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AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

WCR

TARRA-1 W806

167 pages
6 enclosures.

AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

TARRA NO. 1

WELL COMPLETION REPORT

VIC/P17

OFFSHORE GIPPSLAND BASIN

PG/195/83

P.N.K. CHAN
AUGUST, 1983.

DISTRIBUTION

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7. * WEEKLY WELL SUMMARY

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3. PETROGRAPHY REPORT

* REPORTS & ATTACHMENTS NOT ON MICROFILM
AVAILABLE ON REQUEST.

ATTACHMENT 3 TARRA-1

		SET OF WIRELINE LOGS	BOX No. 2
RUN 1	:	ISF-SLS-GR-SP-CAL	1:200
211-1006m		LDL-GR-CAL	1:200
RUN 2	:	ISF-SLS-GR-SP-CAL	1:200
1002-2570m		LDL-CNL-GR-CAL	1:200
		HDT	1:200
		CST No. 1 and 2	
		"CYBERDIP"	
		"CLUSTER PLOT"	
		"GEODIP"	
RUN 3	:	ISF-SLS-GR-SP-CAL	1:200
2566-2904m		LDL-CNL-GR-CAL	1:200
		HDT	1:200
		CST NO. 3	
		"CYBERDIP"	
		"CLUSTER PLOT"	
		"GEODIP"	

I SUMMARY

Tarra No. 1 was spudded on 4th March 1983, and reached a total depth of 2905 KB on 3rd April, 1983 in sediments of the Early Cretaceous Strzelecki Group.

Lost circulation problems were encountered in the 17-1/2" hole section with no returns in the limestone units from the shoe at 211m to 326m. LCM pills and cement plugs were necessary to rectify the losses and drilling continued to 568m with partial losses before full returns were regained. The 13-3/8" casing was set at 1002m KB, 9-5/8" casing at 2567m KB and the well terminated at TD 2905m KB with a 8-1/2" hole section.

The Latrobe Group was penetrated from 2110m KB with the top of the coarse clastics at 2244m KB. The Group overlies the objective Early Cretaceous Strzelecki Group at 2583m KB.

No hydrocarbon indications were seen in cuttings or ditch returns and this was confirmed by logs.

The lithic sands of the Strzelecki Group were found to be of poor reservoir potential.

The well was plugged and abandoned, and rig released on 21st April, 1983.

II INTRODUCTION

Tarra No. 1 was the fourth well drilled in VIC/P17 by the operator, Australian Aquitaine Petroleum Pty. Ltd., and formed part of the first two years permit commitments.

Prior to drilling, the GA-81 seismic survey with a total of 3,536 line-km of seismic was shot; the structure and play concept of Tarra were based on the interpretation of this survey.

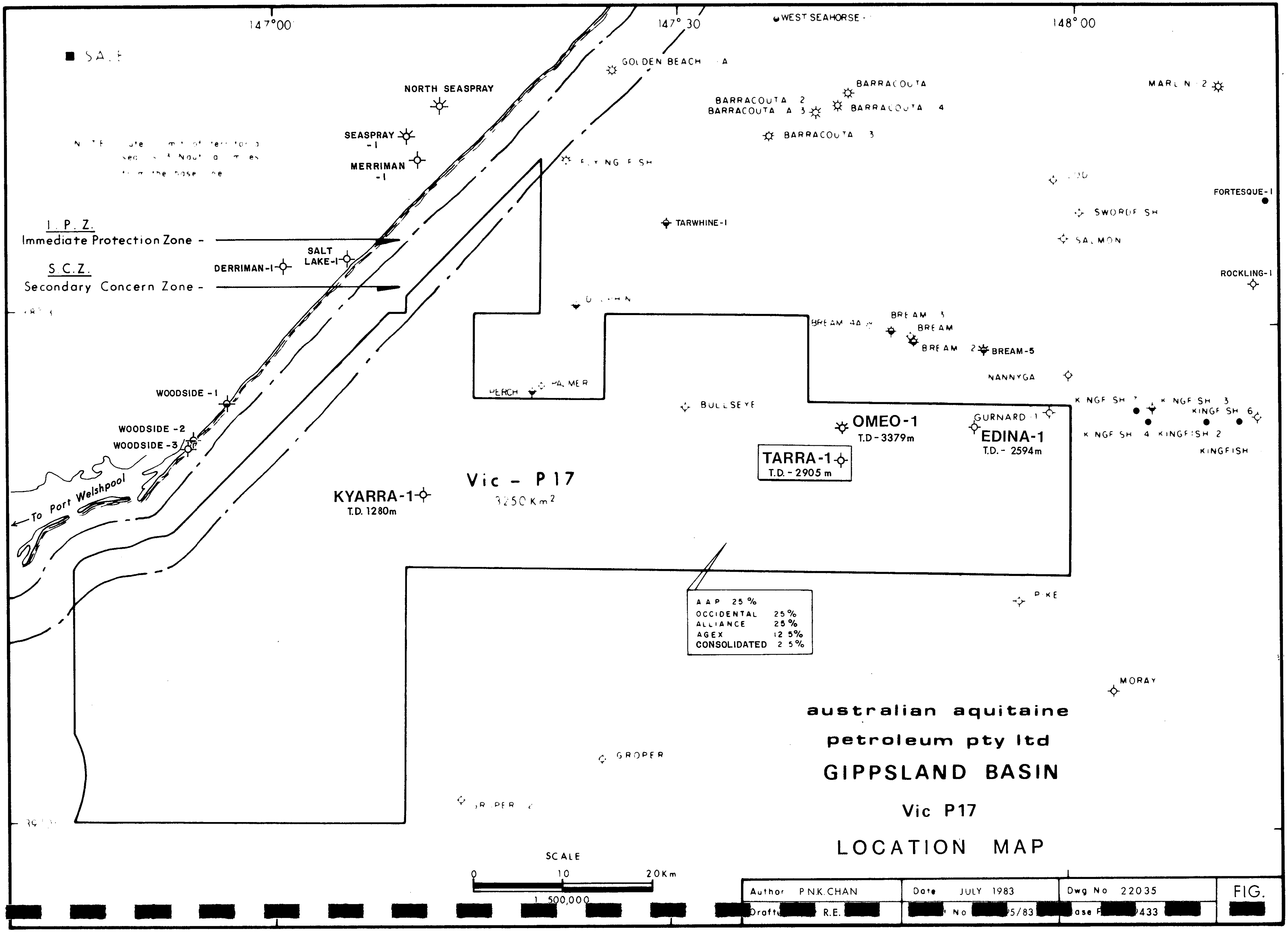
The semi-submersible "Ocean Digger" was contracted to carry out drilling operations with a supply and logistics base established in Port Welshpool by Aquitaine in association with Phillips and Shell.

The Tarra structure represents a tilted fault block of the Strzelecki sediments, with closure on the south - southwest (downthrown side) and seal updip to the north-east by a normal fault. There is no structural closure in the top Latrobe Group. Areal closure of the Strzelecki sediments below the Intra Strzelecki Green Horizon is 9.6 sq.km.

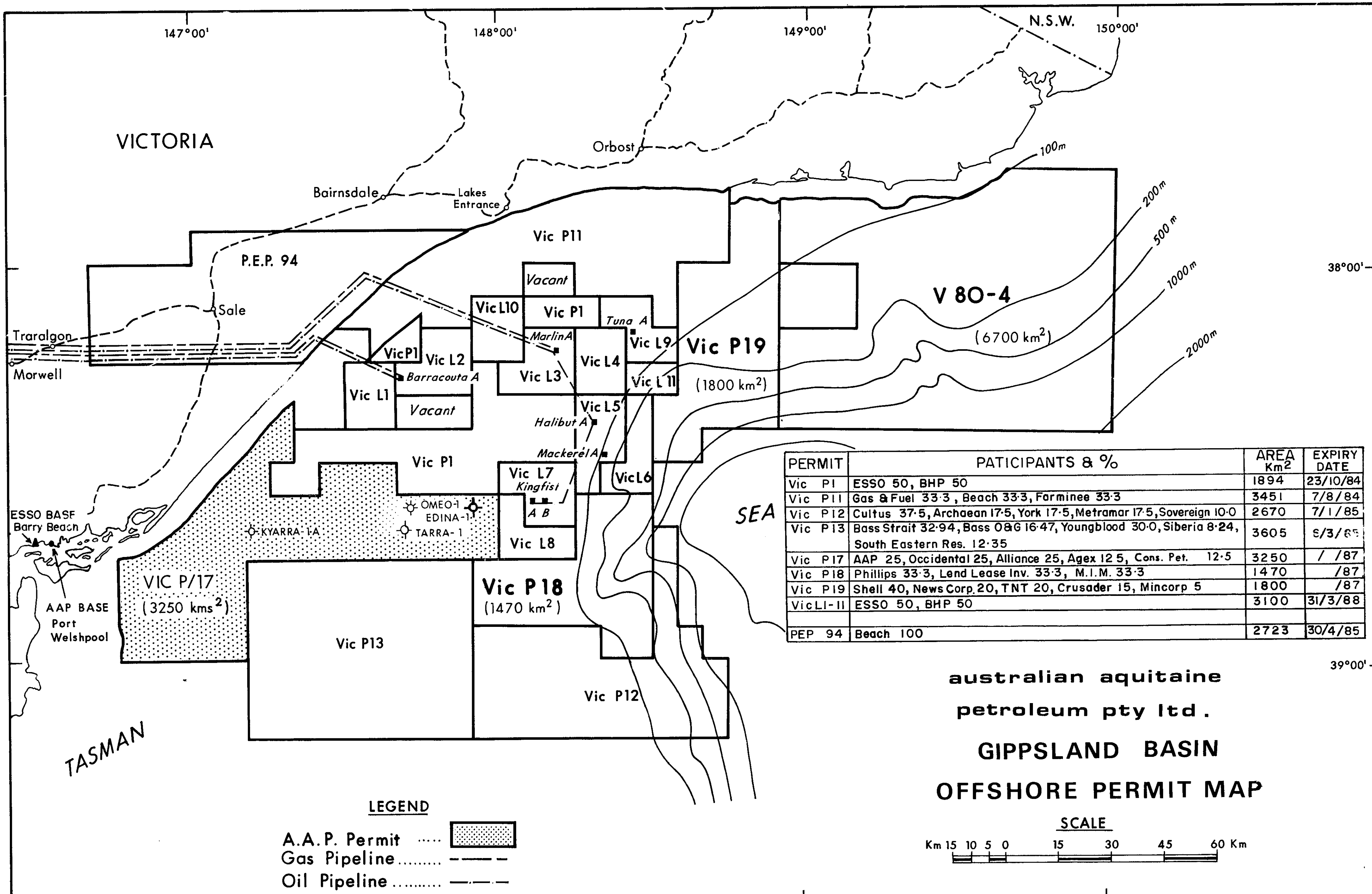
The main reason for drilling Tarra No. 1 was to explore the reservoir potential of the Strzelecki sediments in the Southern Margin. Traditionally, permeability in the Strzelecki Group has always been too low for producing hydrocarbons. It is was hoped that some changes in the composition of the source material in the southern margin, and subaerial exposure of the Strzelecki block, may have a consequent improvement in reservoir characteristics.

In the Tarra area, the normal fault which penetrates the Strzelecki sediments is anticipated to form a lateral seal after post migration, and hydrocarbons are presumed to have migrated from deeper sediments and trapped in the Strzelecki clastics.

The results of Tarra No. 1 have reinforced the concept of non-prospectivity of the Strzelecki sediments. Though the clastics are well sorted, matrix constituents and diagenesis have been highly detrimental to permeability and porosity.



147°00
147° 30
148° 00
WEST SEAHORSE
GOLDEN BEACH
NORTH SEASPRAY
SEASPRAY -1
MERRIMAN -1
BARRACOUTA
BARRACOUTA 2
BARRACOUTA A 3
BARRACOUTA 4
BARRACOUTA 3
MARLIN 2
FORTESQUE-1
SWORDFISH
SALMON
TARWHINE-I
ROCKLING-I
I. P. Z.
Immediate Protection Zone -
S. C. Z.
Secondary Concern Zone -
DERRIMAN-I
SALT LAKE-I
BREAM 3
BREAM
BREAM 2
BREAM-5
NANNYGA
PALMER
PERCH
BULLSEYE
WOODSIDE -1
WOODSIDE -2
WOODSIDE -3
OMEO-1
T.D - 3379m
GURNARD
EDINA-1
T.D. - 2594m
KINGFISH 3
KINGFISH 6
KINGFISH 4
KINGFISH 2
KINGFISH
TARRA-1
T.D. - 2905 m
To Port Welshpool
KYARRA-1
T.D. 1280m
Vic - P17
3250 Km²
AAP 25 %
OCCIDENTAL 25 %
ALLIANCE 25 %
AGEX 12 5%
CONSOLIDATED 2 5%
PIKE
MORAY
GROPER
australian aquitaine
petroleum pty ltd
GIPPSLAND BASIN
Vic P17
LOCATION MAP
SCALE
0 10 20Km
1 500,000
Author P.N.K. CHAN
Date JULY 1983
Dwg No 22035
FIG.
[redacted] R.E. [redacted] 5/83 [redacted] 433 [redacted]



PERMIT	PATICIPANTS & %	AREA Km²	EXPIRY DATE
Vic P1	ESSO 50, BHP 50	1894	23/10/84
Vic P11	Gas & Fuel 33·3, Beach 33·3, Farminee 33·3	3451	7/8/84
Vic P12	Cultus 37·5, Archaean 17·5, York 17·5, Metramar 17·5, Sovereign 10·0	2670	7/1/85
Vic P13	Bass Strait 32·94, Bass O&G 16·47, Youngblood 30·0, Siberia 8·24, South Eastern Res. 12·35	3605	8/3/85
Vic P17	AAP 25, Occidental 25, Alliance 25, Agex 12 5, Cons. Pet. 12·5	3250	/ /87
Vic P18	Phillips 33·3, Lend Lease Inv. 33·3, M.I.M. 33·3	1470	/87
Vic P19	Shell 40, News Corp. 20, TNT 20, Crusader 15, Mincorp 5	1800	/87
Vic L1-11	ESSO 50, BHP 50	3100	31/3/88
PEP 94	Beach 100	2723	30/4/85

australian aquitaine petroleum pty ltd.

GIPPSLAND BASIN OFFSHORE PERMIT MAP

SCALE

Km 15 10 5 0 15 30 45 60 Km

Author: P.N.K. CHAN	Date: JULY 1983	Dwg. No.: 22034	FIG. 2
Drafted by: R.E.	Report No.: PG 195/83	Base Plan: 19434	

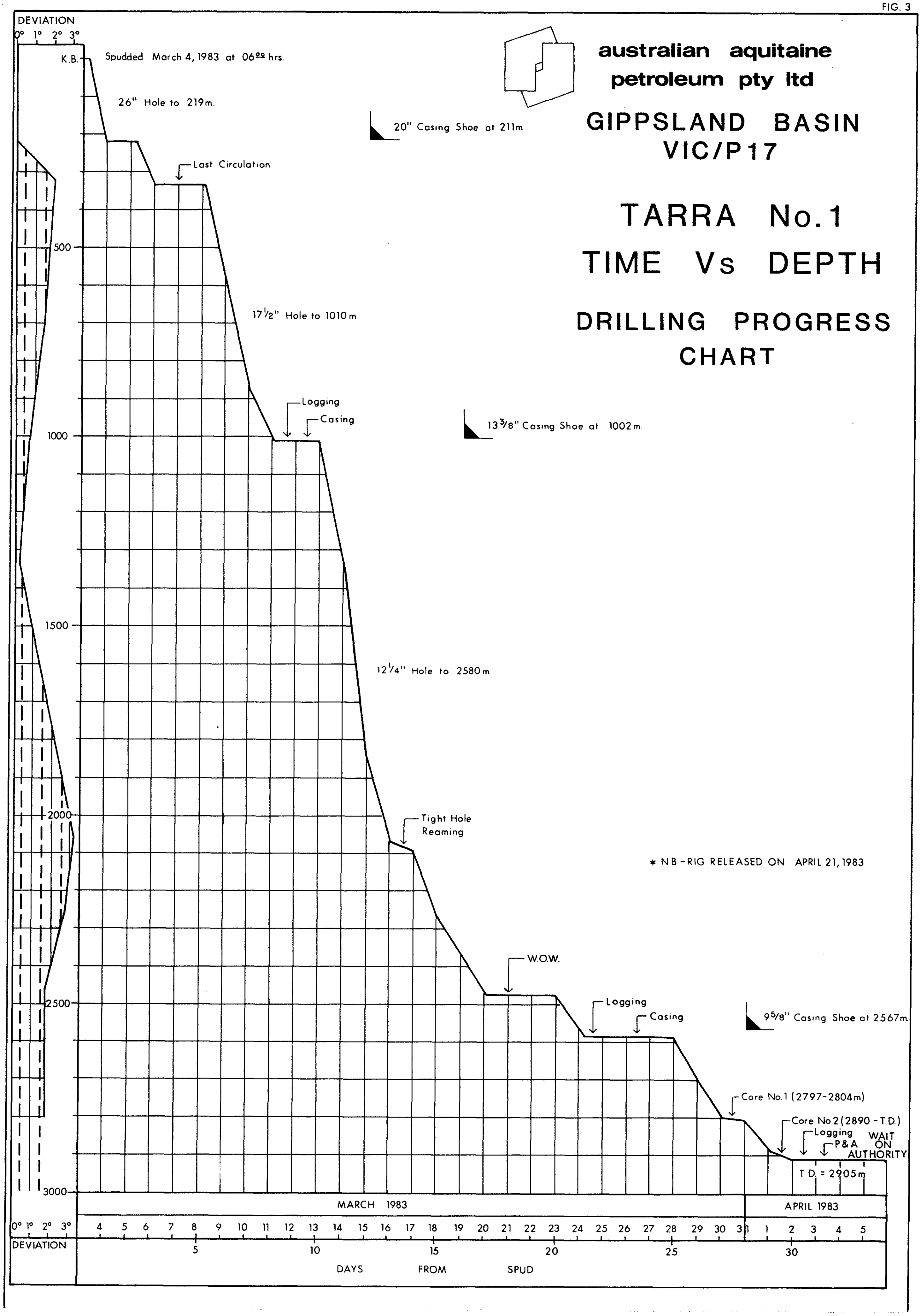
III WELL HISTORY

A. GENERAL DATA

(i)	Well Name & Number:	Tarra No. 1
(ii)	Name & Address of Operator:	Australian Aquitaine Petroleum P/L. 99 Mount Street, NORTH SYDNEY NSW 2060
(iii)	Name & Address of Titleholder:	Australian Aquitaine Petroleum P/L. 99 Mount Street, NORTH SYDNEY NSW 2060. Australian Occidental P/L. 66 Berry Street, NORTH SYDNEY NSW 2060 Alliance Resources P/L 15th Floor, Collins Tower, 35 Collins Street, MELBOURNE VIC 3000. Consolidated Petroleum Aust. N.L. Hartogen House, 15 Young Street, SYDNEY NSW 2000 Agex Pty. Ltd. 16th Floor, AGL Building, 111 Pacific Highway, NORTH SYDNEY NSW 2060.
(iv)	Petroleum Title:	Permit VIC-P17
(v)	District:	Gippsland Basin

(vi)	Location:	SP:No. 440 Line GA81-31 Latitude: 38°38'37.15"S Longitude: 147°42'08.20"E Northings: 5722518 Eastings: 561116
	Elevation:	Water Depth: 62.5MMSL Sea level: 30.5m RKB
(viii)	Total Depth:	2905m RKB
(ix)	Date Drilling Commenced:	4th March, 1983.
(x)	Date Total Depth Reached:	3rd April, 1983.
(xi)	Date Well Abandoned:	21st April, 1983.
(xii)	Date Rig Released:	21st April, 1983.
(xiii)	Drilling Time in days to TD:	32 days
(xiv)	Status:	Plugged and abandoned
(xv)	Total Cost (by Technical Cost Control	$8,059,600

FIG. 3



australian aquitaine
petroleum pty ltd
GIPPSLAND BASIN
VIC/P17
TARRA No.1
TIME Vs DEPTH
DRILLING PROGRESS CHART
DEVIATION
0° 1° 2° 3°
K.B.
Spudded March 4, 1983 at 06⁰⁰ hrs.
26" Hole to 219m.
20" Casing Shoe at 211m.
Last Circulation
500
17½" Hole to 1010 m.
Logging
Casing
13⅜" Casing Shoe at 1002m.
1000
1500
12¼" Hole to 2580 m
2000
Tight Hole
Reaming
* NB - RIG RELEASED ON APRIL 21, 1983
W.O.W.
2500
Logging
Casing
9⅝" Casing Shoe at 2567m.
Core No.1 (2797-2804m)
Core No 2 (2890 - T.D.)
Logging
P&A
WAIT ON AUTHORITY
T.D. = 2905m
3000
MARCH 1983
APRIL 1983
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5
5 10 15 20 25 30
DAYS FROM SPUD

B. DRILLING DATA

(i) Drilling Contractor:

Australian Odeco P/L.
14th Floor, CAGA Centre,
256 Adelaide Terrace,
PERTH WA 6000.

(ii) Drilling Plant:

Semi Submersible rig "Ocean Digger" designed to drill to a depth of 5500 metres in water depths from 36 to 183 metres.

Power - Three Fairbanks - Morse. Model 38-D-8-1/8" diesel engines rated at 1800HP each.

Mooring System - Ten Baldt LWT 30,000lb anchors with 3,000 feet of 2 1/2" chain.

Mast - Lee C. Moore 40' x 40' x 142' 1,000,000lb static capacity.

Drawworks - Emsco A 1500 E.

Mud Pumps - 2 of Emsco D-1350.

Mud Tanks - 1020 barrels capacity

Drill String - 5" 19.5 lb/ft drill pipe. 9 1/2", 7 3/4" + 6 1/2" drill collars.

(iii) Blowout Preventer Equipment

18 3/4" 10,000 psi WP BOP stack consisting of:-

- 1 x CIW type "U" triple ram type preventer 10,000 psi WP' with 6 side outlets. Blind Shear Rams on top, 5" Pipe Rams in bottom and middle unit.
- 2 x CIW Collet Connectors 18 3/4" 10,000 psi.
- 1 x Hydril Type GL, 5,000 psi bag preventer.
- 1 x 18 3/4" Vetco pressure balanced ball joint.
  4 x 3 1/8" Shaffer 10,000 psi Fail Safe Valves.
- 2 x 3" 10,000 psi safety pressure lines to surface. One as Choke Line, one as Kill Line.
- Payne 320 gallon BOP Control System.
- 600 feet of 22" OD x 0.50" Regan integral marine riser with 45 foot stroke Slip Joint.

- Regan KFDS Diverter.
- 10,000 psi WP surface choke manifold. Two hand adjustable, two fixed and one remote controlled chokes - all CIW.

(iv) Hole Sizes & Depths

Size		93.0m = Seabed (RKB)
26"	to	219m
17 1/2"	to	1010m
12 1/4"	to	2580m
8 1/2"	to	2905m T.D

(v) Casing & Cementing Details

Size	Weight	Grade	Shoe Depth	Cement	Cement To
20"	133lb.ft	X56	211m	32T	Seabed
13 3/8"	68lb.ft	K55	1002m	48T	500m
9 5/8"	47lb.ft	N80	2567m	14T	2070m

(vi) Drilling Fluid

26" Hole: High viscosity spud mud, with returns to seafloor. Viscosity Marsh, 100 plus.

17 1/2" Hole: Type: Sea water/Q. Mix.

Average properties:-
SG : 1.10
VIS (Marsh) : 35
GELS : 15/20
PV : 7
YP : 25

WL : NC

pH : 8.0

Clna : 21,250 ppm.

LOST CIRCULATION PROBLEMS IN UPPER LIMESTONE/CALCAREOUS SECTION.

12 1/4" Hole: Type: Seawater Polymer

Average properties:-

SG : 1.16

VIS : 45

GELS : 16/26

PV : 15

YP : 20

WL : 6.6

pH : 8.5

Clna : 26,000 ppm

8 1/2" Hole: Type: Seawater/gel/polymer

Average properties:-

SG : 1.09

VIS : 48

GELS : 6/15

PV : 19

YP : 14

WL : 6.5

pH : 10.5

Clna : 17,500 ppm

(vii) Water Supply

Potable water distilled on board drilling vessel. Fresh drill water from Welshpool.

(ix) Plug back & squeeze jobs: abandonment.

				TESTED
Cement plugs:	2600	to	2520m	(1000 PSI)
	260	to	200m	
	200	to	120m	(1000 PSI)

Mud S.G in uncemented intervals : 1.15 S.G.
Well head cut and recovered.

(xii) Communications

VHF + UHF Radio link.
Ship to shore telex.
Telephone line with Facsimile.

(xiii) Base of Operations

Welshpool Victoria.

LOCATION

(i) Site Investigations

Pre-drill & Post-drill seabed inspection carried out by Side-Scan Sonar. (see "Other Surveys" Section D of this chapter)

(ii) Anchoring Methods

Rig anchors, (10) positioned approximately 600 metres from rig. Marked by special buoys.

(iii) Transportation

From Welshpool Base to rig location
1 x 5,600 HP + 1 x 5,400 HP Supply, anchor handling towing vessels. Landing, towing vessel.
1 x Standby vessel.
1 x Puma SA 330J helicopter.
1 x Bell 412 helicopter.

C. FORMATION SAMPLING

(i) Ditch Cuttings

Lagged samples were collected from rig shale shakers by the mud logging personnel (Geoservices). These samples were collected at 10 metres interval from 20" casing depth 210m to 1010 metres, 9 metres interval to 1710m, 6 metres interval to 1935 metres and 3 metre intervals thereafter to total depth at 2905m.

Four sets of washed and dried cuttings were collected. One complete set was deposited with B.M.R's core and cuttings laboratory in Fyshwick, A.C.T and another with the Mines Department Store, Oil & Gas Division, Port Melbourne. One complete set of cuttings was kept by Aquitaine in their Artarmon store in Sydney and one set was sent to SNEA(P) in Pau - France for analysis. In addition, two sets of unwashed and air dried cuttings were collected and kept by Aquitaine in the Artarmon warehouse in Sydney.

(ii) Coring

Two cores were cut with a Christensen core barrel 6-3/4" Stratapax core head.

Core No.	Interval	Meters Cut	Recovered
1	2797.0m-2804.0m	7.0m	1.5m (21.4%)
2	2890.0m-2905.0m	15.0m	13.7m (91.1%)

One inch plugs were taken for analysis by AUSCORE. Complete description and analysis of core is presented in Appendix No. 3.

Core was slabbed longitudinally and a quarter portion was respectively dispatched to B.M.R's core and cuttings laboratory in Fyshwick - A.C.T. and the Mines Department Store - Oil and Gas Division, in Port Melbourne, Victoria. Half portion was retained by Aquitaine in the Artarmon warehouse in Sydney.

Selected core chips and SWC's were dispatched for source rock and dating analysis.

(iii) Side Wall Cores

Two side wall cores were run in the 12-1/4" hole, CST No. 1 & 2; (2568m-1046m). 60 SWC were shot with 59 recovered and 1 misfired.

CST No. 3 (2879.9m-2570m) run in the 8-1/2" hole, recovered all 30 SWC shot.

Recovered sidewall cores were sent to David Taylor (Paltech) and Wayne Harris (W.M.C) for palaeontological and palynological analyses respectively.

Complete descriptions of sidewall cores are presented in Appendix No. 2

TARRA-1.

D. LOGGING AND SURVEYS

(i) Electric and Wireline Logging

Schlumberger ran the following logs.
Details of Log interpretation are listed in Appendix No. 3.

DEPTH METRES	DATE	LOGS	ADDITIONAL SERVICES
211 m TO 1006 m	12-3-83	ISF - SLS - GR - SP-CAL LDL - GR - CAL	
1002 m TO 2570m	23-3-83 26-3-83	ISF - SLS - GR - SP-CAL LDL - CNL - GR - CAL HDT CST # 1 + 2	CYBERDIP * CLUSTER * GEODIP *
2566 m TO 2904 m	3-4-83	ISF - SLS - GR - SP-CAL LDL - CNL - GR - CAL HDT VELOCITY SURVEY CST # 3	CYBERDIP * CLUSTER * GEODIP * * PROCESSED LOGS

* Logs evaluation is summarised under section F (Relevance to the Occurence of Hydrocarbons)

(ii) Mud Log and Composite Log

The ditch gas was continuously monitored by Geoservices. The master log prepared by the Geoservices personnel is included in Enclosure 4.

A Field Wellsite Log was prepared by Aquitaine Geologists and has been incorporated into the composite log included in Enclosure 3.

(iii) Velocity Survey

Velocity survey was conducted by Seismograph Services Limited shooting every 30 metres from 500m to 2900m K.B. All relevant records of this survey (VSP) are retained in Australian Aquitaine Petroleum office, North Sydney, The velocity survey and calibrated log data have been incorporated in Enclosure 5.

(iv) Deviation Surveys

The deviation of hole from vertical was measured by Totco Survey equipment.

TOTCO

No.	Depth(M)	deg^{o}
1	219	0
2	326	2
3	712	1-1/2
4	1010	3/4
5	1334	1/4
6	2066	3-1/4
7	2265	2-3/4
8	2465	1-3/4
9	2580	1-3/4
10	2797	1-3/4

(v) Other Surveys

Seabed inspection

Prior to moving the rig on location and after the rig had moved away from Tarra No. 1 location a Side Scan survey was conducted by Racal-Decca to investigate the sea-floor for any foreign object. An area of 2 x 2.8km was surveyed to cover the wellsite and the anchor pattern (see attachment 2).

Navigation Survey

The rig was positioned using an "Oasis and TMR-HA" positioning system. The survey was conducted by Racal-Decca. Results are summarised in Attachment 2.

E. TESTING

NIL

IV GEOLOGY

A. PREVIOUS EXPLORATION AND SURVEYS

The Gippsland Basin has been a target for oil exploration since the nineteen-thirties with early drilling activities concentrated in the onshore section of the basin where oil seeps are known. The first offshore drilling did not take place until 1965 when Esso drilled "Gippsland Shelf No. 1" which was renamed Barracouta No. 1. In this year both Barracouta and Marlin fields were discovered; the discovery wells were Gippsland Shelf No. 1 and No. 4 respectively. The history of exploration in offshore Gippsland is summarised in Table 3.

Production from the Gippsland Basin is now entering its twelfth year. The major oil and gas prospects have been defined and five oil and two gas fields have been developed. Further development of known fields is continuing and platforms are being designed or fabricated for Cobia, Fortescue, Flounder and Bream.

Exploration by Australian Aquitaine Petroleum and its partners commenced in November, 1981 after the granting of permit VIC/P17. During November the GA-81 seismic survey was carried out and a total of 3536 line km of seismic survey was carried out.

During June 1982, the GA-82 seismic survey was carried out and an additional 403 km of seismic was shot.

Edina No. 1 was spudded on the 26th September 1982, and was plugged and abandoned without encountering any hydrocarbons. The rig was released on the 1st November 1982, before moving to Omeo No. 1 Location.

Omeo No. 1 was spudded on 2nd November 1982, and was plugged and abandoned on 10th February 1983 with minor gas and oil shows.

Kyarra No. 1A was spudded on 16th February 1983, and was plugged and abandoned on 1st March 1983.

TABLE 1

WIRELINE SERVICES SUMMARY : TARRA NO. 1

DATE	RUN	LOGS	INTERVAL (M) KB	TIME CIRC STOPPED (HRS)	TIME LOGGER ON BOTTOM (HRS)	MAX REC TEMP (BHT) °C	RM BHT ohm-m	RMF BHT ohm-m	RMF BHT ohm-m	SCALE 1:200	1:500	REMARKS
12.3.83	1	ISF-SLS-GR-SP-CAL	211-1006.5 GR to 95	2330/11th	0430/12th	46.6°C	0.178	0.137	0.238	X	X	
12.3.83	1	LDL-GR-CAL	211-1006	2330/11th	0715/12th	47.7°C	0.175	0.135	0.234	X	X	
25.3.83	2	ISF-SLS-GR-SP-CAL	1002-2569	0530/25th	1600/25th	88.9°C	0.110	0.085	0.158	X	X	
25.3.83	2	LDL-CNL-GR-CAL	1002-2570	0530/25th	2015/25th	94.4°C	0.105	0.081	0.151	X	X	
25.3.83	1	HDT	1650-2561	0530/25th	0115/26th	97.2°C	0.102	0.079	0.147	X	-	2 passes
26.3.83	1	CST No. 1	2105-2568	SHOT 30		RECOVERED 30				-	-	Extrapolated
26.3.83	2	CST No. 2	1046-2314	SHOT 30		RECOVERED 29	MISFIRED 1			-	-	BHT 101°C
25.3.83	1	PROCESSED CYBERDIP	1650-2561							X	-	
3.4.83	3	ISF-SLS-GR-SP-CAL	2566-2903	1800/2nd	0200/3	92.7°C	0.128	0.092	0.151	X	X	
3.4.83	3	LDL-CNL-GR-CAL	2566-2904	1800/2nd	0545/3	96.1°C	0.125	0.089	0.146	X	X	
3.4.83	2	HDT	2566-2904	1800/2nd	1050/3	101.1°C	0.120	0.086	0.140	X	X	2 passes
3.4.83	1	VELOCITY SURVEY	500-2900									
3.4.83	3	CST No. 3	2570-2879	SHOT 30		RECOVERED 30				-	-	Extrapolated
3.4.83	2	PROCESSED CYBERDIP	2566-2904							X	-	BHT 108°C

PROCESSED LOGS
CLUSTER x2
GEODIP x2

N.B. Assumming sea bed temperature of 10°C
Temperature gradient of Tarra No. 1
is calculated as 3.5°C/100m.

TABLE 2

GIPPSLAND BASIN EXPLORATION HISTORY

SIGNIFICANT DATES

1951 - 1956	BMR runs regional gravity and aeromag.
1960	BHP granted PEP 38 and 39 over the whole basin.
1961 - 1962	BHP runs aeromag surveys.
1962 - 1963	BHP reconnaissance seismic survey.
May 1964	Esso-BHP Farmout Agreement.
1965	Barracouta, Marlin discoveries.
1966	Marlin delineation.
1967	Kingfish, Halibut discoveries.
1968	Tuna, Snapper discoveries.
1969	Mackerel discovery, Barracouta on production.
1970	Halibut, Marlin on production.
1971	Kingfish on production.
1972	Mackerel delineation wells.
1974	First major relinquishment.
1975	Shell relinquishment.
1976	Second round of relinquishments.
1978	Mackerel on production, Fortescue discovery.
1979	Tuna on production.
1980	Final relinquishments.

TABLE 3

SURVEYS IN GIPPSLAND BASIN

YEAR	NAME OF SURVEY	BY	TYPE
1944	Morwell Brown Coal Field	B.M.R.	Onshore Gravity
1948	Morwell Brown Coal Field	B.M.R.	Onshore Gravity
1948-59	Traralgon South	B.M.R.	Onshore Gravity
1951	Yallourn - Morwell - Traralgon	B.M.R.	Onshore Gravity
1951	East Gippsland	B.M.R.	Onshore Gravity
1951-52	Gippsland	B.M.R.	Onshore Magnetic
1952	Avon Area	B.M.R.	Onshore Seismic
1952	Darriman	B.M.R.	Onshore Gravity
1952-53	Gippsland	B.M.R.	Onshore Gravity
1954	Darriman	B.M.R.	Onshore Seismic
1955	"Seven Mile" Nowa Nowa	B.M.R.	Onshore Magnetic
1956	Gippsland Offshore	B.M.R.	Onshore Magnetic
1958	Baragwarrath Anticline	B.M.R.	Onshore Gravity
1959	Latrobe Valley	B.M.R.	Onshore Seismic
1960	Bairnsdale - Sale (E. Gippsland)	Woodside.	Onshore Seismic
1960	Bass Strait	B.H.P.	Offshore Magnetic
1960	Longford	B.M.R.	Onshore Gravity
1961	Anderson's Inlet	Oil Dev.	Onshore Magnetic
1961	Bass Strait & Encounter Bay	Hematite	Onshore Magnetic
1961	Gippsland Basin	B.M.R.	Onshore Gravity
1961	Rosedale	B.M.R.	Onshore Seismic
1961	Sale - Lake Wellington	Woodside	Onshore Seismic

1962	Sale (Extended)	Arco (Woodside)	Onshore Seismic
1962-63	Flinders Island	Hematite	Offshore Seismic
1962-63	Ninety Mile Beach	ARCO Woodside	Offshore Seismic
1963	Gormandale	A.P.M.	Onshore Seismic
1964	Gippsland Shelf (EG)	Esso	Offshore Seismic
1964	Seaspray	AROC	Offshore Seismic
1965	Offshore Gippsland Basin	Shell	Offshore Seismic
1965	Paynesville	Woodside	Onshore Seismic
1965	Woodside - Paynesville	Woodside	Onshore Seismic
1966	ET 66 G.B.	Esso	Offshore Seismic
1966	Rosedale	A.P.M.	Onshore Gravity
1966	Stockyard Hill	Woodside	Onshore Gravity
1966-67	Hydrosonds Survey	B.O.C.	Onshore Seismic
1967	Eastern & Western Bass Strait	Magellan	Aeromagnetic
1967	Ex-67 G.B.	Esso	Offshore Seismic
1967	EC-67 G.B.	Esso	Offshore Seismic
1967	Golden Beach	B.O.C.	Offshore Seismic
1967	Sole Sparker	Shell	Sparker offshore Seismic
1967	Venus Bay	Alliance	Sparker Offshore Seismic
1968	EH-68 G.B.	Esso	Sparker Offshore Seismic
1968	Tarwin	AOD	Onshore Seismic
1968	Toongabbie	APM	onshore Seismic
1968-69	East Gippsland	Magellan	Seis & Magnetic
1968-69	G69A	Esso	Offshore Seis & Meg
1969	Bemm River	WYP Dev.	Onshore Gravity & magnetic

1969	Cape Patterson	Alliance Oil	Onshore Gravity & Seismic
1969	Gippsland Basin Onshore	Woodside	Onshore Seismic
1969	Lakes Entrance Offshore	BOC & Woodside	Offshore Seismic
1969	Tasman - Bass Strait	Magellan	Offshore Seismic Sparker & Magnetic
1970	Bemm River	YPO Dev.	Onshore Seismic
1970	G69B (Sole Structure)	Hematite	Offshore Seismic
1970	G70A (Tuna Structure)	Hematite	Offshore Seismic
1970	Seaspray	Woodside Planet Etc.	Offshore Seismic
1970	Central High Survey	Shell	Offshore Seismic
1970	Tarwin	A.O.D.	Onshore Seismic
1970-73	Continental Margin	B.M.R.	Offshoe Seismic
1971	G71A	Esso	Offshore Seismic
1971	G71B	Esso	Offshore Seismic
1972	G72A	Esso	Offshore Seismic
1972-73	Continental Margin	Shell	Offshore Geophysical
1973	North East Furneaux	Magellan	Offshore Seismic
1973	G73A	Esso	Offshore Seismic
1973	G73B	Esso	Offshore Seismic
1973	Offshore Gippsland Basin Survey	Shell	Offshore Seismic
1974	G74A	Esso	Offshore Seismic
1976	G76A	Esso	Offshore Seismic
1977-78	G77A	Esso	Offshore Seismic
1980	G80A	Esso	Offshore Seismic
1980	GB-79	Beach	Offshore Seismic
1980	GBS-80	Bass Strait O & G	Offshore Seismic
1980	GC-80	Cultus Pacific	Offshore Seismic

1980	MGS-80	Mincorp	Airborne Geochemical
1980	MSI-80	Mincorp	Airborne Geochemical
1981	GB-81	Beach	Offshore Seismic
1981	GBS-81	Bass Strait O & G	Offshore Seismic
1981	G81A	Esso	Offshore Seismic
1981	GM81A	Mincorp	Onshore Seismic
1981	GB81A	Beach	Onshore Seismic
1981	GA81A	Aust. Aquitaine	Offshore Seismic
1981	GA81A Ext.	Bass Strait O & G	Offshore Seismic
1981	GP81A	Phillips	Offshore Seismic
1981	GC82A	Cultus Pacific	Offshore Seismic
1981-82	GS81A	Shell	Offshore Seismic
1981-82	G82A	Esso	Offshore Seismic
1981-82	G82B	Esso	Offshore Seismic
1982	CSR-82A	Sion Resources	Onshore Seismic
1982	GH82A	Hudbay	Offshore Seismic
1982	GB82A	Beach	Onshore Seismic
1982	G82C	Esso	Offshore Seismic
1982	GA82B	Aust. Aquitaine	Offshore Seismic.

