DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

Rept.Bk.No. 80/54

COONGRA NO. 1

WELL COMPLETION REPORT

GEOLOGICAL SURVEY

By

I.W. NORTHCOTT

FOSSIL FUELS SECTION

MAY, 1980.

D.M.E. No: 545/73

CONTENTS

FIGURES

APPENDICES

ENCLOSURES

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

Rept.Bk.No. 80/54
D.M.E. No. 545/73

COONGRA NO. 1
WELL COMPLETION REPORT

INTRODUCTION

Coongra No. 1 located approximately 130 km north-west of Oodnadatta (Fig. 1) was spudded on 3rd March 1978 and reached total depth on 20th March 1978 at 200.7 m. Numerous drilling problems occurred as a result of the collapse of unconsolidated formations into the well. A total of 67.85 m of core was cut recovering only 11.32 m (17%).

In the region of Coongra No. 1 (Fig. 1) Mesozoic sediments of the Eromanga Basin cover the Muloorinna Ridge, a "basement" feature that appears to separate the Permian Arckaringa and Pedirka basins.

The primary drilling objective was to determine whether Permian sediments extended across the northern Muloorinna Ridge, and thereby connected the Arckaringa and Pedirka basins. A secondary objective was to identify a "basement" high-speed seismic refractor, to assist interpretation of geophysical data. Two "basement" refractors have previously been identified in the region: a ?Devonian dolomite and an ?Ordovician quartzite.

The well penetrated sediments of the Eromanga Basin and was abandoned within the Early Cretaceous Cadnaowie Formation. At total depth the well was 34 m deep to prognosed "basement" but no Permian or "basement" was encountered.

WELL HISTORY

1. General Data

(i) Well: Coongra No. 1 (redrill: Coongra No. 1A)

(ii) Operator: S.A. Dept. of Mines and Energy, 191 Greenhill Rd., EASTWOOD SA 5063

(iii) Petroleum Tenement: Outside any licence area

(iv) 1: 250 000 Sheet: Wintinna SG 53-14

(v) Location-Coongra No. 1: Latitude 27°08'15" S, Longitude 134°08'20" E

- Coongra No. 1A: 46.6 m, azimuth 330°, from Coongra No. 1

(vi) Elevation: ground level: 292 metres a.s.l.

	Coongra No. 1	Coongra No. 1A
(vii) Total depth:	200.7 m (driller)	138 m (driller)
(viii) Date Drilling commenced:	3rd March 1978	14th March 1978
(ix) Date Total depth reached:	20th March 1978	15th March 1978
(x) Date well abandoned:	20th March 1978	16th March 1978
(xi) Date Rig released:	24th March 1978	-
(xii) Drilling time:	12 days	2 days
(xiii) Status:	plugged and abandoned	plugged and abandoned

(xiv) Total cost: $22,696

2. Drilling Data

(i) Name and address of drilling contractor:

S.A. Department of Mines and Energy,
Mechanical and Drilling Branch,
Dalgleish Street,
THEBARTON, SA 5031

(ii) Drilling rig:
Make: Mayhew 100
Rated Capacity: 305 metres, hole size 108 mm to 144 mm
Motor: Cummins C175 diesel
Power Rating: 175 HP @ 2,500 RPM

(iii)Mast:
Make: Gardner-Denver
Type: Tabular four way taper design
Rated Capacity: 35 000 lbs

(iv) Pumps: 2

(1) Rig pump:

Make: Gardner Denver
Type: Duplex slush pump
Size: F and G 5" x 6"; 150 gpm @ 75 strokes/min.
Motor: chain driven from rig P.T.O.

(2) Trailer mounted coring pump:

Make: John Bean
Type: 435 Triplex
Size: 23/4" x 23/4"; 30 gpm
Motor: Petter diesel
Power Rating: PH2-16 HP @ 2,000 rpm

(v) Blowout Prevention Equipment: None

(vi) Hole sizes and depths:

Coongra No. 1		Coongra No. 1A	
Size	Depth (m)	Size	Depth (m)
11 3/4"	0.5	12¼"	0.5
4 3/4"	6.0	7¼"	3
7¼" ream	6.0	5 3/8"	138
4 3/4"	18.0		
5 3/8" ream	18.0		
5 3/8"	66.0		
7¼" ream	33.0		
5 3/8"	105.5		
3 3/4"	118.6		
5 3/8" ream	116.6		
5 3/8"	127.4		
3 3/4"	128.4		
5 3/8" ream	128.4		
5 3/8"	131.6		
3 3/4"	147.8		
5 3/8" ream	147.8		
5 3/8	165.6		
3 3/4"	200.7		

(vii)Casing and Cementing Details:

(1) Casing

Coongra No. 1

Size	Weight	Grade	Depth (m)
6"O.D. x 3/16" wall	11.641 lbs/ft	swelled, unstressed	33.3 m left in hole
PQ drillpipe O.D. 4½" I.D. 4 1/10"	10.31 lbs/ft	flush joint	165.2 m recovered

Coongra No. 1A

6" O.D. x 3/16" wall	11.641 lbs/ft	swelled, unstressed	3 m recoverd

(2) Cementing:

Coongra No. 1: backfilled and plugged from surface to 36m using 9 sacks cement

Coongra No. 1A: backfilled and plugged from surface to 8m using 2 sacks cement

(viii)Drilling Material Consumed:

	Coongra No. 1	Coongra No. 1A
Supagel	12 sacks	3 sacks
Roplug	1 sack	-
Rotrol	15 sacks	8 sacks
Hydropol	-	½ sack
Q-Broxim	2/3 sack	-
Rohull	½ sack	½ sack
Diesel	135 litres	130 litres

Bits used:

No. used	Size	Type	Make
1	7 7/8	M	Hughes (Coongra Nos 1,1A)
1	5 3/8	VH2	Varel (Coongra No 1)
1	5 3/8	V2	Varel (Coongra No 1A)
3	HQTT	Diamond multistep	Mindrill (Coongra No 1)
1	HQTT	Tungsten chips	DM (Coongra No 1)

(ix) Type of Core Barrel and Inner Tube

Core Barrel:	Longyear	HQTT	3.0 m
Inner Tube:	Longyear	HQTT	3.0 m

(x) Water Supply: Top bore located 3 km north of Welbourn Hill Station. Salty water, suitable for stock only.

(xi) Perforations: none

(xii) Fishing Operations:

Coongra No. 1 rotary-drilled 5 3/8" hole to 165.6 m depth. HQTT stuck in hole at 154.7 m. Snapped HQTT at 36 m. Fish with "A" type carrot on API drill string. Snapped HQTT at 45 m. Ordered PQ washover string from Department Depot. Moved off hole to Coongra No. 1 A, 46.6 m azimuth 330° from Coongra No. 1. Drilled to 138 m. Hole collapsed back to 12 m. Abandoned hole. Repositioned over Coongra No. 1. Washed over with PQ drillpipe to 165.2 m. Fished HQTT with "A" type carrot on API drill string. Recovered HQTT. Laid down barrel and damaged HQTT. RIH with HQTT using PQ drill pipe as casing, cored ahead until hole abandoned at 200.7 metres. PQ recovered, 6" casing abandoned.

