W953

KIPPER-2 INTEPRETIVE DATA

WCR VOLUME 2

WELL COMPLETION REPORT
KIPPER-2
VOLUME 2
INTERPRETATIVE DATA

GIPPSLAND BASIN
VICTORIA

ESSO AUSTRALIA LIMITED

Compiled by: D.L.MORETON

OCTOBER, 1987.

KIPPER-2

WELL COMPLETION REPORT

VOLUME 2

(Interpretative Data)

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2811L/34

GEOLOGICAL AND GEOPHYSICAL ANALYSIS

Prognosis (KB = 22 metres ASL)

Formation/Horizon	Pre-Drill Depth (mSS)	Post-Drill Depth (mSS)	mKB
Seaspray Group	106	107	129
Latrobe Group	1534	1517	1539
Top of "coarse clastics"		1522	1544
Mid Paleocene Marker		1789	1811
Top of Volcanics	2065	2048	2070
Top of S-1 Gas (base of volcanics)	2195	2189	2211
P. mawsonii shale	2485	not penetrated	

Introduction

Kipper-2 was a Year 6 permit commitment well drilled by Esso Exploration & Production Australia Inc. in the VIC/P19 permit in the north eastern part of the Gippsland Basin. The well was located 2.2 kilometres south east of Kipper-1 down the flank of a fault dependent closure located on the low-side of a NW-SE trending fault.

Kipper-2 successfully tested the downdip potential of the S-1 reservoir discovered in Kipper-1. Kipper-2 defined the existence of an oil leg to the S-1 reservoir and established the position of the gas/oil and oil/water contacts.

Previous Drilling History

Kipper-1 was drilled in 1986 and discovered a small oil accumulation in Lower *N. asperus* to *P. asperopolus* aged sediments in what is probably fault independent closure. Three other small oil sands were discovered in Upper *T. longus* sediments in what are also probably fault independent closures.

A 290 metre gross gas column, with gas on rock, was discovered reservoired in T. apoxyexinus and N. senectus sands (the S-1 reservoir) in fault dependent closure.

Geological Discussion

Stratigraphy (Figure 1; Enclosure 1; Appendix 1 & 2)

Kipper-2 penetrated 1410 metres of Miocene to Pliocene Seaspray Group, consisting of Limestone and calcareous siltstone/claystone. The base of the Seaspray Group is Oligocene (Proteacidites tuberculatus zone).

The Seaspray Group unconformably overlies 5.0 metres of Gurnard Formation consisting of mid Eocene-aged siltstones (Lower N. asperus palynological zone) with substantial development of glauconite and pyrite. This represents a condensed shallow marine sequence which has been heavily oxidized.

The Gurnard Formation unconformably overlies 22.0 metres of similar, though unoxidized sediments of Early Eocene age. (P. asperopolus palynological zone). These Flounder Formation sediments represent marine infilling of the north-north-east flank of the Tuna-Flounder Channel complex.

The Flounder Formation unconformably overlies the rest of the Latrobe Group sediments of Late Cretaceous to Eocene age. (T. apoxyexinus to M. diversus). This section thickens considerably from Kipper-1. The Early Paleocene to Early Eocene (Lower L. balmei to Lower M. diversus) sequence consists of siltstones, coals and minor sandstones which are interpreted to have been deposited in a coastal plain environment. An upward coarsening sequence between 1580m RKB and 1592m RKB may indicate some marine influence.

A sequence of siltstones, shales, coals and sands of Lower L. balmei age overlies a regressive nearshore sand and transgressive marine shale sequence. This latest Cretaceous (top of Upper T. longus) marine transgression is recorded throughout much of the Gippsland Basin. The remainder of the Upper T. longus and Lower T. longus section consists of interbedded sandstones, siltstones, shales and minor coals which are interpreted to have been deposited in a sandy flood plain environment.

The T. longus section overlies 141 metres of volcanics from 2070m RKB and 2211m RKB. As in Kipper-1 these are interpreted to be of extrusive origin based on their widespread occurence, relict textures and from geochemical analyses that suggest that the volcanics have not had any heating effects on the immediately underlying and overlying sediments. The occurence of Lower T. longus sediment above the volcanics and N. senectus below suggests a T. lilliei age.

The volcanics overlie sandstones and siltstones of Late Cretaceous age (N. senectus). A further 24.5 metres of volcanics occur in what is interpreted to have been a fluvial/flood plain environment.

These N. senectus sediments overlie a sequence of shales, siltstones and minor sandstones of T. apoxyexinus age. The occurence of a marine dinoflagellate assemblage between 2491m RKB and 2544.1m RKB indicates marine incursions into what is interpreted to be a low energy flood plain environment. The occurence of this dinoflagellate assemblage between 2187.5m RKB and 2192.0m RKB in Kipper-1 again highlights the increased thickness of T. longus and older section seen in Kipper-2 compared to Kipper-1.

Structure and Seal (Enclosures 2 & 3)

The Kipper structure is a dominantly fault dependent closure located on the low side of a NW-SE trending normal fault. The structure is interpreted to have formed from the combination of an Eocene compressive event acting parallel to the normal fault, with minor inversion at the top of Latrobe.

No revision has been necessary to the pre-drill seismic interpretation. Minor adjustments to the Top of Latrobe Structure Map have been made to account for the intersection of the Top of Latrobe at 1539mKB, 17m high to prediction. The top of the S-1 gas was intersected at 2211mRKB, 6m high to prediction and no alterations were necessary to the top of S-1 Reservoir Structure map.

