF COOTABARLO AND CALLABONNA E.L. APPLICATIONS

INTRODUCTION

USE ENVELOPE
EL 437 COVERS
SAME AREA

Applications were submitted by Esso Exploration and Production Australia Inc. for two Exploration Licences east of Lake Frome in the Lake Frome embayment. (3462) These are Callabonna of 1680 sq. km and Cootabarlo of 2860 sq. km. The target commodity in these areas was oil shale.

REASONS FOR APPLICATION

Commercial oil shale is almost invariably a derivative of algae incorporated in fine grained marine or lacustrine sediments. The most important deposit in Australia is that at Rundle in SE Queensland where an early to mid-Tertiary sequence of lacustrine sediments is preserved in a graben structure. The giant reserves of the Piceance Creek Basin in Colorado are also in Tertiary lacustrine sediments. Evidence of algal organic matter, lacustrine conditions and Tertiary age are thus important or crucial factors to be sought in oil shale exploration.

Sediments of the Tarkaroola Basin which represents the Tertiary portion of the Lake Frome embayment are clearly of a prospective age, and lacustrine sediments are known, indicating a correct facies. Cookson (1955 p110) describes abundant Botryococcus and Pediastrum remains in a carbonaceous shale section of Cootabarlo No. 1 bore, therefore organic material typical of oil shale is shown to be present in the Tertiary sediments. The area of Lake Frome thus appeared highly prospective for oil shale justifying land applications for further exploration.

SUBSEQUENT INVESTIGATIONS

Two types of information were sought to acquire a better understanding of the area, these being documented research into the sediments of the area and borehole records or stored core.

The Tertiary stratigraphy of the area is described by Callen, 1975 who divides the sequence into a lower, Eocene, fluviatile and lacustrine succession correlated with the Eyre Formation and an upper Miocene lacustrine assemblage named the Namba Formation. Carbonaceous shales occur in both formations but are best developed in the Namba. This lies in the Poontana sub Basin situated to the west of Lake Frome. It does not unfortunately occur within the areas of application.

The Eyre Formation is dominantly fluviatile and sandy but contains lacustrine intervals. One of these was intersected in Cootabarlo 1 and 2. Core from Cootabarlo 2 is available for study at SADME and a carbonaceous shale section was viewed. The interval is not precisely known due to poor core recovery but lies somewhere between 471 ft and 537 ft. It was seen to consist of shale of both grey and brown colour, the grey containing flecks of carbonaceous matter and the short interval of brown shale being obviously rich in organic matter. The soft yet coherent consistency and the shiny surface of scratch marks is similar to some oil shales.

Two samples were taken of the core by kind permission of SADME, one of a typical grey shale and one of the brown material. They were submitted for total organic carbon determination (T.O.C.). The grey shale sample had a T.O.C. of 3.7 and the brown a figure of 12.7. The former clearly cannot be regarded as an oil shale but the latter has a T.O.C. consistent with an oil shale grade of 15-16 U.S. gallons per ton. If the brown shale is an oil shale then it is rather lean in economic terms. However a duplicate sample has been sent to ALS in Brisbane for Fischer Assay. At the time of writing the result is not available but will be forwarded later.

CONCLUSIONS

Should the brown shale prove to be oil shale it is unlikely to be of commercial grade. The interval is not precisely known but indications are that it is relatively thin. The depth at which it occurs, approximately, 512 ft., is clearly too deep for surface mining. It appears that conditions suitable for oil shale formation did develop in the Lake Fromé Embayment but were sustained only for a short period of time. Examination of other bore records of holes that passed through the Eyre Formation in the Cootabarlo-Callabonna area show no obvious indications of thicker development of lacustrine sediments though the holes are very few and far between. Conditions for oil shale formation appear to have been more favourable in the Miocene Namba Formation which does not occur in the area of the applications.

RECOMMENDATIONS

In view of the unlikelihood of thick oil shales being developed in the Cootabarlo Callabonna area it is recommended that we do not proceed with the land applications.

Fischer assay for the brown shale sample from Cootabarlo 2 should be forwarded to SADME when available.

J.E. Martyn

References

Callen, R.A. 1975 The stratigraphy sedimentology and uranium deposits of Tertiary Rocks in the Lake From area, S.A.; M.Sc. Thesis University of Adelaide unpubl.

Cookson, I.S. 1955 Records of the Occurrence of Botryococcus braunii, Pediastrum and the Hystrichosphaerideae in Cainozoic deposits of Australia. Mem. Nat. Mus. Melbourne Vol 18.

Ker, D.S. 1966 The Hydrology of the Frome Embayment in South Australia. Rept. of Investigations no. 27 Dept. of Mines S. Australia.

Australian Laboratory Services PTY LTD

005

CONSULTING CHEMISTS & ANALYSTS

Use EL 437 (same area) env 346

OIL SHALE ASSAY REPORT

OFFICE & LABORATORY
44 BALACLAVA ST.,
WOOLLOONGABBA 4102
Phone (07) 391 6799 A/H 355 0776
TELEX ALSI V42944

BATCH No.: S215-80/D064 CLIENT: ESSO AUSTRALIA MINERALS LTD.

ORDER No.: S 29464 AREA: DATE REC'D: 14-4-80

SAMPLE TYPE: OIL SHALE No.: 1 DATE COMP'D: 17-4-80

ATTENTION

SAMPLE NO.	OIL YIELD l/t	OIL S.G.	WATER YIELD l/t	GAS + LOSS kg/t	RESIDUE kg/t		Wt. %
LAKE COOTABARLON 512 No.2	10	--	64	32	895		

12' approx in Lake Cootabarlow no. 2)

C.R.A. EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)
95 COLLINS STREET, MELBOURNE, AUSTRALIA 3001

P.O. BOX 384D
TELEPHONE: 63 0491
TELEGRAMS: "CONRIO"
TELEX AA 30108

006

31st May, 1979.

The Director of Mines,
P.O. Box 151,
EASTWOOD, S.A. 5063

Dear Sir,

E.L. 437 - Lake Coontayunta, S.A.
Report for the Quarter Ended 3rd April, 1979

Please find enclosed a report by P.A. Buckle and G.B. Bubner entitled "Report on Lake Coontayunta, E.L. 437 for Quarter Ending 4 April, 1979" dated 15th May, 1979.

Only preliminary reconnaissance and a literature review have been undertaken to date, but it is anticipated that the drilling of one deep hole later in the year will be carried out when further geophysical modelling is completed.

Expenditure for the period ended 31st March, the nearest accounting period, amounted to $2,709 comprising:

Salaries and Wages	$704
General Supplies	375
Vehicles	396
Travel and Accommodation	458
Contractors	895
General Overheads	673
	$2,709

Yours faithfully,

for: J. COLLIER
General Manager

SAF:jm

Attach.

C.R.A. EXPLORATION PTY. LIMITED

007

FIRST QUARTERLY

REPORT ON LAKE COONTAYUNTA E.L. 437

FOR PERIOD ENDING 4TH APRIL 1979

AUTHORS: P.A. BUCKLE
G.J. BUBNER

SUBMITTED TO: D.R. KENNEDY

COPIES TO: S.A.D.M.E.
CRAE ADELAIDE
CRAE MELBOURNE
CRAE PT. AUGUSTA

DATE: 15TH MAY 1979

CONTENTS

1. SUMMARY AND CONCLUSIONS

1. An examination of open file reports and drill holes indicates that Palaeozoic and Adelaidean rocks are absent from the top of the Benagerie Ridge in the south of E.L. 437. Limited drill hole information in the north of the E.L., indicates possible Middle Cambrian rocks covering the ridge.

2. A reconnaissance magnetic survey conducted over a regional magnetic high in the north of E.L. 437, indicates that the depth to magnetic basement is approximately 2 km.

2. FURTHER WORK

Further work will aim at gaining a better understanding of the geology and stucture of the area with the ultimate aim being to generate a number of drill targets. Further examination of drill holes will be undertaken to establish the distribution and source of volcanic fragments found in samples beneath the Mesozoic strata. Other geophysical techniques will be examined in order to obtain further information on the depth to the Palaeozoic and Precambrian strata in the north of the E.L.

3. INTRODUCTION

Lake Coontayunta E.L. 437 was applied for on 29th June, 1978, and granted to C.R.A. Exploration Pty. Limited on the 4th January, 1979, for a term of one year. The E.L. is situated immediately east of Lake Frome and covers an area of 2469 square kilometres.

The area was taken out, principally, to explore for sandstone hosted uranium mineralization in Tertiary and Mesozoic sediments and for uranium/copper mineralization associated with Precambrian volcanics. The location of the E.L. is based on the northerly projection of the Precambrian Benagerie Ridge where relatively thin Mesozoic and Cainozoic cover is anticipated.

This report covers the work carried out and results obtained for the Quarter ending 4th April, 1979.

E - 012

4. WORK CARRIED OUT

4.1 GEOLOGY

No field work was undertaken. A review was made of open file reports at the South Australian Department of Mines and Energy after application for the E.L. Drill cuttings and core from seven holes in the district which penetrate below the Mesozoic section were examined at the S.A.D.M.E. Core Library.

These holes and several other holes which were cited in relevant literature are listed in Appendix 1 with summary logs for each.

Information on the Pre-Mesozoic geology within the E.L. is limited by the scarcity of drill holes, particularly in the north. A compilation of geological and geophysical information is shown on plan SAa 210.

4.2 GEOPHYSICS

A review of the existing geophysical data was conducted. This revealed a paucity of good quality detailed data, which basically consists of wide-spread, early 1960's gravity and magnetics.

A reconnaissance low-level magnetic and radiometric survey was undertaken to obtain good quality magnetic data for quantitative depth estimates. This survey covered approximately 600 line kilometres, with flight path recovery on 1:100000 photomosaics. Preliminary depth estimates were carried out on anomalies over the presumed ridge, and on numerous other smaller features.

One seismic traverse shot across the presumed ridge was inspected at the S.A.D.M.E.

5. PREVIOUS WORK

A summary of previous exploration is given by Callen (1974, 1975, 1976). Although the area covered by E.L. 437 has been held prior to C.R.A.E., exploration concentrated on possible

uranium mineralization in the Cainozoic sediments. The Frome Embayment has been explored for oil and gas by Delhi Australian Petroleum Ltd., Santos Ltd., Crusader Oil N.L. and Frome Broken Hill Co. Ltd., undertook gravity, magnetic and seismic surveys and the drilling of several exploration wells with little success.

To assist oil exploration, the South Australian Department of Mines and Energy has drilled four stratigraphic holes in the vicinity of E.L. 437, namely Yalkalpo 1 and 2, Mudguard 1 and Bumbarlow 1.

6. STRATIGRAPHY

There is no outcrop of Lower Cainozoic and older rocks in E.L. 437. The stratigraphy and structure have been inferred from drill hole and geophysical information and from Callen (1975, 76).

6.1 LOWER TO MIDDLE PROTEROZOIC

These rocks outcrop on the western margin of Frome 1:250000 (SH 54-10) in the Mt. Painter Inlier, on Curnamona 1:250000 (SH 54-14) in the south of E.L. 437, in the Olary Block and to the east in N.S.W. in the Willyama Block. Rock types comprise metamorphics, porphyry and granite. A basement high, "the Benagerie Ridge", extends north of the Olary Block. Scattered outcrop of the Ridge occurs in the northern part of the Curnamona sheet, however within E.L. 437, it is concealed by Cainozoic, Mezosoic and in part probably by Cambrian sediments.