3. Formation Sampling

(i) Ditch Cuttings

One sample of ditch cuttings was taken for each 3-metre interval of rotary drilled hole, after allowance for ciculation-time lag to reach surface. A small fraction was washed and examined under x30 binocular microscope. Samples were not tested for fluorescence.

(ii) Coring - Coongra No. 1

Core Run	from	to	metres cut	Recovery	%
1	105.35	106.50	1.15	0.38	33
2	106.50	107.50	1.00	0.45	45
3	107.50	108.50	1.00	0.00	0
4	108.50	109.10	0.60	0.10	17
5	109.10	109.80	0.70	0.20	29
6	109.80	112.80	3.00	0.12	4
7	112.80	113.30	2.50	0.00	0
8	113.30	113.80	0.50	0.00	0

Core Run	from	to	metres cut	Recovery	%
9	113.80	114.80	1.00	0.00	0
10	114.80	115.60	0.80	0.01	1
11	115.60	118.60	3.00	0.04	1
12	127.40	128.40	1.00	0.00	0
13	131.60	132.95	1.35	0.72	53
14	132.95	135.95	3.00	1.00	33
15	135.95	136.80	0.85	0.68	80
16	136.80	139.80	3.00	1.58	53
17	139.80	142.40	2.60	1.43	55
18	142.40	145.20	2.80	1.93	69
19	145.20	147.80	2.60	1.67	64
20	165.20	168.20	3.00	0.82	27
21	168.20	171.20	3.00	0.00	0
22	171.20	174.20	3.00	0.00	0
23	174.20	177.20	3.00	0.00	0
24	177.20	180.20	3.00	0.11	4
25	180.20	185.20	5.00	0.00	0
26	185.20	186.55	1.35	0.00	0
27	186.55	186.90	0.35	0.00	0
28	186.90	187.37	0.47	0.00	0
29	187.37	187.50	0.13	0.00	0
30	187.50	187.80	0.30	0.05	17
31	187.80	188.00	0.20	0.00	0
32	188.00	188.30	0.30	0.01	3
33	188.30	191.30	3.00	0.00	0
34	191.30	191.40	0.10	0.00	0
35	191.40	194.40	3.00	0.00	0
36	194.40	197.40	3.00	0.00	0
37	197.40	198.00	0.60	0.00	0
38	198.00	200.00	2.00	0.00	0

Core Run	from	to	metres cut	Recovery	%
39	200.00	200.20	0.20	0.02	10
40	200.20	200.50	0.30	0.00	0
41	200.50	200.70	0.20	0.00	0
TOTAL			67.85	11.32	17%

(iii) Repositories: all samples and cores are stored at:-

South Australian Department of Mines and Energy
Core Library,
Conyngham Street,
GLENSIDE, SA 5063

4. Logging Details and Surveys

Logging Details

Run 1	Depth (m)	Casing Sizes and Depths
Gamma Ray, Neutron	Surface to 154	6" to 33 m (logs)
Density	" "	HQ rods 154.7 m (driller SIH)
Run 2		
Gamma Ray, Neutron	Surface to 198	6" to 33 m (logs)
Density	" "	HQ rods to 153.6 m (logs)
S.P., Point Resistivity	164.4 to 196.8	
16" normal, 64" normal resis.	160.8 to 196.2 to 195.4	
6' lateral resis.	160.8 to 196	

(ii) Penetration Rate: recorded for each metre drilled.

(iii) No other surveys.

5. Formation Testing

No formation testing was carried out.

GEOLOGY

1. General

The Pedirka and Arckaringa basins are Permian infrabasins apparently separated by the Muloorinna Ridge (Milton and Morony, 1975) and overlain by Mesozoic sediments of the Eromanga Basin (Fig. 1). The Arckaringa Basin contains only Early Permian sediments, and although no Late Permian sediments have been identified in the Pedirka Basin they may exist in its deeper, eastern part (Devine and Youngs, 1975).

Within the region of interest (Fig. 2) the Muloorinna Ridge is built partly of ?Devonian dolomite at the Mount Willoughby No. 1 well (Thornton, 1971), and of ?Ordovician quartzite at the Oodnadatta No. 1 well (Freytag 1966: Wopfner et al., 1970), Oodnadatta Town Bore No. 2 (Thornton, 1974) and Weedina No. 1 well (Papalia, 1970). Permian stratigraphy within the Arckaringa and Pedirka basins can be summarised as follows:

Arckaringa Basin		Pedirka Basin
Mount Toondina Beds: shales, silstones, minor sands and coals.	EARLY PERMIAN	Purni Formation: thinly bedded coals and sandstones (upper unit) conglomerate, sandstone (middle unit); carbonaceous shale, sand and conglomeratic lenses (lower unit).
Stuart Range Formation: shale with silty bands.		
Boorthanna Formation: conglomerate and sandstone (upper unit); diamictites (lower unit).		Crown Point Formation: diamictites

Reviews of the Arckaringa and Pedirka basins have recently been published by Townsend (1976) and Youngs (1975).

Sediments of the Eromanga Basin include the Late Jurassic Algebuckina Sandstone and the overlying Early Cretaceous Cadnaowie, Bulldog Shale and Oodnadatta Formations (Wopfner et al., 1970).

The Algebuckina Sandstone is a fine-grained sand to pebble conglomerate; it is generally vivid white due to an abundance of interstitial kaolin. Vertical and lateral facies changes are common within this formation, which Wopfner et al. (1970) consider was deposited under freshwater terrestrial conditions.

The Cadnaowie Formation is dominantly a quartz sandstone; it is generally fine to medium-grained, containing irregular gritty bands and pebbles and particularly near its base may contain large boulders. These sediments were laid down under marginal marine conditions initiated by a marine transgression (Wopfner et al., 1970).

Dark grey shales, fossiliferous, carbonaceous, silty and pyritic are characteristic of the Bulldog Shale.

The Oodnadatta Formation is clay-rich and includes three members: the basal Coorikiana Member, a fine grained glauconitic sandstone; the silty Wooldridge Limestone Member; and the Mount Alexander Sandstone Member, which also is fine grained and glauconitic.

Tertiary silcretes, gibber spreads and/or Quaternary aeolian and gypseous sands are variably developed as a surface veneer throughout the area.

2. Drilling Objectives

As a consequence of this Department's geophysical and geological investigations within the area, Devine and Youngs (1973, 1975) recognised that possible interconnection between the Pedirka and Arckaringa basins may have resulted in deposition of Permian sediments across the Muloorinna Ridge. Coongra No. 1 was sited principally to test this hypothesis. The well site location

TABLE 1

3. STRATIGRAPHIC TABLE: Coongra No. 1 elevation: 292 m a.s.l.

AGE			MICROPLANKTON ZONES		FORMATION	DRILLED DEPTH (m)	DEPTH (m) SUBSEA
						0	+ 292
QUATERNARY					Un-named	9	+ 283
EARLY CRETACEOUS	ALBIAN				BULLDOG SHALE		
					?	82.3	+ 209.7
					CADNAOWIE FORMATION		
	APTIAN	LATE	O.operculata	c (1)			
				b			
		EARLY		a (2) (3)			
						200.7 (TD)	+ 91.3

Micro-fossil assem-blage at (1) 106 metres (2) 188.3-191.2 metres (3) 200.2 metres

was selected on a seismic and gravity "high", (Fig. 4) with the secondary objective of determining "basement" lithology partly to assist seismic interpretation.

