

INTRODUCTION

The Erldunda No. 1 Well is the first oil exploratory well to be drilled by Exoil (N.S.W.) Pty. Ltd. in its Oil Permit 130 in the Amadeus Basin of the Northern Territory. The well, situated approximately 110 miles south-south-west of Alice Springs on the Stuart Highway, was drilled to evaluate the reservoir and source potential and to establish the subsurface stratigraphy of the Proterozoic and Palaeozoic section in this area of the southern Amadeus Basin. The well was sited on a large anticlinal feature located by seismic surveys.

WELL HISTORY

GENERAL DATA:

Well Name and Number: Erldunda No. 1

Name and Address of Operator: Exoil (N.S.W.) Pty. Ltd.,
1st Floor, Perry House,
Elizabeth and Albert Streets,
BRISBANE. QUEENSLAND.

Name and Address of Tenement Holder:
Exoil (N.S.W.) Pty. Ltd.,
1st Floor, Perry House,
Elizabeth and Albert Streets,
BRISBANE. QUEENSLAND.

Petroleum Tenement: O.P. 130 Northern Territory of Australia
Area: 9,509 square miles

District: Kulgera

Location: 25°18'36"S; 133°11'48"E
Map Reference G.53-1 Kulgera

Elevation: Ground 1330' a.s.l.

Kelly Bushing: 1343.5' a.s.l.

Total Depth: 5,463 feet

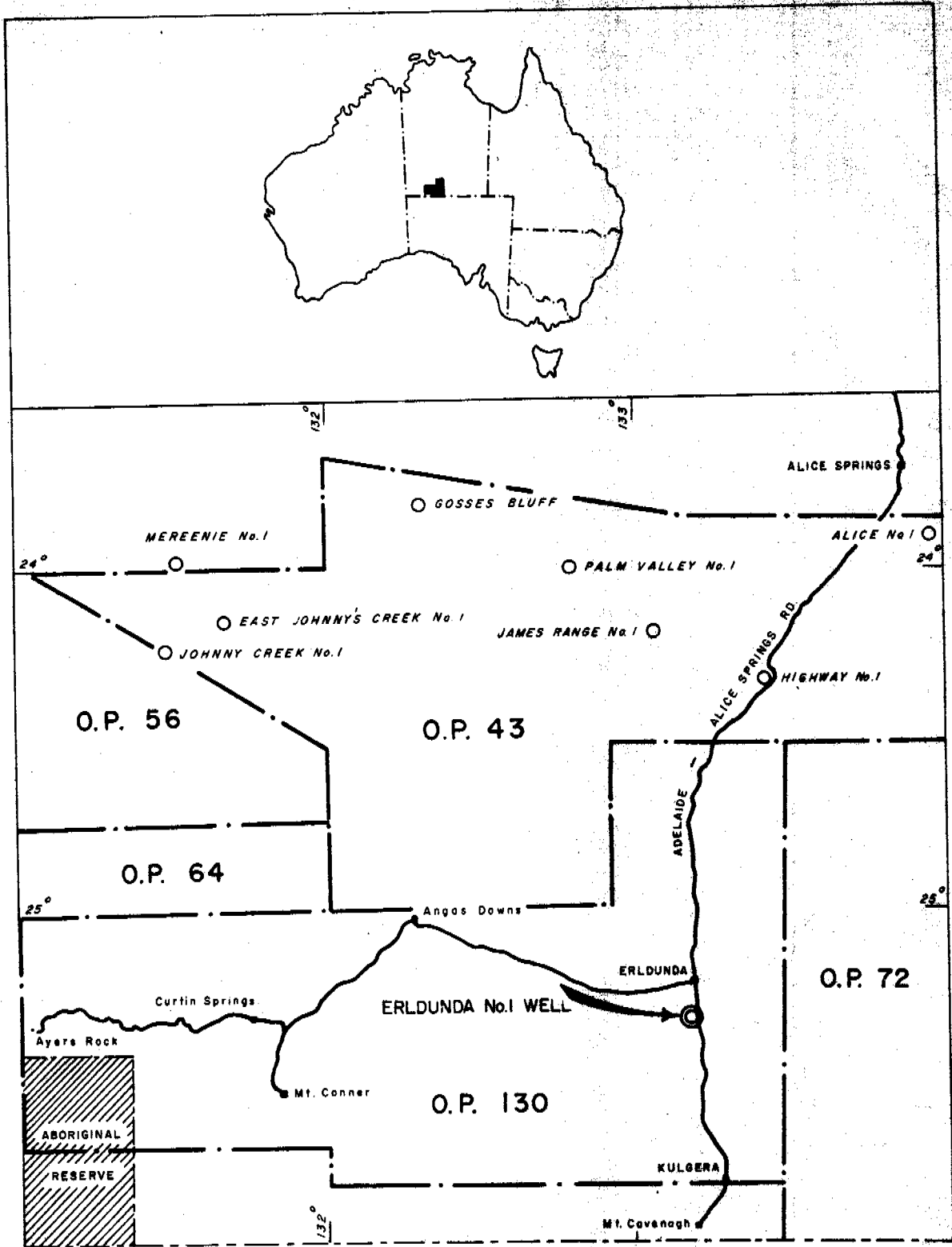
Date Drilling Commenced: 20th June, 1965.