IV GEOLOGY CONT.

B. REGIONAL GEOLOGY

The Gippsland Basin formed as the result of two separate phases of continental separation along new plate boundaries. Initial formation has been related to a phase of intra-cratonic rifting between the Tasmanian block and the Australian mainland which occurred between 140 and 100 MY BP (Elliot; 1972). This rift extended from the Otway Basin to the Bellona Gap on the Lord Howe Rise to the East.

The boundary of the Gippsland Basin is marked to the south by the marginal fault system which brings basement rocks of the Bassian Rise in contact with basinal sediments. The northern boundary is an unconformable contact between basin sediments and rocks of the Tasman Fold Belt, while the western boundary with the Otway Basin is marked by the Selwyn Fault on Mornington Peninsula.

Initial sedimentation occurred in the latest Jurassic or Early Cretaceous with a sequence of entirely non-marine greywackes, chloritic mudstones and occasional coals being deposited. Much of the coarse clastic component of these sediments was derived from contemporaneous acid to intermediate volcanics which are inferred to have a southerly provenance. These sediments are collectively termed the Strzelecki Group and appear to have limited hydrocarbon source and reservoir potential.

The separation of the Lord Howe Rise and New Zealand from eastern Australia abound 80 MY to 60 MY BP marked a general increase in the rate of subsidence within the Gippsland Basin. Fluviatile sedimentation continued in the Late Cretaceous but gave way to prograding deltaic complexes during the Palaeocene and Eocene. Individual complexes have yet to be delineated by well and seismic data although Loutit and Kennett (1981) have related sedimentary cycles within the Gippsland Basin to global eustatic and sea level changes.

These depositional cycles are recognisable from the Late Cretaceous to Late Eocene Latrobe Group through to the Oligocene to Early Miocene Lakes Entrance Formation (Figure 4). At the top of the Latrobe Group a regional transgression inundated the basin and caused the formation of a series of barrier systems during periods of stillstand. Associated with these barrier systems are glauconitic, nearshore marine facies together with lagoonal and marsh facies in which coal-forming carbonaceous sediments were laid down. This transgressive sequence, which marks the final phase of Latrobe sedimentation, is termed the Gurnard Formation; although this classification is still informal.

The Latrobe sequence, containing many channel, point bar and barrier sand bodies, is the primary reservoir sequence within the Gippsland Basin. Intra-Latrobe seals are formed by siltstone and coal sequences of the marsh facies while the top of the Latrobe Group is sealed by the glauconitic siltstone of the Gurnard Formation and the calcareous siltstones and claystones of the Lakes Entrance Formation.

The transgressive phase which resulted in the formation of the Gurnard and Lakes Entrance sediments has been related to the separation of Antarctica from southern Australia, which began about 45 MY BP. During this period and the Late Miocene en echelon anticlines and shear faults were generated. This pattern of faults and northeast-southwest trending anticlines is compatible with the existence of a dextral wrench couple operating in the region at the time. It is this phase of structuration which acted upon the Latrobe sediments and formed the major structural targets for hydrocarbon exploration within the basin.

During the Oligocene and into the Early Miocene, deposition of shale and marl occurred throughout the basin and onlapped the basin margins and structural "highs". Miocene sedimentation gradually changed in style from the shales and marls of the Lakes Entrance Formation to the bryozoan limestone and marl of the Gippsland Limestone. This limestone sequence is characterised offshore by two major depositional features. On the southern platform a massive linear slump zone occurs which can be traced seismically for more than 130km. Over the remainder of the basin complex channeling is in evidence caused by structural movements and eustatic sea level changes.

The final period of basin development was marked by a return to continental clastic sedimentation in southern Gippsland with marine sedimentation continuing on the continental shelf. The highland region north of the basin and the South Gippsland Hills along the western margin were uplifted during the Kosciusko uplift in the Late Pliocene.

IV GEOLOGY CONT.

C. REGIONAL STRATIGRAPHY

The stratigraphy of the offshore Gippsland Basin is summarised in Figure 3.

Basement

The basement is composed of slightly metamorphosed Paleozoic sediments of the Tasman Geosyncline. These rocks are exposed in the Victorian Ranges to the north and form islands along the Bassian Rise to the south. The Geosyncline sediments are composed of deformed siltstones, shales, sandstones, and igneous rocks of Ordovician and Silurian age which are overlain by Devonian - Carboniferous red beds made up of conglomerates, sandstones and pebbly sandstones with interbedded rhyolite, rhyodacite and trachytes (Threlfall et al., 1976).

Four wells (Groper 1, Groper 2,Bluebone 1 and Mullet 1) located along the southern margin of the basin reached basement rocks in granite and in red siltstones and sandstones. Although the basin centre has never been reached by drilling, aeromagnetic surveys suggest that basement rocks will be similar to those found onshore.

Early Cretaceous (Strzelecki Group)

The Strzelecki Group represents the first sediments to have been deposited in the basin. The group consists of non-marine, immature greywackes, shales and coals. The greywackes are medium-grained and composed of quartz, rock fragments and feldspar grains held together by abundant chloritic and kaolinite clay matrix and minor calcareous cement. The shales are micaceous and slightly carbonaceous. The rocks are interpreted to have been deposited in alluvial fan and alluvial plain environments in a rapidly subsiding basin. The sandstones contain much volcanic material and have poor reservoir characteristics. Therefore, the group is generally regarded as economic basement in the offshore area. The maximum thickness of the group is estimated to be more than 3,500m (James and Evans, 1971).

The Strzelecki Group is exposed onshore at Narracan and Balook Highs. Offshore, in the areas where the group is reached by drilling or recognised seismically, it is separated from the overlying Latrobe by an angular unconformity.

Upper Cretaceous - Eocene (Latrobe Group)

Latrobe Undifferentiated: This sequence refers to the Late Cretaceous-Eocene sediments onlapping the Strzelecki Group and which contain major hydrocarbon accumulations. The maximum thickness of the sequence is estimated to be approximately 5,000m. In the western and central basin, non-marine deposition was predominant from Late Cretaceous to Early Eocene with the formation of alluvial and delta plain deposits comprising quartzose sandstone, coal, mudstone, siltstone and shale. Sand grains range from very fine to very coarse. Volcanic rock fragments and feldspars are less abundant than in the Strzelecki Group. The sandstones are poorly sorted but more mature than the underlying Strzelecki sandstones. At the end of the Late Cretaceous the southeastern side of the basin was encroached by a marine shoreline, but the centre of the basin was still largely a site of non-marine deposition. The upper section of Paleocene-Eocene age shows numerous point bar sandstones embedded in swamp deposits. The paleocurrent direction, as determined from the variation of these sandstones, is from the northwest (Threlfall et al., 1976).

Gurnard Formation, This formation refers to the reworked sediments which were formed during the major transgressions in the Eocene times. These sediments vary from nearshore muds containing glauconite to shoreline deposits including beach sand and back-swamp coal. The unit, which has an erosional contact with the underlying deltaic sediments, is in turn overlain by marine sediments of the Lakes Entrance Formation.

Flounder Formation: This occurs only in the eastern side of the basin (outside of VIC/P17) and is composed of marginal marine to marine sediments which filled the channels cut during the Early Eocene time. The fill of up to 500m thickness (as encountered at Flounder No. 1) consists of clay siltstone containing varying amounts of coarse clastics. The siltstone is grey-brown in colour, micaceous, pyritic and contains both benthonic and planktonic foraminifera.

Turrum Formation: This also occurs only in the eastern side of the basin where, during the Late Eocene, the area was eroded by the Marlin channel and later filled with marine shales of latest Eocene age. The shales are up to 350m thick, dark grey-brown in colour, slightly calcareous, slightly pyritic and micaceous.

Oligocene - Miocene

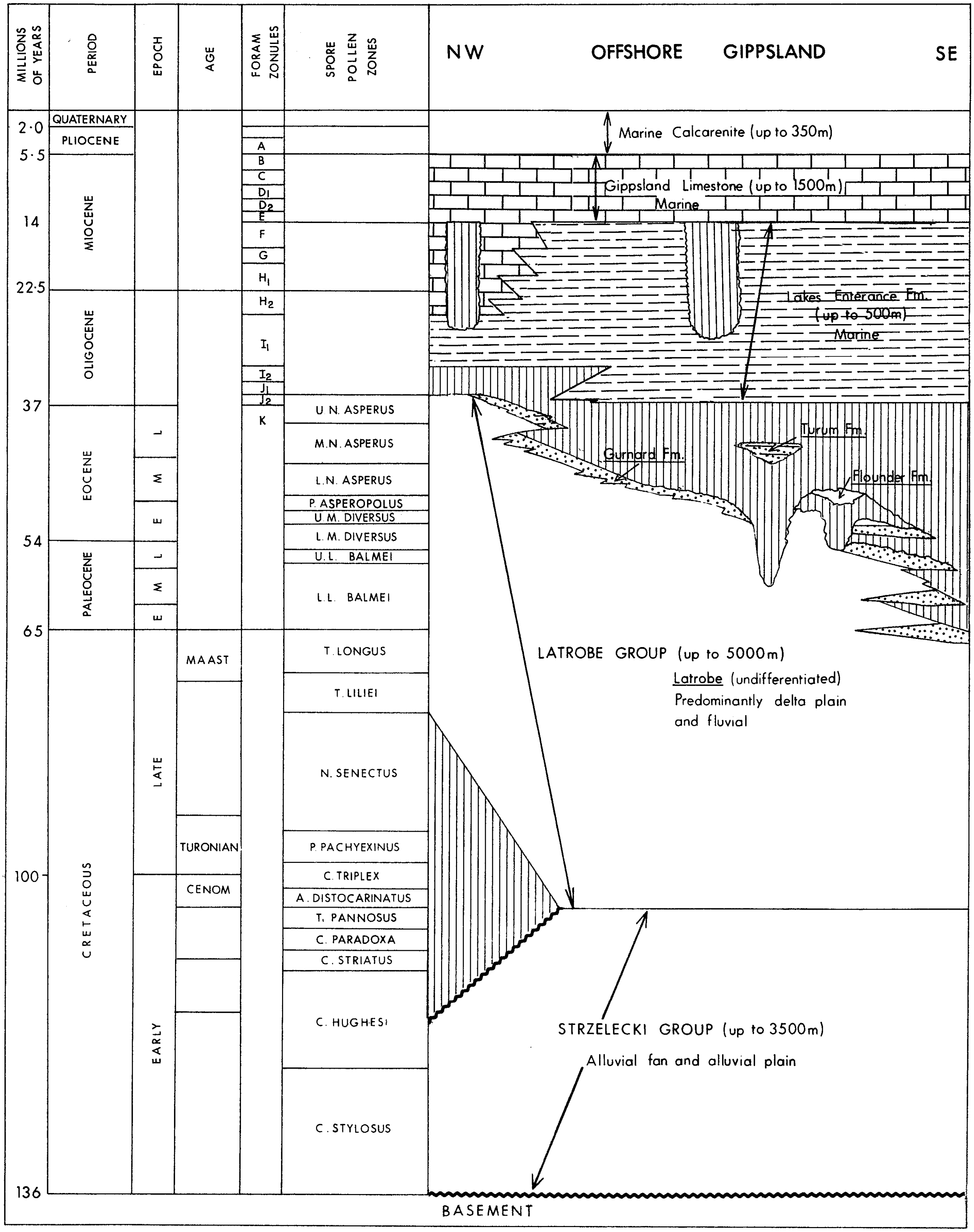
The Oligocene-Miocene sequence consists of two formations the Lakes Entrance Formation and the Gippsland Limestone (Figure 3). Although these two formations represent two separate units onshore, their offshore contact is gradational. The Lakes Entrance Formation refers to the maximum 500m thick unit of marine mudstone overlying the Latrobe Group. The mudstone is light olive-green in colour, sometimes grey, with a variable argillaceous and calcareous content. It contains pyrite, glauconite and marine fauna.

The Gippsland Limestone was first applied to the onshore Miocene limestones and marls which overlie the Lakes Entrance Formation. Offshore, the Lakes Entrance Formation grades upward to a unit of 1500m of Miocene limestone, calcarenite and marl with occasional coarse clastics of mudstone. Slumping and sub-marine channelling are common in the Miocene and are probably related to the tectonic and structural movements in the basin and sea level changes.

Pliocene - Recent

Up to 350m of marine calcarenites lie between the Miocene Gippsland Limestone and the sea floor. Stratigraphic data on this uppermost sequence are generally lacking, although foraminiferal assemblages suggest that the lower part of the sequence may belong to the Late Miocene.

FIG. 4



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Gippsland Basin VIC/P17

STRATIGRAPHY

OFFSHORE GIPPSLAND BASIN

N.B. MODIFIED FROM THRELFALL ET AT., 1976

Dwg No: 20375

IV. GEOLOGY CONT.

C. (ii) STRATIGRAPHY OF SEDIMENTS PENETRATED

The stratigraphy and thickness of sediments penetrated in Tarra No. 1 are summarised in Fig. 4 and Table 4.

TABLE 4

AGE		FORAM ZONULES	FORMATION		ASSOC. HORIZON	FORMATION TOPS M (KB)	THICKNESS (M)	
PLIOCENE TO RECENT			UNDIFFERENTIATED			93	233	
MIOCENE	LATE	B-2	GIPPSLAND LIMESTONE	U		326	986	1515
MIOCENE	MID	C, D2, E1	GIPPSLAND LIMESTONE	L		1312	529	1515
MIOCENE	EARLY	E-2, F, G, H1	LAKES ENTRANCE			1841	269	
OLIGOCENE		J2	LATROBE GROUP – GURNARD	a		2110	55	134
EOCENE	LATE ?	K	LATROBE GROUP – GURNARD	b		2165	79	134
EOCENE	EARLY	N TO P	LATROBE GROUP – UNDIFF. LATROBE		BROWN	2244	53	339
PALEOCENE ?		L.B*	LATROBE GROUP – UNDIFF. LATROBE			2297?	156	339
CRETACEOUS ?	LATE	T.L*	LATROBE GROUP – UNDIFF. LATROBE		PURPLE	2453?	130	339
CRETACEOUS	EARLY		STRZELECKI		BLUE	2583	322	

*L.B. - L. Balmei, T.L. Longus (Spore/Pollen Zones)

HORIZON TOPS AND DEPTHS

HORIZON	T.W.T. VEL. SURV.	T.W.T. (SEISMIC)	PREDICTED M R.K.B.	ACTUAL M. R.K.B.	ASSOC. Fm.
BROWN	1.714	1.721	2220	2244	TOP Latrobe Clastics
PURPLE	1.755	1.775	2320	2436	base Paleocene
BLUE	1.904	1.906	2550	2583	Top Strzelecki
GREEN	-	2.141	3020	3000	Intra Strzelecki

Recent Pliocene (seafloor to 326m RKB)

These recent sediments are comprised mainly of marine calcarenites, marls and associated coquina beds of bryozoa, brachiopods and foraminiferas. The calcarenites grade to biomicrites and are generally, light grey to grey white, tan, chalky with minor sparry calcite, friable with good vugular porosity. Lost circulation problems from nil to 50% returns are common in the top section of the hole. Stratigraphic data on this sequence is undifferentiated; the base of Pliocene sediments is and ifferentiated from Late Miocene sediments. The base is tentatively picked at 326m based on the appearance of less coquinitic limestone.

Miocene (326m - 2110m RKB)

The Gippsland Limestone was first applied to the onshore Miocene limestones and marls which overlie the silts and marls of the Lakes Entrance Formation. Offshore it is common for the Miocene limestones to grade into the siltstones and marls of the Lakes Entrance sediments. Generally the sequences are time trangressive. For the wells in VIC/P17 and Tarra No. 1, based on seismic, logs and microfauna data the sequences are defined as follows.

a. The Gippsland Limestone (326 - 1841m KB) is comprised dominantly of interbeds of calcarenite and marls. Slumping and submarine channeling are common with local silty and arenaceous facies distribution. Based on micropaleontologhical zonations, a mid Miocene hiatus (absence of zonule D1) is present which subdivides the Gippsland Limestone into an Upper and Lower Member.

The Upper Member - Middle to Late Miocene (210 - 1312m) is dominant limestone/calcarenite with marl and very calcareous claystone towards the base; the argillaceous fractions are dispersive, soft, blocky and sticky.

The Lower Member - Early to Middle Miocene (1312m - 1841m) is comprised of calcareous claystone, light grey to green, medium grey, soft to firm, less sticky in part, blocky, becoming more indurated with depth, locally subfissile, grading to siltstone, minor limestone and arenaceous interbeds.

b. The Lakes Entrance Formation (1841m - 2110m KB). The top is gradational; on logs it is picked as a more compact sequence of marine claystone, less calcareous than the marls above, the clay fraction is slightly dispersive, also locally subfissile and splintery in part. Minor siltstone and arenaceous beds are common. Traces of glauconite and abundant pyrite aggregates are disseminated in the clay matrix.

Onshore, the name Lakes Entrance Formation is applied to a marine shale or marl which is entirely of Oligocene age. Offshore, the upper boundary is time trangressive into the Early Miocene.

Oligocene to Late Eocene (2110m - 2245m KB)

Sea level rise continued through the Late Eocene into Early Oligocene. As the shoreline encroached over the eroded Latrobe clastics, a destructive shallow marine facies of silty, sandy glauconitic shale accumulated. This is termed the Gurnard Formation

In Tarra No. 1, the term Gurnard Formation is applied to the highly glauconitic sands and silts above the coarse clastics. There are two distinct units in this formation. The lower unit of Late Eocene age is highly glauconitic, arenaceous in part and dominant rusty brown to reddish in colour. The basal section is barren of planktonics with minor benthonic fauna in the upper sequence indicative of a shallow, inner continental shelf environment.

The upper unit is Oligocene in age. The boundary at 2165m is marked by earthy brown to reddish oxidised glauconitic sands and silts. It is thought to be equivalent to a weathering surface caused by a sea-level drop at the end of Eocene with a consequent erosional sequence on the basin margins and over the crests of most anticlines. Sea-level rose again and the upper unit is comprised mainly of marginal marine glauconitic silts and rejuvenated sediments of the lower unit. A hiatus of some 10 million years in time span (Appendix 4) in Early Oligocene separates the early Miocene sediments. The benthonic fauna reflect this disruption with mid shelf deposition of the Gurnard and the onlap of upper slope deposition of Lakes Entrance sediments.

Early Eocene - Late Cretaceous (2245m - 2583m KB)

The first sands of the Latrobe Undifferentiated encountered at 2244m, are generally clean, quartzose coarse to very coarse, subrounded, very good porosity and excellent permeability. The upper sediments are dominant marginal marine deposits, barrier, point bar sands, deltaic crevasse splays with interbeds of marsh coal and carbonaceous shale deposits.

Below the coal beds from 2467m, the sands are more poorly sorted with more silty and argillaceous intercalation. Correlation with nearby wells has not been defined, but preliminary palynology results have indicated a thin Early Eocene sequence. The top of the Paleocene sequence (L. Balmei) is tentatively picked at 2297m KB. Palynology also indicates a questionable Late Cretaceous sequence (T. Longus?) from 2453m KB. The basal sequence is represented by dominantly fluvio-alluvial deposits.

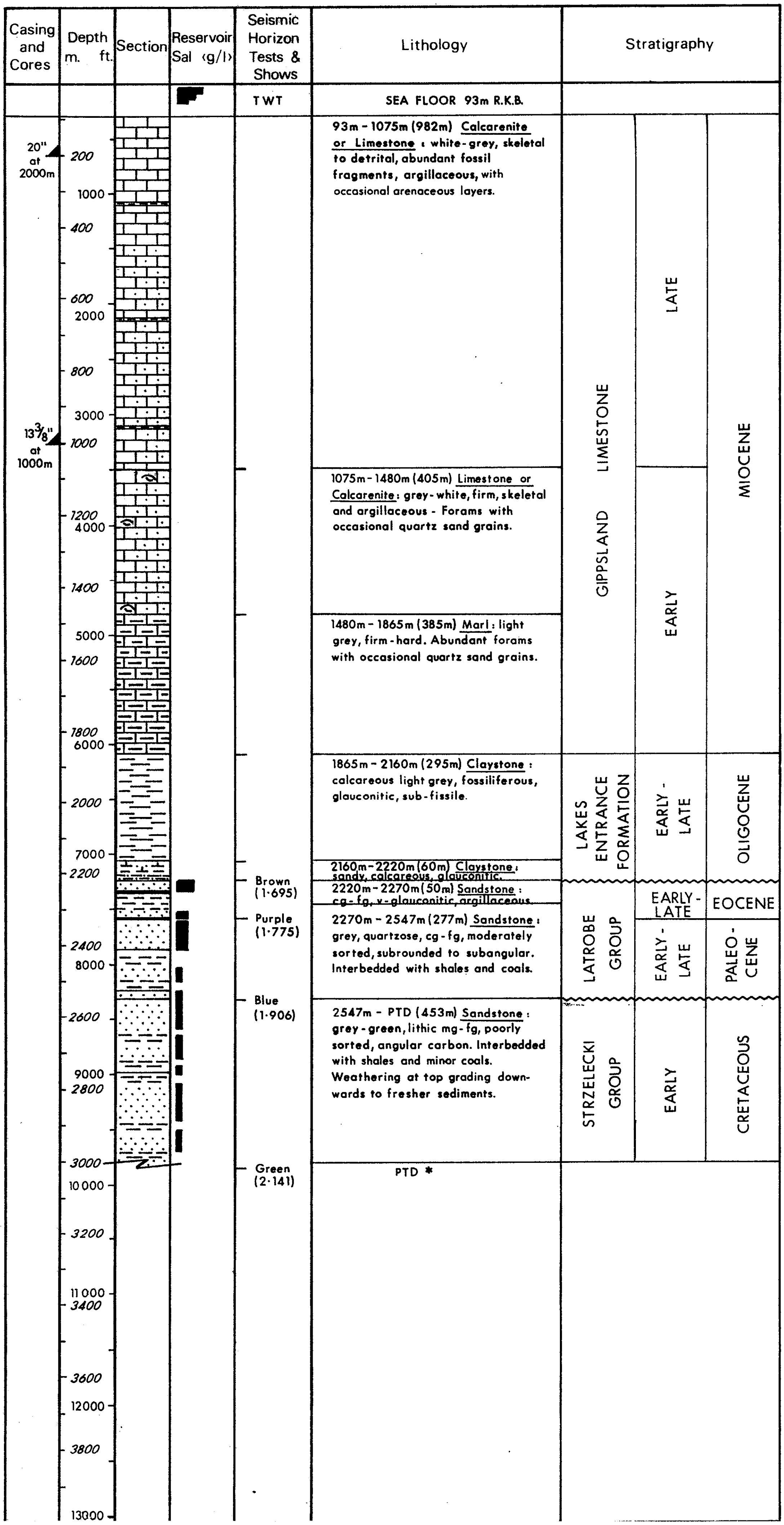
Early Cretaceous (2583m - T.D. 2905m KB)

The top of the Early Cretaceous Group is picked at 2583m KB. The fine grained lithic sandstones with a characteristic "salt and pepper" texture are separated from the overlying Latrobe Undifferentiated by a bed (2583m - 2586m) of disseminated pyrite aggregates. Dipmeter patterns from the Cluster-plot indicate near horizontal dips or 2^{o} - 6^{o} dips towards the north for the above Latrobe sediments. In the Strzelecki sediments below 2586m, dipmeter patterns indicate a definate dip of 6^{o} - 15^{o} southwest, dominantly averaging 10^{o}SW.

Cores cut in the Strzelecki sediments show a subarkosic lithic sandstone, fine grained, subangular to subrounded, poor to moderate sorting, well cemented by diagenesis with diagentic materials/kaolinite/quartz overgrowths filling pore interstices, common kaolinite pseudomorphs of weathered feldspars and minor lignitic laminae.

The sediments are inferred to be deposited in a distal alluvial fan and braided stream complex.

AUSTRALIAN AQUITAINE PETROLEUM PTY. LIMITED



TARRA No. 1

PREDICTED SECTION

Permit	VIC/P17
Location	SP440 line GA81-31
Latitude	38° 38' 37·4" S
Longitude	147°42'09·8" E
Rig	Ocean Digger
K.B.	30m
G.L.	63m
T.D.	3000m *
Status	New Field Wildcat
Spudded	
Operator	AAP
Cost	
Cost/ft.	
Objectives	Accumulations below the Blue Horizon.
Structure	Tilted- fault block sealed by faults.
Comments	

* PTD of 3000m or 300m into the strzelecki, whichever first occurs.

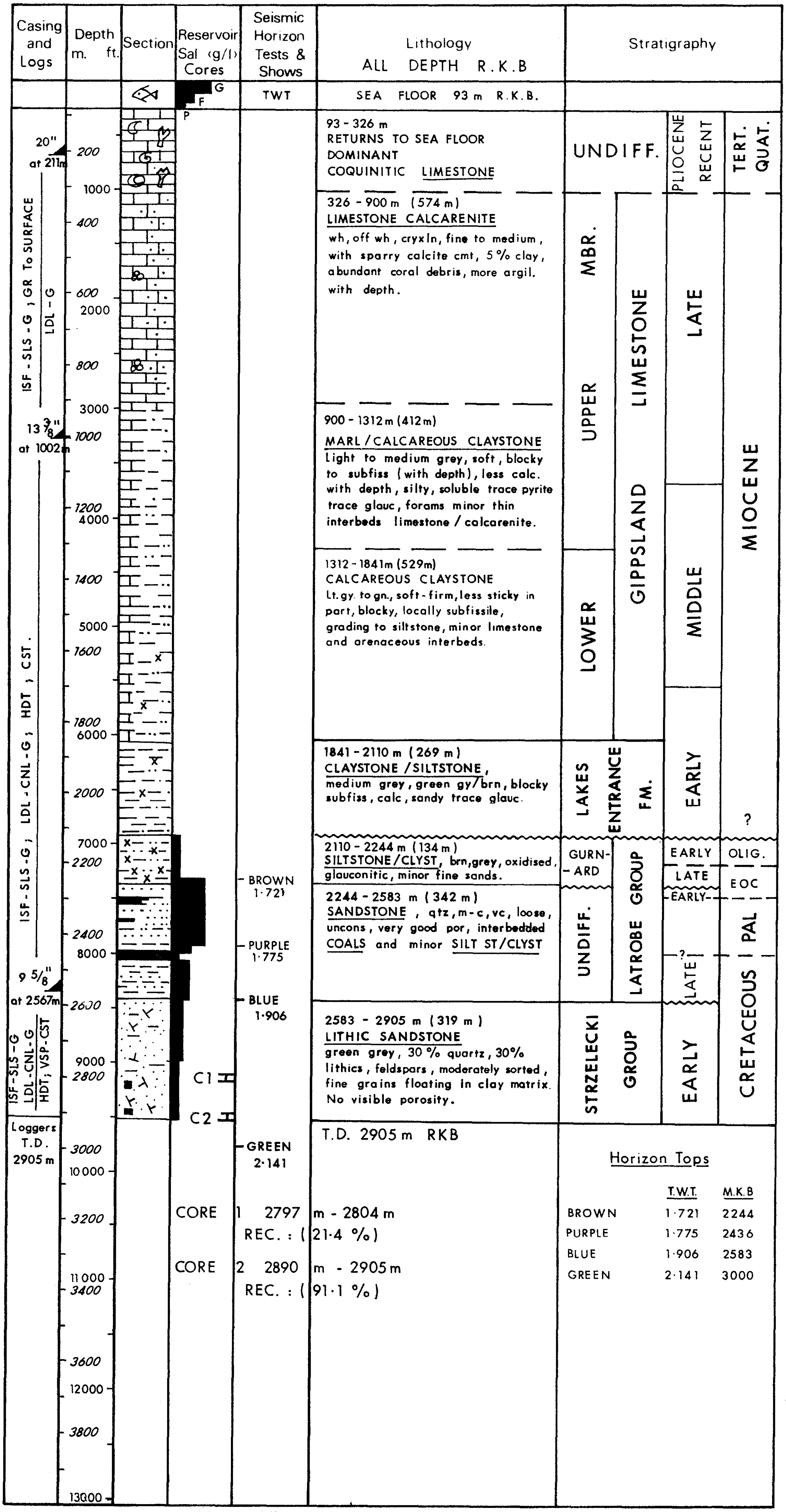
PG 195/83
Author: K. LY
Date: 1-2-83
Base Map No 9112
Reference No. 21464

FIG. 8

AUSTRALIAN AQUITAINE PETROLEUM PTY LIMITED

TARRA - No. 1

COMPLETED SECTION



Permit VIC P-17

Location SP 440 Line GA81-31

Latitude 38° 38' 37·150" S

Longitude 147° 42' 08·207" E

Rig OCEAN DIGGER

K.B. 30·5 m a.m.s.l.

S.B. 62·5 m b.m.s.l.

T.D. 2905 m (9531') R.K.B.

Status P & A

Spudded 4/3/83

T.D. REACHED 3/4/83

RIG RELEASED 21/4/83

Operator

AAP

Cost $8,059,600

Cost/ft.

Objectives

STRZELECKI ACCUMULATION BELOW THE BLUE HORIZON

Structure

TILTED FAULT BLOCK SEALED BY FAULTS.

Comments

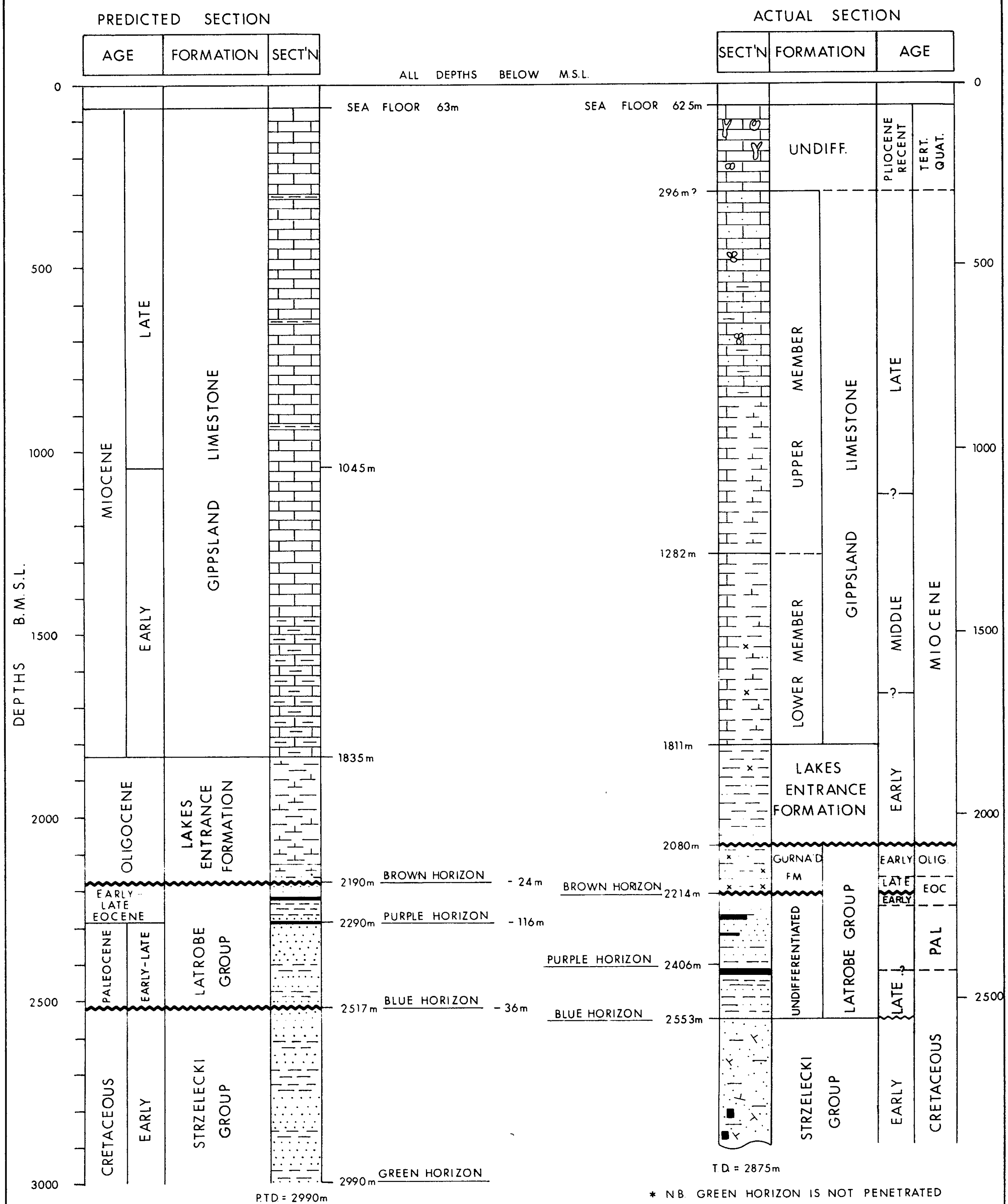
1. No reservoir potential were found in the Strzelecki sediments.
2. No tests conducted on lack of shows.

Author: P. CHAN

Date: APRIL 1983

Base Map No 9112

Reference No. 21757



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VIC/P17

GIPPSLAND BASIN

TARRA No.1

COMPARISON OF PREDICTED TO ACTUAL DRILLED SECTION

Author : P.N.K. CHAN	Date : JULY 1983	Dwg. No. : 22033	FIG. 7
Drafted by : R.E.	Report No. : PG195/83	Base Plan :	

IV GEOLOGY CONT.

D. STRUCTURE

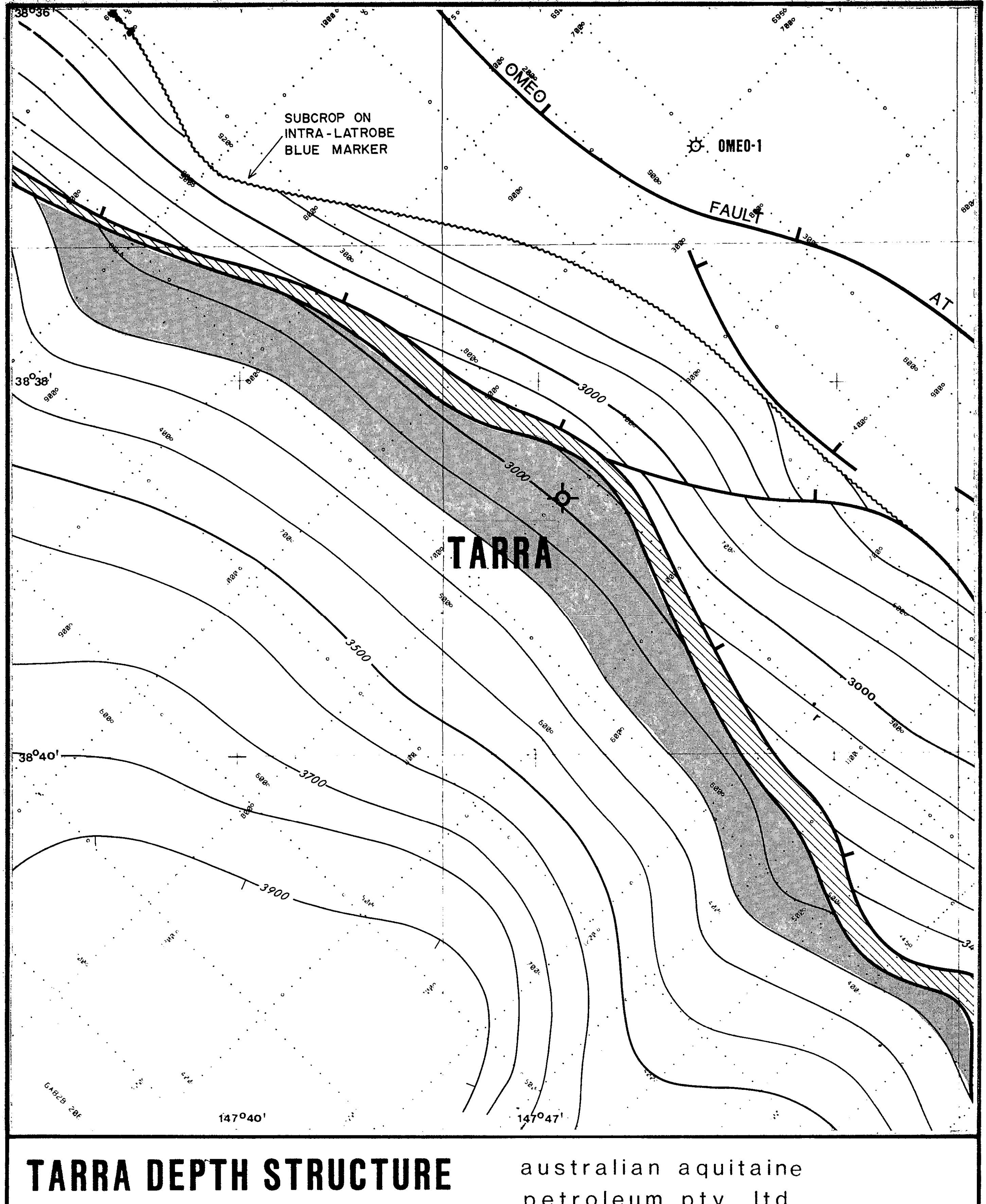
The Tarra Structure represents a tilted fault block of Strzelecki sediments. The upper surface of the block is truncated and overlain by the Latrobe sediments.

