

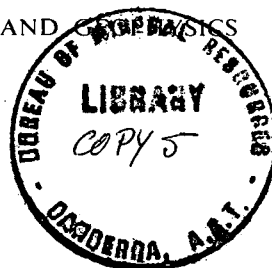
COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND CHEMICALS

Petroleum Search Subsidy Acts

PUBLICATION No. 48



**SUMMARY OF DATA AND RESULTS
CANNING BASIN, WESTERN AUSTRALIA**

**Babrongan No. 1 Well
Langoora No. 1 Well
Hawkstone Peak No. 1 Well**

OF

WEST AUSTRALIAN PETROLEUM PTY LIMITED

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

1966 33

COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

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

SECRETARY: R. W. BOSWELL

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

DIRECTOR: J. M. RAYNER

THIS REPORT WAS PREPARED FOR PUBLICATION IN THE PETROLEUM EXPLORATION BRANCH

ASSISTANT DIRECTOR: M. A. CONDON

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 offices of the Bureau of Mineral Resources in Canberra and Melbourne (after the agreed period) and copies of the main reports may be purchased.

In order to make the main results 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 Canning Basin, Western Australia: Babrongan No. 1, Langoora No. 1, and Hawkstone Peak 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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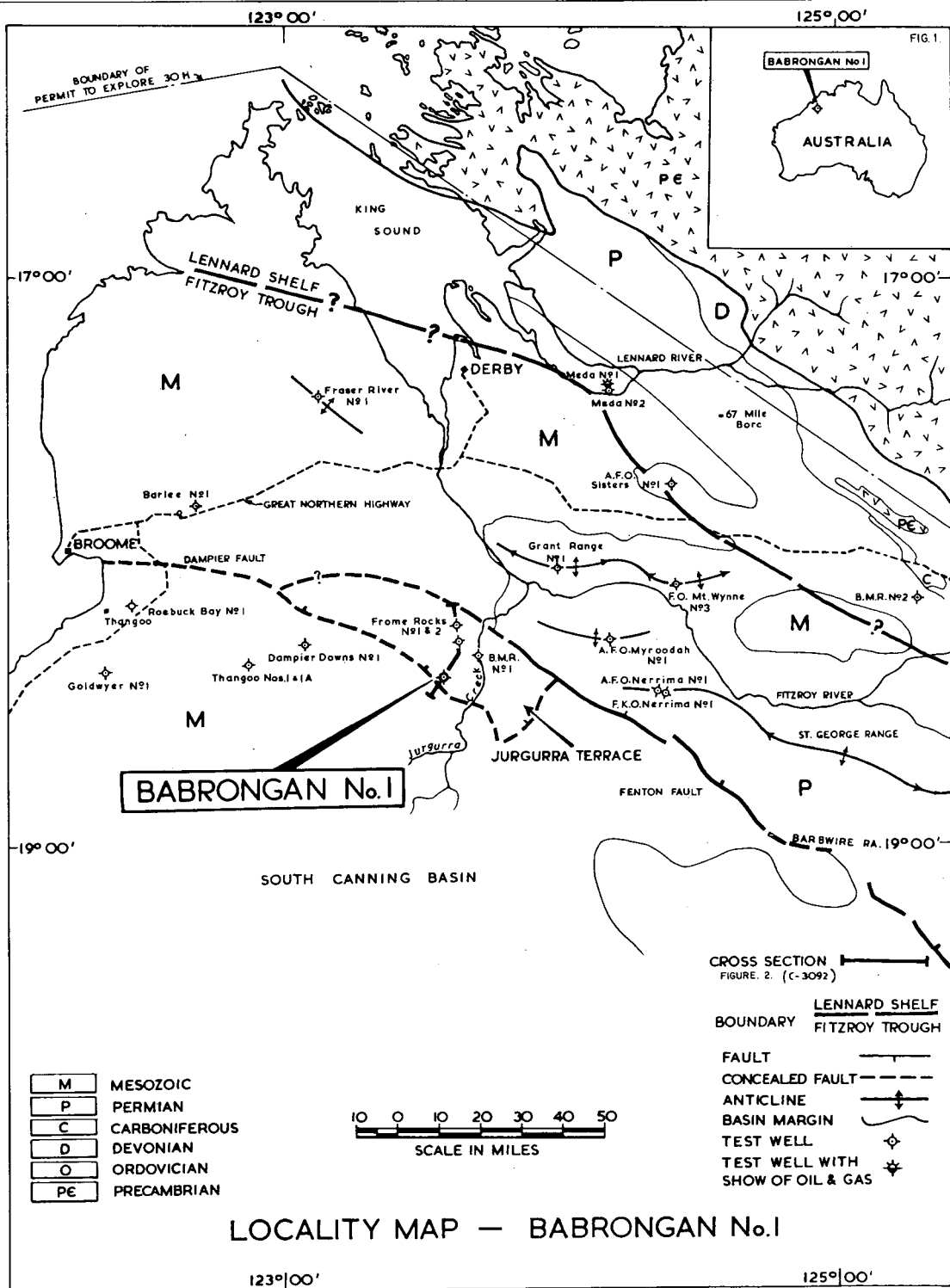
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BABRONGAN NO. 1

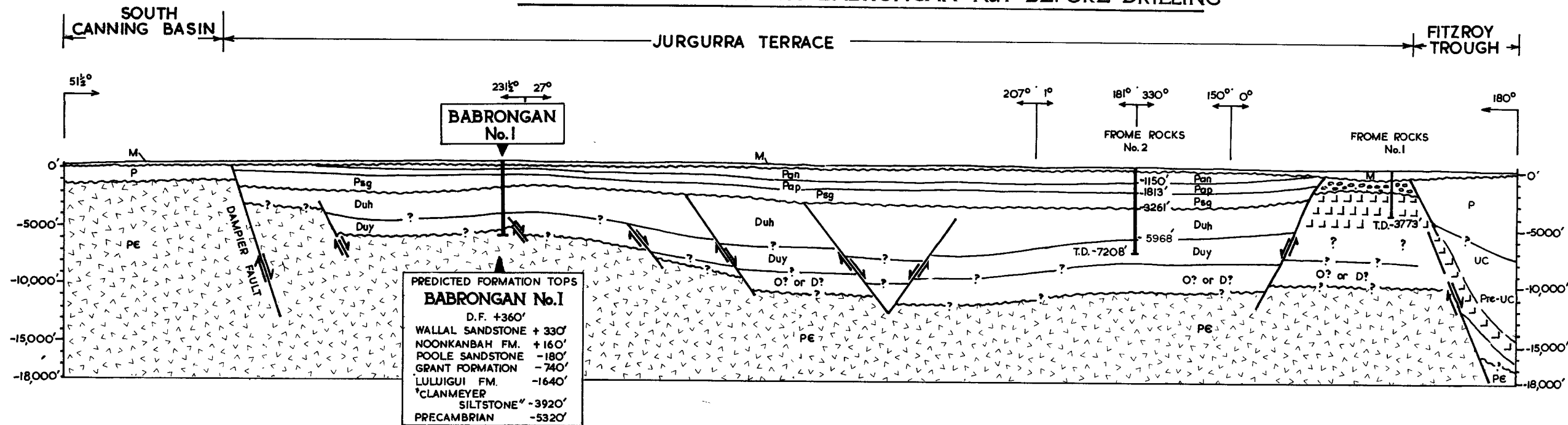
of

WEST AUSTRALIAN PETROLEUM PTY LIMITED

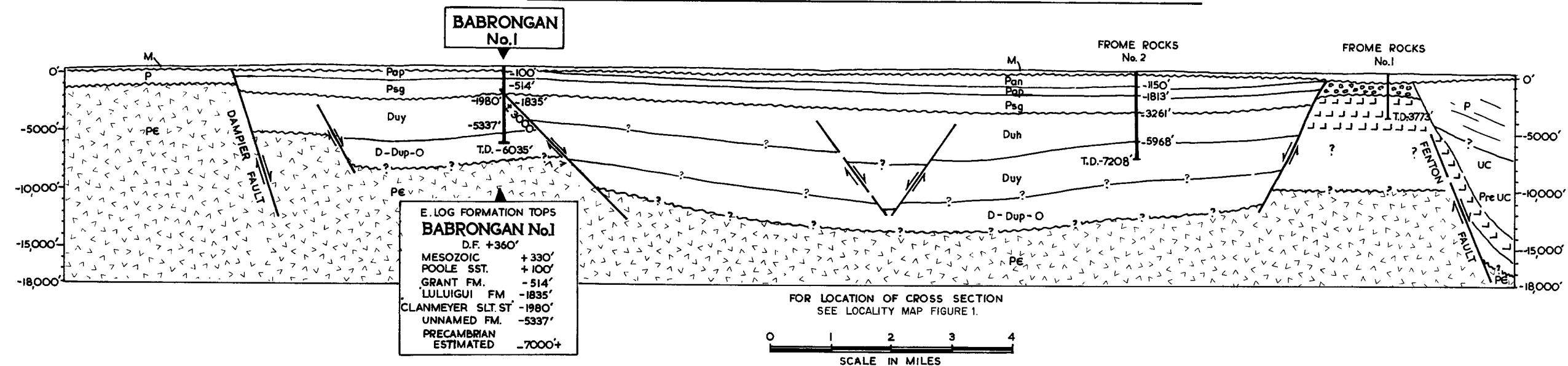
SUMMARY OF DATA AND RESULTS



CROSS SECTION THROUGH BABRONGAN No.1 BEFORE DRILLING



CROSS SECTION THROUGH BABRONGAN No.1 AFTER DRILLING



LEGEND

MESOZOIC	M	UNDIFFERENTIATED
PERMIAN	Pan	NOONKANBAH FORMATION
	Pap	POOLE SANDSTONE
	Psg	GRANT FORMATION
	P	UNDIFFERENTIATED
DEVONIAN	UC	ANDERSON FORMATION
	Pre-UC	PRE ANDERSON FORMATION
	Duh	'LULUIGUI FORMATION'
	Duy	'CLANMEYER SILTSTONE'
ORDOVICIAN	Dup	UNNAMED FORMATION (? VIRGIN HILLS FORMATION)
	D	OTHER DEVONIAN
PRECAMBRIAN	O	UNDIFFERENTIATED
	PE	PRECAMBRIAN (GRANITIC OR METAMORPHIC ROCKS)



REVISIONS	WEST AUSTRALIAN PETROLEUM PTY. LIMITED		
	CROSS SECTION THROUGH BABRONGAN No.1 BEFORE AND AFTER DRILLING		
	W.E. GARDNER		25 JAN. 1963
	DR BY W.E.G.	DATE	SCALE
TR. BY N.W.P.	25 JAN. 1963		
CH. BY R.M.L.E.			
C - 3092			

BABRONGAN NO. 1

SUMMARY OF DATA AND RESULTS *

SUMMARY

Babrongan No. 1 Well was located on the southern edge of the Jurgurra Terrace, 97 miles east-south-east of Broome, Western Australia, and approximately 11 miles south of Frome Rocks No. 2. The well was drilled by Oil Drilling and Exploration (W.A.) Pty Limited for West Australian Petroleum Pty Limited, to a total depth of 6395 feet. Drilling commenced on 29th May, 1962, and was completed on 10th July, 1962. A full programme of logging, testing, and coring was undertaken.

The well penetrated 20 feet of Quaternary surface sand and clay, 230 feet of undifferentiated Mesozoic sandstone and siltstone, and 6135 feet of Palaeozoic sandstone, siltstone, shale and minor carbonate. The Palaeozoic formations or units encountered were the Poole Sandstone and Grant Formation of Permian age and the Luluigui Formation, Clannmeyer Siltstone, and an un-named unit of the Upper Devonian.

At 2340 feet the well intersected a fault and/or unconformity. If a fault is present it is believed to have a throw of approximately 3000 feet. With the exception of approximately 145 feet, the Luluigui Formation has been removed. Correlation with Frome Rocks No. 2 Well shows that an additional 2572 feet of Clannmeyer type sediments are present in Babrongan No. 1.

The un-named unit of the Upper Devonian has been equated to the Virgin Hills Formation. This is the first time that this formation has been suspected of being present on the Jurgurra Terrace. The presence of these sediments is considered important to further exploration in the area as the Virgin Hills Formation is associated with reef development on the north rim of the Canning Basin and may also indicate the presence of reefs on the Jurgurra Terrace.

Two minor shows of hydrocarbons were noted in the well. Neither was considered to be of commercial value and no drill stem tests were run. The well was abandoned at 6395 feet because of mechanical difficulties.

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

* Abstracted from Well Completion Report "Babrongan No. 1", by W.E. Gardner, West Australian Petroleum Pty Limited, January, 1963.

WELL HISTORY

General Data

Location:	Latitude 18° 23' 23" S. Longitude 123° 35' 37" E.
Total Depth:	6395 feet
Date drilling commenced:	29th May, 1962
Date drilling completed:	10th July, 1962
Date well abandoned:	6th August, 1962
Date rig released:	6th August, 1962
Elevation (ground):	351 feet
Elevation (derrick floor):	360 feet (datum for depths)
Status:	Dry hole; plugged and abandoned
Cost:	£178,443

Drilling Data

Drilling Plant:	
Make:	National
Type:	T-32
Hole sizes and depths:	20" to 265 feet 13 3/4" to 2060 feet 9 7/8" to 6395 feet
Casing details:	
Size (in.):	16 10 3/4
Weight (lb./ft):	65 40.5
Grade:	H.40 J.55
Range:	2 2
Setting depth (ft):	265 2038

Logging and Testing

Ditch Cuttings:	
Interval:	10 feet from 20 to 6390 feet
Coring:	17 cores were cut using a Hughes "J" Type core barrel with 7 7/8" core heads. A total of 165 feet was cored and 122.5 feet (74.8%) recovered.