Date Drilling Completed: 20th July, 1965.

Date Well Abandoned: 21st July, 1965.

Date Rig Released: 21st July, 1965.

Drilling Time in Days to Total Depth: 31 days



EXOIL (N.S.W.) PTY. LTD.
 LOCALITY MAP
 ERLDUNDA No. 1 WELL



Status: Dry and abandoned

Total Cost:

Subsidy Paid:

DRILLING DATA:

Name and Address of Drilling Contractor:

Oil Drilling and Exploration Limited,
93 York Street,
SYDNEY. N.S.W.

Drilling Plant:

Make: National

Type: T-32

Rated Capacity: with 4½" drill pipe: 7,500 feet

Engines (4): 3 Cummins, Type N.H. 1600, each 200 h.p.

1 G.M.C. Twin, Model 671, 300 h.p.

Mast:

Make: Ideco

Type: Junior Fulview

Rated Capacity: 490,000 lbs.

Pumps (2):

Make:	Ideal	Ideal
Type:	C.250	C.150
Size:	7¼" x 15"	7¼" x 12"

Air Drilling Equipment:

<u>Unit</u>	<u>Make</u>	<u>Type</u>	<u>Size</u>	<u>Motors</u>
Compressor	Ingersoll-Rand	HHE-3 Stage	1500 c.f.m. 300 p.s.i.	Waukesha 405 h.p.
Booster Compressor	Ingersoll-Rand	HHE-2 Stage	3000 c.f.m. 1500 p.s.i.	Waukesha 405 h.p.
Injection Pump	Aldrich	Triplex HS-3B	1" x 2½"	Wisconsin 30 h.p.

Hole Sizes and Depths:

- 20" hole from surface to 101 feet
- 13¾" hole from 101 feet to 961 feet
- 9½" hole from 961 feet to 1862 feet
- 8¾" hole from 1862 feet to 1959 feet
- 7½" hole from 1959 feet to 5463 feet

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Casing and Cementing Details:

Size:	16"	10 $\frac{3}{4}$ "
Weight (lbs./ft.):	60	40.5
Grade:	Conductor	H-40
Range:	2	2
Setting Depth:	86'	961'
Type and location of collar, shoe, etc:	Baker Cement Float Shoe	Baker Cement Guide Shoe; and Baker Cement Float Collar run 60' above shoe
Quantity cement:	120 sacks	340 sacks
Cemented to:	Surface	-
Method Used:	Cemented down annulus	Rig pumps - single stage - plug

Drilling Fluid:

Erlunda No. 1 was air-drilled from surface to 50 feet and mist-drilled from 50 feet to 5,450 feet. A bottom hole core was cut from 5450' to 5463' with mud only after mudding up the hole for final logging.

While mist-drilling a solution of water, foaming agent and corrosion inhibitor was continuously injected at the rate of 5 - 13 barrels per hour.

The following table of mud and additives includes mud mixed at the beginning of the operation and held in the mud tanks in the event that mudding up was required. This mud was used to fill the hole for final logging.

Mud and Additives Used

Teepol	301 $\frac{3}{4}$ gals.)	} foaming agent
Comprox	571 $\frac{1}{4}$ gals.)	
Bichromate	3002 lbs.	
Caustic	5510 lbs.	
Gel	25072 lbs.	
Myrtan	250 lbs.	

