

COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

Petroleum Search Subsidy Acts

PUBLICATION No. 68



SUMMARY OF DATA AND RESULTS
CARNARVON BASIN, WESTERN AUSTRALIA

Wandagee No. 1 Well

Marrilla No. 1 Well

Minderoo No. 1 Well

OF

WEST AUSTRALIAN PETROLEUM PTY LIMITED

*Issued under the Authority of the Hon. David Fairbairn
Minister for National Development*

1965

COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

MINISTER: THE HON. DAVID FAIRBAIRN, D.F.C., M.P.

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BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

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Canberra A.C.T.*

FOREWORD

Under the Petroleum Search Subsidy Act 1959-1961, agreements relating to subsidized operations provide that the information obtained may be published by the Commonwealth Government six months after the completion of field work.

The growth of the exploration effort has greatly increased the number of subsidized projects and this increase has led to delays in publishing the results of operations.

The detailed results of subsidized operations may be examined at the office of the Bureau of Mineral Resources in Canberra (after the agreed period) and copies of the reports may be purchased.

In order to make the main result of operations available early, short summaries are being prepared for publication. These will be grouped by area and date of completion as far as practicable. Drilling projects and geophysical projects will be grouped separately. In due course, full reports will be published concerning those operations which have produced the more important new data.

This publication contains summaries of data and results of three drilling operations undertaken in the Carnarvon Basin, Western Australia: Wandagee No. 1, Marrilla No. 1, and Minderoo No. 1. The information has been abstracted by the Petroleum Exploration Branch of the Bureau of Mineral Resources from well completion reports furnished by West Australian Petroleum Pty Limited.

J.M. RAYNER
DIRECTOR

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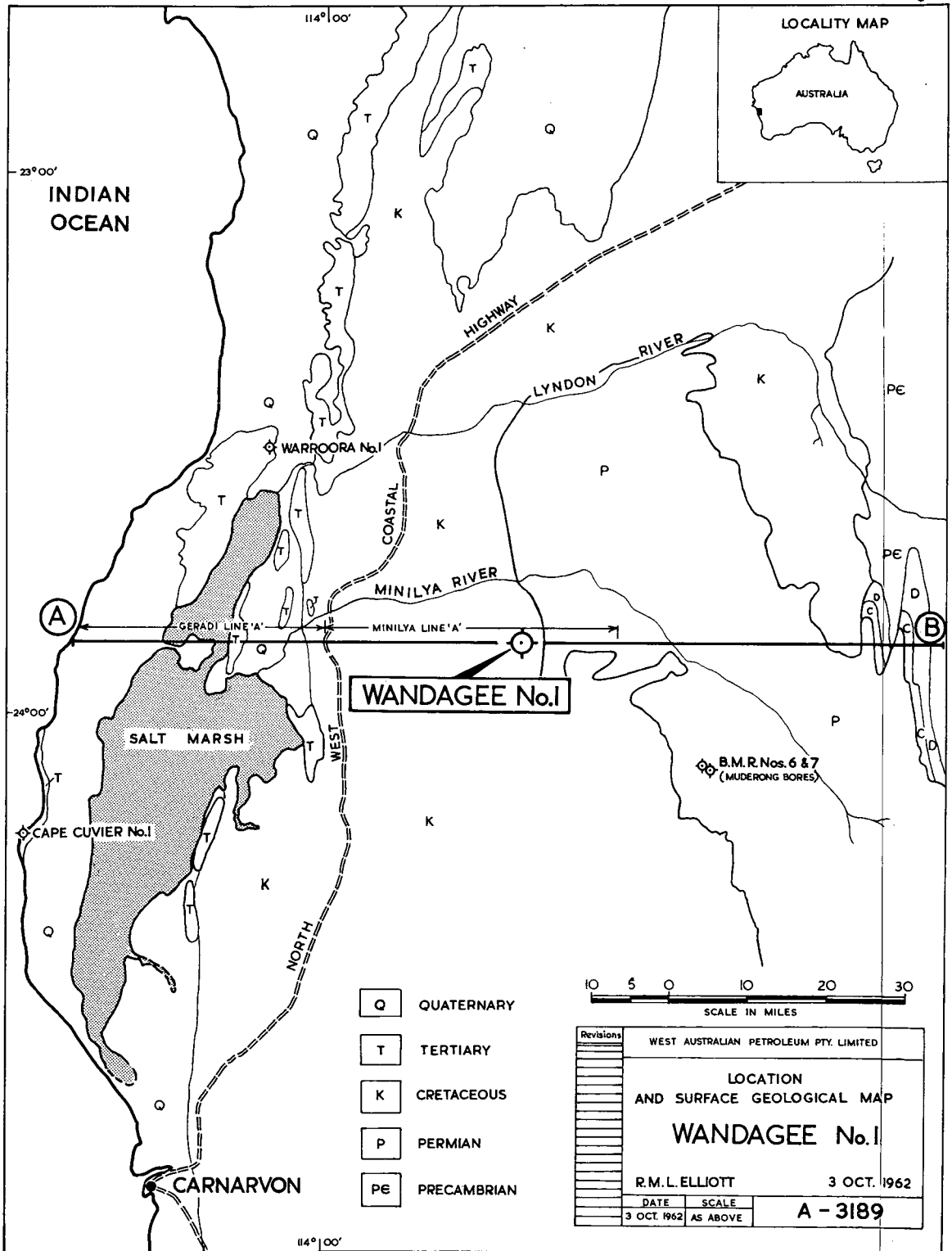
WANDAGEE NO. 1

of

WEST AUSTRALIAN PETROLEUM PTY LIMITED

SUMMARY OF DATA AND RESULTS

Fig. 1



WANDAGEE NO. 1

SUMMARY OF DATA AND RESULTS*

SUMMARY

Wandagee No. 1 Well was located in the Carnarvon Basin, Western Australia, approximately 84 miles north-east of Carnarvon. The well was drilled by Oil Drilling and Exploration (W.A.) Pty Limited for West Australian Petroleum Pty Limited, to a total depth of 3521 feet. Drilling commenced on 25th April, 1962 and was completed on 12th June, 1962. A full programme of logging, testing, and coring was undertaken.

The well was sited on a shallow part of the Wandagee Ridge. After drilling through 26 feet of Quaternary sand, the well penetrated 556 feet of a normal Carnarvon Basin sequence of Cretaceous sediments. The Upper Devonian Gneudna Formation was encountered at 591 feet, and this was followed from 912 feet by a section ranging in age from Silurian to possible Ordovician. The well bottomed at 3521 feet in the Tumblagooda Sandstone after drilling through 861 feet of the formation.

The primary objective of the well was to investigate the stratigraphy and oil potential of the Devonian and older rocks on a shallow part of the Wandagee Ridge. Traces of gas were observed in the marine siltstone unit at the top of the Tumblagooda Sandstone (2870 to 3098 feet), but no other hydrocarbon shows were recorded. Four drillstem tests recovered only brackish to salt water. The well was completed as a water well for Wandagee Station.

The off-structure drilling operation at Wandagee No. 1 was subsidized under the Petroleum Search Subsidy Act 1959-1961, from surface to total depth.

* Abstracted from: Well Completion Report Wandagee No. 1, by V. Pudovskis, West Australian Petroleum Pty Limited, October, 1962.

WELL HISTORY

General Data

Well name and number:	Wandagee No. 1
Location:	Latitude 23°53'15" S. Longitude 114°23'51" E.
Name and address of Tenement Holder:	West Australian Petroleum Pty Limited, 251 Adelaide Terrace, Perth. W.A.
Details of Petroleum Tenement:	Permit to Explore 28H
Total Depth:	3521 feet
Date drilling commenced:	25th April, 1962
Date drilling completed:	12th June, 1962
Date well abandoned:	17th June, 1962
Date rig released:	17th June, 1962
Elevation (ground):	225 feet
Elevation (derrick floor):	234 feet (datum for depths)
Status:	Completed as water well
Cost:	£87,893

Drilling Data

Drilling Plant:	
Make:	National
Type:	T-20
Hole sizes and depths:	12 1/4" to 743 feet 8 1/2" to 3512 feet 7 7/8" to 3521 feet (T.D.)
Casing details:	
Size (in.):	9 5/8
Weight (lb./ft):	36
Grade:	J.55
Setting depth (ft):	712

Logging and Testing

Ditch Cuttings:	
Interval:	Ten feet from surface to 3000 feet, and five feet from 3000 feet to total depth.

Coring: Nine cores were cut using a Hughes "J" Type core barrel with 7 7/8" hard formation core heads. 93 feet of formation were cored and 86 feet (92.5%) recovered.

Sidewall Cores: On one run at total depth, seven sidewall cores were recovered by the Schlumberger core sample taker.

Electric and other logging (Schlumberger):

Induction - Electrical Log:	30 - 3521 feet (4 runs)
Microlog-Caliper:	677 - 3520 feet (2 runs)
Sonic Log-Caliper:	90 - 3515 feet (3 runs)
Laterolog:	677 - 3518 feet (2 runs)
Gamma Ray Log:	20 - 3514 feet (2 runs)
Continuous Dipmeter:	750 - 3517 feet (1 run)
Temperature Log:	750 - 3520 feet (1 run)

Velocity Survey: A survey with 11 shots (7 levels) was run from 690 feet to 3500 feet by Geophysical Service International.

Drilling Rate, Oil and Gas Log: Five-foot drilling time was recorded from surface to total depth. While coring, one-foot drilling time was recorded.

Formation Tests: Four drillstem tests were conducted using a Johnston Tester. The intervals tested were:

DST No. 1	- 1054 to 1091 feet
DST No. 2	- 3457 to 3521 feet
DST No. 3	- 1809 to 1906 feet
DST No. 3A	- 1809 to 1955 feet

Deviation Surveys: Using the Totco Drift Indicator, 28 drift readings were recorded from surface to total depth. The maximum reading of 3° was recorded at 2866 feet; the final deviation at 3510 feet was 2°.

GEOLOGY

Stratigraphy

General:

As the age of the Mesozoic section in the Carnarvon Basin is well known, no palaeontological material was collected while drilling through it in Wandagee No. 1. The subdivision of the Palaeozoic section is based on reports by J.M. Dickins and P.J. Jones (1962), B.E. Balme (1962), and R.A. McTavish (1962), which are included in Appendix 1 of the well completion report, and on the results from Dirk Hartog No. 17B Well. Electrical logs and lithological breaks were used to establish the formation boundaries.