Sidewall sampling: 20 samples recovered between 2185-6027 feet

Electric and other logging:

Electrical Log:	266-5990 feet (3 runs)
Microlog-Caliper:	2039-5739 feet (1 run)
Sonic Log-Caliper:	266-6132 feet (2 runs)
Induction-Electrical:	2039-5734 feet (1 run)
Gamma Ray Log:	6-6150 feet (2 runs)
Gamma Ray-Neutron:	2000-3429 feet (1 run)
Continuous Dipmeter:	2039-6137 feet (1 run)

Velocity Survey: Conducted in the interval 2100-6000 feet

GEOLOGY

Stratigraphy

Alluvium (Quaternary): 10 to 30 feet (20 feet)

Unconsolidated reddish sand and clay.

Mesozoic (undifferentiated): 30 to 260 feet (230 feet)

Interbedded, fine to coarse-grained, quartzose sandstone and light grey, micaceous siltstone.

Poole Sandstone (Permian, Lower Artinskian): 260 to 856 feet (596 feet)

This unit unconformably underlies the Mesozoic. Upper 230 feet consist of quartzose, fine to coarse-grained sandstone with some interbeds of siltstone. Interval 493-583 feet is interbedded, greyish-green, carbonaceous shale and grey, micaceous siltstone. Interval 583-813 feet is interbedded, grey siltstone and quartzose, fine to coarse-grained, locally carbonaceous sandstone. Interval 813-856 feet is grey, micaceous siltstone.

Nura Nura Member (Permian, Artinskian-Sakmarian): 856 to 874 feet (18 feet)

Slightly calcareous, grey siltstone with thin beds of bryozoal calcarenite.

Grant Formation (Permian, Sakmarian): 874 to 2195 feet (1321 feet)

Quartzose, fine to coarse-grained sandstone with thin beds of grey, carbonaceous siltstone. Interval 1526-1550 feet is dark grey, very carbonaceous shale. Interval 1995-2070 feet contains coarse gravel of stream-rounded cobbles.

Luluigui Formation (Upper Devonian, Famennian): 2195 to 2340 feet (145 feet)

This unit unconformably underlies the Grant Formation. Mainly white, slightly calcareous siltstone with minor silty calcilutite interbedded with greyish-green, fossiliferous shale and fine to medium-grained, soft sandstone.

Fault and/or Unconformity at 2340 feet.

Clanmeyer Siltstone (Upper Devonian; Famennian): 2340 to 5697 feet (3357 feet)

Calcareous, greyish-green, locally fossiliferous siltstone and shale. The lower 400 feet includes interbedded siltstone, shale and limestone.

Un-named formation - probably equivalent to Virgin Hills Formation (? Upper Devonian; Famennian ?): 5697 to 6395 feet (698 feet +)

Reddish-brown shale and siltstone interbedded with brown and grey dolomite and dolomitic limestone.

Structure

The Babrongan structure was seismically defined, prior to drilling, as a north-south trending anticline with 200-300 feet of mapped vertical closure on the top of the Luluigui Formation.

A major change in the pre-drilling concept of the Babrongan structure is the presence of a feature, possibly an unconformity but thought to be a fault, having a throw of approximately 3000 feet. If faulting is involved there is an excellent possibility for down-thrown closure against the fault approximately one mile north of Babrongan No. 1 where Luluigui Formation sandstones may butt against the non-porous Clanmeyer Siltstone.

REFERENCES

- WEST AUSTRALIAN PETROLEUM Frome Rocks No. 1 and No. 2 Wells, Western Aust-
PTY LIMITED, 1962:ralia. Bur.Min.Resour.Aust.Petrol.Search Subs.Acts
 Publ. 8.
- WEST AUSTRALIAN PETROLEUM Well Completion Report, Babrongan No. 1 (Unpubl.).
PTY LIMITED, 1963:

ADDITIONAL DATA FILED IN THE BUREAU OF MINERAL RESOURCES

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

- | | |
|---|--------|
| (i) Well Completion Report | 14 pp. |
| Appendix 1 - Palynological report by E. M. Fowler | 1 p. |
| Palaeontological report by J. M. Dickins | 4 pp. |
| Appendix 2 - Petrological report by J. E. Glover | 6 pp. |
| Appendix 3 - Core analysis and S.G. data | 4 pp. |
| Appendix 4 - List of Schlumberger well logs | 1 p. |
| Appendix 5 - Velocity survey report | 2 pp. |
| Appendix 6 - Deviation surveys | 2 pp. |

- (ii) Daily drilling reports for period 28th May, 1962 to 6th August, 1962.
- (iii) Well logs including the following:
 - (a) Electrical Log
 - Run 1, 266-2052 feet (2" = 100 ft)
 - Run 2, 2039-3429 feet (2" = 100 ft)
 - Run 3, 3329-5990 feet (1", 2" = 100 ft)
 - (b) Microlog-Caliper
 - Run 1, 2039-5739 feet (2" = 100 ft)
 - (c) Sonic Log-Caliper
 - Run 1, 266-2050 feet (2" = 100 ft)
 - Run 2, 2039-6132 feet (2" = 100 ft)
 - (d) Induction-Electrical Log
 - Run 1, 2039-5734 feet (2" = 100 ft)
 - (e) Gamma Ray Log
 - Run 1, 6-2048 feet (2" = 100 ft)
 - Run 3, 3329-6150 feet (2" = 100 ft)
 - (f) Gamma Ray- Neutron
 - Run 1, 2000-3429 feet (2" = 100 ft)
 - (g) Continuous Dipmeter
 - Run 1, 2039-6137 feet (2" = 100 ft)
 - (h) Drilling rate, oil and gas log (2" = 100 ft)
- (iv) Graphic Log (Predicted Section), Babrongan No. 1
- (v) Velocity Determination, Babrongan No. 1
- (vi) Deviation Diagram, Babrongan No. 1

APPENDIX 1

DEFINITIONS OF NEW FORMATION NAMES

by

S. P. Willmott *

LULUIGUI FORMATION (new name, S. P. Willmott)

Definition: The name Luluigui Formation is proposed for the thinly bedded, interbedded sequence of siltstone, shale, limestone, and fine-grained sandstone lying unconformably beneath the Permian Grant Formation and conformably overlying the Famennian Clanmeyer Siltstone in the Frome Rocks No. 2 Well (Latitude 18° 15' 15" S, Longitude 123° 39' 35" E).

Type Section: The type section of the Formation lies in the above well between the depths of 3557 and 6264 feet, giving a drilled thickness of 2707 feet. However, dips recorded in the Formation vary widely and it is probably affected by normal faulting, so a true stratigraphic thickness for the unit cannot be obtained.

Derivation of name: The name is taken from Luluigui Station, the pastoral property on which the well was drilled. The name is pronounced as "Loo-loo-guy".

Lithology: The Luluigui Formation consists of finely interbedded siltstone and shale, dark grey, slightly calcareous, slightly micaceous, with numerous bands rich in ostracods and abundant thin (1/2"-1") lenses of coquinitic limestone. It contains subordinate beds of limestone (recrystallized calcarenite), brown and grey, dense, non-porous, hard, often silty, and with numerous sandy beds, pyrite often present but not common. About 15 percent of the Formation consists of sandstone, very fine-grained, chloritic and micaceous, porous, slightly permeable with calcareous cement. In parts of the Formation, the limestone beds are the dominant lithology, but usually, the siltstone and shale are dominant.

Stratigraphic relationships: The Luluigui Formation is overlain by the Sakmarian Grant Formation with an angular and erosional unconformity. It is underlain conformably by the Famennian Clanmeyer Siltstone.

Fossils and age: The unit is believed to be middle to upper Famennian in age, based on examination of abundant ostracods by P. J. Jones, microspores by B. E. Balme, and conodonts by B. F. Glenister.

Distribution and thickness: The Luluigui Formation has been intersected by two wells, but is not known to crop out. The Formation has a drilled thickness of 2707 feet in Frome Rocks No. 2 Well. Only 145 feet of the unit is recorded at Babrongan No. 1. The Luluigui Formation occurs over most of the Jurgurra Terrace.

Repository of samples and electric logs: The bulk of the cores and cuttings of the type section are stored in West Australian Petroleum Pty Limited's core house at Norma

* West Australian Petroleum Pty Limited.

Road, Myaree, W.A. Representative samples are also stored by the Bureau of Mineral Resources in Canberra, and by the Geological Survey of Western Australia in Perth. Copies of all electric and lithologic logs are held by the Bureau in Canberra, and appear in P.S.S.A. Publication No. 8: Frome Rocks No. 1 and No. 2 Wells, Western Australia.

CLANMEYER SILTSTONE (new name, S.P. Willmott)

Definition: The name Clanmeyer Siltstone is proposed for the monotonous siltstone unit lying apparently conformably beneath the Upper Devonian Luluigui Formation in the Babrongan No. 1 Well (Latitude 18° 23' 23" S, Longitude 123° 35' 37" E). The Clanmeyer Siltstone is defined as the siltstone and shale unit underlying the Luluigui Formation as described in Frome Rocks No. 2 Well and extending downward to the first occurrence of reddish-brown shales noted at 5697 feet in Babrongan No. 1.

Type Section: The type section of the formation lies between 2340 and 5697 feet in the Babrongan No. 1 Well, giving a drilled thickness of 3357 feet. The section encountered between 6264 and 7504 feet (T.D.) in Frome Rocks No. 2 Well can be regarded as an auxiliary reference section.

Derivation of name: The formation name is taken from Clanmeyer Pool (Latitude 18° 14' 03" S, Longitude 123° 44' 08" E), a permanent pool on Jurgurra Creek about six miles east of Frome Rocks No. 2.

Lithology: The Clanmeyer Siltstone consists dominantly of siltstone, grey-green to greenish-grey, slightly to moderately calcareous, biotitic, locally pyritic, with interbedded, very fine-grained, sandy and shaly beds, and a few lenses of calcareenite, tan, fossiliferous. In the lower half of the section the lithology becomes increasingly calcareous and develops nodules, lenses and thin beds of limestone, tan to grey, silty to shaly, fossiliferous locally, dolomitic. Proportion of carbonate increases to 50 percent of rock on lowermost 200 feet of the formation.

In Frome Rocks No. 2 Well, the lithology of the upper 1240 feet of the formation (the uppermost 375 feet of which is apparently missing at Babrongan No. 1) consists of siltstone with occasional 1/2" beds of sandstone, very fine-grained, calcareous, micaceous. The siltstone varies from a greywacke-siltstone to a very fine-grained sub-greywacke.

Stratigraphic relationships: The Clanmeyer Siltstone is overlain, apparently conformably, by the Luluigui Formation in Frome Rocks No. 2. In Babrongan No. 1 the boundary may be a fault or an unconformity. The formation is underlain by an unnamed formation of probable Famennian age similar to the Virgin Hills Formation of the Lennard Shelf area.

Distribution and thickness: The Clanmeyer Siltstone has been recorded in two wells, but is not known to crop out.

Electrical log correlations suggest that the upper 375 feet of the formation encountered in Frome Rocks No. 2 are missing in Babrongan No. 1. The section drilled in Frome Rocks No. 2 correlates with the section drilled between 2340 feet and 3125 feet in Babrongan No. 1. Below 3125 feet in Babrongan No. 1 an additional 2572 feet of Clanmeyer Siltstone was encountered. The total composite thickness of the formation is 3732 feet.

The Clanmeyer Siltstone is probably widespread over the Jurgurra Terrace.

Fossils and age : Examination of microspores by B. E. Balme, and of a goniatite (*?Platyclymenia* sp.) by B. F. Glenister, show that the Clanmeyer Siltstone is middle to upper Famennian in age.

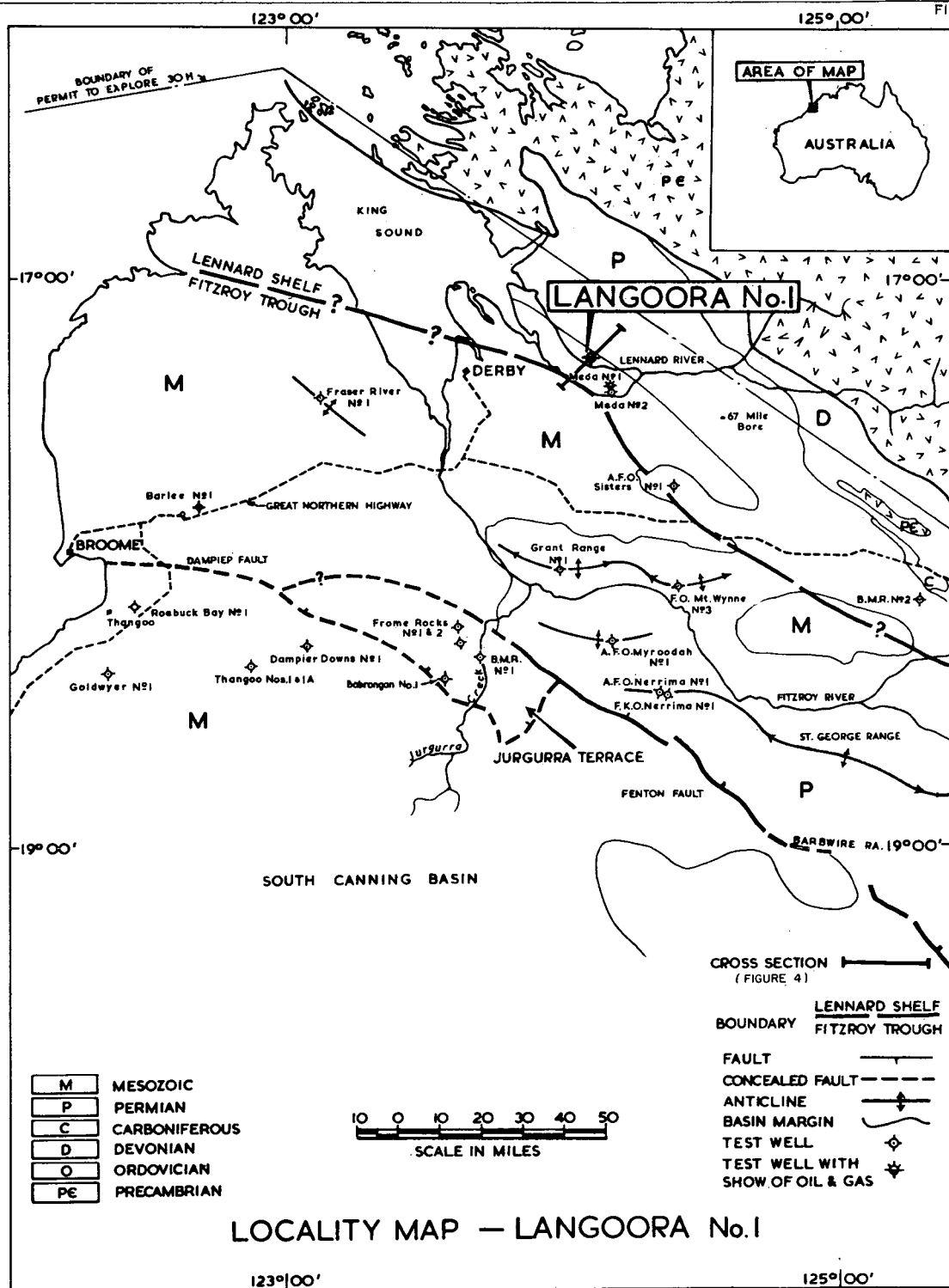
Repository of samples and electric logs : The bulk of cores and cuttings of the type section and the auxiliary reference section are stored in West Australian Petroleum Pty Limited's core house at Norma Road, Myaree, W.A. Representative cuts of cores and samples are stored by the Bureau of Mineral Resources in Canberra, and by the Geological Survey of Western Australia in Perth. Copies of all electric and lithologic logs are held by the Bureau in Canberra.