Water Supply:

A water bore was drilled by Namco International 20 yards from the wellsite to a depth of 120 feet. This

bore tested salt water at 800 gallons per hour.

Adequate water for the drilling operation was supplied from this bore plus salt water produced while mist drilling the well.

Fresh water for the camp was hauled from a stock bore fifteen miles from the wellsite.

Perforation and Shooting Record:

No perforation or shooting was required in this well.

Plugging Back and Squeeze Cementation Jobs:

No squeeze cementation jobs were required.

In abandoning the well the following plugs were set:-

<u>Plug No.</u>	<u>Interval</u>	<u>Cement</u>
1	5000' - 5200'	60 sacks
2	900' - 1400'	250 sacks
3	Surface - 60'	25 sacks

Fishing Operations:

One fishing job was required on Erldunda No. 1. While rigging up to drill out under 16" casing, a 4½" drill pipe thread protector was dropped in the hole. This was milled up with a conventional rock bit in 2¼ hours. Total time lost in this operation was 9 hours, i.e. 1.2% of total rig time.

Side-tracked hole:

No side-tracking was required in this drilling operation.

LOGGING AND TESTING:

Drill Cuttings:

Drill cuttings were caught from the blooey line while air and mist drilling, at ten foot intervals while drilling and at five foot intervals while coring. Cuttings from air drilling were packaged as they came from the blooey line and cuttings from mist drilling were dried before

bore tested salt water at 800 gallons per hour.

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Side-tracked hole:

No side-tracking was required in this drilling operation.

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packaging. Sample quality was extremely good, as seen from the lithology column of the Composite Log. Cuttings from intervals drilled with tungsten-carbide "button" bits were finely divided due to the crushing action of the bit.

Three cuts of all samples were made - one for Exoil (N.S.W.) Pty. Ltd., one for the Bureau of Mineral Resources, Canberra, and one for the Northern Territory Administration, Alice Springs.

Coring:

The programme called for routine cores to be cut for stratigraphic information, at major changes of lithology, and when porosity and/or permeability; and oil and/or gas indications were encountered. This programme was followed throughout the operation; Cores 1, 2, 3, 4, 5, 6, 10, 11 and 12 were cut for normal stratigraphic information (core 12 was cut following nil recovery from core 11). Cores 7 and 8 were cut to examine a persisting change in lithology, and core 9 was cut to evaluate a carbonaceous shale which yielded methane gas from cuttings.

Coring equipment consisted of a Hughes Tool Co. 20 foot type "J" conventional core barrel using 7 $\frac{7}{8}$ " hard formation core heads, and a 60' x 6 $\frac{1}{4}$ " Christensen diamond core barrel using 7 $\frac{13}{16}$ " diamond core heads. Five of the twelve cores were cut with the diamond.

The following table lists cored intervals and recoveries:-

<u>Core No.</u>	<u>Interval</u>	<u>Cored</u>	<u>Recovered</u>	<u>% Recovered</u>
1	598' - 608'	10'	6'8"	67
2	1202' - 1206'	4'	3'	75
3	1862' - 1868'	6'	3'	50
4	2395' - 2398'	3'	1'11"	64
5*	3057' - 3061'	4'	3'6"	88
6*	3651' - 3654'	3'	5"	14
7*	3982' - 3984'	2'	Nil	0
8*	3985' - 3986'	1'	8"	67
9	4182' - 4197'	15'	7'	47

<u>Core No.</u>	<u>Interval</u>	<u>Cored</u>	<u>Recovered</u>	<u>% Recovered</u>
10*	4792' - 4802'	10'	9'	90
11	5437' - 5450'	13'	Nil	0
12	5450' - 5463'	13'	1 $\frac{1}{8}$ "	13

* Diamond

Total footage cored: 84 feet

Total footage recovered: 39 feet 10 inches

Percentage recovery: 47.4%

A four-inch sample from each two feet of recovery has been sent to the Bureau of Mineral Resources, Canberra. The cores are held by Exoil in Alice Springs.

Core Descriptions are included in Appendix I.

Side-Wall Sampling:

No side-wall cores were taken.