The S-1 reservoir is top sealed by the overlying volcanics. No closure is mapped on the high side of the fault nor is any fault independent closure mapped at this level on the low side of the fault. The mechanism of the fault seal is still unknown. Two mechanisms are possible. The emplacement of impermeable volcanic material as a dyke along the fault or alternatively the juxtaposition of either Strzelecki Group or early Latrobe shales (seen in Kipper-1), against the reservoir. Interpretation of either of these geometries is possible from the seismic data.

Reservoir and Hydrocarbons (Appendices 2, 3 & 4)

Kipper-2 intersected gas shows in sandstones at the top of the S-1 reservoir, (N. Senectus to T. apoxyexinus) below 2211mRKB (from the base of the volcanics). A further sequence of volcanics were penetrated between 2242.5mRKB and 2266.5mRKB with gas shows encountered from sandstones below. The section was continuously cored from 2281mRKB to 2360.1mRKB. Gas shows were seen in sandstones to 2296mRKB below which good fluorescence and cut were observed in sands to 2339.5mKB. The next sand below 2348.8mKB had no shows of fluorescence or cut.

Wireline logging and testing indicated an interpreted gas oil contact at 2306mRKB with an interpreted oil water contact at 2320mRKB. The fluorescence and cut seen in cores below this point are interpreted to be residual oil shows. The residual oil column observed may be due to leakage along the fault or alternatively a minor post Latrobe regional tilting event.

Kipper-2 intersected a gross gas column of 95m (49.2m net) with an average porosity of 18% and an average gas saturation of 67%. The oil leg consists of a gross column of 14m (5.2m net); porosities in the oil sands average 17% and oil saturations 43% (including transition zone, 2317.8mKB to 2320mRKB). R.F.T. pressure measurements suggest that the oil and gas form a single hydraulic system. A.P.I. gravities of the oil recovered by RFT varied from 40.4^{o} ro 42.9^{o} API and the oil is a typical Gippsland crude dominated by n-alkanes with only a moderate amount of light gasoline components. The S-1 oil seen in Kipper-2 is distinctly different from the oils seen in Kipper-1 in Lower N. asperus and Upper T. longus sediments as it lacks this gasoline fraction. The Kipper-2 oil is interpreted to have been derived from a terrestrial source.

Geochemical analysis of cuttings samples from the Latrobe Group indicate that the shales have fair to good source potential but should be considered gas prone. Vitrinite reflectance data suggests the section is immature rising to early mature at T.D. (Ro = 0.7% at TD).

The _T. apoxyexinus_ shales in Kipper-2 are a similar facies to the _P. mawsonii_ shale identified in Kipper-1 providing a rich potential gas source, (average TOC 2.52%). It is interpreted that the source of the S-1 hydrocarbon accumulation is deeper in the basin to the south and west. Migration into the S-1 reservoir is interpreted to have occurred at the top of porosity beneath the volcanics.

GEOPHYSICAL DISCUSSION

Seismic coverage in the area of the Kipper discovery is provided by the G81A, S81A and G85A surveys, forming a regular grid of lines with approximately 0.5km spacing. The bulk of the coverage is provided by the S81A and G85A surveys.

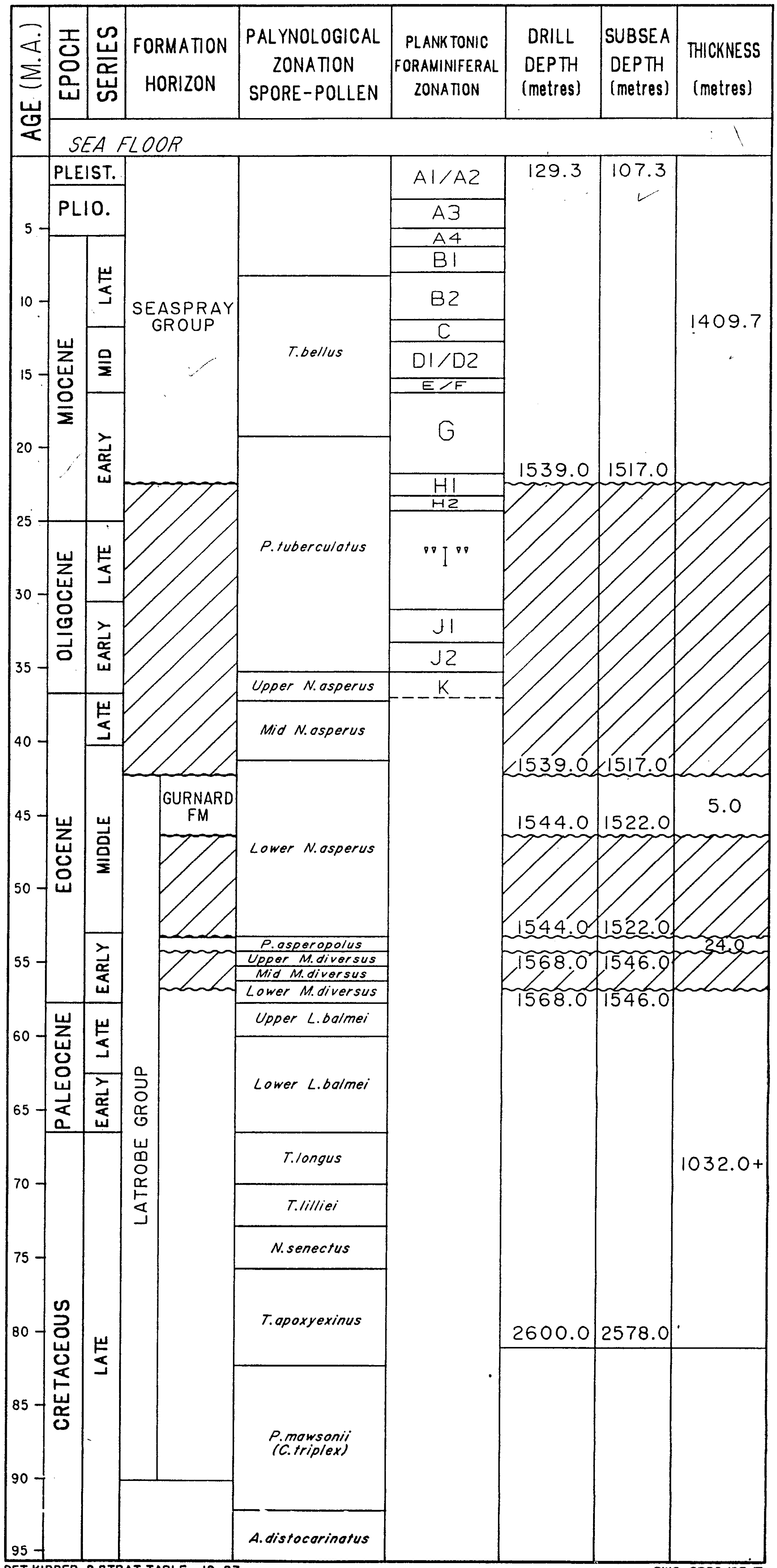
Each data set has been used in this latest interpretation. Migrated versions of S81A lines are available over the Kipper discovery and all G85A lines have been migrated. Character ties between each survey are usually fair to good. A lag adjustment of +12 msec. is required to be added to the data recorded by Shell to tie the Esso data.