The stratigraphic sequence encountered in Wandagee No. 1 Well is shown in the Table below:

<u>Age</u>	<u>Formation</u>	<u>Depth Intervals</u> (feet)	<u>Thickness</u> (feet)
Quaternary	Sand	9 - 35	26
————— UNCONFORMITY —————			
Upper Cretaceous	Toolonga Calcilutite	35 - 86	51
————— DISCONFORMITY —————			
Upper-Lower Cretaceous	Gearle Siltstone	86 - 269	183
Lower Cretaceous	Windalia Radiolarite	269 - 532	263
Lower Cretaceous	Muderong Shale	532 - 583	51
Lower Cretaceous	Birdrong Formation	583 - 591	8
————— UNCONFORMITY —————			
Upper Devonian	Gneudna Formation	591 - 912	321
————— UNCONFORMITY (?) —————			
Silurian (?)	Unit A (Nannyarra Greywacke?)	912 - 1308	396
————— DISCONFORMITY —————			
Silurian	Dirk Hartog Limestone	1308 - 2660	1352
————— UNCONFORMITY —————			
Silurian or (?) Ordovician	Tumblagooda Sandstone	2660 - 3521 (T.D.)	861+

Detailed:

Quaternary: 9 to 35 feet (26 feet)

Loose, coarse-grained, red sand grading downwards into well-cemented sandstone. At the base the amount of calcareous cement increases and the rock grades into cream, sandy, very finely crystalline limestone. The Quaternary unconformably overlies the Toolonga Calcilutite.

Toolonga Calcilutite (Upper Cretaceous; Campanian-Santonian): 35 to 86 feet (51 feet)

Light grey claystone containing radiolaria. No carbonate rocks typical of the Toolonga Calcilutite were observed in the section, thus the age of the formation is doubtful.

Gearle Siltstone (Upper-Lower Cretaceous; Turonian-Albian): 86 to 269 feet (183 feet)

The formation is disconformably overlain by the Toolonga Calcilutite. In the upper part it consists of dark grey to black claystone, friable, with abundant white, fine globular inclusions (radiolaria?). In the lower part it grades into dark to medium grey, pyritic siltstone containing foraminifera.

Windalia Radiolarite (Lower Cretaceous; Albian): 269 to 532 feet (263 feet)

The formation is conformably overlain by the Gearle Siltstone. As in the Cape Range-Rough Range area, the Windalia Radiolarite in the Wandagee No. 1 Well consists of two distinctive members.

The upper member (269 to 434 feet) is represented by typical dark grey, porous, siliceous siltstone (radiolarite), with abundant white spots (radiolaria?), lenses of chert, and fragments of belemnites; at the base it contains some very pyritic lenses and occasional pelecypods.

The lower member (434 to 532 feet) consists of siliceous siltstone as above with pyritic and glauconitic lenses, interbedded with grey-green, fine-grained sandstone, subangular, slightly porous. The contact between the Windalia Radiolarite and the underlying Muderong Shale is transitional.

Muderong Shale (Lower Cretaceous; Aptian): 532 to 583 feet (51 feet)

Dark to medium grey, very fine-grained siltstone, glauconitic in the upper part, friable and sideritic towards the base. The Muderong Shale conformably overlies the Birdrong Formation.

Birdrong Formation (Lower Cretaceous; Aptian?): 583 to 591 feet (8 feet)

Medium to coarse-grained sandstone, with well-sorted, rounded, clear, bluish and greenish quartz grains and scattered, very dark green glauconite grains, containing occasional pyritized wood fragments. The formation unconformably overlies the Gneudna Formation.

Gneudna Formation (Upper Devonian; Frasnian-Givetian): 591 to 912 feet (321 feet)

The upper member (591 to 748 feet) is dominantly light to grey-brown fossiliferous limestone, pyritic and stylolitic in parts, grading downwards into calcarenite, with some beds of green siltstone and shale. The lower member (748 to 912 feet) consists of thinly interbedded dolomite and shale, the latter grading into siltstone in places. Thin beds of sandstone occur in the upper part of the lower member. No fragments of macrofossils were observed in the sequence, but scolecodonts are common in the shale

beds. Reports by B.E. Balme and R.A. McTavish suggest a Devonian age for the member. B.E. Balme considers it to be the uppermost Givetian or early Frasnian.

Nannyarra Greywacke (?) (?Silurian): 912 to 1308 feet (396 feet)

Cream and light grey, fine-grained to conglomeratic, porous, feldspathic, micaceous sandstone having a recrystallized calcareous and dolomitic cement. Interbeds of grey-green, micaceous, partly dolomitic, shale, claystone, and siltstone occur. The sandstones are 100 percent water saturated, with a salinity of 6750 ppm. NaCl and 9780 ppm. total salts (DST No. 1). The basal part of the formation, from 1250 to 1308 feet, consists of red-brown, pink and purple, fine-grained sandstone, with thin beds of red-brown claystone. No macrofossils were observed in the samples.

R.A. McTavish reported poorly preserved conodonts in Core No. 1 (1075 to 1091 feet) and suggested a Middle Silurian age for the formation. The lithology and stratigraphic position of the unit suggest a possible correlation with the Nannyarra Greywacke. The unit disconformably overlies the Dirk Hartog Limestone.

Dirk Hartog Limestone (Middle Silurian): 1308 to 2660 feet (1352 feet)

Predominantly dolomite with interbedded siltstone and claystone. The porosity of the dolomite is usually low, except for some vuggy beds which show good porosity and permeability, and contain water with salinity 4940 ppm. NaCl and 10,619 ppm. total salts (DST No. 3A).

The formation in the well consists of three lithological units:

Upper unit: 1308 to 2055 feet, consists mostly of oolitic dolomite with few siltstone and claystone beds, and some anhydrite in the lower 200 feet.

Middle unit: 2055 to 2248 feet, is predominantly dolomitic siltstone interbedded with claystone and dolomite and lenses of anhydrite.

Lower unit: 2248 to 2660 feet, consists predominantly of sugary and microcrystalline, anhydritic dolomite with a few siltstone beds.

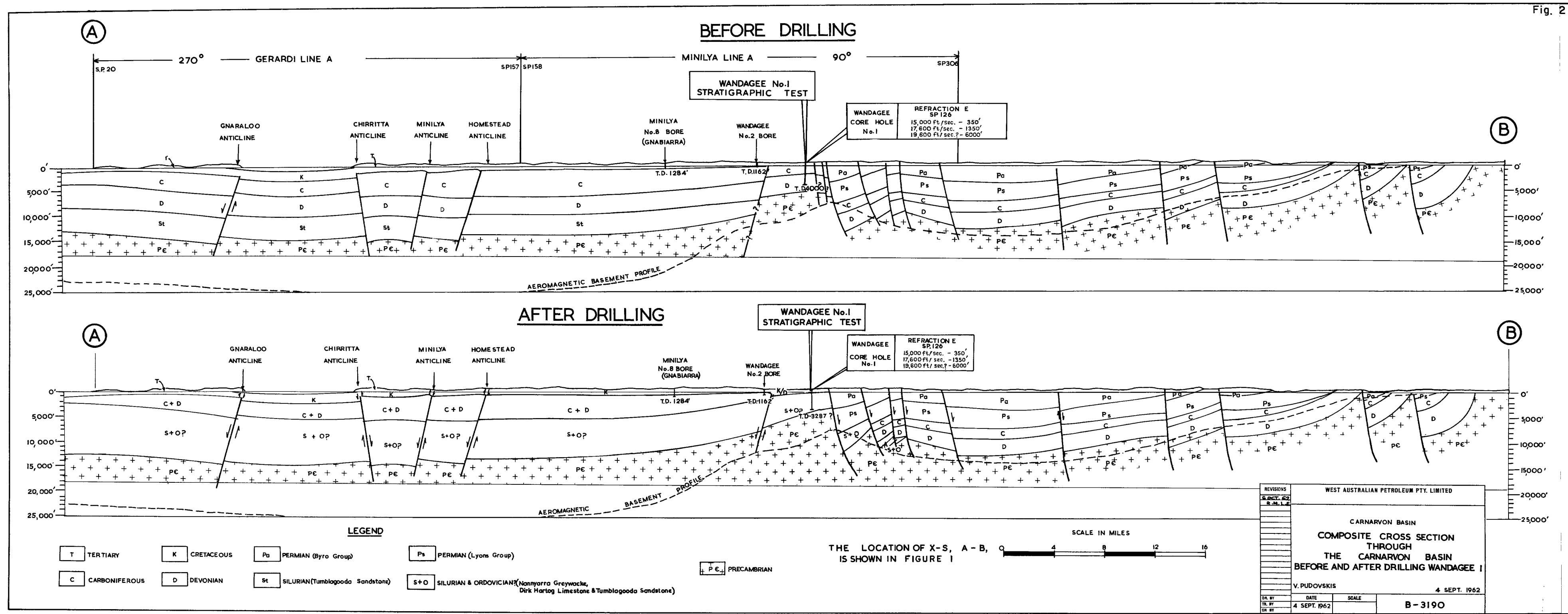
Lithological and electrical logs show that the Dirk Hartog Limestone section in the Wandagee No. 1 Well can be correlated with that in the Dirk Hartog No. 17B Well. It is evident that the upper two units, Lithological Units A and B (total 1760 feet), which are present in Dirk Hartog No. 17B are missing in Wandagee No. 1. Lithological Unit C of Dirk Hartog No. 17B corresponds to the upper unit (1308 to 2055 feet) of Wandagee No. 1 Well, and Lithological Unit D to the middle unit (2055 to 2248 feet) in Wandagee No. 1. The lower unit (2248 to 2660 feet) of Wandagee No. 1 is completely missing in the Dirk Hartog No. 17B section.

The Dirk Hartog Limestone overlies unconformably (or disconformably) the Tumblagooda Sandstone.

Tumblagooda Sandstone (Silurian or (?) Ordovician): 2660 to 3521 feet (861 feet +)

The Tumblagooda Sandstone in Wandagee No. 1 Well has been divided into three members. The upper member (2660 to 2870 feet) consists of brown-red, fine-grained,

Fig. 2



poorly cemented, porous, slightly dolomitic, and anhydritic sandstone with a few beds of dolomite and siltstone. The middle member (2870 to 3098 feet) consists of brown-red and green, sandy, micaceous, dolomitic, and anhydritic siltstone with beds of dolomite, claystone, and sandstone. Microplankton were noted. The age of the member has been suggested by B.E. Balme as (?)Ordovician. The lower member (3098 to 3521 feet) consists of brown-red to pink, fine-grained to conglomeratic, feldspathic sandstone with siliceous and dolomitic cement in parts. No fossils were recorded in the section. The formation contains water with 20,650 ppm. NaCl and 33,050 ppm. total salts (DST No. 2).

Structure

Wandagee No. 1 Well was sited on the Wandagee Ridge, thought to be a northerly-trending horst tilted westwards. This was confirmed by the dipmeter survey, which showed dips ranging from west-north-west to west-south-west or south-west.

No structural closure was mapped with the seismograph near Wandagee No. 1, but the seismic survey indicated that the area is regionally high. The structural position of the Dirk Hartog Limestone in Wandagee No. 1 Well is about 2400 feet higher than in Dirk Hartog No. 17B Well.

Relevance to Occurrence of Petroleum

No signs of crude oil were present in the well. A very small gas show was observed while penetrating the basal part of the marine siltstone unit (3070 to 3098 feet) in the Tumblagooda Sandstone. It was indicated by a J.W. gas detector reading of 10 units (100 units = 4% methane). It is probable that this small amount of gas originated in the siltstone unit.