4. Stratigraphy

4.1 Un-named (Quaternary); depth interval: surface to 9 m.

This unit consists dominantly of unconsolidated silcrete cobbles within a light brown, gritty, soil matrix.

4.2 Bulldog Shale (Albian); depth interval: 9m-82.3m

This formation consists of white, reddish, ochre and yellow weathered and oxidised clayey siltstones to a depth of approximately 36 m. Weathering diminished below this depth and the fresh rock consists predominantly of clayey siltstones, dark grey to black in colour, occasionally slightly calcareous and containing some carbonaceous specks. The siltstone fraction consists of fine, subangular clear to white quartz with minor amounts of glauconite. Pyrite and accessory opaques and some calcium carbonate crystals were noted together with some laminations in cuttings samples. Several hard bands of brown dolomitic siltstone, up to approximately 20 cm thick were intersected.

Interbedded glauconitic, fine to medium grained sandstones were developed between 60.3 m and 65.8 m depth. These were unconsolidated, porous and well sorted, composed predominantly of quartz, with angular to subrounded and often polished grains which were variably clear, white, rose, bluish or yellow. Glauconite constituted about 10% and pyrite 2% of the cuttings from these sandstones. Pyrite and chlorite growths were common on other grains and minor opaques including zircon and ?ilmenite also occur.

Some interbeds of fine to medium grained quartz sandstone occurred below 66 m, becoming more common towards the base of the Bulldog Shale.

4.3 Cadnaowie Formation (Late Aptian-Albian?); depth interval, 82.3 m to 200.7 m.

This formation consists mainly of clay-rich, fine to coarse pebbly white quartzose sandstone, poorly sorted and probably lacking well-defined bedding. The sandstones commonly show a bimodal grain size distribution with subangular to subrounded grain shapes. Pyrite and ilmenite comprise up to 5% of the retrieved rock samples. Accessory glauconite, sphene, zircon, garnet, muscovite, other unidentified opaques and carbonaceous chips also were noted. The sand fraction averages 60% of the whole rock. The clay matrix is composed predominantly of kaolinite; it is shiny, bright white to light grey in colour and frequently forms thin (5cm) bands. The clay fraction appeared to increase with depth and near total depth it may average 60% of the whole rock.

Some sedimentary structure was visible in recovered cores with pebbles commonly concentrated in bands and heavy minerals commonly occurring as laminae on cross-bedding.

Within the interval 105-110 m quartz cobbles were drilled and at 127 m depth the top of an 80 cm thick pyritic sandstone was intersected.

The drilled Cadnaowie Formation generally was unconsolidated and had little cohesive strength.

A core sample taken at 106 m depth contained a microfossil assemblage which indicates a marine environment of deposition. Cuttings from the interval 188.3 m to 191.2 m depth and core from 200.2 m depth also contained microfossils indicating a marine environment of deposition. A sample taken from

core at 145.8 m depth contained spores and pollen only, indicating a probably non-marine environment of deposition.

5. Results and Discussions

After considerable drilling difficulties a depth of 200.7 m was reached, this being 34 m below prognosed "basement" depth. The well was then plugged and abandoned because the geophysical interpretation was already proved incorrect and also because of mechanical problems (broken inner tube winch cable, no replacement diamond core bits, HQ rotary drilling could not occur through the washover PQ drillstring) which would have made additional drilling prohibitively expensive. The major drilling objectives were therefore not achieved.

Any interpretation of the section based upon the logging suite is unreliable. The hole was logged by running tools inside the washover string to 164.5 m and thereafter in the open hole. Corrections to the log readings for the effects of hole rugosity, casing thickness and density are not known.

It is possible that an Algebuckina Sandstone - Cadnaowie Formation contact may lie at 110 m depth in Coongra No. 1, based on core evidence for a cobble conglomerate just above that level. Wopfner et al. (1970) describe such a conglomerate at the base of the Cadnaowie Formation in the outcrop type section, ascribing it to a marine transgression. However, the section between 82.3 m and 200.7 m depth is otherwise consistent lithologically and its subdivision not warranted.

From a study of palynological data Hos (1979) presents a stratigraphic subdivision differing from that presented here. He recognized only Cadnaowie Formation from 83.5 m depth to total depth, and correlated it with marine mudstones of the Wallumbilla Formation. On page 10 of his report this inter-

pretation is contradicted, however, and it is suggested that the Coongra section above 67 m depth may be correlated with the Oodnadatta Formation.

Figures 4 and 5 present lithostratigraphic and biostratigraphic correlations between wells in the Coongra region. Figure 4 indicates that relative to the biostratigraphic reference section for the Eromanga Basin of South Australia (Santos Oodnadatta No. 1), the Cadnaowie Formation as penetrated in Coongra No. 1 is diachronous. This confirms the comment made in Hos' (1979) Abstract.

Knowledge of the cover rocks over the Muloorinna Ridge has been little advanced by Coongra No. 1 (Fig. 5). Permian sediments have not been proven absent in the Coongra area, but it seems not unreasonable to assume that the Muloorinna Ridge, like the Birdsville Track Ridge, may have been emergent during the Permian.

Terence R. Watt
per.
I.W. NORTHCOTT

REFERENCES

Devine, S.B. and Youngs, B.C., 1973. Stratigraphic problems and proposed drilling north of Oodnadatta. S.A. Dept. of Mines report RB 73/25 (unpublished).

Devine, S.B. and Youngs, B.C., 1975. The Palaeozoic subsurface stratigraphy and petroleum potential of northern South Australia. J. Aust. Petrol. Expl. Assoc., 15:

Freytag, I.B., 1966. Proposed rock units for marine Lower Cretaceous sediments in the Oodnadatta region of the Great Artesian Basin. Quart. geol. Notes. geol. Surv. S. Aust., 18: 3-7.

Hos, D.P.C., 1979. Early Cretaceous palynology of SADME Coongra No. 1, southwestern Eromanga Basin. S.A. Dept. of Mines and Energy report RB 79/15 (unpublished).

Milton, B.E., and Morony, G.K., 1975. A regional interpretation of 1: 1 000 000 gravity and aeromagnetic maps of the Great Artesian Basin in South Australia. Rep. Invest. geol. Surv. S. Aust., 46.

Morgan, R., 1977. New dinoflagellate zones and a depositional model for the Great Australian Basin. Quart. Notes, geol. Surv. NSW, 28: 10-18.

Papalia, N., 1970. Weedina No. 1 well completion report. S. Aust. Dept. Mines open file, Env. 1934 - unpublished.

Thornton, R.C.M., 1970. Lambina No. 1 well completion report. S.A. Dept. of Mines report RB 70/79 (unpublished).

Thornton, R.C.N., 1971. Mount Willoughby No. 1 well completion report. S.A. Dept. of Mines report RB 71/37 (unpublished).

Thornton, R.C.N., 1974. Oodnadatta Town Bore 2 well completion report. S.A. Dept. of Mines report RB 74/178 (unpublished)

Townsend, I.J., 1975. Stratigraphic drilling in the Arckaringa Basin 1969-1971. Rep. Invest. geol. Surv. S. Aust., 45.

Wopfner, H., Freytag, I.B., and Heath, G.R., 1970. Basal Jurassic - Cretaceous rocks of western Great Artesian Basin, South Australia: stratigraphy and environment. Bull. Am. Ass. Petrol. Geol., 54 (3): 383-416.