LANGOORA NO. 1

of

WEST AUSTRALIAN PETROLEUM PTY LIMITED

SUMMARY OF DATA AND RESULTS



LANGOORA NO. 1

SUMMARY OF DATA AND RESULTS *

SUMMARY

Langoora No. 1 Well was located in the Lennard Shelf subdivision of the Canning Basin, 30 miles east of Derby, Western Australia, and approximately 86 miles north-north-east of Babrongan No. 1. The well was drilled by Oil Drilling and Exploration (W.A.) Pty Limited for West Australian Petroleum Pty Limited, to a total depth of 5305 feet. Drilling commenced on 25th August, 1962 and was completed on 29th September, 1962. A full programme of logging, testing, and coring was undertaken.

The well penetrated 95 feet of Quaternary alluvium; 314 feet of Triassic Blina Shale; and 3729 feet of Permian sandstones, siltstones, and minor shale of the Liveringa, Noonkanbah, Poole and Grant formations. Below the Grant Formation the well encountered 143 feet of sandstone, possibly of the Upper Carboniferous Anderson Formation, 580 feet of Lower Carboniferous Laurel Formation, and 370 feet of carbonates, siltstones and shales of the Upper Devonian "Fairfield Formation Equivalent". Precambrian basement schist was entered at 5240 feet.

The well was drilled to test the hydrocarbon potential of the Lower Carboniferous Laurel Formation and a postulated Upper Devonian reef. The structure was an anomaly, located by gravity and seismic surveys, thought to be an Upper Devonian reef complex, but which was subsequently suggested by drilling to be a basement ridge. The suspected Devonian reef was not encountered. No shows of oil or gas were noted while drilling the well.

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

* Abstracted from: Well Completion Report Langoora No. 1, by W.E. Gardner, West Australian Petroleum Pty Limited, April, 1963.

WELL HISTORY

General Data

Location:	Latitude	17° 18' 07" S.
	Longitude	124° 06' 48" E.
Total Depth:	5305 feet (Schlumberger)	
Date drilling commenced:	25th August, 1962	
Date drilling completed:	29th September, 1962	
Date well abandoned:	6th October, 1962	
Date rig released:	9th October, 1962	
Elevation (ground):	69 feet	
Elevation (derrick floor):	78 feet (datum for depths)	
Status:	Dry hole; plugged and abandoned	

Drilling Data

Drilling Plant:

Make:	National
Type:	T-32

Hole sizes and depths:	20"	to	155 feet
	13 3/4"	to	1907 feet
	9 7/8"	to	5305 feet

Casing details:

Size (in):	16	10 3/4
Weight (lb./ft):	65	40.5
Grade:	H.40	J.55
Range:	2	2
Setting depth (ft):	155	1903

Logging and Testing

Ditch Cuttings:

Interval:	10 feet from surface to total depth
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Coring:

11 cores were cut, 9 using a Hughes "J" Type core barrel with 7 7/8" core heads, and 2 using a D. and S. 6 7/8 conventional diamond core barrel with a 9 3/4" Triefus diamond bit. A total of 147 feet was cored and 128 feet were recovered (87% recovery).

Sidewall sampling: 17 samples were recovered between 4645-5010 feet

Electric and other logging:

Electrical Log:	154-4419 feet (3 runs)
Induction-Electrical:	154-5305 feet (6 runs)
Microlog-Caliper:	3500-5305 feet (1 run)
Sonic-Log-Caliper:	154-5292 feet (5 runs)
Gamma Ray Log:	10-4413 feet (4 runs)
Gamma Ray-Neutron:	1877-5305 feet (1 run)
Laterolog:	3500-5301 feet (2 runs)
Continuous Dipmeter:	1877-5302 feet (1 run)
Cement Bond Log:	30-1896 feet (2 runs)

Velocity Survey: Conducted in the interval 1875-5295 feet

GEOLOGY

Stratigraphy

Alluvium (Quaternary): 9 to 104 feet (95 feet)

Poorly sorted, iron-stained sandstone, with lateritic pebbles, grading down into finer-grained, less iron-stained sandstone.

Blina Shale (Lower Triassic): 104 to 418 feet (314 feet)

Medium grey, pyritic shale at top, grading rapidly into grey, carbonaceous, micaceous siltstone. Thin beds of light grey, fine-grained sandstone occur below 250 feet and tan chert occurs below 300 feet.

Liveringa Formation (Permian; Upper Artinskian-Tartarian): 418 to 905 feet (487 feet)

Light grey, fine-grained sandstone, micaceous and pyritic in places, with siltstone (dark grey to speckled) dominant from 474 to 577 feet, and with minor siltstone and green shale intercalations from 795 to 905 feet. Faulting was noted at 590 feet.

Noonkanbah Formation (Permian Artinskian): 905 to 1770 feet (865 feet)

Interbedded siltstone, calcilutite, and fine-grained sandstone down to 1460 feet, and dominantly siltstone from 1460 to 1770 feet. The siltstone is pyritic, micaceous, and fossiliferous in parts.

Poole Sandstone (Permian; Lower Artinskian): 1770 to 1950 feet (180 feet)

Fine to medium-grained, white sandstone, moderately to poorly sorted, mostly unconsolidated, and with minor grey siltstone bands.

Grant Formation (Permian (Sakmarian) - Upper Carboniferous): 1950 to 4147 feet (2197 feet)

"Upper Fluvio-glacial Member": 1950 to 2620 feet (670 feet)

Fine to medium-grained, kaolinitic sandstone, pyritic and micaceous in part with minor grey siltstone and green shale interbeds.

"Glacial Member": 2620 to 2872 feet (252 feet)

Light to dark grey siltstone, micaceous and carbonaceous in part, interbedded with carbonaceous shale down to 2760 feet. Fine to medium-grained, kaolinitic sandstone interbeds occur below 2760 feet.

"Lower Fluvio-glacial Member": 2872 to 3595 feet (723 feet)

White to grey, fine to medium-grained, kaolinitic sandstone with few thin beds of carbonaceous shale.

"Lower Grant Member": 3595 to 4147 feet (552 feet)

Fine to coarse, white, kaolinitic, calcareous sandstone interbedded with tan to greenish-grey siltstone and dark grey carbonaceous shale. The exact age of this member is not confirmed and it may be transitional between the Permian and the Upper Carboniferous.

Anderson Formation (Upper Carboniferous): 4147 to 4290 feet (143 feet)

Fine, white to tan, moderately sorted, kaolinitic sandstone with pink and green grains, carbonaceous in part. The Anderson Formation is conformable upon the Laurel Formation.

Laurel Formation (Lower Carboniferous): 4290 to 4870 feet (580 feet)

"Upper Member": 4290 to 4602 feet (312 feet)

Interbedded, fine, calcareous sandstone, sandy limestone, calcarenite, calcilutite, and light to dark grey shale.

"Lower Member": 4602 to 4870 feet (268 feet)

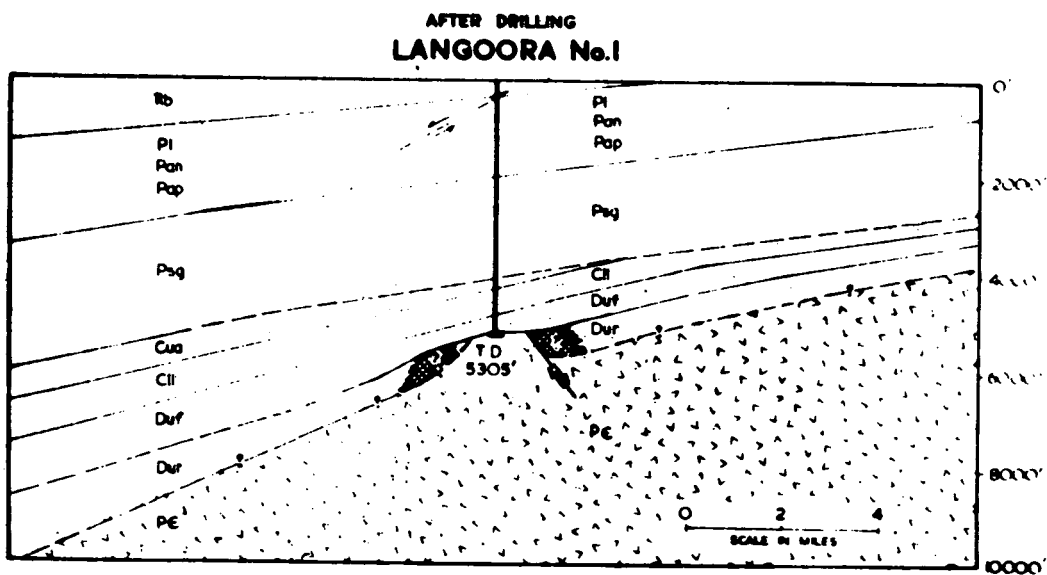
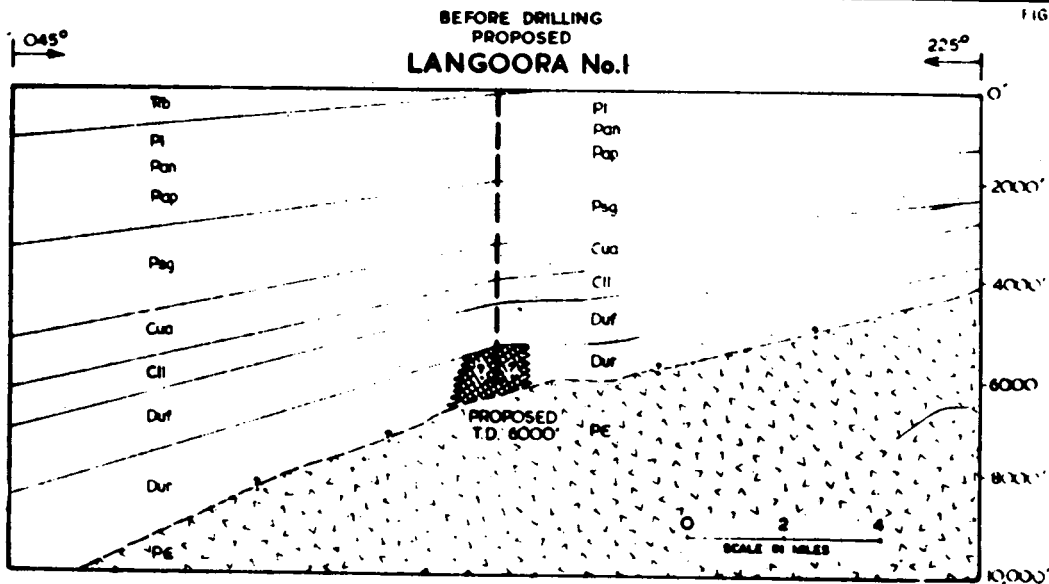
Similar to the "Upper Member" but with increased proportion of limestone and calcarenite.

"Fairfield Formation Equivalent" (Devonian; Famennian): 4870 to 5240 feet (370 feet)

Interbedded, off-white to tan, finely crystalline dolomite, dolomitic siltstone, and green-grey-brown shale. The sequence becomes more calcareous and arenaceous towards a basal conglomerate, 50 feet thick, of probable Devonian age. No index fossil forms occur and the formation age is assumed.

Schist (Precambrian): 5240 to 5305 feet (65 feet +)

Quartz-chlorite-biotite schist and quartz-hornblende schist with veins of calcite along fractures and foliation.