Closure is formed on the upthrown blocks by updip of sediments and juxtaposed on the fault plane acting as a seal. Below the Blue Marker, which is picked as the base of the Latrobe Sediments, the Strzelecki beds dip consistently at approximately 15^{o} to the southwest based on seismic section. The dip is confirmed by dipmeter patterns which show consistent dips averaging 10^{o} SW in the Strzelecki sediments below 2583m KB in Tarra No. 1 location

The downthrown block of the normal fault is still principally the Strzelecki near the well with the Latrobe formation becoming thicker laterally to the southeast.

There is no structural closure in the top Latrobe Formation, vertical seals are presumed to be present in the intra and basal Latrobe argillaceous sequence to seal the Strzelecki play. The play concept also requires the fault plane to act as a seal against updip migration and at the same time as a conduit for lateral migration of hydrocarbons from deeper Latrobe sediments in the southeast.

Mapped at the level of the Blue marker interpreted as the top of the Strzelecki sediments, structural closure is calculated to be $0.5km^2$. At the level of the Intra-Strzelecki Green Marker, the structure is interpreted to have a closure of $9.6km^2$ (Fig. 8).



TARRA DEPTH STRUCTURE

Contour Interval: 100m

Datum: Sea Level

SCALE 1:50 000

0 500 1000 2000 Metres

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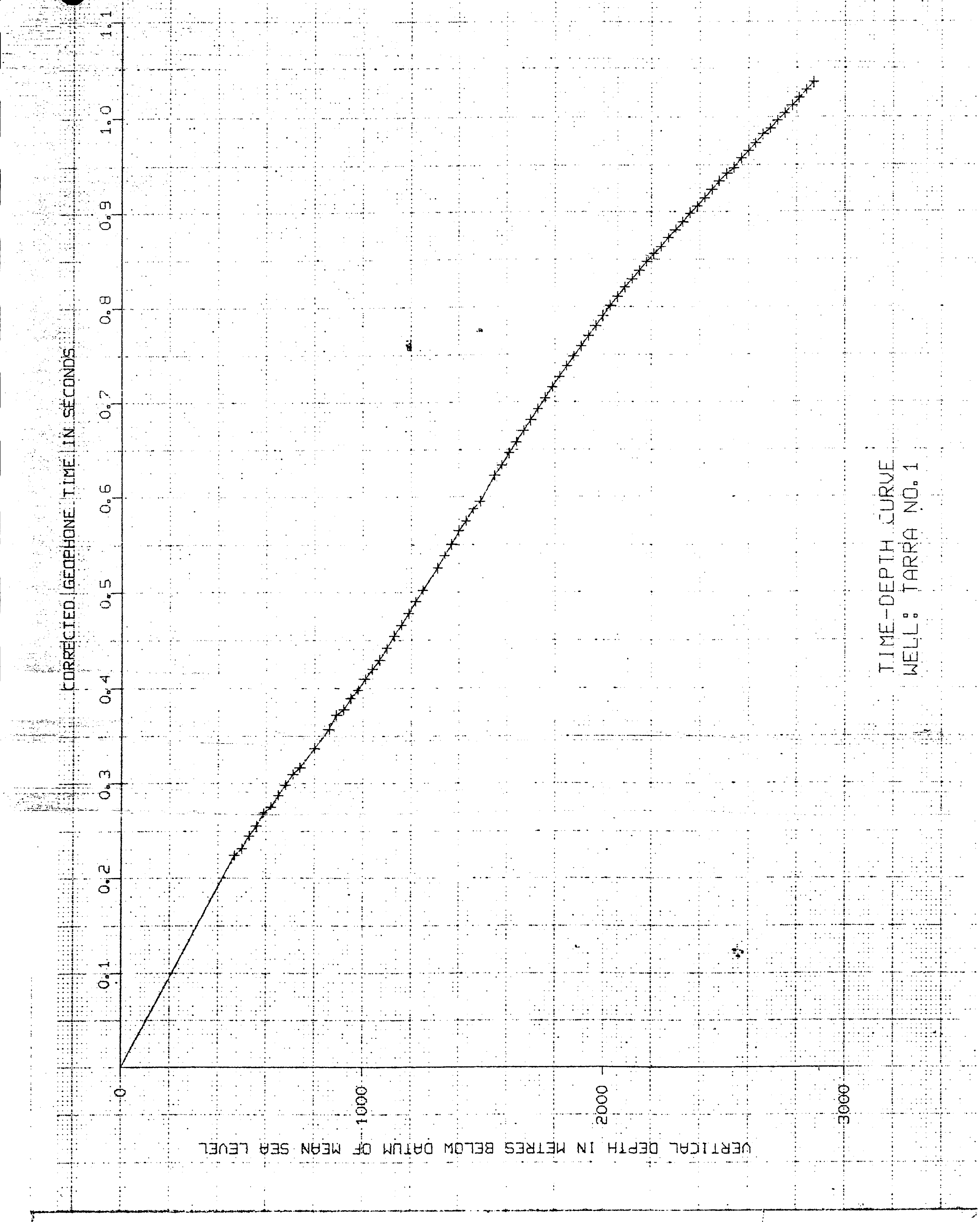
GIPPSLAND BASIN

VIC/P17

DEPTH TO INTRA-STRZELECKI GREEN MARKER

Author: C. HODGE	Date: FEBRUARY 1983	Dwg No: 22026	FIG.
Drafted By: L. BAILEY	Report No PG 195/83	Base Plan: 21394	8

TARRA-1. TDC.



TIME-DEPTH CURVE
WELL: TARRA NO.1
CORRECTED GEOPHONE TIME IN SECONDS
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
0
1000
2000
3000
VERTICAL DEPTH IN METRES BELOW DATUM OF MEAN SEA LEVEL

IV GEOLOGY CONT.

E. RESERVOIR PROPERTIES AND SOURCE ROCKS

Reservoirs

The main prospective reservoir sequence in the Gippsland Basin is the Late Cretaceous to Late Eocene Latrobe Group. Porosities and permeabilities within these sediments are very good. Statistical analyses of core porosities give a mean porosity of 21% with a standard deviation of less than 5%. However shale laminae can greatly affect both porosity and permeability. Permeabilities vary greatly but average at 700 millidarcies (horizontal) and 320 millidarcies (vertical).

In Tarra No. 1, log porosities in the top Latrobe sediments average 23%. Permeabilities are inferred to be excellent from the good development of mudcake in the borehole, and Rt-Rxo logs separation.

The primary objective of the Tarra No. 1 play was to test the reservoir potential of the Strzelecki sediments. To date, sandstones of the Strzelecki Group are generally known to contain very low permeability and thus are not considered as potential reservoirs in the Gippsland Basin. This statement has been confirmed by a recent study made from outcrop examinations and from well cores (Australian Occidental Report, 1982). However there was a possibility that subaerial exposure of the Strzelecki block in the Tarra Structure could have caused secondary porosity and permeability with the dissolution of carbonate cement.

The results of Tarra No. 1 indicate the non-prospectivity of the Strzelecki sediments in this area. Two cores cut in the Strzelecki gave measured porosities of 5.9%-12.3% (average 8.5%) and permeabilities of 1.6 - 7.6 md (average 5.2 md). The high clay matrix of the typical subarkosic, lithic sandstone and the alteration of feldspars to kaolinite are the primary detrimental factors inhibiting reservoir improvement. Neither cuttings nor logs indicate any sign of permeability.

Source Rocks

Source-rock analyses were carried-out in the Miocene to Early Cretaceous sediments from 1916m to 2902m by AMDEL. Examination of spores and pollens was made by W. Harris consultant.

AMDEL LABORATORY

Total organic carbon and rock-eval pyrolysis data on 21 side-wall cores and 4 convential core samples.
Description of Dispersed Organic Matter on 25 samples.
Vitrinite Reflectance on 5 samples.

W. HARRIS Consultant

Evaluated the percentage of the different classes of Organic Matter and Thermal Alteration Index on 37 samples from 2085 to 2880m.

General Results

Miocene and Oligocene (=Lakes Entrance Fm.) from 1916 to 2146m.

These marine sediments, rich in dinoflagellates, are dominated by amorphogen or inertinite, tending to gas-prone type IV composition, inherited from coaly land plants. Very poor as a source bed.

Eocene from 2146 to 2245m (= Gurnard Fm.).

The Gurnard Fm. is also rich in inertinite and thus is not a source. However the exinite particles are mostly oil and bitumen.

Latrobe Fm. (Eocene to Campanian) from 2245 to 2581.

Coals and carbonaceous shales of this interval, particularly in the Paleocene and Maastrichtian sediments, contain oil-prone type III humic organic matter, have good hydrocarbon yields and are very good oil source rocks. Source of the samples do not contain sufficient of organic matter.

Strzelecki (Early Cretaceous Undifferentiated) from 2581 to T.D. 2905m.

Contains inertinite and vitrinite but with a very low hydrogen index. In TARRA-1 it is a poor gas-prone source rock.

Maturation

While TAI are low to very low (≤ 2) in all the drilled formations, Vitrinite Reflectance Ro varies regularly from .48 in the Paleocene to .51 in the Maastrichtian - Campanian before rising slowly to .69 near T.D. This reflects only a gently erosion on top of the tilted block.

Since the top oil generation window is reached when Ro = 70 for most of the Non-resinitic organic matter, most of the good source rocks encountered in TARRA-1 well will be matured when buried around 3000m.

The presence of oil in fewer resinitic samples, like the coal at 2427m, shows that some oil could be produced from the Paleocene source beds.

However the oil shows encountered in the Gurnard Fm. at 2192.1 and 2232.5m are to be explained by migration, possibly from the Paleocene coal.

IV GEOLOGY CONT.

F. RELEVENCE TO THE OCCURRENCE OF HYDROCARBONS

1. Maximum ditch gas peaks recorded during the drilling of Tarra No. 1 was 6.0% C1 at 2478m and 2494m associated with coals in the intra Latrobe sequence. Background gas recorded was 0.1%-0.2% C2 and minor gas peaks are also associated with coals and carbonaceous layers.

2. In the objective Strzelecki sediments, maximum ditch gas recorded was 0.2% C1. Logs indicate the sequence to be water saturated with very poor permeability.

3. There is no structural closure in the Top Latrobe coarse clastics. This sequence has excellent reservoir characteristics, typical of the producing reservoirs, but is void of any hydrocarbons.

Evaluation of the sequences penetrated is summarised below:

In the 12-1/4" hole section, the zone of interest lies between 2245m to 2580m KB. The caliper indicates excellent hole conditions with minor rugosity in coaly, carbonaceous layers. Mud cake is developed in most permeable zones.

DEPTH	SP	GR	RILD	PB	ØN	T	T	Øpb/N	SW
2250	10	23	0.6	2.3	21	87	24	24	100
2258	10	28	1.0	2.2	23	92	28	28	80
2266	-10	23	0.75	2.35	23	97	24	23	100
2275	15	100	10.0	2.48	18	72	1	16	SHALE
2289	15	38	1.0	2.33	18	82	20	21	100
2308	15	125	10.0	2.55	21	73	13	15	SHALE
2310	15	38	1.0	2.28	19	85	22	24	90
2335	-8	30	0.9	2.26	21	82	20	25	92
2367	12	40	1.3	2.32	17	80	18	21	88
2403	-8	40	1.0	2.25	20	84	21	25	85
2423	-6	38	1.2	2.38	18	84	21	19	100
2451	-15	38	1.5	2.30	19	90	26	23	77
2503	15	90	3.8	2.40	22	84	21	20	SHALE
2550	-	45	1.5	2.30	19	78	17	23	77

SP calculations show a RW of about 0.06 ohm-m. A RT VS porosity plot shows a range of 0.05 to 0.07 ohm-m. For SW calculation, an RW of 0.06 was used; R shale is 8.0 ohm-m; and the Indonesian equation is computed. No clay corrections are made for porosities.

In the 8-1/2" hole section, the formation logged is typical of Strzelecki sediments. The Strzelecki is easily distinguished by the higher resistivity readings of about 6 ohm-m for the sandy sections compared to a value of about 1 ohm-m in the Latrobe.

No indications of hydrocarbons are observed; RILD is lower than RSFL, there is virtually no separation between the two logs inferring the low permeability of the formation. The caliper log does not show any development of mud cake.

The high clay content of the sediments (clay matrix and cement) is reflected by the high gamma ray and also high neutron and density readings.

Both sonic porosity and crossplot porosity plotted are indicative of clay porosity values or of dispersive clay in the rock unit. Porosities after clay corrections average 5-10%.

IV GEOLOGY CONT.

G. CONTRIBUTION TO GEOLOGICAL CONCEPTS RESULTING FROM DRILLING

1. The sequence penetrated in Tarra No. 1 are consistent with predicted lithology and structure.

2. Age dating by palnology inferred a thin Early Eocene sequence, reflecting a paleohigh of the Tarra structure in post Paleocene time.

3. No Late Cretaceous sediments were predicted for the Tarra play; with the original concept that in the proximity of Tarra, the Late Cretaceous unconformity overlying the Strzelecki sediments was considered to be an erosional surface followed by a period of non deposition. Palynological results of a possible Late Cretaceous sequence (T. Longus) in Tarra No. 1 suggest that the Strzelecki tilted block had not influenced depositional patterns during post Early Cretaceous times. Non marine sediments deposited in a fluvio - alluvial environment dipping 2-6 N overlie the tilted Strzelecki block with sediments dipping 6-15 SW deposited in a distal alluvial fan and braided stream complex.

APPENDIX 1

LITHOLOGICAL DESCRIPTIONS - CUTTINGS SAMPLES

TARRA NO/ 1

APPENDIX I - TARRA NO. 1

CUTTINGS SAMPLES DESCRIPTIONS

KB	30.5m	amsl
SB	62.5m	bmsl

All depths relate to Rotary Kelly Bushing at zero tide datum (Low Water Indian Springs) which is 93 metres above seabed.

SB - 219m	:	No returns to surface - 26" hole.
219 - 290m	:	Coquinitic limestone, white, grey, brown, cryptocrystalline, abundant corals, shells, trace forams, traces siltstone, grey, firm, blocky in pair.
290m - 326m	:	Lost circulation, no returns to surface, samples recaught whilst drilling cement plug indicate coquinitic limestone, yellow, orange brown, white, light grey, hard, cryptocrystalline, with abundant coral fragments and shell fragments.
326m - 400m	:	Limestone, white, off white, hard, generally clear, cryptocrystalline, grading to calcarentic, white, grey, fine medium grained, soft - moderately firm, slightly argillaceous and with abundant fossil fragments of shells, corals and rare forams.
400m - 570m	:	Limestone, calcarenite, white, off shite, light grey, grey, soft - hard brittle, less that 5% clay, fine medium grained with sparry calcite cement, in part grading to coquina limestone (530-550m). Fossil assemblage percentage generally decreasing with depth, and predominantly corals.
570m - 620m	:	Calcarenite, white, light grey, grey, fine - medium grained, sparry calcite cement, less than 5% clay, trace coral debris.
620m - 700m	:	Calcarenite, as above, with increase percentage of fossil debris, predominantly corals, and traces glauconite and carbonaceous material.
700m - 740m	:	Calcarenite, white, light grey, hard to very hard, fine grained to very fine grained, becoming finer and more argillaceous with depth, sparry and chalky calcite cement.
740m - 790m	:	Calcarenite, as above, with increased coral debris, traces glauconite and carbonaceous material, traces grey cryptocrystalline Limestone.

790m - 830m	:	Calcarenite, becoming greyer and more argillaceous with depth with Claystone (from 815m to 830m) grey, light grey, soft, sticky, slightly soluble, washing out in part, seen as fine interbeds and interstitial infilling.
830m - 900m	:	Calcarenite, light grey, grey, firm - soft brittle in part, grading from very fine grained argillaceous to very calcareous Claystone, grey, blocky - amorphous, silty, firm - moderately firm -soft and sticky, slightly soluble, traces carbonaceous specks.
900m - 943m	:	Claystone, grey, blocky, amorphous, silty, generally as above.
943m - 1017m	:	Interbedded Limestone, white, off white, hard, generally clean, crystalline - cryptocrystalline, with traces coral fragments, calcarenite light medium grey, firm, argillaceous and claystone, grey, medium, dark with depth, becoming more soluble and sticky with depth, very calcareous, $CaCo_3$ - 67-83%.
1017m - 1032m	:	Claystone, grey, medium grey, soft, blocky, highly calcareous and calcarenite light grey, off white, very fine grained, argillaceous, trace limestone and forams.
1032m - 1155m	:	Claystone, grading at times to Siltstone grey medium grey, blocky, calcareous, with varying traces of disseminated pyrite, fine grained glauconite and forams.
1155m - 1323m	:	Claystone, light, medium, occassionally dark grey, blocky to subfissile (with depth), becoming less calcareous with depth, soft-slightly firm, silty, soluble, with varying (to 10% of sample) traces of forams and pyrite, very fine grained, and rare glauconite.
1323m - 1415m	:	Claystone, light-medium grey, blocky to sub-fissible, soft, moderately firm, silty, calcareous, with minor siltstone, light grey, off white, blocky, poorly sorted, calcareous high glauconite content at base of section with traces to abundant forams at base.
1415m - 1470m	:	Claystone/Shale. Claystone as above grading with depth to shale, becoming dark grey and more fissile
1470m - 1518m	:	Claystone, light to medium grey, in part white, blocky to subfissile, firm, calcareous, silty, and grading at times to siltstone, light grey, blocky, soft very calcareous, grading to calcarenite. Traces to abundance of forams.

1518m - 1584m	:	Claystone, medium grey, blocky to sub-fissile, calcareous, silty, in part soft and soluble, but generally moderately firm, traces grey/green claystone, generally subfissile. Traces forams, pyrite as replacement and finely disseminated in claystone.
1584m -1675m	:	Claystone, as above, grading in part with depth to shale, with minor thin interbeds of limestone, brown, buff, crystalline cryptocrystalline, hard, clean, in part dolomitic. Traces forams, pyrite, glauconite and vein calcite.
1675m - 1710m	:	Claystone, medium-light grey, blocky, calcareous, moderately firm, occassionally subfissile, rarely grey/green, with high pyrite inclusions and up to 10% of sample being forams, bioturbated?
1710m - 1746m	:	Claystone, medium-light grey, blocky-sub-fissile, soft moderately firm, calcareous, silty, becoming softer and stickier with depth, with traces pyrite, glauconite and forams.
1746m - 1764m	:	Claystone, light medium grey, blocky, silty, becoming more calcareous with depth, and Calcarenite,white, fine grained, soft, slightly sticky.
1764m - 1841m	:	Claystone,medium to dark grey, rarely grey/green, soft-slightly firm, silty, blocky-fissile, in part grading to shale, with occassional trace forams and trace buff dolomite. One piece brown very fine grained Sandstone in 1815 sample.
1841m - 1902m	:	Claystone, medium to dark grey, blocky to subfissile, soft to moderately firm to brittle, calcareous, silty, and traces of Limestone, white, light brown-calcarenitic, crystalline, hard.
1902m - 1929m	:	Finely interbedded Claystone, grey, medium grey, grey/green, blocky to subfissile, silty, calcareous and Siltstone, light to medium grey in part light brown, blocky, calcareous, soft to firmer with depth and traces of disseminated pyrite.
1929m - 1965m	:	Claystone, as above, with abundance of pyrite aggregates, replacement, seen as a burrow infillings and thin laminae, with traces of glauconite and forams.
1965m - 2058m	:	Claystone, medium grey, grey/green, grey/brown, generally blocky becoming subfissile at times, soft-slightly firm, silty, calcareous (30%) and siltstone, light grey, grey/brown blocky, calcareous, poorly indurated, with trace glauconite and at times abundant pyrite (to 10% of sample), rare sand (quartz) grain 'Floaters' are irregularly dispersed.

2058m - 2075m	:	Claystone, medium grey, blocky, moderately firm, calcareous, silty, traces pyrite, very fine grained, disseminated and rare glauconite. Calcimetry 25%.
2075m - 2088m	:	Claystone/Shale, grey medium grey, grey/brown, grey/green, blocky, slightly firm, silty, calcareous.
2088m - 2110m	:	Interbedded Claystone, medium grey, grey/green, grey/brown, blocky, calcareous with 'floaters' of very fine grained quartz and Siltstone, light to dark brown, blocky, calcareous, laminated, with loose fine grained quartz floaters, in part very coarse grained and angular, remnants after argillaceous matrix washed away. Minor glauconite and pyrite accessories
2110m - 2135m	:	Sandstone/Calcarenite, white, soft, sticky, very fine grained, grading in part to white, clear, brittle, clean crystalline Limestone, interbedded with Siltstone gradational to Claystone/Marl, very calcareous, light brown, blocky, sticky with rare lithics and abundant glauconite.
2135m - 2158m	:	Siltstone, becoming medium brown, calcareous soft, blocky to laminated with fine quartz floaters, also associated grey brown to green (chlorite) argillaceous fraction with abundant glauconite, dominant medium grained.
2158m - 2185m	:	Siltstone, becoming earthy brown, soft, blocky, very calcareous, glauconite occuring as elongated nodular grains, fine to medium associated subfissile firm claystone, grey brown, light off-green (chlorite?).
2185m - 2236m	:	Interbedded Claystone/ and Siltstone as above, with claystone grading to siltstone with depth and becoming very sandy. Accessories of glauconite, generally nodular, and pyrite, very fine grained and disseminated abound with depth, claystone becomes greener and siltstone grades browner to dark brown. Loose quartz grains, very fine grained, clear and brown stained, subrounded, make up to 30% of sample.
2236m - 2244m	:	Siltstone, dark brown, blocky, soft, calcareous, with quartz 'floaters' ranging from very fine to course grained, generally subrounded and occassionally frosted. Traces pyrite and abundant glauconite.
2244m - 2256m	:	Loose, coarse grained to medium grained quartz grains, shattered in part, subrounded to subangular, glassy, with argillaceous and pyritic material adhering to grain surfaces, and dispersive clay/silt, suggestive of Conglomerate facies.

2256m - 2340m	:	Sandstone, loose quartz grains, clear, milky, white, grading fine to very coarse grained, generally medium to coarse grained, poorly sorted, angular to subrounded, with traces of argillaceous and kaolinitic matrix. From 2316 increase in white, fine grained moderately sorted, moderate visible porosity, poorly cemented sandstone, non calcareous, with minor interbeds of Claystone light grey, grey green, blocky to subfissile, slightly firm, silty, non calcareous, accessories include biotitic and muscovitic mica, glauconite grains and pyrite aggregates. Minor Coals at 2273m, 2292m, 2296m, 2305-2308m, black brittle, vitreous, bituminous (anthracite?) conchoidal.
2340m - 2433m	:	Predominantly loose, medium to very coarse grained Quartz grains, poorly sorted, matrix washed out, traces kaolinite and grey claystone adhering to grain surfaces, angular to subrounded, with interbeds of Siltstone, grey, dark brown, blocky, carbonaceous, non calcareous and Claystone, grey, grey/green, brown/grey, blocky, non-slightly calcareous, silty, micromicaceous thin seams of black, brittle, vitreous, in part woody and soft coals, grading at times to black, fissile brittle Shale. Occassional traces of pyrite as microfracture infillings.
2433m - 2460m	:	Claystone and coarse grained sand interbedded as above, percentage of claystone increasing with depth.
2460m - 2480m	:	Dominant local Coal seams, black, brittle, vitreous in part, occassional woody, lignitic and laminated with silty carbonaceous layers, grading to Shale, black, dark brown, platy, non calcareous highly carbonaceous.
2480m - 2506m	:	Claystone/Shale, dominant brown grey to grey, firm, blocky to subfissile, fissile fraction associated with carbonaceous shale, lignitic laminae, silty, micromicaceous calcareous in part, local loose fine to medium quartz grains, fine trace glauconite, pyrite, local coal seams to 2494m. Black, brittle, vitreous in part occassional woody, lignitic and laminated with silty carbonaceous layers, local arenaceous layers, quartzose, fine to medium, subrounded.
2506m - 2509m	:	Sandstone (60%), white to frosty, quartzose, fine to medium, local medium, subrounded, gen loose, cemented in part, calcareous, argillaceous matrix with silty. Argillaceous layers (40%).
2509m - 2525m	:	Claystone, gradational to Siltstone, grey, brown, grey, carbonaceous laminae, firm, interbedded with sandy layers, generally fine to medium poorly sorted, subrounded, argillaceous matrix, loose, also cemented with clay/kaolinite coatings on grain surfaces.

2525m - 2568m	:	Sandstone, quartzose, clear to frosty, dominant loose medium to coarse, subangular to subrounded, moderate to well sorting, fair to good porosity, minor clay kaolinite cement, good trace pyrite, also filling pore interstices, thin silty Claystone layers associated rounded glaucontie grains, drilling break at 2546m associated with finer, well sorted sands in a coarsening downwards sequence.
2568m - 2582m	:	Siltstone (50%), gradational to Claystone, grey white, also brown grey, firm, blocky, fissile fraction associated with carbonaceous, micaceous laminae, also mottled with carbonaceous specks and rounded glauconite grains, loose poorly sorted quartz grains minor pyrite and rounded cherty grains. Interbeded sandy/claystone layers (50%) generally as above local medium to coarse grained quartz, in part pebbly, subrounded, angular fractured grains suggestive of conglomeratic unite, also soft, greyish clay, plastic and sticky (river clay?).
2582m - 2586m	:	Claystone/Shale, grey, associated with fine grained disseminated pyrite (10%), silty and sandy in part, also siliceous. Pyrite occurs in blocks and aggregates, also cubic, locally to 50% of sample.
2586m - 2592m	:	Sandstone, offwhite, light grey, sub-lithic, fine grained, moderate sorted, 5-10% rock fragments/lithic, subangular quartz partially recrystalized, well cemented with Clay/Kaolinite/Silica minor quartz overgrowths, poor visible porosity, associated abundant pyrite. No show.
2592 - 2691m	:	Sandstone, Lithic (greywacke), light grey, greenish grey, green, opaque, smokey subangular to subrounded. Quartz grains, fine moderate to well sorted, common clay/kaolinite/white siliceous coatings on grain surfaces, occur as loose aggregates in cuttings sample with 15-30% rock fragments/lithics, fine, subrounded, volcanics? Minor Calcareous calcite grains, siliceous fragments, chloritic. Locally greyish white firm clay (weathered feldspars?). Dominant 40-60% quartz grains, occur in cutting sample as loose, unconsolidated, but believed to be well cemented insitu with poor visible porosity, locally argillaceous in slower rop section and also associated minor lignite, carbonaceous material (5%) at 2623m, 2678m, otherwise monotonous sequence of lithic sandstone.
2691m - 2709m	:	Sandstone, lithic, as above, more argillaceous, finer grained, high content of clay matrix, clay layers, brown grey, firm, blocky, amorphous, slightly dispersive (10-20% quartzose).

2709m - 2720m	:	Sandstone, lithic, (40-50% quartz) light grey, greenish grey, green, opaque, smoky subangular quartz, dominant fine, moderate sorted, occur as loose aggregates with clay/kaolinite/siliceous/ chloritic cement coatings on grains 15-30% lithics, fine, subrounded, volcanics, siliceous, chloritic grains, weathered feldspar.
2720m - 2775m	:	Sandstone, lithic, as above, (30-50% quartzose), vari coloured lithics and quartz aggregates, the cuttings are better cemented in part, crystalline siliceous/kaolinitic/ calcareous cement, grains more subangular and recrystalized boundaries, locally fresh feldspar grains, minor silty carbonaceous claystone, lignite from 2760 - 2763m.
2775m - 2781m	:	Sandstone, lithic as above (20-30% quartzose) minor Siltstone, grey to brown, firm, blocky, slightly dispersive, slightly carbonaceous, high clay content resulting in bit balling up.
2781m - 2797m	:	Sandstone, lithic, more arenaceous in part (40-50% quartz), feldspathic in part with crystalline siliceous/kaolinitic cement. No visible porosity.
2797m - 2798.5m	:	(Core 1 - 2797m - 2804m; Recovered 1.5m) Lithic sandstone, light grey, green grey, 50% quartzose, fine, subangular, moderate to well sorted, well cemented, silica/kaolinite, slightly calcareous, argillaceous matrix, 10% feldspathic (dominant weathered to kaolinite grains retaining euhedral crystal shape), 20% rock fragments and lithics, green to dark grey, also lignitic grains, minor muscovite, weathered biotite, also microfractures, annealed by later diagenesis and destroying most porosity, very poor to nil visible porosity. No fluorescence. Environment of deposition interpreted as non marine possible levee to overbank deposits/alluvial fan.
2798.5m - 2804m	:	No recovery.
2804m - 2817m	:	Sandstone, lithic to subarkosic, light grey, 30-50% quartzose, fine, moderate sorted, well cemented with silica/kaolinite/minor calcareous cement, subangular with overgrowths and recrystalised grain boundaries, 10% feldspathic/kaolinite clay 10-30% rock fragments, lithics, greenish grey to dark grey trace lignite, carbonaceous material, common clay matrix and silty layers. No. show.
2817m - 2827m	:	Lithic Claystone, brown grey to grey, with 10-20% quartz grains and 10-20% lithics floating in clay matrix, slightly calcareous, kaolinitic and siliceous in part.

2827m - 2856m : Lithic Sandstone, subarkosic, grey, 20-40% quartzose, fine, moderate to poor sorting, 20% lithics, 20-40% silty and argillaceous, 5-10% carbonaceous and slightly calcareous.

2856m - 2882m : Lithic, Claystone, brown grey, firm to hard, blocky locally subfissile, in more carbonaceous and micromicaceous fractions, silty, generally non calcareous, slightly dispersive and sticky, dominantly argillaceous, minor interbeds of more arenaceous layers, calcareous, with quartz and lithics well cemented in clay matrix, also common lignite and carbonaceous material (5%).

2882m - 2890m : Lithic Sandstone/Claystyone, more arenaceous in part, with 20-40% quartz grains and lithics floating in an off-white kaolinitic matrix, more feldspathic than above sediments.

CORE 1 RECOVERY 13.67m (2890m - 2905m)

2890m - 2893.2m : Lithic Sandstone, grey green, hard, mottled salt and pepper texture, 30% quartz, clear to frosty, opaque, subangular, well sorted, 30% lithics/rock fragments, green, orange, red, subrounded, minor biotite (weathered), chloritic. 20% feldspar, occur mainly as kaolinite pseudomorphs and few grains of fresh feldspar. 20% clay matrix/kaolinite cement. Rock type is well cemented with no visible porosity, also associated coal/ lignite laminae, occur disseminated or blocky as remnants of wood debris, generally black, hard, vitreous, conchoidal.

2893.2m - 2894m : Lithic Sandstone, as above, becoming poorly sorted with coarse to pebbly clay fragments, elongated along grain matrix subrounded to rounded, also medium to coarse quartz grains, opaque to clear, fractured, subrounded floating in clay matrix, associated high coal/lignite content, plant/wood debris, minor dish structures and fine carbonaceous laminae.

2894m - 2898m : Lithic Sandstone, grey green, hard, salt and pepper texture as above, fine grained, moderate sorted, massive with no visible structures, well cemented with poor to nil visible porosity. No fluorescence.

2898m - 2903.67m : Lithic Sandstone as above, with thin coarser feldspathic layers, generally weathered down to kaolinite and minor coal/lignite laminae, minor weathered mica flakes (biotite)and occassional lithic/clay pebbles.

2903m - 2905m : Total Depth
No Recovery

APPENDIX II

SIDEWALL CORE DESCRIPTION

APPENDIX II

SIDE WALL CORES DESCRIPTION

CST NO. 1: SHOT 30: RECOVERED 30 (2568m - 2105m)

1.	2568m	(20mm)	Sandstone, white, quartzose, friable, very fine to fine, locally medium, poorly sorted with quartz grains floating in an argillaceous matrix, calcareous in part, generally cemented with white clay (Kaolinite).
2.	2562.5m	(20mm)	Sandstone, clear to milky, quartzose, very fine to medium, moderately sorted, friable, poorly cemented, occassional calcareous cement, poor primary porosity, porosity differs with cementation and consolidation, fine laminae of dark grey silty claystone.
3.	2556m	(26mm)	Shale, dark grey, carbonaceous, soft, silty micaceous with very fine to fine, subangular moderately sorted, clean milky sandstone, fine quartzose and poorly cemented (kaolinite), poor visible porosity.
4.	2543m	(15mm)	Shale, brown grey, carbonaceous, silty, micaceous slightly calcareous with coal/ lignitic laminae and very fine laminae of arenaceous material.
5.	2536m	(20mm)	Sandstone, clean, quartzose, milky to clear, very fine to coarse, poorly sorted, subangular to subrounded generally loosely cemented, fair porosity partially destroyed by quartz overgrowths disseminated clay and pyrite. No fluorescence.
6.	2533m	(20mm)	Sandstone, clear, milky, friable, poorly consolidated, very fine to fine, moderate to well sorted, clay matrix, very fine grains of disseminated pyrite, poor visible porosity, fine coal particles, minor dark brown/grey silty, micaceous, carbonaceous layers.
7.	2511.5m	(20mm)	Shale, dark grey, carbonaceous, silty, micaceous, with fine arenaceous layers and inclusions.
8.	2501m	(15mm)	Shale, carbonaceous, silty, brown grey, micaceous, very fine sandy layers/ incluscions, fine coal/ black carbonaceous material.

9.	2474m	(16mm)	Claystone, grey, massive, firm, slightly micaceous, slightly calcareous with plant debris and lignitic material.
10.	2468m	(38mm)	Coal, black, shiny, vitreous, conchoidal with interbedded laminae of carbonaceous brown/black shale.
11.	2445m	(28mm)	Claystone/shale, light grey brown, massive slightly micaceous, generally non calcareous.
12.	2427m	(36mm)	Coal, black, vitreous, conchoidal bituminous, with minor dark grey carbonaceous shale.
13.	2411.9m	(20mm)	Shale, brown grey, firm, massive, fissile with local lignitic and carbonaceous streaks, generally no calcareous.
14.	2382m	(25mm)	Shale, brown grey, carbonaceous, firm to blocky, fissile in part with woody, carbonaceous, laminae, generally amorphous.
15.	2362.1m	(20mm)	Shale, grey to brown grey, firm massive, with conchoidal fractures, minor lignitic laminae, very slightly calcareous in part.
16.	2335m	(30mm)	Sandstone, white, tan quartzose, friable, dominant medium, subangular, poorly sorted, locally moderate sorted with good porosity, also well cemented locally with clay and kaolinite filling pore spaces and minor quartz fluorescence
17.	2305.5m	(35mm)	Coal/carbonaceous shale, brownish black, firm amorphous, generally woody, fissile, more carbonaceous shale characteristics, with minor lignitic fragments. No fluorescence or cut.
18.	2274m	(15mm)	Claystone, white to light grey, soft to firm, massive, calcareous, white local grey clay laminae, generally kaolinitic appearance.
19.	2265m	(10mm)	Pyritised Claystone, (50%), labile, poorly sorted with pyrite grains, medium to coarse quartz, silt in an argillaceous matrix.
20.	2250.5m	(25mm)	Sandstone, quartzose off white, friable fine to coarse, poorly sorted subrounded, very good visible porosity. Local patches of poor porosity in cemented part with fine sand and clay filling minor pore spaces. No fluorescence.

21.	2241m	(30mm)	Claystone, gradational to siltstone, brownish bue with floating glauconite grains in clay matrix, local dark greenish weathered chlorite?
22.	2237m	(33mm)	Claystone, gradational to Siltstone, brownish grey, firm, soft in part, abundant glauconite grains also weathered patches of green chlorite, weathered mica, in argillaceous matrix, slightly calcareous in part.
23.	2232.5m	(30mm)	Siltstone, gradational to claystone, as above firm, brownish reddish hue, abundant glauconite grains and fine white flakes of mica, very slightly calcareous.
24.	2220.9m	(45mm)	Siltstone, gradational to Claystone, firm, brownish grey, common glauconite grains local white flakes of muscovite, white clay spots (kaolinite/feldspathic pseudomorphs).
25.	2208.1m	(40mm)	Silstone, gradational to claystone, brown, brown grey with slight reddish hue, (oxidised in part), massive with poorly sorted, silty, fine glauconite and quartz grains.
26.	2177.5m	(28mm)	Siltstone, grey brownish grey, firm, blocky, abundant glauconitic grains floating in clay matrix, local fine sand grains.
27.	2145	(35mm)	Shale, grey, firm, amorphous, massive, rare trace glauconite, siliceous in part.
28.	2122.1m	(30mm)	Shale/Siltstone, grey, greenish grey, becoming more arenaceous in part with coarser gluaconite grains, poorly sorted and floating grey white clay matrix, local brown clay laminae.
29.	2113m	(32mm)	Shale, grey to light grey, generally as above, with abundant glauconitic grains, chlorite, white argillaceous material (kaolinitic), silty in part, with minor brown clay laminae.
30.	2105m	(40mm)	Shale, grey to dark grey, massive, firm, amorphous, subfissile, siliceous in part, locally green (chlorite) with trace glauconite grains slightly calcareous in part.

SIDE WALL CORES DESCRIPTION

CST NO. 2: SHOT 30: RECOVERED 29 (2314m 1046m)
MISFIRED 1

1.	2314m	(20mm)	Sandstone, clear, frosty, quartzose, fine to medium, subangular, moderately sorted, friable, poorly cemented, fair porosity, fine dissemenated pyrite, rare micaceous spots, also locally cemented with high clay content.
2.	2257m	(22mm)	Sandstone, clear to white, quartzose, fine to very fine, subangular, well sorted, moderately cemented, fair porosity, very fine streaks of carbonaceous material and coal.
3.	2192.1m	(40mm)	Claystone, earthy brown, calcareous, silty, glauconitic.
4.	2160m	(48mm)	Claystone/Siltstone, grey, grey brown, fissile, calcareous, slightly micaceous.
5.	2135m	(35mm)	Claystone, greenish grey, grey brown, very calcareous, abundant glauconite.
6.	2117.1m	(30mm)	Claystone, grey brown, very calcareous, slightly arenaceous in part, gluaconitic.
7.	2108m	(43mm)	Claystone, light brown, grey, rare glauconite grains, calcareous, pyritic.
8.	2095m	(45mm)	Marl/claystone, grey to light brownish grey, rare trace glauconite, calcareous, firm, soluble and dispersive in part, massive, minor calcareous lithic grains.
9.	2085m	(25mm)	Marl/claystone, grey, low trace gluaconite, silty and slightly arenaceous.
10.	2060.1m	(45mm)	Marl/claystone, grey, brown, grey low trace of gluaconite.
11.	2020.1m	(40mm)	Marl/claystone, brown, grey, good trace glauconite grains, very silty, slightly arenaceous in part.
12.	1985m	(40mm)	Marl/claystone, calcareous grey, brown, grey, as above, rare glauconite.
13.	1940.1m	(38mm)	Claystone/marl, grey, calcareous, firm, massive, rare trace glauconite grains.
14.	1916.1m	(50mm)	Claystone/marl, massive grey, subfissile in part, less silty.