To the south east of E.L. 437, in Mudguard 1 bore, the top of the Ridge is represented by a porphyritic rhyolite (intersected at 194 m) and has been dated by Rb:Sr age determination, between 1160 and 1350 my. (Youngs, 1977). Thompson (1966) noted the similarity between this porphyry and those of the Precambrian Gawler Range Volcanics on the Gawler Craton. Bumbarlow 1, which is located near the north eastern shore of Lake Frome, intersected interbedded vesicular basalt and red to green-grey sandstone and shale from 400 m to the total depth of 720 m. This sequence is overlain by Mesozoic sediments. Rb:Sr age determination of the shale yields 1360 140 my (Youngs, 1977), which approximates the age of the Roopena Volcanics, on the Gawler Craton.

G.W. Giles (pers comm, 1979) of the University of Adelaide, has found by trace element analysis that the porphyritic rhyolite in Mudguard 1 is similar to the Gawler Range Volcanics of the Gawler Craton and to the Pepegoona Porphyry of the Mt. Painter Inlier. The Adelaidean Beda and Wooltana Volcanics form another distinct group. Similar analysis is being undertaken on the basalts in Bumbarlow 1 to aid correlation.

Volcanic fragments occur in chip samples from the base of both Cootabarlow 3 and Curraworra bores and a "red granite" was reported at the base of Culberta Bore. Immediately above these intersections lies the Cadna-owie Formation (Cretaceous). It is not clear whether the volcanic fragments represent Precambrian basement or pebbles in Lower Cretaceous/Jurassic conglomerates which were derived from the Benagerie Ridge. A closer examination of the samples will be made at the S.A.D.M.E. Core Library.

6.2 ADELAIDEAN

Rocks of the Adelaidean system outcrop to the west of E.L. 437 in the Flinders Ranges, to the south in the Olary Block, and to the east in parts of the Willyama Block. These rocks were deposited unconformably on the Lower to Middle Proterozoic basement.

Callen suggests that there may be a thin cover (500-600 m) of Adelaidean sediments on crystalline basement in an area to the south of Lake Frome, based on drilling by Delhi-Santos and depth estimates to basement by Tucker and Parker.

Adelaidean rocks are probably not developed in E.L. 437 on the Benagerie Ridge.

6.3 PALAEOZOIC

A thick sequence (greater than 610 m) of gently folded Middle Cambrian red beds and carbonates occupy the depressions formed between the basement highs of the Flinders Ranges, Olary Block, Willyama Block and Benagerie Ridge. They are correlated with the Cambrian rocks within the Flinders Ranges.

To the east of Mudguard 1, a thick sequence of Middle Cambrian, was intersected in Yalkalpo 1 and 2. A N-S trending fault with a vertical displacement of greater than 500 m is inferred between the two sets of holes.

In the northern half of E.L. 437, Cambrian sediments possibly overly the Precambrian Benagerie Ridge. This is indicated by basal intersections in Cootabarlow 1 and Coonee Creek bores. There appears to be little Cambrian cover on the ridge in the southern half of the E.L. It is suggested by Youngs (1978) that Cambrian rocks were deposited over the ridge, and were later eroded with the uplift of the ridge which either occurred during the Delamerian Orogeny or the later Palaeozoic or both.

6.4 MESOZOIC

The oldest Mesozoic rock is a conglomerate which contains clasts of porphyry and various metamorphic rocks and which unconformably overlies the Cambrian sediments. The clasts are probably derived from the Benagerie Ridge. Overlying the conglomerate is the Cadna-owie Formation, consisting of shale, silt, sands with conglomerate beds developed. The Cadna-owie Formation grades up into the Maree Formation which is a sequence of bluish grey micaceous shale and siltstone, laminated beds, intraformational breccia and minor polymictic conglomerate.

From the limited bore hole information it appears that the base of the Mesozoic deepens from 189 m in Culberta bore in the south to 454 m in Cootabarlow 2 in the north.

A preliminary isopach map was constructed and indicated that the axis of thinnest Mesozoic, between 90 and 125 m, trends NE-SW, in the vicinity of Culberta bore. The Mesozoic gradually thickens northward, reaching an estimated 280 m plus, in the north of the E.L. This interpretation is tentative only.

6.5 CAINOZOIC

The basin containing Cainozoic sediments in the Lake Frome area has been given the new name, Tarkarooloo Basin (Callen 1976). The sediments are continental in character and result from the erosion of basement which was uplifted in

the early Paleocene and later in the Pliocene. Only slight uplift of the Benagerie Ridge occurred during these times. The Tarkarooloo Basin is made up of a number of smaller sub-basins e.g. Poontana Sub Basin, west of Lake Frome and the Wirrealpa Sub Basin, further to the south, on Copley 1:250000 sheet.

In E.L. 437, the Tertiary is mainly represented by the basal Eyre Formation (Palaeocene-Eocene) and the overlying Namba Formation. The Eyre Formation is a fine to coarse grained, subrounded to well rounded sandstone which is often pyritic and carbonaceous.

In the southern part of the Frome Embayment it is incised into basement and is the host to roll front type mineralization at Yarramba, Honeymoon, East Kalkaroo and Goulds Dam deposits. In E.L. 437 the Eyre Formation forms a blanket cover over basement with little development of channels. An Oligocene silcrete layer is often developed at the top of the formation. The Namba Formation is Miocene in age and consist mainly of finely laminated dark clay and thin carbonate layers with sand developed in parts. The sandy units at the base of the Namba Formation host the Beverley uranium deposit.

A thin cover of Quaternary lake deposits and sand dunes conceals most of the Tertiary sediments.

7. GEOPHYSICS

7.1 MAGNETICS

Investigation of the S.A.D.M.E. 1:250000 aeromagnetic map revealed a 200 gamma anomaly striking north-south, possibly representing a basement ridge. To obtain good quality magnetic data over the ridge, a reconnaissance aeromagnetic-radiometric survey was flown. Flight specifications are as follows:-

Contractor : Austral

Mangetometer : Geometrics G 806 with stinger

Spectrometer : Austral ISG - 4 (98 cu. in. xtal)

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Altitude : 50 metre M.T.C.

Speed : average 90 knots

Date Flown : 9/3/79

Record : Analogue

Photography : 1:100000 black and white photomosaics from 1976 photography

Preliminary interpretation has involved ½-slope methods to obtain depth to top of two - dimensional thin bodies. This is obviously a gross approximation to the real situation, and interpretation is further aggravated by the interference of anomalies due to small, shallower bodies. Computer modelling will allow more realistic models to be used, and the following results must be treated as approximate maximum depths only.

FIDUCIAL	DEPTH B.G.L. (km)	AMP (%)	COMMENTS
8.63	1.8	240	presumed ridge; tail of anomaly obscured by smaller.
8.73	0.5	35	shape of anomaly uncertain; not evident on 1:250000 map.
11.25	1.6	200	on line across southern end of ridge as shown on 1:250000 map; anomalies overlap. Anomaly at 11.25 represents ridge.
11.41	0.6	150	
14.48	2.3	300	presumed ridge; some interference at tail due to small source. (possible same as 17.23).
17.23	0.4	20	small source on tail of large anomaly at 17.23; shape uncertain.
18.18	3.8	360	presumed ridge.
19.59	0.3	40	small symmetrical anomaly; on 1:250000 map appears to trend NW-SE.
20.89	1.7	240	slightly assymmetric; on 1:250000 map appears as fairly large high.
21.40	0.4	125	symmetrical anomaly; shows as slight perturbation in contours on 1:250000 map.

FIDUCIAL	DEPTH B.G.L. (km)	AMP (γ)	COMMENTS
22.20	1.0	30	small inflection; shows as slight perturbation in contours on 1:250000 map.
27.31	1.4	260	presumed ridge; tail obscured by smaller anomaly (poss. equiv. of 17.23 etc.).
29.50	0.4	90	symmetrical anomaly; equivalent of anomaly 19.59.
310.00	3.6	380	presumed ridge; tail obscured by smaller anomalies.

The flight path is shown on plan SAa 210, and the depth estimates are plotted on plan SAa 267.

7.2 RADIOMETRICS

In conjunction with the aeromagnetic survey, four channels (K, Th, U, Total Count) of radiometrics were recorded in analogue form. The K channel expired at fiducial 7 (ink reservoir empty) and the other three channels recorded until about fiducial 27, when the spectrometer recording system suddenly ceased to operate. On all four channels the raw data shows no areas of anomalous activity.

7.3 GRAVITY

Existing gravity data for the E.L. area is derived from 2 surveys; 1) a regional survey flown by Wongela for Delhi in 1963 on a 6.4 by 6.4 km grid, and 2) 3 lines of detailed gravity along seismic lines conducted by United Geophysical for Crusader Oil in 1970.

On a regional scale there is no obvious correlation between the magnetics and the gravity. The report on the Eromanga-Frome seismic-gravity survey for Delhi-Santos (1966) and the final report on the Frome Downs seismic and gravity survey for Crusader (1970) both mention discrepancies between seismic and gravity results in areas on the Frome 1:250000 sheet. This, combined with the paucity of detailed gravity data in the area, induces some considerable uncertainty in any gravity interpretation. No quantitative interpretation has been attempted at this stage.

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7.4 SEISMIC

The 1970 seismic-gravity survey for Crusader Oil incorporated one line of seismic across the presumed ridge. This line, CFK (see plan SAa 267), was inspected at the S.A.D.M.E., and is of very poor quality. In its present un-reprocessed state, no useful information can be obtained from it.

P.A. BUCKLE
G.J. BUBNER

009

REFERENCES

Callen R.A., 1974 a Sedimentary Uranium Exploration, Company Borehole Distribution, Lake Frome Area S.A.D.M.E. Report Book No. 74/117.

Callen R.A., 1975 b The Stratigraphy, Sedimentology and Uranium Deposits of Tertiary Rocks:Lake Frome Area, South Australia. S.A.D.M.E. Report Book No. 75/103. (Presented as MSc Thesis, University of Adelaide).

Callen R.A., 1976 b Explanatory Notes, Frome. South Australia S.A.D.M.E. Report Book No. 76/27.

Youngs B.C., 1978 Mudguard 1 and Yalkalpo 2 - Well Completion Reports. S.A.D.M.E. Report Book No. 77/66.

Youngs B.C., 1978 Bumbarlow 1 - Well Completion Report. S.A.D.M.E. Report Book No. 78/117.

United Geophysical Corporation, 1966 : P.S.S.A. Report. Eromanga From Seismic/Gravity Survey for Delhi-Santos on Delhi et al A.T.P. 66-67 p QD. S.A.D.M.E. Open File Envelope No. 719.

Austral United Geophysical Pty. Ltd., 1970 : P.S.S.A. Final Report Frome Downs Seismic and Gravity Survey S.A. for Crusader on Delhi-Santos P.E.L. 5.6. S.A.D.M.E. Open File Envelope No. 1566.

KEYWORDS

Locality: Frome SH 54-10

Lower Proterozoic, Adelaidean, Middle Cambrian, Mesozoic, Cainozoic, Benagerie Ridge, drilling core, drilling open hole, uranium, porphyry, basic volcanics.