Porosity and Permeability

Core analyses were made by the Bureau of Mineral Resources; detailed results of the analyses are recorded in Appendix 7 to the well completion report. Porosities in the Dirk Hartog Limestone ranged from 1 percent to 11 percent with nil permeability. Analyses of three samples from the Tumblagooda Sandstone showed porosities of 1 percent to 3 percent and nil permeability.

Contribution to Geological Knowledge resulting from the Drilling of Wandagee No. 1

The drilling of the well showed that the Wandagee Ridge consists mainly of Silurian and probably Ordovician rocks. Under a reduced section of Cretaceous sediments, only a thin veneer of Upper Devonian is present unconformably overlying older Palaeozoic rocks.

Correlation with Dirk Hartog No. 17B Well indicates that the upper part of the Silurian section in Wandagee No. 1 Well is also reduced. This reduction is caused by erosion (or non-deposition?) of about 1800 feet of the Dirk Hartog Limestone. However, in lower Dirk Hartog Limestone time the depositional basin in the Wandagee area was deeper than that at Dirk Hartog Island. This is indicated in Wandagee No. 1 by:

- (i) Increased thickness of the beds as compared with Dirk Hartog No. 17B;

- (ii) Additional section of more than 400 feet at the base of the formation; and
- (iii) Reduced amount of anhydrite.

The drilling results helped to recognize a new Silurian (Middle Silurian?) formation in the subsurface (Silurian, Unit A, in this report) consisting of fine to very coarse sandstones with some beds of shale and siltstone, which is disconformably underlain by the Dirk Hartog Limestone. Although very poorly preserved Silurian conodonts were recovered from this formation, it is possible that it can be correlated with the outcropping Nannyarra Greywacke.

The results obtained from the drilling of Wandagee No. 1 indicate that Silurian and (?) Ordovician rocks may be present also to the east of the Wandagee Fault for some distance. The Lower Carboniferous - Devonian section is probably much thinner west of the Wandagee Fault than was expected prior to drilling this well.

REFERENCES

- | | | |
|----------------------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BUREAU OF MINERAL RESOURCES,
GEOLOGY AND GEOPHYSICS, (Ed.), | 1964: | Wandagee Ridge seismic survey, in Summary of seismic operations in the Carnarvon Basin, Western Australia, of West Australian Petroleum Pty Limited. <u>Bur. Min. Resour. Aust. Petrol. Search Subs. Acts Publ. 50.</u> |
| CONDON, M.A., | 1954: | Progress report on the stratigraphy and structure of the Carnarvon Basin, Western Australia. <u>Bur. Min. Resour. Aust. Rep. 15.</u> |
| DENNISON, R.G., WARWICK, J.W.,
and MARTIN, R.H., | 1962: | Wandagee Ridge (South) Seismic Reconnaissance - Project 78. <u>Unpubl. report for West Australian Petroleum Pty Limited.</u> |
| PUDOVSKIS, V., | 1957: | Geological well summary, Dirk Hartog No. 17B (deep test), Carnarvon Basin, Western Australia. <u>Unpubl. report for West Australian Petroleum Pty Limited.</u> |
| PUDOVSKIS, V., | 1961: | The Lower Cretaceous in Cape Range wells. <u>Unpubl. report for West Australian Petroleum Pty Limited.</u> |
| PUDOVSKIS, V., | 1962: | Wandagee No. 1 Well Completion Report. <u>Unpubl. report for West Australian Petroleum Pty Limited.</u> |

ADDITIONAL DATA FILED IN THE
BUREAU OF MINERAL RESOURCES

The following additional data relating to Wandagee No. 1 Well have been filed in Bureau of Mineral Resources, Canberra, and are available for reference:

- (i) Well Completion Report, by V. Pudovskis 13 pp.
 - Appendix 1: Palaeontological reports, by J.M. Dickins, 11 pp.
P.J. Jones, B.E. Balme, and R.A. McTavish
 - Appendix 2: Water analyses, by Government Chemical 5 pp.
Laboratories, Perth
 - Appendix 3: Core descriptions and specific gravities 1 p.
 - Appendix 4: List of Schlumberger logs 1 p.
 - Appendix 5: Drillstem tests 1 p.
 - Appendix 6: Deviation records 1 p.
 - Appendix 7: Core analyses, by BMR 2 pp.
 - Appendix 8: Velocity survey report, by R.G. Dennison 2 pp.
- (ii) Daily drilling reports for period 24th April, 1962 to 17th June, 1962
- (iii) Well logs including the following:
 - (a) Induction - Electrical Log
 - Run 1, 30- 736 feet (2", 5" = 100 ft)
 - Run 2, 712- 836 feet (2", 5" = 100 ft)
 - Run 3, 677-2655 feet (2", 5" = 100 ft)
 - Run 4, 2550-3521 feet (2", 5" = 100 ft)
 - Run 4, 677-3521 feet (1" = 100 ft)
 - (b) Microlog-Caliper
 - Run 1, 677-2653 feet (2", 5" = 100 ft)
 - Run 2, 2550-3520 feet (2", 5" = 100 ft)
 - (c) Sonic Log-Caliper
 - Run 1, 90- 737 feet (2", 5" = 100 ft)
 - Run 2, 677-2649 feet (2", 5" = 100 ft)
 - Run 3, 2550-3515 feet (2", 5" = 100 ft)

(d) Laterolog

Run 1,	677-2651 feet	(2", 5" = 100 ft)
Run 2,	2550-3518 feet	(2", 5" = 100 ft)

(e) Gamma Ray Log

Run 1,	20- 738 feet	(2", 5" = 100 ft)
Run 2,	700-3514 feet	(2", 5" = 100 ft)

(f) Continuous Dipmeter

Run 1,	750-3517 feet	(2" = 100 ft)
Final plotted log, Run 1		(1.2" = 100 ft)

(g) Temperature Log

Run 1,	750-3520 feet	(2" = 100 ft)
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(h) Drilling rate, oil and gas log (2" = 100 ft)

(i) Graphic Log, Wandagee No. 1 Well
(Predicted Section)

(iv) Velocity Survey determinations, Wandagee No. 1 Well.

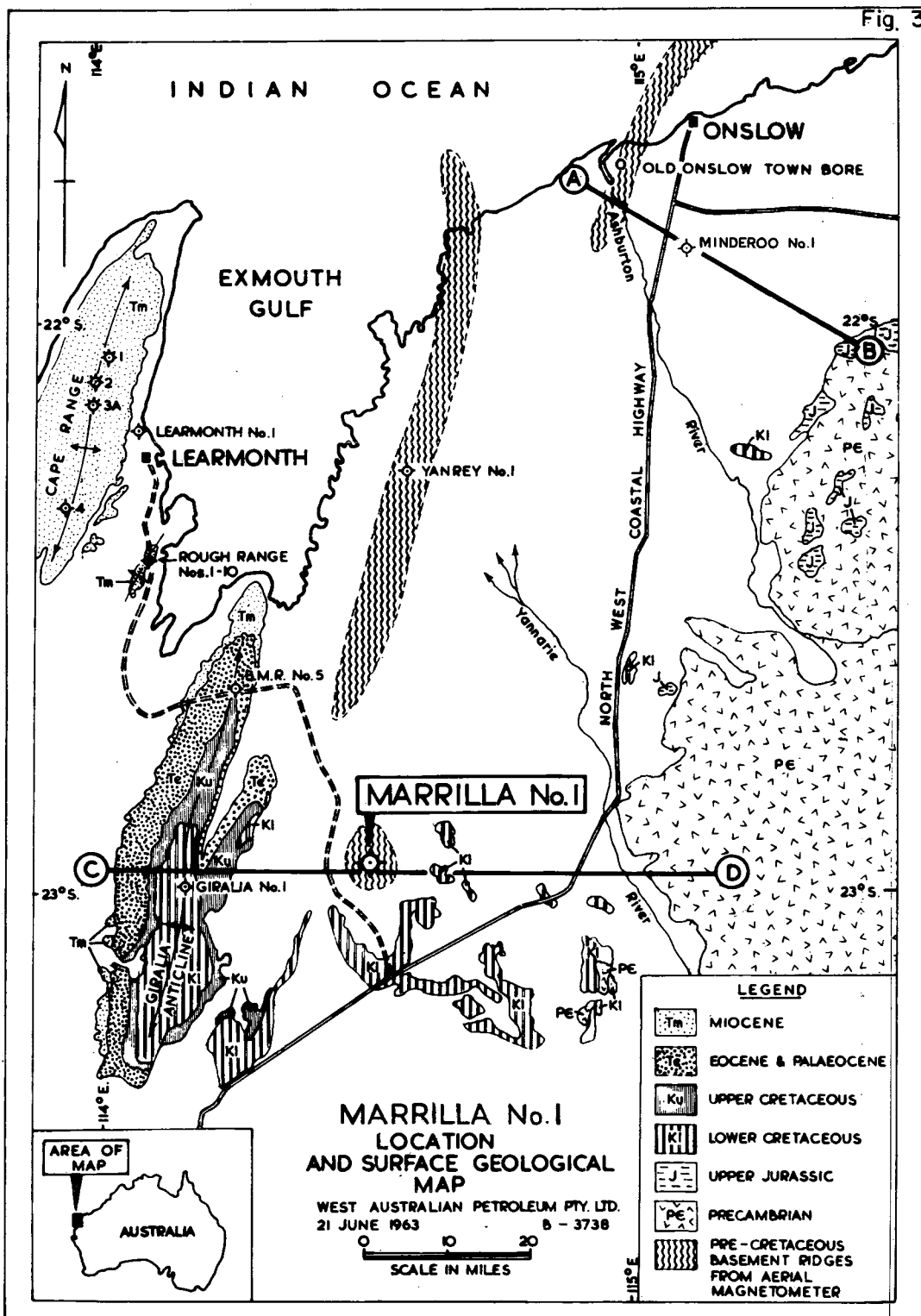
MARRILLA NO. 1

of

WEST AUSTRALIAN PETROLEUM PTY LIMITED

SUMMARY OF DATA AND RESULTS

Fig. 3



MARRILLA NO. 1

SUMMARY OF DATA AND RESULTS*

SUMMARY

Two stratigraphic wells, Marrilla No. 1 and Minderoo No. 1, were drilled in the north-eastern part of the Carnarvon Basin during March and April, 1963. The primary objective of each well was to obtain stratigraphic and porosity data relating to the Cretaceous and pre-Cretaceous sediments in the area.

Marrilla No. 1 Well was located on the Rabbit Proof Fence, approximately five miles north-east of Marrilla Homestead and 55 miles east-south-east of Learmonth, Western Australia. The well was drilled by Geophysical Service International for West Australian Petroleum Pty Limited, to a total depth of 1498 feet. Drilling commenced on 17th March, 1963 and was completed on 3rd April, 1963. A programme of logging and coring was undertaken, but no formation tests were attempted.