Youngs, B.C., 1975. The geology and hydrocarbon potential of the Pedirka Basin. Rep. Invest. geol. Surv. S. Aust. 44.

APPENDICES

A Cuttings Descriptions

B Core Descriptions

C Petrographic Descriptions

APPENDIX A

Coongra No. 1 Cuttings Descriptions

0-3 m quartz cobbles, silcrete, with gritty soil matrix; some reddish ochre and white claystone, minor gypsum.

3-6 m as above.

6-9 m as above.

9-12 m claystone (100%); weathered; red, white, grey in colour; soft, sticky, massive; minor gypsum flakes.

12-15 m as above.

15-18 m as above.

18-21 m claystone (80%) as above; 10% siltstone, yellow to red, ironstained, firm; minor gypsum.

21-24 m as above.

24-27 m as above.

27-30 m as above.

30-33 m as above.

33-36 m claystone (100%) as above; siltstone, dolomitic, very thin, brown, hard; intersected at 36 m.

36-39 m claystone (80%) as above; siltstones (20%), much fresher, dark to black, occasional shale laminae; clayey, contains very fine quartz silt, grains rounded, polished; soft to firm; non-calcareous.

39-42 m claystone (65%) as above; siltstone (35%) as above.

42-45 m as above; slightly harder.

45-48 m claystone (40%) as above; siltstone (60%) as above.

48-51 m as above.

51-54 m claystone (20%) as above; siltstone (80%) as above.

54-57 m as above; minor carbonaceous specks, glauconite grains.

57-60 m probably 100% siltstone; minor pyrite.

60-63 m siltstone (70%) as above; sandstone (30%), fine to medium grained, granular, white to pale, unconsolidated;

predominantly quartz; clear, rose, bluish, light green and yellow; angular to subrounded, some polished grains; 10% of sandstone is glauconite, 2% pyrite, minor chlorite; some quartz grains feature pyrite and chlorite growths.

63-66 m sandstone (100%) as above.

66-69 m siltstone (80%) as above; sandstone (20%) as above; lithologies probably interbedded.

69-72 m as above.

72-75 m as above

75-78 m as above.

78-81 m siltstone (55%) as above; sandstone (45%) as above.

81-84 m as above to 83.50; thereafter sandstone, coarse.

84-87 m sandstone (100%), medium to coarse grained; quartzose, clear, white, subangular to subrounded; small pebbles and granules frequent; poorly sorted; bimodal; set in white clayey kaolinitic matrix; accessory pyrite, garnet, limonite, mica, sphene, unidentified opaques, zircon, carbonaceous specks.

87-90 m as above.

90-93 m as above.

93-96 m as above.

96-99 m as above.

99-102 m as above.

102-105.35 m as above.

105.35-118.6 m Coring runs 1 to 11 inclusive - for core descriptions see Appendix II.

118.6-121.40 m as above.

121.4-124.4 m as above.

124.4-127.4 m as above; at 127 m predominantly poor recovery due to white kaolonitic soapy clay; washes away easily.

127.4-128.4 m Core run 12.

128.4-131.6 m sandstone as above; at 128.2 m intersected sandstone, pyritic; very hard; 30% quartz grains; coarse.

131.6-147.8 m Coring runs 13 to 19 inclusive.

147.8-151 m as above.

151-154 m as above.

154-157 m as above.

157-160 m as above.

160-163 m as above.

163-165.2 as above.

APPENDIX B

CORE DESCRIPTIONS

DEPARTMENT OF MINES — SOUTH AUSTRALIA

CORE DESCRIPTION

WELL COONGRA #1
LOCATION
LAT.
LONG.
ELEVATION GR. 992m DATUM A.S.L.
R.T.

CORE NO. Runs 1 to 11 inclusive
DEPTH 105.35 m. to 118.6 m.
DATE DRILLED March 1978
RECOVERY 1.3 m. 9.8 %
FORMATION CADNA-OWIE

DEPTH (METRES)	GRAPHIC LOG	DRILL TIME MINS	RECOVERY LOG	DESCRIPTION
105				
105.35			33%	Sandstone, medium to coarse, some small pebbles & granules; predominantly quartz, some felspar subangular, subrounded, bimodal, grains generally white; 15% clay, light green to bright white, Kaolinitic; heavy minerals, pyrite; clay massive; core unconsolidated.
106.0				
106.5			46%	a.a.; accessories include; pyrite, garnet, sphene, ilmenite-haematite?, muscovite biotite, clay occasionally forms thin laminae to 2.5cm caused by sedimentation lag ie; sand deposited first, ultimately clay from suspension.
107.0				
107.5			0%	
108.0				
108.5			17%	
109.0	109.1		29%	
109.8				quartz cobble; white, fractured, jointed at 60°, minor pyrite; conglomerate clast; this horizon is interpreted as being the base of the Cadna-owie formation.
110.0			4%	
111.0				
112.0				
113.0	112.9		0%	
	113.3		0%	
114.0	113.8		0%	
115.0	114.8		1%	small piece of pyritic sandstone recovered - aa.
	115.6			
116.0			1%	clay fragment recovered aa.
117.0				
118.0				
	118.6			
119.0				
127				
	1224		0%	Run 12
128				
	1284			

CORE BARREL
CORE BIT
TIME—START
FINISH

LOGGED BY
DATE

PETROLEUM GEOLOGY SECTION

SHEET 1 OF 4 | DRG. NO. S

DEPARTMENT OF MINES — SOUTH AUSTRALIA

CORE DESCRIPTION

WELL COONGRA #1
LOCATION —
LAT.
LONG.
ELEVATION GR. 292 m DATUM A.S.L.
R.T.

CORE NO. Run 13 to 19 inclusive
DEPTH 131.6 m to 147.8 m
DATE DRILLED March 1978
RECOVERY 9.01 m 55.6 %
FORMATION CADNA-OWIE

DEPTH (METRES)	GRAPHIC LOG	DRILL TIME MINS	RECOVERY LOG	DESCRIPTION
131.6				
132			58%	sandstone clayey; med-coarse, small pebbles & granules, poorly sorted; angular quartz grains, white kaolinitic clay matrix, easily washes away, some 2-3cm aggregates calcareous cemented. opaques; pyrite & lesser garnet, haematite micas. Core unconsolidated.
133				
133.95				
134			33%	a.a.
135				
135.95			80%	a.a. several thin concentrations of pebbles into bands.
136				
136.8				
137				a.a. several clay bands
138			53%	
139				
139.8				
140				a.a.
141			55%	
142				
142.4				
143				a.a.
144			49%	
145				
145.2				
146				a.a. several heavy mineral laminae, x-bedded.
147			44%	
147.8				
148				

CORE BARREL
CORE BIT
TIME—START
FINISH

LOGGED BY
DATE

PETROLEUM GEOLOGY SECTION

SHEET 2 OF 4 DRG. NO. S

DEPARTMENT OF MINES — SOUTH AUSTRALIA

CORE DESCRIPTION

WELL COONGRA # 1
LOCATION
LAT.
LONG.
ELEVATION GR. 292a. DATUM G.S.I.
R.T.