15.	1895.1m	(45mm)	Claystone/marl, grey, calcareous, as above, locally brown grey in part.
16.	1867.1m	(35mm)	Claystone/marl, grey as above, less calcareous in part.
17.	1857m	(35mm)	Marl/claystone, grey as above, firmer in part.
18.	1844m	(35mm)	Marl/claystone, grey soft to firm, silty with coarse, chlorite calcareous fragmnets slightly arenaceous in part.
19.	1836.1m	(55mm)	Marl/claystone, grey more firmer in part, subfissile, calcareous, silty.
20.	1816.9m	(55mm)	Marl/claystone, grey, silty, firm, locally subfissile.
21.	1790m	(55mm)	Marl/claystone, grey, silty, locally subfissile/flakey in part.
22.	1752.1m	(45mm)	Marl/claystone, grey, silty, calcareous with white calcareous spots/forams.
23.	1694.9m	(55mm)	Marl/claystone, firm, plastic, non silty.
24.	1627m	(60mm)	Marl/claystone, as above, non silty, massive, grey.
25.	1544.1m	(45mm)	Marl/claystone, calcareous, silty as in (29), grey.
26.	1432.6m	(50mm)	Marl/claystone, grey, calcareous, as above, massive, no visible structure, disseminated fine pyrite, minor calcareous fragments.
27.	1389m	(35mm)	Claystone/marl, soft, sticky, grey, massive, calcareous.
28.	1282m	(50mm)	Claystone/marl, grey to dark grey, massive, silty, calcareous.
29.	1134m	(40mm)	Claystone/marl, grey to dark grey, calcareous, firm, massive, silty in part, locally disseminated calcite grains, disseminated fine pyrite, minor calcareous fragments associated forams fossils.
30.	1046m		MISFIRED

SIDE WALL CORES DESCRIPTION

CST NO. 3: SHOT 30: RECOVERED 30 (2879.9m -2570m)

1.	2879.9m	(26mm)	Claystone, grey, slightly silty and micaceous, non calcareous, trace of carbonaceous debris.
2.	2856.4m	(25mm)	Lithic sandstone, quartzose (40%) clear to frosty, medium, moderately sorted, subangular - salt and pepper texture lithics (60%). Green, black, medium to very fine, subangular rare felspars and mica, weathered felspars. Kaolinitic cement, slightly calcareous, carbonaceous debris, (plant debris).
3.	2820m	(35mm)	Claystone, brown grey, brittle, slightly, silty, micaceous, calcareous, finely laminated, carbonaceous debris.
4.	2793m	(21mm)	Lithic sandstone as (2), very fine to fine, less black lithics, flakes of biotite and carbonaceous debris, no Fluorescence or cut.
5.	2776.1m	(27mm)	Lithic sandstone as (4), with reddish lithics.
6.	2751m	(25mm)	Lithic sandstone, fine, rare reddish, light green, lustrous lithics and lithic claystone with quartz lithics and silts floating in kaolinitic matrix.
7.	2722m	(28mm)	Claystone, grey green, firm, brittle, with carbonaceous debris, slightly calcareous.
8.	2704m	(35mm)	Claystone, grey green, firm, brittle, no calcareous.
9.	2698m	(35mm)	Lithic sandstone, quartz (40%), frosty, salt and pepper texture, subangular, fine to medium, moderately sorted, varicoloured lithics, coal, kaolinitic cement, slightly calcareous, poor to nil visible porosity.
10.	2676.2m	(24mm)	Lithic sandstone, as (9), more coal fragments, with green, reddish, grey green, and rare black lithics.
11.	2656.1m	(19mm)	Lithic sandstone, as (9), salt and pepper texture, fine to medium.

12.	2644m	(20mm)	Claystone, grey brown, firm, brittle, non calcareous, very fine laminae and grains of carbonaceous material.
13.	2633m	(23mm)	Claystone, grey green, firm, brittle slightly calcareous, with very fine mica and carbonaceous grains.
14.	2622.9m	(42mm)	Claystone, grey brown, soft, sticky, non calcareous, trace of carbonaceous material.
15.	2616m	(30mm)	Lithic sandstone, fine, with coal fragments, as (9), quartz (40%), frosty, salt and pepper texture, moderately sorted with varicoloured lithics, clay matrix, kaolinitic, slightly calcareous.
16.	2608.1m	(32mm)	Lithic sandstone, as (15), dominant fine grained with more green lithics.
17.	2604m	(31mm)	Lithic sandstone, as (15), salt and pepper texture, fine grained, clay/ kaolinitic matrix, poor to nil visible porosity.
18.	2599m	(35mm)	Claystone, grey green, firm, brittle to labile, very slightly calcareous, with very fine mica and carbonaceous grains.
19.	2595.1m	(22mm)	Lithic sandstone, as (15), salt and pepper texture, fine grained, moderately sorted.
20.	2592m	(24mm)	Lithic sandstone, as (15), with more feldspar dominant as kaolinite pseudomorphs.
21.	2590m	(20mm)	Lithic sandstone, as (15), with numerous black lithics and lithic silty claystone, less feldspathic.
22.	2587m	(15mm)	Sandstone, grey, very fine to fine, silty, with few varicoloured lithics, fresh and slightly weathered pyrite, trace of oxydizations, and claystone, light grey, silty, sandy, calcareous, poor visible porosity. No fluorescence or cut.
23.	2585m	(41mm)	Pyrite, blocky in black, pyritic, calcareous, clay matrix, and patchy also disseminated white kaolinite.

24	2582.5m	(23mm)	Loose Quartz, frosty to white, fine to coarse, angular, in white kaolinitic matrix and claystone, black, silty, calcareous. No fluorescence cut.
25.	2580.9m	(29mm)	Loose Quartz, frosty to white, very fine to fine, white kaolinitic matrix, labile, traces of pyrite, few lithics and coal.
26.	2579m	(23mm)	Loose Quartz, as (24), also poorly cemented, labile, very fine to fine, laminae of carbonaceous material. Traces of pyrite. Weathered sandstone? Angular to subangular poorly sorted, clay/kaolinitic matrix.
27.	2577m	(25mm)	Sandstone, poorly cemented, as (26), quartzose, very fine to fine locally coarse, frosty, white to grey, angular to subangular poorly sorted, soft kaolinitic cement, rare trace lithics, minor coat/lignite grains, trace pyrite and mica, inferred fair porosity.
28.	2575m	(23mm)	Sandstone, as (26), poorly sorted, quartzose, liable, poorly cemented.
29.	2573.5m	(16mm)	Sandstone, as (26), quartzose, fine to coarse, poorly sorted.
30.	2570m	(27mm)	Sandstone, as (26), dominant quartzose, fine to coarse, poorly sorted, no apparent kaolinitic matrix, inferred fair to good porosity.

APPENDIX III

CORE DESCRIPTION AND ANALYSES

CORE DESCRIPTION

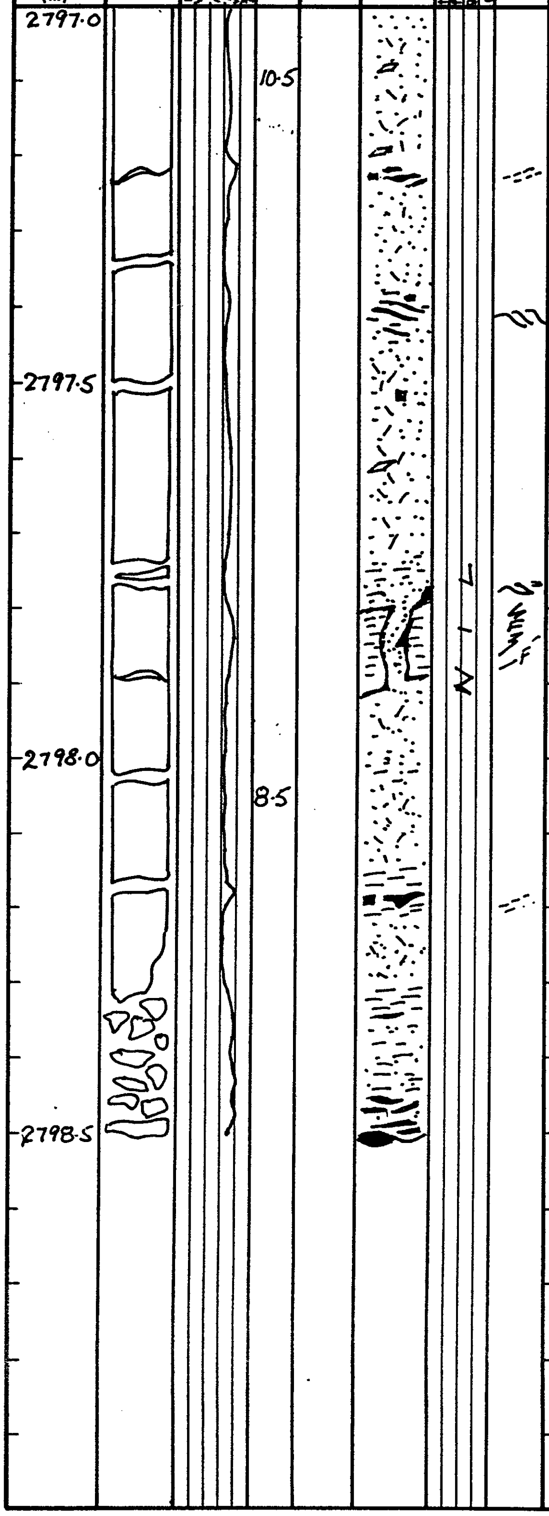
AAP

PERMIT	VIC P-17
BASIN	GIPPSLAND

CORING INTERVAL	2797m to 2804m
RECOVERY LENGTH	1.5m
% RECOVERY	21.4%
OPERATION DATE	1/4/83
CORE BARREL TYPE	STRATAPAX 60' DIA
MUD	GEL-POLYMER

WELL	TARRA No. 1
CORE NO.	1
TOP	2797.0m
BASE	2798.5m
GEOLOGIST	P. CHAN

DEPTH (m) | AS RECOV. | GRAINS | Ø | CO_3 | SECT. | Fluo. Dir | STRS. | LITHOLOGICAL DESCRIPTION



LITHIC SANDSTONE, LIGHT GREY, GREEN GREY, 50% quartzose, fine grained, subangular, moderate to well sorted, well cemented, siliceous / kaolinitic, common quartz overgrowths, 10% feldspathic, dominant weathered to kaolinite, many retaining euhedral / crystal shape, 20% rock fragments, lithics (volcanics ?), siliceous grains, subangular to subrounded, minor lignite carbonaceous material forming laminae and micro cross bedding, otherwise massive; thin argillaceous layers; slightly micromicaceous, very slightly calcareous in part, trace muscovite and rare weathered biotite.

MICROFRACTURES, annealed by later diagenesis

LARGE shale clasts dumped as bedload in fine grained clastics.

common lignite / disseminated coal, brown black, brittle

argillaceous matrix, carbonaceous with lignite / coal, poorly sorted, with spotted orange clay (weathered products)

ROCK TYPE is dominant lithic sandstone, well cemented by diagenesis, fine grained with very poor to nil visible porosity. No fluorescence or show.

ENVIRONMENT OF DEPOSITION.

NON MARINE ; FLOODPLAIN ?

DISTAL ALLUVIAL FAN / BRAIDED STREAM DEPOSITS

Dwg. No.: 19913

CORE DESCRIPTION
AAP

PERMIT VIC P17
BASIN GIPPSLAND

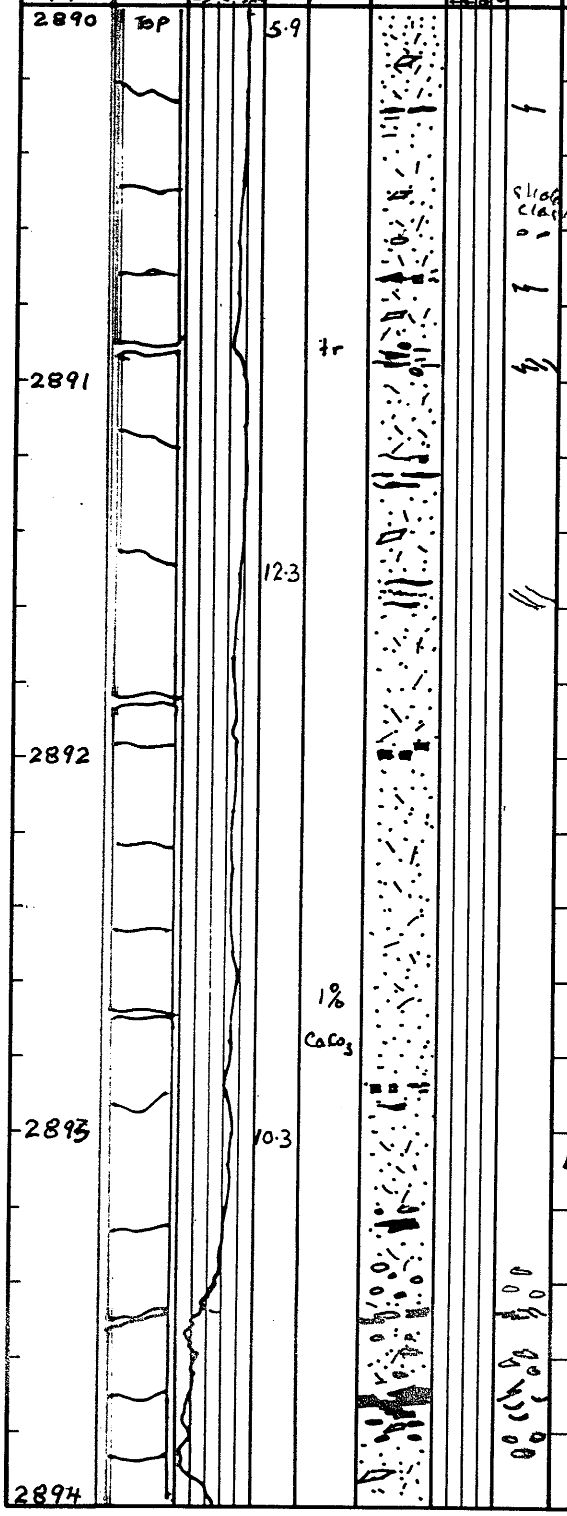
CORING INTERVAL 2890 - 2905m
RECOVERY LENGTH 13.67m
% RECOVERY 91.1%
OPERATION DATE 2.4.1983
CORE TYPE STRATAPAX BARREL DIA. 60'
MUD GEL-POLYMER

WELL TARRA No.1
CORE NO. 2

TOP	2890 m
BASE	2894 m

GEOLOGIST P. CHAN

DEPTH (m)	AS RECOV.	GRAINS	Ø	CO_3	SECT.	Fluo. Dir	STRS.	LITHOLOGICAL DESCRIPTION Sh #1



LITHIC SANDSTONE, subarkosic in part
grey green, hard, salt and pepper texture, well cemented
30% quartz, clear to frosty, smoky, opaque fine grained, subangular, well sorted, occasional recrystalized grain boundaries
30% rock fragments / lithics (volcanics, siliceous, cherty fragments), green, black, minor red, orange, subrounded, fine, minor weathered biotite, chloritic
20% feldspars, occur mainly as kaolinite pseudomorphs with minor fresh feldspars grains
20% CLAY matrix / kaolinite cement very slightly calcareous in part.

Rock type is massive, well cemented by diagenesis with poor to nil visible porosity

Associated coal/lignite laminae, occur as disseminated grains or blocky as remnants of wood debris, generally black, hard, vitreous, conchoidal.

From 2893.2m,
Becoming poorly sorted with coarse to pebbly clay fragments, elongated along grain matrix / bedding plane, subrounded, also medium to coarse quartz grains, clear to opaque, fractured subrounded and floating in clay matrix, (CHANNEL LAG ?).
MINOR DISH STRUCTURES and fine carbonaceous laminae, also associated

Dwg. No.: 19913

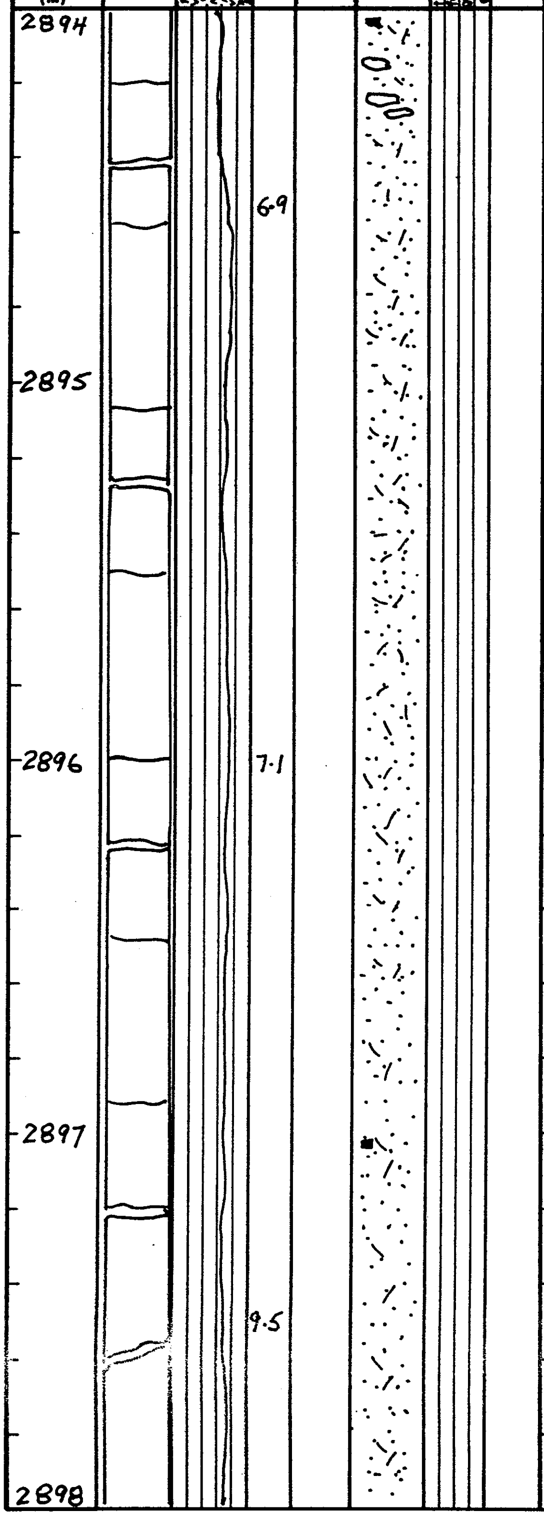
CORE DESCRIPTION
AAP

PERMIT VIC P-17
BASIN GIPPSLAND

CORING INTERVAL 2890 - 2905 m
RECOVERY LENGTH 13·67 m
% RECOVERY 91·1 m
OPERATION DATE 2·4·1983
CORE TYPE STRATAPAX BARREL DIA 60'
MUD GEL POLYMER

WELL TARRA No. 1
CORE NO. 2
TOP 2894 m
BASE 2898 m
GEOLOGIST P. CHAN

DEPTH (m)	AS RECOV.	GRAINS	Ø	CO₃	SECT.	Fluo. Dir	STRS.	LITHOLOGICAL DESCRIPTION SH #2



high coal/lignite content, plant/wood debris.

local clay pebbles (0.5 to 2 cm), grey, hard, siliceous

LITHIC SANDSTONE, as above,
hard, massive, dominant very fine to fine grained,
subarkosic in part, with spotty white kaolinite
Dominant green, dark grey lithics, chloritic in part
very poor visible porosity and permeability.

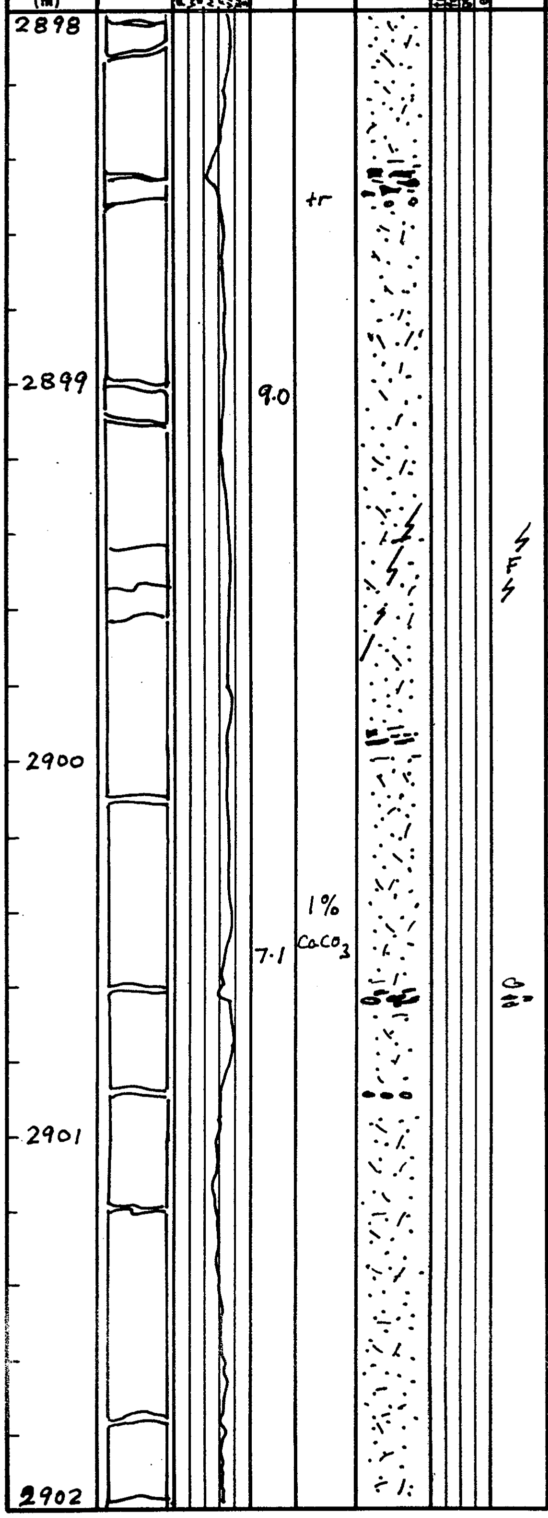
No Fluorescence

Dwg. No.: 19913

CORE DESCRIPTION
AAP

PERMIT	VIC P 17
BASIN	GIPPSLAND
CORING INTERVAL	2890 - 2905m
RECOVERY LENGTH	13.67m
% RECOVERY	91.1%
OPERATION DATE	2.4.1983
CORE TYPE	
BARREL DIA.	60'
MUD	GEL POLYMER
WELL	TARRA No. 1
CORE NO.	2
TOP	2898 m
BASE	2902 m
GEOLOGIST	CHAN/GUBIAN

DEPTH (m) | AS RECOV. | GRAINS | Ø | CO_3 | SECT. | Fluo. Dir | STRS. | LITHOLOGICAL DESCRIPTION #3



LITHIC SANDSTONE, lithology similar to above sediments, dominant very fine to fine, local coal/lignite laminae, carbonaceous plant debris, grains slightly coarser at 2898.5m. abundant yellow black flakes of biotite associated with higher percentage of feldspars.

Microfractures, annealed by later diagenesis

common lignitic/plant debris, blocky, vitreous, conchoidal, also woody in part

Becoming dominant fine grained with minor medium grains of kaolinite (weathered feldspars), generally layered or as thin laminae

Dwg. No.: 19913

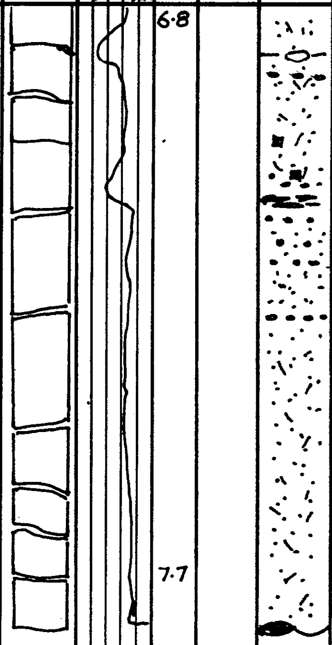
CORE DESCRIPTION
AAP

PERMIT	VIC P17
BASIN	GIPPSLAND

CORING INTERVAL	2890-2905m
RECOVERY LENGTH	13.67m
% RECOVERY	91.1%
OPERATION DATE	2.4.1983
CORE TYPE	BARREL DIA 60'
MUD	GEL-POLYMER

WELL	TARRA No.1
CORE NO.	2
TOP	2902 m
BASE	2903.67m
GEOLOGIST	CHAN / GUBIAN

DEPTH (m)	AS RECOV.	GRAINS	Ø	CO_3	SECT.	Fluo. Dir	STRS.	LITHOLOGICAL DESCRIPTION #4
2902			6.8					local reddish, well rounded pebble (5cm)
								Becoming more poorly sorted in part, assorted carbonaceous / lignitic fragments, coarser rock fragments and lithics,
								subhorizontal layers of white grains (kaolinite / feldspars), medium to coarse (dip less than 5°).
2903								
			7.7					
2903.67								
2904					NO RECOVERY			ROCK TYPE is classified as subarkosic LITHIC SANDSTONE, dominant fine grained with brief interludes of coarser material (probably deposited as channel lag in a non-marine floodplain? Interpreted to be dominant alluvial fan; distal facies with braided stream deposits.
								Poor to nil visible porosity with very poor permeability is quite consistent throughout.
2905								No sign of fluorescence or show
								* Measured permeability to air ranged 1.6 to 7.6 md.



Dwg. No.: 19913

Form AO-00052

THE SMALL AUSTRALIAN

U.T.S. PTY. LTD.

THE SMALL AUSTRALIAN

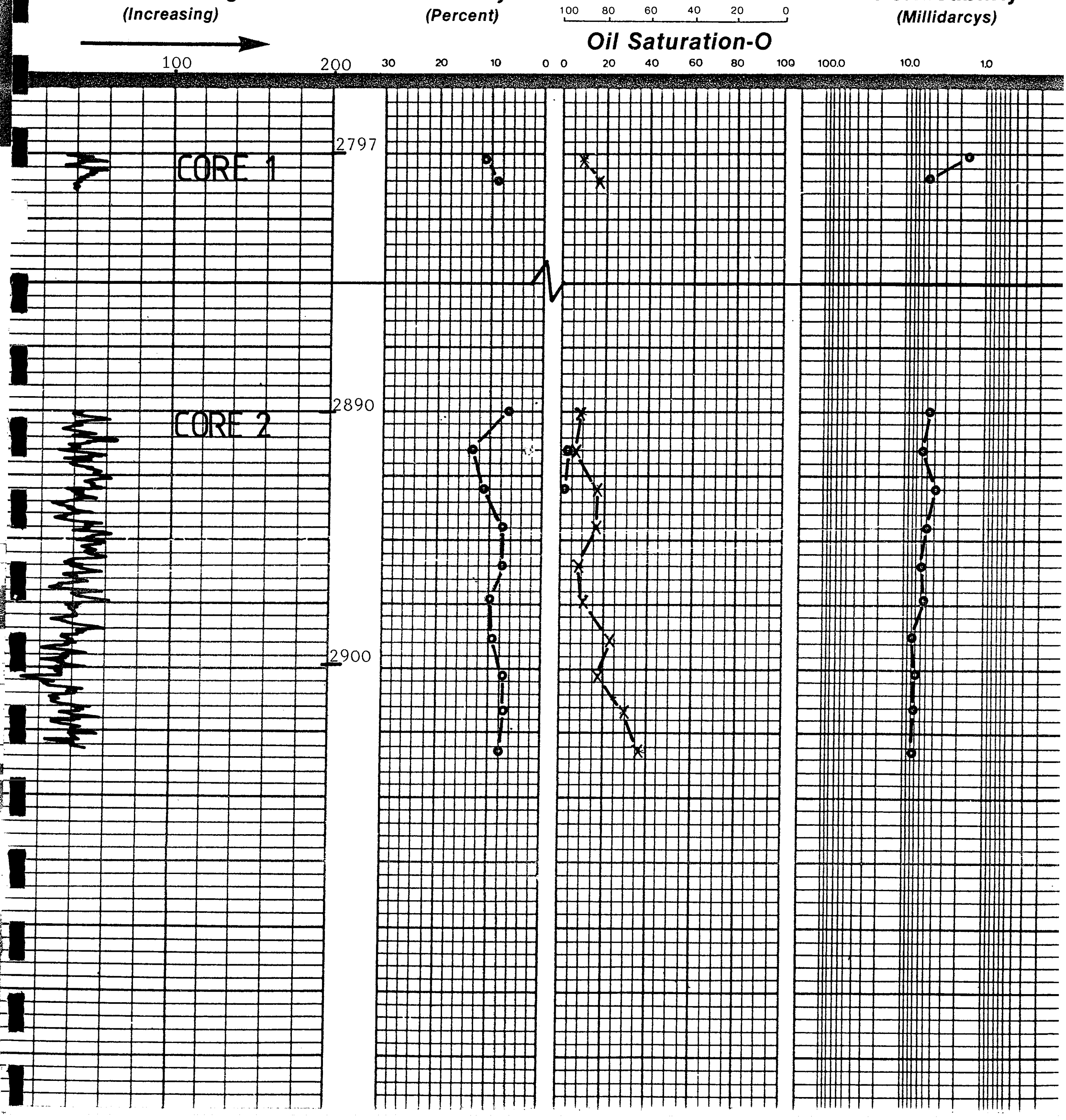
Company: AUSTRALIAN AQUITAINE Country: AUSTRALIA Date: 20.5.83.

Well: TARRA NO. 1 State: VICTORIA Elevation:

Field: Location: OFFSHORE File No. CA3-1

The AusOil Group of Companies United Tool Service Pty. Ltd. AusLog Pty. Ltd. AusCore Pty. Ltd.

Gamma Log *(Increasing)* — **Porosity** *(Percent)* — **Total Water Saturation-X** / **Oil Saturation-O** — **Permeability** *(Millidarcys)*



CORE ANALYSIS
FINAL DATA REPORT

Company: AUSTRALIAN AQUITAINE PETROLEUM PTY.LTD. Country: AUSTRALIA Date: 22 APRIL 1983

Well: TARRA #1 State: QUEENSLAND File No. UTS C.A3- 1

Field: Core Interval (M) 2797.00 - 2798.50; 2890.00 - 2903.67

Sample No.	Depth (M)	POROSITY %	DENSITY	PERM (md) to air	Residual SATURATION (% pore vol)	
					OIL	WATER
1	2797.20	10.5	2.59	1.6	0	89.6
2	2798.10	8.5	2.58	4.8	0	83.3
3	2890.10	5.9	2.63	4.5	0	90.4
4	2891.50	12.3	2.60	5.4	4.0	94.4
5	2893.00	10.3	2.62	3.6	1.9	82.7
6	2894.50	6.9	2.61	4.4	0	82.7
7	2896.00	7.1	2.63	5.5	0	90.6
8	2897.50	9.5	2.63	5.1	0	88.4
9	2899.00	9.0	2.61	7.6	0	76.6
10	2900.50	7.1	2.63	6.6	0	91.0
11	2902.00	6.8	2.63	6.9	0	70.5
12	2903.50	7.7	2.61	6.9	0	63.6

APPENDIX IV

FORAMINIFERAL SEQUENCE IN TARRA NO. 1

BY D. TAYLOR

THE FORAMINIFERAL SEQUENCE
in
TARRA # 1,
GIPPSLAND BASIN.

for: AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

June 7, 1983.

David Taylor,
23 Ballast Point Road, BIRCHGROVE 20[illegible]
AUSTRALIA (02) 82 5643

BIOSTRATIGRAPHY from sidewall cores — Depth in metres at Base of Zones (refer Tables 2 & 3 for data)			E-LOG PICKS	PALEOENVIRONMENTS (refer Table 4) — BIOFACIES with estimated paleodepths (0 10 40 100 200 400m)	LITHOFACIES
LATE MIOCENE	1134.1	B-2		SHELF/ SLOPE BREAK anoxic →	biomicrites pyrite at base.
MID MIOCENE ~~ (? 2my) ~~	1282.0¶	C ~~	~ 1315¶ ~~		
MID MIOCENE	1627.0	D-2		UPPER SLOPE	biomicrite & marl with recycling at base
	1694.9	?E-1			
EARLY MIOCENE	1752.1	E-2			
	1867.1	F			
	2020.1¶	G			
~~ (10 my) ~~	2108.0	H-1 ~~	2060¶ / ~ 2110 ~~	~~	~~
early OLIGOCENE	2160.0	J-2	2165	MID INNER SHELF	micrites & marls with "GREENSANDS"
late EOCENE	2208.1	K	2209	INTERTIDAL	micaceous "GREENSANDS"
? ? ?	2250.5	? ?	2257		
MID to ? EARLY EOCENE	2543.0	N to P	2480	ESTUARINE INTERTIDAL	micaceous & lignitic silts & sands with biogenic pyrite

TABLE 1: INTERPRETED FORAMINIFERA SEQUENCE for TARRA # 1.

~~ (10 my) ~~ hiatus with time span in parenthesis.

¶ offsets due to sample gaps.

David Taylor 7/6/1983.

INTRODUCTION.

Thirtyeight sidewall cores were submitted for examination from TARRA # 1 well, between 2543.0 and 1134.1 metres. Only three samples were barren of foraminifera and these were all within the Eocene estuarine/deltaic sequence at and below 2220.9 metres. However, foraminifera, particularly planktic ones, were by no means frequent within this interval (2220.9 to 2543.0 metres) and biostratigraphic zonation is imprecise.

The sidewall core at 2257.0metres was very soft and unable to be cleaned of mudcake before processing, thus it was not surprising that the prepared residue contained a 50/50 mixture of Mid Eocene micaceous quartz sandstone and Mid Miocene fine grained carbonates. The obvious contaminants in this sample were not plotted on Tables 3 and 4, although note is made on each of the Tables.

The following Tables accompany this report:-

TABLE 1: INTERPRETED FORAMINIFERAL SEQUENCE based on Tables 3 & 4: on Page 1.

TABLE 2: Interpretative:- BIOSTRATIGRAPHIC DATA SHEET with reliability of Zonal picks: at back of text.

TABLE 3: Factual data:- PLANKTONIC FORAMINIFERAL DISTRIBUTION: at back of text.

TABLE 4: Factual data:- BENTHONIC FORAMINIFERAL DISTRIBUTION & SEDIMENT GRAIN ANALYSIS: at back of text.

The TARRA # 1 sequence is discussed freifly in ascending biostratigraphic sequence (i.e. uphole).

? EARLY to MID EOCENE - 2543.0 to 2257.0m (top at 2257m on E-logs).

This interval contains sporadic assemblages of planktonic foraminifera, which are numerically sparse in specimens and low in specific diversity (refer Tables 3 & 4). A planktonic assemblage, including *Globigerina primitiva, Globorotalia turgida* and *G. centralis* was present at the top of the interval, at 2257m, whilst at the base at 2543m, the fauna contains *G. frontosa* (≡ *G. boweri* of Jenkins) but lacks *G. centralis*. In terms of the New Zealand sequence (Jenkins, 1971) this would infer a range from the Early/Mid Eocene boundary at 2543m to a position high in the Mid Eocene at 2257m. Recent studies in North Africa confirm that this biostratigraphic succession, from *G. frontosa* to *G. centralis,* took place within the Mid Eocene (e.g. Boukharry et al, 1982). Furthermore, Boukharry et al (l.c.) consider this succession to be an evolutionary lineage; referring to *G. frontosa* as *Globorotalia cerroazulensis frontosa* and to *G. centralis* as *G. cerroazulensis pomeroli.* The former morphotype ranges from the base of the Mid Eocene (Blow Zone P10) to the base of Blow Zone P.12 (= top Zone of Mid Eocene); whilst the latter morphotype first appears at the base of Blow Zone P.12 with range extending in the Late Eocene. However, in Tarra # 1, the association of *G. primitiva* with *G. centralis,* confines the sample at 2257m to the top of the Mid Eocene (= Zone N).

The sporadic occurrence of planktonics together with the dominance of primitive arenaceous, benthonic foraminifera, *Haplophragmoides* spp, indicates fluctuating salinities in estuarine/lagoonal paleoenvironments during deposition of this Mid Eocene interval (refer Taylor, 1965). This interpretation is collaborated by the presence of lignite and biogenic pyrite within this interval.

<u>EOCENE - 2250.5 to 2220.9 (2257 to 2209m on E-logs).</u>
No precise zone can be assigned to this Eocene interval of "Green" and "Brown" sands (glauconite, limonite, ? goethite and quartz), as it was barren of planktonics. It contained very few benthonic foraminifera; *Haplophragmoides* spp. being most noticeable. An intertidal, estuarine situation is envisaged. The presence of windblown quartz sand at the base of the interval suggests a barrier barred regime (refer Table 4).

<u>LATE EOCENE - 2208.1 to 2177.5m (2209 to 2165m on E-logs).</u>
Those assemblages were poor in planktonic faunas. The basal sample at 2208.1 contained only one species, *Globigerina linaperta,* diagnostic of the Late Eocene, but this was in association with forms which ranged up into the Early Oligocene. Therefore the interval has been designated as Zone K. Lithologically the interval commenced as a silty "Greensand" with a decrease in glauconite and increase in carbonate up sequence. The benthonic fauna indicates a shallow, inner continental shelf environment.

OLIGOCENE HIATUS between 2113 and 2108 (= 2110m on E-logs).

As in many offshore Gippsland wells, a hiatus of some 10 million years in time span was evident in Tarra # 1; as was also the case in Edina # 1 and Omeo # 1. The association at 2113m was of early Oligocene (Zone J-2) character with *Globigerina angiporoides, G. brevis* and *Globorotalia gemma*. A complete disruption of biostratigraphic events was apparent as the planktonic fauna at 2108m was definitely of early Miocene (Zone H-1) age with *Globigerina woodi connecta, Globoquadrina dehiscens* and *Catapsydrax dissimilis*. The benthonic fauna also reflect this disruption with mid shelf deposition at 2113m and upper slop deposition at 2108m. The paleodepth increase across this hiatus from early Oligocene to early Miocene was of the order fo 200 metres. This hiatus was a widespread event, not only in Gippsland, but over the entire Tasman Sea, Southern Ocean region (Louitt & Kennett, 1981).

EARLY to MID MIOCENE - 2108 to 1389m (2110 to 1315m on E-logs).