LIST OF ATTACHMENTS

Appendix 1 Bore holes and summary logs. Lake Frome east area.

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Plan SAa 212	Location of Lake Coontayunta E.L. 437 1:250000
Plan SAa 210	Lake Frome Area : Compilation of Geophysical and Geological Data 1:500000
Plan SAa 267	Preliminary magnetic depth estimates 1:250000

BORE-HOLES AND SUMMARY LOGS - LAKE FROME EAST AREA

1. BORE-HOLES INSPECTED AT SOUTH AUSTRALIAN DEPARTMENT OF MINES AND ENERGRY CORE LIBRARY.

BORE-HOLE NAME PARTY RESPONSIBLE	INTERVAL (m)	ROCK TYPE / FORMATION	AGE
Yalkalpo 1 SADME	3.5- 57.8	Namba Formation	Tertiary
	57.8- 81.5	Eyre Formation	Tertiary
	81.5-186.5	Maree Formation	Cretaceous
	186.5-213.3	Cadna-owie Formation	Cretaceous
	213.3-214.0	Basal conglomerate	Jurassic
	214.0-219.0	Dolomite/limestone	M. Cambrian
Yalkalpo 2 SADME	0 - 12	Sand and clay	
		Namba Formation	Tertiary
	12 - 77	Eyre Formation	Tertiary
	77 -258	Maree & Cadna-owie	Cretaceous
	258 -523	Billy Creek Formation	Cambrian
	523 -788	Parara & Wilkawillina Limestone Formation	Cambrian
	788 -799	Sandstone-calcareous	?
Cootabarlow 2 Frome-Broken Hill	0 - 24	Sand	Quaternary
	24 -149	Namba Formation	Tertiary
	149 -176	Eyre Formation	Tertiary
	176 -405	Maree Formation	Cretaceous
	405 -454	Cadna-owie Formation	Cretaceous
	454 -487	Crey Silt a.a + pink to red brown quartz feld. sand	Cambrian ?
Cootabarlow 3 Frome-Broken Hill	0 - 24	Sand	Quaternary
	24 -143	Namba Formation	Tertiary
	143 -170	Eyre Formation	Tertiary
	170 -374	Maree Formation	Cretaceous
	374 -414	Cadna-owie	Cretaceous
	414 -419	Silt + Chips of red brown volcanic, + quartz feld. quartzite	Cambrian ?
Mudguard 1 SADME	0 - 12	Sand	Quaternary
	12 - 81	Namba Formation	Tertiary
	81 - 99	Eyre Formation	Tertiary
	99 -194	Maree/Cadna-owie Formation	Cretaceous

BORE-HOLE NAME PARTY RESPONSIBLE	INTERVAL (m)	ROCK TYPE / FORMATION	AGE
Curraworra	0 - 6	Sand	Quaternary
	6 - 93	Namba Formation	Tertiary
	93 -124	Eyre Formation	Tertiary
	124 -262	Maree Formation	Cretaceous
	262 -350	Cadna-owie Formation	Cretaceous
	350 -352	Grey quartzose micaceous sandstone + vesic basalt fragments	Cambrian? Precambrian?
Bumbarlow 1 SADME	0 -160	Namba Formation + Quaternary	Tertiary + Quaternary
	160 -192	Eyre Formation	Tertiary
	192 -355?	Maree Formation	Cretaceous
	355? -390	Cadna-owie Formation	Cretaceous
	390 -400	Conglomerate	Cretaceous / Jurassic
	400 -702	Interbedded red grey siltstone, shale and vesicular basalt	
	702 -720.3	Dark grey black shale	

2. BORE-HOLE LOGS FROM OPEN FILE REPORTS (CORE NOT INSPECTED)

BORE-HOLE NAME PARTY RESPONSIBLE	INTERVAL (m)	ROCK TYPE / FORMATION	AGE
Lakeside 1	0 - 9	Sand	Quaternary
Crusader Oil	9 -142	Namba Formation	Tertiary
	142 -183	Eyre Formation	Tertiary
	183 -306	Maree Formation	Cretaceous
	306 -309	Cadna-owie	Cretaceous
	309 -327	"Hard Quartzite" - minor red clay fragments at base	Cambrian ?
Cootabarlow 1	0 - 18	Sand	Quaternary
Frome-Broken Hill	18 -132	Namba Formation	Tertiary
	132 -166	Eyre Formation	Tertiary
	166 -413	Maree/Cadna-owie	Cretaceous
	413 -437	Hard siliceous sand	Cambrian ?
Arboola	0 - 10	Sand	Quaternary
	10 - 80	Namba Formation	Tertiary
	80 -128	Eyre Formation	Tertiary
	128 -309	Maree Formation	Cretaceous
	309 -323	Cadna-owie	Cretaceous
Culberta	0 - 97	Namba/Eyre Formation	Tertiary
	97 -189	Maree/Cadna-owie	Cretaceous
	189 -198	"red granite"	Precambrian ?
Glenmanyie	0 - 32	Namba & Quaternary	Tertiary + Quaternary
	32 - 71	Eyre Formation	Tertiary
	71 -246	Maree + Cadna-owie	Cretaceous
	246 -257	Grey limestone	Cambrian ?
	257 -266	Pale green-grey slate	Cambrian ?
	266 -271	Brown sandstone	Cambrian ?
Coonee Creek	0 - 88	Namba & Quartzite	Tertiary + Quaternary
	88 -112	Eyre Formation	Tertiary
	112 -393	Maree + Cadna-owie	Cretaceous
	393 -403	Hard sandstone	Cretaceous ? Cambrian ?

C.R.A. EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)

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IN REPLY PLEASE QUOTE

13S L1

29th August, 1979.

The Director of Mines,
P.O. Box 151,
EASTWOOD, S.A. 5063

Dear Sir,

E.L. 437 - Lake Coontayunta, South Australia
Report for the Quarter Ended 3rd July, 1979

Enclosed is a report by G. J. Bubner entitled "Second Quarterly Report on Lake Coontayunta E.L. 437 for the Period Ending 4 July, 1979" dated 17th August, 1979.

The area is still considered to have potential and drilling in the fourth quarter is planned on ground gravity anomalies recovered in the current (third) quarter.

Expenditure for the period amounted to $7,181 comprising:

Salaries and Wages	$3,011
General Supplies	200
Vehicles	476
Travel and Accommodation	501
Contractors	421
General Overheads	2,572
	$7,181

Yours faithfully,

SAF:jm

for: J. Collier
General Manager

Encl.

RECEIVED
31 AUG 1979
DEPT. OF MINES
AND ENERGY
SECURITY
3462.

024

C.R.A. EXPLORATION PTY. LIMITED

SECOND QUARTERLY REPORT ON

LAKE COONTAYUNTA E.L. 437

FOR PERIOD ENDING 4TH JULY 1979.

AUTHOR: G.J. BUBNER

SUBMITTED TO: D.R. KENNEDY

COPIES TO: S.A.D.M.E.
C.R.A.E. MELBOURNE

DATE: 17TH AUGUST 1979

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CONTENTS

026

1. SUMMARY

Quantitative interpretation of magnetic data using computer modelling indicates the existence of a two-dimensional magnetic source, presumably a basement ridge, trending north-south through the centre of E.L. 437. This ridge is interpreted to be at a depth of approximately three kilometres in the centre of the E.L., and shallows to a depth of about two kilometres towards the south. Susceptibilities of the order of .006 SI units are used, consistent with a Proterazoic basement lithology.

2. INTRODUCTION

This report describes work carried out by C.R.A.E. on Lake Coontayunta E.L. 437 for the period 5th April to 4th July, 1979.

E.L. was granted on 4th January for a term of one year. It is situated immediately east of Lake Frome, and covers an area of 2469 square kilometres. (Plan SAa 282).

Work to date has consisted of a literature search and drill core inspection, brief reconnaissance airborne magnetic/radiometric survey, and magnetic interpretation.

3. CONCLUSIONS

Computer modelling of aeromagnetic profiles has provided quantitative depth estimates to a presumed basement ridge. These results are as follows.

PROFILE	FIDUCIALS	CALCULATED DEPTH (±5%)	SUSC (SI UNITS)
1	11/12	1 800, 2 000 Metres	.0046, .0049
2	8/ 9	2 500	.0064
3	27/28	2 500	.0064
4	14/15	3 .100	.0061
5	17/19	3 000	.0062
6	30/32	2 700	.0062

027

4. WORK CARRIED OUT

4.1 GEOLOGY

No work was carried out.

4.2 GEOPHYSICS

Aeromagnetic profiles across the presumed basement ridge were quantitatively interpreted by computer modelling. This has allowed the preliminary depth estimates to be revised.

A contract was drawn up for gravity surveys to be carried out over selected magnetic/gravity features within the E.L. These surveys are expected to commence early in the third quarter.

5. INTERPRETATION

Six aeromagnetic profiles across the presumed ridge were selected, corrected for regional gradient, and modelled using a forward-modelling program for arbitrarily shaped two-dimensional polygons. The model for each profile was initially approximated by a triangle, on the assumption that the magnetic source is a basement high. This triangle was then modified to obtain a reasonable fit between the calculated profile and the smoothed observed data. No remanent magnetization has been incorporated in the modelling.

This work was carried out using a Tektronix 4051 intelligent terminal. The algorithm for the software is adapted from that of Hiertzler, Peters, Talwani and Zurflueh.

Results of the modelling for each profile are detailed below. The locations of the profiles and depth estimates to magnetic basement are shown on plan SAa 283. In order to maintain a realistic view of the results in lieu of the uncertainties inherent in modelling, it is suggested that error bounds of, say, ±5%, be applied to all given model dimensions.

5. GEOPHYSICAL INTERPRETATION

5.1 PROFILE 1 - FIDUCIALS 11/12

This profile represents the southern end of the presumed ridge. Two basement highs are postulated to explain the

two peaks of the anomaly, although a separate source (intrusive, say) could be equally as plausible for either of the peaks. The western anomaly is modelled as a ridge with a steeper eastern slope, and a depth to top of 1 800 metres. The eastern anomaly is modelled as a smaller ridge with a relatively steep western flank and a near vertical eastern flank, at a depth of 2 000 metres. The steep eastern flank could be explained in terms of a fault with a throw of some 2 000 metres. Susceptibilities of .0046 and .0049 (SI Units) were used for the western and eastern models respectively, which is consistent with susceptibilities of basement gneiss/granite-gneiss rock types.

In this and the other five models a slab of basement the width of the profile is included. The necessity to include this slab simply reflects the magnitude of the base level chosen when removing the regional from the observed data.

5.2 PROFILE 2 - FIDUCIALS 8/ 9

Profile 2 is 12-13 kilometres north of 1. Here the ridge is represented as a body about seven kilometres wide, with a reasonably steep western flank and gently sloping eastern flank. Depth to top is calculated as 2 500 metres, using a susceptibility of .0064.

5.3 PROFILE 3 - FIDUCIALS 27/28

Profile 3 nearly duplicates Profile 2, and similar results are obtained for the model; width seven kilometres, depth 2 500 metres.