CORE NO. Run 20 to 25 inc.
DEPTH 165·2 to 185·0 m
DATE DRILLED March 78
RECOVERY m %
FORMATION CADNA-OWIE

DEPTH (METRES)	GRAPHIC LOG	DRILL TIME MINS	RECOVERY LOG	DESCRIPTION
165·2				as per previous description ; sandstone clayey
166			27%	
167				
168	168·2			
169			0%	
170				
171	171·2			
172			0%	
173				
174	174·2			
175			0%	
176				
177	177·2			c.c.
178			4%	
179				
180	180·2			
181			0%	
182				
183				
184				
185				

CORE BARREL
CORE BIT
TIME—START
FINISH

LOGGED BY
DATE

PETROLEUM GEOLOGY SECTION

SHEET 3 OF 4 DRG. NO. S

DEPARTMENT OF MINES — SOUTH AUSTRALIA

CORE DESCRIPTION

WELL COONGRA #1

LOCATION

LAT.

LONG.

ELEVATION GR. 292 m DATUM A.S.L.

R.T.

CORE NO. Run 25 in part to 41 inclusive

DEPTH 185 M to 200·7

DATE DRILLED March 1978

RECOVERY m %

FORMATION EADNA-OWIE

DEPTH (METRES)	GRAPHIC LOG	DRILL TIME MINS	RECOVERY LOG	DESCRIPTION
185·2			0%	
186				
186·65			0%	
186·9			~2%	
187				
187·37			0%	
187·5			17%	recovered 5cm of sandstone clayey a.a.
187·8			5%	0%
188				
188·3			0%	
189				
190				
191				
191·3			0%	
191·4				
192			0%	
193				
194				
194·4			0%	
195				
196				
197				
197·4			0%	
198				
199			0%	
200			10%	2cm of sandstone clayey a.a.
200·2			0%	
200·5			0%	
200·7				TD 200·7m.

CORE BARREL

CORE BIT

TIME—START

FINISH

LOGGED BY

DATE

PETROLEUM GEOLOGY SECTION

SHEET 4 OF 4

DRG. NO. S

APPENDIX C

PETROGRAPHIC DESCRIPTIONS

amdel

The Australian Mineral Development Laboratories

Flemington Street, Frewville, South Australia 5063
Phone Adelaide 79 1662, Telex AA 82520

Winner of Award for Outstanding Export Achievement, 1975

Pilot Plant: Osman Place, Thebarton, Sth. Aust.
Phone Adelaide 43 8053
Branch Offices: Perth and Sydney
Associated with: Professional Consultants Australia Pty. Ltd.

Please address all correspondence to Frewville.
In reply quote: GS 1/2/0

9 May 1978

Director General,
Department of Mines & Energy,
PO Box 151,
EASTWOOD, SA 5063.

Attention: I. Northcott

REPORT GS3571/78

YOUR REFERENCE:	Application of 7 April 1978
MATERIAL:	4 rocks/sands
LOCALITY:	Coongra No. 1
IDENTIFICATION:	P537 - P540/78
DATE RECEIVED:	10 April 1978
WORK REQUIRED:	As specified on application

Investigation and Report by: Dr Brian Steveson

Manager, Geological Services Division: Dr Keith J. Henley

Keith Henley

for R.E. Wilmshurst
Acting Managing Director

jd/1

EXAMINATION OF SAMPLES FROM COONGRA NO.1

1. INTRODUCTION AND PROCEDURES

Four samples (P537-P540/78) were received from Fossil Fuels section of SADME. A clay analysis was carried out on P537/78; this was done simply by carrying out an X-ray diffractometer scan of the bulk sample. No further testing was required.

The three other samples were loose sands and these were deslimed at 0.045 mm; and the -1.2+0.045 mm fraction was separated statically in tetrabromoethane (sp.gr. 2.96). The products were washed, dried and weighed. The sp.gr. products were then examined both in transmitted light (heavy and light products) and in polarised reflected light (PS Nos. 26652-4) (heavy products).

2. RESULTS

Sample P537/78 consists predominantly of well-crystallised kaolinite, with moderate quartz and traces of muscovite.

The proportions of >2.96 sp.gr. material in the separated portions of the three other samples are as follows:

Sample	% >2.96 sp.gr.
P538/78	0.96
P539/78	2.19
P540/78	2.85

P538/78 consists predominantly of angular to subangular quartz grains ranging in size from 0.15 mm to 1.5 mm. The average grain size is approximately 0.25 to 0.3 mm; in general, the sand is moderately well sorted. There are small amounts of a brown, iron-stained clay and aggregates of clean, fine-grained ?kaolinite. The >2.96 sp.gr. product contains 95 to 98% of altered ilmenite and leucoxene with only traces of zircon, tourmaline, pyrite and rutile (possibly 1 to 3% each). Sillimanite and sphene were tentatively identified also.

P539/78 is much coarser-grained and the average grain size is about 0.8 to 1.0 mm with a range commonly from 0.4 to 4 mm. The abundant quartz grains are distinctly angular and many show re-entrant angles. Despite this evidence of immaturity, the sand is almost completely free from clay - only one or two grains of iron-stained clay were noted. The heavy product consists largely of altered ilmenite (90 to 95%) with small amounts of zircon, pyrite (some of which is framboidal) and a trace of ?galena.

P540/78 is distinctly different from the two samples described above; quartz grains range from angular to sub-round varieties. The latter are in the size range of 0.25 to 0.7 mm whereas the whole of the sample has a size range of 0.2 to 1.5 mm, with an average of 0.4 mm. There are traces, only, of brown, iron-stained clays. The heavy fraction contains about 90% of pyrite and more than 5% of kyanite. Other trace heavy components are magnetite, rutile and staurolite.