A complete sequence from Zone H-1 to Zone D-2 was represented in the Tarra samples. However, the planktonic assemblages were seldom high in specific diversity, reflecting the geographic location in the south west sector of the Basin. Miocene faunas to the east and north-east were much more diverse, reflecting the influence of the warm, East Australian Current which did not (and does not) reach the western sector of the Gippsland Basin. Deposition was on the upper part of the continental slope.

MID MIOCENE HIATUS between 1389 and 1282m (= 1315 on E-logs).

Zone D-1 appears to be absent in both the Tarra and Omeo sections which is significant in that most wells drilled to the east and south-east contain a thick accumulation of D-1 carbonates as canyon fills. The supposition may be drawn that the Tarra and Omeo locations were source areas for sediment redeposited in submarine canyons.

MID to LATE MIOCENE - 1282 to 1134.1m (base at 1315 on E-logs).

Once again the planktonic assemblages were not as diverse as those in the east. Environmentally slight shallowing in paleodepth occurs on resumption of sedimentation compared with that before the mid Miocene hiatus.

Topographic hollows may have developed from high energy scouring which removed or prevented accumulations of D-1 sediment. The assumption is made on the abundance of pyrite above the Mid Miocene hiatus in both Tarra and Edina, suggesting restriction of oxygen at the sediment/water interface.

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TABLE 2

MICROPALEONTOLOGICAL DATA SHEET

BASIN: GIPPSLAND ELEVATION: KB: 30.5m GL: -62.8m

WELL NAME: TARRA # 1 TOTAL DEPTH:

AGE		FORAM. ZONULES	HIGHEST DATA Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	LOWEST DATA Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time
PLEISTOCENE		A_1										
		A_2										
PLIOCENE		A_3										
		A_4										
		B_1										
MIOCENE	LATE	B_2	1134.1	1				1134.1	1			
		C	1282	0				1282	0			
	MIDDLE	D_1	*					*				
		D_2	1389	0				1627	1			
		E_1	1694.9	2				1694.9	0			
		E_2	1752.1	1				1752.1	1			
	EARLY	F	1790	1				1867.1	1			
		G	1916.1	1				2020.1	1			
		H_1	2060.1	1				2108	1			
OLIGOCENE	LATE	H_2	¶					¶				
		I_1										
		I_2										
	EARLY	J_1	¶					¶				
		J_2	2113	1				2160	0			
EOCENE		K	2177.5	2				2208	1			
		Pre-K	2257.0	1				2543	1			

COMMENTS: *Probable hiatus with D-1 absent due to slope slumping at ≃1315m (E-log).

¶Definite Oligocene hiatus with Zones H-2, I-1, I-2 & J-1 absent from sequence. E-log surface ≃2110.

Pre-K Sporadic occurrences of Zone N, O & P assemblages = Mid to ? Early Eocene. Contact relationship with late Eocene uncertain.

CONFIDENCE RATING:

- 0: SWC or Core - Complete assemblage (very high confidence).
- 1: SWC or Core - Almost complete assemblage (high confidence).
- 2: SWC or Core - Close to zonule change but able to interpret (low confidence).
- 3: Cuttings - Complete assemblage (low confidence).
- 4: Cuttings - Incomplete assemblage, next to uninterpretable or SWC with depth suspicion (very low confidence).

NOTE: If an entry is given a 3 or 4 confidence rating, an alternative depth with a better confidence rating should be entered, if possible. If a sample cannot be assigned to one particular zone, then no entry should be made, unless a range of zones is given where the highest possible limit will appear in one zone and the lowest possible limit in another.

DATA RECORDED BY: David Taylor DATE: 7/6/1983

DATA REVISED BY: [illegible] DATE: 5/6/1985.

PE906387

This is an enclosure indicator page.
The enclosure PE906387 is enclosed within the container PE902577 at this location in this document.

The enclosure PE906387 has the following characteristics:

ITEM_BARCODE =	PE906387
CONTAINER_BARCODE =	PE902577
NAME =	Planktonic Foraminifera Distribution Chart
BASIN =	GIPPSLAND
PERMIT =	VIC/P17
TYPE =	WELL
SUBTYPE =	DIAGRAM
DESCRIPTION =	Planktonic Foraminiferal Chart for Tarra-1
REMARKS =	
DATE_CREATED =	2/06/83
DATE_RECEIVED =	7/01/84
W_NO =	W806
WELL_NAME =	TARRA-1
CONTRACTOR =	
CLIENT_OP_CO =	AUSTRALIAN AQUITAINE PETROLEUM

(Inserted by DNRE - Vic Govt Mines Dept)

PE906388

This is an enclosure indicator page.
The enclosure PE906388 is enclosed within the container PE902577 at this location in this document.

The enclosure PE906388 has the following characteristics:

ITEM_BARCODE = PE906388
CONTAINER_BARCODE = PE902577
NAME = Benthonic Foraminifera Distribution Chart
BASIN = GIPPSLAND
PERMIT = VIC/P17
TYPE = WELL
SUBTYPE = DIAGRAM
DESCRIPTION = Benthonic Foraminiferal Distribution Chart and Sediment Grain Analysis for Tarra-1
REMARKS =
DATE_CREATED = 6/06/83
DATE_RECEIVED = 7/01/84
W_NO = W806
WELL_NAME = TARRA-1
CONTRACTOR =
CLIENT_OP_CO = AUSTRALIAN AQUITAINE PETROLEUM

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX V

PALYNOLOGICAL EXAMINATION

BY W. K. HARRIS

TARRA NO. 1 WELL
GIPPSLAND BASIN

Palynological examination and kerogen typing of sidewall cores.

by

W.K. Harris

TABLE I

TARRA NO. 1 WELL

SUMMARY OF PALYNOLOGICAL DATA

DEPTH (m)	SWC	PRESERVATION	DIVERSITY	SPORE POLLEN ZONE	DINOFLAGELLATE ZONE	CONFIDENCE LEVEL	ENVIRONMENT
2085	39	good	low	P. tuberculatus	unnamed	4	Open marine
2105	30	good	low	P. tuberculatus	unnamed	4	Open marine
2113	29	fair	low	P. tuberculatus	unnamed	4	Open marine
2122	28	fair	low	P. tuberculatus	unnamed	4	Open marine
2135	35	fair	low	P. tuberculatus	unnamed	4	Open marine
2145	27	good	low	Upper N. asperus	?P. coreoideum	5	Open marine
2160	34	good	low	Upper N. asperus	?P. coreoideum	5	Open marine
2177.5	26	fair	low	Upper N. asperus	?P. coreoideum	5	Open marine
2192.1	33	fair	low	Upper N. asperus	?P. coreoideum	5	Marginal marine
2208.1	25	fair	low	Upper N. asperus	?P. coreoideum	5	Marginal marine
2220.9	24	fair	low	Upper N. asperus	?P. coreoideum	5	Marginal marine
2232.5	23	fair	low	Upper N. asperus	?P. coreoideum	5	Marginal marine
2237	22	fair	low	Upper N. asperus	?P. coreoideum	5	Marginal marine
2241	21	fair	low	Upper N. asperus	?P. coreoideum	5	Marginal marine
2257	32	fair	low	Upper N. asperus	?P. coreoideum	5	Marginal marine
2274	18	fair	low	L. balmei	-	4	-
2305.5	17	fair	low	L. balmei	-	5	Non marine
2362.1	15	fair	low	L. balmei	-	5	Marginal marine
2382	14	fair	moderate	L. balmei	-	5	Non marine
2411.9	13	fair	moderate	L. balmei	-	5	Non marine
2446	11	fair	moderate	L. balmei	-	5	Non marine
2468	10	poor	very low	Indeterminate	-	-	-
2474	9	poor	low	T. longus	-	5	Non marine
2501	8	fair	low	T. longus	-	4	Non marine
2511.5	7	fair	very low	Indeterminate	-	-	Marginal marine
2533	6	fair	low	T. longus	-	4	Non marine
2543	4	fair	low	T. longus	-	4	Non marine
2556	3	fair	very low	Indeterminate	-	-	Non marine
2579	85	fair	low	T. longus	-	4	Non marine
2582.5	83	barren	-	-	-	-	-
2599	77	fair	low	undiff. E. Cretaceous	-	-	Non marine
2622.9	73	fair	very low	undiff. E. Cretaceous	-	-	Non marine
2644	71	poor	very low	undiff. E. Cretaceous	-	-	Non marine
2676.2	69	fair	very low	undiff. E. Cretaceous	-	-	Non marine
2751	65	fair	very low	undiff. E. Cretaceous	-	-	Non marine
2820	65	fair	moderate	C. striatus	-	4	Non marine
2879.9	60	fair	moderate	C. striatus	-	4	Non marine

Confidence Levels:

1 cuttings sample, low diversity + contaminants
2 cuttings sample, good assemblage
3 core or sidewall core, low diversity, + contaminants
4 core or sidewall core, low diversity
5 core or sidewall core, good assemblage.

Palynological Report

Client: Australian Aquitaine Petroleum

Study: Tarra No. 1 Well, Gippsland Basin

Aims: Determination of age and distribution of kerogen types

INTRODUCTION

Thirty seven sidewall cores from Tarra No. 1 well drilled in the Gippsland Basin at Lat 38°38'37.4"S, Long 147°42'9.8"E in Vic P17 were processed by normal palynological procedures.

The biostratigraphy and consequent age determinations are based on Stover & Partridge (1973) and Partridge (1976) for the Tertiary sediments; and principally on Dettmann (1963), Dettmann & Playford (1969), with the modifications of Dettmann & Douglas (1976) and Burger (1973), for the Cretaceous sequence.

OBSERVATIONS AND INTERPRETATION

A. Biostratigraphy

Table I summarises the biostratigraphy and age determinations for the samples studied. Tables II to IV indicate the distribution of species identified in the Cretaceous and Tertiary sequences.

Preservation, and diversity data are indicated on Table 1. Most samples yielded reasonably well preserved and moderately diverse assemblages. One sample was barren of plant microfossils.

1. Early Cretaceous, undifferentiated: 2879.9-2599 m

In keeping with Early Cretaceous assemblages elsewhere in the Gippsland Basin, most samples lack sufficient index forms to permit a confident correlation with accepted zonal schemes of this age. However the bottom two samples at 2879.9 m and 2820 m contain in particular Crybelosporites striatus which indicates a correlation with C. striatus sub zone of the Dictyotosporites speciosus zone. The absence of forms characteristic of the Coptospora paradoxa zone supports this correlation. The age of the sub-zone is Late Aptian to Early Albian.

Samples higher in the well lack zonal species and are simply dated as undifferentiated Early Cretaceous.

No marine palynomorphs were recovered over the interval and deposition took place in a non-marine environment.

2. Tricolpites longus zone: - 2579 - 2474 m

Assemblages from this interval are characterised by low diversity. Nevertheless, important species such as Stereisporites punctatus and Australopollis obscurus make their appearance at 2579 m and thus indicate the commencement of T. longus zone. The zone is also characterised by very common Gambierina spp. and rare Nothofagidites spp.

Most samples contain only terrestrially derived palynomorphs and were deposited in a non-marine environment. However one sample at 2511.5 m contained several dinoflagellates related to Areoligera sp. and thus a marginal marine environment is envisaged.

3. Lygistepollenites balmei zone: 2446 - 2274 m

The presence of Haloragacidites harrisii together with Phyllocladidites reticulosaccatus at 2446 m indicate the commencement of the L. balmei zone. The appearance of Nothofagidites flemingii at 2305.5 m would suggest that the Upper L. balmei zone is present at that level. Because diversities are generally low a firm subdivision of the L. balmei zone in this well, is not possible.

One sample at 2362.1 m contained rare dinoflagellates and possibly indicates marginal marine conditions. However there is a possibility of contamination by mud invasion.

All other samples indicate deposition in a non-marine environment.

4. Upper Nothofagidites asperus zone:- 2257-2145 m

Again samples in this interval have low diversity but assemblages are dominated by Nothofagidites spp. This feature alone is characteristic of the zone. Importantly Proteacidites spp. show very low diversity in this interval.

Corroborative evidence is afforded by the dinoflagellate assemblages which are clearly younger than the Vozzennikovia extensa zone and are probably equated with Partridge's (1976) Phthanoperidinium coreoideum zone. The zone has not been described in detail but the lack of V. extensa would support the younger age.

All samples recorded marine phytoplankton and from 2257 to 2192.1 m the dinoflagellates are subordinate to the terrestrially derived spores and pollen and a near shore marine environment is indicated. From 2177.5 to 2145 m dinoflagellates become more prominent and indicate deepening water conditions and a more open marine environment.

5. Proteacidites tuberculatus zone: 2135 - 2085 m

The appearance of Cyatheacidites annulata at 2135 m and the lack of younger index forms indicates the presence of the P. tuberculatus zone. Again the spore/pollen assemblages are of low diversity and are dominated by marine dinoflagellates indicating open marine environments.

The age of the P. tuberculatus zone is Late Oligocene or Early Miocene.

B. Kerogen Types and Spore Colouration

During routine palynological processing of sidewall cores an unoxidised kerogen sample was taken and the nature of the kerogens and spore colouration are documented in Table VI. Spore colour is expressed as the "Thermal Alteration Index" (TAI) of Staplin (1969) according to the scale in Table V.

Total organic matter (TOM) is expressed semi-quantitatively in the scale-

TARRA # 1 Table II

DESCRIPTION:

GIPPSLAND BASIN EARLY CRETACEOUS SPORES AND POLLEN

CHECKLIST OF PRESENCE/ABSENCE BY LOWEST APPEARANCE

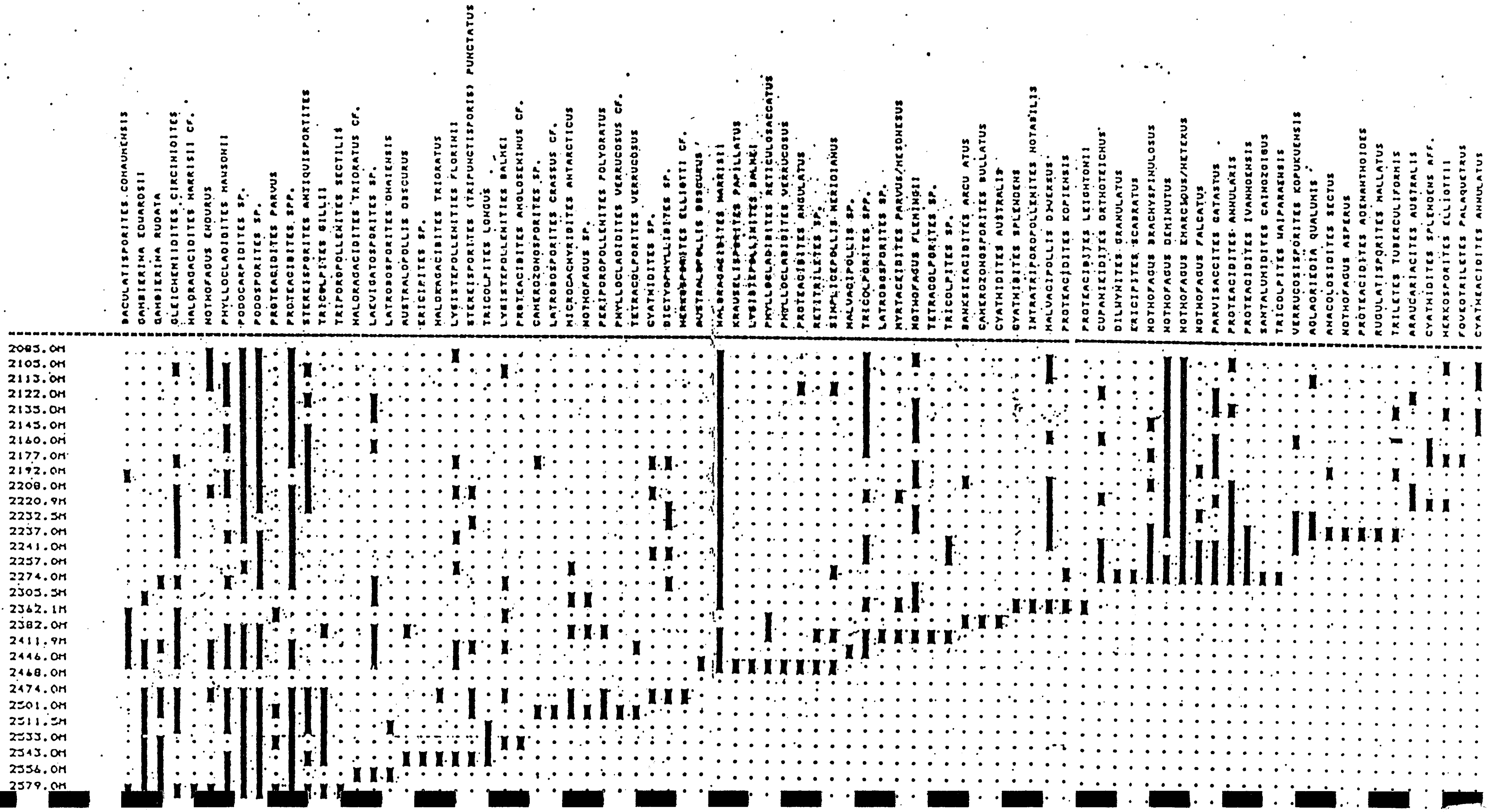
	2599.0M	2622.9M	2644.0M	2676.2M	2751.0M	2820.0M	2879.9M
AEQUITRIRADITES SPINULOSIS	·	·	·	·	·	■	■
BACULATISPORITES COMAUMENSIS	■	■	■	■	■	■	■
CERATOSPORITES EQUALIS	■	·	·	·	·	■	■
CICATRICOSISPORITES AUSTRALIENSIS	·	■	■	■	■	■	■
CINGUTRILETES CLAVUS	·	·	·	·	·	·	■
CRYBELOSPORITES STRIATUS	·	·	·	·	·	■	■
CYATHIDITES AUSTRALIS	■	■	■	■	■	■	■
CYCADOPITES SP.	·	·	·	·	·	·	■
DICTYOPHYLLIDITES MORTONI	■	·	·	·	·	■	■
FALCISPORITES GRANDIS	■	■	■	·	■	■	■
FALCISPORITES SIMILIS	■	■	■	·	■	■	■
FORAMINISPORIS WONTHAGGIENSIS	·	·	·	·	·	·	■
KUYLISPORITES LUNARIS	·	·	·	·	·	·	■
LYCOPODIUMSPORITES AUSTROCLAVATIDITES	■	·	·	·	■	·	■
MICROCACHYRIDITES ANTARCTICUS	■	■	·	■	·	■	■
NEORAISTRICKIA TRUNCATA	■	·	·	·	■	·	■
PODOCARPIDITES SP.	■	■	■	■	■	■	■
PODOSPORITES SP.	■	■	■	■	■	■	■
POLYCINGULATISPORITES CRENNULATUS	·	·	·	·	·	·	■
ROUSEISPORITES RETICULATUS	·	·	·	·	·	■	■
STEREISPORITES ANTIQUASPORITES	■	■	■	·	■	■	■
AEQUITRIRADITES VERRUCOSUS	·	·	·	·	·	■	·
BALMEISPORITES HOLODICTYUS	·	·	·	·	·	■	·
CICATRICOSISPORITES CUNEIFORMIS	·	·	·	·	·	■	·
CICATRICOSISPORITES HUGHESI	■	·	·	·	·	■	·
CICATRICOSISPORITES LUDBROOKI	·	·	·	·	·	■	·
CRYBELOSPORITES STYLOSUS	·	·	·	·	·	■	·
CYCLOSPORITES HUGHESI	·	·	·	·	·	■	·
FORAMINISPORIS ASSYMETRICUS	·	·	·	·	·	■	·
ROUSEISPORITES SIMPLEX	·	·	·	·	·	■	·
CAMEROZONOSPORITES RUDIS	·	·	·	·	■	·	·
PILOSISPORITES NOTENSIS	·	·	·	·	■	·	·
DICTYOTOSPORITES SPECIOSUS	■	·	·	■	·	·	·
MATONISPORITES COOKSONIAE	·	■	·	·	·	·	·
ANNULISPORA FOLLICULOSA	■	·	·	·	·	·	·
COROLLINA SP.	■	·	·	·	·	·	·
CYCADOPITES FOLLICULARIS	■	·	·	·	·	·	·
RETICULATISPORITES PUDENS	■	·	·	·	·	·	·

TARRA # 1 TABLE XXI

DESCRIPTION:

LATE CRETACEOUS -TERTIARY SPORE POLLEN

CHECKLIST OF PRESENCE/ABSENCE BY LOWEST APPEARANCE



TARRA 1 DINOFLAGELLATES

DESCRIPTION:

TABLE IV

CHECKLIST OF PRESENCE/ABSENCE BY LOWEST APPEARANCE

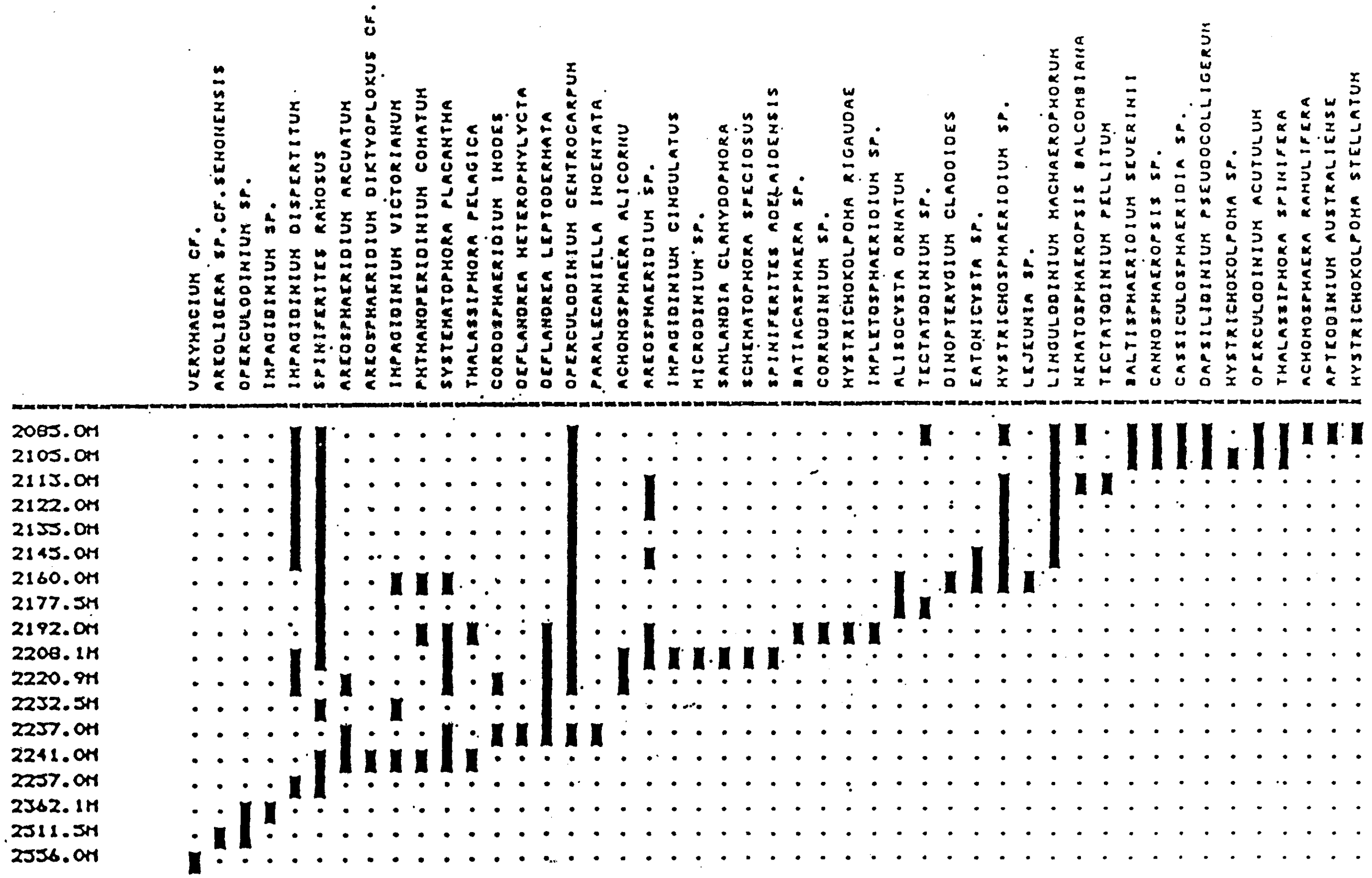


Table V

MATURATION LEVELS, Bujak et al. 1977

CATEGORIES	ORGANIC COMPONENTS		OIL	GAS CONDENSATE	THERMALLY DERIVED METHANE
			TAI	TAI	TAI
HYLOGEN	NON-OPAQUE FIBROUS PLANT MATERIAL OF WOODY ORIGIN }	TRACHEIDS VESSELS	>2→3 (2.5-2.9)	>2→≥3 (2.3-3.2)	2→4
PHYROGEN	NON-OPAQUE NON-WOODY ORIGIN }	SPORES POLLEN ALGAE ACRITARCHS CUTICLES	>2→3 (2.2→3)	2→<3+	$>2^{-}\rightarrow 4$
AMORPHOGEN	STRUCTURELESS ORGANIC MATTER }	FINELY DISSEMINATED or COAGULATED FLUFFY MASSES	2→<3+	2→3+	3+→5
MELANOGEN	OPAQUE ORGANIC DEBRIS		-	2+→<3	2.5-4

Notes: (1) Hylogen, Phyrogen, Melanogen 4→5: Traces of Dry Gas and Co_2

(2) Hylogen, Phyrogen, Melanogen 1→2: Biogenic methane (Marsh gas).

TAI (Thermal Alteration Index):
1+, 2-, 2 - YELLOWS
2, 2+, 3, 4 - BROWNS
4-, 5 - BLACK

TABLE VI

TARRA NO. 1 WELL

SUMMARY OF MATURATION AND KEROGEN DATA

Depth (m)	TAI	TOM	Phyr. %	Amorph %	Hylo %	Melano %
2085	1+	very low	20	40	-	40
2105	1+	very low	20	50	-	30
2113	1+	very low	20	70	-	10
2122	1+	very low	5	85	-	10
2135	N.D.	very low	5	80	-	15
2145	1+	very low	30	60	-	10
2160	1+	very low	10	70	-	20
2177.5	1+	very low	20	70	-	10
2192.1	N.D.	very low	Tr.	90	-	15
2208.1	N.D.	very low	-	90	-	10
2220.9	N.D.	very low	Tr.	85	-	15
2232.5	N.D.	very low	Tr.	90	-	10
2237	N.D.	very low	10	80	-	10
2241	1+	low	20	60	10	10
2257	1+	moderate	30	40	10	20
2274	N.D.	very low	10	60	-	30
2305.5	1+	low	10	90	-	10
2362.1	N.D.	very low	Tr.	90	-	10
2382	1+	low	30	40	10	20
2411.9	1+	low	20	60	-	20
2446	1+	low	-	-	20	80
2468	N.D.	low	Tr.	-	10	90
2474	1+	low	30	10	10	50
2501	1+	low	5	80	-	15
2511.5	1+	moderate	30	10	10	50
2533	1+	low	30	-	10	60
2543	1+	moderate	30	-	20	50
2556	2	low	30	20	20	30
2579	1+-2	low	30	-	10	60
2582.5	N.D.	very low	30	30	10	30
2599	2	low	15	20	5	60
2622.9	2	very low	5	50	5	40
2644	2	low	20	20	10	50
2676.2	2	low	15	-	10	75
2751	2	low	30	20	20	30
2820	2	low	40	10	20	30
2879.9	2	low	25	-	15	60

abundant, moderate, low, very low, barren. Samples classed as having abundant or moderate amounts of TOM would be expected to have TOC's (total organic content) greater than 1%.

In this report four classes of organic matter are recognised - amorphogen, phyrogen, hylogen and melanogen and these terms are more or less synonymous with amorphous, herbaceous, woody, and coaly. For reasons as outlined by Bujak et al (1977) the former terms are preferred because they do not have a botanical connotation. The thermal alteration index scale follows that of Staplin (1969) and as outlined by Bujak et al. (1977). At a TAI of 2+ all four types of organic material contributed to hydrocarbon generation whereas at a TAI of 2, only amorphogen forms liquid hydrocarbons. The upper boundary defining the oil window is at a TAI of approximately 3 but varies according to the organic type. Above TAI 3+ all organic types only have a potential for thermally derived methane.

Spore colouration in Tarra No. 1 well ranges from values of 1 to 2 at T.D. The Tertiary sequence shows very little evidence of alteration and below the Tertiary - Cretaceous unconformity there is a very gradual increase in maturity. However all values indicate that the entire section is immature for the generation of hydrocarbons.

Kerogen is dominated in the Early Tertiary sequence by amorphogen which is a potential source for liquid hydrocarbons whereas the Early and Late Cretaceous section is mainly dominated by melanogen. The potential in this section is for the generation of gaseous hydrocarbons with some liquid fraction.

Kerogens from the Oligocene-Miocene section are characterised by amorphous kerogen and the organic yields are very low.

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W.K. Harris,
Consulting Geologist - Petroleum
25.9.83

APPENDIX VI

SOURCE ROCK EVALUATION

BY A.M.D.E.L.

SOURCE ROCK EVALUATION, TARRA No.1, VIC/P-17, GIPPSLAND BASIN

Australian Aquitaine Petroleum Pty. Ltd

F3/422/0-5277/83 September, 1983

The Australian Mineral Development Laboratories

..emington 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

21 September, 1983

F3/422/0
5277/83

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

Attention: Mr Frank Brophy

REPORT F5277/83

YOUR REFERENCE:	Telex No.3039, 8/4/83 Letter 5471, 14/4/83
MATERIAL:	Sidewall cores (21 samples). Conventional cores (4 samples).
LOCALITY:	TARRA No.1
IDENTIFICATION:	Interval 1916.1-2902.6 metres
DATE RECEIVED:	11 April 1983
WORK REQUIRED:	Total organic carbon, Rock-Eval pyrolysis, description of dispersed organic matter. Vitrinite reflectance (5 samples only). Solvent extraction, liquid chromatography of extract, gas chromatography of saturates (1 sample only). Interpretation.

Investigation and Report by: Dr David M. McKirdy and Brian L. Watson
Rock-Eval Analysis by: Dr Robert E. Cox

Chief - Fuel Section: Dr Brian G. Steveson
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1. INTRODUCTION

Total organic carbon and Rock-Eval pyrolysis data on 21 sidewall core and 4 conventional core samples from 1916.1-2902.6 metres depth in Tarra-1 were communicated by telex to F. Brophy on 15 April and 22 April, 1983. This report formally presents the aforementioned data, and incorporates the results of additional analytical work, as follows:

1. Description of dispersed organic matter (25 samples);

2. Measurement of vitrinite reflectance (5 samples); and

3. Analysis of residual hydrocarbons in a sandstone core.

The above information is used to assess the hydrocarbon generating potential (maturity, organic richness, kerogen type) of the units sampled (Lakes Entrance Formation, Latrobe Group, Strzelecki Group : Table 1) at the Tarra-1 well locality.

2. ANALYTICAL PROCEDURE

2.1 Sample Preparation

The sidewall core samples were oven dried at 50°C and then ground in a Siebtechnik mill for 20-30 secs.

2.2 Total Organic Carbon (TOC)

Total organic carbon was determined by digestion of a known weight (2-10 g) of powdered rock in 50% HCl to remove carbonates, followed by combustion in oxygen in the induction furnace of a Leco IR-12 Carbon Determinator and measurement of the resultant CO_2 by infra-red detection.

2.3 Rock-Eval Analysis

A 100 mg portion of powdered rock was analysed by the Rock-Eval pyrolysis technique (Girdel IFP-Fina Mark 2 instrument; operating mode, Cycle 1).

2.4 $C_{15}+$ Extractable Organic Matter (EOM)

Rock chips (∿ 240 g) were extracted with azeotropic chloroform/methanol (87:13) in a Soxhlet apparatus for 12 hours. Removal of solvent by careful rotary evaporation gave the $C_{15}+$ EOM.

The EOM was separated into saturated hydrocarbons, aromatic hydrocarbons and polar compounds (resins plus asphaltenes) by liquid chromatography on 20 parts activated alumina under 80 parts activated silica gel. The saturates were eluted with petroleum ether, the aromatics with petroleum ether/methylene chloride (91:9), and the polars with methanol/methylene chloride (65:35) followed by methanol.

The saturated hydrocarbons were examined by gas chromatography using the following instrumental parameters:

Gas chromatograph:	Perkin Elmer Sigma 2 fitted with Grob injector
Column:	25 m x 0.33 m fused silica, SGE QC3/BP1
Detector:	FID
Injector and detector temperature:	280°C

Carrier gas:	H_2 at 9 psi
Column temperature:	60°C for 3 mins, then 4° per minute to 275°C and held at 275° until all peaks eluted.
Quantitation:	Relative concentrations of individual normal and isoprenoid alkanes obtained by measurement of peak areas above naphthene hump.

2.5 Organic Petrology

Representative portions of each rock (crushed to -14+35 BSS mesh) were obtained with a sample splitter and then mounted in cold setting Astic resin using a 2.5 cm diameter mould. Each block was ground flat using diamond impregnated laps and carborundum paper. The surface was then polished with aluminium oxide and finally magnesium oxide.

Reflectance measurements on vitrinite phytoclasts, were made with a Leitz MPV1.1 microphotometer fitted to a Leitz Ortholux microscope and calibrated against synthetic standards. All measurements were taken using oil immersion (n = 1.518) and incident monochromatic light (wavelength 546 nm) at a temperature of 24±1°C. Fluorescence observations were made on the same microscope utilizing a 3 mm BG3 excitation filter, a TK400 dichroic mirror and a K510 suppression filter.

3. RESULTS

TOC and Rock-Eval data for the samples analysed are listed in Table 2. The variation of T_{max}, production index ($S_1/S_1 + S_2$), TOC, potential yield ($S_1 + S_2$) and hydrogen index with depth is illustrated in Figures 1A and 1B. Figures 2-4 are cross plots of hydrogen index versus T_{max} which demonstrate kerogen type and maturity.

Vitrinite reflectance (VR) data are given in Table 3. Dispersed organic matter (DOM) descriptions are summarised in Tables 4 and 5. Histograms of the reflectance measurements and extended descriptions of the DOM for each sample may be found in Appendices 1 and 2, respectively. The types of DOM present in selected samples are illustrated in Plates 1-12. Figure 5 is a depth-reflectance profile for the lower 600 metres of Tarra-1.

C_{15}+ extract data on a core sample from 2891.3-2891.5 metres depth are presented in Table 6. Figure 6 is a chromatogram of the saturated hydrocarbons.

4. DISCUSSION

4.1 Maturity

Vitrinite reflectance data (Fig. 5) indicate that the Tarra-1 well section above ∿2450 metres is immature (VR ∿0.5%). Maturation levels appropriate for the early generation of light naphthenic oil and/or condensate from resinite-rich DOM (VR = 0.45-0.6% : Snowdon and Powell, 1982) have been attained by Latrobe and Strzelecki Group sediments between 2270 and 2740 metres depth. The latter depth is also the threshold for significant gas generation from terrigenous Type III kerogen (Monnier *et al.*, 1983). The top of the oil-generation window for resinite-poor, woody-herbaceous DOM (VR = 0.7%) occurs just below T.D. at approximately 2930 metres.

The Tmax profile (Fig.14) reveals a similar downhole increase in organic maturity. Below 2550 metres depth T_{max} values are consistently higher than 430°C, equivalent to VR ∿0.5% for Type III kerogen (Figs. 2-4).

4.2 Source Richness

Half of the core samples analysed have TOC contents in excess of 1% : Gurnard Formation (2 samples), Undifferentiated Latrobe (7 samples), and Strzelecki Group (4 samples) (Table 2, Fig. 1B). However, only five of these organic-rich sediments display the richness characteristics of hydrocarbon source beds. They are as follows:

Formation	Depth (m)	TOC (%)	$S_1 + S_2$ (kg/tonne)	Source Richness*
Undifferentiated	2382.0	6.90	20.6	Good
Latrobe	2427.4	69.8**	151.8	Excellent
	2468.0	63.5**	158.8	Excellent
	2511.5	2.96	3.6	Fair
	2556.0	2.94	3.3	Fair

* Based on potential hydrocarbon yield ($S_1 + S_2$)

** Coal

4.3 Source Quality and Kerogen Type

Hydrogen indices in the range HI = 60-283 (Fig. 1B) suggest that these rocks contain organic matter of humic Type III, tending to inertinitic Type IV composition (Figs. 2-4). Optical examination confirmed the presence of woody-herbaceous DOM and coal (Tables 4 and 5; Appendix 2).

Low hydrogen indices (HI <100) generally correlate with dry-gas-prone, inertinite-rich DOM in siltstones and silty shales. The high percentage of 'exinite' in the DOM of some of these samples (notably those from the Gurnard Formation and Latrobe Clastics) comprises mostly migrated oil and bitumen (Tables 4 and 5). The very low hydrogen indices (HI = 65-68) of siltstone (2893.7 m) and shale (2902.5 m) from the Strzelecki Group are difficult to reconcile with the high vitrinite content (70-75%) of their DOM.

Undifferentiated Latrobe Group samples with hydrogen index values of HI ≥ 200 contain immature, oil-prone Type III organic matter. This organic matter, present as coal and DOM in shale, is rich in vitrinite (40-70%) and exinite (10-30%) (Table 4). The major exinites are liptodetrinite, resinite and sporinite (Table 5).

At the maturation levels attained by sediments of the Undifferentiated Latrobe Group in Tarra-1 (VR ∿0.45-0.55%), resinite is a potential source of so-called immature naphthenic oil and/or condensate (Connan and Cassou, 1980; Snowdon and Powell, 1982). Moreover, the abundance of this labile exinite in one SWC sample (*ca*. 10% of coal from 2427.4 metres : see Plates 3 and 4) is more than enough to produce significant quantities of liquid hydrocarbons. The presence of very rare exsudatinite in the same coal (Table 5; Appendix 2) attests to the mobilisation of hydrocarbons. On the available evidence, however, it is impossible to determine whether or nor such locally derived hydrocarbons have contributed to the migrated oil observed in the overlying Latrobe Clastics and Gurnard Formation (Table 5).

4.4 C_{15}+ Hydrocarbon Analysis

During prior petrophysical analysis of a sandstone core from the Strzelecki Group (Core 2, 2891.3-2891.5 metres) a small amount of liquid hydrocarbon was recovered (F.Brophy, written communication, April 1983).