After drilling through 90 feet of Quaternary alluvium, the well penetrated 1252 feet of Cretaceous sediments and bottomed in (?) Lower Silurian Dirk Hartog Limestone at 1498 feet.

It was hoped that this well would penetrate the thin sedimentary section overlying the shallow Precambrian basement. However, the very hard pre-Cretaceous (Silurian) rocks encountered below 1347 feet made any attempt to reach basement with this small rig uneconomical. The well was plugged and abandoned after taking a bottom-hole core over the interval 1492 to 1497 feet.

The off-structure drilling operation at Marrilla No. 1 was subsidized under the Petroleum Search Subsidy Act 1959-1961, from surface to total depth.

* Abstracted from: Well Completion Report Marrilla No. 1 and Minderoo No. 1, by M.H. Johnstone, J.W. Burdett, D.N. Smith, and G.R. Pearson, West Australian Petroleum Pty Limited, July, 1963.

WELL HISTORY

General Data

Well name and number:	Marrilla No. 1
Location:	Latitude 22° 55' 45" S. Longitude 114° 30' 00" E.
Name and address of Tenement Holder:	West Australian Petroleum Pty Limited, 251 Adelaide Terrace, Perth, W.A.
Details of Petroleum Tenement:	Permit to Explore 28H
Total Depth:	1498 feet
Date drilling commenced:	17th March, 1963
Date drilling completed:	3rd April, 1963
Date rig released:	4th April, 1963
Elevation (ground):	155 feet
Elevation (K.B.):	160 feet (datum for depths)
Status:	Dry hole; plugged and abandoned

Drilling Data

Drilling Plant:	
Make:	Mayhew
Type:	2000
Hole sizes and depths:	8 1/2" to 128 feet 5 5/8" to 1492 feet 4 3/4" to 1498 feet (T.D.)
Casing details:	
Size (in.):	6
Setting depth (ft):	123

Logging and Testing

Ditch Cuttings:	
Interval:	Ten feet from surface to total depth.
Coring:	Nine cores were cut; a total of 78 feet was cored and 58.25 feet (74.7%) recovered.

Electric and other logging (Widco):

Point Resistivity Log	123-1497 feet (1 run)
Gamma Ray Log	0-1494 feet (2 runs)

GEOLOGY

Stratigraphy

General:

Marrilla No. 1 Well was spudded in a thick sequence of Quaternary alluvium. This was underlain by a normal sequence of Cretaceous siltstone with a basal sandstone. This, in turn, was underlain by a sequence of multi-coloured dolomites, siltstones, and coarse sandstones which lithologically resemble the Lower Silurian rocks of the southern part of the Carnarvon Basin. Rare chitinozoans and hystrichosphaerids indicate this formation to be Siluro-Devonian in age, so a lithological correlation with the Dirk Hartog Limestone is valid.

The section penetrated in Marrilla No. 1 is tabulated below:

<u>Age</u>	<u>Formation</u>	<u>Depth Intervals</u> (feet)	<u>Thickness</u> (feet)
Quaternary	Alluvium	5 - 95	90
Upper Cretaceous	Lower Gearle Siltstone	95 - 770	675
Lower Cretaceous	Windalia Radiolarite	770 - 1040	270
	Muderong Shale	1040 - 1252	212
	Birdrong Formation	1252 - 1347	95
(?) Lower Silurian	Dirk Hartog Limestone	1347 - 1498 (T.D.)	151+

Detailed:

Quaternary: 5 to 95 feet (90 feet)

Red to brown, fine to coarse-grained sandstone, with siltstone and claystone interbeds. Below 70 feet, the alluvium is predominantly cream to light brown in colour.

Lower Gearle Siltstone (Upper Cretaceous): 95 to 770 feet (675 feet)

Dark grey to black, silty, bentonitic claystone interbedded with black bentonitic shale and glauconitic, sandy siltstone towards the base.

Windalia Radiolarite (Lower Cretaceous): 770 to 1040 feet (270 feet)

This formation is difficult to distinguish from the overlying Gearle Siltstone; it is rather more siliceous. The most common lithology in this interval is a dark grey claystone and shale. The rock is massive to fissile, glauconitic in places, micaceous, and contains belemnites. The basal 30 feet of the unit is a medium-grained, glauconitic sandstone.

Muderong Shale (Lower Cretaceous): 1040 to 1252 feet (212 feet)

Medium to dark grey, glauconitic shale and shaly siltstone. Micaceous and sideritic in parts, and grading downwards towards the base into fine-grained, glauconitic sandstone.

Birdrong Formation (Lower Cretaceous): 1252 to 1347 feet (95 feet)

Dark green-grey, fine (predominantly) to coarse-grained, glauconitic, quartz sandstone with micaceous and shaly streaks and aggregates of pyrite.

Dirk Hartog Limestone (? Lower Silurian): 1347 to 1498 feet (151 feet+)

In Marrilla No. 1, the formation has been divided into two lithological units:

Upper unit: 1347 to 1423 feet, consists of grey to white, micaceous siltstone with fine sandstone bands and lenses. This unit contains a fine, quartz conglomerate at its top.

Lower unit: 1423 to 1498 feet, consists of purple-brown to green-grey, finely crystalline, vuggy dolomite, with sandstone, chocolate siltstone, and blue shale bands and lenses. The unit is dated as Silurian on a few chitinozoa and hystrichosphaerids.

Structure

Marrilla No. 1 was drilled in the centre of a prominent magnetic anomaly located by the Bureau of Mineral Resources aerial magnetometer survey of the northern Carnarvon Basin in 1956-57 (BMR, 1961).

Contribution to Geological Knowledge resulting from the Drilling of Marrilla No. 1

The lower part of the Cretaceous sequence (the Muderong Shale and the Birdrong Formation) was not deposited over the Precambrian "high" beneath the Yanrey No. 1 Well. It was suspected that similar conditions would occur over the basement "high" beneath Marrilla No. 1 indicated by the aeromagnetic survey. However, the well penetrated a complete sequence of Lower Cretaceous rocks, including a 95-foot thick basal sandstone. Thus, the Birdrong Formation is not absent over all the pre-Cretaceous basement "highs" as was suspected after the drilling of Yanrey No. 1.

The pre-Cretaceous sequence, especially the mottled purple-to-green, hard-drilling dolomites, and the chocolate shales and siltstones, closely resemble the typical lithologies developed in the Lower Silurian Dirk Hartog Limestone in the Wandagee No. 1 and the Dirk Hartog No. 17B wells. The similar sequences encountered in these wells were poor in fossil material. Examination of this unit for conodonts (the most likely Silurian fossils) revealed only one poorly preserved undiagnostic form (R.A. McTavish, pers. comm.); however H.S. Edgell describes Siluro-Devonian chitinozoans from this unit. The drillers' descriptions of the pre-Cretaceous sequence in water bores on Mia Mia Station, 30 miles to the south of Marrilla No. 1, could be applied equally to Lower Silurian or to Devonian rocks. The drilling of Marrilla No. 1 has greatly extended the known Silurian sediments in the Carnarvon Basin.

REFERENCES

- BUREAU OF MINERAL RESOURCES,
GEOLOGY AND GEOPHYSICS, 1961: Set of provisional maps of the results of aeromagnetic surveys conducted in the Carnarvon Basin in 1956 and 1957.
- CONDON, M.A., JOHNSTONE, D.,
PRICHARD, C.E., and 1956: The Giralia and Marrilla Anticlines, North-West Division, Western Australia. Bur. Min. Resour. Aust. Bull. 25.
- JOHNSTONE, M.H.,
HOELSCHER, P.A., and 1957: The geology of the Onslow area. Unpubl. report for West Australian Petroleum Pty Limited.
- McKELLAR, M.G.,
- JOHNSTONE, M.H., 1955: Giralia No. 1 Well Completion Report. Unpubl. report for West Australian Petroleum Pty Limited.
- JOHNSTONE, M.H., BURDETT, J.W., 1963: Marrilla No. 1 and Minderoo No. 1 Stratigraphic Bores, Carnarvon Basin, Western Australia. Unpubl. report for West Australian Petroleum Pty Limited.
- SMITH, D.N., and PEARSON, G.R.,
- PUDOVSKIS, V., 1957: Yanrey No. 1 geological well summary. Unpubl. report for West Australian Petroleum Pty Limited.
- QUILTY, J.H., 1963: Perth Basin aeromagnetic survey, Western Australia, 1957. Bur. Min. Resour. Aust. Rec. 1963/74 (Unpubl.).
- WILLMOTT, S.P., 1959: Bureau of Mineral Resources Stratigraphic Bore No. 5 (Giralia) geological completion report. Unpubl. report for West Australian Petroleum Pty Limited.