5.4 PROFILE 4 - FIDUCIALS 14/15

This Profile is two kilometres north of Profiles 2 and 3. The model is increased in width and depth extent, and has a depth to top of 3 100 metres. Susceptibility has been marginally adjusted to .0061.

5.5 PROFILE 5 - FIDUCIALS 17/19

The model for this profile, which is two kilometres north of profile 4, is essentially the same as that for profile 4. Basically, the eastern slope has been modified to produce a more gradual slope, and the western flank increased in slope. The depth is similar at 3 000 metres.

5.6 PROFILE 6 - FIDUCIALS 30/32

This profile is one kilometre north of profile 5. The model is very broad, about 15 kilometres, and is reduced in relief. Depth to top is calculated at 2 700 metres for a susceptibility of .0062.

G.J. BUBNER

030

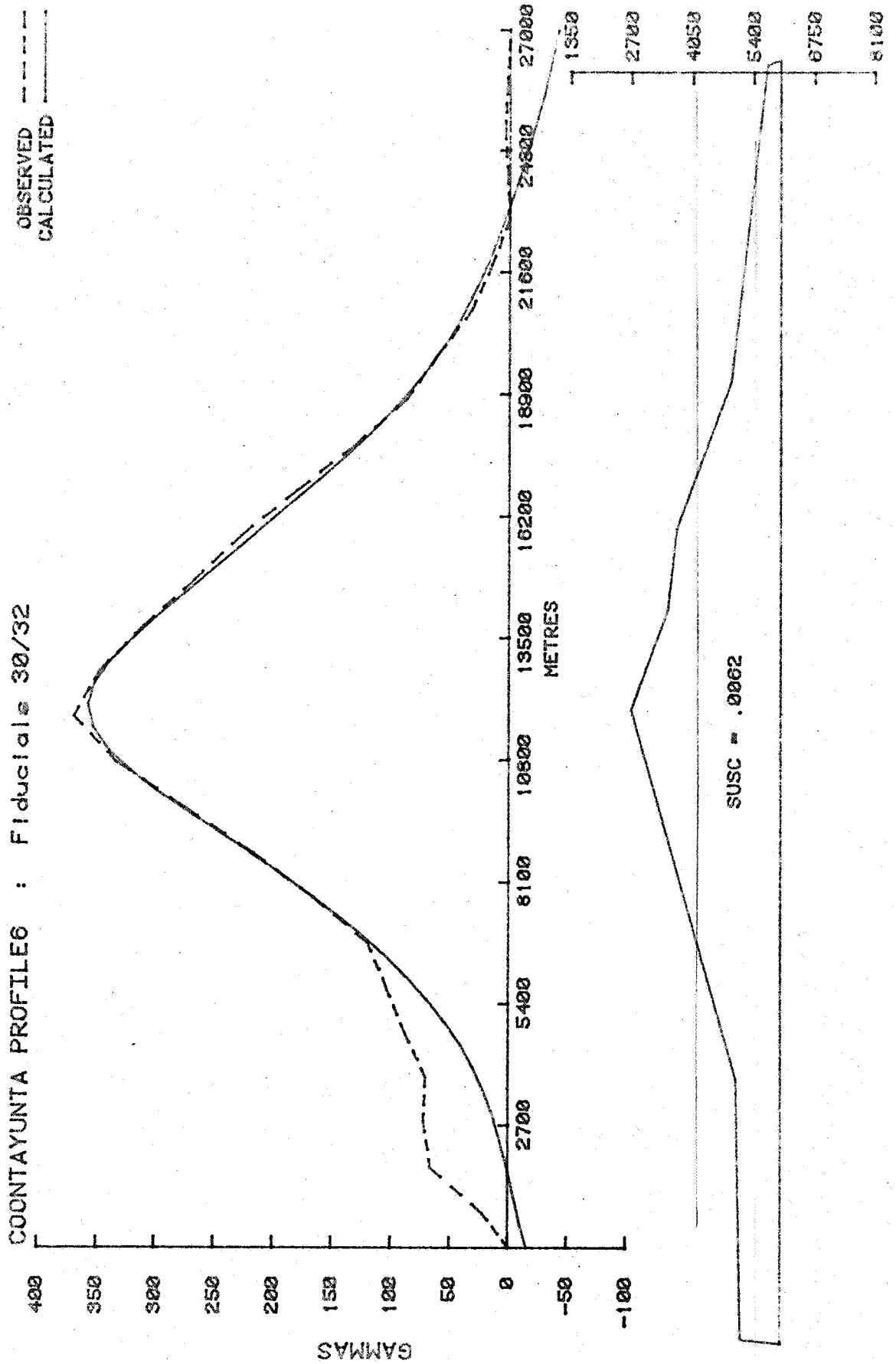
KEYWORDS

Airborne geophysical surveys, magnetic surveys, magnetic interpretation, computer modelling.

Locality: Frome SH 54-10

LIST OF PLANS

Plan SAa 282	Lake Coontayunta E.L. 437:	Flight path plot and drill hole locations.
Plan SAa 283	Lake Coontayunta E.L. 437:	Calculated depths to magnetic basement.

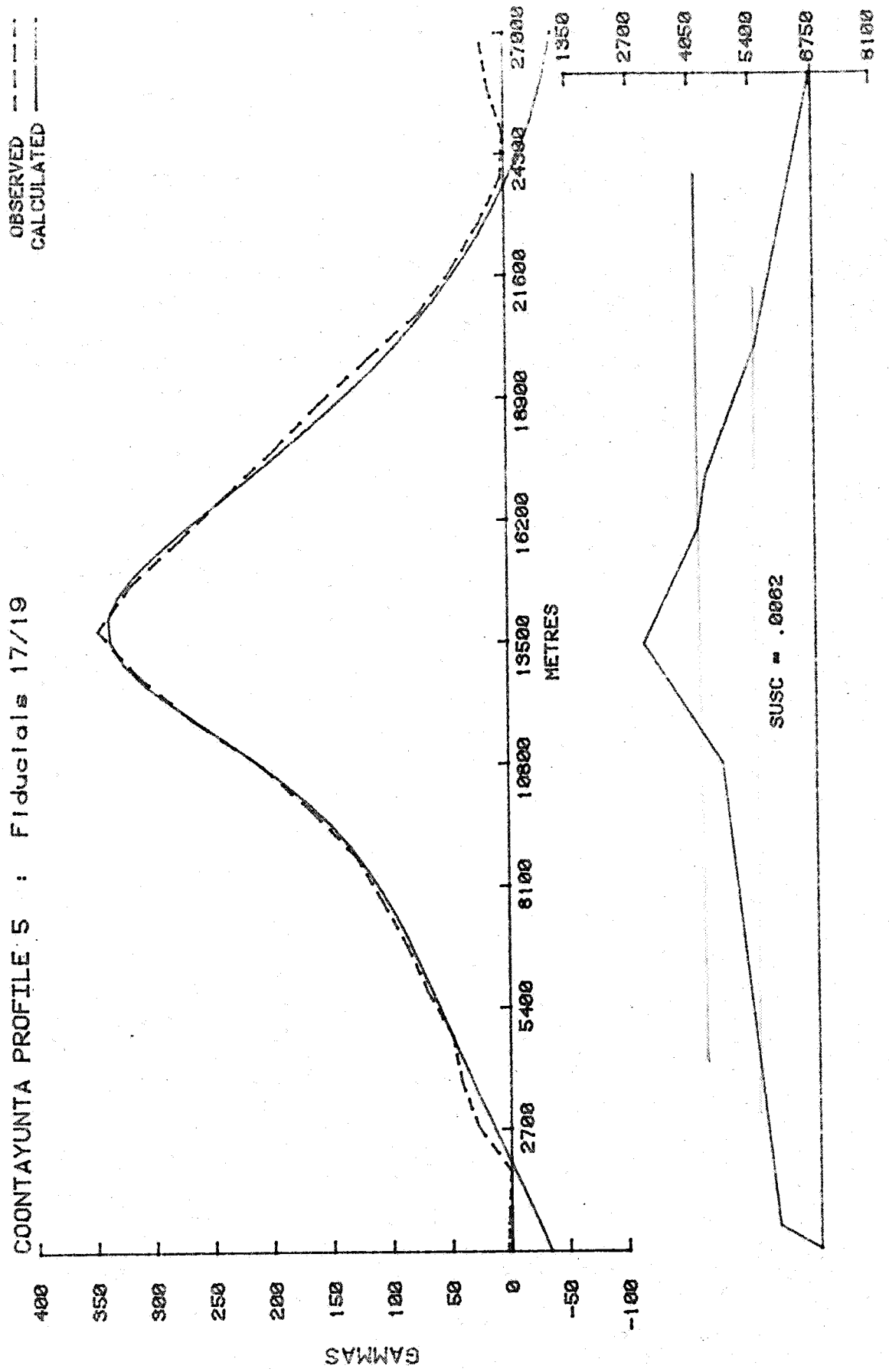


C.R.A EXPLORATION PTY. LIMITED.