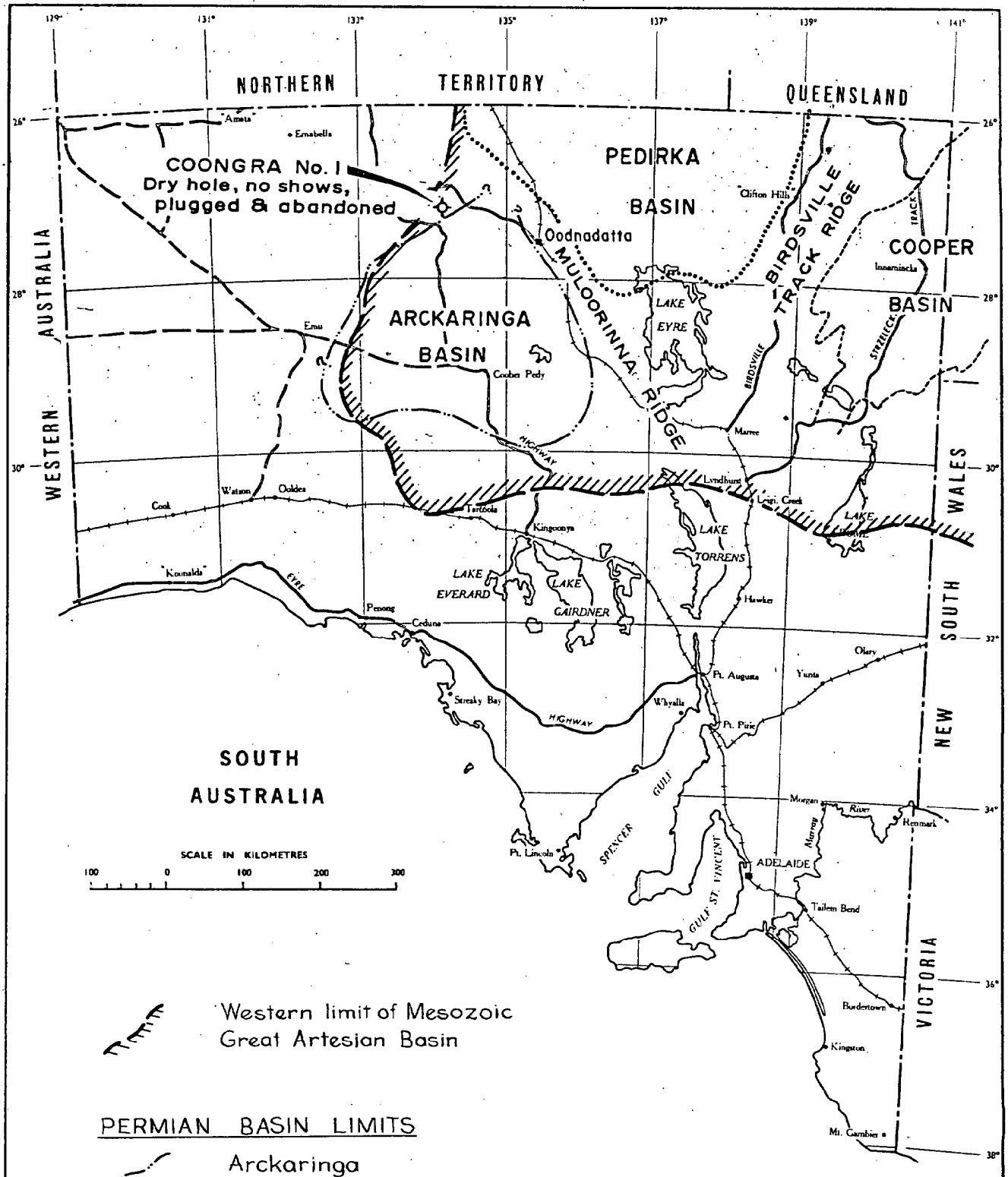


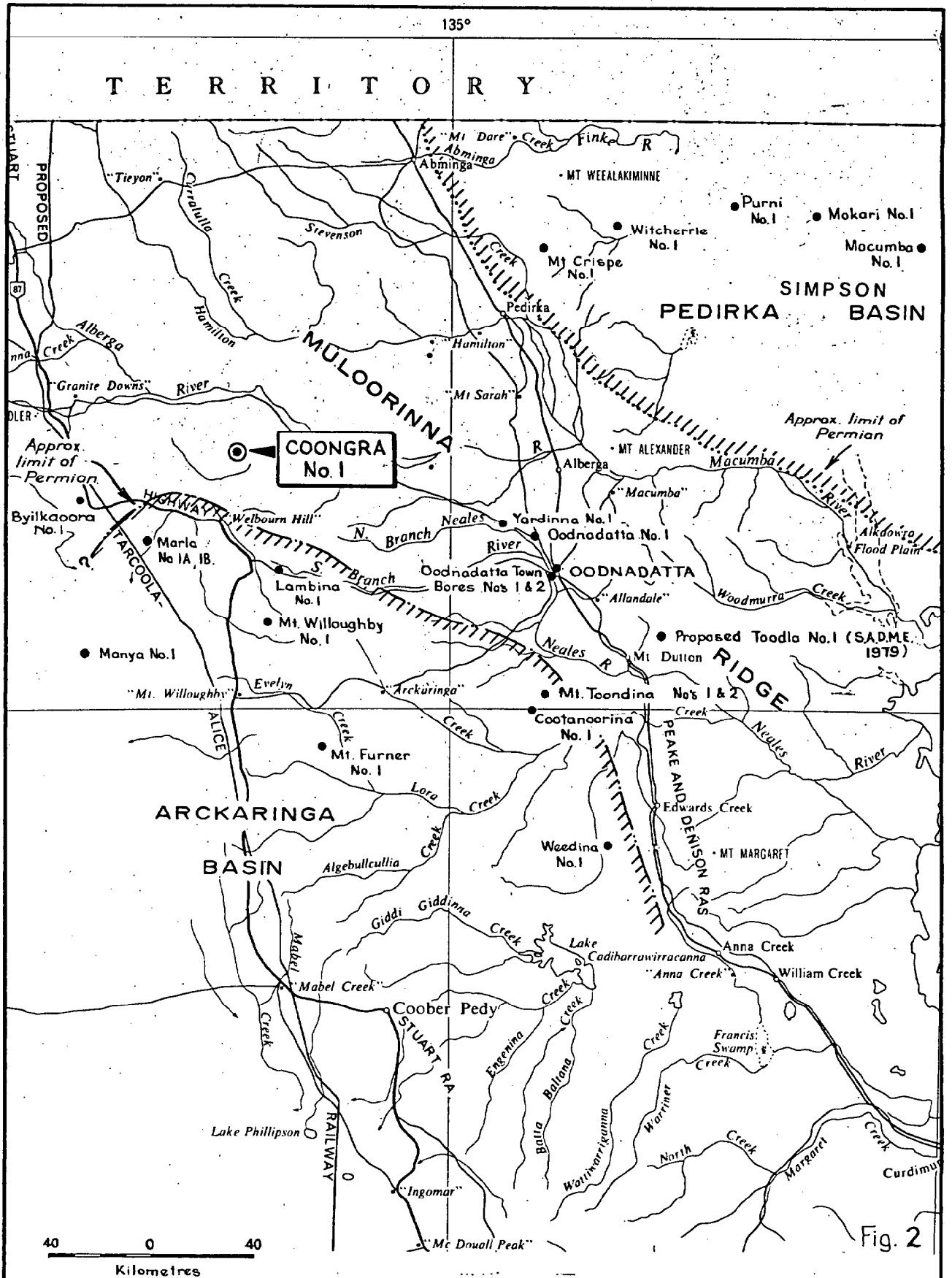
Fig. 1

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

Compiled. I. Northcott	COONGRA No. 1 STRATIGRAPHIC WELL GENERAL LOCALITY PLAN & APPROXIMATE BASIN LIMITS	Date: 20 - 8 - 79
Drn. M.R. Ckd.		Drg. No. S 14217

1526

P.F. No. 55850 994.2



	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE: 1 : 2,000,000
COMPILED: I. Northcott	COONGRA No. 1 STRATIGRAPHIC WELL LOCATION OF STRATIGRAPHIC & PETROLEUM EXPLORATION WELLS	DATE: August 1979
DRN: M.R. CKD:		PLAN NUMBER S 14218

1526

133°30'
135°00'
27°00'
28°00'

COONGRA No 1

Welbourn Hill H.S.

LAMBINA N°1

MT. WILLOUGHBY N°1

Wintinna H.S.

Mt. Willoughby H.S.

Copper Hill H.S.

Arckaringa H.S.

APPROX. LIMITS OF DOLOMITE REFRACTOR

WINTINNA

Fig. 3

Depth to a high speed reflector & refractor (feet).
Datum :- Mean Sea Level.

Bouguer gravity in milligals.