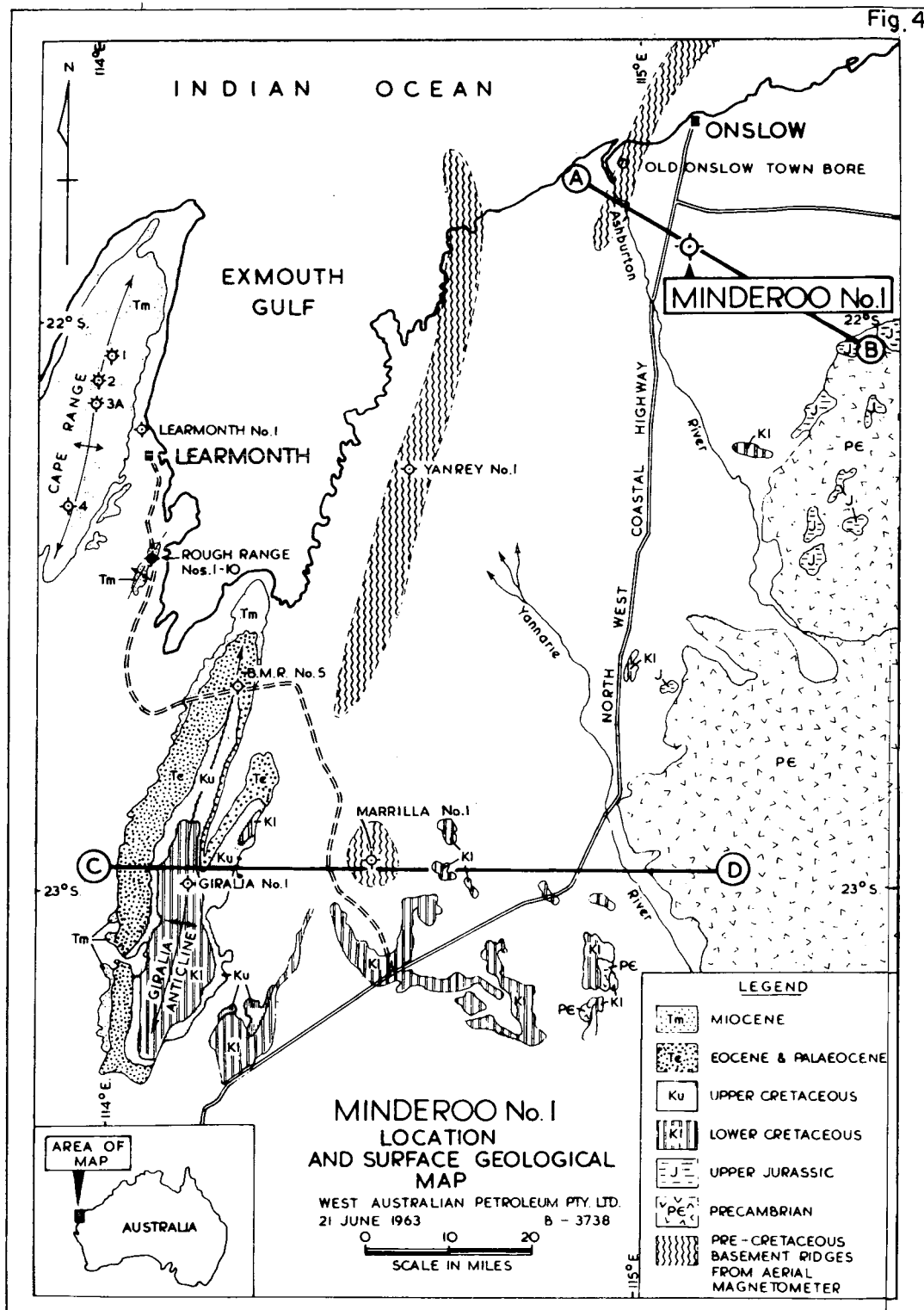
MINDEROO NO. 1

of

WEST AUSTRALIAN PETROLEUM PTY LIMITED

SUMMARY OF DATA AND RESULTS

Fig. 4



MINDEROO NO. 1

SUMMARY OF DATA AND RESULTS *

SUMMARY

Minderoo No. 1 Well was located at the extreme north-eastern end of the landward part of the Carnarvon Basin, some 16 miles south of Onslow. The well was drilled by Geophysical Service International for West Australian Petroleum Pty Limited, to a total depth of 2000 feet. Drilling commenced on 9th April, 1963 and was completed on 27th April, 1963. A programme of logging and coring was undertaken, but no formation tests were attempted.

The well was drilled through Quaternary alluvium to 100 feet, Miocene sediments to 125 feet, Cretaceous sediments to 1270 feet, and bottomed in Upper Carboniferous sediments at 2000 feet.

The rig reached its maximum depth of 2000 feet before drilling out of the Carboniferous sequence. Although only 280 feet of sediments of this age are known from outcrop (the Harris Sandstone which lies at the base of the glacial sediments of the Lyons Group), greater thicknesses are known in the subsurface. The Warroora No. 1 Well penetrated 1041 feet of similar sandstones, siltstones, and calcareous rocks beneath the Permian glacials. The well was still in this sequence at 5992 feet (T.D.). In Rough Range No. 1, 1505 feet of sandstones and shales of this age were encountered between the Permian glacials and the Lower Carboniferous limestones.

The presence of this thick Upper Carboniferous sequence in the eastern part of the Basin necessitates a re-evaluation of the stratigraphic and structural history of the northern Carnarvon Basin.

The off-structure drilling operation at Minderoo No. 1 was subsidized under the Petroleum Search Subsidy Act 1959-1961, from surface to total depth.

* Abstracted from: Well Completion Report Marrilla No. 1 and Minderoo No. 1, by M.H. Johnstone, J.W. Burdett, D.N. Smith, and G.R. Pearson, West Australian Petroleum Pty Limited, July, 1963.

WELL HISTORY

General Data

Well name and number:	Minderoo No. 1
Location:	Latitude 21° 50' 40" S. Longitude 115° 04' 40" E.
Name and address of Tenement Holder:	West Australian Petroleum Pty Limited, 251 Adelaide Terrace, Perth, W.A.
Details of Petroleum Tenement:	Permit to Explore 217H (formerly 29H)
Total Depth:	2000 feet
Date drilling commenced:	9th April, 1963
Date drilling completed:	27th April, 1963
Date rig released:	27th April, 1963
Elevation (ground):	35 feet
Elevation (K.B.):	40 feet (datum for depths)
Status:	Dry hole; plugged and abandoned
Total cost, Marrilla No. 1 and Minderoo No. 1:	£28,052

Drilling Data

Drilling Plant:	
Make:	Mayhew
Type:	2000
Hole sizes and depths:	8 1/2" to 125 feet 5 5/8" to 1990 feet 4 3/4" to 2000 feet (T.D.)
Casing details:	
Size (in.):	6
Setting depth (ft):	121

Logging and Testing

Ditch Cuttings:	
Interval:	Ten feet from surface to total depth.
Coring:	Twelve cores were cut; a total of 96 feet was cored and 41 feet (42.7%) recovered.

Electric and other logging (Widco):

Electrical Survey	120-2000 feet (3 runs)
Gamma Ray Log	0-2000 feet (3 runs)

GEOLOGY

Stratigraphy

General:

Beneath a thick layer of Quaternary alluvium, the Minderoo No. 1 Well encountered a thin veneer of Miocene limestone capping a normal Cretaceous sequence. The Cretaceous rests with an angular unconformity on a thick sequence of Upper Carboniferous sandstones and shales which were not bottomed in this 2000-foot well.

The section penetrated in Minderoo No. 1 is tabulated below:

<u>Age</u>	<u>Formation</u>	<u>Depth Intervals</u> (feet)	<u>Thickness</u> (feet)
Quaternary	Alluvium	5- 100	95
Lower Miocene	Trealla Limestone	100- 125	25
Upper Cretaceous	Upper Gearle Siltstone	125- 165	40
	Lower Gearle Siltstone	165- 767	602
Lower Cretaceous	Windalia Radiolarite	767-1010	243
	Muderong Shale	1010-1122	112
	Birdrong Formation	1122-1270	148
Upper Carboniferous	Unnamed formation	1270-2000 (T.D.)	730+

Detailed:

Quaternary: 5 to 100 feet (95 feet)

Brown, very fine-grained, poorly sorted sand grading into silty claystone; a bed of limonite and quartz pebbles occurs between 60 and 70 feet.

Trealla Limestone (Lower Miocene): 100 to 125 feet (25 feet)

White to orange, aphanitic limestone with scattered, fine quartz grains.

Upper Gearle Siltstone (Upper Cretaceous): 125 to 165 feet (40 feet)

Bright green to green-grey, glauconitic and pyritic claystone. This formation has the lithologic and electrical log character so typical of its development in the Rough Range wells.

Lower Gearle Siltstone (Upper Cretaceous): 165 to 767 feet (602 feet)

Dark grey, slightly silty, very bentonitic claystone, slightly glauconitic and pyritic, with disseminated, very fine flakes of dark mica. Belemnites occur scattered through the formation. Massive when dry, puggy when wet.

Windalia Radiolarite (Lower Cretaceous): 767 to 1010 feet (243 feet)

Dark grey, sideritic, micaceous siltstone, grading into claystone, with minor amounts of glauconite and pyrite.

Muderong Shale (Lower Cretaceous): 1010 to 1122 feet (112 feet)

Dark grey, micaceous, slightly glauconitic siltstone (1010 to 1065 feet), followed by light grey to white, coarse to pebbly (at base), porous, quartz sandstone.

Birdrong Formation (Lower Cretaceous): 1122 to 1270 feet (148 feet)

Medium to light grey, predominantly medium-grained, quartz sandstone having a kaolinitic cement. The bottom ten feet contain Aptian to upper Neocomian microplankton and Upper Carboniferous spores.

Unnamed formation (Upper Carboniferous): 1270 to 2000 feet (730 feet +)

The Upper Carboniferous sequence in Minderoo No. 1 has been divided into two distinct lithologic units:

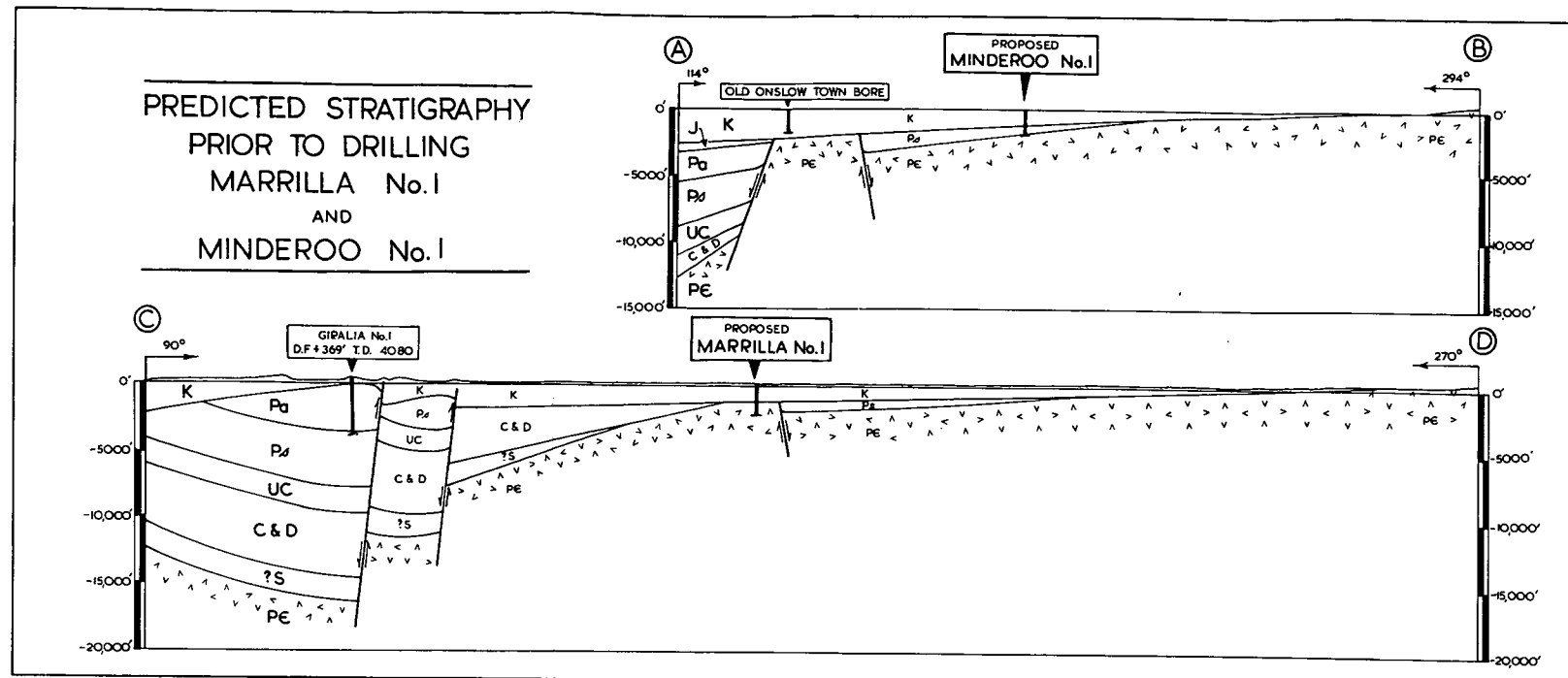
Unit A: 1270 to 1558 feet, consists of medium grey, slightly fissile, micaceous shale, grading downwards into calcareous shale containing beds of grey, argillaceous limestone.