AIRBORNE MAGNETIC INTERPRETATION

GEOPHYSICS: G.J.B.
DATE: 4 JUL 1979

REPORT No. 9660

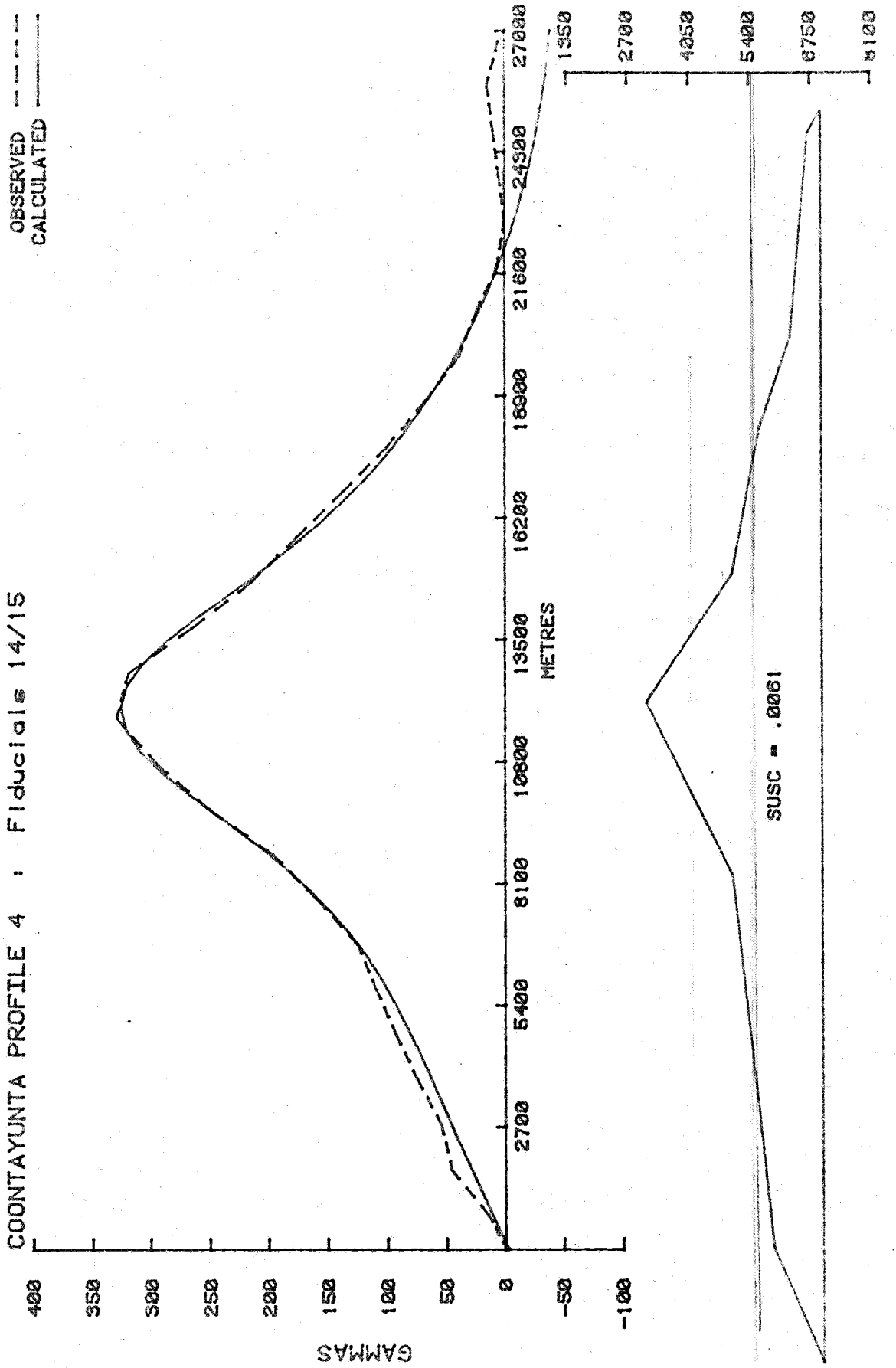


C.R.A EXPLORATION PTY. LIMITED.

AIRBORNE MAGNETIC INTERPRETATION

GEOPHYSICS: G.J.B.
DATE: 4 JUL 1979

REPORT N° 9660

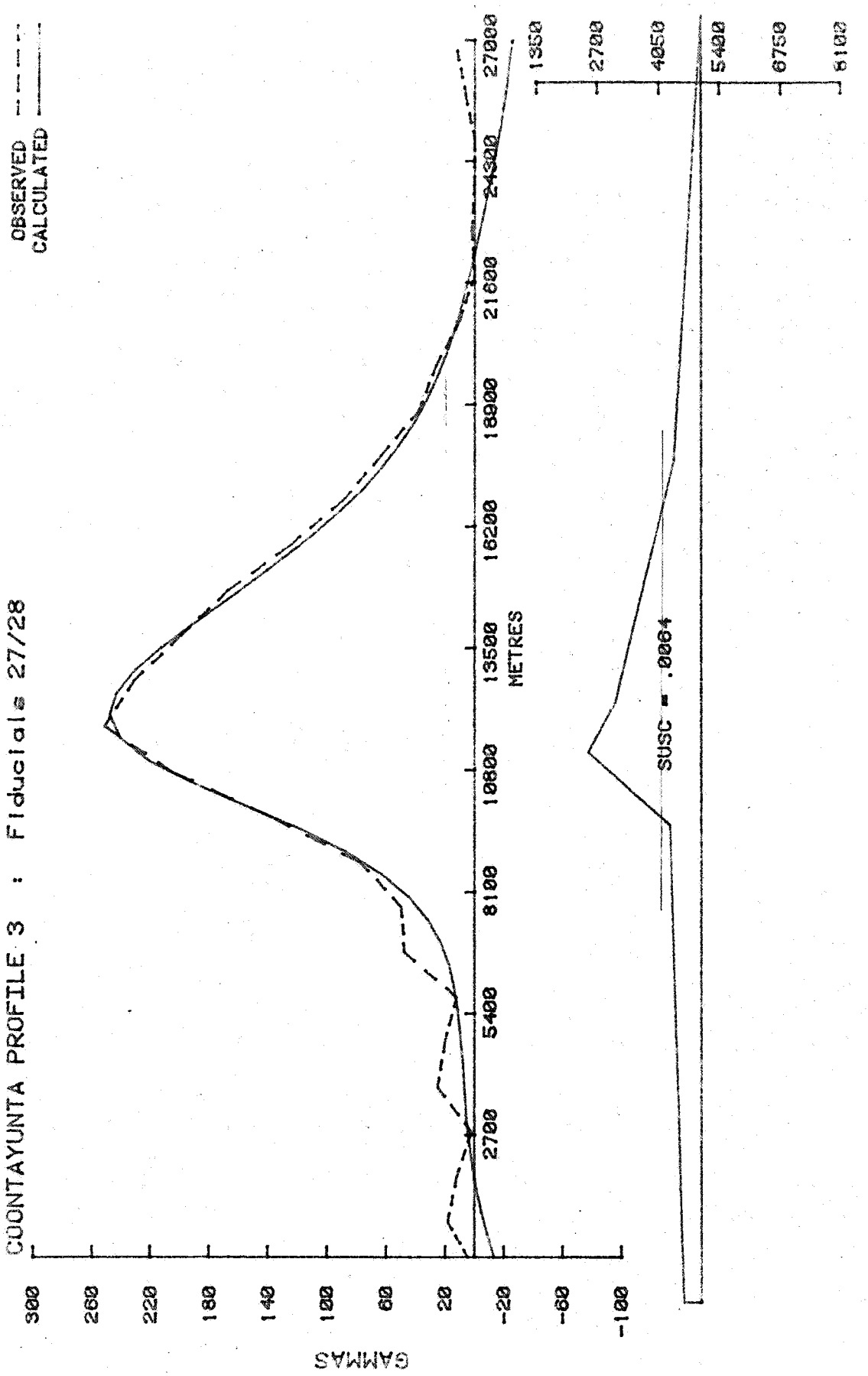


C.R.A EXPLORATION PTY. LIMITED.

AIRBORNE MAGNETIC INTERPRETATION

GEOPHYSICS: G.J.B.
DATE: 4 JUL 1979

REPORT Nº 9660

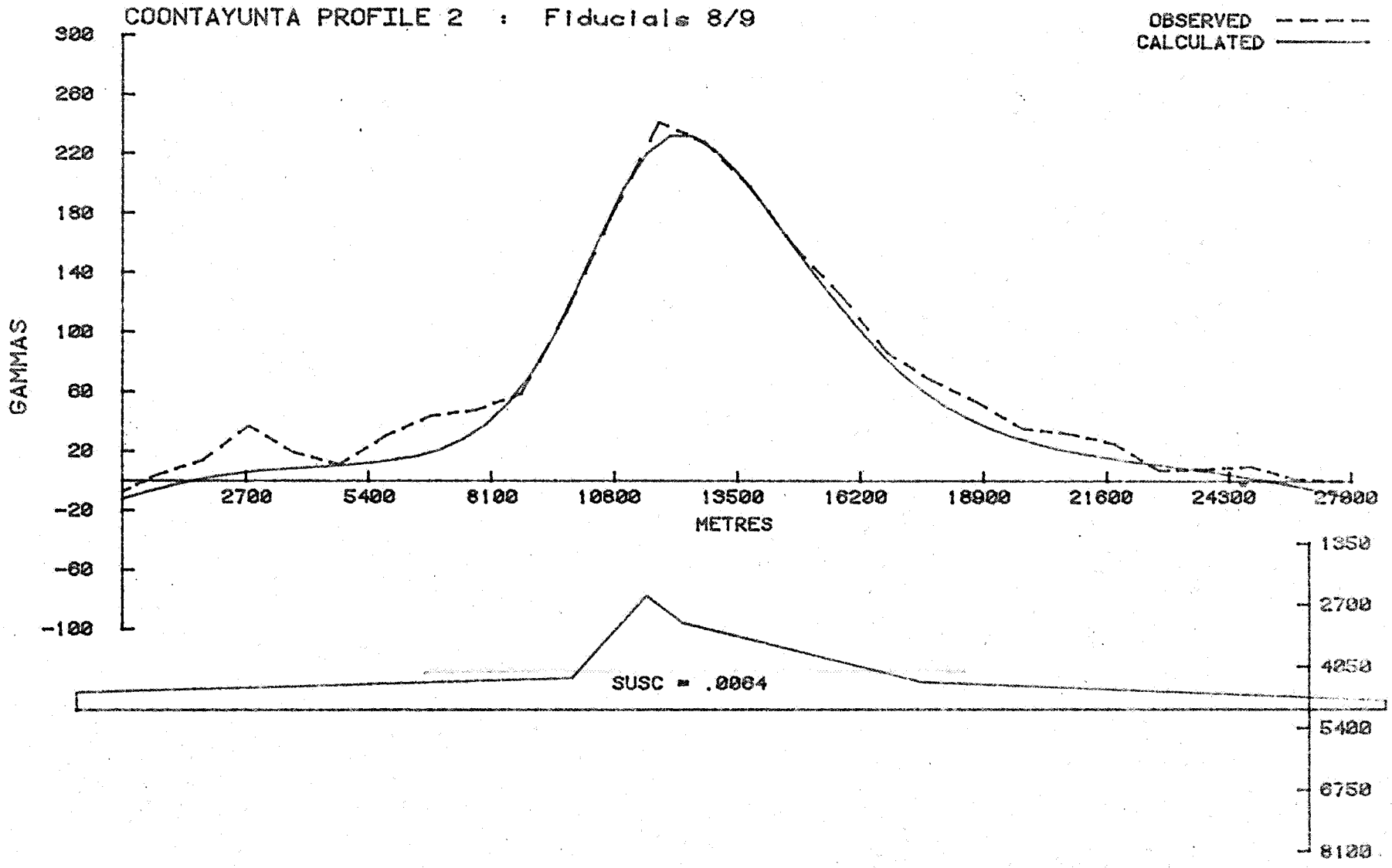


C.R.A EXPLORATION PTY. LIMITED.

