

EARLIER FILES

LATER FILES

RECORDS DISPOSITION

PAA

SRUP 5-19-69 LAT 31 38

Comp 3-11-69

LONG 147° 58' 38"

GURNARD-1

ESSO. VIC/PI T.D. 9724

559

W.D. 228' RT.

GLOMAR 177

IES	Run 1.	2"	2523-8249	
	" 2.	2"	7950-9701	Log transparencies
	" 1.	5 & 1"	2523-8249	" long J.
	" 2.	5 & 2"	7950-9701	
	" 1 & 2.	2"	2523-9701	
	" 1 & 2.	5"	2523-9300	End of log missing
B.H.C.S./GR.	" 1	500GR	2523-8237	SEPARATE LOGS 2 AND 5
	" 2		7970-9700	" " 2" " 5"
	" 1 & 2	500GR	2523-9700	" " 2" " 5"
FDC/GR.	" 1		2521-9698	" " 2+10 " 5"
C.D.M.	" 1	2"	2506-9698	
	" 1	2 & 5"	" "	DIFFERENT DISPLAYS OR COMPUTATIONS
	" 1	5 & 2"	2523-9697	
	" 1	Radial	2506-9698	

FIT RESULTS TESTS 1 & 2. NO LOG - FILMS DESTROYED DURING DEVELOPMENT.

CORE LAB MUDLOG. 600' - 9724'

S.W.C DESCRIPTIONS. RUN 1 5000 - 8110.

" " " 2 2600 - 9684.

TIME DEPTH CURVE.

WELL SUMMARY.

+10

LITHOLOGY. 600' - 9724'

+ BIOLOGICAL AND C.D. LABORATORY REPORTS BY D. TAYLOR & M.A. MARTIN 1983

? MICROPALAEOONTOLOGY REPORT BY D. TAYLOR.

? PALYNOLOGY REPORT BY L.E. STOVER & A.P. PARTRIDGE.

" " " P.R. EVANS & L.E. STOVER.

NO CORES CUT.

? PALYNOLOGY REPORT REVISED BY A.D. PARTRIDGE. MISSING

GEOIDIP LOG. P.R. HIGH DENSITY DIPS. RUN 2. SCALE 1/48.

PALYNOLOGICAL SHEET BY W.K. HARRIS

nothing recorded?

EX
Sec
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Exe
Exe
Exe
Exe
Exe
Exe
Exe
CO
Gen
Chi
Mar
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GURNARD-1 (W559)

Well Summary Report

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well completion Log

WEEKLY REPORTS

AND LITHOLOGY.

HEMATITE PETROLEUM PROPRIETARY LIMITED

WEEKLY DRILLING REPORT

Tenement Number: Vic.P/1

Operator: Esso Standard Oil (Aust.) Ltd.

Drilling Unit: Glomar III

Well: Gurnard 1.


Date of Report: 10th November, 1969.

Location: Latitude: 38° 35' 33" South
147° 58' 38" East

Water Depth: 228 feet

Progress: Total Depth 9724 feet
Previous 9724 feet
Progress 0 feet

Operations: "Glomar III" picked up anchors,
and abandoned the site at 1200 hours
on 3rd November, 1969.


W.M. Lonie,
General Manager.

MES:YEF-H
10th November, 1969.

3.

3-11-69.

Testing:

F.I.T. No.1 9660 feet - recovered 50 ccs. mud filtrate and
2944.3 8% formation water plus trace dull,
green fluorescence (? contamination)

F.I.T. No.2 9596 feet - recovered 350 ccs. mud filtrate and
2924.8 8% formation water in sample chamber
and 520 ccs. filtrate plus 12%
formation water in segregator with
trace pale, yellow fluorescence and
fair hydrocarbon odour.

Both levels thought to be tight.



W.M. Lonie
General Manager

MES:YEF
Melbourne
6th November, 1969.

3-11-69

Gas Readings:

Interval (ft.)	Hot Wire Cuttings	Drilling Mud				
		Hot Wire	Gas Chromatograph			
		CO ₂	C ₁	C ₂	C ₃	
9620-9724	1-15	2-14	Trace	350- 2600	Trace - 300	Trace - 200

Lithology:

<u>Interval</u> (ft.)	<u>Drilling Rate</u> (mins/ft)
9620-9654	3.5 - 7.0

80% Siltstone, light grey, calcareous, sparsely glauconitic, and mid brown, non-calcareous, micritic, abundant carbonaceous material.

10% Sandstone, fine to medium grained, occasional aggregates of fine-grained sandstone with weak, pale yellow fluorescence and weak yellow cut.

10% Coal.

9654 - 9724

100% Siltstone, as above, with traces of Coal and Sandstone.

Logging:

<u>Log</u>	<u>Interval (ft.)</u>
IES	7932 - 7923
IES	7950 - 9701
FDC-GR	2521 - 9698
Sonic SP	7970 - 9700
CDM-HDT	2523 - 9667

A total of 30 S.W.C.'s were shot, of which 27 were recovered from the interval of 2600-9684 feet.

HEMATITE PETROLEUM PROPRIETARY LIMITED

WEEKLY DRILLING REPORT

Tenement Number: Vic P/1.
Operator: Esso Standard Oil (Aust.) Ltd.
Drilling Unit: Glomar III.
Well: Gurnard 1. KB = 9.75M
Date of Report: 3rd November, 1969.

Location: Latitude : 38° 35' 33" South
Longitude : 147° 58' 38" East.

Water Depth: 228 feet.

Progress: Total Depth : 9724 feet
Previous : 9654 feet
Progress : 70 feet

Operations: After waiting on weather, at a depth of 9654 feet, drilling continued to a T.D. of 9724 feet. Two formation interval tests were run at 9596 and 9660 feet; recoveries were mainly mud filtrate with some formation water, which showed traces of fluorescence.

On completion of the electric logging programme, cement plugs were run and "Glomar III" is currently waiting on weather, before abandoning the site, and moving to the Tailor 1 location.


Cement Plugging:

<u>Number</u>	<u>Interval</u> (ft.)	<u>Cement</u> (sacks)
1	9470-9700	160 - with 2% CaCl ₂ . Top tagged at 9470 feet
2	2323-2633	3000 with 2% CaCl ₂ . Top tagged at 2299 feet
3	440-555	110

27-10-69

Lithology (conit)

<u>Interval (ft)</u>	<u>Drilling Rate</u> (ms/ft.)	
9470-9520	1.1-2.4	<u>Sandstone</u> , light grey-white, finely grained, well sorted, with abundant clay matrix, trace carbonaceous material, poor porosity. Interbedded <u>Siltstone</u> and <u>Coal</u> , as above.
9520-9560	1.3-3.2	<u>Sandstone</u> , unconsolidated medium to coarse grained, with minor <u>Siltstone</u> .
9560-9640	2.0-6.0	Mainly <u>Coal</u> with interbedded <u>Siltstone</u> and minor finely grained <u>Sandstone</u> , as before.



W.M. Lonie
General Manager

MES:JS
Melbourne
29th October, 1969.

Lithology (conit.)

27-0-69

<u>Interval (ft)</u>	<u>Drilling Rate</u> (ms/ft.)	
8270-8540	1.0-4.8	Interbedded <u>Siltstone</u> , <u>Coal</u> and <u>Sandstone</u> , fine grained, moderately hard to friable, quartzose, slightly pyritic and carbonaceous, trace medium to coarse grained well rounded <u>sandstone</u> .
8540-8640	2.0	<u>Sandstone</u> , mainly medium to coarse grained, quartz, well rounded, unconsolidated, with poor sorting; and minor fine grained, well-sorted, sub rounded, moderately firm, pyritic, occasional carbonaceous material and some <u>siltstone</u> .
8640-8650	2.8	<u>Coal</u> , black, vitreous, <u>Shale</u> , pyritic, dark brown, silty, finely laminated.
8650-8740	1.7	<u>Sandstone</u> , as before, interbedded with carbonaceous <u>Siltstone</u> and minor <u>Coal</u> .
8740-8750	3.5	<u>Coal</u> , as above.
8750-8800	2.2	<u>Sandstone</u> with minor <u>Shale</u> and <u>coal</u> .
8800-8920	1.9	<u>Coal</u> with interbedded <u>Sandstone</u> and minor carbonaceous <u>Siltstone</u> .
8920-8980	1.0-2.2	<u>Sandstone</u> with carbonaceous <u>siltstone</u> and minor <u>coal</u> .
8980-9070	1.0-3.0	<u>Sandstone</u> , fine grained, sub-angular to sub-rounded, moderately well sorted, trace (lithics) and pyrite with spotty blue fluorescence and cut between 9050-70 ft; interbedded with <u>Siltstone</u> and coal, as above.
9070-9220	1.4-3.4	<u>Sandstone</u> , coarse grained, unconsolidated, sub angular to sub rounded, well sorted.
9220-9470	1.1-4.3	<u>Sandstone</u> , unconsolidated coarse to very coarse grained, with interbedded carbonaceous <u>Siltstone</u> and <u>Coal</u> .

HEMATITE PETROLEUM PROPRIETARY LIMITED

WEEKLY DRILLING REPORT

Tenement Number: Vic P/1.
Operator: Esso Standard Oil (Aust.) Ltd.
Drilling Unit: Glomar III.
Well: Gurnard 1.
Date of Report: 27th October, 1969.
Location: Latitude : 38° 35' 33" South
Longitude : 147° 58' 38" East.
Water Depth: 228 feet.
Progress: Current : 9654 feet
Previous 8081 feet
Progress 1573 feet

Operations: Drilling continued to 8278 feet at which depth electric logging (IES and GR Sonic) and a velocity survey were carried out. Routine drilling has continued to the present depth; samples were circulated out at 8980, 9073, 9117, 9135, 9158 and 9209 to evaluate sand sections for reservoir characteristics and hydrocarbons. Glomar III is now preparing to resume drilling following weather delay at 18 hours.