Tb	TRIASSIC BLINA SHALE	CII	L CARBONIFEROUS LAUREL FM
PI	PERMIAN LIVERINGA FM	Duf	DEVONIAN FAIRFIELD FM EQUIV
Pan	PERMIAN NOONKANBAH FM	Dur	DEVONIAN REEF COMPLEX & EQUIV
Pop	PERMIAN POOLE SANDSTONE		REEF
Psg	PERMIAN GRANT FM	PE	PRECAMBRIAN BASEMENT
Cua	U CARBONIFEROUS ANDERSON FM		FAULT

WEST AUSTRALIAN PETROLEUM PTY LIMITED	
CANNING BASIN	
DIAGRAMMATIC CROSS-SECTIONS BEFORE AND AFTER DRILLING LANGOORA No.1	
W E GARDNER	4 APRIL 1963
4 APR 1963	

Structure

Dipmeter data indicate the strata below the Grant Formation dip generally south at angles less than 10 degrees. This is in accordance with the regional dip on the Lennard Shelf in the area. The absence of the expected Devonian reef complex and the occurrence of basement almost 800 feet above the anticipated depth indicate that the well is located on a basement ridge.

REFERENCES

- | | | |
|---|-------|--|
| WEST AUSTRALIAN PETROLEUM
PTY LIMITED, | 1962: | Meda No. 1 Well, Western Australia. <u>Bur.Min.Resour.</u>
<u>Aust.Petrol. Search Subs. Acts Publ. 7.</u> |
| WEST AUSTRALIAN PETROLEUM
PTY LIMITED, | 1963: | Well Completion Report, Langoora No. 1 (Unpubl.). |

ADDITIONAL DATA FILED IN THE BUREAU OF MINERAL RESOURCES

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

- | | | |
|-------|---|--------|
| (i) | Well Completion Report | 15 pp. |
| | Appendix 1 - Palynological report by E.M. Fowler | 6 pp. |
| | Micropalaeontological report by R.A. McTavish | 4 pp. |
| | Appendix 2 - Petrological report by J.E. Glover | 4 pp. |
| | Appendix 3 - Drill Stem Tests and water analyses | 3 pp. |
| | Appendix 4 - Core analysis and S.G. data | 2 pp. |
| | Appendix 5 - List of Schlumberger well logs | 1 p. |
| | Appendix 6 - Deviation records | 1 p. |
| | Appendix 7 - Velocity survey report | 2 pp. |
| (ii) | Daily drilling reports for period 25th August, 1962 to 9th October, 1962. | |
| (iii) | Well logs including the following: | |
| | (a) Electrical Log | |
| | Run 1, 154-1898 feet (2", 5", = 100 ft) | |
| | Run 2, 1877-3918 feet (2", 5", = 100 ft) | |
| | Run 3, 3818-4419 feet (2", 5", = 100 ft) | |

(b) Induction-Electrical Log

Run 1, 154-1892 feet (2", 5", = 100 ft)
Run 2, 1877-3914 feet (2", 5", = 100 ft)
Run 3, 3814-4415 feet (2", 5", = 100 ft)
Run 4, 4315-4558 feet (2", 5", = 100 ft)
Run 5, 3814-5300 feet (1", = 100 ft)
Run 6, 1877-5305 feet (2", 5", = 100 ft)

(c) Microlog-Caliper

Run 1, 3500-5305 feet (2", 5", = 100 ft)

(d) Sonic Log-Caliper

Run 1, 154-1882 feet (2", 5", = 100 ft)
Run 2, 1877-3903 feet (2", 5", = 100 ft)
Run 3, 3803-4407 feet (2", 5", = 100 ft)
Run 4, 4307-4547 feet (2", 5", = 100 ft)
Run 5, 4300-5292 feet (2", 5", = 100 ft)

(e) Gamma Ray Log

Run 1, 10-1886 feet (2", 5", = 100 ft)
Run 2, 1786-3868 feet (2", 5", = 100 ft)
Run 3, 3768-4413 feet (2", 5", = 100 ft)
Run 4, 50-1877 feet (1" = 100 ft)

(f) Gamma Ray-Neutron

Run 1, 1877-5305 feet (2", 5", = 100 ft)

(g) Laterolog

Run 1, 3500-4561 feet (2", 5", = 100 ft)
Run 2, 4461-5301 feet (2", 5", = 100 ft)

(h) Continuous Dipmeter

Run 1, 1877-5302 feet (2", = 100 ft)
Run 1, 1877-5302 feet (1" = 100 ft) (Plotted)

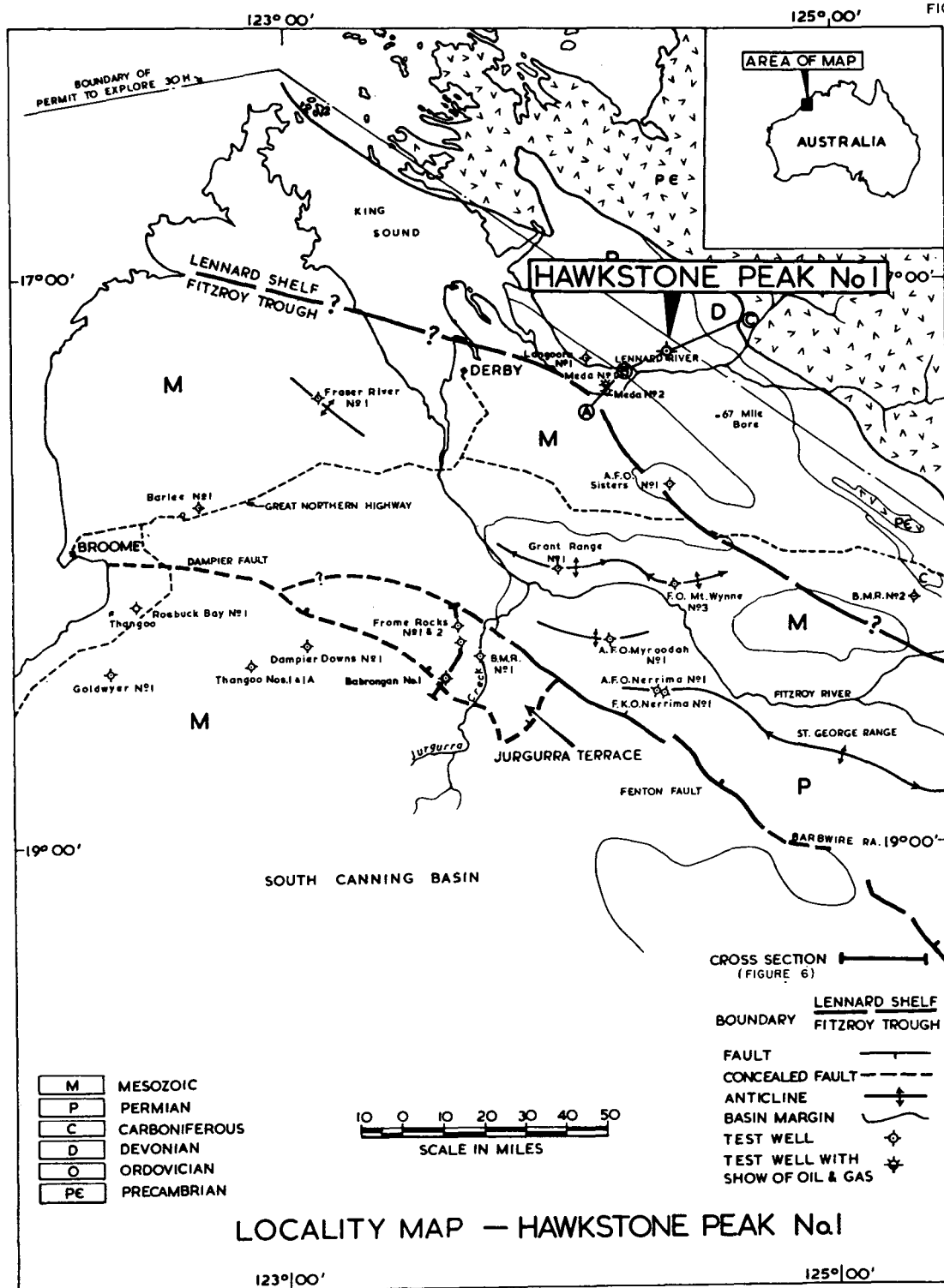
(i) Cement Bond Log

Run 1, 216-1896 feet (2" = 100 ft)
Run 2, 30-1877 feet (2" = 100 ft)

(j) Drilling rate, oil and gas log (2" = 100 ft)

(iv) Graphic Log (Predicted Section), Langoora No. 1

(v) Velocity Determination, Langoora No. 1



HAWKSTONE PEAK NO. 1

SUMMARY OF DATA AND RESULTS*

SUMMARY

Hawkstone Peak No. 1 Well was located in the Lennard Shelf subdivision of the Canning Basin, 50 miles east of Derby, Western Australia. The well was drilled by Oil Drilling and Exploration (W.A.) Pty Limited for West Australian Petroleum Pty Limited, to a total depth of 3897 feet. Drilling commenced on 17th October, 1962 and was completed on 26th November, 1962. A full programme of logging, testing and coring was undertaken.

The section penetrated by the well contained 41 feet of Quaternary alluvium, 751 feet of sandstones of the Permian Grant Formation, 379 feet of Lower Carboniferous siltstone, and limestone of the Devonian "Fairfield Formation Equivalent", 1917 feet of dolomite, limestone, siltstone, shale and sandstone of the Devonian Hawkstone Reef Complex, and 42 feet of Precambrian metamorphics.

The well was drilled to test the petroleum possibilities of the Hawkstone Reef Complex in a closed structure mapped by seismic and gravity surveys and to give stratigraphic and lithological information.

No shows of oil and gas were encountered and open hole formation tests over the intervals between 2149 and 2194 feet, 2557 and 2611 feet, and 3095 and 3155 feet, yielded fresh water and mud.

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

* Abstracted from: Well Completion Report Hawkstone Peak No. 1, by W.E. Gardner, West Australian Petroleum Pty Limited, May, 1963.

WELL HISTORY

General Data

Location:	Latitude 17° 14' 45" S. Longitude 124° 24' 26" E.
Total Depth:	3897 feet
Date drilling commenced:	17th October, 1962
Date drilling completed:	26th November, 1962
Date well abandoned:	2nd December, 1962
Date rig released:	2nd December, 1962
Elevation (ground):	161 feet
Elevation (derrick floor):	170 feet (datum for depths)
Status:	Dry hole; plugged and abandoned
Cost:	£122,940

Drilling Data

Drilling Plant:	
Make:	National
Type:	T-32
Hole sizes and depths:	20" to 66 feet 13 3/4" to 940 feet 9 7/8" to 3897 feet
Casing details:	
Size (in.):	16 10 3/4
Weight (lb./ft):	65 40.5
Grade:	H.40 J.55
Range:	2 2
Setting depth (ft):	66 938

Logging and Testing

Ditch Cuttings:

Interval:	10 feet from surface to total depth
Coring:	21 cores were cut, the first 19 using a Hughes "J" Type core barrel with 7 7/8" core heads, and two using a D. and S. 6 7/8" conventional diamond core barrel with a

9 3/4" Triefus diamond bit. A total of 214 feet was cored and 179.2 feet (83%) recovered.

Sidewall sampling: Four samples were recovered between 2417-3531 feet

Electric and other logging:

Induction-Electrical:	75-3889 feet (4 runs)
Microlog:	941-3894 feet (4 runs)
Sonic Log-Caliper:	65-3882 feet (5 runs)
Gamma Ray-Neutron:	30-3894 feet (4 runs)
Laterolog:	65-3890 feet (4 runs)
Continuous Dipmeter:	941-3890 feet (1 run)
Cement Bond Log:	60- 938 feet (1 run)
Temperature Survey:	0-2136 feet (1 run)

Velocity Survey: Conducted in the interval 1000-3890 feet

GEOLOGY

Stratigraphy

Alluvium (Quaternary) : 9 to 50 feet (41 feet)

Unconsolidated, fine to pebbly, reddish-orange sandstone.

Grant Formation (Permian; Sakmarian) : 50 to 801 feet (751 feet)

"Upper Fluvioglacial Member": 50 to 610 feet (560 feet)

Fine to coarse-grained, white sandstone with thin quartz pebble beds; kaolinitic and poorly consolidated. Thin beds of grey, sandy claystone occur below 420 feet.

"Glacial Member": 610 to 801 feet (191 feet)

Light grey, micaceous siltstone to 703 feet followed by interbedded, white, medium-grained and fine-grained sandstone, micaceous siltstone, and grey-green shale. The identification of this member is not certain and it may be part of the Laurel Formation.

Laurel Formation (Lower Carboniferous) : 801 to 1180 feet (379 feet)

Irregularly interbedded, light grey, micaceous siltstone, grey-white to tan calcarenite, grey shale, and tan dolomite.

"Fairfield Formation Equivalent" (Devonian; Famennian) : 1180 to 1938 feet (758 feet)

Interbedded, fine to coarse-grained, lithic sandstone; mottled red, grey, tan, calcareous siltstone; and grey shale, from 1180 to 1420 feet; interbedded, grey, dolomitic limestone, calcilutite, calcareous siltstone, grey-green shale, and tan dolomite from 1420 to 1514 feet; and white to tan limestone, finely crystalline, dolomitic in part, with minor interbeds of calcareous siltstone and shale, from 1514 to 1938 feet.

Hawkstone Reef Complex (Devonian; Famennian - Frasnian) : 1938 to 3855 feet (1917 feet)

"Porous Dolomite Facies": 1938 to 2415 feet (477 feet)

Grey-tan, porous, re-crystallised dolomite, thought to be equivalent to the reef facies of the reef complex seen in outcrop. Abundant vertical and sub-vertical, open and sealed fractures were noted.

"Terrigenous Facies": 2415 to 2723 feet (308 feet)

Grey to brown, fine sandy dolomite grading locally into dolomitic siltstone and limestone and having interbeds of white, very fine to medium-grained, slightly pyritic sandstone below 2630 feet.