5 0 5 10 15 20 25
KILOMETRES

DEPARTMENT OF MINES AND ENERGY– SOUTH AUSTRALIA

COONGRA No. 1 STATIGRAPHIC WELL

GEOPHYSICAL INTERPRETATION PLAN

WINTINNA 1:250,000

	COMPILED: B.E. Milton G.K. Merony	DRN: M.R.	SCALE: 1:250 000	PLAN NUMBER 79-603
DIRECTOR GENERAL		CKD:	DATE: Aug 1979	

1526

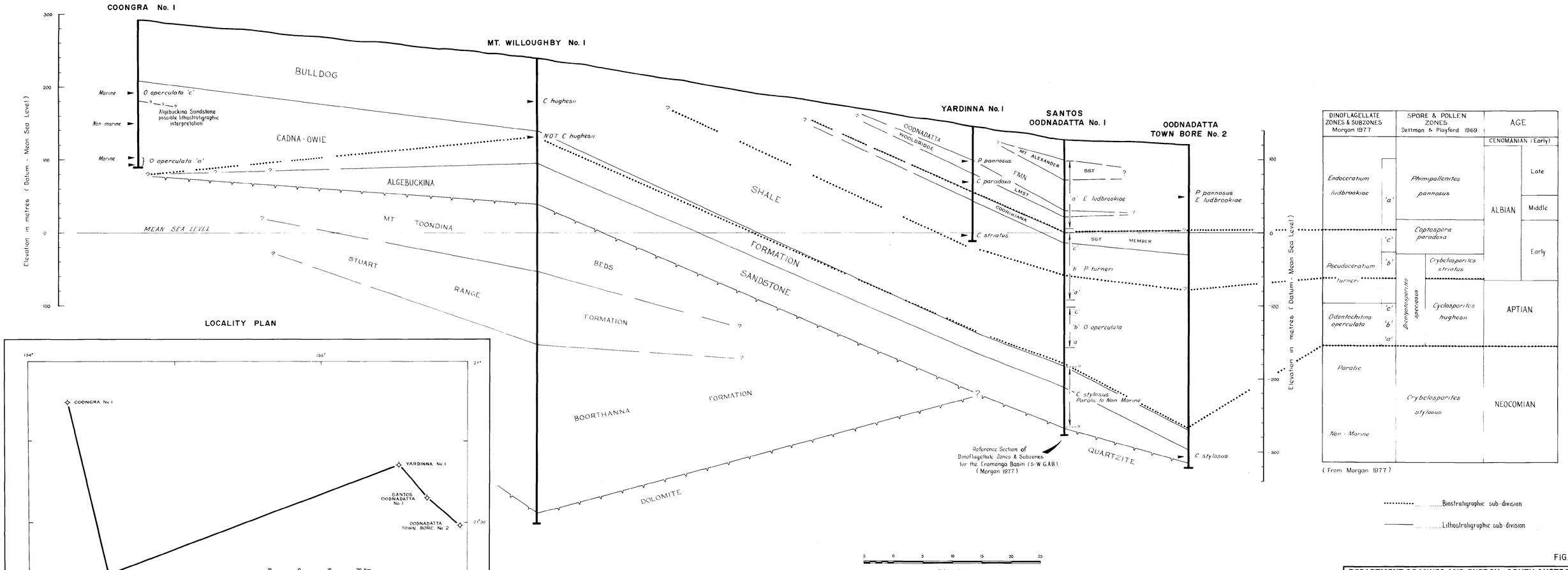


FIG. 4

DEPARTMENT OF MINES AND ENERGY – SOUTH AUSTRALIA

COONGRA No 1 STRATIGRAPHIC WELL
LITHOSTRATIGRAPHIC & BIOSTRATIGRAPHIC CORRELATION DIAGRAM

	COMPILED: I.N.	DRN: M.R.	SCALE Sec 1 250 000 Sec 1 50 000	PLAN NUMBER 79-782
DIRECTOR GENERAL		CKD:	DATE NOV 1979	

N

COONGRA No.1
+292
+283
+209·7
+182
+91·3

LAMBINA No.1
+302
+296

MT WILLOUGHBY No.1
+241·4
+140·8
+96·9
+41·8
-51·2
-150
-382
-398

YARDINNA No.1
+148
+102
+82
+56
+47
-9

OODNADATTA No.1
+129
+100
+73
+32
+25
+2
-11
-180
-209
-265
-274

OODNADATTA TOWN BORES
No.2 +121
No.1 +113
+116
+106
+4
-28
-269
-295
-313
-319
-342
-363

BULLDOG SHALE

CADNA-OWIE FORMATION

Algebuckina Sandstone
Possible interpretation

ALGEBUCKINA SANDSTONE +142

MT TOONDINNA BEDS +87

STUART RANGE FORMATION +41

BOORTHANNA FORMATION -2

(?) DEVONIAN DOLOMITE -61 -140 -146

MT ALEXANDER SANDSTONE MBR.

OODNADATTA LIMESTONE

WOOLDRIDGE SANDSTONE

COORIKIANA MEMBER -28

ORDOVICIAN QUARTZITE

Mean Sea Level

Scale in kilometres
0 5 10 15

CENOZOIC	TERTIARY			Silcrete cobbles, sand dunes
MESOZOIC	EARLY CRETACEOUS	Oodnadatta Fmn.		Claystone, grey, slightly silty
			Mt Alexander Sandstone Mbr	Medium coarse sandstone, glauconitic
			Wooldridge Limestone Mbr.	Thin limestone lenses, interbedded shale and silts
			Coorikiana Sandstone Mbr	Glauconitic sandstone, fine - medium grained well sorted
		Bulldog Shale		Dark grey shale, silty
		Cadna-owie Formation		Sandstone, med - coarse grained inter - bedded shales, boulders at base
	LATE JURASSIC	Algebuckina Sandstone		Pebbly sandstone, white clay matrix, poorly sorted
PALAEOZOIC	EARLY PERMIAN	Mt Toondinna Beds		Interbedded coals, shales, siltstones & sandstones
		Stuart Range Formation		Grey claystone - shale
		Boorthanna Formation		Diamictite, conglomerate
	DEVONIAN (Early)			Dolomite
	ORDOVICIAN			Quartzite