Interval (ft)	Hot Wire Cuttings	Drilling Mud				
		Hot Wire	CO2	Gas Chromatograph		
				C1	C2	C3
2520.6 - 2602.9 8270-8540	0-2	1-5	-	180-950	0-150	0-75
2602.9 - 2718.8 8540-8920	0-12	2-6	-	90-1070	0-160	0-90
8920-9110	0.5-14	2-7	-	360-1250	-	-
9110-9200	0	1-3	-	150-550	-	-
2804.16 - 2859.02 9200-9380	0-3	2-7	-	350-1960	25-260	tr-100
2859.02 - 2932.17 <u>9380-9620</u>	0-7	4-17	-	600-4200	50-800	25-400

Lithology:

<u>Interval (ft)</u>	<u>Drilling Rate (ms/ft)</u>	
8030-8270	0.7-2.2	Interbedded <u>Siltstone</u> and <u>Coal</u> with minor <u>Sandstone</u> , white to light grey, fine to medium grained,

<u>Interval (ft)</u>	<u>Drilling Rate</u> <u>(mins/ft)</u>	
7170-7265	1.2-4.2	<u>Sandstone</u> , fine grained, glauconitic, argillaceous, silty & grading to <u>Siltstone</u> sandy.
7265-7620	0.7-4.1	<u>Sand</u> , medium grained to granular, sub angular to rounded, unconsolidated, glauconitic, pyritic, no fluorescence or cut; interbedded with <u>Siltstone</u> , light to dark brown, firm to hard, non-calcareous, carbonaceous and <u>Coal</u> , black, brittle, conchoidal fracture.
7620-7690	1.8-2.4	<u>Sand</u> , unconsolidated, medium to coarse grained, as above.
7690-7860	0.8-6.6	Interbedded <u>Coal</u> and <u>siltstone</u> / minor <u>sand siltstone</u> , light to dark brown, argillaceous, very carbonaceous, mass ? <u>Coal</u> , very silty in places.
7860-8030	0.7-3.0	Interbedded <u>coal</u> and <u>siltstone</u> as above, very minor sandstone, white to light grey, fine to medium.

Yours faithfully,



W.M. Lonie
General Manager

MES:JS
Melbourne
22nd October, 1969.

20-10-69

Lithology:

<u>Interval (ft)</u>	<u>Drilling Rate</u> <u>(mins/ft.)</u>	
3860-4000 1176 - 1219	0.8	<u>Marl</u> , light to medium grey, soft to firm, glauconitic.
4000-4410 1344.1	0.5-1	<u>Limestone</u> , buff, micritic skeletal hard with distinctive forams, glauconite, and disseminated <u>quartz</u> grains.
4410-4510 1374.6	0.4-0.9	50% <u>Marl</u> , as above. 50% <u>Calcarenite</u> , soft to firm, fossiliferous, with 50% dispersed <u>quartz</u> and glauconite.
4510-4680 1426.4	0.3-0.5	100% <u>Marl</u> , as above.
4680-4800 1463	0.2-0.4	70% <u>Mudstone</u> , grey green, silty in part, very glauconitic, fossiliferous and pyritic, very calcareous. 20% <u>Sand</u> , medium to coarse grained, well rounded, with <u>pyrite</u> & <u>glauconite</u> , coatings on grains. 10% <u>Marl</u> , as above.
4800-4950 1508.7	0.3	80% <u>Mudstone</u> , as above. 20% <u>Marl</u>
4950-5700	0.4-0.7	<u>Calcarenite</u> , <u>Mudstone</u> , as above
5700-6000 1828.8	0.3-0.8	<u>Calcarenite</u> , <u>Mudstone</u> to calcareous, <u>Siltstone</u> , light grey, brown glauconitic, pyritic, argillaceous.
6000-6390	0.4-0.9	<u>Calcarenite</u> , <u>Siltstone</u> , as above.
6390-6800 2072.6	0.2-1.3	<u>Siltstone</u> , calcareous, as above.
6800-7046	2.0-4.0	<u>Calcarenite</u> ., & <u>Siltstone</u> , as above; becoming very finely sandy.
7046-7170 2185.4	3.5-4.9	<u>Calcarenite</u> , & <u>Siltstone</u> , light grey, brown, locally pyritic & glauconitic, abnormal forams, soft to firm.

HEMATITE PETROLEUM PROPRIETARY LIMITED

WEEKLY DRILLING REPORT

Tenement Number: Vic P/1
Operator: Esso Standard Oil (Aust.) Ltd.
Drilling Unit: Glomar III
Well: Gurnard 1
Date of Report: 20th October, 1969.
Location: Latitude : 38° 35' 33" South
Longitude : 147° 58' 38" East
Water Depth: 228 feet
Progress: Current 8081 feet
Previous 4010 feet
Progress 4071 feet

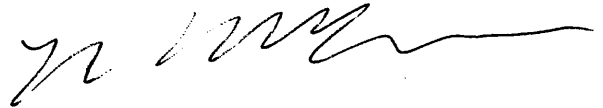
Operations: Following successful completion of fishing operations drilling has continued to 8081 feet without major operational delay, and without encountering any significant hydrocarbon shows. No coring or electric logging was done during the week and present operations are drilling ahead in the Latrobe Delta Complex.

Interval (ft)	Hot Wire Cuttings	Drilling Mud				
		Hot Wire	C02	Gas C1	Chromatograph C2	C3
3860-4430	-	9-25	-	800-2800	-	-
4430-4510	-	7-10	-	700-900	-	-
13746 - 1608.7 4510-4950	-	10-26	-	1100-2400	-	-
4950-6390	-	2-6	-	350-1250	-	-
6390-7046	0-1	1-4	-	100-800	-	-
7046-7150	0-1	0.5-5	-	50-890	-	-
7150-7265	0-1	2-7	-	270-700	-	-
2214.3 - 2322.5 7265-7620	0-1	1-8	-	50-2600	0-1800	-
7620-7690	0	1-2	-	80-250	-	-
2343.3 - 2395.7 7690-7860	0-5	0.5-15	-	50-2500	0-600	0-90
7860-8030	0-1	0.5-2	-	50-400	0-50	trace

13/10/69

<u>Interval (ft)</u>	<u>Drilling Rate (mins/ft)</u>	
1290 - 1350	0.2 - 0.3	<u>Calcarenite</u> a/a.
1350 - 1470	0.3	No returns (Slip joint leak).
1470 - 2040	0.2 - 0.8	<u>Calcarenite</u> a/a.
2040 - 2280	0.3 - 0.6	No returns (Mud circ. leak).
2280 - 2550	0.4 - 1.0	<u>Marl</u> , mid grey, sparsely foss., trace fine grained qtz., soft.
2550 - 3220	0.4 - 0.8	<u>Marl</u> , lt - mid grey, sl. glauc., foss., soft.
3220 - 3860	0.4 - 1.0	<u>Marl</u> , mid grey, grn., glauc., foss., soft.

Drill cuttings below 3860 feet were left in the hole following twistoff of drill string.



W.M. Lonie
General Manager

MES:JS
Melbourne
13th October, 1969.

HEMATITE PETROLEUM PROPRIETARY LIMITED

WEEKLY DRILLING REPORT

Tenement Number: Vic P/1
Operator: Esso Standard Oil (Aust.) Ltd.
Drilling Unit: Glomar III
Well: Gurnard 1
Date of Report: 13th October, 1969.
Location: Latitude: 38° 35' 33" South
Longitude: 147° 58' 38" East
Water Depth: 228 feet
Progress: Current 4010 feet
Previous 994 feet
Progress 3016 feet

Operations: Drilling continued until 2550 feet at which depth a 13³/₈ inch casing string was run and cemented at 2523 feet with 1650 sacks of Australian cement. Drilling of 12¹/₄ inch diameter hole has proceeded to 4010 feet without encountering any significant hydrocarbon indications. Fishing is now in progress, following twistoff at a bumper sub.

Gas Readings

<u>Interval (ft)</u>	<u>Cuttings Hot Wire</u>		<u>C02</u>	<u>Gas Chromatograph</u>		
				<u>c1</u>	<u>c2</u>	<u>c3</u>
600-1560	Insignificant					
1560-2550	0	5-36	Trace	360-1250	50-600	-
2550-3220	0	25-30	Trace	260-650	-	-
3220-3340	0	14-36	Trace	360-650	-	-
3340-3550	0	24-54	Trace	2050-4820	-	-
3550-3860	0	9-24	Trace	800-1430		

Lithology:

<u>Interval (ft)</u>	<u>Drilling Rate (mins/ft)</u>	
600 - 1250	0.2 - 0.4	<u>Calcarenite</u> , lt. - mid grey, unconsol., marly, ab. bryozoal. & pelycypods frags.
1250 - 1290	0.3	<u>Coquina</u> , lt. grey, crse, bryozoal.

HEMATITE PETROLEUM PROPRIETARY LIMITED

WEEKLY DRILLING REPORT

Tenement Number: Vic P/1

Operator: Esso Standard Oil (Aust.) Ltd.