Data quality varies down the section. It is good above the top of the intra-Latrobe volcanics, with the top of the Latrobe Group manifested as a well developed continuous trough. Data quality degrades to poor below the interpreted top of the volcanics.

Depth maps for two seismic horizons have been included. These are the Top of Latrobe Group and the Base of Volcanics (top reservoir). The pre-drill prognosed and post-drill actual depths are tabulated above. These depths indicate a maximum error at top Latrobe (1.1%) and a 0.3% error to the base of Volcanics (top reservoir). These errors did not warrant revision of the pre-drill depth maps.

Figures

KIPPER-2
STRATIGRAPHIC TABLE



Appendix 1

APPENDIX 1

PALYNOLOGICAL ANALYSIS

PALYNOLOGICAL ANALYSIS OF KIPPER-2
GIPPSLAND BASIN

By

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Esso Australia Ltd. September, 1987

Palaeontology Rept. 1987/10

2796L:1

PART 1

INTERPRETED DATA

- Introduction
- Summary Table
- Geological Comments
- Biostratigraphy
- References
- Interpreted Data Summary
- Data Sheet

INTRODUCTION

Forty-eight sidewall cores and four conventional core samples were processed and their spore-pollen and dinoflagellate content examined. The ages obtained ranged from Santonian (Tricolporites apoxyexinus Zone) to Miocene (Proteacidites tuberculatus Zone).

The section encountered is basically similar to Kipper-1 except

(1) Sediments assignable to P. mawsonii Zone were not encountered.

(2) All Late Cretaceous zones are considerably thicker in Kipper-2.

All species encountered in Kipper-2 are listed on the enclosed range charts.

SUMMARY DATA KIPPER-2

AGE	UNIT	SPORE POLLEN ZONES MICROPLANKTON ZONES	DEPTH (mKB)
MIOCENE	SEASPRAY GROUP	P. tuberculatus	1523.9-1538.1
	1539.0m		
MIDDLE EOCENE	GURNARD FM.	Lower N. asperus (T. tricornus)	1544.0
	1544.0m		
EARLY EOCENE	LATROBE GROUP	P. asperopolus K. thompsonae	(1550.1)
		P. asperopolus	1555.1-1565.0
		Lower M. diversus	1577-1585.5
PALEOCENE		Upper L. balmei (A. homomorphum)	1603.0-1809.5 (1623.5-1809.5)
		Lower L. balmei	1871.5
MAASTRICHTIAN		Upper T. longus (M. druggii)	1880.0 (1880.0)
		Upper T. longus	1888.0-1944.0
		Lower T. longus	1954.0-2055.1
	(Volcanics- 2070.0-2211.0)		
CAMPANIAN		N. senectus	2211.0-2293.0
CAMPANIAN-SANTONIAN		T. apoxyexinus (C. porosa)	2315.0-2590.1 (2491.0-2544.0)

GEOLOGICAL COMMENTS

1) The oldest sediments encountered in Kipper-2 were Santonian/Campanian (Tricolporites apoxyexinus Zone) in age. This implies that the older shales encountered in Kipper-1 was not penetrated in Kipper-2. The Tricolporites apoxyexinus Zone is approximately 200m thicker in Kipper-2 than Kipper-1.

2) The Chatangiella porosa (=Chatangiella perforata Zone in Kipper-1) Association reported by Marshall and Partridge (1986) as being of possible use in correlating deep Latrobe sediments is recognised in Kipper-2. As in Kipper-1 the association is restricted to the basal part of the Tricolporites apoxyexinus Zone, however, the dinoflagellate zone is considerably thicker in Kipper-2 than Kipper-1.