AIRBORNE MAGNETIC INTERPRETATION

GEOPHYSICS: G.J.B.
DATE: 4 JUL 1979

REPORT Nº 9660



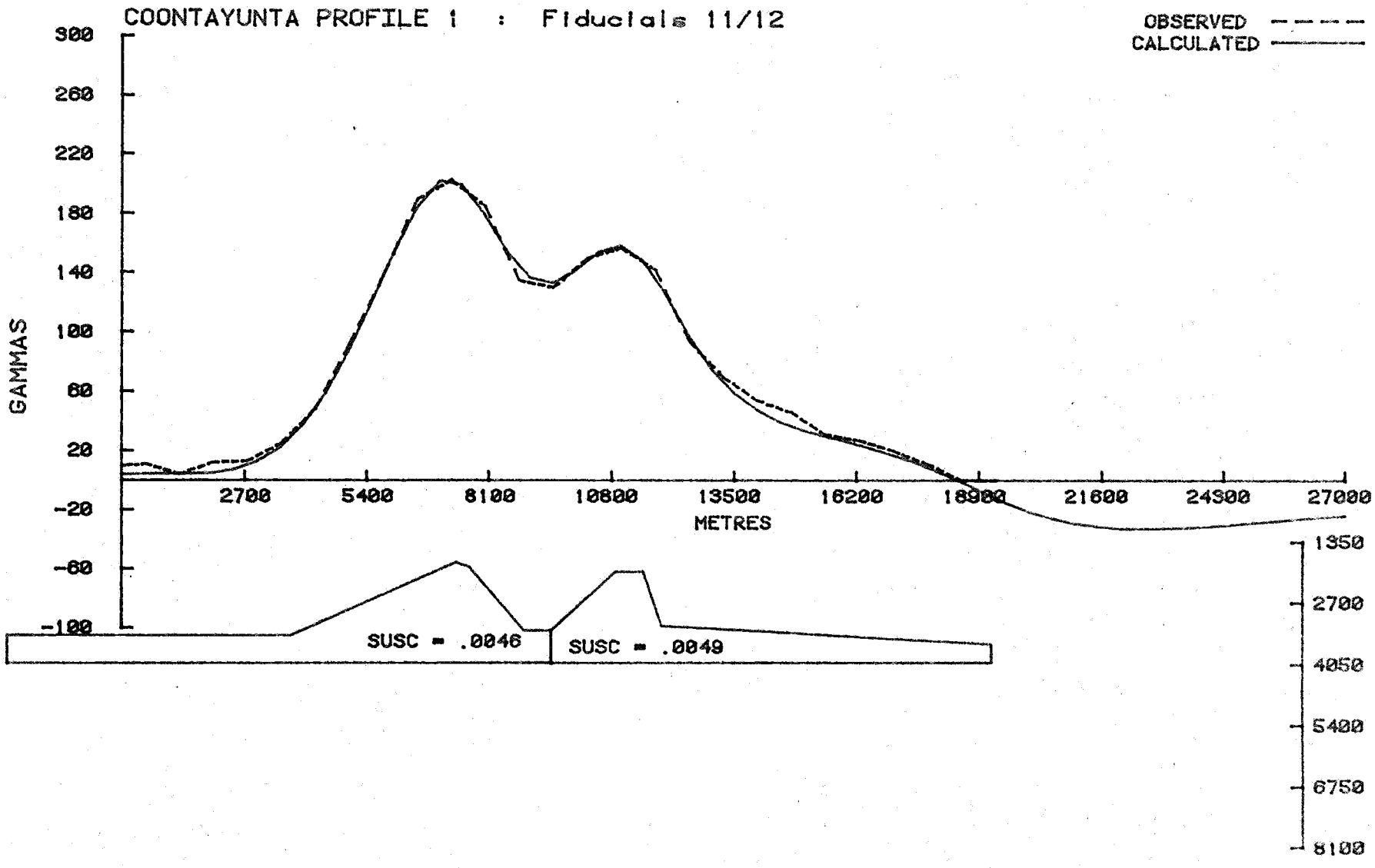
C.R.A EXPLORATION PTY. LIMITED.

AIRBORNE MAGNETIC INTERPRETATION

GEOPHYSICS: GJB
DATE: 4 JUL 1979

REPORT No 3660

035



C.R.A EXPLORATION PTY. LIMITED.

AIRBORNE MAGNETIC INTERPRETATION

GEOPHYSICS: G.J.B.
DATE: 4 JUL 1979

REPORT No. 9660

036

C.R.A. EXPLORATION PTY. LIMITED
(INC. IN N.S.W.)

28th FLOOR, 55 COLLINS STREET, MELBOURNE,
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TELEPHONE: (AREA CODE 03)
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DIRECT LINE: 658

IN REPLY PLEASE QUOTE

13 S Ll

7th November 1979.

The Director of Mines,
P.O. Box 151,
EASTWOOD. S.A. 5063

Dear Sir,

EL437 - Lake Coontayunta, South Australia
Report for the Quarter Ended 3 October 1979

Enclosed is a report by G.J. Bubner entitled "Third Quarterly Report on Lake Coontayunta EL437 for Period Ending 4 October 1979", dated 4 October 1979.

Geophysical exploration failed to delineate a target worthwhile for deep expensive scout drilling.

Expenditure for the period amount to $2,195 comprising :

Salaries & Wages	$1,304
General Supplies	99
Vehicles	34
Travel & Accommodation	(165)
General Overheads	923
	$2,195

Yours faithfully,

for: J. Collier
General Manager.

Enc.

SAF:smb

RECEIVED
12 NOV 1979
DEPT. OF MINES AND ENERGY SECURITY
3462.

038

C.R.A. EXPLORATION PTY. LIMITED

THIRD QUARTERLY REPORT ON LAKE COONTAYUNTA E.L. 437 FOR PERIOD ENDING 4TH OCTOBER 1979.

AUTHOR: G.J. BUBNER

SUBMITTED TO: D.R. KENNEDY

COPIES TO: S.A.D.M.E.
C.R.A.E. MELBOURNE

DATE: 4.10.1979

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9660

CONTENTS

1. SUMMARY

A gravity survey conducted over section of a basement ridge has failed to define any significant anomalies indicative of concentrations of excess mass.

2. INTRODUCTION

This report describes work carried out by C.R.A. Exploration Pty. Limited on Lake Coontayunta E.L. 437 for the period 5th July - 4th October 1979.

E.L. 437 was granted on 4th January 1979 for a period of one year. It covers an area of 2 469 square kilometres and is situated immediately east of Lake Frome (Plan SAa 282).

Work to date includes a literature search and drill core inspection, airborne magnetic/radiometric survey and interpretation, and a gravity survey.

3. WORK CARRIED OUT

3.1 GEOLOGY

No work was carried out.

3.2 GEOPHYSICS

A gravity survey was carried out by Solo Geophysics and Company over an area coincident with an elongate magnetic anomaly. (Plan no. SAa 305). Stations were read on a one x one kilometre grid oriented true north. Levels were obtained by barometer, with one north-south optical line run the length of the area to provide additional control. The data was reduced for a Bouguer density of 2.4 gm/cc, and the probable error of any one Bouguer gravity value is $\pm$0.4 milligals.

4. RESULTS

Whilst final contour maps are still awaited, profiles of the raw data have been compiled. (Plan no. SAa 306). The gravity

survey was carried out with intention to define any anomalies of a size comparable with that observed over the Roxby Downs deposit i.e. anomalies of wavelength 4-8 kilometres and amplitudes of the order of five milligals.

With reference to the profiles it is evident that no comparable anomaly exists. The profiles are generally flat, with typically a .25 - .5 milligal variation from station to station. Perhaps the most outstanding anomaly in the area is that on the east end of line B, and even then the amplitude is only one milligal.

In lieu of the absence of any significant anomalies no qualitative interpretation has been attempted. The variations that are seen in the Bouguer profiles can probably be explained in terms of the following:

a. levelling errors. If the aforementioned error bounds of $\pm$0.4 milligals were applied to each reading, many of the Bouguer profiles could be redrawn as a straight line within the error bounds.

b. intra-basement density contrasts. In the first quarterly report on E.L. 437 it was noted that discrepencies between gravity and magnetic/seismic data have been observed in the Lake Frome area. Tucker (1972) comments on the difficulties encountered in gravity interpretation in South Australia, including low density contrasts between Adelaidean and Pre-Adelaidean rock-types, and basement inhomogeneities.

G.J. BUBNER

042

REFERENCES

C.R.A. EXPLORATION PTY. LTD. — First quarterly report on Lake Coontayunta E.L. 437 for period ending 4th April 1979.

TUCKER, D.H., 1972 — Magnetic and gravity interpretation over an area of Precambrian sediments in Australia. Unpubl. Ph.D. thesis, University of Adelaide.

KEYWORDS

Locality: Frome SH 54-10

Proterozoic, Adelaidean, geophys-gravity

LIST OF ATTACHMENTS

Plan SAa 282	Lake Coontayunta E.L. 437 Location Map	1:250 000
Plan SAa 305	Lake Coontayunta E.L. 437 Gravity Survey Area	1:250 000
Plan SAa 306	Lake Coontayunta E.L. 437 Bouguer Gravity Profiles, Lake Elder Area, Lines A to T.	

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043

13S L1

18th December, 1979.

The Director of Mines,
P.O. Box 151,
EASTWOOD, S.A. 5063

Dear Sir,

E.L. 437 - Lake Coontayunta, South Australia
Final Report

Enclosed is report 9660 by G. J. Bubner entitled "Final Report on Lake Coontayunta E.L. 437" dated 30th November, 1979.

A detailed gravity survey failed to delineate any targets worthy of drilling, and the sequence of geophysical investigations usually employed in the search for Roxby Downs type mineralisation has now been exhausted.

Final expenditure on this Exploration Licence amounted to $24,220 comprising:

Salaries and Wages	$6,541
General Supplies	1,986
Vehicles	183
Travel and Accommodation	837
Contractors	9,266
General Overheads	5,407
	$24,220

Yours faithfully,

for: J. Collier
General Manager

SAF:jm

Encl.

044

C.R.A. EXPLORATION PTY. LIMITED

EMV 3462

FINAL REPORT ON LAKE COONTAYUNTA E.L. 437

AUTHOR: G.J. BUBNER

SUBMITTED TO: D.R. KENNEDY

COPIES TO: S.A.D.M.E.
C.R.A.E. MELBOURNE

DATE: NOVEMBER 30, 1979.

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CONTENTS

PAGE 045

1. SUMMARY

E.L. 046

E.L. 437 was taken out to explore for sandstone hosted uranium mineralization in Tertiary and Mesozoic sediments and for uranium/copper mineralization associated with Precambrian volcanics. The location was based on the northerly projection of the Precambrian Benagerie Ridge.

The exploration effort was directed towards elucidation of the nature of a basement ridge, trending north-south within the E.L., with a view to defining areas prospective for Roxby Downs type mineralization.

A literature search and drill core inspection indicated that Palaeozoic and Adelaidean rocks are absent from the top of the Benagerie Ridge in the south of the E.L.. A reconnaissance magnetic survey inferred a basement ridge at depths of around two kilometres in the north of the E.L.. A gravity survey conducted over a portion of this ridge failed to define any anomalies indicative of significant excess mass accumulations.

2. INTRODUCTION

This is the final report on Lake Coontayunta E.L. 437, which was granted to C.R.A. Exploration Pty. Limited on the 4th January 1979 for a term of one year. It covers an area of 2,469 square kilometres to the east of Lake Frome.

3. CONCLUSIONS

In the absence of any significant gravity anomalies it is recommended that no further exploration be undertaken.

4. WORK CARRIED OUT - GEOPHYSICS

A reconnaissance airborne magnetic/radiometric survey was conducted to provide good quality data in the vicinity of a magnetic 'ridge' evident on the Frome 1:250,000 magnetic map. Computer modelling of the data, using a two-dimensional ridge model, returned depths of 1800 - 2000 metres at the southern end, increasing to 3000 metres at the northern end.

No anomalous counts were observed in any of the four radiometric channels.

A gravity survey was carried out over a rectangular area of nine X nineteen kilometres over the southern portion of the basement ridge. Stations were read on a one X one kilometre grid, and the data barometrically levelled to an accuracy of ± 0.4 milligals. The profiles are generally flat, with typically a 0.25 - 0.5 milligal variation from station to station. There are no anomalies in excess of one milligal. It is suggested that the observed variations are due to a combination of the following:

a) levelling error bounds

b) variation in unconsolidated sediment thickness

c) intra-basement inhomogeneities.