Well: Gurnard 1

Date of Report: 6th October, 1969

Drilling Unit: Glomar 111

Location: Latitude 38^o 35' 33" South
Longitude 147^o 58' 38" East

Water Depth: 228 feet

Progress: Current 994 feet
Previous 0 feet
Progress 994 feet

Operations: Glomar 111 arrived on location at 1600 hours on 2nd October, 1969, and is now drilling at 994 feet. A combined 20" and 30" casing string was set at 1602 feet with 1000 sacks of cement.



W.M. Lonie
General Manager

MES:JS
6.10.69

PALYNOLOGY

&

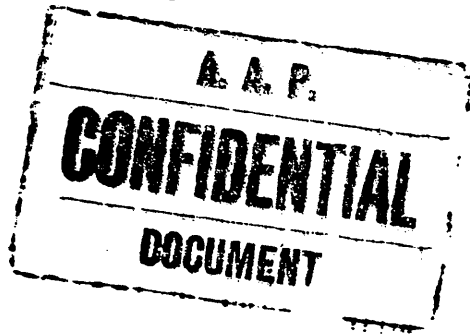
PALAEONTOLOGY

20 NOV 1983

OIL and GAS DIVISION

BIOSTRATIGRAPHIC & PALEOENVIRONMENTAL
DATA PACKAGE # 1
for
GIPPSLAND BASIN.

GURNARD-1



for: AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

July 20, 1983.

FILED IN GIPPSLAND BASIN REPORTS UNDER
AUSTRALIAN AQUITAINE. B-5-2

David Taylor
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AUSTRALIA. (02)810 5643.

and

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AUSTRALIA. (02)662 2954

INTRODUCTION.

This data package details available data on thirteen (13) Gippsland Basin, offshore wells. Additional palynological and foraminiferal studies were conducted on rotary cutting samples from four wells; namely Bullseye # 1, Moray # 1, Perch # 1 and Pike # 1. Micro-floral and micro-faunal lists are included for all samples examined specifically for this project.

An explanatory report is submitted, separately, by Helene Martin on her palynological results, summarised here. David Taylor will contribute further discussion when requested.

INDEX of WELL DATA - PACKAGE # 1.

	<i>H. Martin additional palynology with species lists.</i>	<i>D. Taylor additional micropaleontology with foram lists.</i>	<i>D. Taylor interpretation of records.</i>
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† BREAM # 4A	-	-	p. 3 †
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* refer GROPER # 2 sheet (page 8) for Schematic Model of Transgressive Onlap on Western Margin.

† Unable to interpret BREAM # 3 because infrequent sidewall cores were penetrated by drilling mud - thus contaminated.

BLUE BONE # 1

<i>Sample*</i> Depth m	ZONE & fossil type	AGE	STRAT-UNIT & FACIES	LITHOLOGY etc.
342.21	F (forams)	EARLY MIOCENE		
----- ?	----- ?	----- ?	----- ?	----- ?
359.9 to 431.8	Non diagnostic			strand line calcarenites
----- ?	----- ?	----- ?	----- ?	----- ?
478.25 & 510.8 to 512.0 (CC) & 516.8	K (forams) or Pre K	LATE EOCENE	? TURRUM FORMATION	qtz glauconitic mudstone

REFER GROPER # 2 sheet for Schematic Model of Transgressive Onlap
on Western Margin.

*Sidewall cores unless suffix (CC),
indicating conventional core.

FOSSIL TYPE (forams) = planktonic
foraminifera

----- ? ----- inadequate information

Data source: Taylor files

Interpreted by: David Taylor,
July, 1983.

BREAM # 4A

(Bream # 3 had heavy mudcake penetration of SWC. Unable to interpret).

Sample Depth m	ZONE & fossil type	AGE	STRAT-UNIT & FACIES	Lithology etc.
1826 to 1836	H-1 (forams)	EARLY MIOCENE	TASMAN SEA	biogenic micrites with oozes
1839 to 1847.3	H-2 (forams)	LATE	CARBONATES	
1850.5 to 1854.5	I-1 (forams)	OLIGOCENE		
1857.0 1859.0	J-2 (forams)	EARLIEST OLIGOCENE	LAKES ENTRANCE MARLS Deep water equivalents.	qtz sandy micrite extreme diagenetic alteration.
1860.0 1861.9 1865.5¶	K (forams)	LATEST EOCENE	COLQUHOUN FORMATION littoral-intertidal	"greensand"
1869.0 1872.0	N (forams)	MID EOCENE	GURNARD FORMATION	"greensand" oxidised at top¶
1875.5 to 1885.0	? (forams)	MID EOCENE	ibid	ibid

¶ oxidised "greensand" at 1865.5 contained mixed zone N/K assemblages, indicating exposed surface.

----- apparent conformable contact FOSSIL TYPE (forams) = planktonic foraminifera
 ~~~~~ definite hiatus

Data source: Taylor files  
 Interpreted by: David Taylor,  
 July 1983.

BULLSEYE # 1

| Sample *<br>Depth<br>m                                | ZONE &<br>fossil type                        | AGE                  | STRAT-UNIT<br>& FACIES                              | LITHOLOGY etc                                     |
|-------------------------------------------------------|----------------------------------------------|----------------------|-----------------------------------------------------|---------------------------------------------------|
| 1891.0<br>1906.2<br>1921.5<br>1936.8                  | H (forams)                                   | EARLY<br>MIOCENE     | GIPPSLAND LST<br>shallow shelf                      | bryozoal calcarenite                              |
| 1952.0<br>1967.3<br>1982.5<br>1997.7                  | I (forams)                                   | LATE<br>OLIGOCENE    | LAKES ENTRANCE<br>MARLS<br>shallow shelf            | calcareous siltsts<br>with qtz, glauc &<br>pyrite |
| 2013.0<br>2028.0<br>2043.5<br>2055.7                  | J-1 (forams)                                 | MID<br>OLIGOCENE     | Littoral at base<br>COLQUHOUN FORMATION<br>lagoonal | silty "greensand"                                 |
| ~~~~~ ? ~~~~~ ? ~~~~~ ? ~~~~~ ? ~~~~~ ? ~~~~~ ? ~~~~~ |                                              |                      |                                                     |                                                   |
| 2080.0<br>2092.3<br>2104.5<br>2119.8                  | K (forams)<br>or<br>Pre K                    | LATE<br>EOCENE       | ?TURRUM FORMATION<br>Lagoonal                       | calcareous,<br>glauconitic,<br>claystone          |
| ----- ? ----- ? ----- ? ----- ? ----- ? ----- ? ----- |                                              |                      |                                                     |                                                   |
| 2241.7<br>to<br>2266.15 (RC)                          | Basal N.<br>asperus-<br>P. asperopolus (S/P) | MID-EARLY<br>MIOCENE | ? non-marine                                        |                                                   |
| ----- ? ----- ? ----- ? ----- ? ----- ? ----- ? ----- |                                              |                      |                                                     |                                                   |
| 2302.75<br>to<br>2327.15 (RC)                         | M. diversus                                  | EARLY<br>EOCENE      | marginal<br>marine                                  |                                                   |

~~~~~ ? ~~~~~ possible hiatus

----- apparent conformable contact

FOSSIL TYPE (foram) = planktonic foraminifera

(S/P) = spore/pollen

(dino) = dinoflagellate

*sidewall cores unless suffix (RC),
indicating rotary cuttings.

Data source: Taylor files.

Interpreted by: David Taylor
July, 1983.

| CUTTINGS | | SPORES | | ANGIOSPERM POLLEN | | DINOFLAGELLATES | | Dinoflagellate abundance | | Dinoflagellate preservation | | SPORE
POLLEN
ZONE | AGE |
|---------------|---|--------|--|-------------------|--|-----------------|--|--------------------------|--|-----------------------------|--|------------------------------------------------|---------------------|
| Depth in feet | | | | | | | | | | | | | |
| 7350-60 | ↓ | | | | | | | | | | | Basal
<i>N. asperus-
P. asperopolus</i> | Early-Mid
Eocene |
| 7430-40 | ↓ | | | | | | | | | | | | |
| 7550-60 | ↓ | | | | | | | | | | | | |
| 7580-90 | ↓ | | | | | | | | | | | <i>M. diversus</i> | Early
Eocene |
| 7630-40 | ↓ | | | | | | | | | | | | |

SPORES, POLLEN and DINOFLAGELLATES IDENTIFIED IN BULLSEYE # 1.

Reference to Species:

- 1 Dettmann, 1963
- 2 Martin, 1973
- 3 Stover & Partridge, 1973
- 4 Couper, 1960
- 5 Lentin & Williams, 1977
- 6 Stover & Evitt, 1978
- 7 Deflandre & Cookson, 1955
- 8 Harris, 1965

Key to assessment of abundance and preservation:

- φ good, above average
- o average
- ÷ poor, below average
- z very poor, trace occurrence

Helene A Martin, July 1983.