Unit B: 1558 to 2000 feet, is essentially an interbedded sequence of:

- (i) light-grey, well consolidated, very fine-grained sandstone with patches of fontainbleau cement;
- (ii) dark-grey to medium-grey, silty, poorly-fissile shale, containing carbonaceous plant fragments; interbedded with lenses and slumped beds of siltstone;
- (iii) very pale grey, well-consolidated, hard, micaceous siltstone containing small shale pellets. The age of the bottom-hole core which is in this lithology has been determined as Upper Carboniferous.

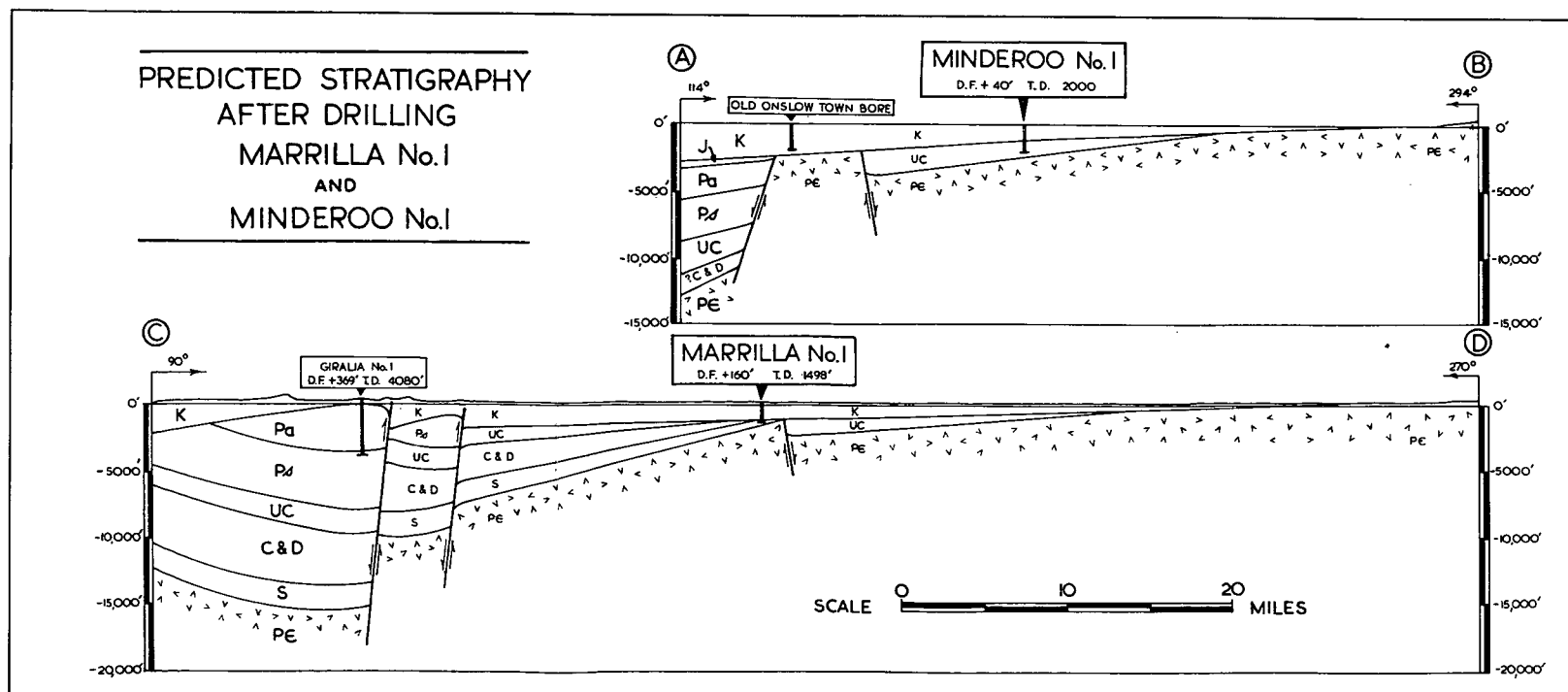
Structure

Both gravity and magnetic surveys show that the shallow basement ridge through Marrilla No. 1 and Yanrey No. 1 breaks up into several areas of shallow basement in the area west of Onslow but there appears to be a continuous trough of sediments between these basement ridges and the Precambrian outcrop to the east. Minderoo No. 1 was located in this trough so that, as well as examining the basal Cretaceous sequence, it would also determine the nature of the pre-Cretaceous sediments filling this trough. The well showed that 148 feet

**LEGEND**

CRETACEOUS AND TERTIARY	K	Mainly Cretaceous siltstones but including Eocene and Miocene limestones to the West.
JURASSIC	J	Paralic facies
PERMIAN Artinskian	Pa	Byro Group, Wooramel Group, and Callytharra Formation
PERMIAN Sakmarian	Pd	Lyons Group, glacials
CARBONIFEROUS Upper	UC	Unnamed siltstone-sandstone sequence
L.CARBONIFEROUS - UPPER DEVONIAN	C & D	Limestones, sandstones, and shales.
SILURIAN Lower	S	Dirk Hartog Limestone and Tumblagooda Sandstone
PRECAMBRIAN	PE	Metamorphics

LOCATION OF SECTIONS A - B AND C - D
IS SHOWN ON B-3738
(FIGURE 4)



REVISIONS	WEST AUSTRALIAN PETROLEUM PTY. LTD.		
	NORTHERN CARNARVON BASIN		
	CROSS SECTIONS BEFORE AND AFTER DRILLING MARRILLA No.1 AND MINDEROO No.1		
	M. H. JOHNSTONE 29 JULY 1963		
DR. SYM.H.J.	DATE	SCALE	C - 3797
TR. BY H.W.P.	29 JULY 1963		
CH. BY M.H.J.			

of the Birdrong Formation was present in this area, and was in a coarse, porous, but non-glaucinitic, silty facies. Beneath the base of the Cretaceous at 1270 feet, the trough was filled with Upper Carboniferous sandstones, siltstones, and thin limestones. Examination of the microfossils from the Cretaceous - Upper Carboniferous interface did not reveal any relict Jurassic forms which might indicate Jurassic deposition in the vicinity of this well.

Contribution to Geological Knowledge resulting from the Drilling of Minderoo No. 1

The presence of a thick sequence of Upper Carboniferous sandstones, shales, siltstones, and limestones beneath the Cretaceous in Minderoo No. 1 was not expected. Sediments of this age are not widely known in outcrop - the Harris Sandstone being the only formation with a similar microfloral assemblage. Similar sediments have been penetrated in Warroora No. 1 (4951 to 5992 feet T.D.) and Rough Range No. 1 (9200 to 10,705 feet) wells. Minderoo No. 1 thus shows that this thick sequence of Upper Carboniferous rocks is not restricted only to the western part of the basin, but also fills the pre-Cretaceous trough between the Yanrey ridge and the Precambrian basin margin. A basement depth estimate (from the aeromagnetic survey) of approximately 2500 feet near Minderoo No. 1 leaves little room for sediments of any other age to be present in this trough. Dips estimated at 10° or more in cores in this sequence indicate that there is an angular unconformity between the Upper Carboniferous and the overlying, flat-lying Cretaceous.

ADDITIONAL DATA FILED IN THE BUREAU OF MINERAL RESOURCES

The following additional data relating to Marrilla No. 1 and Minderoo No. 1 wells have been filed in the Bureau of Mineral Resources, Canberra, and are available for reference:

- | | | |
|-------|------------------------------------------------------------------------------------------|--------|
| (i) | Well Completion Report, by M.H. Johnstone, J.W. Burdett,
D.N. Smith, and G.R. Pearson | 16 pp. |
| | Appendix A: Sample descriptions, Marrilla No. 1 | 22 pp. |
| | Appendix B: Sample descriptions, Minderoo No. 1 | 17 pp. |
| | Appendix C: List of cores | 1 p. |
| | Appendix D: List of Widco logs | 1 p. |
| | Appendix E: Micropalaeontology and stratigraphy,
Marrilla No. 1, by H.S. Edgell | 19 pp. |
| | Appendix F: Micropalaeontology and stratigraphy,
Minderoo No. 1, by H.S. Edgell | 19 pp. |
| | Appendix G: Core analyses, Marrilla No. 1, by BMR | 2 pp. |
| | Appendix H: Core analyses, Minderoo No. 1, by BMR | 2 pp. |
| (ii) | Daily drilling reports, Marrilla No. 1, for period 17th March, 1963 to 4th April, 1963. | |
| (iii) | Daily drilling reports, Minderoo No. 1, for period 9th April, 1963 to 27th April, 1963. | |

(iv) Widco well logs including the following:

(a) Point Resistivity Log, Marrilla No. 1

Run 1, 123-1497 feet (2" = 100 ft)

(b) Gamma Ray Log, Marrilla No. 1

Run 1, 0-1015 feet (2" = 100 ft)

Run 2, 123-1494 feet (2" = 100 ft)

(c) Electrical Survey, Minderoo No. 1

Run 1, 120-1127 feet (2" = 100 ft)

Run 2, 120-1640 feet (2" = 100 ft)

Run 3, 1535-2000 feet (2" = 100 ft)

(d) Gamma Ray Log, Minderoo No. 1

Run 1, 0-1130 feet (2" = 100 ft)

Run 2, 1058-1640 feet (2" = 100 ft)

Run 3, 1565-2000 feet (2" = 100 ft)

COMPOSITE WELL LOG
WEST AUSTRALIAN PETROLEUM PTY LIMITED

PLATE I
SHEET I

PERMIT TO EXPLORE 28H
LICENCE TO PROSPECT —

LOCATION LAT 23° 53' 15" S LONG 114° 23' 51" E
ELEVATION GROUND LEVEL 225'
DERRICK FLOOR 234'

DATE SPUNDED 25TH APRIL 1962
DATE DRILLING STOPPED 12TH JUNE 1962
TOTAL DEPTH D.F. 3521'

MOLE SIZE: IN. FROM TO
12 1/4 0 743'
8 1/2 743' 3512'
7 3/8 3512' 3521'

CASING SIZE W.T. TYPE DEPTH CMT. CMT. TO
9 5/8 36 J-55 712 200 SURFACE

CEMENT PLUGS. FROM TO TOP SACKS
1300' 1500' 1300' 75
1906' 2100' 1955' 75

PERFORATIONS: NIL

WELL HEAD FITTINGS: WELL COMPLETED AS WATER WELL
DRILLED BY: OIL DRILLING & EXPLORATION (W.A.) PTY LTD.
DRILLING METHOD: ROTARY