G.J. BUBNER

048

REFERENCES

Buckle, P.A., and Bubner, G.J., 1979. Report on Lake Coontayunta E.L. 437 for Quarter Ending 4th April 1979.

Bubner, G.J., 1979. Second and Third Quarterly Reports on Lake Coontayunta E.L. 437.

KEYWORDS

Locality: Frome SH 54-10

Lower Proterozoic, Adelaidean, Benagerie Ridge, drilling core, copper, uranium, airborne geophysical surveys, geophys - magnetics, geophys - gravity, computer modelling.

LIST OF ATTACHMENTS

SAa	210	Lake Frome Area	Compilation of Geological and Geophysical data. 1:500,000
	212	Lake Coontayunta	Location Map. 1:250,000
	267	" "	Preliminary magnetic depths estimates. 1:250,000
	282	" "	Flight path plot and drill hole locations. 1:250,000
	283	" "	Calculated depths to magnetic basement. 1:250,000
	305	" "	Gravity survey area. 1:250,000
	306	" "	Bouguer gravity profiles, Lake Elder area, lines A to T. 1:50,000
	345	" "	Lake Elder grid gravity contours. 1:25,000

49

L. Callabonna

Ruin

Moolawatana Bore

Fence

Proof

Vermin

140°08'

140°26'

30°10'

140°33'

30°15'

L. Cootabarlow

Cootabarlow Bore

2,489 km.² (approx.)

L. Pundalpa

L. Coontayunta

L. Bumbarlow

30°30'

Arboola Bore

FROME

T.N

L. Elder

Yellnif Dam

30°40'

Culberta Bore

30°45'

140°30'

LAKE

30°48'

140°23'

140°15'

140°00'

Scale 1:250,000

5 0 5 10 15 20 25 K.M.S.

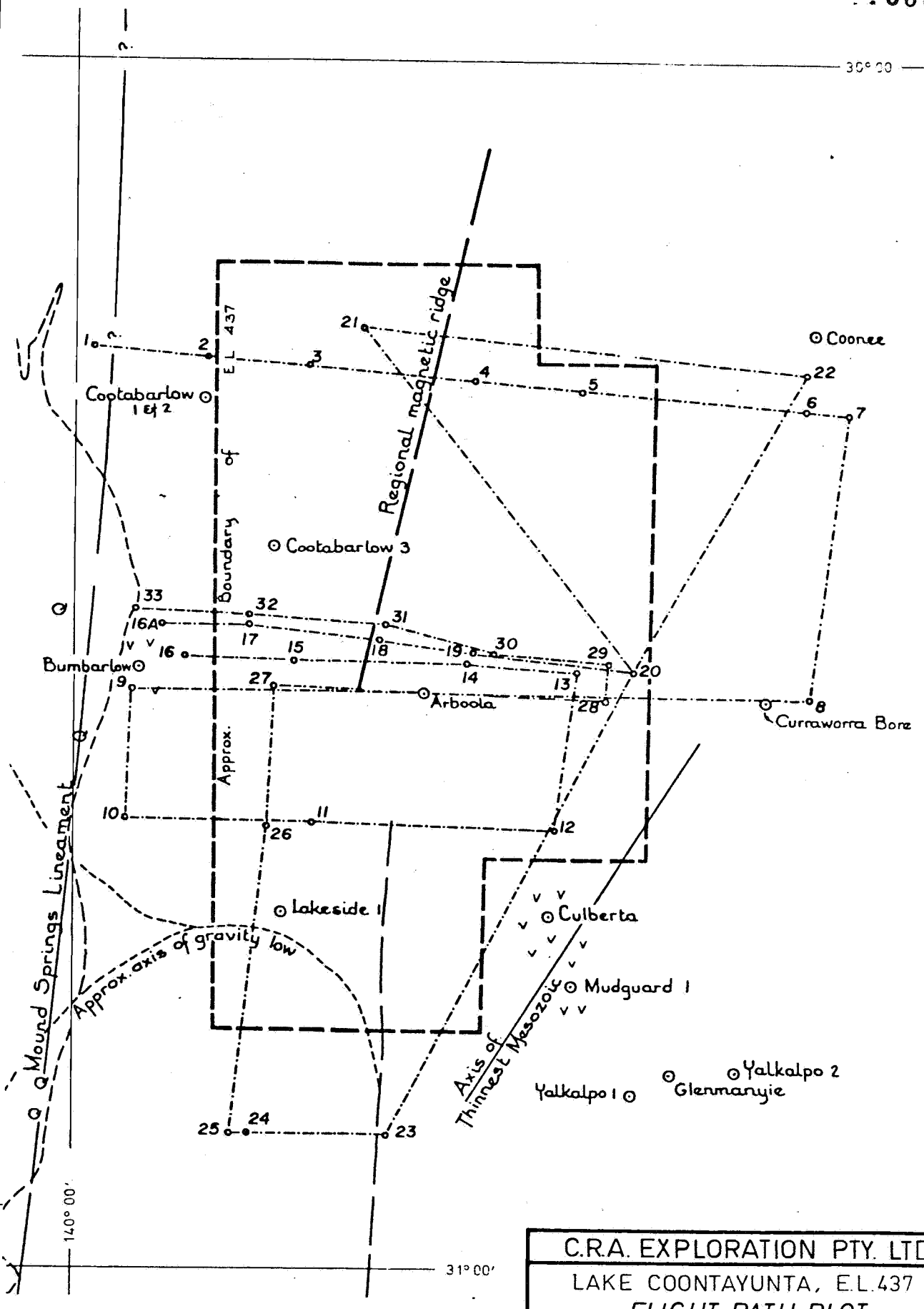
C.R.A. EXPLORATION PTY. LIMITED

LAKE COONTAYUNTA, E.L. 437.

LOCATION MAP

Sheet Ref.: FROME SH 54-10

Geol.: P. A.B.	Scale : 1:250,000
Drawn: D.R.W. 28-6-'78.	Plan N°: SAa 212



SCALE 1:500,000.

0 10 20 30 40 KMS.

C.R.A. EXPLORATION PTY. LTD.

LAKE COONTAYUNTA, E.L.437

FLIGHT PATH PLOT & DRILL HOLE LOCATIONS

1:250,000 MAP SHEET REF: FROME SH 54-10

Geophys::	G.J.B.	Report No.:	9660
Drawn:	D.R.W.	Scale:	1:500,000
Date:	JUN 1979.	Plan No.:	SAa 282

51

L. Callabonna
Ruin
Moolawatana Bore
Fence
Fence
Cootabarlow Bore
L. Cootabarlow
140°08'
140°26'
140°33'
30°10'
30°15'
30°30'
30°40'
30°45'
30°48'
140°23'
140°30
140°15'
140°00
437
E. L.
OF
APPROX.
BOUNDARY
FROME
LAKE
L. Pundalpa
L. Coontayunta
L. Bumbarlow
L. Elder
Yellnif Dam
Culberta Bore
TN.
33
16A
32
17
16
15
31
2·7
18
3·0
19
30
29
3·1
14
13
20
27
2·5
2·5
9
28
8
10
26
1·8
2·0
12
Scale 1 250,000
5 0 5 10 15 20 25 K M.S
Report N°: 9660

LEGEND

Reconnaissaince aero-magnetic survey flight path.

26 Fiducial.

1·8 Calculated magnetic depth estimates - (metres below ground level).

C.R.A. EXPLORATION PTY. LIMITED

LAKE COONTAYUNTA, E.L. 437.
CALCULATED DEPTHS TO MAGNETIC BASEMENT

Sheet Ref.: FROME SH 54-10

Geophysicist : G.J.B.	Scale : 1:250,000
Drawn: D.R.W. 28-6-'78	Plan N°: SAa 283

52

52

40°08'

40°26

30°10'

140°33

Ridge

Magnetic

Regional

L Coontayunta

L Pundalpa

LINE A

LINE T

L Bumbarlow

Arboola Bore

L Elder

L Cootabarlow

Cootabarlow Bore

Yellnif Dam

Culberta Bore

30°48'

140°23'

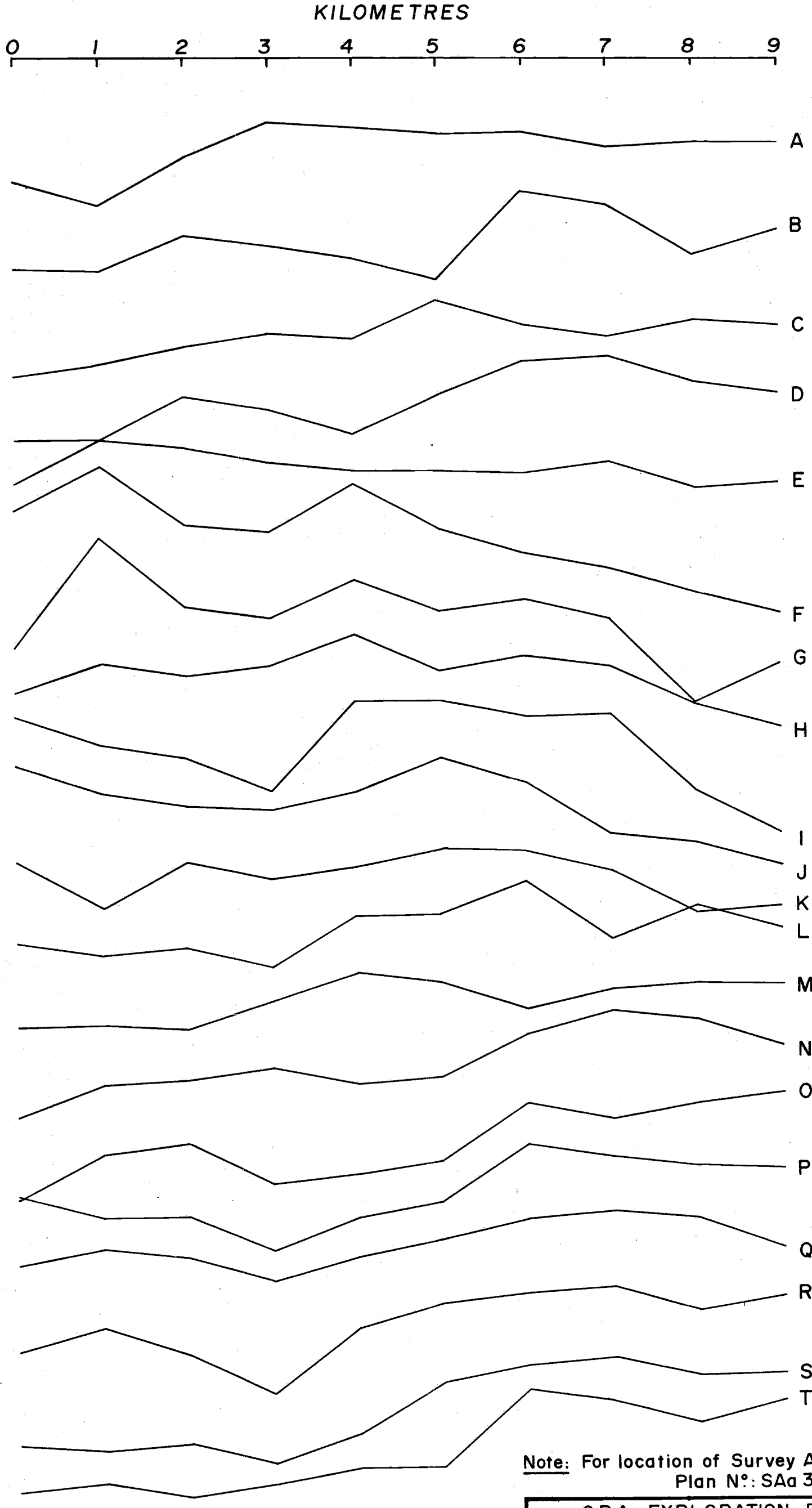
Survey Area

CRA EXPLORATION PTY LIMITED

LAKE COONTAYUNTA, E.L 437
GRAVITY SURVEY AREA

Geophys G J B	Scale 1:250,000
Drawn D R W	Date 27 SEPT 1
Report N° 3660	Plan N° SAu 305

53.