"Back Reef Facies" ("Pillara Formation Equivalent"): 2723 to 3855 feet (1132 feet)

(a) "Carbonate Unit" : 2723 to 3525 feet (802 feet)

Light grey to tan, finely crystalline dolomite with interbeds of white to brown siltstone, grey-green shale, and fine-grained calcareous sandstone to 2847 feet; white to light grey limestone with subordinate dolomite to 2940 feet; tan dolomite to 3205 feet, becoming more clastic with dolomitic siltstone, limestone, and calcilutite interbeds to 3335 feet; grey dolomite to 3525 feet.

(b) "Sandstone Unit": 3525 to 3855 feet (330 feet)

Red and white speckled, grading to grey-green, fine to coarse micaceous sandstone containing clay pebbles and grading into a conglomerate below 3800 feet.

Basement (Precambrian): 3855 to 3897 feet (42 feet +)

Quartzite with schistose partings.

Structure

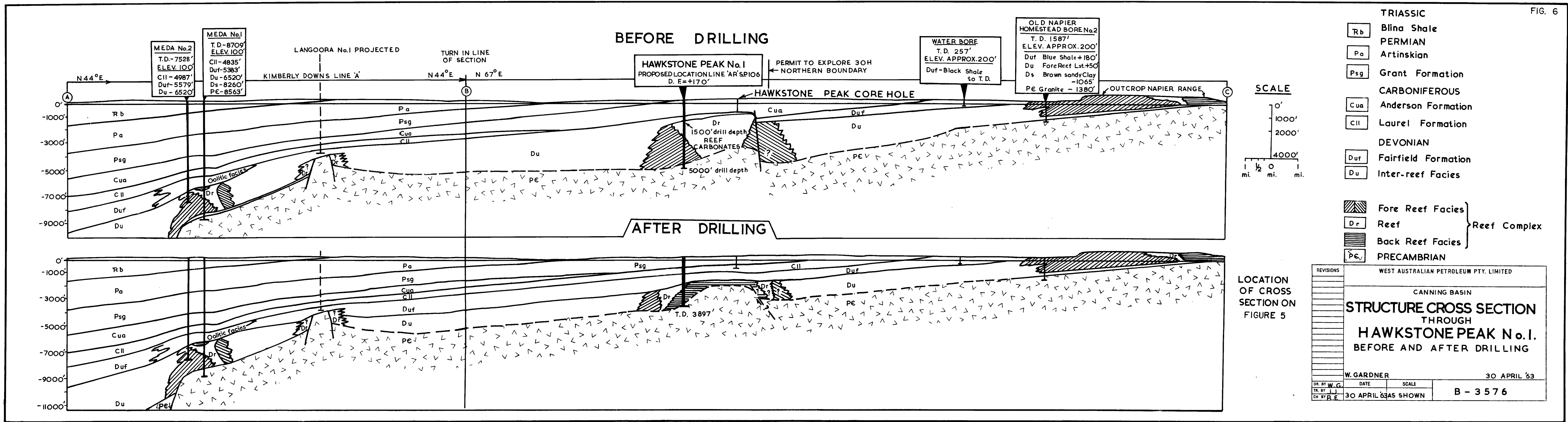
The Hawkstone Peak structure was located by gravimetric, aeromagnetic, and seismic surveys, and is a north-west trending closed feature thought to represent a reef complex associated with a basement ridge. The drilling confirms that a reef complex is present.

REFERENCES

- | | |
|---|--|
| WEST AUSTRALIAN PETROLEUM
PTY LIMITED, | Meda No. 1 Well, Western Australia, Bur. Min. Resour.
1962: <u>Aust. Petrol. Search Subs. Acts Publ. 7.</u> |
| WEST AUSTRALIAN PETROLEUM
PTY LIMITED, | Well completion Report, Hawkstone Peak No. 1,
1963: (Unpubl.). |

ADDITIONAL DATA FILED IN THE BUREAU OF MINERAL RESOURCES

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



- | | |
|---|--------|
| (i) Well Completion Report | 15 pp. |
| Appendix 1 - Petrological report by R. Pearson | 8 pp. |
| Appendix 2 - Palaeontological reports | 15 pp. |
| Appendix 3 - Drill Stem Tests | 6 pp. |
| Appendix 4 - Core analysis and S.G. data | 4 pp. |
| Appendix 5 - List of Schlumberger well logs | 1 p. |
| Appendix 6 - Deviation records | 1 p. |
| Appendix 7 - Velocity survey report by R.E. Sheriff | 2 pp. |
| Appendix 8 - Use of Reef Complex terminology by
R. Elliott | 1 p. |
- (ii) Daily drilling reports for period 17th October, 1962 to 2nd December 1962.
- (iii) Well logs including the following:
- (a) Induction-Electrical Log
- Run 1, 75-1170 feet (2",5" = 100 feet)
Run 2, 941-1938 feet (2",5" = 100 feet)
Run 3, 1500-2610 feet (2",5" = 100 feet)
Run 4, 1500-3889 feet (2",5" = 100 feet)
Run 4, 941-3889 feet (1" = 100 feet)
- (b) Microlog
- Run 1, 941-1938 feet (2",5" = 100 feet)
Run 2, 1838-2147 feet (2",5" = 100 feet)
Run 3, 2047-2615 feet (2",5" = 100 feet)
Run 4, 2515-3894 feet (2",5" = 100 feet)
- (c) Sonic Log-Caliper
- Run 1, 65-1162 feet (2",5" = 100 feet)
Run 2, 941-1928 feet (2",5" = 100 feet)
Run 3, 1838-2139 feet (2",5" = 100 feet)
Run 4, 1900-2610 feet (2",5" = 100 feet)
Run 5, 2510-3882 feet (2",5" = 100 feet)
- (d) Gamma Ray-Neutron
- Run 1, 30-1170 feet (2",5" = 100 feet)
Run 2, 941-1938 feet (2",5" = 100 feet)
Run 3, 1838-2617 feet (2",5" = 100 feet)
Run 4, 2515-3894 feet (2",5" = 100 feet)

(e) Laterolog

Run 1, 65-1166 feet (2", 5" = 100 feet)

Run 2, 941-1934 feet (2", 5" = 100 feet)

Run 3, 1834-2614 feet (2", 5" = 100 feet)

Run 4, 2514-3890 feet (2", 5" = 100 feet)

(f) Continuous Dipmeter

Run 1, 941-3890 feet (2" = 100 feet)

Run 1, 941-3890 feet (1" = 100 feet) (Plotted)

(g) Cement Bond Log

Run 1, 60- 938 feet (2" = 100 feet)

(h) Temperature Survey

Run 1, 0-2136 feet (2" = 100 feet)

(i) Drilling rate, oil and gas log (2" = 100 feet)

(iv) Graphic Log (Predicted Sections) Hawkstone Peak No. 1

(v) Velocity Determination, Hawkstone Peak No. 1.

COMPOSITE WELL LOG

PLATE 3
SHEET No1

WEST AUSTRALIAN PETROLEUM PTY LIMITED
HAWKSTONE PEAK NO.1.

PERMIT TO EXPLORE No.30H
LICENCE TO PROSPECT No.101H.

LOCATION : 17° 14' 45" S. 124° 24' 26" E.
ELEVATION GROUND LEVEL 161'
DERRICK FLOOR 170'

STATE: WESTERN AUSTRALIA

4 MILE SHEET: DERBY

BASIN: CANNING

WELL STATUS: ABANDONED

DATE SPUNDED: 17th OCTOBER 1962
DATE DRILLING STOPPED: 26th NOVEMBER 1962
TOTAL DEPTH D.F. DRILLER - 3897'
SCHLUMBERGER - 3895'
DATE WELL ABANDONED: 2nd DECEMBER 1962

HOLE SIZE: IN FROM TO
20 0 66
13 66 940
9 940 3897'

CASING: SIZE WT. G.P. DEPTH CMT. QMT. TO
10 651bs. H-40 66' 70x SURFACE
10 405 lbs J-55 938' 450x SURFACE

CEMENT PLUGS: FROM TO TOP SACKS
3360 3155 3155
1038 838 838
30 9 9 100
25

PERFORATIONS: NIL

WELL HEAD FITTINGS: M.S. PLATE WELDED OVER CASING
DRILLED BY: OIL DRILLING AND EXPLORATION PTY LTD.
DRILLING METHOD: ROTARY.

INDUCTION LOG DATA

RUN NUMBER	1	2	3	4
DATE IN 1962	20 OCT	29 OCT	11 NOV	26 NOV
FIRST READING	1170	1938	2610	3889
LAST READING	75	941	1500	1500
INTERVAL MEASURED	1095	997	1110	2389
CASING SCHLUMBERGER	65	941	941	941
CASING DRILLER	66	938	938	938
DEPTH REACHED	1171	1939	2618	3895
BOTTOM DRILLER	1173	1938	2620	3897
MUD NATURE	GEL	GEL	GEL	GEL
DENSITY lb/cu ft/VISCOSITY	75/38	73/68	65/60	65/55
pH / WATER LOSS cc/30 Mins	10.5/9	11/7	—/30	10.5/9
MUD RESISTIVITY	2 @ 95°F	1 @ 82°F	2 @ 95°F	1 @ 82°F
MUD RESISTIVITY BHT	13 @ 140°F	10 @ 82°F	14 @ 144°F	10 @ 82°F
Rmt - MEASURED	22 @ 80°F	10 @ 82°F	16 @ 90°F	17 @ 100°F
Rmc - MEASURED	0 @ 80°F	2 @ 82°F	22 @ 90°F	63 @ 98°F
BIT SIZE	9 7/8"	9 7/8"	9 7/8"	9 7/8"
MAXIMUM RECORDED TEMP	140°F	140°F	144°F	160°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:	LENGRAND			
WITNESSED BY:	GARDNER ELLIOTT GARDNER			
REMARKS:	Runs 1,2,3, 61ft MQ, Run 4 511ft 40' Run 3 gave poor log and so later re-run in Run 4.			

RADIOMETRIC LOG DATA

TYPE OF LOG	GR N	GR N	GR N	GR N
RUN NUMBER	1	2	3	4
DATE IN 1962	20 OCT	29 OCT	12 NOV	26 NOV
FIRST READING	1170	1938	2617	3894
LAST READING	30	941	1838	2515
INTERVAL MEASURED	1140	997	779	1379
DEPTH REACHED	1171	1939	2618	3895
TYPE OF FLUID IN HOLE	GEL	GEL	GEL	GEL
FLUID LEVEL	FULL	FULL	FULL	FULL
MAXIMUM RECORDED TEMP	140°F	140°F	144°F	160°F
SONDE TYPE	GLO/NLD	GLO/NLD	GLO/NLD	GLO/NLD
TIME CONSTANT SECONDS	3/3	3/3	3/3	3/3
LOGGING SPEED FT/HR	1800'	1800'	1800'	1800'
SENSITIVITY REFERENCE	400/1400	400/1400	400/1400	400/1400

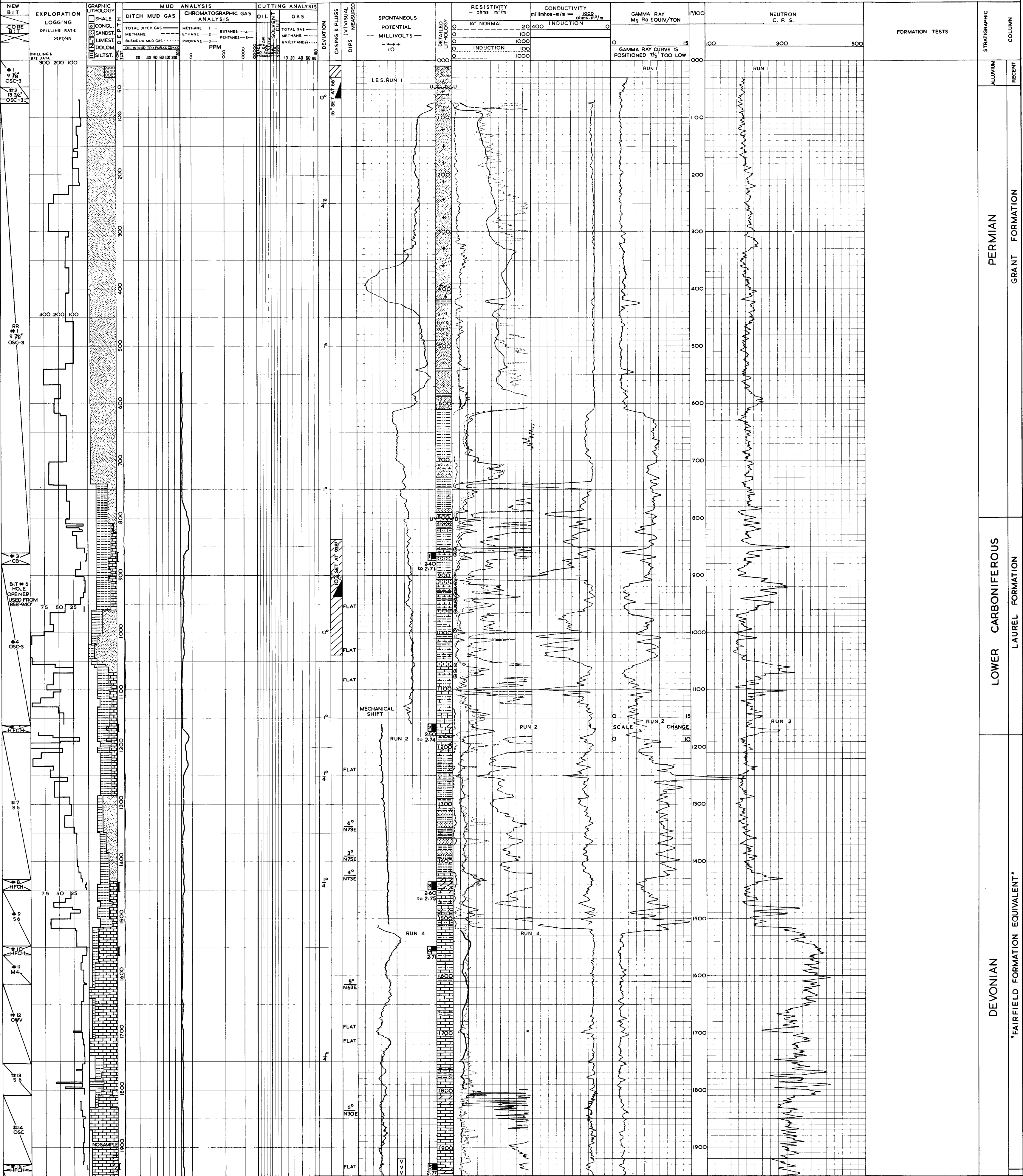
OTHER ELECTRICAL LOGS

SONIC CALIPER	3882' - 65'	5 RUNS
MICROLOG	3894' - 941'	4 RUNS
LATERLOG	3890' - 65'	4 RUNS
DIPMETER	3890' - 941'	1 RUN
CEMENTBOND	938' - 60'	1 RUN
TEMPERATURE	2136' - 0'	1 RUN