STATE: WESTERN AUSTRALIA 4-MILE SHEET: MINILYA

Basin: CARNARVON

WELL STATUS: WATER WELL

RUN No.	1	2	3	4
DATE	27.4.62	2.5.62	21.5.62	12.6.62
FOOTAGE LOGGED	706	124	1978	971
TOTAL DEPTH ELECTRIC LOG	741	842	2656	3522
TOTAL DEPTH DRILLER	743	847	2655	3521
CASING SHOE ELECTRIC LOG	—	712	712 *	712 *
CASING SHOE DRILLER	—	712	750 *	750 *
BIT SIZE	8 1/2	8 1/2	8 1/2	7 1/8
* CASING PARTED AND DROPPED TO 750'				
MUD DATA - TYPE	B E N T O N I T E			
TREATMENT	GEL	GEL	GEL	GEL
WATER LOSS 30 MIN.	—	—	24	11
WEIGHT	70	68	75	76
VISCOSITY	42	42	36	38
pH	9	—	9	9
RESISTIVITY & TEMP	Rm 1.52008 ft 64395 ft 10008 ft 124002 ft Rmf — 50095 ft 6508 ft 96062 ft Rmc — 1708 ft 23062 ft			
MAXIMUM RECORDED TEMP.	—	—	136° F	148° F
ELECTRODE SPACING	AM 16" 16" 16" 16" IND 40" 40" 40" 40" S.O. 1 1/2" 1 1/2" 1 1/2" 1 1/2"			
RECORDED BY	SOCK	SOCK	SOCK	SOCK

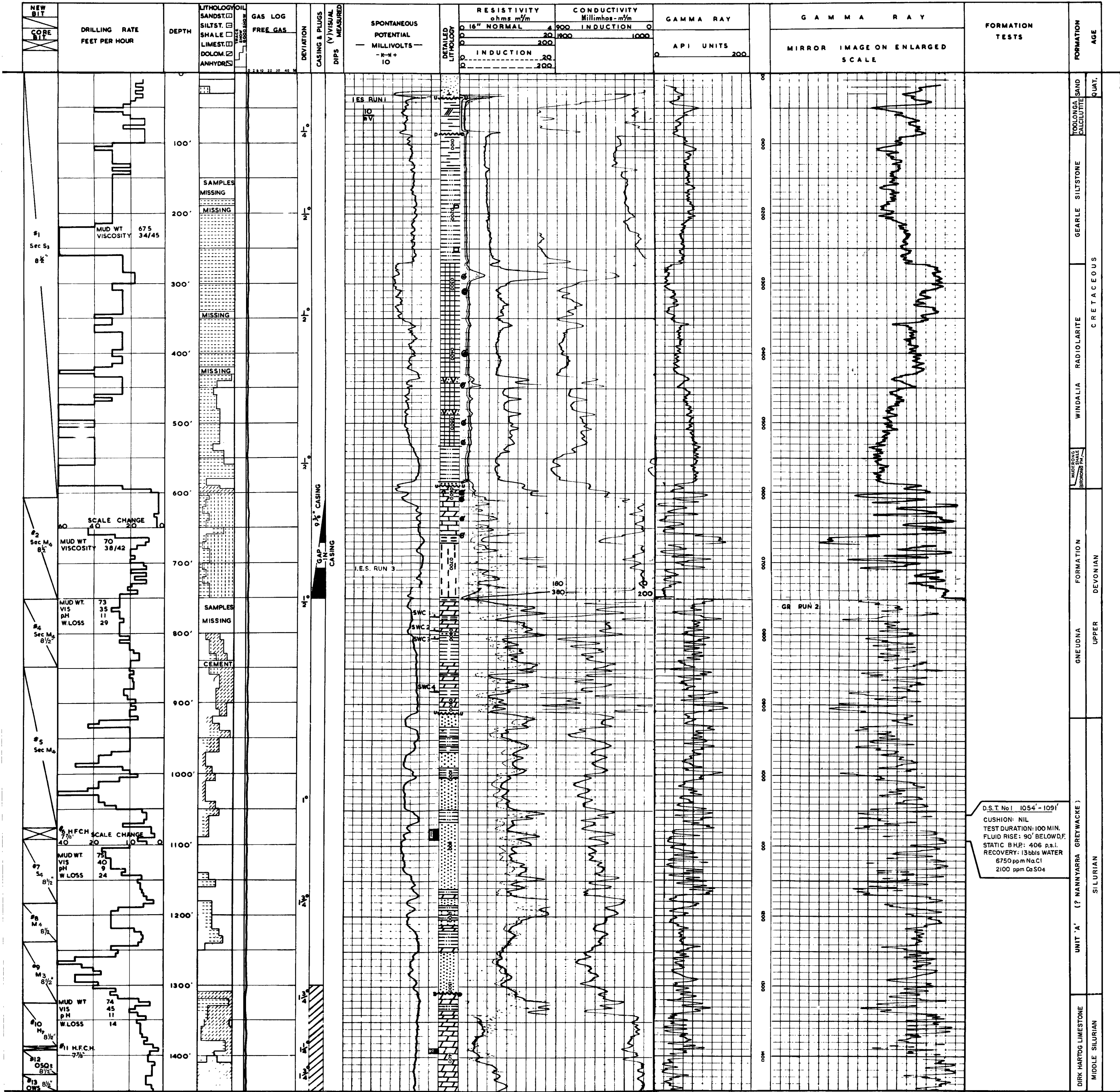
RADIOMETRIC LOG		DATA	
TYPE OF LOG	GR	GR	
RUN NUMBER	1	2	
DATE IN 1962	APRIL 27 JUNE 14		
TOTAL DEPTH DRILLER	743	3521	
TOP OF LOGGED INTERVAL	20	700	
BOTTOM LOGGED INTERVAL	738	3514	
TYPE OF FLUID IN HOLE	MUD	MUD	
FLUID LEVEL	FULL	FULL	
MAXIMUM RECORDED TEMP.	120° F	148° F	
SONDE SIZE & TYPE	—	—	
TIME CONSTANT SECONDS	3	2	
LOGGING SPEED FT/HR	1200	1800	
SENSITIVITY REFERENCE	200	300	

OTHER ELECTRICAL LOGS
TEMPERATURE 3520' TO 750' RUN 1
SONIC 3515' TO 90' RUN 1 TO 3
MICROLOG-CALIPER 3520' TO 677' RUN 1 TO 2
LATEROLOG 3518' — 677' RUN 1 TO 2
CONTINUOUS DIPMETER 3517' — 750' RUN 1

LITHOLOGY BY: V PUDOVSKIS, R.M.L. ELLIOTT
COMPILED BY: V PUDOVSKIS
LOGGED BY: SCHLUMBERGER

LITHOLOGIC REFERENCE & WELL SYMBOLS

CONGLOMERATE	CALCARENITE	ANHYDRITE	GLAUCONITIC	CORE (Recovery black)
SANDSTONE	LIMESTONE	GYPSUM	OOLITIC	SPECIFIC GRAVITY
SILTSTONE	DOLOMITE	SIDERITIC	PYRITIC	SIDE WALL CORE
CLAYSTONE	CALCAREOUS	RADIOLARITE	FOSSILIFEROUS	CASING SHOE
SHALE	DOLOMITIC	CHERT	GAS SHOW	



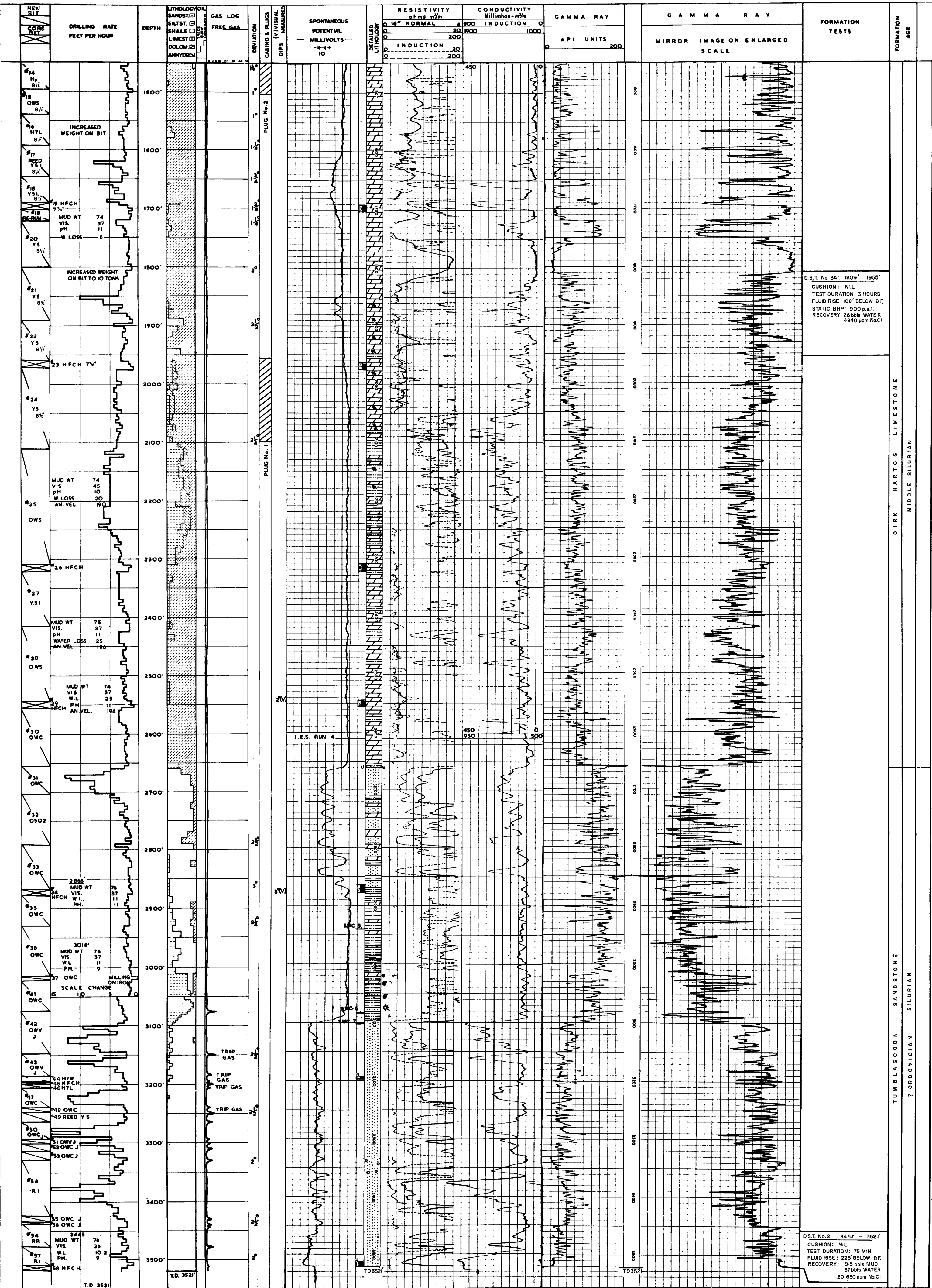
COMPOSITE WELL LOG — SHEET 2
WEST AUSTRALIAN PETROLEUM PTY. LIMITED
WANDAGEE No.1