Electrical and Other Logging:

Two logging runs were made by Welex. Hole fluid for the first run consisted of a natural water fill-up. The hole was filled with mud for the final logging run.

The following logs were run:-

Induction Electric Log	84' - 915'
Guard Log	950' - 5439'
Acoustic-Velocity Log	946' - 5439'
Gamma-Ray Log	30' - 5422'
Forxo-Caliper Log	950' - 5454'

The Forxo tool was malfunctioning and the resultant log is therefore of poor quality.

Drilling Time and Gas Log:

Rate of penetration was recorded on a Geolograph recorder and is plotted on the composite log as minutes per five-foot interval.

As the hole was drilled with air and mist from surface to total depth a conventional mud gas detector was not used. Drilling an open hole provided a continuous

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test of formations drilled throughout the operation. A pilot light burning at the end of the blooey line at all times while drilling and coring provided near-instantaneous detection of any hydrocarbons encountered.

Small amounts of methane were found in shale cuttings in the Pertatataka and Areyonga Formations. These are recorded on the composite log.

No flows of hydrocarbons were encountered in the well.

Formation Testing:

No conventional drill-stem tests were required for the reasons cited above.

Deviation Surveys:

Deviation surveys were taken using a Lane Wells "Sure-Shot" instrument run inside the drill-pipe on a sand line during connections. There were no problems with deviation in this hole. The following table lists all surveys taken:-

100' - $\frac{1}{2}^{\circ}$	1045' - 1°	2870' - $1\frac{3}{4}^{\circ}$
107' - $\frac{1}{2}^{\circ}$	1135' - $\frac{3}{4}^{\circ}$	3230' - 1°
230' - $\frac{3}{4}^{\circ}$	1230' - $\frac{3}{4}^{\circ}$	3375' - $1\frac{1}{4}^{\circ}$
290' - $\frac{3}{4}^{\circ}$	1315' - 1°	3560' - 2°
378' - $\frac{1}{2}^{\circ}$	1455' - $\frac{3}{4}^{\circ}$	3920' - $2\frac{1}{4}^{\circ}$
470' - $\frac{1}{2}^{\circ}$	1620' - $\frac{1}{4}^{\circ}$	4100' - 2°
560' - $\frac{1}{2}^{\circ}$	1853' - 1°	4310' - misrun
679' - $\frac{3}{4}^{\circ}$	2034' - $\frac{3}{4}^{\circ}$	4368' - $1\frac{1}{2}^{\circ}$
780' - $1\frac{1}{4}^{\circ}$	2480' - $\frac{1}{4}^{\circ}$	4579' - 1°
875' - $1\frac{1}{4}^{\circ}$	2780' - 2°	4950' - $\frac{1}{2}^{\circ}$

Temperature Surveys:

No temperature surveys were run in the well.

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A velocity survey was run at total depth by Namco. Results of this survey are discussed in Appendix 5.