   The Chatangiella porosa Assemblage and its' distribution has been documented further by Marshall (in prep.).

3) The volcanics between 2070.0-2211.0m in Kipper-2 cannot be dated with complete accuracy. Sediments above the unit are Maastrichtian (Tricolpites longus Zone) and those below are Campanian (Nothofagidites senectus Zone). No Tricolporites lilliei Zone age sediments were encountered.

4) The age of the reservoir section in Kipper-1 was dated, on the basis of cuttings, to be Nothofagidites senectus Zone in age. In the well sampled Kipper-2 section, however, most sediments proved to be Tricolporites apoxyexinus Zone in age.

5) Two significant unconformities were recognised. Both were previously recognised in Kipper-1.

   a) Between 1565.0 and 1577.0 metres where Proteacidites asperopolus Zone sediments rest directly on Lower Malvacipollis diversus Zone sediments. A similar event was also noted in Tuna-3.

   b) Between 1538.1 and 1544.0 metres at the top of the Latrobe Group. Here, Miocene Proteacidites tuberculatus Zone sediments rest on Middle Eocene. Lower Nothofagidites asperus Zone sediment.

BIOSTRATIGRAPHY

The zone boundaries for the Tertiary section have been established using the criteria of Stover and Partridge (1973) with subsequent proprietary revisions. Cretaceous zone boundaries follow Helby, Morgan and Partridge (1987).

Tricolporites apoxyexinus Zone
2315.0-2590.1 metres
CAMPANIAN/SANTONIAN

The base of this zone is defined as the first appearance of the eponymous species (Partridge 1987). Unfortunately Tricolporites apoxyexinus was not recorded in Kipper-2. Marshall and Partridge (1986) report that the first appearance of Tricolporites labrum (ms) can be used as a local base of this zone albiet with a reduced degree of confidence. In Kipper-2, however, Tricolporites labrum occurs near the top of the interval assigned to the Tricolporites apoxyexinus Zone. Nevertheless, the occurrence of Tricolpites gillii and Latrobosporites amplus throughout the interval together with the absence of Nothofagidites senectus means that the zonal assignment carries a high degree of confidence.

The Chatangiella porosa dinoflagellate Assemblage recorded between 2187.5 and 2192.0m in Kipper-1 (as the Chatangiella perforata Assemblage) is also present in Kipper-2 where it was recognised between 2491.0 and 2544.1m. This represents about a 10 fold increase of thickness between Kipper 1 and Kipper 2. In both cases however the assemblage is restricted to the lower part of the Tricolporites apoxyexinus Zone.

Marshall (in prep.) also records this assemblage from Tuna-4 and dredge samples from seafloor in the Bass Canyon.

Nothofagidites senectus Zone:
2211.0-2293.0 metres
CAMPANIAN

The addition of Nothofagidites senectus to an otherwise unchanged flora in Core 3 at 2293.0m marks the base of the Nothofagidites senectus Zone.

Lower Tricolpites longus Zone.
1954.0-2055.1 metres
MAASTRICHTIAN

The presence of a variety of Proteacidites species, including Proteacidites palisadus, Proteacidites reticuloconcavus and Proteacidites otwayensis without Stereisporites (Tripunctisporis) punctatus (ms) suggest a Lower Tricolpites longus Zone age for this interval. The generally low numbers of Gamberina spp. and the almost complete absence of Lygistepollenites balmei, support the zonal assignment.

Upper Tricolpites longus Zone
1880.0-1944.0 metres
MAASTRICHTIAN

The base of the Upper Tricolpites longus Zone is picked at the oldest occurrence of Stereisporites (Tripunctisporis) punctatus (ms) in sidewall core 33 at 1944.0m. The topmost sample in this interval (sidewall core 37 at 1880.0m) is also assigned to the Manumiella druggii Zone on the presence of specimens of that species.

Lower Lygistepollenites balmei Zone
1871.5 metres
PALEOCENE

The presence of the dinoflagellate species Cladopyxidium saeptum, Deflandrea speciosa, and Glaphyrocysta rettintexta indicates a age no younger than the Lygistepollenites balmei Zone for the sample. This, coupled with the non-appearance of any Tricolpites longus or Upper Lygistepollenites balmei Zone elements in an abundant and moderately diverse spore/pollen flora suggest the Lower Lygistepollenite balmei Zone assignment.

Upper Lygistepollenites balmei Zone
1603.0-1809.5 metres
PALEOCENE

The base of both the Upper Lygistepollenites balmei Zone and the Apectodinium homomorphum Zone are both recognised in sidewall core 39 at 1809.5m on the first appearance of the short spined variety of Apectodinium homomorphum. The oldest appearance of Proteacidites adenanthoides in the same sample supports the zonal assignment.

Apectodinium homomorphum is recognised up to sidewall core 48 at 1623.5m confirming the Upper Lygistepollenites balmei/Apectodinium homomorphum, zonal determination for this interval. Sidewall core 49 at 1603.0m is also assigned to the Upper Lygistepollenites balmei Zone, despite the lack of Apectodinium homomorphum, because it contained a abundant and moderately diverse spore-pollen assemblage and lacked any Malvacipollis diversus Zone indicators.

Lower Malvacipollis diversus Zone
1577.0 - 1585.5 metres
EARLY EOCENE

The base of the Lower Malvacipollis diversus Zone is recognised on the first appearance of Proteacidites grandis with consistant Malvacipollis diversus in sidewall core 51 at 1585.5m.