DOLPHIN # 1

| Sample
Depth
m | ZONE &
fossil type | AGE | STRAT-UNIT
& FACIES | LITHOLOGY etc. |
|-----------------------------------|-----------------------|-------------------|---------------------------------|-----------------------------------------------|
| 1079.7 (SWC) | H (forams) | EARLY MIOCENE | GIPPSLAND LST
shallow shelf | bryozoal calc qtz
sandy siltsts |
| 1143.7 (SWC) | I (forams) | LATE
OLIGOCENE | LAKES
ENTRANCE | calcareous
glaucanitic
mudstones
etc |
| 1195.6 (RC)
to
1204.75 (RC) | J-1 (forams) | MID
OLIGOCENE | MARLS
littoral | |
| 1220.0 (SWC) | K (forams) | LATE EOCENE | COLQUHOUN
FORMATION lagoonal | "Greensand" |
| 1222.7 (CC)
to
1242.6 (CC) | NO DATA (forams) | | | |

SWC = sidewall core

CC = conventional core

RC = rotary cutting

~~~~~ definite hiatus

----- apparent conformable contact

FOSSIL TYPE (forams) = planktonic foraminifera

(dino) = dinoflagellates

(S/P) = spore/pollen

Data source: Taylor files

Interpreted by : David Taylor,  
July, 1983.

GROPER # 1

| <i>Sample</i> | <i>ZONE &amp; fossil type</i> | <i>AGE</i> | <i>STRAT-UNIT &amp; FACIES</i> | <i>LITHOLOGY etc</i> |
|---------------|-------------------------------|------------|--------------------------------|----------------------|
| 851 (SWC)     |                               | EARLY      | LAKES                          | bryozoal marl        |
| 854 (C.C.)    | H (forams)                    | MIOCENE    |                                |                      |
| -----         |                               |            |                                |                      |
| 862.3 (CC)    |                               | LATE       | MARLS                          | calc. siltstone      |
| to            | I (forams)                    | OLIGOCENE  | shallow shelf                  |                      |
| 902.8 (CC)    |                               |            |                                |                      |
| -----         |                               |            |                                |                      |
| 905.8 (CC)    |                               | MID        | COLQUHOUN FM                   | glaucinitic, calc,   |
| to            | J-1 (forams)                  | OLIGOCENE  | lagoonal &                     | mudst.               |
| 907 (CC)      |                               |            | littoral                       |                      |
| ~~~~~         |                               |            |                                |                      |
| 919.6 (CC)    | K (forams)                    | LATE       |                                | glaucinitic qtz      |
| to            | and/or                        | EOCENE     |                                | sandy mudst          |
| 922.3 (CC)    | Pre-K                         |            | TURRUM                         |                      |
|               |                               |            | FORMATION                      |                      |
| 931.8 (CC)    | D. extensa (dino)             | LATE       | lagoonal/                      |                      |
| to            | Mid                           | EOCENE     | estuarine                      |                      |
| 962.9 (CC)    | N. asperus (S/P)              |            |                                |                      |
| ----- ?       | ----- ?                       | ----- ?    | ----- ?                        | ----- ?              |
| 1011 (SWC)    | lower                         | MID        | ?                              | micaceous siltst     |
|               | N. asperus (S/P)              | EOCENE     |                                |                      |

REFER GROPER # 2 sheet for Schematic Model of Transgressive Onlap  
on Western Margin.

SW = sidewall core  
CC = conventional core

FOSSIL TYPE (foram) = planktonic foraminifera  
(dino) = dinoflagellates  
(S/P) = spore/pollen

~~~~~ definite hiatus

----- apparent conformable contact

--?-- inadequate information

Data source: Taylor files

Interpreted by: David Taylor

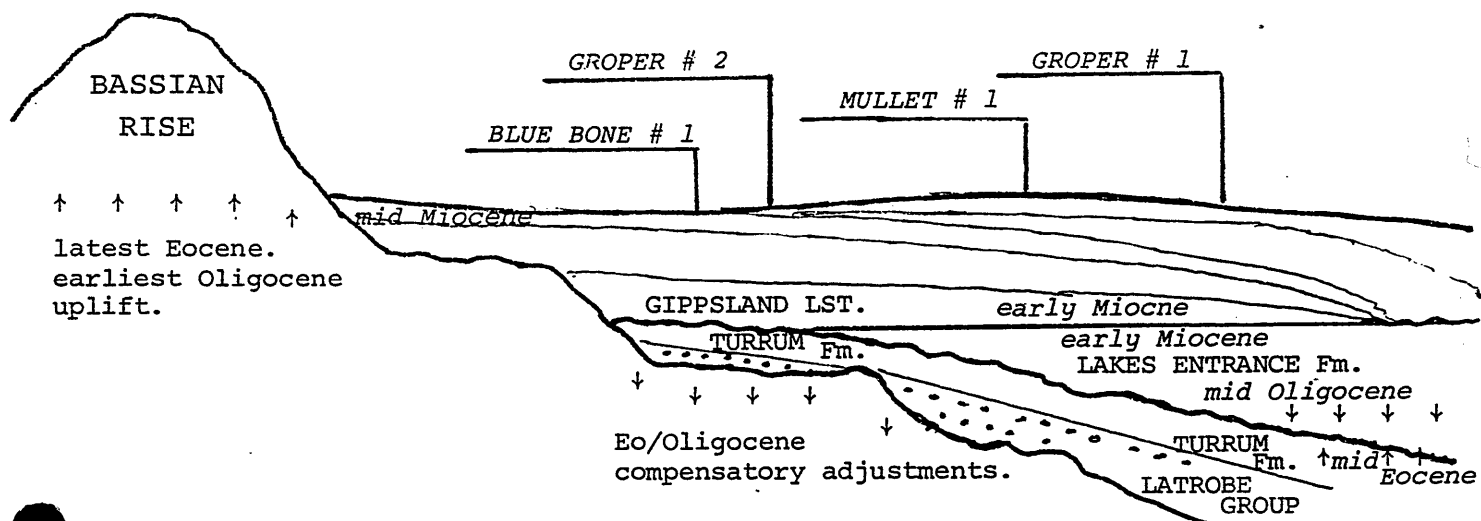
GROPER # 2

| Sample
Depth
m | ZONE &
fossil type | AGE | STRAT-UNIT
& FACIES | LITHOLOGY etc. |
|----------------------|------------------------|---------------|------------------------|----------------------|
| 750(CC) | H-1 (forams) | EARLY MIOCENE | GIPPSLAND LST. | bryozoal calcarenite |
| 760.7(SWC) ? | | | ? TURRUM FORMATION | glauconitic qtz |
| 762.5(SWC) | litho-correlation only | | lagoonal/estuarine | sandy mdst |

CC = conventional core
 SWC = sidewall core
 ~~~ = definite hiatus

FOSSIL TYPE (forams) = planktonic foraminifera

Data Source: Taylor files  
 Interpreted by: David Taylor,  
 July, 1983.



SCHEMATIC MODEL of TRANSGRESSIVE ONLAP after TECTONIC  
 ADJUSTMENT on WESTERN MARGIN - GIPPSLAND BASIN.

David Taylor  
 July, 1983.

GURNARD # 1

| Sample*<br>Depth<br>m | ZONE &<br>fossil type          | AGE              | STRAT-UNIT<br>& FACIES         | LITHOLOGY etc.                  |
|-----------------------|--------------------------------|------------------|--------------------------------|---------------------------------|
| 2074.0                | H-1 (forams)                   | EARLY MIOCENE    | TASMAN<br>SEA                  | biogenic micrites<br>with oozes |
| 2104.5                | H-2 (forams)                   | LATEST OLIGOCENE | CARBONATES                     | at base                         |
| 2135.0                | I-1 (forams)                   |                  |                                |                                 |
| 2150.25               | J-2 (forams)                   | EARLY OLIGOCENE  | LAKES ENTRANCE<br>MARLS - deep | calcareous<br>claystones        |
| 2180.75               |                                |                  | water equivalent               |                                 |
| ? (RC)                | K (forams)                     | LATE EOCENE      | COLQUHOUN FM.<br>Littoral      | "greensand"                     |
| 2196.0                | N (forams)<br>N. asperus (S/P) | MID EOCENE       | GURNARD FM.<br>Estuarine       | "greensand"                     |

\* all depths cited were sidewall cores unless  
otherwise stated.

FOSSIL TYPE (forams) = planktonic foraminifera

----- apparent conformable contact

(S/P) = spore/pollen

~~~~~ definite hiatus

Data source: Taylor files

Interpreted by: David Taylor,
July 1983.

KINGFISH # 7

| Sample
Depth
m | Zone &
fossil types | AGE | STRAT-UNIT
& FACIES | LITHOLOGY etc. |
|---------------------------|------------------------|--------------------------------------|--------------------------------------------------------------|-------------------------------------------------------|
| 2213.0
to
2237.5 | H-2
(forams) | LATE
OLIGOCENE | TASMAN SEA
CARBONATES
& OZES | biomicrites |
| 2243.7
to
2249.7 | I-1
(forams) | | (continental
rise) | |
| 2252.7
2260.0 | J-2
(forams) | EARLY
OLIGOCENE | LAKES ENTRANCE equivalent
Deep water
Continental slope | calc siltst &
micrites recrystall-
ised at base |
| 2261.6 | K
(forams) | LATE
EOCENE | COLQUHOUN FORMATION
lagoonal/estuarine | "greensand" |
| 2263.1
2267.7
?2280 | Pre K
(forams) | ? LATE but
probably
MID EOCENE | GURNARD FORMATION | glauc &
limonitic qtz
sands |