LITHOLOGIC REFERENCE & WELL SYMBOLS

SANDSTONE, SANDY	CALCARENITE	PYRITE, MICA OOLITIC	CORE RECOVERY - BLACK SPECIFIC GRAVITY
PEBBLES & CONGL.	CALCAREOUS	KAOLIN-KAOLINITIC	SIDE WALL SAMPLE
SHALE & CLAYSTONE	DOLOMITE	CARBONACEOUS	LOST CIRCULATION - COMPLETE
SILTSTONE	DOLOMITIC	FOSSILIFEROUS	LOST CIRCULATION - PARTIAL
LIMESTONE	METAMORPHIC	CASING SHOE	U UNCONFORMITY

LITHOLOGY BY: W.E. GARDNER & R.M.L. ELLIOTT.
COMPILED BY: W.E. GARDNER JANUARY 1963
LOGGED BY: SCHLUMBERGER (ELECTRIC) EXPLORATION LOGGING (MUD)



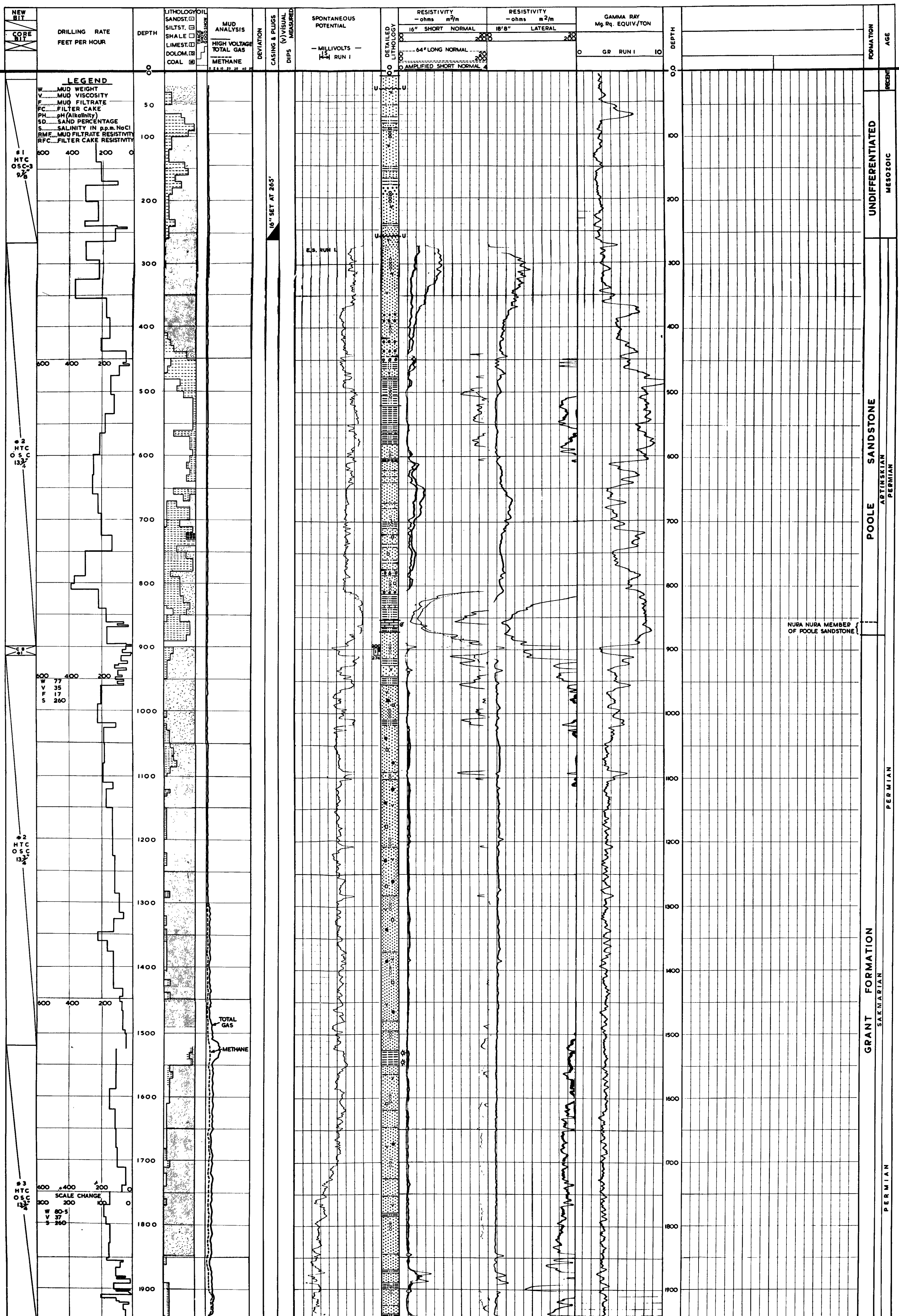
HAWKSTONE PEAK NO. 1

of

WEST AUSTRALIAN PETROLEUM PTY LIMITED

SUMMARY OF DATA AND RESULTS

WELL STATUS: **ABANDONED**



COMPOSITE WELL LOG
WEST AUSTRALIAN PETROLEUM PTY. LTD.
BABRONGAN No. 1.

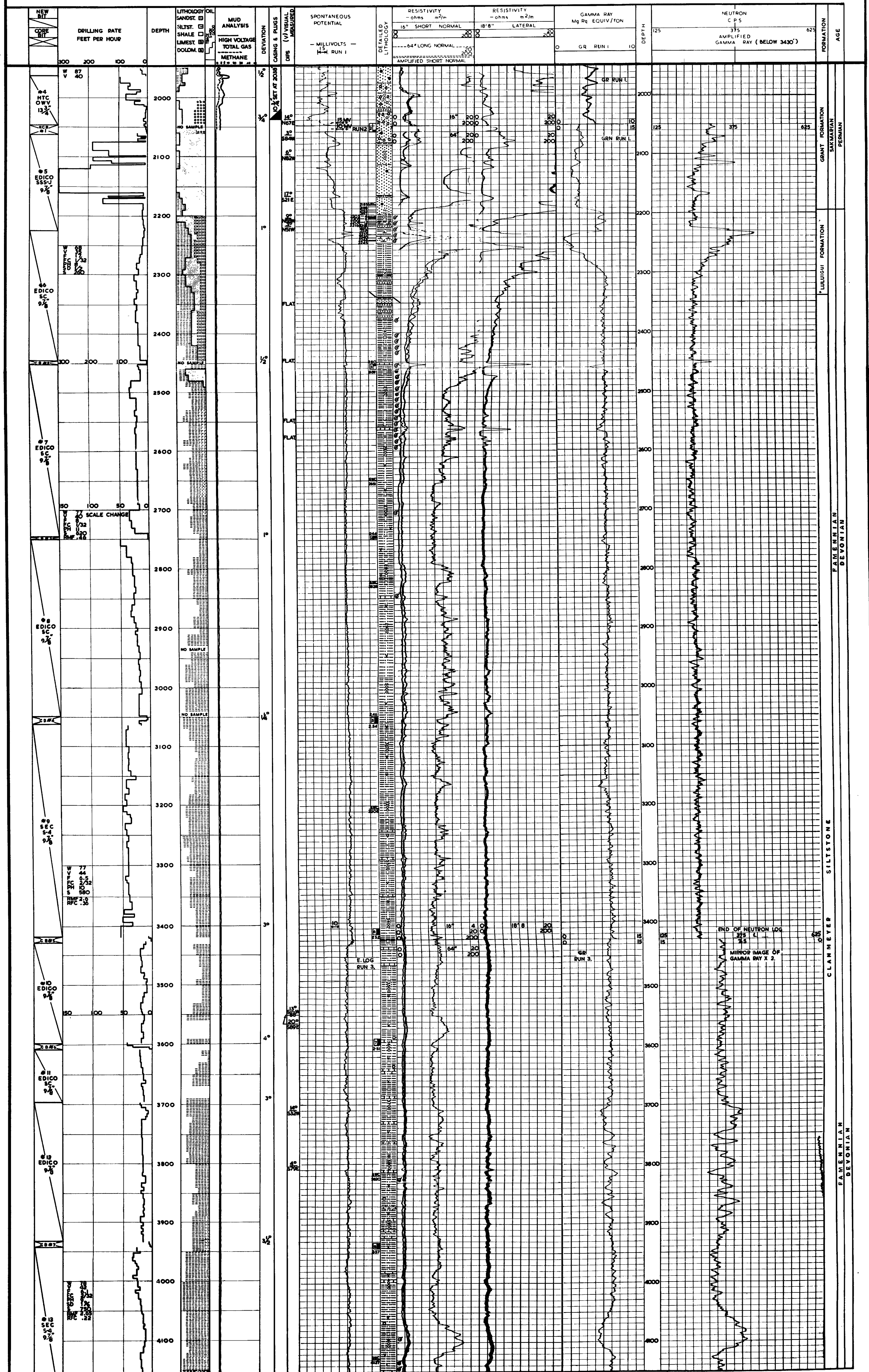
SHEET 2.

LOCATION : LAT. 18° 23' 23" LONG. 123° 35' 37"
ELEVATION: GROUND LEVEL - 351' DERRICK FLOOR - 360'

STATE: WESTERN AUSTRALIA

4-MILE SHEET: MT. ANDERSON

BASIN: CANNING



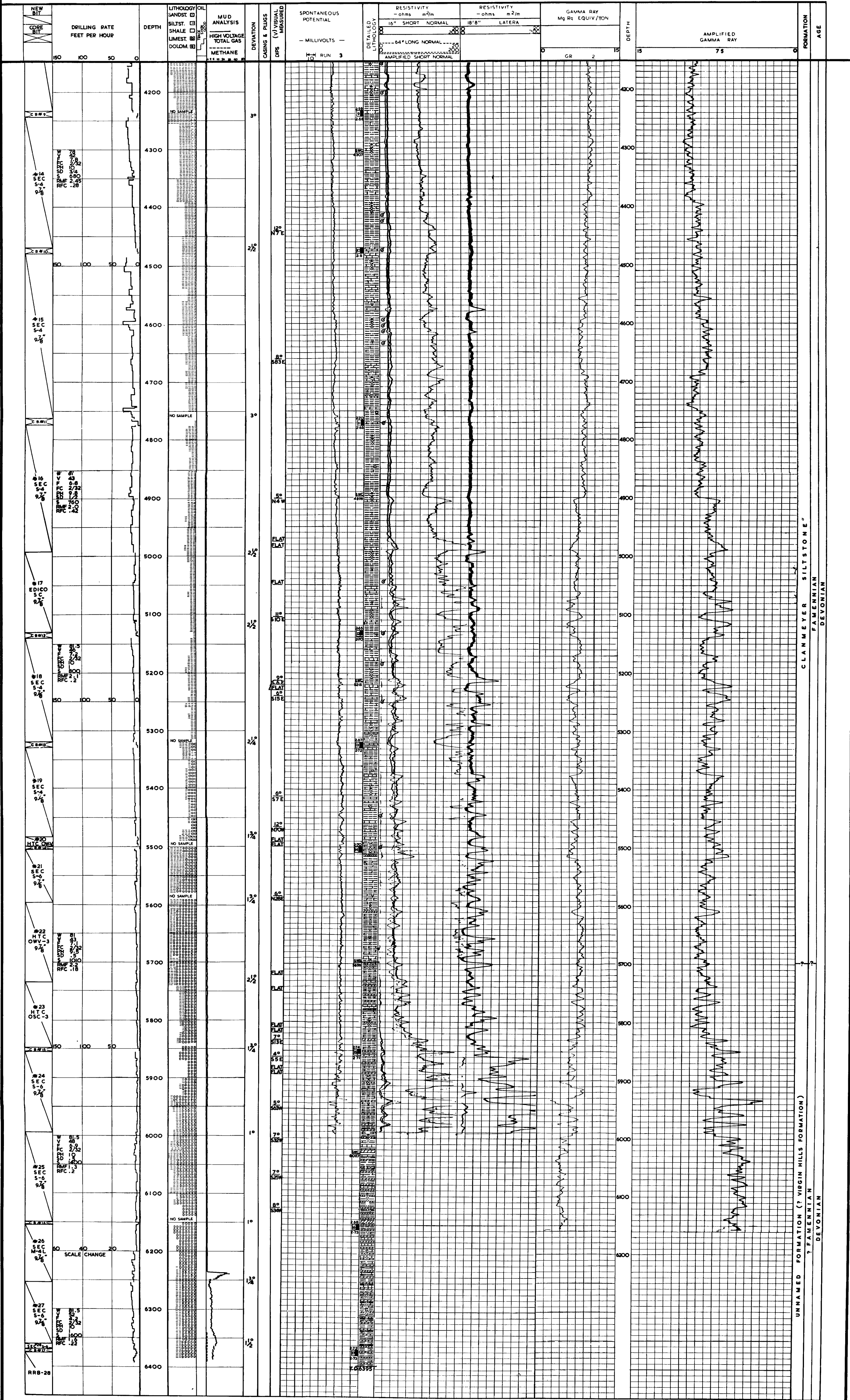
COMPOSITE WELL LOG
WEST AUSTRALIAN PETROLEUM PTY. LTD.
BABRONGAN No. 1.