The two samples assigned to this zone contain a distinctly different spore-pollen assemblage to those of the underlying Upper Lygistepollenites balmei Zone. Species appearing for the first time in the Lower Malvacipollis diversus Zone include Intratriporopollenites notabilis, Spinizonocolpites prominatus and Tetracolporites textus (ms).

Proteacidites asperopolus Zone
1550.1-1565.0 metres
EARLY EOCENE

Sidewall core 56 at 1550.1m, the topmost sample in this interval can be assigned to the Proteacidites asperopolus Zone with a high degree of confidence on the appearance of the dinoflagellate species Kisselovia thompsonae (ms) and a diverse spore-pollen assemblage including Myrtaceidites tenuis, Proteacidites pachypolus and Santalumidites cainozoicus.

Sidewall cores 55 and 54 at 1555.1 and 1565.1 metres respectively are also assigned to the Proteacidites asperopolus Zone because (1) They contain Gemmatricolporites divaricatus (ms), Santalumidites cainozoicus Tricolpites incisus and Myrtaceidites tenuis. All these species themselves only indicate an age of no older than Upper Malvacipollis diversus Zone. However, they are all more consistently found in the Proteacidites asperopolus Zone: and (2) Sediments of the Upper Malvacipollis diversus Zone were not found in Kipper-1.

The pick of the base of the Proteacidites asperopolus Zone in Kipper-2 carries a lower degree of confidence.

Lower Nothofagidites asperus Zone
1544.0 metres
MIDDLE EOCENE

The recognition of the acritarch Tritonites tricornus (ms) in this sample indicates a Lower Nothofagidites asperus Zone determination for this sample.

Proteacidites tuberculatus Zone.
1523.9-1538.1 meters
MIOCENE

The appearance of Cyatheacidites annulatus in both these samples indicates a confident Proteacidites tuberculatus Zone assignment and as with Kipper-1 the presence of Foveotriletes lucunosus and a diverse dinoflagellate assemblage suggest that we are dealing with the middle or upper part of this zone.

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PART 2

BASIC DATA

- Basic Data Summary
- Palynomorph Distribution Chart

INTERPRETED DATA SUMMARY KIPPER-2

Sample Type	Depth (m)	Spore-Pollen Zone	Dinoflagellate Assemblage	Geologic Age	Confidence Rating	Comments
SWC 60	1523.9	P. tuberculatus		Miocene	0	
SWC 58	1538.1	P. tuberculatus		Miocene	0	
SWC 57	1544.0	Lower N. asperus	T. tricornus	Middle Eocene		
					0	
SWC 56	1550.0	P. asperopolus	K. thompsonae	Early Eocene	1	
SWC 55	1555.1	P. asperopolus		Early Eocene	2	
SWC 53	1565.0	P. asperopolus		Early Eocene	2	
SWC 52	1577.0	Lower M. diversus		Early Eocene	1	
SWC 51	1585.5	Lower M. diversus		Early Eocene		
SWC 50	1591.4	?		Indeterminate		
SWC 59	1603.0	Upper L. balmei		Paleocene	2	
SWC 48	1623.5	Upper L. balmei	A. homomorphum	Paleocene	1	
SWC 47	1652.5	Upper L. balmei	A. homomorphum	Paleocene	0	
SWC 46	1675.5	?		Indeterminate		Contaminants from Gippsland Limestone dominate
SWC 44	1699.5	Upper L. balmei	A. homomorphum	Paleocene	1	
SWC 42	1742.5	Upper L. balmei	A. homomorphum	Paleocene	0	
SWC 41	1754.0	Upper L. balmei		Paleocene	2	
SWC 39	1809.5	Upper L. balmei	A. homomorphum	Paleocene	1	
SWC 38	1871.5	Lower L. balmei		Paleocene	2	

Sample Type	Depth (m)	Spore-Pollen Zone	Dinoflagellate Assemblage	Geologic Age	Confidence Rating	Comments
SWC 37	1880.6	Upper T. longus	M. druggii	Maastrichtian	1	
SWC 36	1888.0	T. longus		Maastrichtian	1	
SWC 35	1899.5	?		Indeterminate		
SWC 33	1944.0	Upper T. longus		Maastrichtian	2	Coal sample
SWC 32	1954.0	Lower T. longus		Maastrichtian	1	
SWC 31	1969.0	Lower T. longus		Maastrichtian	2	
SWC 30	1982.5	Lower T. longus		Maastrichtian	1	
SWC 29	1999.0	Lower T. longus		Maastrichtian	2	
SWC 28	2015.5	Lower T. longus		Maastrichtian	2	
SWC 27	2030.0	Lower T. longus		Maastrichtian	2	
SWC 26	2041.5	Lower T. longus		Maastrichtian	1	
SWC 25	2055.1	Lower T. longus		Maastrichtian	1	Contamination
SWC 21	2211.6	N. senectus		Campanian	2	
SWC 20	2235.6	N. senectus		Campanian	1	
SWC 19	2242.1	N. senectus		Campanian	1	
SWC 16	2267.6	N. senectus		Campanian	1	
CORE 3	2287.0-2287.05	N. senectus		Campanian	1	
CORE 3	2292.6-2293.0	N. senectus		Campanian	1	
CORE 5	2315.0	T. apoxyexinus		Campanian/Santonian	1	
CORE 6	2330.0	T. apoxyexinus		Campanian/Santonian	2	
SWC 15	2364.4	?		Indeterminate		
SWC 14	2385.0	?		Indeterminate		