Solvent extraction of core chips yielded only 39 ppm C_{15}+ EOM, consistent with the low S_1 value obtained by Rock-Eval pyrolysis. Furthermore, the low production index ($S_1/S_1 + S_2$ = 0.06) suggests little or no staining by non-indigenous (i.e. migrated) hydrocarbons. This is confirmed by the very low hydrocarbon content of the core extract (9.8% of EOM) which appears to comprise mostly indigenous geolipids associated with the coal (durite) component of the core (Appendix 2).

Certainly the low pristane/phytane ratio (pr/ph ∿1) of the saturated hydrocarbons (Fig. 6) is highly atypical of Gippsland Basin oils (Powell and McKirdy, 1975). Note, however, that these saturates appear to have sustained appreciable evaporative loss during isolation (Table 6). Hence, their true pr/ph value may be somewhat higher than that indicated in Figure 6.

5. CONCLUSIONS

1. At the Tarra-1 well locality the top of the oil generation window for resinite-poor terrigenous organic matter (VR = 0.7%) is located just below T.D. at ∿2930 metres depth in the Strzelecki Group. Latrobe and Strzelecki Group sediments in the interval 2270-2740 metres are sufficiently mature (VR = 0.45-0.6%) for the genesis of immature oil and condensate from thermally labile exinites (resinite, fluorinite).

2. Coals and carbonaceous shales of the Latrobe Group (2380-2470 m) contain oil-prone Type III organic matter rich in vitrinite (40-70%) and exinite (10-30%). Core samples from this interval have hydrogen indices (HI = 200-283 mg hydrocarbons/g TOC) and potential hydrocarbon yields (S_1 + S_2 = 21-159 kg/tonne) characteristic of good to excellent oil source rocks.

3. The abundance of resinite in one particular Latrobe Group coal (10% of core sample) is sufficient to impart significant source potential for immature oil/condensate.

4. (?)Migrated oil is present in siltstones of the Gurnard Formation and Latrobe Clastics.

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TABLE 1: FORMATION TOPS, TARRA-1

		Depth (metres, K.B.)
Lakes Entrance Formation		1841
Latrobe Group	- Gurnard Formation	2110
	- Latrobe Clastics	2244
	- Undifferentiated Latrobe	?
Strzelecki Group		2583
	Total Depth	2905

AMDEL

ROCK-EVAL PYROLYSIS

TABLE 2

Client AQUITAINE

Well TARRA-1

DEPTH	T MAX	S1	S2	S3	PI	S2/S3	PC	TOC	HI	OI
1916.10	427	0.05	0.49	1.75	0.09	0.28	0.04	0.65	75	269
2020.10								0.27		
2105.00	421	0.04	0.36	1.53	0.10	0.23	0.03	0.48	75	319
2145.00	390	0.05	0.28	2.11	0.16	0.13	0.02	0.42	67	502
2192.10	425	0.10	0.84	1.57	0.11	0.53	0.07	1.32	64	119
2232.50	423	0.16	0.93	0.64	0.15	1.45	0.09	1.54	60	42
2274.00								0.20		
2314.00								0.10		
2382.00	421	1.03	19.56	0.91	0.05	21.49	1.71	6.90	283	13
2427.40	412	11.98	139.87	3.03	0.08	46.16	12.65	69.80	200	4
2468.00	421	18.98	139.79	2.18	0.12	64.12	13.23	63.50	220	3
2474.00	426	0.23	1.64	1.06	0.12	1.54	0.15	1.05	156	100
2511.50	425	0.67	2.88	0.40	0.19	7.20	0.29	2.96	97	14
2556.00	431	0.33	2.95	1.51	0.10	1.95	0.27	2.94	100	51
2579.00	424	0.23	1.32	0.77	0.15	1.71	0.12	1.53	86	50
2599.00	446	0.03	0.62	0.18	0.05	3.44	0.05	0.77	81	23
2622.90	436	0.00	0.36	0.21	0.00	1.71	0.03	0.45	80	47
2644.00	439	0.04	0.69	1.10	0.06	0.62	0.06	0.95	73	116
2704.00	447	0.00	0.34	0.00	0.00	0.00	0.02	0.57	60	0
2751.00								0.11		
2798.50	445	0.03	1.86	0.00	0.02	0.00	0.15	2.22	84	0
2820.00	436	0.02	0.64	0.00	0.03	0.00	0.05	0.79	81	0
2891.30	434	0.08	1.17	0.25	0.06	4.68	0.10	1.42	82	18
2893.70	447	0.03	1.07	0.00	0.03	0.00	0.09	1.57	68	0
2902.60	454	0.06	1.62	0.00	0.04	0.00	0.14	2.48	65	0

KEY TO ROCK-EVAL PYROLYSIS DATA SHEET

	PARAMETER	SPECIFICITY
T max	position of S_2 peak in temperature program (^oC)	Maturity/Kerogen type
S_1	kg hydrocarbons (extractable)/tonne rock	Kerogen type/Maturity/Migrated oil
S_2	kg hydrocarbons (kerogen pyrolysate)/tonne rock	Kerogen type/Maturity
S_3	kg CO_2 (organic)/tonne rock	Kerogen type/Maturity *
$S_1 + S_2$	Potential Yield	Organic richness/Kerogen type
PI	Production Index ($S_1/S_1 + S_2$)	Maturity/Migrated Oil
PC	Pyrolysable Carbon (wt. percent)	Organic richness/Kerogen type/Maturity
TOC	Total Organic Carbon (wt. percent)	Organic richness
HI	Hydrogen Index (mg h'c (S_2)/g TOC)	Kerogen type/Maturity
OI	Oxygen Index (mg $CO_2(S_3)$/g TOC)	Kerogen type/Maturity *

*Also subject to interference by CO_2 from decomposition of carbonate minerals.

TABLE 3: VITRINITE REFLECTANCE MEASUREMENTS, TARRA-1

Sample	Depth (m)	Mean Maximum Reflectance (%)	Standard Deviation	Range	Number of Determinations
SWC14	2382	0.48	0.03	0.41-0.53	36
SWC10	2468	0.52	0.04	0.46-0.65	32
SWC3	2556	0.51	0.06	0.40-0.64	37
Core 2	2893.7	0.67	0.03	0.62-0.74	35
Core 2	2902.5	0.69	0.05	0.59-0.79	33

TABLE 4: PROPORTIONS OF VITRINITE, INERTINITE AND EXINITE IN ORGANIC MATTER, TARRA-1

Sample	Depth (m)	Percentage of Organic Matter		
		Vitrinite	Inertinite	Exinite
SWC44	1916.1	-	100	-
41	2020.1	-	100	-
30	2105	-	60	40
27	2145	5	65	30*
33	2192	-	70	30*
23	2232.5	<5	20	80*
18	2274	-	-	100*
31	2314	-	40	60*
14	2382	65	5	30
12	2427.4	70	10	20
10	2468	40	50	10
9	2474	5	85	10
7	2511.5	40	45	15
3	2556	35	45	20
85	2579	35	55	10
77	2599	-	90	10
73	2622.9	-	90	10
71	2644	-	75	25
67	2704	-	70	30
65	2751	-	70	30*
62	2820	-	60	40
Core 1	2798.5	-	90	10
Core 2	2891.3	-	80	20
Core 2	2893.7	75	20	<5
Core 2	2902.5	70	25	<5

*Exinite is mostly oil, bitumen (see Table 5).

TABLE 5: ORGANIC MATTER TYPE AND ABUNDANCE, TARRA-1

Sample	Depth (m)	Relative Maceral Group Volumes	Volume of Exinite	Exinite Macerals
SWC44	1916.1	I	abs	-
41	2020.1	I	abs	-
30	2105	I > E	vr	sp
27	2143	I > E > V	vr	oil
33	2192.1	I > E	vr	oil, sp
23	2232.5	E > I > V	ra	oil, bmen
18	2274	E	vr-tr	oil
31	2314	E > I	vr	oil, bmen
14	2382	V > E > I	spa-Co	lipto, sp, cut, sub, fluor
12	2427.4	*V > E > I	Ab	res, sp, cut, fluor, sub, exs
10	2468	*I > V > E	Ab	lipto, fluor, res, sp, cut
9	2474	I > E > V	ra	lipto, bmen, ?lama, ?tela
7	2511.5	I > V > E	ra	lipto, cut, bmen, sp, res, fluor
3	2556	I > V > E	ra	fluor, res, cut, sp, oil, ?bmen
85	2579	I > V > E	ra	res, fluor, cut, ?oil, sp
77	2599	I >> E	ra	lipto, sp, bmen
73	2622.9	I >> E	vr	lipto, sp
71	2644	I > E	ra-vr	lipto, cut, oil, ?lama, bmen
67	2704	I > E	ra	lipto, sp, cut
65	2751	I > E	vr-tr	?oil
62	2820	I > E	ra	sp, lipto, cut
Core 1	2798.5	I >> E	vr	lipto, oil, res, cut, fluor
Core 2	2891.3	I >> E	vr	sp, cut, bmen, fluor, res
Core 2	2893.7	V > I > E	tr	res, fluor, sp
Core 2	2902.5	V > I > E	vr	bmen, sp, cut, res

KEY

V	Vitrinite	ra	Rare (0.1-0.5%)	fluor	Fluorinite
I	Inertinite	vr	Very rare (<0.1%)	lama	Lamalginite
E	Exinite	abs	Absent	tela	Telalginite
*	Coal	sp	Sporinite	exs	Exsudatinite
Ab	Abundant (>2%)	cut	Cutinite	bmen	Bitumen
Co	Common (1-2%)	res	Resinite		
spa	Sparse (0.5-1%)	sub	Suberinite		
		lipto	Liptodetrinite		

TABLE 6: C_{15}+ EXTRACT DATA, TARRA-1

Sample	Bulk Composition*				C_{15}+ Alkane Distribution**							
	Saturates %	Aromatics %	Polars %	Asphaltenes %	Pr / n-C_{17}	Ph / n-C_{18}	TMTD / Pr	Pr / Ph	n-Alkane Profile: Maximum	n-Alkane Profile: C_{23}+ %	OEP C_{25}	OEP C_{27}
Core 2 2891.3 - 2891.5 m	7.6	2.2	—— 90.2 ——		0.66	0.29	nd	1.0	C_{19}	nd	nd	nd

*EOM Yield = 39 ppm

**Alkane parameters subject to modification by evaporative loss of C_{15} - C_{17} hydrocarbons during isolation of saturates fractions (weight 0.7 mg)

Client : AQUITAINE Well name : TARRA-1

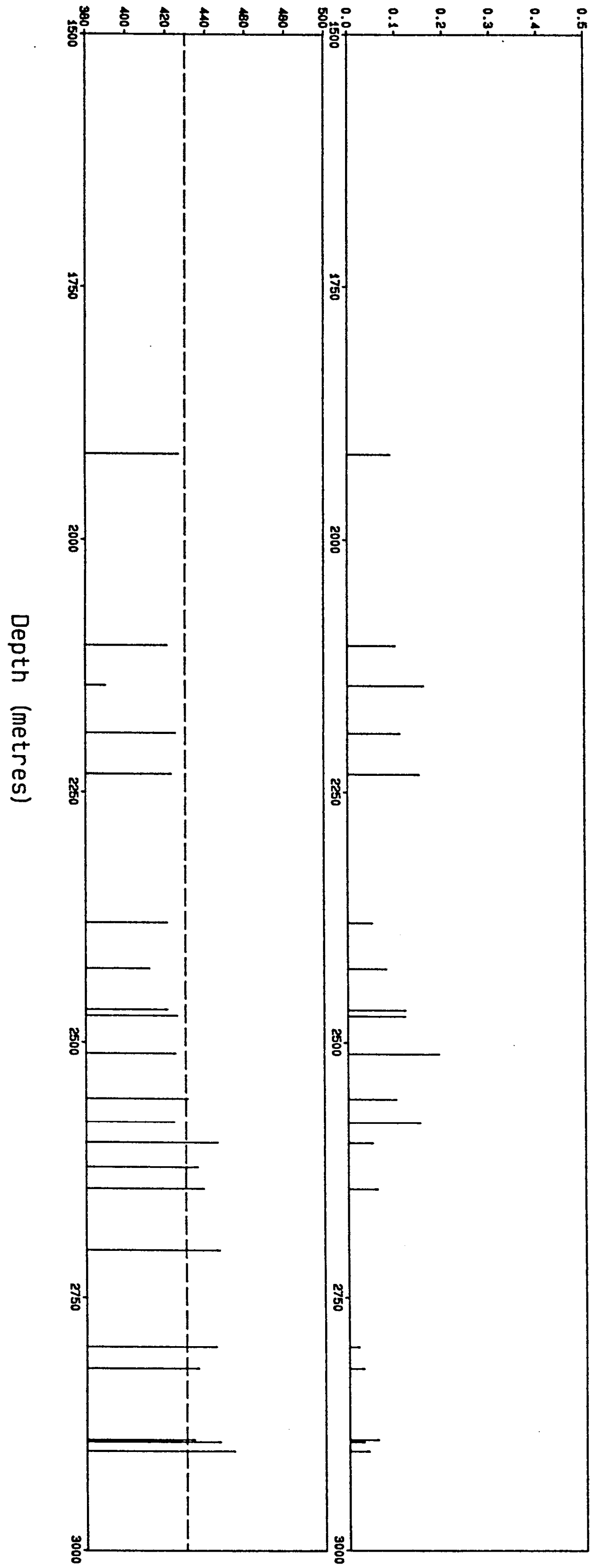


FIGURE 1A

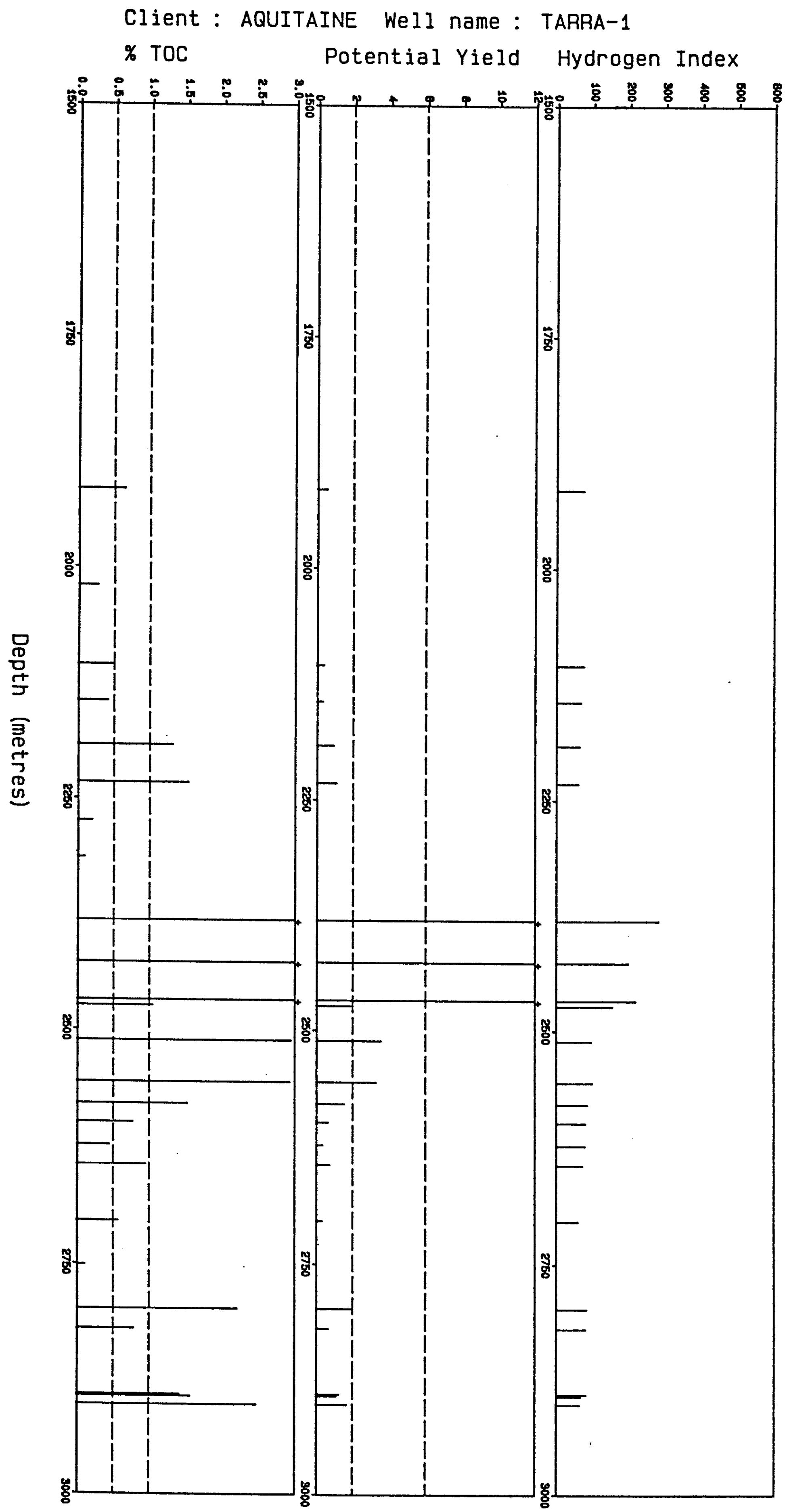

Client : AQUITAINE Well name : TARRA-1
% TOC
Potential Yield
Hydrogen Index
Depth (metres)
0.0 0.5 1.0 1.5 2.0 2.5 3.0
0 2 4 6 8 10 12
0 100 200 300 400 500 600
1500
1750
2000
2250
2500
2750
3000

FIGURE 1B

Client : AQUITAINE
Well name : TARRA-1
Interval : Lakes Entrance Formation

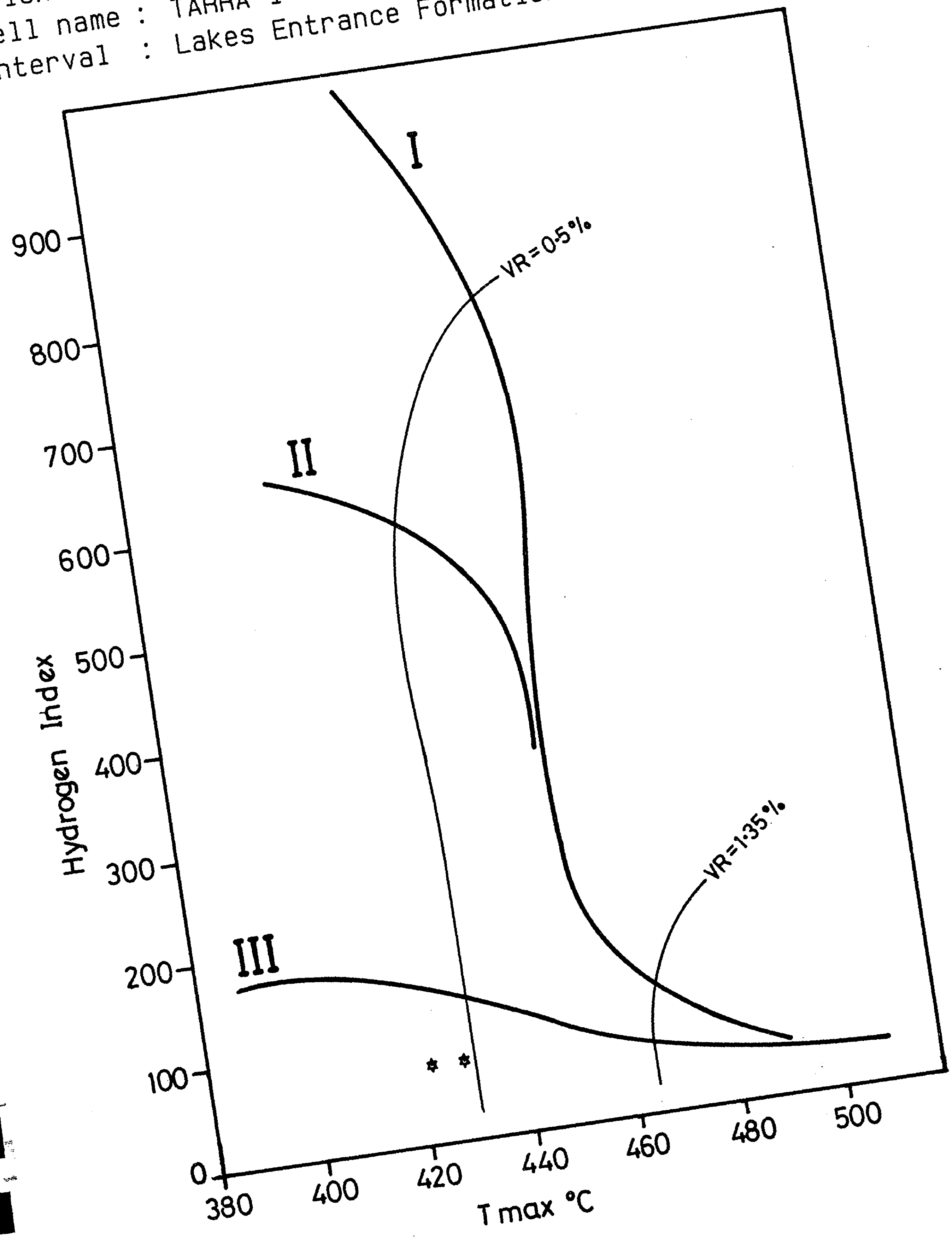


FIGURE 2

Client : AQUITAINE
Well name : TARRA-1
Interval : Latrobe Group

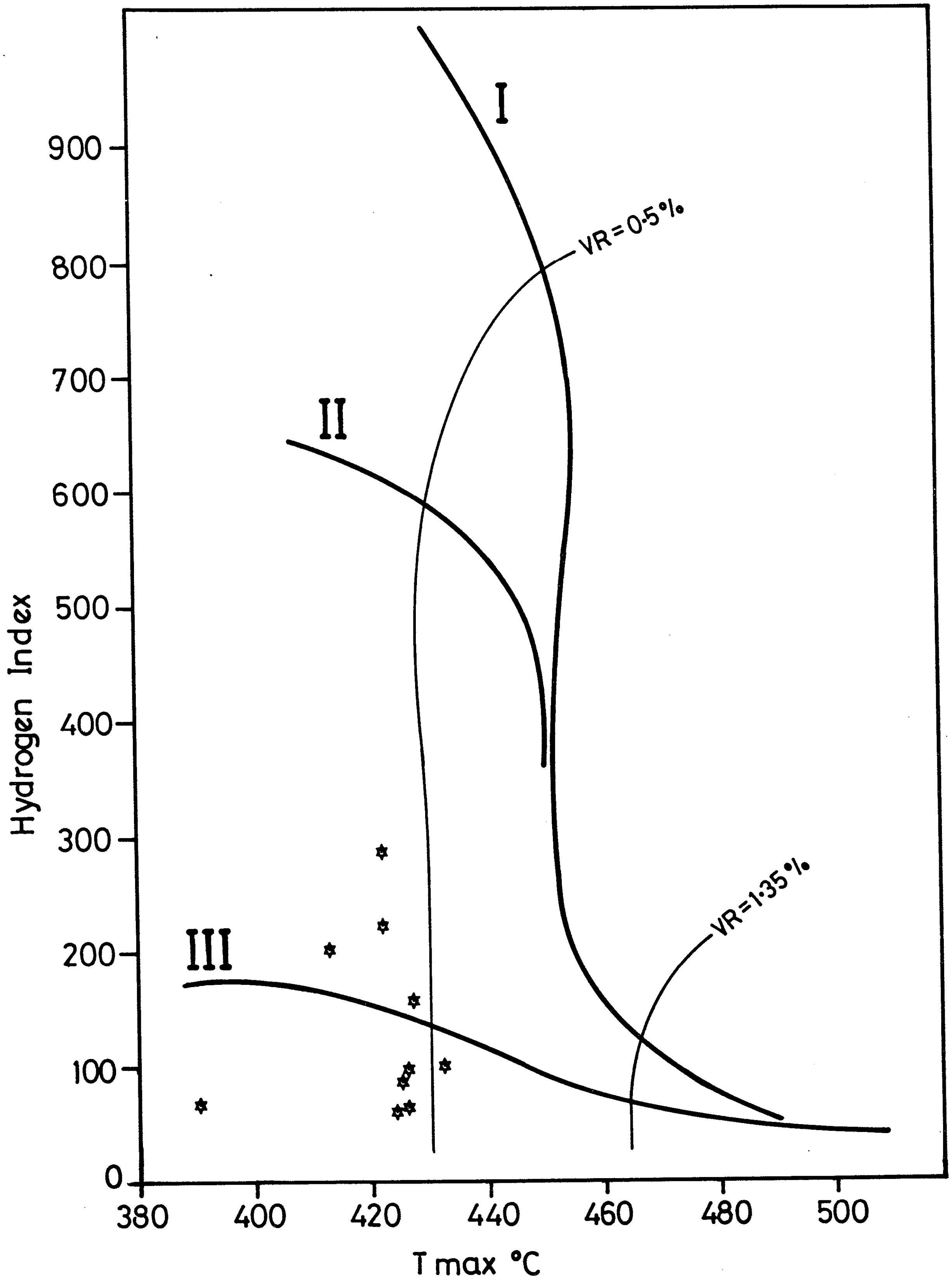


FIGURE 3

Client : AQUITAINE
Well name : TARRA-1
Interval : Strzelecki Group

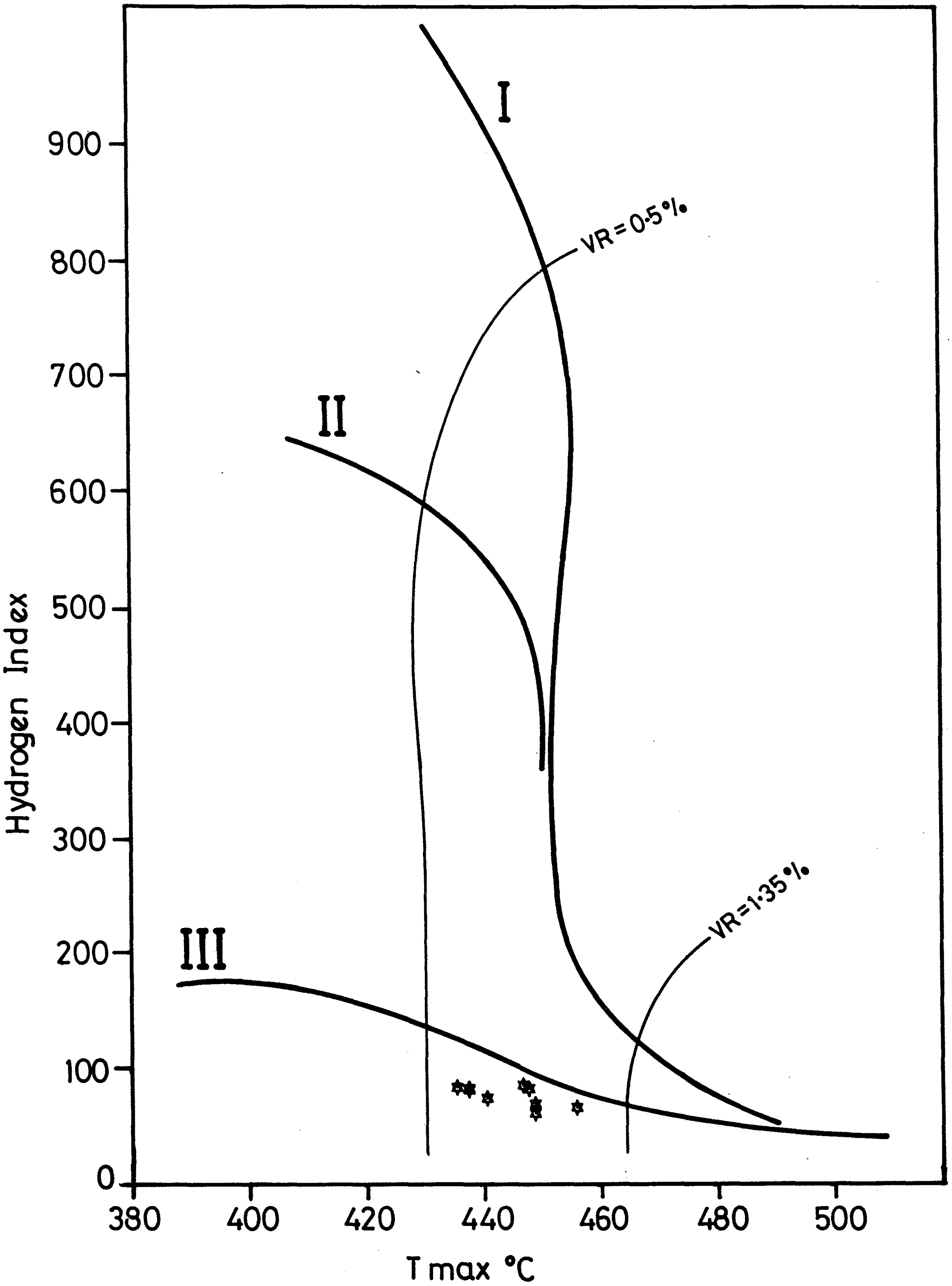


FIGURE 4

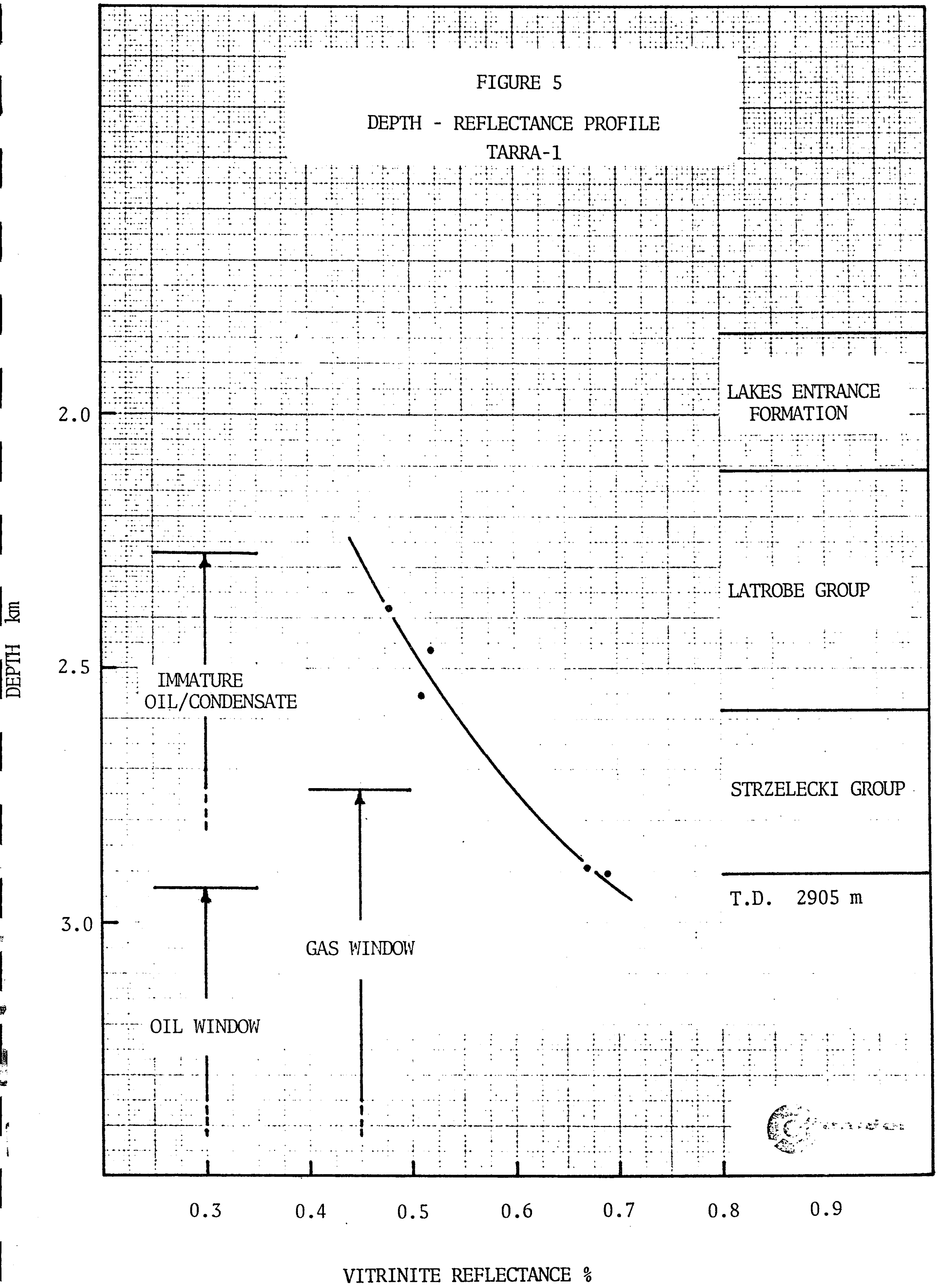


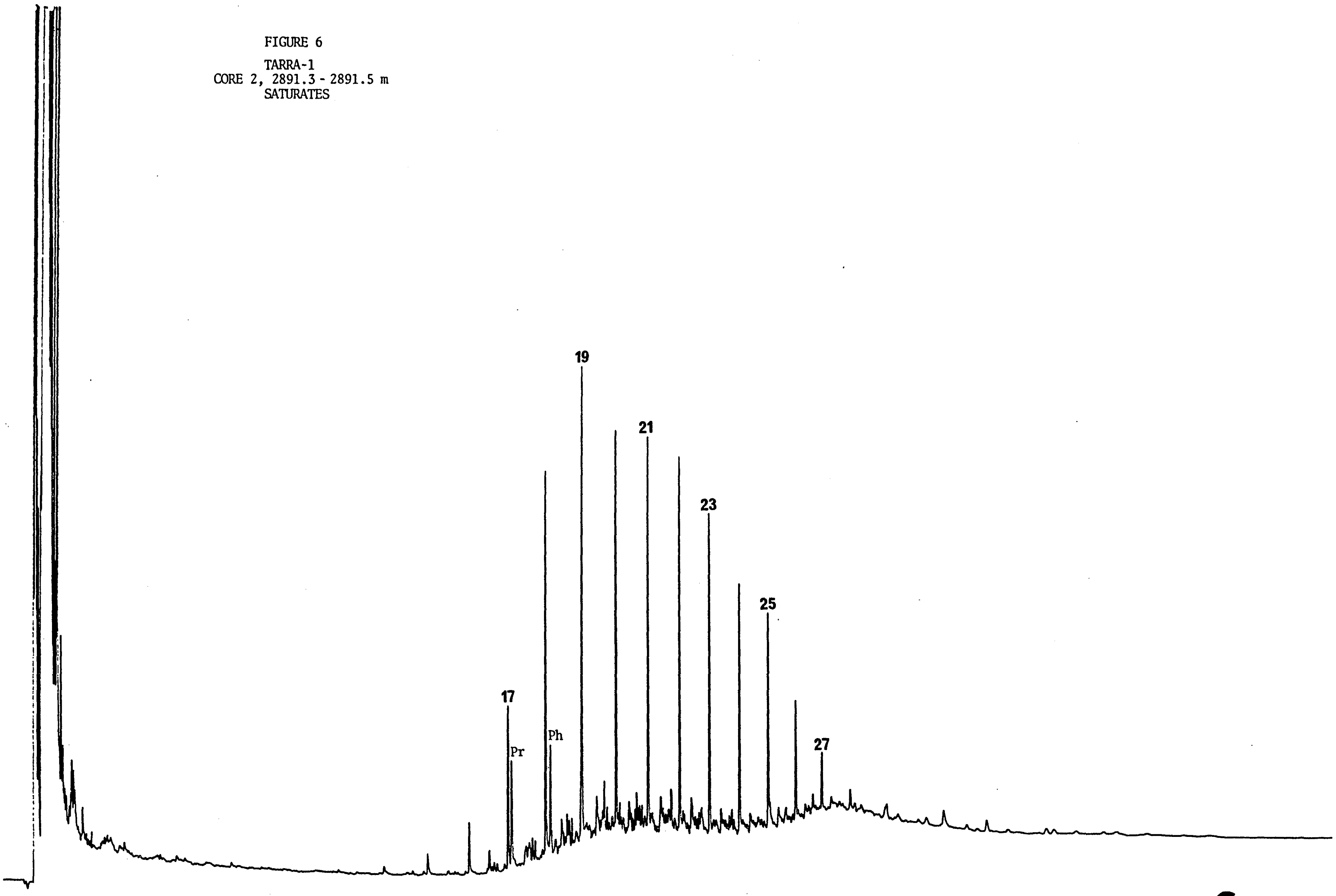
FIGURE 5

DEPTH - REFLECTANCE PROFILE

TARRA-1

FIGURE 6

TARRA-1
CORE 2, 2891.3 - 2891.5 m
SATURATES



APPENDIX 1

HISTOGRAMS OF VITRINITE REFLECTANCE MEASUREMENTS
TARRA-1

TARRA NO. 1

2382 M

SORTED LIST
.41 .43 .43 .44 .44 .44 .45 .46 .46 .46 .46 .47 .47 .47 .47 .48
.48 .48 .48 .48 .49 .49 .49 .49 .49 .49 .5 .5 .5 .5 .5 .51 .52
.52 .53 .53
Number of values = 36

MEAN OF VALUES .478
STD DEVIATION .028

HISTOGRAM OF RESULTS
Values are reflectance multiplied by 100

```
41  | *
42  |
43  | **
44  | ***
45  | *
46  | ****
47  | ****
48  | *****
49  | ******
50  | *****
51  | *
52  | **
53  | **
```

TARRA NO. 1

2468 M

SORTED LIST

```
 .46  .46  .47  .47  .48  .48  .49  .49  .49  .49  .5  .51  .51  .51  .51  .51
.52  .52  .52  .53  .53  .54  .54  .55  .55  .55  .55  .55  .56  .56  .57  .65
Number of values =  32
```

```
MEAN OF VALUES  .519
STD DEVIATION  .039
```

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   |
 63   |
 64   |
 65   |*
```

TARRA NO. 1

2556 M

SORTED LIST
.4 .43 .43 .44 .44 .44 .45 .45 .45 .46 .47 .48 .48 .48 .5 .5 .5
.51 .51 .51 .51 .52 .53 .53 .55 .55 .55 .55 .56 .56 .58 .58 .59
.59 .59 .6 .64
Number of values = 37

MEAN OF VALUES .511
STD DEVIATION .058

HISTOGRAM OF RESULTS
Values are reflectance multiplied by 100

```
40  |*
41  |
42  |
43  |**
44  |***
45  |***
46  |*
47  |*
48  |***
49  |
50  |***
51  |****
52  |*
53  |**
54  |
55  |****
56  |**
57  |
58  |**
59  |***
60  |*
61  |
62  |
63  |
64  |*
```

TARRA NO. 1

2893.7 M

SORTED LIST
.62 .63 .63 .63 .64 .64 .64 .64 .64 .64 .65 .65 .65 .65 .65 .66
.66 .66 .67 .67 .67 .67 .67 .68 .68 .69 .69 .7 .7 .7 .71 .72 .7
2 .72 .74
Number of values = 35

MEAN OF VALUES .668
STD DEVIATION .031

HISTOGRAM OF RESULTS
Values are reflectance multiplied by 100