All samples were sidewall cores

FOSSIL TYPE (forams) = planktonic foraminifera

(S/P) = spore/pollen

(dino) = dinoflagellates

~?~ possible hiatus

●~ definite hiatus

- - - apparent conformable contact

Data source: Taylor files

Interpreted by: David Taylor
July 1983

| BASIN GIPPSLAND | SECTION MORAY # 1 | STATE VICTORIA |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Depth: 5330-5400' (1641m)</p> <p>Sample: R.C.</p> <p>Zone: J-2</p> <p>Lith: forams calc qtz
sdst</p> <p>Other fauna:</p> <p>Count:</p> <p>% Planks:</p> <p>Environment:
shallow shelf platform</p> <p>Comments:
HEAVY CONTAMINATION also
noted in SWC's at and
below this level.</p> | <p>Planktonics:</p> <p><i>G'ina angiporoides</i> (S.S.)
<i>G'ina brevis</i>
<i>G'ina tripartita</i></p> <p>plus heavy downhole
contamination.</p> <p>Dominance of:</p> | <p>Benthonics:</p> <p>Jan Juk fauna plus</p> <p><i>Vulvulina granulosa</i> sp.
<i>Ammosphaeroidina</i>
<i>Haeuslerella</i> sp.</p> <p>Dominance of:</p> |

ADDITIONAL FORAMINIFERAL DATA by DAVID TAYLOR (July, 1983)

| BASIN GIPPSLAND | SECTION MORAY # 1 | STATE VICTORIA |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| <p>Depth: 5480-90' (1671.4m)</p> <p>Sample: R.C.</p> <p>Zone: ZONE N - Mid Eocene</p> <p>Lith: lime m-c frosted
and fractured qtz. A-pellet
limonite after glauc.
A pyrite.</p> <p>Other fauna:</p> <p>Count:</p> <p>% Planks:</p> <p>Environment:
GURNARD FORMATION</p> <p>Comments:
HEAVY CONTAMINATION</p> | <p>Planktonics: Orange Stained</p> <p><i>G'ina linaperta</i>
<i>G'ina primitiva</i>
<i>G'ina angiporoides minima</i></p> <p>plus</p> <p>heavy downhole contamination</p> <p>Dominance of:</p> | <p>Benthonics:</p> <p>heavy downhole contamination</p> <p>Dominance of:</p> |

MULLET # 1

| Sample*
Depth
m | ZONE &
fossil type | AGE | STRAT-UNIT
& FACIES | LITHOLOGY etc |
|-------------------------------------------------------|---------------------------|---------------|-----------------------------------------------|------------------------------------|
| 426.7 | F | EARLY MIOCENE | | |
| ----- ? ----- ? ----- ? ----- ? ----- ? ----- ? ----- | | | | |
| 470.3
to
679.2 | non diagnostic | | GIPPSLAND LIMESTONE
strand line | |
| ----- ? ----- ? ----- ? ----- ? ----- ? ----- ? ----- | | | | |
| 684.1
to
687.2 | J-1 (forams) | MID OLIGOCENE | COLQUHOUN FORMATION
Lagoonal &
littoral | glaucinite,
qtz, calc
mdsts. |
| ~~~~~ | | | | |
| 689.6
702.7
703.3 | K (forams)
or
Pre K | LATE EOCENE | ? TURRUM
FORMATION | glaucinitic
qtz sdsts. |

REFER GROPER # 2 sheet for Schematic Model of Transgressive Onlap on Western Margin.

FOSSIL TYPE (forams) = planktonic foraminifera

* all samples cited were sidewall cores.

----- ? ----- inadequate information

~~~~~ definite hiatus

Data source: Taylor files

Interpreted by: David Taylor  
July 1983.

NANNYGAI # 1

| <i>Sample*</i><br>Depth<br>m                          | <i>ZONE &amp;<br/>fossil type</i> | <i>AGE</i>    | <i>STRAT-UNIT<br/>&amp; FACIES</i> | <i>LITHOLOGY etc.</i>   |
|-------------------------------------------------------|-----------------------------------|---------------|------------------------------------|-------------------------|
| 2079.0                                                | H-1                               | EARLY MIOCENE | TASMAN                             | biogenic                |
| -----                                                 |                                   |               |                                    |                         |
| 2104.5                                                | H-2                               | LATEST        | SEA                                | micrites                |
| 2135.0                                                |                                   | OLIGOCENE     | CARBONATES                         | with oozes              |
| &<br>2156.4                                           | I-1 (forams)                      |               |                                    |                         |
| ~~~~~                                                 |                                   |               |                                    |                         |
| 2162.5                                                | J-2 (forams)                      | EARLIEST      | LAKES ENTRANCE                     | calcareous              |
| 2192.9                                                |                                   | OLIGOCENE     | MARLS. Deep<br>water equivalents   | claystones              |
| -----                                                 |                                   |               |                                    |                         |
| 2199.0                                                | K (forams)                        | LATE EOCENE   | COLQUHOUN FM.<br>Littoral          | greensand               |
| ----- ? ----- ? ----- ? ----- ? ----- ? ----- ? ----- |                                   |               |                                    |                         |
| 2205<br>to<br>2216.75                                 | No paleo<br><br>LITHO-ONLY        | <br><br>?     | ? GURNARD<br>FORMATION             | "oxidised<br>greensand" |

\* All samples cited were sidewall cores

FOSSIL TYPE (forams) = planktonic foraminifera

----- apparent conformable contact

--?--- inadequate information

~~~~~ definite hiatus

Data source: Taylor files

Interpreted by: David Taylor
July 1983

PERCH # 1

| <i>E-log
Pick
m</i> | <i>Sample*
Depth
m</i> | <i>ZONE &
fossil type</i> | <i>AGE</i> | <i>STRAT-UNIT
& FACIES</i> | <i>LITHOLOGY</i> |
|-----------------------------|--------------------------------|-----------------------------------|-----------------------------|----------------------------------------------------------------------|----------------------------|
| | 1034 | <i>H(forams)</i> | EARLY
MIOCENE | <i>GIPPSLAND LST
shallow shelf</i> | bryozoal calcarenite |
| | 1095 | <i>I(forams)</i> | LATE to
MID
OLIGOCENE | <i>LAKES ENTRANCE MARL
shallow shelf
COLQUHOUN FORMATION</i> | qtz sandy excl.
siltst. |
| | 1128.5 | | | <i>Lagoonal/estuarine</i> | Greensand |
| | 1131.5 (R.C.) | | LATE | ?TURRUM
FORMATION | limonitic sdst. |
| | 1143.75 | <i>Pre K(forams)</i> | to | | |
| | 1161.43 | | MID EOCENE | <i>estuarine</i> | |
| | 1195.6 | <i>N.asperus (S/P)</i> | | | |
| | (R.C.) | | | | |
| | 1372.5 (R.C.) | ? <i>L. balmei</i> | | | |
| | to | <i>(S/P)</i> | PALEOCENE | <i>non-marine</i> | |
| | 1381.6 (R.C.) | | | | |

* Sidewall cores unless suffix (R.C.) indicating rotary cuttings.

~~~~~ definite hiatus  
 ----- apparent conformable contact  
 ----- ? ----- contact relationship not known

FOSSIL TYPE (foram) = planktonic  
 foraminifera  
 (S/P) = spore/pollen  
 (dino) = dinoflagellates

Data source: Taylor files plus additional  
 palynology on cuttings by  
 Helene Martin.  
 Micropaleontology on cuttings  
 by David Taylor.

Interpreted by: *David Taylor*  
 July, 1983.

For additional sample results see attached sheets



| BASIN GIPPSLAND                                                                                                                                                                                                                                                                                               | SECTION PERCH # 1                                                                                                                                                                                                                                                                            | STATE VICTORIA                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Depth: 3670-80 (1119.4m)<br>Sample: R.C.<br>Zone: J-1(3)<br>Lith: 40% f ang orange qtz<br>sdst (slightly calc)<br>50% pellet glauc<br>10% c ang qtz<br>Other fauna:<br>A - bryo.<br>Count: ? 1000<br>% Planks: ? 30%<br>Environment:<br>shallow shelf<br>Comments:<br>COLQUHOUN FORMATION<br>GREENSAND Member | Planktonics:<br><br><i>G'ina angiporoides</i> (S.S.)<br><i>G'ina tripartita</i><br><i>G'ina euapertura</i><br><i>G'ina praebulloides</i><br><i>G'alia nana</i><br><i>G'alia opima</i><br><i>G'alia extans</i><br><i>G'alia munda</i><br><br>plus downhole contamination<br><br>Dominance of: | Benthonics: .<br><br><i>Cib. novozealandica</i><br><i>Cib. perforatus</i><br><i>Gry. zealandica</i><br><i>Gaud. convexa</i><br><i>Quin. singletoni</i><br><br>plus<br>typical JAN JUKIAN<br>Assemblage<br><br>Dominance of: |

ADDITIONAL FORAMINIFERA DATA by DAVID TAYLOR (july, 1983)

| BASINGIPPSLAND                                                                                                                                                                                                                                                                                                      | SECTION PERCH # 1                                                                                                                                                                   | STATE VICTORIA                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Depth: 3700-10 (to 1131.5m)<br>Sample: R.C.<br>Zone: Late to Mid Eocene<br>Lith: lim c-m ang qtz sdst<br>py - A<br>plus downhole contamination<br><br>Other fauna:<br>bryo - A<br>Count: ?<br>% Planks: ?<br>Environment: shallow warm<br>continual shelf platform<br>- intertidal<br>Comments:<br>TURRUM FORMATION | Planktonics: ORANGE STAINED<br><br><i>G'ina linaperta</i><br><i>G'ina angiporoides</i> (S.S.)<br><i>G'alia centralis</i><br><br>plus<br>downhole contamination<br><br>Dominance of: | Benthonics: Orange coated<br><br><br><i>Anom. aotea</i><br><i>Amphistegina</i> sp.<br><i>Gyroid. zealandica</i><br><br>plus white specimens<br>from further uphole<br><br>Dominance of: |

## PIKE # 1

| E-log<br>Pick<br>m | Sample*<br>Depth<br>m | ZONE &<br>fossil type | AGE                 | STRAT-UNIT<br>& FACIES                           | LITHOLOGY etc.                                   |
|--------------------|-----------------------|-----------------------|---------------------|--------------------------------------------------|--------------------------------------------------|
|                    | 1805.6                | H-1(forams)           | EARLY<br>MIOCENE    | TASMAN SEA<br>CARBONATES                         | biogenic micrites &<br>globigerinid ooze at base |
| 1810               | ~~~~~                 | ~~~~~                 | ~~~~~               | ~~~~~                                            | ~~~~~                                            |
|                    | 1810.5                | J-2(forams)           | EARLY               | LAKES ENTRANCE MARL                              | calcareous clayst.                               |
|                    | 1817.8                |                       | OLIGOCENE           | deep water equiv.                                | extreme diagen alteration                        |
|                    | 1828.8                |                       |                     |                                                  |                                                  |
| -----              |                       |                       |                     |                                                  |                                                  |
|                    | 1829.4                | K(forams)             | LATE EOCENE         | COLQUHOUN FORMATION                              | "greensand"                                      |
| 1830               | ----                  | ?                     | ?                   | ?                                                | ?                                                |
|                    | 1847.7                | NO DATA               |                     |                                                  |                                                  |
| 1968               | ----                  | ?                     | ?                   | ?                                                | ?                                                |
|                    | 1988 to               | N(forams)Lower        | MID EOCENE          | GURNARD FORMATION                                | limonitic qtz sands &                            |
|                    | 2007<br>(RC)          | N.asperus (S/P)       |                     | - Intertidal                                     | silts. N.B. oxidised                             |
|                    | 2007 to               | P.asperopolus-        |                     |                                                  | green sdst in SWC at                             |
|                    | 2031<br>(RC)          | M. diversus(S/P)      | MID-EARLY<br>EOCENE | non marine with<br>marine ingression at<br>2025. | 1969                                             |