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378' - 1/2°	1455' - 3/4°	3920' - 2 1/4°
470' - 1/2°	1620' - 1/4°	4100' - 2°
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679' - 3/4°	2034' - 3/4°	4368' - 1 1/2°
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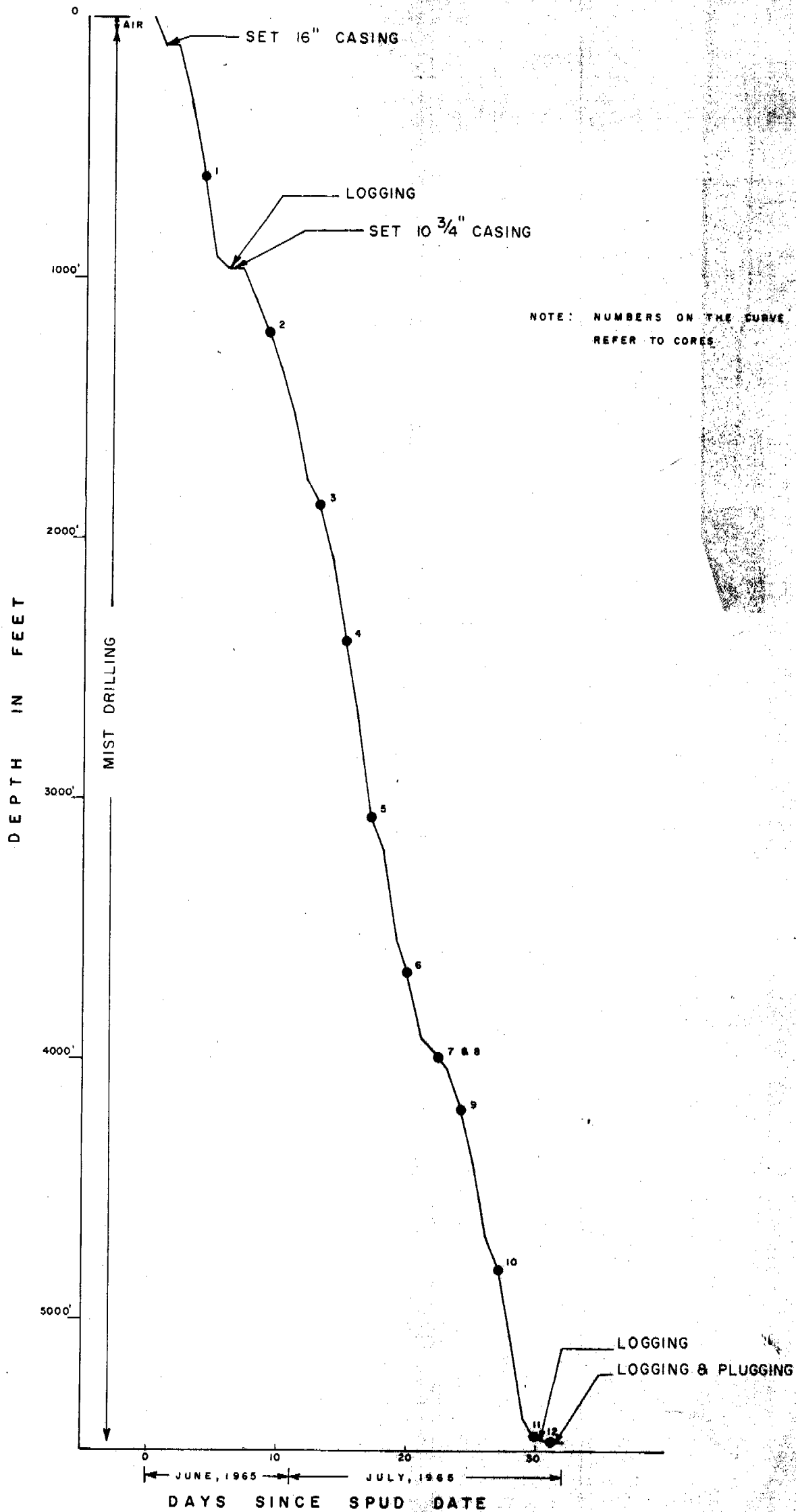
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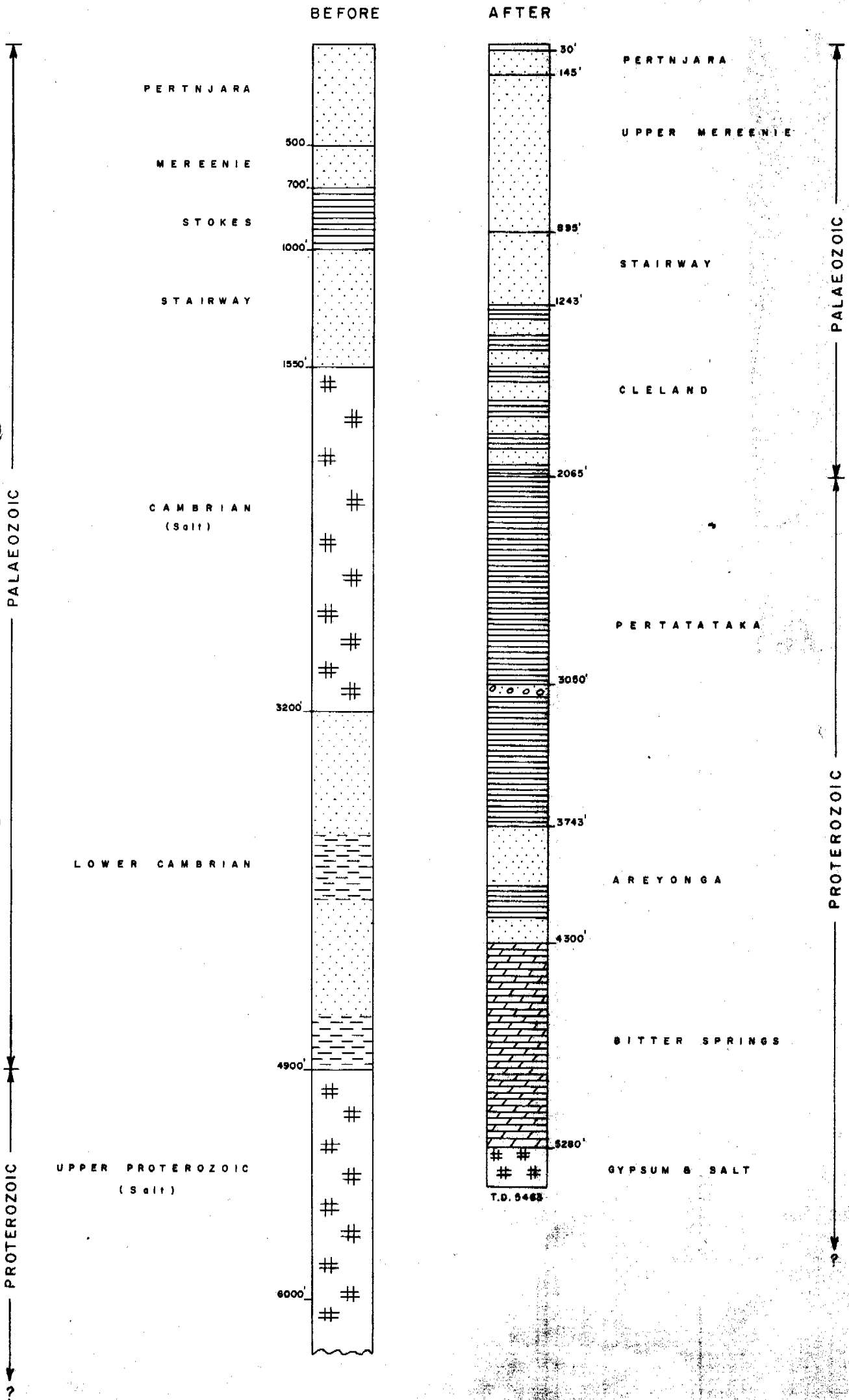