```
62   |*
63   |***
64   |******
65   |*****
66   |***
67   |*****
68   |**
69   |**
70   |***
71   |*
72   |***
73   |
74   |*
```

TARRA NO. 1

2982.5 M

SORTED LIST

```
.59  .61  .61  .63  .64  .65  .65  .66  .66  .66  .67  .68  .68  .69  .69  .69
.69  .69  .7  .7  .7  .7  .71  .72  .72  .73  .73  .73  .73  .74  .76  .79  .79
```

Number of values = 33

MEAN OF VALUES .691
STD DEVIATION .047

HISTOGRAM OF RESULTS
Values are reflectance multiplied by 100

```
59   |*
60   |
61   |**
62   |
63   |*
64   |*
65   |**
66   |***
67   |*
68   |**
69   |*****
70   |****
71   |*
72   |**
73   |****
74   |*
75   |
76   |*
77   |
78   |
79   |**
```

APPENDIX 2

ORGANIC MATTER DESCRIPTIONS

TARRA-1

Sample 1: SWC 44: Depth 1916.1 m

This sidewall core consists of siltstone containing rare to absent dispersed organic matter. Inertinite is the only type of organic matter present.

The overall volume of organic matter in this siltstone is much less than 0.5%

Sample 2: SWC 41: Depth 2020.1 m

This sample is very similar to Sample 1. It is a siltstone with rare dispersed organic matter. This organic matter consists entirely of inertinite.

The overall volume of organic matter in this siltstone is much less than 0.5%.

Sample 3: SWC 30: Depth 2105 m

Like the previous two samples, this sidewall core consists of siltstone in which dispersed organic matter is rare. However, in this siltstone inertinite is more abundant than exinite.

Very rare sporinite (moderate yellow fluorescence) is the only exinite maceral present in the siltstone.

The overall volume of organic matter in this siltstone is less than 0.5%. Approximately 60% of this organic matter is inertinite. The remaining organic matter is exinite.

Sample 4: SWC 27: Depth 2145 m

This sample is very similar to the previous three samples in that it consists of a siltstone with rare dispersed organic matter. In this siltstone inertinite is more abundant than exinite which is much more abundant than vitrinite.

The only exinite maceral present is very rare oil (bright yellow-green fluorescence).

The overall volume of organic matter in this sample is again less than 0.5%. Inertinite comprises approximately 65% of this organic matter and exinite approximately 30%. The remaining 5% is vitrinite.

Sample 5: SWC 33: Depth 2192.1 m

This sidewall core consists of shale with rare dispersed organic matter. In this shale inertinite is more abundant than exinite.

Oil (bright yellow-green fluorescence) is very rare, whereas sporinite (moderate yellow to moderate orange fluorescence) is present only in trace amounts.

The overall volume of organic matter in this shale is less than 0.5%. Approximately 70% of the organic matter is inertinite. The remaining organic matter consists of exinite.

Sample 6: SWC 23: Depth 2232.5 m

This sidewall core is an oil-stained shale containing rare to sparse dispersed organic matter. The majority of the organic material in this shale is oil and asphaltic bitumen. The indigenous dispersed organic matter consists chiefly of inertinite, with minor amounts of vitrinite.

Oil and bitumen (bright yellow-green to bright yellow, bright orange and moderate orange fluorescence) are rare in this shale.

The overall volume of organic matter in the shale is estimated to be 0.5-1%. Approximately 80% of this organic matter consists of oil and oil-derived bitumens. Inertinite comprises approximately 20% of the organic matter and vitrinite less than 5%.

Sample 7: SWC 18: Depth 2274 m

This sidewall core consists of fine-grained sandstone. The only recognisable matter in this shale is oil (bright yellow-green fluorescence). Oil is present in very rare to trace amounts.

Sample 8: SWC 31: Depth 2314 m

This sample consists of silty shale with rare dispersed organic matter. In this shale oil and oil-derived bitumens are slightly more abundant than inertinite.

Oil (bright yellow-green fluorescence) is very rare, whereas bitumen (moderate orange fluorescence) occurs only in trace amounts.

The overall volume of organic matter in this shale is much less than 0.5%. Oil and oil-derived bitumens comprise approximately 60% of this organic matter. The remaining organic matter is inertinite.

Sample 9: SWC 14: Depth 2382 m

This sidewall core consists of shale with common to abundant dispersed organic matter. In this shale vitrinite is more abundant than exinite which is much more abundant than inertinite.

Exinite is sparse to common. The exinite macerals present in order of abundance are liptodetrinite (moderate yellow to moderate orange fluorescence), sporinite (moderate yellow to moderate orange fluorescence), cutinite (moderate yellow to moderate orange fluorescence), suberinite (dull orange fluorescence) and fluorinite (bright yellow-green to bright yellow and moderate yellow fluorescence). Liptodetrinite is sparse to common in this shale, whereas sporinite and cutinite are rare. Suberinite is very rare and is slightly more abundant than fluorinite.

The overall volume of organic matter in this shale is estimated to be 5-10%. Approximately 65% of this organic matter is vitrinite. Exinite comprises approximately 30% of the organic matter, and inertinite the remaining 5%.

Sample 10: SWC 12: Depth 2427.4 m

This sidewall core consists of coal. In this coal vitrinite is much more abundant than exinite which is more abundant than inertinite. The coal is therefore an exinite-rich duroclarite.

Exinite is abundant in this coal. The exinite macerals present are resinite (moderate yellow to moderate orange fluorescence), sporinite (moderate yellow to moderate orange fluorescence), cutinite (moderate yellow to moderate orange fluorescence), fluorinite (bright yellow to bright yellow-orange fluorescence), suberinite (dull orange fluorescence) and exsudatinite (moderate orange fluorescence). Resinite and sporinite are abundant. Cutinite is rare and is slightly more abundant than fluorinite and suberinite. Exsudatinite is very rare.

The overall volume of organic matter in this coal is estimated to be approximately 80-90%. Vitrinite forms approx: ately 70% of this organic matter. Exinite comprises approximately 20% of the organic matter, and inertinite the remaining 10%.

Sample 11: SWC 10: Depth 2468 m

This sample is similar to Sample 10 in that it consists entirely of coal. However, in this particular coal inertinite is more abundant than vitrinite which is more abundant than exinite. The coal is therefore a clarodurite.

Exinite is again abundant. The exinite macerals present are liptodetrinite (moderate yellow to moderate orange fluorescence), fluorinite (bright yellow-green to bright yellow fluorescence), resinite (bright yellow and moderate orange fluorescence), sporinite (moderate yellow to moderate orange fluorescence) and cutinite (moderate yellow to moderate orange and dull orange fluorescence). Liptodetrinite is abundant in this coal, whereas fluorinite, resinite, sporinite and cutinite are sparse.

The overall volume of organic matter in this coal is again estimated to be 80-90%. Inertinite comprises approximately 50% of this organic matter, and vitrinite approximately 40%. The remaining organic matter is exinite.

Sample 12: SWC 9: Depth 2474 m

This sidewall core is a shale with sparse dispersed organic matter. In this shale inertinite is much more abundant than exinite which is slightly more abundant than vitrinite.

Exinite is rare in this shale. The exinite macerals present are liptodetrinite (moderate orange fluorescence), bitumen (bright yellow-green to bright yellow and dull brown fluorescence), ?lamalginite (bright orange fluorescence) and ?telalginite (bright yellow to bright orange fluorescence). Liptodetrinite is rare, whereas bitumen and ?lamalginite are very rare. Telalginite occurs in trace amounts.

The overall volume of organic matter in this shale is estimated to be 0.5-1%. Inertinite makes up approximately 90% of this organic matter. Exinite comprises approximately 5% of the organic matter and vitrinite less than 5%.

Sample 13: SWC 7: Depth 2511.5 m

This sidewall core consists of silty shale in which dispersed organic matter is common to abundant. Inertinite is slightly more abundant than vitrinite which is more abundant than exinite.

Exinite is rare in this shale. The exinite macerals present in order of abundance are liptodetrinite (moderate orange fluorescence), cutinite (moderate yellow to moderate orange fluorescence), ?bitumen (moderate orange fluorescence), resinite (moderate yellow to moderate orange fluorescence) and fluorinite (bright yellow fluorescence). Liptodetrinite, cutinite and ?bitumen are rare, whereas sporinite and resinite are very rare. Fluorinite is present in trace amounts.

The overall volume of organic matter in this shale is estimated to be approximately 2-5%. Inertinite comprises approximately 45% of this organic matter and vitrinite approximately 40%. The remaining organic matter is exinite.

Sample 14: SWC 3: Depth 2556 m

This sidewall core is a silty shale with common to abundant dispersed organic matter. Inertinite is more abundant than vitrinite which is more abundant than exinite.

Exinite is rare in this shale. The exinite macerals present are fluorinite (bright yellow-green to bright yellow and bright orange fluorescence), cutinite (moderate yellow to moderate orange fluorescence), resinite (dull orange fluorescence), sporinite (moderate yellow fluorescence), oil (bright yellow fluorescence) and ?bitumen (dull orange to dull brown fluorescence). Fluorinite, cutinite and resinite are rare, whereas sporinite and oil are very rare. ?Bitumen occurs in trace elements.

The overall volume of organic matter in this shale is estimated to be approximately 3-5%. Approximately 45% of this organic matter is inertinite. Vitrinite comprises approximately 35% of the organic matter and exinite the remaining 20%.

Sample 15: SWC 85: Depth 2579 m

This sample is a silty shale with sparse to common dispersed organic matter. In this shale inertinite is more abundant than vitrinite which is more abundant than exinite.

Exinite is rare. The exinite macerals present are resinite (moderate to dull orange fluorescence), fluorinite (bright yellow to bright orange fluorescence), cutinite (moderate orange fluorescence), ?oil (bright yellow-green fluorescence) and sporinite (moderate orange fluorescence). Resinite and fluorinite are rare in this shale and are slightly more abundant than cutinite. ?Oil is very rare and sporinite occurs in trace amounts.

The overall volume of organic matter is estimated to be 1-2%. Approximately 55% of this organic matter is inertinite. Vitrinite comprises approximately 35% of the organic matter and exinite comprises the remaining 10%.

Sample 16: SWC 77: Depth 2599 m

This core is a shale in which dispersed organic matter is common. Vitrinite is absent from this shale and inertinite is much more abundant than exinite.

Exinite is rare in this sample. The exinite macerals present are liptodetrinite (moderate yellow to moderate orange fluorescence), sporinite (moderate orange fluorescence) and bitumen (moderate to dull orange fluorescence). Liptodetrinite is rare and sporinite is very rare. Bitumen is present in trace amounts.

The overall volume of organic matter in this sample is estimated to be 1-2%. Inertinite comprises approximately 90% of this organic matter. The remainder is exinite.

Sample 17: SWC 73: Depth 2622.9 m

This sidewall core consists of siltstone with sparse dispersed organic matter. Inertinite is much more abundant than exinite. No vitrinite is present.

Exinite is very rare in this sample. The exinite macerals present are liptodetrinite (moderate to dull oragne fluorescence) and sporinite (moderate orange fluorescence). Liptodetrinite is very rare and sporinite is present in trace amounts.

The overall volume of organic matter in this sample is estimated to be 0.5-1%. Inertinite comprises approximately 90% of this organic matter and exinite makes up the remaining 10%.

Sample 18: SWC 71: Depth 2644 m

This sample is a shale containing sparse dispersed organic matter. Vitrinite is absent from this sample and inertinite is more abundant than exinite.

Exinite is rare to very rare in this shale. The exinite macerals present are liptodetrinite (moderate orange fluorescence), cutinite (moderate orange fluorescence), oil (bright yellow-green fluorescence), ?lamalginite (moderate orange fluorescence) and bitumen (moderate orange fluorescence). Liptodetrinite is rare to very rare, whereas cutinite and oil are very rare. Bitumen is present in trace amounts and is slightly less abundant than ?lamalginite.

The overall volume of organic matter in this shale is esimated to be 0.5-1%. Approximately 75% of this organic matter is inertinite; the remainder consists of exinite.

Sample 19: SWC 67: Depth 2704 m

This sidewall core consists of a siltstone with rare to sparse dispersed organic matter. Inertinite is more abundant than exinite. Vitrinite is not present.

Exinite is rare in this sample. The exinite macerals present are liptodetrinite (moderate orange fluorescence), sporinite (moderate to dull orange fluorescence) and cutinite (moderate orange fluorescence). Liptodetrinite is rare and is slightly more abundant than sporinite. Cutinite is very rare.

Sample 19: SWC 67: Depth 2704 m (Continued)

The overall volume of organic matter in this sample is estimated to be 0.5-1%. Inertinite comprises approximately 70% of the organic matter and exinite the remaining 30%.

Sample 20: SWC 65: Depth 2751 m

This sidewall core consists of very fine-grained quartz sandstone. Organic matter is rare or absent. Inertinite is the only type of indigenous organic matter represented. However, oil (bright yellow-green fluorescence) also is present in very rare to trace amounts.

The overall volume of organic matter in this sample is estimated to be less than 0.5%. Inertinite accounts for approximately 70% of this organic matter. The rest is oil.

Sample 21: SWC 62: Depth 2820 m

This sidewall core consists of siltstone containing sparse dispersed organic matter. Vitrinite is absent from this siltstone. Inertinite is more abundant than exinite.

Exinite is rare in this sample. The exinite macerals present are sporinite (moderate orange fluorescence), liptodetrinite (moderate orange fluorescence) and cutinite (moderate yellow to moderate orange fluorescence). Sporinite and liptodetrinite are rare, whereas cutinite is very rare.

The overall volume of organic matter in this siltstone is estimated to be 0.5-1%. Inertinite comprises approximately 60% of this organic matter and exinite comprises the remaining 40%.

Sample 22: Core 1: Depth 2798.5 m

This core consits of a sandy siltstone with rare to sparse (and in places common) dispersed organic matter. In this rock inertinite is much more abundant than exinite.

Exinite is very rare. The exinite macerals present are liptodetrinite (moderate orange fluorescence), oil (bright yellow-green fluorescence), cutinite (moderate orange fluorescence), resinite (dull orange fluorescence) and fluorinite (bright yellow fluorescence). Liptodetrinite and oil are very rare, whereas cutinite, resinite and fluorinite are present in trace amounts.

The overall volume of organic matter in this core is 1-2%. Approximately 90% of this organic matter is inertinite and exinite comprises the remaining 10%.

Sample 23: Core 2: Depth 2891.3-2891.5 m

This core consists chiefly of sandstone with rare to absent dispersed organic matter. However, some discrete coal (durite) fragments are also present.

Exinite is very rare in this core. The exinite macerals present are sporinite (moderate orange fluorescence), cutinite (moderate orange fluorescence), bitumen (dull orange fluorescence), resinite (dull orange fluorescence) and fluorinite (bright yellow and moderate yellow fluorescence). Sporinite, cutinite and bitumen are very rare, whereas resinite and fluorinite are present only in trace amounts.

The overall volume of organic matter in the core is estimated to be 0.5-1%. Approximately 80% of this organic matter is inertinite and exinite comprises the remaining 20%.

Sample 24: Core 2: Depth 2893.7 m

This core consists chiefly of a silty sandstone with rare to absent dispersed organic matter. In this sandstone vitrinite is more abundant than inertinite and exinite is absent. Discrete coal fragments occupy approximately 1% of the core. The majority of these coals are vitrites although some inertite grains are also present.

Exinite is present in trace amounts in this core, being located entirely in the coal grains. The exinite macerals present are resinite (dull orange fluorescence), sporinite (moderate orange fluorescence) and fluorinite (bright orange to moderate orange fluorescence).

The overall volume of organic matter in this core is estimated to be approximately 1-3%. Approximately 85% of this organic matter is vitrinite. Inertinite comprises approximately 10% of the organic matter and exinite the remaining 5%.

Sample 25: Core 2: Depth 2902.5 m

This core consists of sandstone containing sparse to common dispersed organic matter, as coal fragments (chiefly vitrite with minor fusite). Vitrinite is much more abundant than exinite which is more abundant than inertinite.

Exinite is very rare in this core. The exinite macerals present are bitumen (dull orange fluorescence), sporinite (moderate yellow to moderate orange fluorescence), cutinite (moderate yellow to moderate orange fluorescence) and resinite (dull orange fluorescence). Bitumen and sporinite are very rare, whereas cutinite and resinite occur only in trace amounts.

The overall volume of organic matter in this core is estimated to be 1-2%. Approximately 85% of this organic matter is vitrinite. Exinite comprises about 10% of the organic matter and inertinite the remaining 5%.

PLATES

A series of twelve plates are included to illustrate some of the types of organic matter present in these samples. All plates were printed from 35 mm photomicrographs taken using an oil immersion objective with a nominal magnification of 32 or 50. Field dimensions are shown for each print.

In some prints fluorescence colours and intensities have been altered by the printing process and the limited latitude of the original transparencies.

PE906389

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The enclosure PE906389 is enclosed within the container PE902577 at this location in this document.

The enclosure PE906389 has the following characteristics:

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BASIN =	GIPPSLAND
PERMIT =	VIC/P17
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SUBTYPE =	PHOTOMICROGRAPH
DESCRIPTION =	Microphotographs from Tarra-1, 1 of 6, Appendix 6
REMARKS =	
DATE_CREATED =	30/09/83
DATE_RECEIVED =	7/01/84
W_NO =	W806
WELL_NAME =	TARRA-1
CONTRACTOR =	AMDEL
CLIENT_OP_CO =	AUSTRALIAN AQUITAINE PETROLEUM

PLATE 1: 2274 m Reflected Light

This plate shows two distinct bitumens (very dark brown and light brown, occurring slightly above and to the right of the centre of the field) occurring with inertinite in shale.

Field Dimensions 0.26 mm x 0.18 mm

PLATE 2: 2274 m Fluorescence Mode

The same field as Plate 1 illustrating the markedly differing fluorescence characteristics of the two bitumens (dull orange and bright yellow).

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          SUBTYPE = PHOTOMICROGRAPH
      DESCRIPTION = Microphotographs from Tarra-1, 2 of 6,
                    Appendix 6
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    DATE_RECEIVED = 7/01/84
             W_NO = W806
        WELL_NAME = TARRA-1
       CONTRACTOR = AMDEL
     CLIENT_OP_CO = AUSTRALIAN AQUITAINE PETROLEUM
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(Inserted by DNRE - Vic Govt Mines Dept)

PLATE 3: 2437.4 m Reflected Light

This coal is an exinite-rich duroclarite consisting chiefly of vitrinite (grey) and exinite (dark brown) with common inertinite (white).

Field Dimensions 0.26 mm x 0.18 mm

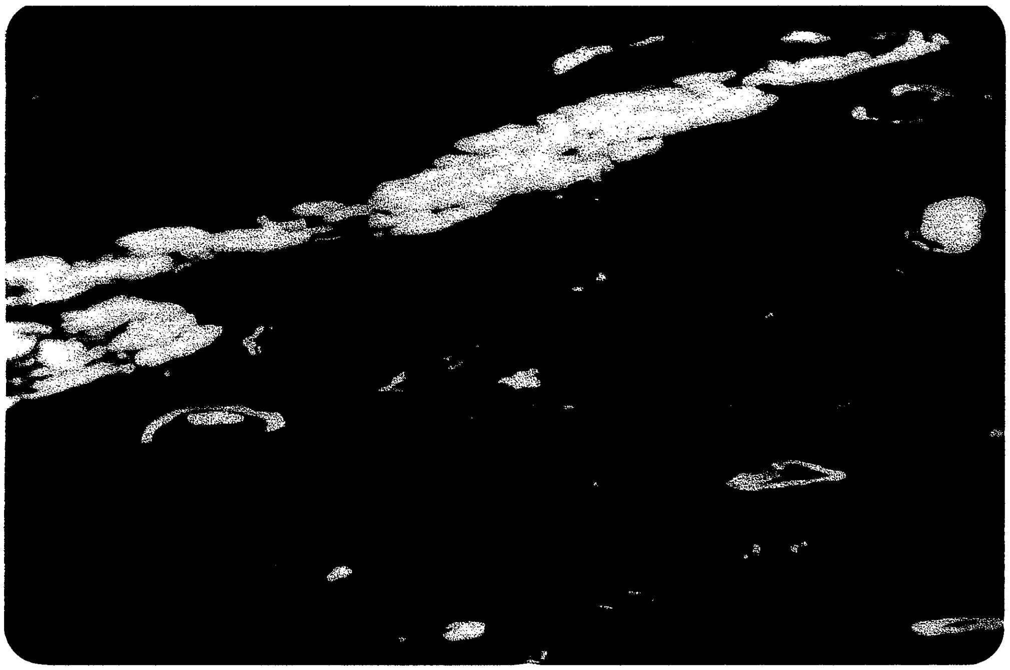

PLATE 4: 2427.4 m Fluorescence Mode

This is the same field as Plate 3 illustrating the bright fluorescence of the resinite, cutinite, fluorinite and sporinite.

PE906391

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CLIENT_OP_CO	= AUSTRALIAN AQUITAINE PETROLEUM

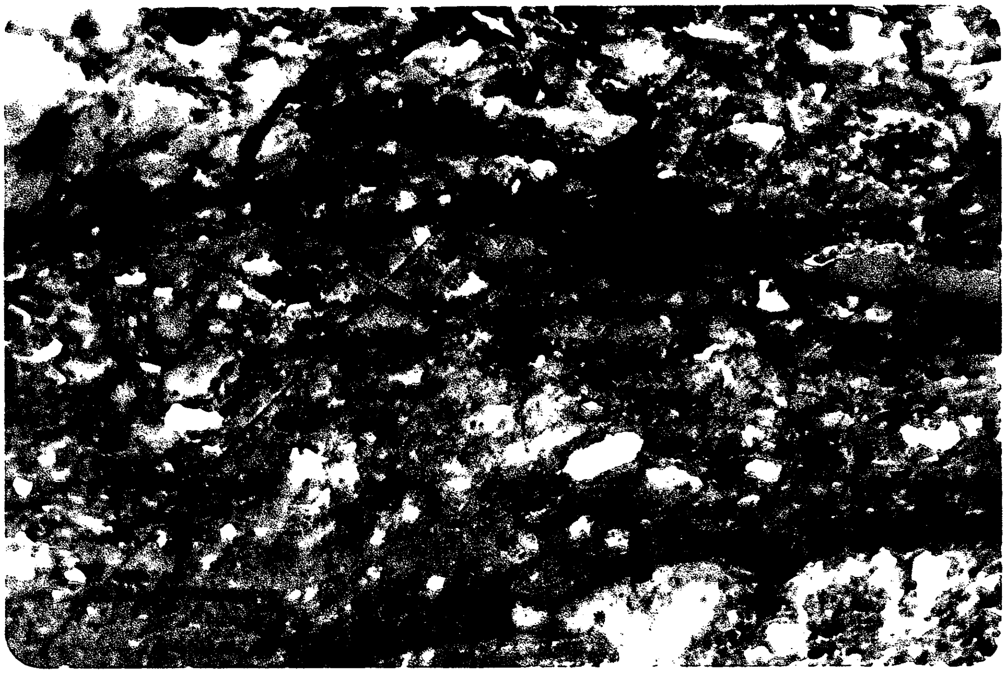

PLATE 5: 2468 m Reflected Light

This coal is much richer in inertinite than the coal from 2427.4 m, (Plates 3 and 4) and is therefore termed a clarodurite.

Field Dimensions 0.26 mm x 0.18 mm

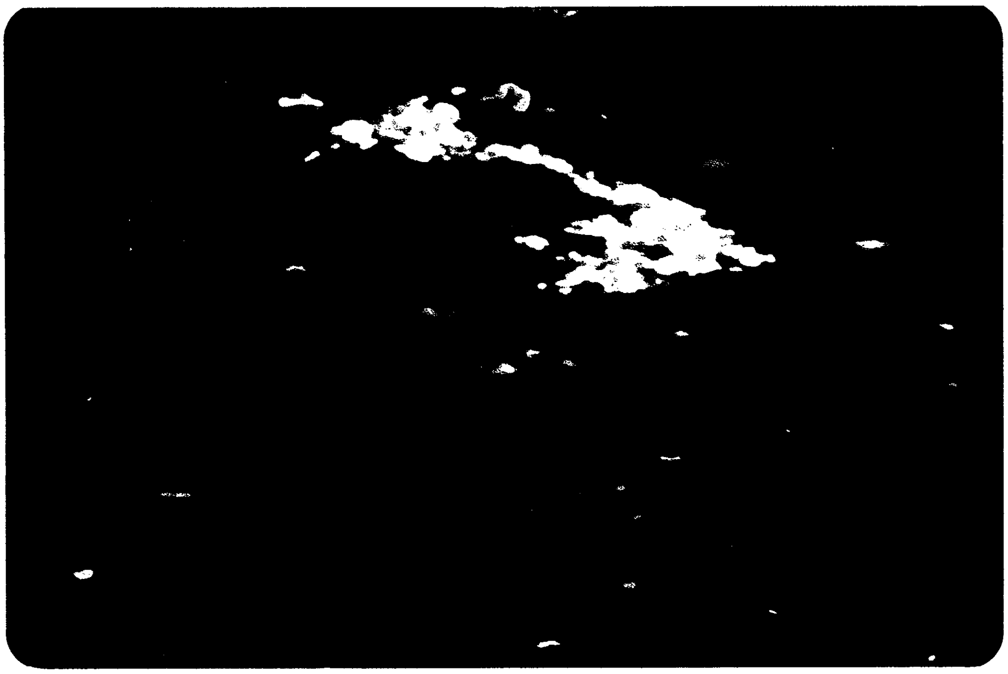

PLATE 6: 2468 m Fluorescence Mode

The same field as Plate 5 illustrating the intense fluorescence of the fluorinite in the coal as compared to the sporinite (dull orange, upper left).

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CONTRACTOR = AMDEL
CLIENT_OP_CO = AUSTRALIAN AQUITAINE PETROLEUM

(Inserted by DNRE - Vic Govt Mines Dept)

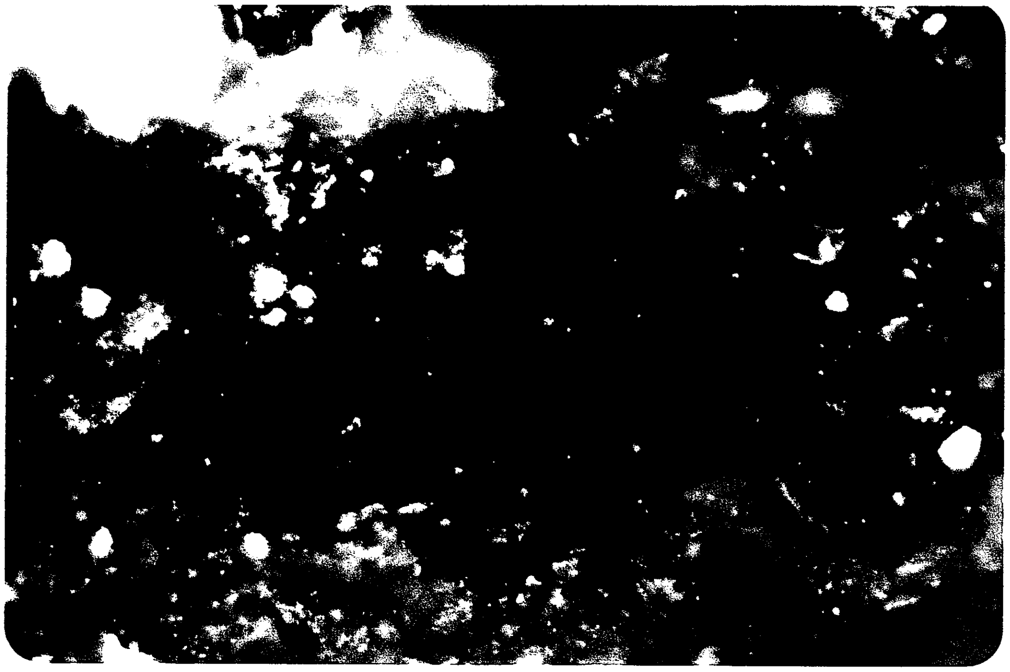

PLATE 7: 2511.5 m Reflected Light

This plate shows bitumen (dark brown) occurring with sporinite (dark brown) in siltstone.

Field Dimensions 0.26 mm x 0.18 mm

PLATE 8: 2511.5 m Fluorescence Mode

The differing fluorescence characteristics of the sporinite (orange) and the bitumen (yellow) enable their identification in fluorescence mode. (Same field as Plate 7).

PE906393

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BASIN = GIPPSLAND
PERMIT = VIC/P17
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DATE_CREATED = 30/09/83
DATE_RECEIVED = 7/01/84
W_NO = W806
WELL_NAME = TARRA-1
CONTRACTOR = AMDEL
CLIENT_OP_CO = AUSTRALIAN AQUITAINE PETROLEUM

(Inserted by DNRE - Vic Govt Mines Dept)

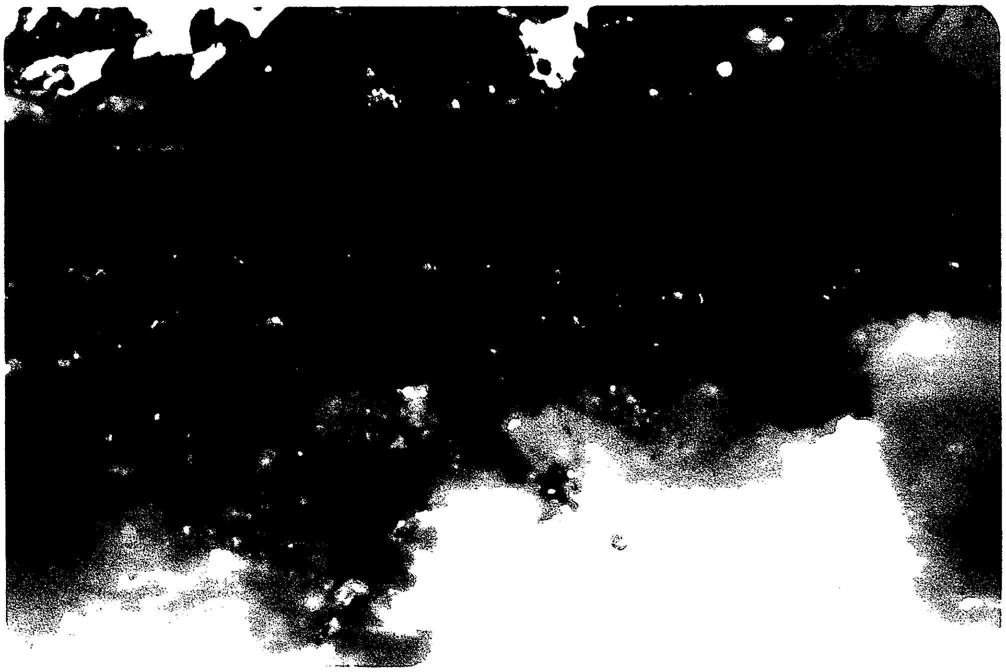

PLATE 9: 2556 m Reflected Light

This plate shows a thin 'stringer' of coal occurring in sandstone. The coal is a clarite.

Field Dimensions 0.26 mm x 0.18 mm

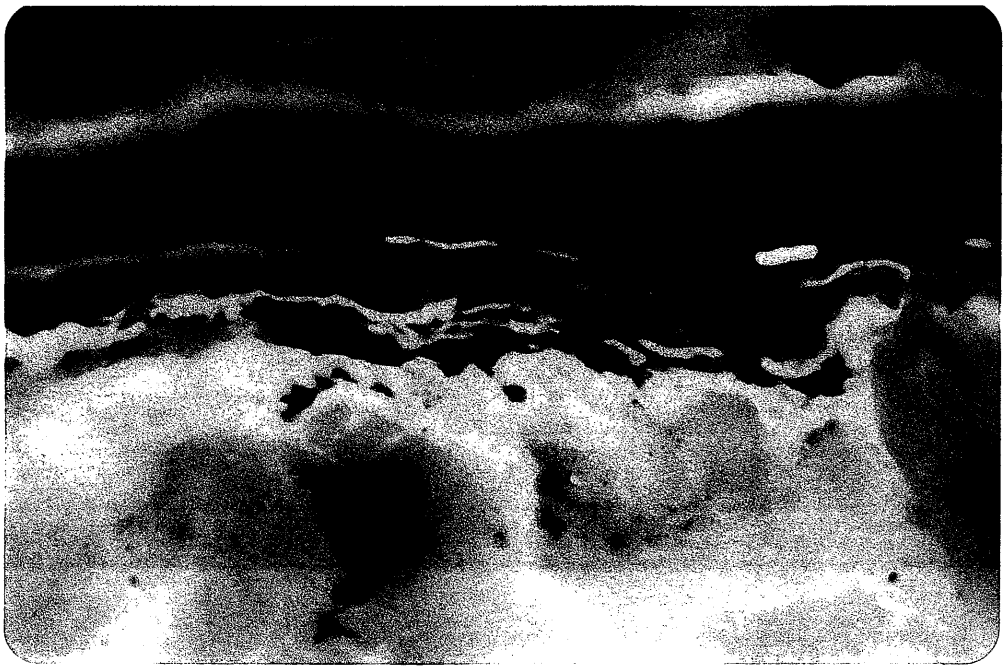

PLATE 10: 2556 m Fluorescence Mode

The same field as Plate 9 highlighting the exinite macerals in the coal: cutinite (moderate orange), sporinite (moderate orange) and fluorinite (bright yellow-green).

PE906394

This is an enclosure indicator page.
The enclosure PE906394 is enclosed within the container PE902577 at this location in this document.

The enclosure PE906394 has the following characteristics:

ITEM_BARCODE =	PE906394
CONTAINER_BARCODE =	PE902577
NAME =	Colour Photomicrographs, 6 of 6
BASIN =	GIPPSLAND
PERMIT =	VIC/P17
TYPE =	WELL
SUBTYPE =	PHOTOMICROGRAPH
DESCRIPTION =	Microphotographs from Tarra-1, 6 of 6, Appendix 6
REMARKS =	
DATE_CREATED =	30/09/83
DATE_RECEIVED =	7/01/84
W_NO =	W806
WELL_NAME =	TARRA-1
CONTRACTOR =	AMDEL
CLIENT_OP_CO =	AUSTRALIAN AQUITAINE PETROLEUM

(Inserted by DNRE - Vic Govt Mines Dept)

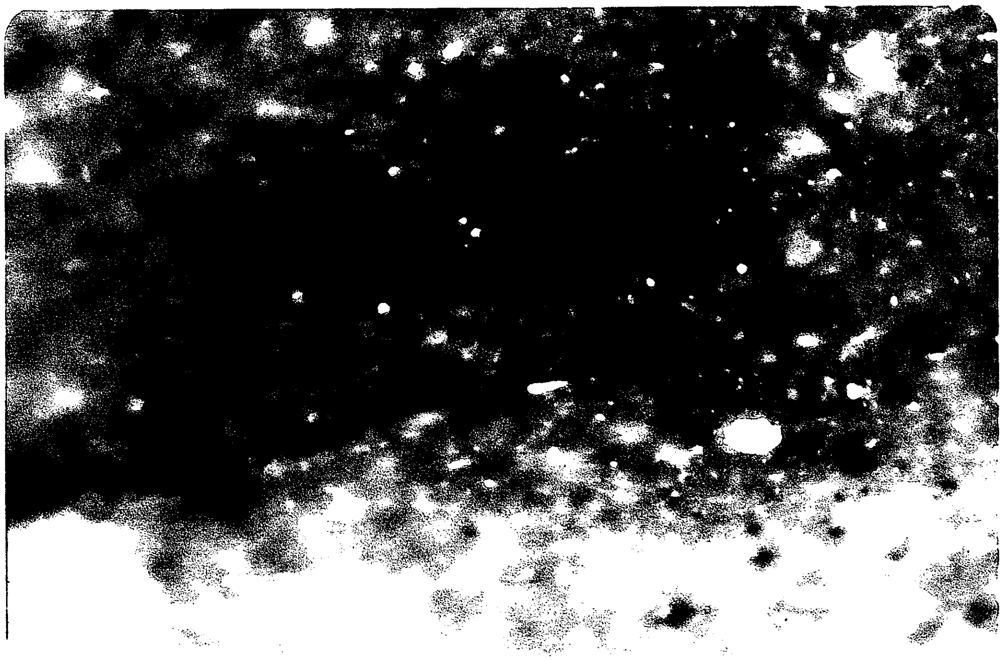

PLATE 11: 2820 m Reflected Light

This plate shows a dinoflagellate occurring with liptodetrinite in a siltstone.

Field Dimensions 0.26 mm x 0.18 mm

PLATE 12: 2820 m Fluorescence Mode

Same field as Plate 11. The fluorescence colour and intensity of the liptodetrinite are very similar to those of the dinoflagellate. This indicates that the liptodetrinite is probably fragmented phytoplankton.

PE906395

This is an enclosure indicator page.
The enclosure PE906395 is enclosed within the container PE902577 at this location in this document.

The enclosure PE906395 has the following characteristics:

ITEM_BARCODE =	PE906395
CONTAINER_BARCODE =	PE902577
NAME =	Geochemical Graph, 1 of 2
BASIN =	GIPPSLAND
PERMIT =	VIC/P17
TYPE =	WELL
SUBTYPE =	DIAGRAM
DESCRIPTION =	Geochemical Graph (Tmax and Production Index v depth) for Tarra-1
REMARKS =	
DATE_CREATED =	30/09/83
DATE_RECEIVED =	7/01/84
W_NO =	W806
WELL_NAME =	TARRA-1
CONTRACTOR =	AMDEL
CLIENT_OP_CO =	AUSTRALIAN AQUITAINE PETROLEUM

(Inserted by DNRE - Vic Govt Mines Dept)

PE906396

This is an enclosure indicator page.
The enclosure PE906396 is enclosed within the container PE902577 at this location in this document.

The enclosure PE906396 has the following characteristics:

ITEM_BARCODE = PE906396
CONTAINER_BARCODE = PE902577
NAME = Geochemical Graph, 2 of 2
BASIN = GIPPSLAND
PERMIT = VIC/P17
TYPE = WELL
SUBTYPE = DIAGRAM
DESCRIPTION = Geochemical Graph (%TOC, Production Yield and Hydrogen Index v depth) for Tarra-1
REMARKS =
DATE_CREATED = 30/09/83
DATE_RECEIVED = 7/01/84
W_NO = W806
WELL_NAME = TARRA-1
CONTRACTOR = AMDEL
CLIENT_OP_CO = AUSTRALIAN AQUITAINE PETROLEUM

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX VII

WEEKLY WELL SUMMARY

FINAL POSITION

LAT: 38 DEG 31 MIN 37.195 SEC - SOUTH
LON:147 DEG 42 MIN 08.2 SEC - EAST
21M WEST BEARING 279 DEG TRUE FROM INTENDED POSITION.

AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