~~~~~ definite hiatus

FOSSIL TYPE (foram)=planktonic
foraminifera

----- apparent conformable contact

(S/P)=spore/pollen

---- ? ---- ? ---- ? inadequate information

(dino)=dinoflagellates

*sidewall cores unless suffix (R.C.)
indicating Rotary Cuttings.

Data source: Taylor files plus additional
palynology on cuttings by
Helene Martin.
Micropaleontology on cuttings
by David Taylor.

Interpreted by: David Taylor
July, 1983.

For additional sample results see attached sheets.

FORMATION INTERVAL TESTING

Test # 1 9660'

1. Tool open to chamber 40 minutes @ estimated pressure of 4-500 psi.
2. After 40 minutes attempted to close off chamber and fill segregator. Charge caused loss of seal - POH.
3. Recovery - no sample pressure
 approximately 50 cc fluid with dull green fluorescence probably due to contamination.

Test # 2 9596'

1. Tool open to chamber 50 minutes @ estimated pressure of 800 psi.
2. Tool open to segregator 25 minutes.
3. Tool shut-in 15 minutes.
 - a) after 5 minutes pressure build-up to estimated 4500 psi.
4. Recovery - no sample pressure
 - 350 cc fluid from chamber
 - 520 cc fluid from segregator.
 - a) sample from chamber had same dull green fluorescence as in Test # 1.
 - b) sample from segregator had pale yellow even fluorescence
 - c) both samples had definite hydrocarbon odour.
 - d) wearing blender test results from segregator sample:

| |
|-------------|
| 7000 ppm C1 |
| 900 ppm C2 |
| 200 ppm C3 |

Films:

Both films destroyed during developing.

Resistivity calculations:

Rmf @ 60° F = 0.98 Rw @ 60° F = 0.3

Test # 1

R (sample) @ 60° F = 0.8

Test # 2

R (Segregator sample) @ 60° F = 0.77

R (chamber sample) @ 60° F = 0.8

ORGANIC ANALYSIS REPORT

GURNARD No.1
VITRINITE REFLECTANCE, DISPERSED ORGANIC
MATTER DESCRIPTIONS AND TOTAL ORGANIC
CARBON ANALYSES

Australian Aquitaine Petroleum Pty. Ltd

F3/422/0-3420/83

December 1982



The Australian
Mineral Development
Laboratories

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

Please address all
correspondence to
P.O. Box 114 Eastwood
SA 5063
In reply quote:

amdel

20 December 1982

F3/422/0
3420/83 - Final

Australian Aquitaine Petroleum Pty. Ltd.,
Elf Aquitaine Centre,
99 Mount Street,
NORTH SYDNEY NSW 2060

Attention: Dr F. Brophy

REPORT F3420/83 - Final

| | |
|-----------------|------------------------------------------------------------------------------------------------------|
| YOUR REFERENCE: | 5471 KL:bf |
| MATERIAL: | Seven cutting samples |
| LOCALITY: | GURNARD No.1 |
| IDENTIFICATION: | As marked |
| DATE RECEIVED: | 9 December 1982 |
| WORK REQUIRED: | Vitrinite reflectance, dispersed
organic matter descriptions and
total organic carbon analyses |

Investigation and Report by: Brian Watson

Chief - Fuel Section: Dr Brian G. Steveson
Manager, Mineral and Materials Sciences Division: Dr William G. Spence

for Norton Jackson
Managing Director

cah

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1. INTRODUCTION

Seven cuttings samples from Gurnard No.1 were forwarded from Australia: Aquitaine Petroleum Pty. Limited for organic analyses. This report contains vitrinite reflectance determinations, descriptions of dispersed organic matter and total organic carbon analyses.

2. EXPERIMENTAL METHODS

A representative portion of each sample was separated using a sample splitter and mounted in cold setting astic resin in a 2.5 cm round mold. This block was ground flat using diamond impregnated laps and carborundum papers. The surface was then polished with aluminium oxide and finally with magnesium oxide.

Reflectance measurements were taken using a Leitz MPV1.1 micro-photometer fitted to a Leitz Ortholux microscope and calibrated against synthetic standards. All measurements were taken in oil immersion ($n = 1.518$) using incident monochromatic light with a wavelength of 546 nm at a temperature of $23 \pm 1^\circ\text{C}$. Fluorescence observations were made using the same microscope utilizing a 3 mm BG3 excitation filter, a TK400 Dichroic mirror and a K510 suppression filter. The mean maximum reflectance measurements taken on vitrinite are listed below.

3. REFLECTANCE MEASUREMENTS

| Depth
ft | Mean Maximum
Reflectance
(%) | Standard
Deviation | Range | Number of
Measurements |
|------------------------------|------------------------------------|-----------------------|-----------|---------------------------|
| 2240 - 2242
7350-7360 | 0.49 | 0.04 | 0.44-0.53 | 3 |
| 2353 2356
7720-7730 | 0.49 | 0.04 | 0.42-0.62 | 35 |
| 2535.3 - 2538.9
8320-8330 | 0.49 | 0.05 | 0.41-0.60 | 34 |
| 2670 - 2651.7
8760-8700 | 0.52 | 0.05 | 0.43-0.63 | 36 |
| 2758 2761
9050-9060 | 0.53 | 0.05 | 0.45-0.61 | 33 |
| 2918.9 - 2923
9580-9590 | 0.52 | 0.04 | 0.46-0.62 | 32 |
| 2959.6 - 2962.6
9710-9720 | 0.55 | 0.05 | 0.47-0.65 | 36 |

4. DISPERSED ORGANIC MATTER DESCRIPTIONS

Sample 1: Depth 7350-7360 ft

Organic matter is absent from the majority of these cuttings which consist of sandstone fragments. Siltstone occupies approximately 20-30% of the sample and generally contains rare dispersed organic matter. In this siltstone inertinite is much more abundant than vitrinite which is slightly more abundant than exinite. Organic matter is absent from approximately one-third of this siltstone.

Exinite is present in trace amounts in this sample. Cutinite (moderate yellow fluorescence) is the only exinite maceral present.

Sample 2: Depth ^{2380 2386} 7720-7730 ft

This sample consists chiefly of siltstone. Organic matter is rare or absent from these grains but where present, inertinite is more abundant than vitrinite which is slightly more abundant than exinite. Coal grains occupy approximately 15-20% of the sample. The majority of these coals are duroclarites. However, vitrites occupy approximately 5% of the sample. Carbonaceous shale grains also occupy approximately 5% of the sample and contain abundant organic matter. In these shales vitrinite is more abundant than exinite which is more abundant than inertinite.

Exinite is common in this sample and is present in the coals, carbonaceous shale and siltstone. The exinite macerals present in order of abundance are resinite (bright yellow to bright yellow-green and moderate orange fluorescence), sporinite (bright yellow and moderate yellow fluorescence), cutinite (moderate to dull orange fluorescence), liptodetrinite (moderate orange fluorescence), telalginite (bright yellow-green to bright yellow fluorescence) and suberinite (moderate to dull orange fluorescence). Resinite is common in these cuttings. Sporinite and cutinite are sparse and are slightly more abundant than liptodetrinite. Telalginite and suberinite are rare in the cuttings.

Sample 3: Depth 8320-8330 ft

The majority of these cuttings are coal grains. These coals are largely duroclarites. However, a few clarodurite grains are also present. Siltstone grains occupy 20-30% of the sample. Organic matter is rare or absent from these grains. Carbonaceous shale grains occupy 10-15% of the sample and contain abundant organic matter. In these grains vitrinite is more abundant than exinite which is slightly more abundant than inertinite. Organic matter is absent from sandstone grains which occupy 5-10% of the sample.