LOCATION : LAT. 18° 23' 23" LONG. 123° 35' 37"
ELEVATION: GROUND LEVEL 35D' DERRICK FLOOR-360'

STATE: WESTERN AUSTRALIA

4-MILE SHEET: MT. ANDERSON

BASIN: CANNING



COMPOSITE WELL LOG

PLATE 2
SHEET: 1

PERMIT TO EXPLORE No 30H
LICENCE TO PROSPECT No 54H

WEST AUSTRALIAN PETROLEUM PTY LIMITED
LANGOORA No1

LOCATION: LAT. 17° 18' 07" S. LONG. 124° 06' 48" E.
ELEVATION GROUND LEVEL 69'
DERRICK FLOOR 78'

STATE: WESTERN AUSTRALIA

4 MILE SHEET: DERBY

Basin: CANNING

WELL STATUS: ABANDONED

DATE SPUNDED: 25 AUG 1962
DATE DRILLING STOPPED: 29 SEPT 1962
DATE ABANDONED: 6 OCT 1962
TOTAL DEPTH: DRILLER 5299' SCHLUMBERGER 5305'

HOLE SIZE: IN FROM TO
20 0' 155'
13 3/4 155' 1907'
9 7/8 1907' 5299'

CASING: SIZE WT G R DEPTH CMT. CMT TO
16" 65 lbs H-40 155' 150m SURFACE
10 3/4" 40.5 lbs J-55 1903 350m 943'

CEMENT PLUGS: FROM TO TOP SACKS
9' 25' 9 15
1830 2086 1830 122
4856 5299 4856 195

PERFORATIONS: NIL

WELL HEAD FITTINGS: M.S. PLATE WELDED OVER CASING
DRILLED BY: OIL DRILLING AND EXPLORATION PTY. LTD.
DRILLING METHOD: ROTARY

INDUCTION LOG

RUN NUMBER	1	2	3	4	5
DATE IN 1962	30 AUG.	8 SEPT.	15 SEPT.	17 SEPT.	30 SEPT.
FIRST READING	1892	3914	4415	4558	5300
LAST READING	154	1877	3814	4315	4310
INTERVAL MEASURED	1738	2037	601	243	990
CASING SCHLUMBERGER	154	1877 +	ONE DETACHED JOINT	2058-88	
CASING DRILLER	152	1903	1903	1903	1903
DEPTH REACHED	1898	3920	4421	4564	5305
BOTTOM DRILLER	1907	3919	4412	4560	5299
MUD NATURE	FRESH WTR. & BENTONITE		SPERSENE XP 20		
DENSITY 160 LBS/CC	82	40	70	41	72
PH	7.0	7.0	7.0	7.0	7.0
WATER LOSS cc/30 MIN	N.R.	N.R.	7	9	6.5
MUD RESISTIVITY	8.0 @ 87°F	11 @ 97°F	0.95 @ 90°F	0.9 @ 104°F	0.74 @ 98°F
MUD RESISTIVITY BHT.	5.0 @ 135°F	0.75 @ 147°F	0.6 @ 150°F	0.4 @ 150°F	0.45 @ 164°F
Rmf - Measured	11.0 @ 85°F	1.45 @ 78°F	1.0 @ 74°F	0.9 @ 86°F	0.64 @ 92°F
N.R.	0.32 @ 78°F	0.3 @ 74°F	0.31 @ 86°F	0.20 @ 92°F	
BIT SIZE	13 3/4"	9 7/8"	9 7/8"	9 7/8"	9 7/8"
MAXIMUM RECORDED TEMP.	135°F	147°F	150°F	150°F	164°F
ELECTRODE SPACING					
AM	16"	16"	16"	16"	16"
IND	40"	40"	40"	40"	40"
S.O.	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
RECORDED BY	LANGRAND				
WITNESSED BY	GARDNER				
REMARKS	5 FF40 TOOL				

DATA

RADIOMETRIC LOG

TYPE OF LOG	1	GRN
RUN NUMBER	1	GRN
DATE IN 1962	30 AUG.	30 SEPT.
FIRST READING	1886	5305
LAST READING	10	1877
INTERVAL MEASURED	1876	3428
DEPTH REACHED	1894	5305
TYPE OF FLUID IN HOLE	FRESH WTR. SPERSENE	GEL. XP 20
FLUID LEVEL	100'	FULL
MAXIMUM RECORDED TEMP.	135°F	164°F
SONDE TYPE	GNC-G	GNC-G
TIME CONSTANT-SECONDS	3	3
LOGGING SPEED FT/HR.	1800'	1800'
SENSITIVITY REFERENCE	400	400/400

OTHER ELECTRICAL LOGS

INDUCTION ELECTRIC 6 FF40	5305	1877	1 RUN
ELECTRIC	4419	154	3 RUNS
LATEROLOG	5300	3500	2 RUNS
SONIC-CALIPER	5292	154	5 RUNS
MICRO-CALIPER	5305	3500	1 RUN
DIP METER	5305	1877	1 RUN
CEMENT BOND	1882	154	1 RUN

LITHOLOGIC REFERENCE & WELL SYMBOLS

CONGLOMERATE	DOLOMITE	COAL	CORE (RECOVERY BLOCK)
SANDSTONE	DOLOMITIC	CARBONACEOUS MATTER	SPECIFIC GRAVITY
SILTSTONE	CALCULITITE	METAMORPHIC	SIDE WALL CORE
SHALE & CLAYSTONE	CALCARENITE	KAOLIN-KAOLINITIC	CHERTY
LIMESTONE	CALCAREOUS	PYRITIC, MICACEOUS OOLITIC	POSSILIFEROUS
CASING SHOE	FAULT	PLUGS	GAS SHOW
			OIL SHOW
			UNCONFORMITY
			DISCONFORMITY

LITHOLOGY BY: W.E. GARDNER & V. PUDOVSKIS
COMPILED BY: W.E. GARDNER DEC. 1962
LOGGED BY: SCHLUMBERGER (ELECTRIC)
EXPLORATION LOGGING (MUD)

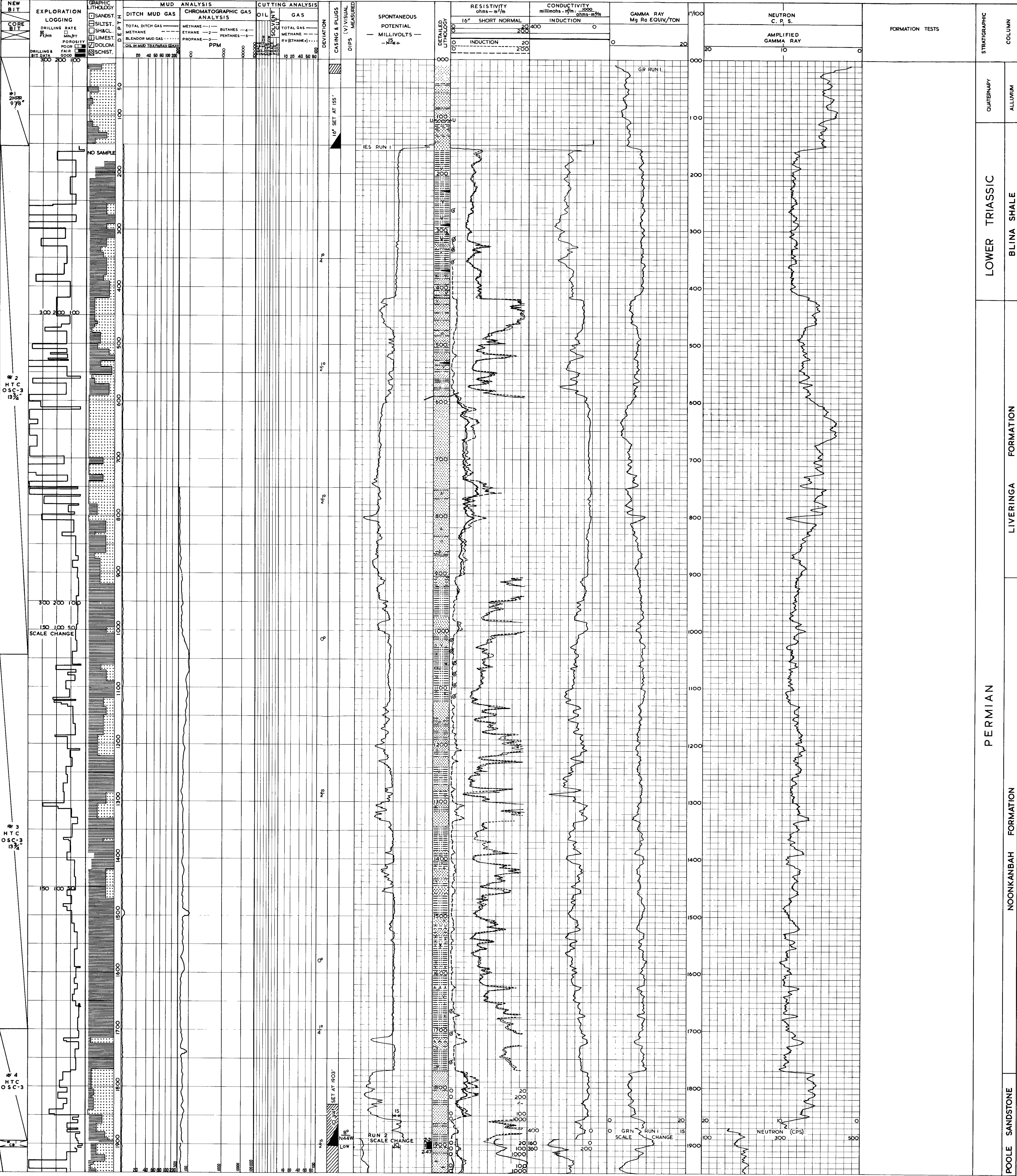


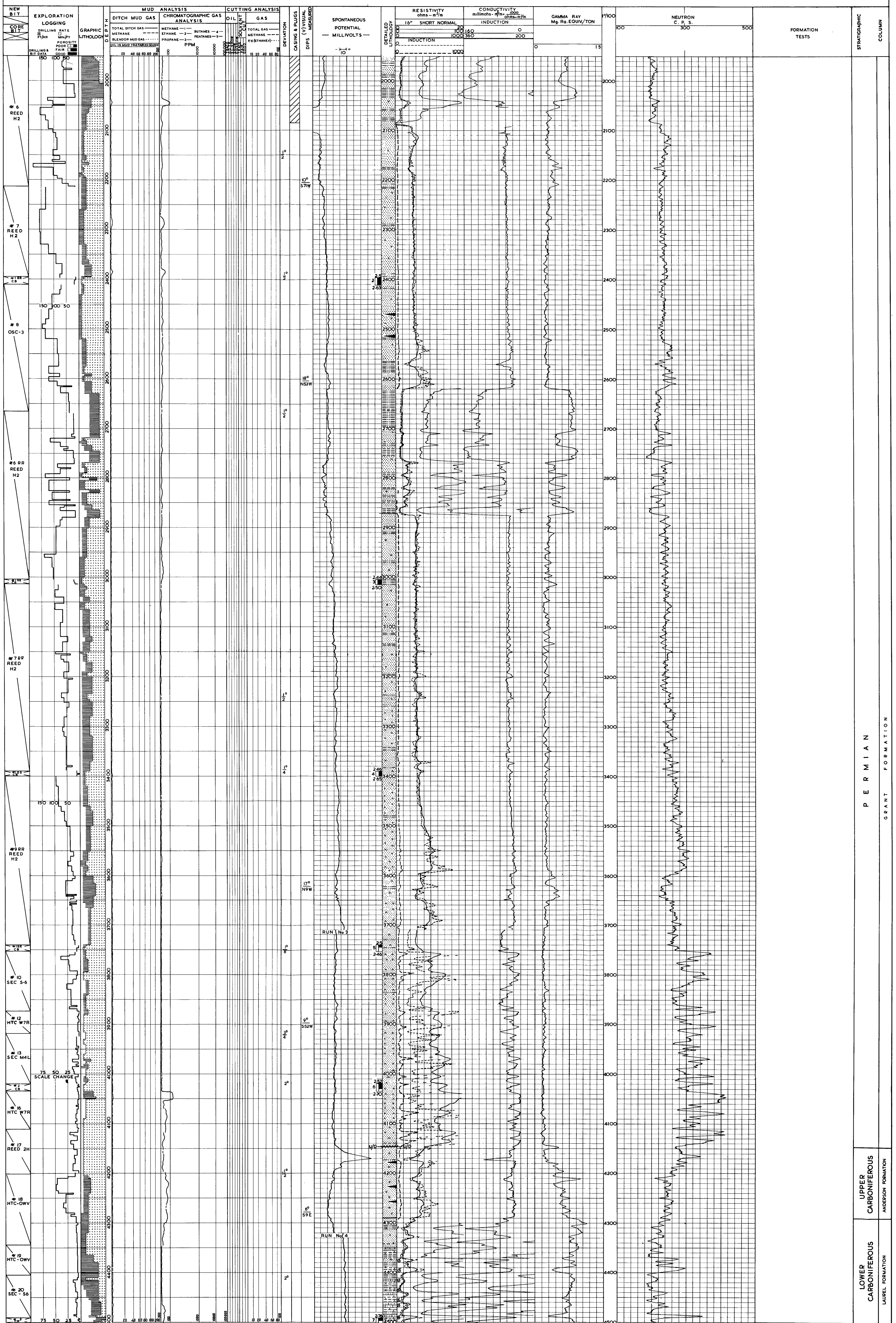
PLATE 2
SHEET: 2

LOCATION : LAT. 17° 18' 07" S. LONG. 124° 06' 48" E.
ELEVATION: GROUND LEVEL 69' DERRICK FLOOR 78'