WEEKLY WELL SUMMARY

WELL NAME: TARRA NO. 1 REPORT NO.: 1

PERIOD: FROM: 1ST MARCH, 1983 TO: 8TH MARCH, 1983

All depths relate to Rotary Kelly Bushings at zero tide datum (Low Water Indian Springs) which is ..93.... metres above seabed.

HOLE	SIZE	36"	26"	17½"	12¼"	8½"	
	DEPTH (m)	NA	219	326	--	--	
CASING	SIZE	NA	20"	13 3/8"	9 5/8"	7"	
	DEPTH (m)	NA	211	--	--	--	

DATE	DEPTH AT 2400 HRS.	PROGRESS	REMARKS
1.3.83	--	--	RIG UNDER TOW TO TRA1 FROM 1830H, 1.3.83
2.3.83	--	--	RIG UNDER TOW. DROP FIRST ANCHOR AT 1105H. RUN ANCHORS, 9 - 3 - 8 - 4. RIG 230M WEST OF LOCATION. REPOSITION RIG + NO. 4 ANCHOR. RUN NO.5 2. BAD VISIBILITY - DENSE FOG.
3.3.83	--	--	RUN ANCHORS, 10 - 7 - 1 - 2 - 5. PROBLEMS WITH SEAS AND FOG, AND ALSO SUPPLY BOAT CREWS. RUN TGB.
4.3.83	219M	126M 9½HRS	RIH 26" BIT. SPUD WELL AT 0600 HRS. DRILL 26" HOLE. SPOT 350BBLS. HI VIS MUD. POOH. RIH. SPOT 400BBLS HI VIS MUD. POOH. RUN 20" CASING. DEVIATION - 0 DEG/219M
5.3.83	219M	NIL	RUN 20" CASING. SHOE AT 211M. CIRCULATE AND CEMENT WITH 565 SAX CLASS "G" WITH 3.79% GEL AND 2% $CACL_2$, PLUS 200 SAX CLASS "G" THIXOTROPIC. DISPLACE. FLOAT & SHOE HELD. RUN BOP AND TEST TO 5000PSI.
6.3.83	326M	107M 4½HRS	RIH 17½" BIT. TOC 199M, FLOAT COLLAR 205M. DRILL OUT 20" CASING. DRILL 17½" HOLE TO 305M. LOST COMPLETE RETURNS. DRILL TO 326M PUMPING LCM PILLS. OBSERVE WITH TV, MUD RETURNS AROUND WELLHEAD. POOH. RIH OPEN END PIPE. CEMENT PLUG NO. 1, 271M TO 221M, 112 SAX "G" PLUG 3.79%GEL + 2% $CACL_2$. WOC. RIH. TOC 320M. SPOT 150BBLS HI VIS LCM PILL. PLUG NO. 2 320M TO 270M, 112 SAX "G" PLUG 3.79% GEL + 2% $CACL_2$ WOC.
7.3.83	326M	NIL	WOC. RIH. TOC 311M. PLUG NO. 3, 311M TO 261M, 112 SAX "G" PLUG 3.79% GEL + 2% $CACL_2$. WOC. RIH. TOC 304M. 57/68% RETURNS. SET 335 SACK BARITE PLUG, AT 305M. CIRCULATE 70% REDUCING TO 50% RETURNS AND ALSO AROUND WELLHEAD. PUMP HI VIS LCM PILL. CEMENT PLUG NO. 4, 360 SAX "G" THIXOTROPICS. 90% RETURNS & AT WELLHEAD. WOC.

8.3.83	326M	NIL	WOC. TOC 219M. CIRC, 100% RETURNS. NO FLOW AROUND WELLHEAD. CEMENT PLUG NO. 5, 219M TO 181M, 400 SAX "G" WOC. TOC 168M. TEST CASING 500PSI, OK. WOC. DRILL OUT CEMENT 168M TO 220M, WASH TO 308M. DRILL OUT CEMENT TO 308M (HARD).

AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

TIME SUMMARY

WELL NAME: TARRA NO. 1 PERIOD: FROM: 1.3.83 TO: 8.3.83

TIME ANALYSIS (HOURS)	FOR WEEK	TOTAL
D: MOVING		
D1 Moving of rig, rigging up/down, anchoring	46	46
D2 Waiting on weather during moving		
D3 Other waiting time	8	8
F: DRILLING - CASING		
F1 Drilling on bottom, incl. connection time	14	14
F2 Trips for new bit	9	9
F3 Ancillary Drilling Operations, incl. Totco, reaming, hole cleaning, testing BOP or casing.	1	1
F4 Casing and Cementing	32½	32½
G: FORMATION SURVEYS		
G1 Coring		
G2 Related Coring Operations, incl. tripping etc.		
G3 Tests and associated operations		
G4 Electric Logging Operations		
A: INTERRUPTION OF OPERATIONS UNDER F OR G		
A1 Stuck Pipe and Fishing Operations		
A2 Mud-Losses, Flows, Treatment	61½	61½
A3 Waiting on Weather		
A4 Other waiting time - Repairs	1½	1½
C: COMPLETION - PLUGGING		
C1 Completion, Stimulation, Production Tests		
C2 Abandonment of Well		
C3 WOW during completion, plugging, testing		
C4 Other Waiting time		
TOTAL TIME:	173½	173½

DOWN TIME: HOURS PERCENTAGE

AUS[redacted]IAN[redacted]UITA[redacted] PE[redacted]EUM[redacted]. L[redacted]

WEEKLY SUMMARY - BITS AND MUD

BIT AND CORE RECORD

BIT NO.	SERIAL NO.	MAKE	TYPE	NOZZLES	FROM	TO	METRES	HOURS	m/h	CONDITION	
1	SA5248	SMI	DSJ	3x18	93	219	126	9½	13,26	1-1-I	26"
2	2505R	HTC	OSC3A	3x18	219	326	107	4½	23,78	1-1-I	17½"

MUD PRODUCT

CHEMICAL	UNIT KG	CONSUMPTION		STOCK	CHEMICAL	UNIT KG	CONSUMPTION		STOCK
		WEEK	CUMULATIVE				WEEK	CUMULATIVE	
CEMENT "G"	KG	68,186	68,186						
BARYTES	KG	6,805	6,805						
BENTONITE	KG	26,223	26,223						
CAUSTIC	KG	560	560						
SODA ASH	KG	975	975						
$CACL_2$	KG	1,350	1,350						
KWIK SEAL	KG	3,636	3,636						
MICA	KG	950	950						

AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

WEEKLY WELL SUMMARY

WELL NAME: TARRA NO. 1 REPORT NO.: 2

PERIOD: FROM: 9TH MARCH, 1983 TO: 15TH MARCH, 1983

All depths relate to Rotary Kelly Bushings at zero tide datum (Low Water Indian Springs) which is 93 metres above seabed.

HOLE	SIZE	36"	26"	17½"	12¼"	8½"	
	DEPTH (m)	NA	219	1010	1839	--	
CASING	SIZE	NA	20"	13 3/8"	9 5/8"	7"	
	DEPTH (m)	NA	211	1002	--	--	

DATE	DEPTH AT 2400 HRS.	PROGRESS	REMARKS
9.3.83	568M	242M 13½HRS	DRILL OUT CEMENT 307/326M. SURVEY. DRILL 17½" HOLE TO 451M. LOSSES 8M3/HR. WOW - WIND TO 65 KNOTS. POOH. ADD EXTRA BUMPER SUB. WOW. RIH. DRILL TO 568M. DEVIATION - 2 DEG/326M. MUD SG: 1.08 VIS: 35 YP: 20 WL: NC
10.3.83	837M	269M 19½HRS	DRILL TO 712M. SURVEY & WIPER TRIP TO 20"SHOE. DRILL TO 837M. TORQUE & DECREASE IN ROP. POOH. DEVIATION - 1½DEG/712M. MUD SG: 1.11 VIS: 30/40 YP: 21 PV: 6 WL: NC
11.3.83	1010M	173M 14½HRS	CHANGE BIT. DRILL TO 1010M. WIPER TRIP TO 20" SHOE. POOH. MUD SG: 1.12 VIS: 32/40 YP: 28 PV: 6 WL: NC
12.3.83	1010M	NIL	POOH. SCHLUMBERGER LOGS. ISF/SLS/GR/SP + LDL/CAL/GR. CONTROL HOLE. RUN 13 3/8" CASING. DEVIATION: 3/4 DEG/1010M. MUD SG: 1.14 VIS: 39/40 YP: 27 PV: 6 WL: NC
13.3.83	1010M	NIL	RUN 13 3/8" CASING. SHOE AT 1002M. CEMENT WITH 21T "G" + 4% GEL, SG: 1.42 PLUS 27T "G" NEAT, SG: = 1.90 DISPLACE, BUMP PLUG 2000PSI/10MINS. RUN, SET + TEST SEAL ASSEMBLY 1500PSI. TEST BOP 5000PSI (HYDRIL 2500PSI, SHEAR RAMS 500PSI) DRILL OUT CEMENT.
14.3.83	1334M	324M 21HRS	DRILL 12¼" HOLE TO 1020M. FPT. EQV DENSITY 1.83SG. DRILL TO 1334M. POOH TO CHANGE BIT MUD SG: 1.12/1.14 VIS: 32/35 YP: 16 PV: 5 WL:26
15.3.83	1839M	505M 20½HRS	CHANGE BIT. DRILL 12¼" HOLE. DEVIATION: ¼ DEG/1334M MUD SG: 1.11/1.12 VIS: 32/38 YP: 16 PV: 5 WL: 25

AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

TIME SUMMARY

WELL NAME: TARRA NO. 1 PERIOD: FROM: 9.3.83 TO: 15.3.83

TIME ANALYSIS (HOURS)	FOR WEEK	TOTAL
D: MOVING		
D1 Moving of rig, rigging up/down, anchoring		46
D2 Waiting on weather during moving		
D3 Other waiting time		8
F: DRILLING - CASING		
F1 Drilling on bottom, incl. connection time	89	103
F2 Trips for new bit	7	16
F3 Ancillary Drilling Operations, incl. Totco, reaming, hole cleaning, testing BOP or casing.	8½	9½
F4 Casing and Cementing	37	69½
G: FORMATION SURVEYS		
G1 Coring		
G2 Related Coring Operations, incl. tripping etc.		
G3 Tests and associated operations		
G4 Electric Logging Operations	17½	17½
A: INTERRUPTION OF OPERATIONS UNDER F OR G		
A1 Stuck Pipe and Fishing Operations		
A2 Mud-Losses, Flows, Treatment	2	63½
A3 Waiting on Weather	7	7
A4 Other waiting time - Repairs		1½
C: COMPLETION - PLUGGING		
C1 Completion, Stimulation, Production Tests		
C2 Abandonment of Well		
C3 WOW during completion, plugging, testing		
C4 Other Waiting time		
TOTAL TIME:	168	341½

DOWN TIME: HOURS PERCENTAGE

[redacted]

WEEKLY SUMMARY - BITS AND MUD

BIT AND CORE RECORD

BIT NO.	SERIAL NO.	MAKE	TYPE	NOZZLES	FROM	TO	METRES	HOURS	m/h	CONDITION	
2R	250SR	HTC	OSC3AJ	3x18	219	837	618	37$\frac{1}{2}$	16.48	3-6-I	17$\frac{1}{2}$"
3	302SP	HTC	OSC3AJ	3x18	837	1010	173	14$\frac{1}{2}$	11.93	1-1-I	17$\frac{1}{2}$"
4	XA6663	SMI	FDGH	3x13	1010	1334	324	21	15.43	7-6-I	12$\frac{1}{4}$"
5	SV736	HTC	X3A	3x13	1334	1839	505	20$\frac{1}{2}$	24.63	IN HOLE	12$\frac{1}{4}$"

MUD PRODUCT

CHEMICAL	UNIT KG	CONSUMPTION		STOCK	CHEMICAL	UNIT KG	CONSUMPTION		STOCK
		WEEK	CUMULATIVE				WEEK	CUMULATIVE	
CEMENT "G"	KG	48000	116186		$CACL_2$	KG	1350	1350	
BARYTES	KG	17249	24054		KWIK SEAL	KG	3636	3636	
BENTONITE	KG	15742	41965		MICA	KG	950	950	
CAUSTIC	KG	1540	2100						
SODA ASH	KG	1360	2335						
LIME	KG	150	150						
Q.BROXIN	KG	125	125						
CMC HV	KG	75	75						
SOD. BICARB	KG	200	200						

AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

WEEKLY WELL SUMMARY

WELL NAME: TARRA NO. 1 REPORT NO.: 3

PERIOD: FROM: 16TH MARCH, 1983 TO: 22ND MARCH, 1983

All depths relate to Rotary Kelly Bushings at zero tide datum (Low Water Indian Springs) which is 93 metres above seabed.

HOLE	SIZE	36"	26"	17½"	12¼"	8½"	
	DEPTH (m)	NA	219	1010	2471	--	
CASING	SIZE	NA	20"	13 3/8"	9 5/8"	7"	
	DEPTH (m)	NA	211	1002	--	--	

DATE	DEPTH AT 2400 HRS.	PROGRESS	REMARKS
16.3.83	2066M	227M 15HRS	WIPER TRIP TO 13 3/8" SHOE. DRILL 12¼" HOLE. POOH. DEVIATION: 3¼ DEG/2066M. MUD SG: 1.14 VIS: 36/50 PV: 15 YP: 25 WL: 14.2
17.3.83	2092M	26M 5½HRS	CHANGE BIT. REAM 1709/2066M. DRILL TO 2076M. SEVERE BIT BALLING. POOH. CHANGE BIT. RIH. DRILL. MUD SG: 1.17 VIS: 53/65 PV: 10 YP: 28 WL: 16.4 INCREASE MUD WEIGHT DUE TO EXCESSIVE HEAVING SHALES.
18.3.83	2265M	173M 22HRS	DRILL TO 2245M. CIRCULATE DRILLING BREAK. DRILL TO 2265M. CIRCULATE BEFORE POOH. MUD SG: 1.18 VIS: 48/53 PV: 14 YP: 22 WL: 7.6
19.3.83	2357M	92M 15HRS	POOH. TIGHT AT 2116M. CHANGE BIT. RIH. DRILL TO 2357M. DEVIATION: 2 3/4 DEG/2265M. MUD SG: 1.18/1.19 VIS: 38/40 PV: 13 YP: 14 WL: 4.8
20.3.83	2465M	108M 23HRS	DRILL TO 2433M. REPOSITION RIG DUE TO INCREASE IN SEA AND WIND. DRILL TO 2465M. DEVIATION: 1 3/4 DEG/2465M. MUD SG: 1.16 VIS: 40/43 PV: 15 YP: 20 WL: 6.6
21.3.83	2471M	6M 2HRS	CHANGE BIT. RIH. WASH 20M. DRILL TO 2471M. BALL JOINT ANGLE TO 6 DEG PLUS. WIND TO 60KNOTS, SEAS TO 7/10M. POOH TO HANG OFF IN SHOE. WEATHER TOO SEVERE. WITH BIT AT 2060M, HANG PIPE ON LOWER PIPE RAMS, CUT PIPE WITH SHEAR RAMS. DISCONNECT RISER AND PULL ABOVE STACK WITH RUCKERS. WOW. WIND 50 KNOTS (GUSTING TO 65 KNOTS) SEAS: 12M, 5 SEC. HEAVE: 2M ROOL: 1.5 DEG PITCH: 2.5 DEG

22.3.83	2471M	NIL	WAIT ON WEATHER. REPOSITION RIG OVER HOLE. PULL RISER. WOW. MAKE UP OVERSHOT. REPOSITION NO. 7 ANCHOR. RUN RISER. TEST CHOKE AND KILL LINES TO 5000PSI. WIND: 40 KNOTS SEAS: 14M, 6 SEC. HEAVE: 2M ROLL: 1.5 DEG PITCH: 2 DEG.

AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

TIME SUMMARY

WELL NAME: TARRA NO. 1 PERIOD: FROM: 16.3.83 TO: 22.3.83

TIME ANALYSIS (HOURS)	FOR WEEK	TOTAL
D: MOVING		
D1 Moving of rig, rigging up/down, anchoring		46
D2 Waiting on weather during moving		
D3 Other waiting time		8
F: DRILLING - CASING		
F1 Drilling on bottom, incl. connection time	83	186
F2 Trips for new bit	35	51
F3 Ancillary Drilling Operations, incl. Totco, reaming, hole cleaning, testing BOP or casing.	14½	24
F4 Casing and Cementing		69½
G: FORMATION SURVEYS		
G1 Coring		
G2 Related Coring Operations, incl. tripping etc.		
G3 Tests and associated operations		
G4 Electric Logging Operations		17½
A: INTERRUPTION OF OPERATIONS UNDER F OR G		
A1 Stuck Pipe and Fishing Operations		
A2 Mud-Losses, Flows, Treatment		63½
A3 Waiting on Weather	35½	42½
A4 Other waiting time - Repairs		1½
C: COMPLETION - PLUGGING		
C1 Completion, Stimulation, Production Tests		
C2 Abandonment of Well		
C3 WOW during completion, plugging, testing		
C4 Other Waiting time		
TOTAL TIME:	168	509½

DOWN TIME: HOURS PERCENTAGE

[redacted] AUS[redacted]LIAN[redacted]UITA[redacted] PET[redacted]EUM[redacted]. L[redacted]

V KLY SUMMARY - BITS AND MUD

BIT AND CORE RECORD

BIT NO.	SERIAL NO.	MAKE	TYPE	NOZZLES	FROM	TO	METRES	HOURS	m/h	CONDITION	
5	SV736	HTC	X3A	3x13	1334	2066	732	36½	20.05	4-7-0 1/8"	12¼"
6	NBH188	REED	HS51	3x13	2066	2076	10	3½	2.86	1-1-I	12¼"
7	KK316	HTC	X3A	3x13	2076	2265	189	24	7.88	7-5-0 1/8"	12¼"
6R	NBH188	REED	HS51	3x13	2265	2465	200	38	5.26	2-4-0¼"	12¼"
8	NBH184	REED	HS51	3x13	2465	2471	6	2	3.00	IN HOLE	12¼"

MUD PRODUCT

CHEMICAL	UNIT KG	CONSUMPTION		STOCK	CHEMICAL	UNIT KG	CONSUMPTION		STOCK
		WEEK	CUMULATIVE				WEEK	CUMULATIVE	
CEMENT "G"	KG	--	116,186		CACL	KG	--	1,350	
BARYTES	KG	9,065	33,119		KWIK SEAL	KG	--	3,636	
BENTONITE	KG	3,539	45,504		MICA	KG	--	950	
CAUSTIC	KG	2,380	4,480		SOLTEX	KG	1,362	1,362	
SODA ASH	KG	520	2,855		CMC LV	KG	1,750	1,750	
LIME	KG	250	400		AL STEARATE	KG	88	88	
Q.BROXIN	KG	2,025	2,150		CONDET	LIT	205	205	
SOD. BICARB	KG	--	200						
DEXTRID	KG	2,497	2,497						

AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

WEEKLY WELL SUMMARY

WELL NAME: TARRA NO. 1 REPORT NO.: 4

PERIOD: FROM: 23RD MARCH, 1983 TO: 29TH MARCH, 1983

All depths relate to Rotary Kelly Bushings at zero tide datum (Low Water Indian Springs) which is 93 metres above seabed.

HOLE	SIZE	36"	26"	17½"	12¼"	8½"	
	DEPTH (m)	NA	219	1010		2703	
CASING	SIZE	NA	20"	13 3/8"	9 5/8"		
	DEPTH (m)	NA	211	1002	2567		

DATE	DEPTH AT 2400 HRS.	PROGRESS	REMARKS
23.3.83	2471M	NIL	MILL 5" DRILL PIPE STUB ON LOWER PIPE RAMS. RIH OVERSHOT. LATCH ONTO FISH. OPEN PIPE RAMS. POOH. RETRIEVE WEAR BUSHING. TEST BOP STACK. UNABLE TO TEST. TEST PLUG STOPPING 2 INCHES ABOVE LANDING SHOULDER OF SEAL ASSEMBLY
24.3.83	2563M	92M 13½HRS	TEST BOP STACK. DRILL 12¼" HOLE. MUD SG: 1.15/1.16 VIS: 42/48 PV: 15 YP: 20 WL: 6.8
25.3.83	2580M	17M 4½HRS	DRILL TO 2580M, HIGH TORQUE. POOH. PULL WEAR BUSHING. RETIGHTEN 13 3/8" SEAL ASSEMBLY. RUN RUN SCHLUMBERGER LOGS. ISF/SLS/GR/CAL/LDL/CNL/GR/HDT. DEVIATION: 1 3/4 DEG/2580M.
26.3.83	2580M	NIL	RUN LOGS. HDT, SIDEWALL CORES - 60 SHOTS. RIH BIT. CONDITION HOLE. POOH. MUD SG: 1.15 VIS: 45/52 PV: 16 YP: 22 WL: 6.6
27.3.83	2580M	NIL	POOH. PULL WEAR BUSHING. RUN 9 5/8" 47LB/FT, N80, BTC CASING. CASING SHOE AT 2567M. CEMENT WITH 41.6T CLASS "G" + DOWELL ADDITIVES. SLURRY WEIGHT 1.89 SG. DISPLACE WITH MUD. BUMP PLUG 2500PSI. LOST 9.3M³ DURING DISPLACEMENT. RUN & SET 9 5/8" SEAL ASSEMBLY. TEST SEAL & BOP STACK TO 4000PSI, HYDRIL 2500PSI.
28.3.83	2583M	3M 3½HRS	RIH 8½" BIT. DRILL OUT 9 5/8" CASING. DRILL 8½" HOLE TO 2583M (ROP LESS THAN 0.5M/HR). PERFORM LOT - 1.22SG EQV. POOH. CHANGE BIT. RIH. MUD SG: 1.15 VIS: 56 PV: 22 YP: 31 WL: 9.6
29.3.83	2703M	120M 23½HRS	DRILL TO 2640M - CIRCULATE SAMPLE UP - DRILL TO 2703M. MUD SG: 1.10 VIS: 45 PV: 20 YP: 7 WL: 5.2

AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

TIME SUMMARY

WELL NAME: TARRA NO. 1 PERIOD: FROM: 23.3.83 TO: 29.3.83

TIME ANALYSIS (HOURS)	FOR WEEK	TOTAL
D: MOVING		
D1 Moving of rig, rigging up/down, anchoring		46
D2 Waiting on weather during moving		
D3 Other waiting time		8
F: DRILLING - CASING		
F1 Drilling on bottom, incl. connection time	45	231
F2 Trips for new bit	10	61
F3 Ancillary Drilling Operations, incl. Totco, reaming, hole cleaning, testing BOP or casing.	18½	42½
F4 Casing and Cementing	47	116½
G: FORMATION SURVEYS		
G1 Coring		
G2 Related Coring Operations, incl. tripping etc.		
G3 Tests and associated operations		
G4 Electric Logging Operations	23½	41
A: INTERRUPTION OF OPERATIONS UNDER F OR G		
A1 Stuck Pipe and Fishing Operations		63½
A2 Mud-Losses, Flows, Treatment		
A3 Waiting on Weather	24	66½
A4 Other waiting time - Repairs		1½
C: COMPLETION - PLUGGING		
C1 Completion, Stimulation, Production Tests		
C2 Abandonment of Well		
C3 WOW during completion, plugging, testing		
C4 Other Waiting time		
TOTAL TIME:	168	677½

DOWN TIME: HOURS PERCENTAGE

WEEKLY SUMMARY - BITS AND MUD

BIT AND CORE RECORD

BIT NO.	SERIAL NO.	MAKE	TYPE	NOZZLES	FROM	TO	METRES	HOURS	m/h	CONDITION	
8	NBH 184	REED	HS51	3x13	2465	2471	6	2	3.00	1-1-I	12¼"
9	XBO 999	SMI	FVH	3x13	2471	2580	109	18	6.06	8-7-0¼	12¼"
10	XBO 994	SMI	FVH	3x13							12¼"
11	CE 4110	SMI	FVH	3x14	2580	2583	3	3½	0.86	4-1-I	8½"
12	XA 1552	SMI	F2	3x14	2583	2703	120	23½	DRILLING		

MUD PRODUCT

CHEMICAL	UNIT KG	CONSUMPTION		STOCK	CHEMICAL	UNIT KG	CONSUMPTION		STOCK
		WEEK	CUMULATIVE				WEEK	CUMULATIVE	
CEMENT "G"		41,600	157,786		$CACL_2$		--	1,350	
BARYTES		30,397	63,516		KWIK SEAL		--	3,636	
BENTONITE		12,794	58,298		MICA		--	950	
CAUSTIC		770	5,250		SOLTEX		--	1,362	
SODA ASH		80	2,935		CMC LV		500	2,250	
LIME		--	400		AL STEARATE		62	150	
Q.BROXIN		750	2,900		CONDET		--	205	
SOD. BICARB		1,000	1,200		MONPAC		150	150	
DEXTRID		1,362	3,859		SAPP		650	650	
					CMC HV		275	275	

AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

WEEKLY WELL SUMMARY

WELL NAME: TARRA NO. 1 REPORT NO.: 5

PERIOD: FROM: 30TH MARCH, 1983 TO: 5TH APRIL, 1983

All depths relate to Rotary Kelly Bushings at zero tide datum (Low Water Indian Springs) which is 93 metres above seabed.

HOLE	SIZE	36"	26"	17½"	12¼"	8½"	
	DEPTH (m)	NA	219	1010	2580	2905	
CASING	SIZE	NA	20"	13 3/8"	9 5/8"	--	
	DEPTH (m)	NA	211	1002	2567	--	

DATE	DEPTH AT 2400 HRS.	PROGRESS	REMARKS
30.3.83	2797M	94M 23HRS	DRILL TO 2710M. CONTROL TRIP DRILL TO 2797M. DEVIATION: 1 3/4 DEG/2797M. MUD SG: 1.09 VIS: 42/47 PV: 18 YP: 10 WL: 6.5
31.3.83	2804M	7M 2½HRS (CORE)	POOH. RIH CORE BARREL. CUT CORE NO. 1, 2797/ 2804M. PULL TO 9 5/8" SHOE TO REPAIR ROTARY. ATTEMPT TO RESTART CORING. NO PENETRATION. POOH. RECOVER CORE 21%. RIH BIT. MUD: SG: 1.09 VIS: 50/52 PV: 19 YP: 12 WL:6.4
1.4.83	2877M	73M 22HRS	RIH. DRILL 8½" HOLE. MUD SG: 1.09 VIS: 50/54 PV: 17 YP: 12 WL: 5.9
2.4.83	2905M	28M 8HRS	DRILL TO 2890M. POOH. RIH CORE BARREL. CUT CORE NO. 2 2890/2905M. POOH. RECOVER CORE 91%. RIG UP SCHLUMBERGER. MUD SG: 1.08 VIS: 50/64 PV: 17 YP: 12 WL:6.4
3.4.83	2905M	NIL	RUN SCHLUMBERGER LOGS. RUN 1 - ISF/SLS/GR/CAL/SP 2566.6-2904M RUN 2 - LDL/CNL/GR/CAL 2566.6-2904M RUN 3 - HDT 2566.6-2904M RUN 4 - VELOCITY SURVEY RUN 4 - CST
4.4.83	2905M	NIL	COMPLETE CST. RIH OPEN END DRILL PIPE. CEMENT PLUG 2600M-2520M 129 SX CLASS G. LAYDOWN PIPE. TEST CEMENT PLUG TO 1000PSI. CUT 9 5/8" CSG AT 230M. RECOVER CSG. CEMENT PLUG 260M-200M, 194 SX CLASS G, SQUEEZE $2M^3$ TO 9 5/8" x 13 3/8" ANNULUS. CUT 13 3/8" CSG AT 170M.
5.4.83	2905M	NIL	RECOVER 13 3/8" CSG. CEMENT PLUG 200M-120M, 350SX CLASS G. SQUEEZE $3M^3$ TO 13 3/8" x 20" ANNULUS. LAYDOWN PIPE. TEST CEMENT PLUG TO 1000PSI. PREPARE TO PULL BOP. WOW - 60 KNOT WINDS, 8M SEAS.

AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

TIME SUMMARY

WELL NAME: TARRA NO. 1 PERIOD: FROM: 30.3.83 TO: 5.4.83

TIME ANALYSIS (HOURS)		FOR WEEK	TOTAL
D:	MOVING		
D1	Moving of rig, rigging up/down, anchoring		46
D2	Waiting on weather during moving		
D3	Other waiting time		8
F:	DRILLING - CASING		
F1	Drilling on bottom, incl. connection time	48	279
F2	Trips for new bit	11½	72½
F3	Ancillary Drilling Operations, incl. Totco, reaming, hole cleaning, testing BOP or casing.	3½	46
F4	Casing and Cementing		116½
G:	FORMATION SURVEYS		
G1	Coring	7½	7½
G2	Related Coring Operations, incl. tripping etc.	22½	22½
G3	Tests and associated operations		
G4	Electric Logging Operations	26	67
A:	INTERRUPTION OF OPERATIONS UNDER F OR G		
A1	Stuck Pipe and Fishing Operations		63½
A2	Mud-Losses, Flows, Treatment		
A3	Waiting on Weather		66½
A4	Other waiting time - Repairs	2½	4
C:	COMPLETION - PLUGGING		
C1	Completion, Stimulation, Production Tests		
C2	Abandonment of Well	37½	37½
C3	WOW during completion, plugging, testing	9	9
C4	Other Waiting time		
	TOTAL TIME:	168	845½

DOWN TIME: HOURS PERCENTAGE

AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

WEEKLY SUMMARY - BITS AND MUD

BIT AND CORE RECORD

BIT NO.	SERIAL NO.	MAKE	TYPE	NOZZLES	FROM	TO	METRES	HOURS	m/h	CONDITION
12	XA1552	SMI	F2	3x14	2583	2797	214	46½	4 60	2-4-I 8½"
13	82B093	CHRIS	RC3	--	2797	2804	7	2½	2.80	CORE RECOVERY 21.4%
14	XA1558	SMI	F2	3x14	2804	2890	86	25	3.44	2-3-0 1/8" 8½"
15	81E0937	CHRIS	C22	--	2890	2905	15	5	3.00	CORE. RECOVERY 91.1%

MUD PRODUCT

CHEMICAL	UNIT KG	CONSUMPTION		STOCK	CHEMICAL	UNIT KG	CONSUMPTION		STOCK
		WEEK	CUMULATIVE				WEEK	CUMULATIVE	
CEMENT "G"	KG	72,000	229,786		$CACL_2$	KG	725	2,075	
BARYTES	KG	39,926	103,442		KWIK SEAL	KG	--	3,636	
BENTONITE	KG	2,952	61,250		MICA	KG	--	950	
CAUSTIC	KG	980	6,230		SOLTEX	KG	--	1,362	
SODA ASH	KG	440	3,375		CMC LV	KG	325	2 575	
LIME	KG	--	400		AL STEARATE	KG	125	275	
Q.BROXIN	KG	50	2,950		CONDET	LIT	--	205	
SOD BICARB	KG	--	1,200		MONPAC	KG	125	275	
DEXTRID	KG	684	4,543		SAPP	KG	--	650	
PAC-R	KG	200	200		CMC HV	KG	--	275	
					STARLOSE	KG	227	227	

AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

WEEKLY WELL SUMMARY

WELL NAME: TARRA NO. 1 REPORT NO.: 6

PERIOD: FROM: 6TH APRIL, 1983 TO: 12TH APRIL, 1983

All depths relate to Rotary Kelly Bushings at zero tide datum (Low Water Indian Springs) which is 93 metres above seabed.

HOLE	SIZE	36"	26"	17½"	12¼"	8½"	
	DEPTH (m)	NA	219	1010	2580	2905	
CASING	SIZE	NA	20"	13 3/8"	9 5/8"	7"	
	DEPTH (m)	NA	211	1002	2567	--	

DATE	DEPTH AT 2400 HRS.	PROGRESS	REMARKS
6.4.83	120M PBTD		WOW. RACK RISER. STORE BOP STACK. WOW. WINDS 50 KTS.
7.4.83	--		LAY DOWN RISER. CUT 20" CASING AT 16.4M BELOW TOP OF WELLHEAD. PULL 18 3/4" WELLHEAD PGB & TGB. JUMP DIVERS FOR SEABED INSPECTION, ALL CLEAR. LAY DOWN DRILL COLLARS.
8.4.83	--		LOAD SUPPLY BOAT. WAIT ON ORDERS AS FROM 0200 HOURS.
9.4.83			WAIT ON ORDERS
10.4.83			WAIT ON ORDERS
11.4.83			WAIT ON ORDERS
12.4.83			WAIT ON ORDERS

AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

TIME SUMMARY

WELL NAME: TARRA NO. 1 PERIOD: FROM: 6.4.83 TO: 12.4.83

TIME ANALYSIS (HOURS)	FOR WEEK	TOTAL
D: MOVING		
D1 Moving of rig, rigging up/down, anchoring		46
D2 Waiting on weather during moving		
D3 Other waiting time - WAIT ON ORDERS	118	126
F: DRILLING - CASING		
F1 Drilling on bottom, incl. connection time		279
F2 Trips for new bit		72½
F3 Ancillary Drilling Operations, incl. Totco, reaming, hole cleaning, testing BOP or casing.		46
F4 Casing and Cementing		116½
G: FORMATION SURVEYS		
G1 Coring		7½
G2 Related Coring Operations, incl. tripping etc.		22½
G3 Tests and associated operations		
G4 Electric Logging Operations		67
A: INTERRUPTION OF OPERATIONS UNDER F OR G		
A1 Stuck Pipe and Fishing Operations		63½
A2 Mud-Losses, Flows, Treatment		
A3 Waiting on Weather		66½
A4 Other waiting time - Repairs		4
C: COMPLETION - PLUGGING		
C1 Completion, Stimulation, Production Tests		
C2 Abandonment of Well	28	65½
C3 WOW during completion, plugging, testing	22	31
C4 Other Waiting time		
TOTAL TIME:	168	1013½

DOWN TIME: HOURS PERCENTAGE

AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

WEEKLY SUMMARY - BITS AND MUD

BIT AND CORE RECORD

BIT NO.	SERIAL NO.	MAKE	TYPE	NOZZLES	FROM	TO	METRES	HOURS	m/h	CONDITION
					NIL					

MUD PRODUCT

CHEMICAL	UNIT KG	CONSUMPTION		STOCK	CHEMICAL	UNIT KG	CONSUMPTION		STOCK
		WEEK	CUMULATIVE				WEEK	CUMULATIVE	
CEMENT "G"									
BARYTES									
BENTONITE									
CAUSTIC									
				NIL					

PE902578

This is an enclosure indicator page.
The enclosure PE902578 is enclosed within the container PE902577 at this location in this document.

The enclosure PE902578 has the following characteristics:

ITEM_BARCODE =	PE902578
CONTAINER_BARCODE =	PE902577
NAME =	Seismic Line GA81-31
BASIN =	GIPPSLAND
PERMIT =	
TYPE =	SEISMIC
SUBTYPE =	SECTION
DESCRIPTION =	Seismic Line GA81-31
REMARKS =	
DATE_CREATED =	1/01/82
DATE_RECEIVED =	7/01/84
W_NO =	W806
WELL_NAME =	Tarra-1
CONTRACTOR =	Australian Aquitane Petrol
CLIENT_OP_CO =	Australian Aquitane Petrol

(Inserted by DNRE - Vic Govt Mines Dept)

PE902579

This is an enclosure indicator page.
The enclosure PE902579 is enclosed within the container PE902577 at this location in this document.

The enclosure PE902579 has the following characteristics:

ITEM_BARCODE =	PE902579
CONTAINER_BARCODE =	PE902577
NAME =	Seismic Line GA81-36
BASIN =	GIPPSLAND
PERMIT =	
TYPE =	SEISMIC
SUBTYPE =	SECTION
DESCRIPTION =	Seismic Line GA81-36
REMARKS =	
DATE_CREATED =	1/01/82
DATE_RECEIVED =	7/01/84
W_NO =	W806
WELL_NAME =	Tarra-1
CONTRACTOR =	Australian Aquitane Petrol
CLIENT_OP_CO =	Australian Aquitane Petrol

(Inserted by DNRE - Vic Govt Mines Dept)

PE601300

This is an enclosure indicator page.
The enclosure PE601300 is enclosed within the container PE902577 at this location in this document.

The enclosure PE601300 has the following characteristics:

ITEM_BARCODE =	PE601300
CONTAINER_BARCODE =	PE902577
NAME =	Composite Log (AAP)
BASIN =	GIPPSLAND
PERMIT =	
TYPE =	WELL
SUBTYPE =	COMPOSITE_LOG
DESCRIPTION =	Composite Log (AAP)
REMARKS =	
DATE_CREATED =	1/07/83
DATE_RECEIVED =	7/01/84
W_NO =	W806
WELL_NAME =	Tarra-1
CONTRACTOR =	Australian Aquitane Petrol
CLIENT_OP_CO =	Australian Aquitane Petrol

(Inserted by DNRE - Vic Govt Mines Dept)

PE601299

This is an enclosure indicator page.
The enclosure PE601299 is enclosed within the container PE902577 at this location in this document.

The enclosure PE601299 has the following characteristics:

ITEM_BARCODE = PE601299
CONTAINER_BARCODE = PE902577
NAME = Geoservices - Master Mud Log
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = MUD_LOG
DESCRIPTION = Geoservices - Master Mud Log
REMARKS =
DATE_CREATED = 3/04/83
DATE_RECEIVED = 7/01/84
W_NO = W806
WELL_NAME = Tarra-1
CONTRACTOR = GEOSERVICES
CLIENT_OP_CO = Australian Aquitane Petrol

(Inserted by DNRE - Vic Govt Mines Dept)

PE902580

This is an enclosure indicator page.
The enclosure PE902580 is enclosed within the container PE902577 at this location in this document.

The enclosure PE902580 has the following characteristics:

ITEM_BARCODE =	PE902580
CONTAINER_BARCODE =	PE902577
NAME =	Air Gun Well Velocity Survey and Calibrated log data
BASIN =	GIPPSLAND
PERMIT =	
TYPE =	WELL
SUBTYPE =	VELOCITY_CHART
DESCRIPTION =	Air Gun Well Velocity Survey and Calibrated log data
REMARKS =	
DATE_CREATED =	3/04/83
DATE_RECEIVED =	7/01/84
W_NO =	W806
WELL_NAME =	Tarra-1
CONTRACTOR =	SEISMOGRAPH SERVICES
CLIENT_OP_CO =	Australian Aquitane Petrol

(Inserted by DNRE - Vic Govt Mines Dept)