Exinite is sparse in this sample and is present mostly in the coal and carbonaceous shales. The exinite macerals present in order of abundance are resinite (bright green to bright yellow and bright orange fluorescence), sporinite (moderate yellow to moderate orange fluorescence), cutinite (moderate yellow to moderate orange fluorescence), liptodetrinite (moderate yellow to moderate orange fluorescence), suberinite (no fluorescence) and ?dinoflagellate/acritarchs (bright yellow fluorescence). Resinite and sporinite are sparse in this sample whereas cutinite and liptodetrinite are rare. Suberinite is very rare and ?dinoflagellate/acritarchs are present in trace amounts.

Sample 4: Depth 8760-8700 ft

This sample consists chiefly of siltstone. Organic matter is rare or absent from these grains and where present consists largely of inertinite. Carbonaceous shale grains occupy approximately 10-15% of the sample. In these grains vitrinite is more abundant than inertinite which is more abundant than exinite. Coal grains occupy 5-10% of the sample and consists entirely of duroclarites.

Exinite is sparse in this sample but is common in the coals. The exinite macerals present in order of abundance are resinite (bright yellow to bright orange and moderate yellow fluorescence), sporinite (bright yellow and moderate yellow to moderate orange fluorescence), cutinite (bright yellow and moderate yellow to moderate orange fluorescence) and suberinite (dull orange fluorescence and no fluorescence). Resinite and sporinite are sparse in the sample whereas cutinite and suberinite are rare.

Sample 5: Depth 9050-9060 ft

The majority of these cuttings again consist of siltstone. Organic matter is rare in this siltstone and inertinite is more abundant than vitrinite which is more abundant than exinite. Coal grains occupy approximately 40-50% of the sample and consist entirely of duroclarites. Carbonaceous shale grains occupy 10-15% of the sample volume and contain abundant organic matter. In these grains vitrinite is more abundant than inertinite which is slightly more abundant than exinite.

Exinite is sparse in this sample and is common to abundant in the duroclarites. The exinite macerals present in order of abundance are sporinite (moderate yellow fluorescence), cutinite (moderate yellow fluorescence), resinite (bright yellow and moderate orange fluorescence), suberinite (dull orange fluorescence and no fluorescence), bitumen (moderate to dull orange fluorescence) and fluorinite (bright green and bright yellow fluorescence). Sporinite is sparse in the sample whereas cutinite, resinite, suberinite and bitumen are rare. Fluorinite is very rare in this sample.

Sample 6: Depth 9580-9590 ft

The majority of these cuttings are carbonaceous shales and contain abundant organic matter. In these carbonaceous shales vitritinite is more abundant than exinite which is more abundant than inertinite. Siltstone grains occupy 30-40% of the sample. Organic matter is rare or absent from these grains and where present consist almost entirely of inertinite. Coal grains occupy approximately 10-20% of this sample and again consist largely of duroclarites. However, a few clarodurite grains are present in this sample.

Exinite is sparse to common in these cuttings and is abundant in the coals and carbonaceous shales. The exinite macerals present in order of abundance are sporinite (moderate yellow to moderate orange fluorescence), resinite (bright yellow fluorescence), bitumen (moderate yellow and dull orange to dull brown fluorescence), liptodetrinite (moderate yellow to moderate orange fluorescence), cutinite (moderate orange fluorescence) and suberinite (dull orange fluorescence and no fluorescence). Sporinite, resinite and bitumen are sparse in the sample and are slightly more abundant than liptodetrinite. Cutinite is rare and suberinite is present in trace amounts.

Sample 7: Depth 9710-9720 ft

The majority of these cuttings consist of siltstone. Organic matter is generally rare or absent from this siltstone. Where organic matter is rare in the siltstones it consists almost entirely of inertinite. Organic matter is abundant in approximately 10-20% of these siltstone. In these grains inertinite is more abundant than vitritinite which is slightly more abundant than exinite. Carbonaceous shale grains occupy approximately 10-15% of the sample and again contain abundant organic matter. In these grains vitritinite is more abundant than exinite which is slightly more abundant than inertinite. Coal grains occupy 5-10% of the sample and consist largely of duroclarites. However, a few microite grains are also present in this sample. The inertinite in these grains is only slightly higher reflecting than the vitritinite in the duroclarite grains.

Exinite is sparse to common in this sample and is again abundant in the duroclarite and carbonaceous shale grains. The exinite macerals present in order of abundance are sporinite (moderate yellow to moderate orange fluorescence), cutinite (moderate yellow to moderate orange fluorescence), resinite (bright yellow fluorescence), suberinite (dull orange to dull brown fluorescence), bitumen (moderate orange fluorescence), telalginite (bright yellow fluorescence) and fluorinite (bright yellow fluorescence). Sporinite and cutinite are sparse in the sample whereas resinite, suberinite and bitumen are rare. Telalginite and fluorinite are present in trace amounts.

5. DISCUSSION

Table 1 illustrates the relative abundances of the maceral groups in each of the samples. The table also shows the total organic carbon values, the abundance of exinite and the types of exinites present in each sample. Reflectance data presented in histogram form follows Table 1.

= ~ base Eocene Laticol

The reflectance data indicates that the sequence is mature below approximately 8250 ft. Significant quantities of oil may be generated from the resinite and suberinite rich samples in the sequence. The samples studied have moderate to high source rock potentials excepting sample 1 from 7350-7360 ft in which exinite is present in trace amounts. Fluorinite in samples 5, 6 and 7 indicates that oil is being generated from these samples. This oil is probably largely derived from the resinite and suberinite in these samples as the main generation range for these macerals is 0.5-0.8% R_v max. The main generation range for sporinite and cutinite is 0.7-0.9% R_v max. Therefore these macerals may generate significant quantities of hydrocarbons at greater depths.

In conclusion, these samples generally have a moderate to high source rock potential. Fluorinite in the samples below 9000 ft indicates that oil has been generated from these beds. However, the sequence below 10,000 ft probably also has high source rock potential.

TABLE 1: ORGANIC MATTER TYPE AND ABUNDANCE

| Depth
Ft | Relative Maceral
Group Volumes | Total Organic
Carbon (%) | Estimated
Volume
of Exinite | Exinite Macerals |
|-------------|--------------------------------------|-----------------------------|-----------------------------------|--------------------------------------------------|
| 7350-7360 | I > V ≥ E | 0.30 | tr | cut |
| 7720-7730 | *V > I > E
V > E > I | 10.9 | co | res, sp, cut, lipto,
tela, sub, |
| 8320-8330 | *V > I > E
V > E ≥ I | 11.9 | spa | res, sp, cut, lipto,
sub, ?D/A. |
| 8760-8770 | *V > I > E
V > I > E | 2.96 | spa | res, sp, cut, sub. |
| 9050-9060 | *V > I > E
V > I ≥ E
I > V > E | 16.5 | spa | sp, cut, res, sub,
bmen, <u>fluor</u> , |
| 9380-9590 | V > I > E
V > E > I | 5.90 | spa-co | res, sp, bmen, lipto,
cut, <u>fluor</u> . |
| 9710-9720 | V > I > E
V > E ≥ I
I > V ≥ E | 4.5 | spa-co | sp, cut, res, sub,
bmen, tela, <u>fluor</u> . |

Key

| | |
|-------|---------------------------|
| V | Vitrinite |
| I | Inertinite |
| E | Exinite |
| sp | Sporinite |
| res | Resinite |
| cut | Cutinite |
| D/A | Dinoflagellate/Acristarch |
| lipto | Liptodetrinite |
| bmen | Bitumen |
| tela | Telalginite |
| sub | Suberinite |
| fluor | Fluorinite |
| * | coal grains |
| tr | trace |
| co | common |
| spa | sparse |

GURNARD NO. 1

7350-7360 FT

SORTED LIST

.44 .49 .53

Number of values = 3

MEAN OF VALUES .487

STD DEVIATION .037

HISTOGRAM OF RESULTS

Values are reflectance multiplied by 100

| | |
|----|---|
| 44 | * |
| 45 | |
| 46 | |
| 47 | |
| 48 | |
| 49 | * |
| 50 | |
| 51 | |
| 52 | |
| 53 | * |

GURNARD NO. 1

7720-7730 FT

SORTED LIST

.42 .44 .45 .45 .45 .45 .45 .46 .46 .46 .46 .47 .47 .47 .47 .47
.48 .48 .48 .49 .49 .49 .49 .5 .5 .5 .51 .51 .52 .52 .53 .54 .
.56 .62

Number of values = 35

MEAN OF VALUES .487

STANDARD DEVIATION .039

HISTOGRAM OF RESULTS

Values are reflectance multiplied by 100

| | |
|----|-------|
| 42 | * |
| 43 | |
| 44 | * |
| 45 | ***** |
| 46 | ***** |
| 47 | ***** |
| 48 | ***** |
| 49 | ***** |
| 50 | ***** |
| 51 | ** |
| 52 | ** |
| 53 | * |
| 54 | ** |
| 55 | |
| 56 | * |
| 57 | |
| 58 | |
| 59 | |
| 60 | |
| 61 | |
| 62 | * |