NOTE: NUMBERS ON THE CURVE REFER TO CORES

EXOIL (N.S.W.) PTY. LTD.
ERLDUNDA No. 1
TIME VERSUS DEPTH

EXOIL (N.S.W.) PTY. LTD. ERLDUNDA No. 1

STRATIGRAPHIC SECTIONS BEFORE AND AFTER DRILLING



Drilling Observations:

Figure 2 shows rig time plotted against depth. A total of 746½ hours was required to drill the well from spudding in to rig release. The table below gives the time spent on various operations:-

<u>Operation</u>	<u>Hours</u>	<u>% of Total Hours</u>
Drilling (a) on bottom	399	53.5
(b) trips	58½	7.9
Coring (a) on bottom	35½	4.7
(b) trips	66	8.9
Conditioning Hole	36½	4.9
Deviation Surveys	8½	1.1
Rig Service	7½	1.0
Breakdown Time	10½	1.4
Fishing	9	1.2
Logging	28	3.8
Casing, W.O.C., etc.	57	7.7
Ream for casing	8½	1.1
Abandonment	11½	1.5
Other	<u>10½</u>	<u>1.4</u>
Total	<u>746½</u>	<u>100.0</u>

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G E O L O G Y

SUMMARY OF PREVIOUS WORK:

Geological -

Prior to 1956 only a few references had been made to the geology of the southern part of the Amadeus Basin, principally by Basedow, Chewings, Terry and Ellis. From 1956 onwards Prichard and Quinlan (1962) established the basic succession of the sediments of the Amadeus Basin and Quinlan (1962) followed this by compiling an extremely useful regional map of the whole basin.

Frome-Broken Hill Company investigated the entire Basin from a petroleum viewpoint (inter alia Leslie, 1960 Wulff, 1960) and they modified much of Quinlan's mapping in and around O.P. 130.