LOCATION: LAT. 23° 53' 15" S. LONG. 114° 23' 51" E.
ELEVATION: GROUND LEVEL 225' DERRICK FLOOR 234'

STATE: WESTERN AUSTRALIA

4-MILE SHEET: MINILYA

Basin: CARNARVON



COMPOSITE WELL LOG

WEST AUSTRALIAN PETROLEUM PTY LIMITED
MARRILLA No.1

PERMIT TO EXPLORE 28H STATE WESTERN AUSTRALIA 4 MILE SHEET: YANREY BASIN: CARNARVON WELL STATUS: ABANDONED

LOCATION LAT 22° 55' 45" S. LONG 114° 30' 00" W
ELEVATION GROUND LEVEL: 155' KELLY BUSHING: 160'

DATE SPUDDED: 17 MAR. 1963
DATE DRILLING COMPLETED: 3 APRIL 1963
TOTAL DEPTH K.B.: 1498'

HOLE SIZE: IN. FROM TO
8 1/2 0' 128'
5 5/8 128' 1492'
4 3/4 1492' 1498'

CASING: SIZE WT G R DEPTH CMT.
6" — — 123' 123'
CMT. TO SURFACE

CEMENT PLUGS: FROM TO SACKS
1300 1148 25
130 95 5

E. LOG DATA	
RUN NUMBER	1
DATE IN 1963	2 APRIL
FOOTAGE LOGGED	1494-123
TOTAL DEPTH (LOG)	—
TOTAL DEPTH (DRILLER)	1498'
CASING SHOE (LOG)	121'
CASING SHOE (DRILLER)	123'
BIT SIZE	5 5/8 128-1492'
MUD DATA TYPE	4 3/4 1492-1498'
TREATMENT	HIGH PH DIESEL
WATER LOSS 30 MIN	CAUSTIC
WEIGHT	4-2 cc
VISCOSITY	75 lb / c. ft
RESISTIVITY Rm	140 @ 75°F
TYPE OF LOG	1-75 @ 75°F
RECORDED BY:	PR
	D.N.SMITH

RADIOMETRIC LOG DATA		
TYPE OF LOG	R/G	R/G
RUN NUMBER	1	2
DATE IN 1963	26 MARCH	2 APRIL
TOTAL DEPTH (DRILLER)	1015'	1498'
TOP OF LOGGED INTERVAL	0'	123'
BOTTOM LOGGED INTERVAL	1020'	1494'
TYPE OF FLUID IN HOLE	MUD	MUD
SONDE TYPE	G-7A	G-7A
TIME CONSTANT (SECONDS)	1	3
LOGGING SPEED FT/HR	600	600

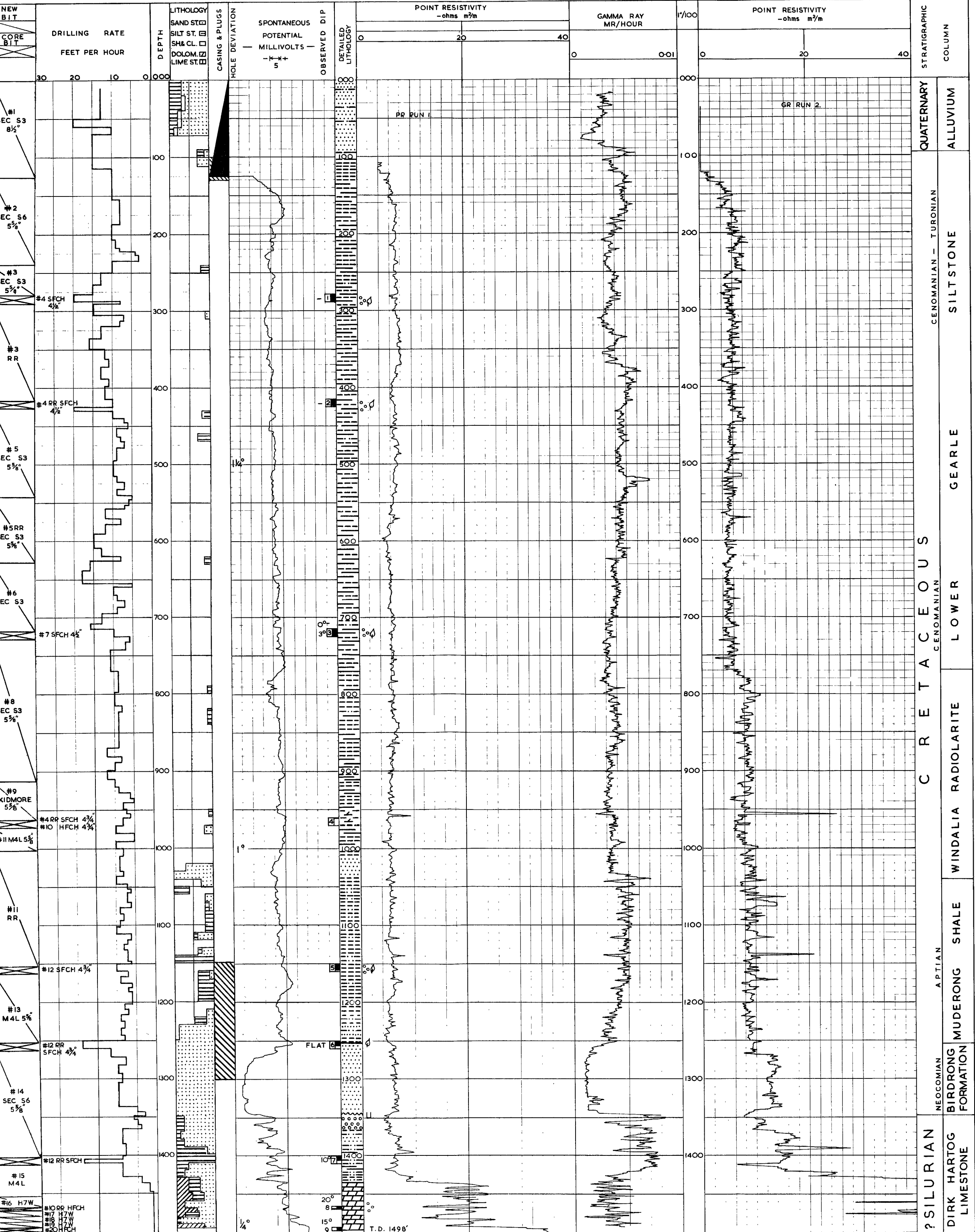
LITHOLOGIC REFERENCE & WELL SYMBOLS

PERFORATIONS: NIL

WELL HEAD FITTINGS: NIL
DRILLED BY: GEOPHYSICAL SERVICE INTERNATIONAL
DRILLING METHOD: ROTARY

CONGLOMERATE	CALCILUTITE	PEBBLY	CORE (Recovery block)
CLAYSTONE	SHALE	CALCARENITE	CASING SHOE
SANDSTONE, COARSE	PYRITIC	CALCAREOUS	
SANDSTONE, FINE	DOLOMITE	FOSSILIFEROUS	
SILTSTONE	CARBONACEOUS MATTER	OIL SHOW	
		GAS SHOW	

LITHOLOGY BY: J.W.BURDETT
G.R. PEARSON
D.N. SMITH
COMPILED BY: J.W.BURDETT



PERMIT TO EXPLORE 217 H (FORMERLY 29H)

COMPOSITE WELL LOG

LOCATION LAT. 21° 50' 40" S. LONG. 115° 04' 40" E.
ELEVATION GROUND LEVEL: 35'
KELLY BUSHING: 40'

WEST AUSTRALIAN PETROLEUM PTY LIMITED

MINDEROO No.1

STATE: WESTERN AUSTRALIA

4 MILE SHEET: ONSLOW

Basin: CARNARVON

WELL STATUS: ABANDONED

HOLE SIZE: IN. FROM TO
8 1/2 0 125
5 1/2 125 1990
4 1/2 1990 2000
CASING: SIZE: 6"
DEPTH: 121'
CMT: 121'
CMT TO: SURFACE

CEMENT PLUGS FROM 1100 140
TO 935 90
SACKS 27 7

PERFORATIONS: NIL

WELL HEAD FITTINGS: NIL

ELECTRIC LOG DATA

RUN NUMBER	1	2	3
DATE IN 1963	15 APRIL	20 APRIL	26 APRIL
FOOTAGE LOGGED	1127' 120'	1640' 120'	2000' 1535'
TOTAL DEPTH ELECTRIC LOG	1127'	1640'	2000'
TOTAL DEPTH (DRILLER)	1126'	1640'	2000'
CASING SHOE (LOG)	121'	121'	121'
CASING SHOE (DRILLER)	121'	121'	121'
BIT SIZE	8 1/2" 0'-125'	8 1/2" 0'-125'	8 1/2" 0'-125'
	5 1/2" 125'-1126'	5 1/2" 125'-1126'	5 1/2" 125'-2000'
MUD DATA—TYPE — LOW PH.	HIGH PH DIESEL	HIGH PH DIESEL	HIGH PH SALT
TREATMENT	CAUSTIC	CAUSTIC	CAUSTIC
WATER LOSS 30 MIN	6cc	6cc	3-2 cc
WEIGHT	66.5 lb./c.ft	76 lb./c.ft.	70 lb./c.ft.
VISCOSITY	130 @ 80°F	58 @ 80°F	70 @ 75°F
RESISTIVITY Rm	1.3 @ 80°F	1.12 @ 80°F	1.14 @ 75°F
ELECTRODE SPACING AM 1	16"	16"	16"
AM 2	64"	64"	64"
RECORDED BY:	J.W.BURDETT	J.W.BURDETT	J.W.BURDETT

RADIOMETRIC LOG DATA

TYPE OF LOG	R/G	R/G	R/G
RUN NUMBER	1	2	3
DATE IN 1963	16 APRIL	20 APRIL	26 APRIL
TOTAL DEPTH (DRILLER)	1126'	1640'	2000'
TOP OF LOGGED INTERVAL	0'	1058'	1565'
BOTTOM LOGGED INTERVAL	1126'	1640'	2000'
TYPE OF FLUID IN HOLE	MUD	MUD	MUD
SONDE TYPE	G-7A	G-7A	G-7A
TIME CONSTANT (SECONDS)	3	1	3
LOGGING SPEED FT/HR	1200	2400	1200

DRILLED BY: GEOPHYSICAL SERVICE INTERNATIONAL
DRILLING METHOD: ROTARY

LITHOLOGIC REFERENCE & WELL SYMBOLS

CONGLOMERATE	CALCILUTITE	PEBBLY	CORE (Recovery block)
CLAYSTONE	SHALE	CALCARENITE	CASING SHOE
SANDSTONE, COARSE	PYRITIC	CALCAREOUS	
SANDSTONE, FINE	COAL	FOSSILIFEROUS	
SILTSTONE	CARBONACEOUS MATTER	OIL SHOW	
		GAS SHOW	

LITHOLOGY BY: J.W.BURDETT
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