STATE: WESTERN AUSTRALIA

4-MILE SHEET: DERBY

BASIN: CANNING



COMPOSITE WELL LOG
WEST AUSTRALIAN PETROLEUM PTY. LTD.
LANGOORA No1

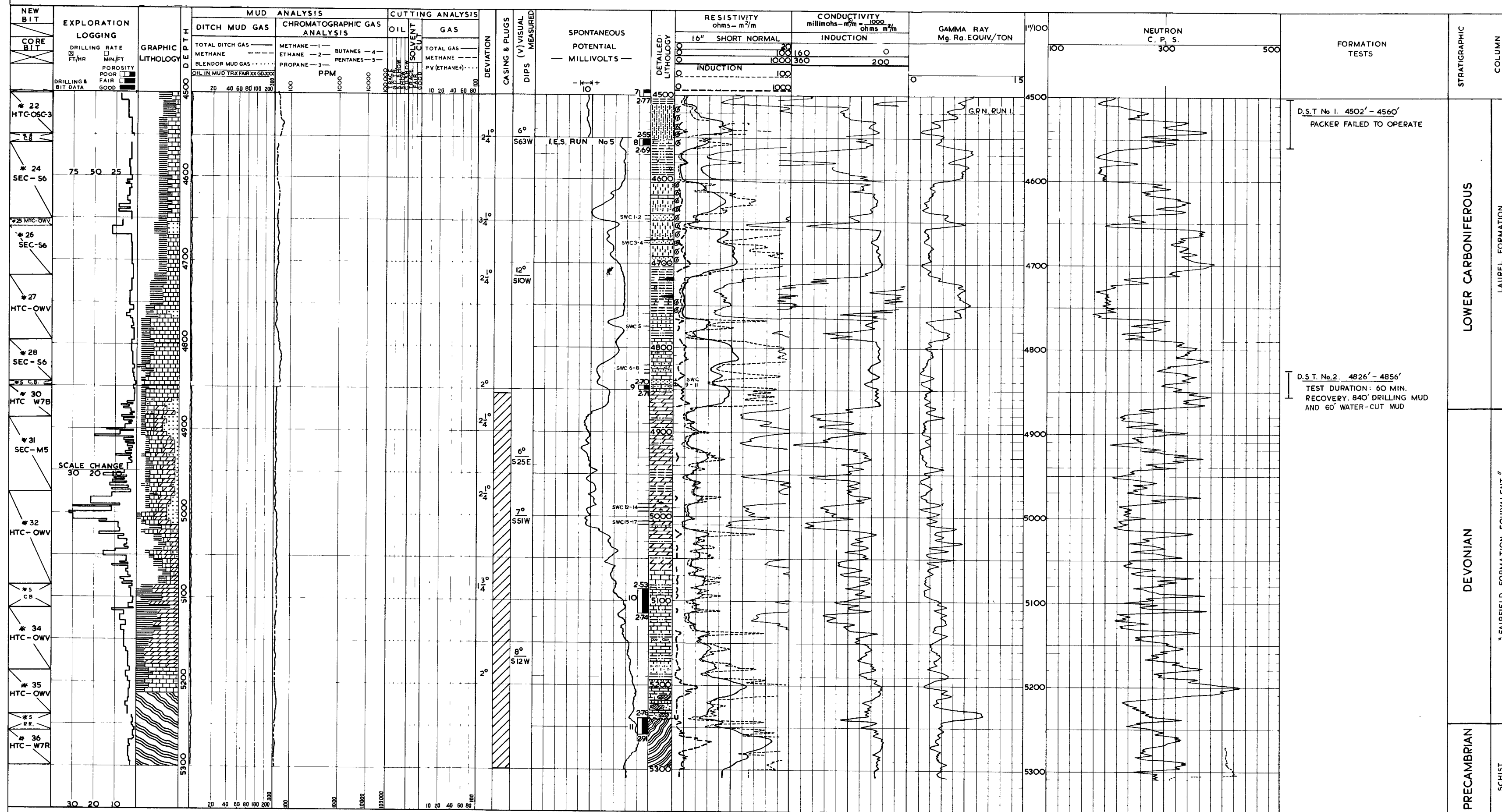
PLATE 2
SHEET: 3

LOCATION: LAT. 17° 18' 07" S. LONG. 124° 06' 48" E.
ELEVATION: GROUND LEVEL 69' DERRICK FLOOR 78'

STATE: WESTERN AUSTRALIA

4-MILE SHEET: DERBY

BASIN: CANNING



COMPOSITE WELL LOG

PLATE 3
SHEET No1

WEST AUSTRALIAN PETROLEUM PTY LIMITED
HAWKSTONE PEAK NO.1.

PERMIT TO EXPLORE No.30H
LICENCE TO PROSPECT No.101H.

LOCATION : 17° 14' 45" S. 124° 24' 26" E.
ELEVATION GROUND LEVEL 161'
DERRICK FLOOR 170'

STATE: WESTERN AUSTRALIA

4 MILE SHEET: DERBY

BASIN: CANNING

WELL STATUS: ABANDONED

DATE SPUNDED: 17th OCTOBER 1962
DATE DRILLING STOPPED: 26th NOVEMBER 1962
TOTAL DEPTH D.F. DRILLER - 3897'
SCHLUMBERGER - 3895'
DATE WELL ABANDONED: 2nd DECEMBER 1962

HOLE SIZE: IN FROM TO
20 0 66
13 66 940
9 940 3897'

CASING: SIZE WT. G.P. DEPTH CMT. QMT. TO
10" 65lbs. H-40 66' 70x SURFACE
10 1/2" 40.5 lbs J-55 938' 450x SURFACE

CEMENT PLUGS: FROM TO TOP SACKS
3360 3155 3155
1038 838 838
30 9 9 100
25

PERFORATIONS: NIL

WELL HEAD FITTINGS: M.S. PLATE WELDED OVER CASING
DRILLED BY: OIL DRILLING AND EXPLORATION PTY LTD.
DRILLING METHOD: ROTARY.

INDUCTION LOG DATA

RUN NUMBER	1	2	3	4
DATE IN 1962	20 OCT	29 OCT	11 NOV	26 NOV
FIRST READING	1170	1938	2610	3889
LAST READING	75	941	1500	1500
INTERVAL MEASURED	1095	997	1110	2389
CASING SCHLUMBERGER	65	941	941	941
CASING DRILLER	66	938	938	938
DEPTH REACHED	1171	1939	2618	3895
BOTTOM DRILLER	1173	1938	2620	3897
MUD NATURE	GEL	GEL	GEL	GEL
DENSITY lb/cu ft/VISCOSITY	75/38	73/68	65/60	65/55
pH / WATER LOSS cc/30 Mins	10.5/9	11/7	—/30	10.5/9
MUD RESISTIVITY	2 @ 95°F	1 @ 82°F	2 @ 95°F	1 @ 82°F
MUD RESISTIVITY BHT	13 @ 140°F	10 @ 82°F	14 @ 144°F	10 @ 82°F
Rmt - MEASURED	22 @ 80°F	10 @ 82°F	16 @ 90°F	17 @ 100°F
Rmc - MEASURED	0 @ 80°F	2 @ 82°F	22 @ 90°F	63 @ 98°F
BIT SIZE	9 7/8"	9 7/8"	9 7/8"	9 7/8"
MAXIMUM RECORDED TEMP	140°F	140°F	144°F	160°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:	LENGRAND			
WITNESSED BY:	GARDNER	ELLIOTT	GARDNER	
REMARKS:	Runs 1,2,3, 61MAQ, Run 4 51140 Run 3 gave poor log and so later re-run in Run 4.			

RADIOMETRIC LOG DATA

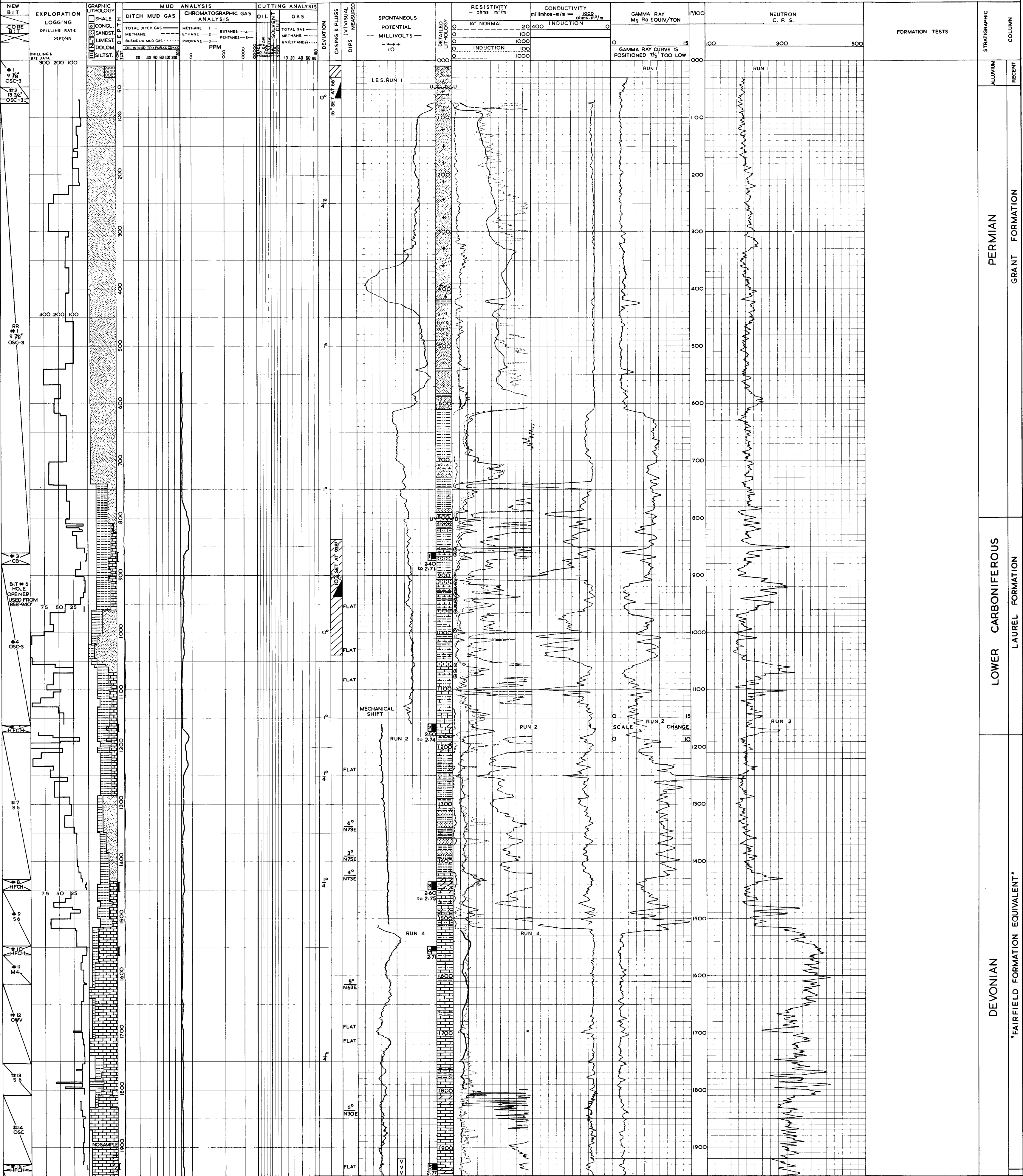
TYPE OF LOG	GR N	GR N	GR N	GR N
RUN NUMBER	1	2	3	4
DATE IN 1962	20 OCT	29 OCT	12 NOV	26 NOV
FIRST READING	1170	1938	2617	3894
LAST READING	30	941	1838	2515
INTERVAL MEASURED	1140	997	779	1379
DEPTH REACHED	1171	1939	2618	3895
TYPE OF FLUID IN HOLE	GEL	GEL	GEL	GEL
FLUID LEVEL	FULL	FULL	FULL	FULL
MAXIMUM RECORDED TEMP	140°F	140°F	144°F	160°F
SONDE TYPE	GLO/NLD	GLO/NLD	GLO/NLD	GLO/NLD
TIME CONSTANT SECONDS	3/3	3/3	3/3	3/3
LOGGING SPEED FT/HR	1800'	1800'	1800'	1800'
SENSITIVITY REFERENCE	400/400	400/400	400/400	400/400

OTHER ELECTRICAL LOGS

SONIC CALIPER	3882' - 65'	5 RUNS
MICROLOG	3894' - 941'	4 RUNS
LATERLOG	3890' - 65'	4 RUNS
DIPMETER	3890' - 941'	1 RUN
CEMENTBOND	938' - 60'	1 RUN
TEMPERATURE	2136' - 0'	1 RUN

LITHOLOGIC REFERENCE & WELL SYMBOLS

LITHOLOGY BY: W.E. GARDNER & R.M.L. ELLIOTT.
COMPILED BY: W.E. GARDNER JANUARY 1963
LOGGED BY: SCHLUMBERGER (ELECTRIC)
EXPLORATION LOGGING (MUD)



COMPOSITE WELL LOG
WEST AUSTRALIAN PETROLEUM PTY. LTD.
HAWKSTONE PEAK No.1

PLATE 3
SHEET No2

LOCATION : LAT. 17° 14' 45" S. LONG. 124° 24' 26" E.
ELEVATION : GROUND LEVEL - 161' DERRICK FLOOR - 170'

STATE : WESTERN AUSTRALIA

4-MILE SHEET : DERBY

Basin : CANNING