Sample Type	Depth (m)	Spore-Pollen Zone	Dinoflagellate Assemblage	Geologic Age	Confidence Rating	Comments
SWC 13	2403.6	?		Indeterminate		
SWC 12	2413.5	?		Indeterminate		Barren
SWC 10	2461.0	?		Indeterminate		
SWC 9	2475.0	?		Indeterminate		
SWC 8	2491.0	T. apoxyexinus	C. porosa	Campanian/Santonian	1	
SWC 7	2503.5	T. apoxyexinus	C. porosa	Campanian/Santonian	1	
SWC 6	2517.0	T. apoxyexinus	C. porosa	Campanian/Santonian	1	
SWC 5	2528.5	T. apoxyexinus	C. porosa	Campanian/Santonian	1	
SWC 4	2544.1	T. apoxyexinus	C. porosa	Campanian/Santonian	1	
SWC 3	2564.0	?		Indeterminate		
SWC 2	2580.1	?		Indeterminate		
SWC 1	2590.1	T. apoxyexinus		Campanian/Santonian	2	

PALYNOLOGY DATA SHEET

BASIN: GIPPSLAND ELEVATION: KB: 22.3m GL: -107.3m

WELL NAME: KIPPER-2 TOTAL DEPTH: 2601.5m

AGE	PALYNOLOGICAL ZONES	HIGHEST DATA Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	LOWEST DATA Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time
NEOGENE	*T. pleistocenicus*										
	M. lipsis										
	C. bifurcatus										
	T. bellus										
	P. tuberculatus	1523.9	0				1538.1	0			
PALEOGENE	Upper *N. asperus*										
	Mid *N. asperus*										
	Lower *N. asperus*	1544.0	0								
	P. asperopolus	1550.1	1				1565.0	2			
	Upper *M. diversus*										
	Mid *M. diversus*										
	Lower *M. diversus*	1577.0	1				1585.5	2			
	Upper *L. balmei*	1603.0	2	1623.5	1		1809.5	1			
	Lower *L. balmei*						1871.5	2			
LATE CRETACEOUS	Upper *T. longus*	1880.0	1				1944.0	2			
	Lower *T. longus*	1954.0	1				2055.1	1			
	T. lilliei										
	N. senectus	2211.0	2	2235.6	1		2293.0	1			
	T. apoxyexinus	2315.0	2				2590.1	2			
	P. mawsonii										
	A. distocarinatus										
EARLY CRET.	*P. pannosus*										
	C. paradoxa										
	C. striatus										
	C. hughesi										
	F. wonthaggiensis										
	C. australiensis										

COMMENTS: Dinoflagellate Zones
Kisselovia thompsonae 1550.1
Apectodinium homomorphum 1623.5-1809.5m
Manumiella druggii 1880.0m
Chatangiella porosa 2491.0-2544.1m

CONFIDENCE RATING:
- O: SWC or Core, Excellent Confidence, assemblage with zone species of spores, pollen and microplankton.
- 1: SWC or Core, Good Confidence, assemblage with zone species of spores and pollen or microplankton.
- 2: SWC or Core, Poor Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.
- 3: Cuttings, Fair Confidence, assemblage with zone species of either spores and pollen or microplankton, or both.
- 4: Cuttings, No Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.

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: MICHAEL HANNAH DATE: August 1987

DATA REVISED BY: DATE:

BASIC DATA SUMMARY - KIPPER-2

Sample Type	Depth (m)	Residue Yield	Preservation	Spore-Pollen Diversity	Microplankton Yield	No. species	Sample Code
SWC 60	1523.9	Fair	Poor	Low	Low	3	78089L
SWC 58	1538.1	Poor	Fair-good	Moderate	Low-Mod.	6	78089J
SWC 57	1544.0	Fair	Good	High	Low	2	78089M
SWC 56	1550.1	Good	Good	High	Low	1	78089H
SWC 55	1555.1	Good	Fair	Moderate	Low-Mod	1	78089G
SWC 53	1565.0	Good	Good	High	Low-Mod	2	78089F
SWC 52	1577.0	Fair	Poor	Moderate	Low	1	78089E
SWC 51	1585.5	Poor	Fair	Low	Low	1	78089D
SWC 50	1591.4	Poor	Poor	Low	Low	1	78089C
SWC 49	1603.0	Fair	Fair	Moderate	Nil	0	78089B
SWC 48	1623.5	Good	Good	Moderate	Moderate	1	78089A
SWC 47	1652.5	Fair	Fair	Moderate	Moderate	1	78088Z
SWC 46	1675.5	Poor	Good	Low	Moderate	3	78088Y
SWC 44	1699.5	High	Good	Moderate	Moderate	1	78088X
SWC 42	1742.5	Good	Good	Moderate	Moderate	3	78088V
SWC 41	1754.0	Fair	Fair	Moderate	Nil	0	78088U
SWC 39	1809.5	Good	Good	Moderate	Low	1	78088S
SWC 38	1871.5	Fair	Fair	Low	Moderate	5	78088R
SWC 37	1880.0	Fair	Fair	Low	Low	1	78088Q
SWC 36	1888.0	Fair	Fair	Low	Nil	0	78088P
SWC 35	1899.5	Poor	Fair	V.low	Nil	0	78088O