GURNARD NO. 1

8320-8330 FT

SORTED LIST

.41 .41 .42 .43 .44 .44 .44 .45 .45 .46 .46 .46 .47 .48 .48 .49
.49 .49 .5 .5 .51 .51 .51 .52 .52 .52 .53 .53 .54 .54 .54 .55
.55 .6
Number of values = 34

MEAN OF VALUES .489
STD DEVIATION .045

HISTOGRAM OF RESULTS

Values are reflectance multiplied by 100

| | |
|----|-----|
| 41 | ** |
| 42 | * |
| 43 | * |
| 44 | *** |
| 45 | ** |
| 46 | *** |
| 47 | * |
| 48 | ** |
| 49 | *** |
| 50 | ** |
| 51 | *** |
| 52 | *** |
| 53 | ** |
| 54 | *** |
| 55 | ** |
| 56 | |
| 57 | |
| 58 | |
| 59 | |
| 60 | * |

GURNARD NO. 1

8760-8770 FT

SORTED LIST

.43 .44 .45 .45 .45 .46 .46 .47 .47 .47 .47 .48 .48 .51 .51 .5
.52 .53 .53 .54 .54 .54 .54 .55 .55 .55 .56 .56 .56 .56 .57 .5
.58 .59 .61 .63

Number of values = 36

MEAN OF VALUES .52

STANDARD DEVIATION .052

HISTOGRAM OF RESULTS

Values are reflectance multiplied by 100

| | |
|----|------|
| 43 | * |
| 44 | * |
| 45 | *** |
| 46 | *** |
| 47 | **** |
| 48 | ** |
| 49 | |
| 50 | |
| 51 | ** |
| 52 | ** |
| 53 | ** |
| 54 | **** |
| 55 | *** |
| 56 | **** |
| 57 | * |
| 58 | ** |
| 59 | * |
| 60 | |
| 61 | * |
| 62 | |
| 63 | * |

GURNARD NO. 1

9050-9060 FT

SORTED LIST

.45 .46 .46 .47 .47 .48 .48 .49 .49 .5 .51 .52 .52 .53 .53 .54
.54 .54 .54 .55 .55 .55 .56 .57 .57 .58 .58 .58 .59 .59 .59 .61
.61

Number of values = 33

MEAN OF VALUES .533

STD DEVIATION .046

HISTOGRAM OF RESULTS

Values are reflectance multiplied by 100

| | |
|----|------|
| 45 | * |
| 46 | ** |
| 47 | ** |
| 48 | ** |
| 49 | ** |
| 50 | * |
| 51 | * |
| 52 | ** |
| 53 | ** |
| 54 | **** |
| 55 | *** |
| 56 | * |
| 57 | ** |
| 58 | *** |
| 59 | *** |
| 60 | |
| 61 | ** |

GURNARD NO. 1

9580-9590 FT

SORTED LIST

.46 .46 .46 .47 .47 .47 .48 .48 .48 .48 .49 .5 .5 .5 .51 .51
.53 .53 .53 .54 .54 .54 .55 .55 .55 .55 .56 .56 .56 .6 .62
Number of values = 32

MEAN OF VALUES .517
STD DEVIATION .041

HISTOGRAM OF RESULTS

Values are reflectance multiplied by 100

| | |
|----|-------|
| 46 | *** |
| 47 | *** |
| 48 | ***** |
| 49 | * |
| 50 | *** |
| 51 | ** |
| 52 | * |
| 53 | *** |
| 54 | *** |
| 55 | ***** |
| 56 | *** |
| 57 | |
| 58 | |
| 59 | |
| 60 | * |
| 61 | |
| 62 | * |

GURNARD NO. 1

9710-9720 FT

SORTED LIST

.47 .47 .5 .5 .51 .51 .51 .51 .51 .52 .52 .52 .53 .53 .53 .53
54 .54 .55 .55 .56 .56 .56 .56 .57 .57 .58 .58 .59 .61 .62 .62
62 .63 .64 .65

Number of values = 36

MEAN OF VALUES .552
STD DEVIATION .046

HISTOGRAM OF RESULTS

Values are reflectance multiplied by 100

47 | **
48 |
49 |
50 | **
51 | *****
52 | ***
53 | *****
54 | **
55 | **
56 | *****
57 | **
58 | **
59 | *
60 |
61 | *
62 | ***
63 | *
64 | *
65 | *

PE603430

This is an enclosure indicator page.
The enclosure PE603430 is enclosed within the
container PE906104 at this location in this
document.

The enclosure PE603430 has the following characteristics:

- ITEM_BARCODE = PE603430
- CONTAINER_BARCODE = PE906104
- NAME = Grapholog Mud Log
- BASIN = GIPPSLAND
- PERMIT = VIC/P1
- TYPE = WELL
- SUBTYPE = MUD_LOG
- DESCRIPTION = Grapholog Mud Log (enclosure from Well
Summary) for Gurnard-1
- REMARKS =
- DATE_CREATED = 06/10/1969
- DATE_RECEIVED =
- W_NO = W559
- WELL_NAME = GURNARD-1
- CONTRACTOR = CORE LABORATORIES AUSTRALIA LTD
- CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

PE603431

This is an enclosure indicator page.
The enclosure PE603431 is enclosed within the
container PE906104 at this location in this
document.

The enclosure PE603431 has the following characteristics:

ITEM_BARCODE = PE603431
CONTAINER_BARCODE = PE906104
 NAME = Induction-Electrical Log
 BASIN = GIPPSLAND
 PERMIT = VIC/P1
 TYPE = WELL
 SUBTYPE = WELL_LOG
DESCRIPTION = Induction-Electrical Log (enclosure
 from Well Summary) for Gurnard-1.
REMARKS =
DATE_CREATED = 28/10/1969
DATE_RECEIVED =
 W_NO = W559
 WELL_NAME = GURNARD-1
 CONTRACTOR = SCHLUMBERGER
 CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

PE603432

This is an enclosure indicator page.
The enclosure PE603432 is enclosed within the
container PE906104 at this location in this
document.

The enclosure PE603432 has the following characteristics:

- ITEM_BARCODE = PE603432
- CONTAINER_BARCODE = PE906104
- NAME = Sonic Log-Gamma Ray
- BASIN = GIPPSLAND
- PERMIT = VIC/P1
- TYPE = WELL
- SUBTYPE = WELL_LOG
- DESCRIPTION = Borehole Compensated Sonic Log - Gamma
Ray (enclosure from Well Summary) for
Gurnard-1.
- REMARKS =
- DATE_CREATED = 28/10/1969
- DATE_RECEIVED =
- W_NO = W559
- WELL_NAME = GURNARD-1
- CONTRACTOR = SCHLUMBERGER
- CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

PE603433

This is an enclosure indicator page.
The enclosure PE603433 is enclosed within the
container PE906104 at this location in this
document.

The enclosure PE603433 has the following characteristics:

- ITEM_BARCODE = PE603433
- CONTAINER_BARCODE = PE906104
- NAME = Formation Density Log
- BASIN = GIPPSLAND
- PERMIT = VIC/P1
- TYPE = WELL
- SUBTYPE = WELL_LOG
- DESCRIPTION = Compensated Formation Density Log
(Gamma Gamma), enclosure from Well
Summary, for Gurnard-1.
- REMARKS =
- DATE_CREATED = 28/10/1969
- DATE_RECEIVED =
- W_NO = W559
- WELL_NAME = GURNARD-1
- CONTRACTOR = SCHLUMBERGER
- CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

PE603434

This is an enclosure indicator page.
The enclosure PE603434 is enclosed within the
container PE906104 at this location in this
document.

The enclosure PE603434 has the following characteristics:

ITEM_BARCODE = PE603434
CONTAINER_BARCODE = PE906104
NAME = Continuous Dipmeter
BASIN = GIPPSLAND
PERMIT = VIC/P1
TYPE = WELL
SUBTYPE = WELL_LOG
DESCRIPTION = Continuous Dipmeter (four-arm high
resolution) Log, enclosure from Well
Summary, for Gurnard-1
REMARKS =
DATE_CREATED = 28/10/1969
DATE_RECEIVED =
W_NO = W559
WELL_NAME = GURNARD-1
CONTRACTOR = SCHLUMBERGER
CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

PE906103

This is an enclosure indicator page.
The enclosure PE906103 is enclosed within the
container PE906104 at this location in this
document.

The enclosure PE906103 has the following characteristics:

ITEM_BARCODE = PE906103
CONTAINER_BARCODE = PE906104
NAME = Time-Depth Curve
BASIN = GIPPSLAND
PERMIT = VIC/P1
TYPE = WELL
SUBTYPE = VELOCITY_CHART
DESCRIPTION = Time-Depth Curve (basic data),
enclosure from Well Summary, for
Gurnard-1. Interpretative section
missing.
REMARKS =
DATE_CREATED = 02/09/1971
DATE_RECEIVED =
W_NO = W559
WELL_NAME = GURNARD-1
CONTRACTOR =
CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

PE604687

This is an enclosure indicator page.
The enclosure PE604687 is enclosed within the
container PE906104 at this location in this
document.

The enclosure PE604687 has the following characteristics:

ITEM_BARCODE = PE604687
CONTAINER_BARCODE = PE906104
 NAME = Well Completion Log
 BASIN = GIPPSLAND BASIN
 PERMIT = VIV/P1
 TYPE = WELL
 SUBTYPE = COMPLETION_LOG
DESCRIPTION = Well Completion Log (enclosure from
 Well Summary) for Gurnard-1
REMARKS =
DATE_CREATED = 3/11/69
DATE_RECEIVED =
 W_NO = W559
 WELL_NAME = GURNARD-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)