Note: For location of Survey Area, refer to Plan N°: SAa 305

Vertical Scale: 1cm = 0·5 mgal.

Horizontal Scale: 1cm = 500 metres.

C.R.A. EXPLORATION PTY. LIMITED.

LAKE COONTAYUNTA, E.L.437

BOUGUER GRAVITY PROFILES, LINES A to T

LAKE ELDER AREA

SHEET REF.: FROME SI 54-2.

Geophys.: G.J.B.	Scale 1:50,000.	Date: 27-Sept-1979
Drawn: D.R.W.	Report No.: 9660.	Plan No.: SAa 306

TN

MT PAINTER INLIER

Beverley

MT PAINTER

Base Tertiary

POONTANA SUB-BASIN

LAKE FROME

Poontana Structure

Mound Springs Lineament

Approx axis of gravity low

Boundary of E.L. 437

Regional magnetic ridge

Approx

Cootabarlow 1 & 2

Cootabarlow 3

Bumbarlow

Arboola

Currawarra Bore

Lakeside 1

Culberta

Mudguard 1

Yalkalpo 1

Yalkalpo 2

Glenmaryie

Axis of Thinnest Mesozoic

Coonee

WIRREALPA SUB-BASIN

ARROWIE BASIN (YOUNGS)

BENAGERIE RIDGE (YOUNGS)

S.A. - N.S.W. BORDER

Remnants of silicified Eyre Formation

GOULD'S DAM

YARAMBA

HONEYMOON

EAST KALKAROO

MT VICTORIA

CROCKERS WELL

RADIUM HILL

30°00'

31°00'

32°00'

139°00'

140°00'

141°00'

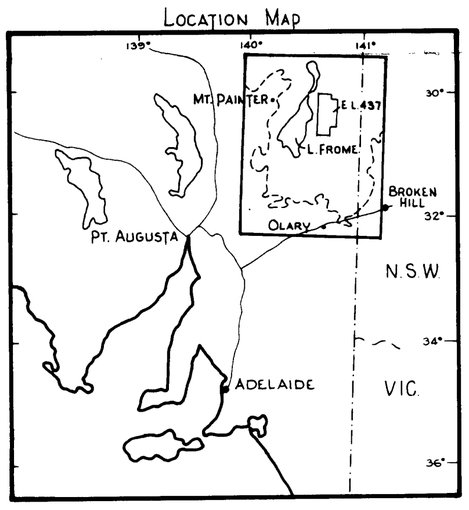
LEGEND

- Limit of Tertiary Tarkarooloo Basin (Callen)
- Limit of Cambrian (Youngs)
- Axis of Gravity Feature
- Axis of Magnetic Feature
- Outline of Benagerie Ridge.
- Bore Hole
- Uranium mineralization
- Approx. position of E.L. 437 (L. Coontayunta).
- Reconnaissance Aeromagnetic Survey Flight Path. (Further details available on Plan Number SAa 267)

PHANEROZOIC
- Mesozoic Sediments.
- Cambrian Sediments.
- Granite.
- Adelaidean Sediments.

PROTEROZOIC
- Granite.
- Volcanics.
- Metamorphics

LOCATION MAP



SCALE 1 : 500,000

0 10 20 30 40 50 KMS

1:250,000 SHEET REFERENCES

S.A.	N.S.W
MARREE SH 54-5	MILPARINKA SH 54-7
COPLEY SH 54-9	COBHAM LAKE SH 54-11
PARACHILNA SH 54-13	BROKEN HILL SH 54-14
ORROROO SI 54-1	
CALLABONNA SH 54-6	
FROME SH 54-10	
CURNAMONA SH 54-14	
OLARY SI 54-2	

C.R.A. EXPLORATION PTY. LIMITED.

LAKE FROME AREA

COMPILATION OF GEOLOGICAL & GEOPHYSICAL DATA

After R.W. ALLEN (1976), & B.C. YOUNG (1978).

Geol.:	P.A.B.	Report No.:
Drawn:	D.R.W.	Scale: 1:500,000.
Date	30-4-'79.	Plan No.: SAa 210.

3462-1

L Callabonna

Ruin

Bore

Moolawatana

Fence

Proof

Ver

L Cootabarlow

Cootabarlow Bore

L. Pundalpa

L Coontayunta

L. Bumbarlow

Arboola Bore

Yellnif Dam

Culberta Bore

L. Elder

E.L. 437

BOUNDARY OF

SEISMIC LINE EFK

APPROX.

FROME

LAKE

140°08'

140°26'

140°33'

140°45'

140°00'E

140°15'E

140°30'E

140°23'

30°10'

30°15' S

30°30' S

30°40'

30°45' S

30°48'

T.N.

Scale 1:250,000

5 0 5 10 15 20 25 kms.

NOTE:

CONTOUR DATA COURTESY OF S.A.D.M.E.

LOCATION MAP

29° 131° 133° 135° 137° 139° 141°

26° 28° 30° 32° 34° 36° 38°

LEGEND

- Reconnaissance aeromagnetic survey - flight path.
- ⊙5 Fiducial.
- 2000 Magnetic contours, values in gammas.
- ●1·4 Preliminary magnetic depth estimates. (metres below ground level).
- E.L. Boundary.

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LAKE COONTAYUNTA, E.L. 437

PRELIMINARY MAGNETIC DEPTH ESTIMATES

1:250,000 SHEET REF.: FROME SH54-10

Geophysical Data G.J.B.	Date: MAY, 1979.
Drawn: D.R.W.	Scale 1:250,000.
Report No.:	Plan No.: SAg 267.

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	10	9	8	7	6	5	4	3	2	1	
A	8·54 29 84	8·26 25·86	8·82 39·21	9·23 17 20	WET LAKE	9·10 11·73	9·12 20 81	8·94 27 82	9·00 33 36	8·99 39 39	A
B	8·02 37 70	7·99 25 79	8·40 30·01	8·28 28·52	8·14 11 25	7·89 18·60	8·93 33 28	8·77 32 29	8·18 34·06	8·49 33·15	B
C	7·26 30·07	7·40 25·33	7·61 26 75	7·76 28·39	7·70 24·17	8·15 22·88	7·86 25·84	7·72 32·87	7·91 27·12	7·85 28·79	C
D	7·02 28·81	7·03 38 67	7·53 26 03	7·37 31·25	7·09 35·79	7·54 32 76	7·93 30·53	7·99 31·31	7·69 34·14	7·56 32 26	D
E	7·00 40 94	7·52 29·92	·.43 28 50	7·25 31·93	7·15 36·06	7·16 32 60	7·13 40·19	7·26 34·77	6·95 33·63	7·02 37 41	E
F	7·20 29 83	7·71 29 49	7·03 32 40	6·94 38 38	7·50 34·30	6·97 33 44	6·69 38 67	6·51 41·59	6·23 36·49	5·99 34 71	F
G	6·10 31 47	7·37 29 23	6·57 28 74	6·43 35·64	6·88 33 62	6·51 30·21	6·65 41 11	6·42 35 17	5·44 39 10	5·90 28·83	G
H	6·07 39 83	6·41 26·14	6·26 37 48	6·38 27 37	6·74 33·69	6·32 31·20	6·49 43 30	6·37 43 57	5·92 23 74	5·66 29 04	H
I	6·27 32 05	5·95 34 34	5·80 21 88	5·41 24 55	6·46 30 76	6·47 30 43	6·28 38·54	6·31 27·19	5·41 19 95	4·92 33·52	I
J	6·21 28 47	5·89 31 17	5·74 26 56	5·70 32 45	5·91 34 69	6·30 36 72	6·01 27 50	5·40 15 55	5·30 24·05	5·04 27 08	J
K	5·59 28 39	5·06 35 27	5·60 30 25	5·40 37 81	5·54 37·15	5·75 40 41	5·72 31 33	5·49 32·19	5·25 21·54	5·08 28·72	K
L	5·14 29·52	5·00 36·28	5·10 34 36	4·87 38 94	5·47 37 92	5·49 28 85	5·87 17 06	5·20 35 42	5·59 28 29	5·32 30·01	L
M	4·68 29·53	4·70 33 70	4·65 47 81	4·98 42 12	5·30 34 68	5·19 18 25	4·88 18·36	5·11 22·90	5·18 28·63	5·16 35·25	M
N	4·13 30·63	4·50 31·73	4·56 28·29	4·70 30·28	4·51 30·33	4·59 25·45	5·09 25·83	5·36 25·56	5·25 34·08	4·95 36·74	N
O	3·66 20·85	4·19 21·51	4·32 29·37	3·85 26·14	3·96 17·68	4·11 29·38	4·78 23·20	4·60 27·43	4·78 40·44	4·70 43·25	O
P	4·20 12 15	3·96 18·79	3·97 29·85	3·57 21·26	3·95 15 07	4·14 19·67	4·80 22 88	4·66 28 66	4·55 33·78	4·52 32·01	P
Q	3·90 13 92	4·09 24·77	3·99 26 95	3·71 13 78	3·99 20 86	4·20 18·81	4·43 26 67	4·52 29 26	4·44 33 24	4·09 34·24	Q
R	3·40 24·99	3·69 23·28	3·36 34·03	2·90 24·58	3·66 28 01	3·95 26·43	4·07 31 54	4·14 29·82	3·86 35·29	4·03 36·85	R
S	2·80 29 39	2·74 23 64	2·82 33 74	2·59 28·96	2·93 25 98	3·53 28·28	3·72 28 18	3·81 24·35	3·60 35·68	3·63 36·74	S
T	2·76 21 58	2·86 24 75	2·70 30·93	2·85 27 36	3·03 30 01	3·04 27·31	3·93 30 20	3·80 30·48	3·55 31·90	3·81 38 25	T
	10	9	8	7	6	5	4	3	2	1	

LEGEND

GRAVITY : 4·52
ELEVATION : 29 26

All elevations approx. A.H.D. as tied to approximated spot heights.

All data reduced relative to main base as no isogal station in the area

DENSITY : 2 40 gm/cc.
CONTOUR INTERVAL : 0·25 mgal.
INSTRUMENTS : LACOSTE Gravity Meter G—35
2 Microbarographs for elevations

SOLO GEOPHYSICS & CO.

C.R.A. EXPLORATION PTY., LIMITED.

LAKE COONTAYUNTA E.L.
LAKE ELDER GRID
GRAVITY SURVEY

DATE: SEPT. 1979 | SCALE: 1:25000 | PLAN Nº SAa 345

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