BASIC DATA SUMMARY - KIPPER-2

Sample Type	Depth (m)	Residue Yield	Preservation	Spore-Pollen Diversity	Microplankton Yield	No. species	Sample Code
SWC 33	1944.0	Good	Good	Moderate	Nil	0	78088L
SWC 32	1954.0	Fair	Fair	Moderate	Nil	0	78088L
SWC 31	1969.0	Good	Good	High	Nil	0	78088K
SWC 30	1982.5	Fair	Fair	Low	Nil	0	78088J
SWC 29	1999.0	Fair	Good	Low	Nil	0	78088I
SWC 28	2015.5	Fair	Fair	Moderate	Nil	0	78088H
SWC 27	2030.0	Fair	Fair	Moderate	Nil	0	78088G
SWC 26	2041.5	Fair	Good	Moderate	Nil	0	78088F
SWC 25	2055.1	Good	Fair	Moderate	Nil	0	78088E
SWC 21	2211.6	Poor	Fair	Moderate	Nil	0	78088G
SWC 20	2235.6	Good	Good	Moderate	Nil	0	78087Z
SWC 19	2242.1	Fair	Fair	Low	Nil	0	78087Y
SWC 16	2267.6	Fair	Fair	Moderate	Nil	0	78087V
CORE 3	2787-2787.5						
CORE 3	2297.6-2293.0						
CORE 5	2315.0	Good	Fair-Good	Low	Nil	0	78103E
CORE 6	2330.0	Good	Moderate	Low	Nil	0	78013D
SWC 15	2364.4	Poor	V.Poor	V.Low	Nil	0	78087U
SWC 14	2385.0	Fair	Poor	V.low	Nil	0	78087T

Sample Type	Depth (m)	Residue Yield	Preservation	Spore-Pollen Diversity	Microplankton Yield	No. species	Sample Code
SWC 13	2403.6	Fair	Poor	V.low	Nil	0	78087S
SWC 12	2413.5	Barren					78087R
SWC 10	2461.0	Fair	Poor	Low	Nil	0	78087P
SWC 9	2475.0	Poor	Poor	Low	Nil	0	78087O
SWC 8	2491.0	High	Good-fair	Low	Low	1	78087N
SWC 7	2503.5	Fair	Moderate	Low	Low	1	78087M
SWC 6	2517.0	Good	Good	Low	Moderate	3	78087L
SWC 5	2528.5	Good	Good	Low	Moderate	2	78087K
SWC 4	2544.1	Fair	Poor	Low	Moderate	2	78087J
SWC 3	2564.0	Fair	Moderate	Low	Nil	0	78087I
SWC 2	2580.1	Poor	Poor	Low	Nil	0	78087H
SWC 1	2590.1	Poor	Poor	Low	Nil	0	78087G

PE900480

This is an enclosure indicator page.
The enclosure PE900480 is enclosed within the container PE902225 at this location in this document.

The enclosure PE900480 has the following characteristics:

```
      ITEM_BARCODE = PE900480
 CONTAINER_BARCODE = PE902225
              NAME = Cretaceous Palynological Range Chart
             BASIN = GIPPSLAND
            PERMIT = VIC/P19
              TYPE = WELL
           SUBTYPE = DIAGRAM
       DESCRIPTION = Cretaceous Palynological Range Chart
                     (from appendix 1 of WCR vol.2) for
                     Kipper-2
           REMARKS =
      DATE_CREATED =
     DATE_RECEIVED = 28/10/1987
              W_NO = W953
         WELL_NAME = KIPPER-2
        CONTRACTOR =
      CLIENT_OP_CO = ESSO AUSTRALIA LIMITED
```

(Inserted by DNRE - Vic Govt Mines Dept)

PE900479

This is an enclosure indicator page.
The enclosure PE900479 is enclosed within the container PE902225 at this location in this document.

The enclosure PE900479 has the following characteristics:

ITEM_BARCODE = PE900479
CONTAINER_BARCODE = PE902225
NAME = Tertiary Palynological Range Chart
BASIN = GIPPSLAND
PERMIT = VIC/P19
TYPE = WELL
SUBTYPE = DIAGRAM
DESCRIPTION = Tertiary Palynological Range Chart (from appendix 1 of WCR vol.2) for Kipper-2
REMARKS =
DATE_CREATED =
DATE_RECEIVED = 28/10/1987
W_NO = W953
WELL_NAME = KIPPER-2
CONTRACTOR =
CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

Appendix 2

APPENDIX 2

QUANTITATIVE LOG ANALYSIS

KIPPER-2

QUANTITATIVE LOG ANALYSIS

Interval: 1540 - 2600MDKB

Analyst : T. M. Frankham

Date : June, 1987

KIPPER-2

QUANTITATIVE LOG ANALYSIS

Wireline log data from the Kipper 2 well has been quantitatively analysed over the interval 1540-2600mRKB for effective porosity and over the interval 2200-2600mRKB for effective water saturation. Results are presented in the form of the accompanying depth plot and listing, and are summarised and discussed below.

LOGS USED:

GR (gamma ray)
LLD (deep laterolog)
DT (sonic transit time)
RHOB (bulk density)
NPHI (neutron porosity)
CALI (caliper)

A crossplot of bulk density vs raw neutron porosity for water bearing intervals (fig. 1) showed an apparent clean sand line parallel to, but below the chartbook clean sand line. A shift of -0.02v/v to the neutron values put the apparent clean sand points on the chartbook clean sand line (fig. 2). This shift was therefore made to recorded neutron porosity values prior to the quantitative analysis being carried out.

Much of the bulk density log suffers from poor hole conditions. This log was therefore edited in washed out zones prior to analysis, by calculating a pseudo-density from the sonic log (normalised to bulk density in intervals where hole conditions were good), and taking the maximum of the measured and pseudo bulk-density. Where both bulk density and sonic logs were badly affected by poor hole conditions in shale intervals, a value of 2.55gm/cc was used.