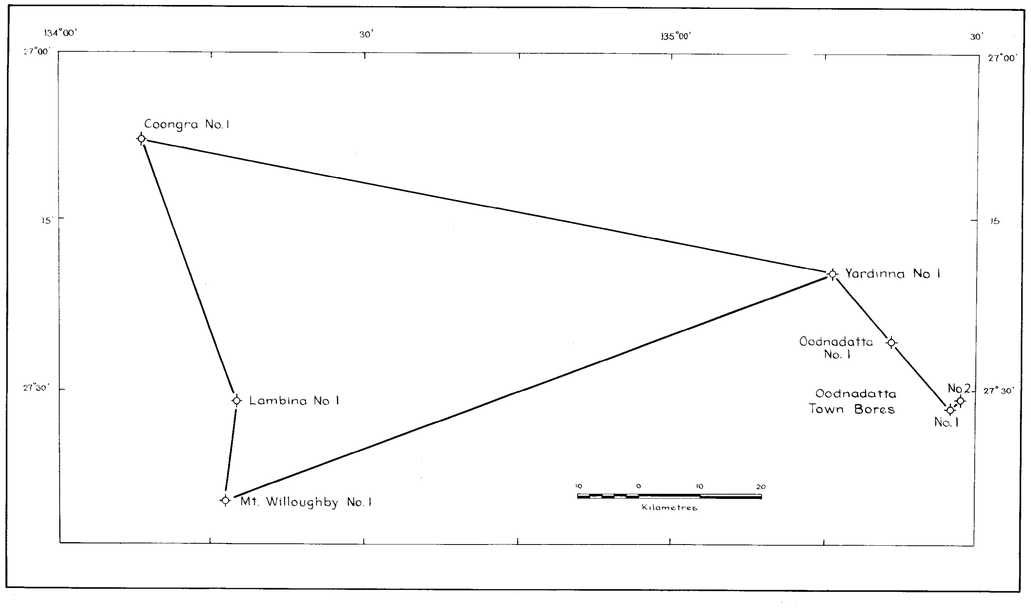


Fig 5

DEPARTMENT OF MINES AND ENERGY – SOUTH AUSTRALIA

COONGRA No. 1 STRATIGRAPHIC WELL ISOMETRIC CORRELATION DIAGRAM

	COMPILED I Northcott	DRN M.R	SCALE Sect 1:250,000 Loc 1:500,000	PLAN NUMBER 79-604
DIRECTOR GENERAL		CKD	DATE August 1979	

COMPOSITE WELL LOG

DEPARTMENT OF MINES AND ENERGY — SOUTH AUSTRALIA

COONGRA No. 1

STATE : SOUTH AUSTRALIA PETROLEUM TENEMENT: NONE 1 : 250000 MILE SHEET: WINTINNA BASIN: EROMANGA

WELL STATUS: PLUGGED & ABANDONED

LOCATION: Latitude 27° 08' 15" S
Longitude 134° 08' 20" E

ELEVATION: 292 m. Datum :- M.S.L.

DATE SPUDDED: 3rd March 1978
DATE DRILLING STOPPED: 20th March 1978
DATE RIG RELEASED: 24th March 1978
TOTAL DEPTH: 200·2 m

HOLE SIZE:

INCHES	FROM	TO
7¼"	0	33 m
5¾"	33	165·6 m
3½"	165·6	200·2 m

CASING:

INCHES	DEPTH	CEMENTED TO	FROM
6"	0-33m.		

CEMENT PLUGS:

Backfilled and plugged from surface to 36 metres.

TYPE OF LOG	16. IN. NORMAL	64. IN. NORMAL	6 FT. LATERAL	S.P	NEUTRON	GAMMA RAY
DATE OF RUN	20-3-79	20-3-79				
FIRST READING						
LAST READING						
INTERVAL MEASURED	160·8 - 196·2m	160·8 - 195·4m	160·8 - 196	164·4 - 196·8	0 - 198·0	0 - 198·0
CASING: LOGGER					165·2	
CASING: DRILLER	165·7					
DEPTH REACHED	196·2	195·4	196·0	196·8	198·0	198·0
BOTTOM: DRILLER	200·7	200·7	200·7	200·7		
MUD TYPE						
DENSITY/ VISCOSITY						
Ph/ FLUID LOSS c.c						
MUD RESISTIVITY						
RECORDED BY						
WITNESSED BY	I. Northcott					

NOTE : All depths in metres.

OTHER SURVEYS: TYPE FROM TO

DRILLED BY: S. A. DEPARTMENT OF MINES.
DRILLING METHOD: ROTARY.
LOGGED BY: S. A. DEPARTMENT OF MINES.

LITHOLOGICAL REFERENCE

Shale claystone	Sandstone	K Kaolinitic
Sandy shale	Granular	V Glauconitic
Silty shale	Pebble	G Garnet
Siltstone	Li Lithic	Ca Calcareous
Argillaceous siltstone	A Anhydrite	Z Dolomitic
Sandy siltstone	Py Pyrite	O Oolitic
Calcite	V Micaceous	F Fossiliferous Fragmental or Indeterminate
Dolomite	Carbonaceous	f Feldspathic
Coal	Fe Ferruginous	Gy Gypsum Gypsiferous
Quartzite	Ca Carbonate Fragments	Mn Manganese
Q Quartz grains	D Dolomite pebbles	

WELL SYMBOLS

- No. 3 — CORE INTERVAL AND NUMBER
- PLUGGED INTERVAL
- CASING SHOE
- FI FLUORESCENCE
- * CUT WITH CCl_4

LITHOLOGY BY : I. Northcott
COMPILED BY:
DRAFTED BY : M. Ross
DRAWING NUMBER : 79-605

BIT RECORD | DRILLING RATE (MINUTES / METRE, 0 10 20 30 40) | LITHOLOGY: TRACE, % OF CUTTINGS | HYDROCARBONS | LITHOLOGICAL DESCRIPTION | DEPTH (METRES) | GAMMA LOG (25 c.p.s.) | NEUTRON LOG (CASING; 150 cps Solid line; 250 cps Dashed) | CORES (RECOVERIES & DIPS) PALAEONTOLOGY & PETROGRAPHY SAMPLES | LITHOLOGY | CASING, PLUGS & TESTS | BIOSTRATIGRAPHY | STRATIGRAPHIC COLUMN

Quartz cobbles, silicified, white to pastel coloured. Light brown gritty soil matrix

Claystone, red, white-grey & ochre coloured, weathered, soft, sticky, massive, minor gypsum flakes

Siltstone, clayey, iron-stained yellow to red, firm

Siltstone, brown, dolomitic, hard.

Claystone as above.

Siltstone, dark grey to black, occasional shale laminae, clayey, very fine quartz grains, soft to firm, non-calcareous.

Sandstone, fine to med. grained, granular, white - pastel in colour, unconsolidated, grains predominently quartz, clear, white rose bluish light green to yellow, angular to subrounded, some polished grns, 10% glauconite, 2% pyrite minor chlorite; some quartz grains feature pyrite and chlorite growths.

Siltstone, dark grey to black, clayey as above, probably interbedded with above lithologies. Sandstone as above

Sandstone, medium to coarse grained, pebbly, clayey. Quartz, clear to white, angular, poorly sorted. Small pebbles and granules frequent. Some quartz grain aggregates set in calcareous cement. Up to 2% pyrite, accessory garnet, ilmenite, micas, sphene, other unidentified opaques. Clay matrix bright white to light grey, shiny, composed predominently of kaolinite, soapy in texture. Thin clay bands also developed. Some heavy mineral laminae unit unconsolidated Scattered quartz pebbles at base.

Sandstone, as above

Sandstone pyritic, med. grained, 30% quartz grains, coarse; hard.

Sandstone, as above

TOTAL DEPTH 200·7 m.

Gy, Gy, V, V, V

6" casing; Pb washover string; Open hole

P = Petrography sample
S = Palynological sample

105·35 S 4521 — Recovery 1·3m 9·8% — 118·6
0% 127·4 128·4
P 540 131·6
Recovery 9·01m 55·6% — P 539, S 4522, P 537 147·8
165·2
Recovery 1·01m 2·9% — S 4523
P 538, S 4524
T.D. 200·7

Unnamed — Q
BULLDOG SHALE — CRETACEOUS — ALBIAN ?
CADNA-OWIE FORMATION — EARLY — LATE APTIAN
Aptian ► Aptian ► Early Aptian ► Early Aptian ► — EARLY APTIAN

1526

FIG. 6