ANALYSIS METHODOLOGY

For the interval 2200-2600mKB, porosities and water saturations were calculated using an iterative technique which converges into a preselected grain density window by appropriately incrementing or decrementing shale volume. Initial shale volume was derived from the Gamma Ray response. The model incorporates porosity calculation from density-neutron crossplot algorithms, water saturation from the dual water relationship, hydrocarbon corrections to the porosity logs where applicable, and convergence upon the preselected grain density window (calculated from hydrocarbon and shale corrected density and neutron logs) by shale volume adjustment. Results were calibrated to preliminary core porosity analysis (cores 4 & 5) by adjusting the hydrocarbon correction to the porosity logs by adjusting the Sw/Sxo relationship (see "Z" in the list of analysis parameters.). Apparent formation water salinty was derived from Rwa calculations in the water sands underlying the hydrocarbon column. The resultant value of 40,000ppm.NaCleq. matches values used in the Kipper 1 analysis. The Gas/Oil contact is not apparent from logs, and was interpreted from RFT data. Specific algorithms and logic used are shown in Appendix 1.

Over the interval 1540-2200mKB, badly washed out hole which has resulted in poor quality density and neutron logs, precluded effective use of the above technique. Since an evaluation of mudlog, drilling, and wireline log data showed no indication of hydrocarbons in this interval, it was analysed for porosity only, with Sw assumed to be 100%. In view of the poor hole conditions, apparent total porosities were calculated from both the density-neutron combination (via crossplot algorithms) and the sonic log (via the Raiga-Clemenceau et al. algorithm, (paper G, 1986 SPWLA)). Calculated values from both sources showed good agreement in non washed-out sands. A minimum of the sonic porosity, the crossplot porosity, and 0.38v/v was then taken as being the best representation of total porosity. (0.38v/v was derived by crossplotting apparent porosity versus caliper and defining a maximum porosity cut-off.) Shale volume was derived from the Gamma Ray response, with the exception of the interval 1811-1870mKB, where shale volume from the density-neutron was considered to be more representative. Effective porosity was then derived from total porosity using calculated shale volume.

The net porosity cut-off value of 0.13v/v used in this analysis was derived from a crossplot (fig. 3) of permeability versus porosity from preliminary core analysis data. These data show orders of magnitude change in permeabilities from less than 0.01md below 0.12v/v porosity to 5md or greater above 15v/v porosity. The 0.13v/v net porosity cut-off used is therefore probably slightly optimistic.

ANALYSIS PARAMETERS.

Input resistivity log;(1=ILD, 2=LLD, 3=RT)......	:	2	
Tortuosity; 'a'..................................	:	1.00	
Cementation factor; 'm'..........................	:	2.00	
Saturation exponent; 'n'.........................	:	2.00	
Fluid density....................................	:	1.00	gm/cc
Gamma Ray value in clean formation (grmin)......	:	25	API
Gamma Ray value in shale (grmax)................	:	80	API
Apparent bulk density of shale(2200m-2600m).....	:	2.580	gm/cc
(1540m-2200m)......	:	2.510	gm/cc
Apparent neutron porosity of shale(2200m-2600m).	:	0.270	v/v
(1540m-2200m).	:	0.330	v/v
Apparent shale resistivity......................	:	7.00	ohm.m
Hydrocarbon density input as log from the database			
Oil.	:	0.7	gm/cc
Gas.	:	0.25	gm/cc
Lower limit of grain density	:	2.650	gm/cc
Upper limit of grain density...................	:	2.685	gm/cc
Formation water expressed in salinity			
Formation water salinity.......................	:	40000	ppm.NaCleq
Measured Rmf...................................	:	0.214	ohm.m
Temperature at which Rmf measured..............	:	17.0	
Temperature units (1=degrees C, 2=degrees F)....	:	1	
Downhole temperature from AMS log data			
Z (where Sxo=SW**Z)............................	:	0.25	
Irreducible water saturation...................	:	0.025	v/v
Vsh upper limit for effective porosity..........	:	0.65	v/v

TMF/38141/91

ANALYSIS SUMMARY.
INIVIDUAL SAND PACKAGES.

Net porosity cut-off.........: 0.13 v/v

Gross Interval: (top) (base)	Thickness Gross	Net	Net to Gross (pct)	Net Averages Effective Porosity	Sw	Interpreted Producible Fluid
1561.0-1562.4	1.4	0.8	57.1	0.159	1.000	Water
1566.4-1570.2	3.8	3.0	78.9	0.232	1.000	Water
1571.2-1579.4	8.2	5.0	61.0	0.251	1.000	Water
1579.8-1585.4	5.6	5.2	92.9	0.267	1.000	Water
1586.0-1587.6	1.6	1.0	62.5	0.172	1.000	Water
1593.2-1595.8	2.6	1.4	53.8	0.164	1.000	Water
1605.6-1608.6	3.0	2.6	86.7	0.271	1.000	Water
1618.0-1623.4	5.4	5.0	92.6	0.250	1.000	Water
1633.0-1635.0	2.0	1.2	60.0	0.217	1.000	Water
1636.0-1643.6	7.6	7.0	92.1	0.241	1.000	Water
1648.4-1652.0	3.6	2.8	77.8	0.225	1.000	Water
1654.0-1664.0	10.0	8.0	80.0	0.242	1.000	Water
1670.0-1671.4	1.4	1.0	71.4	0.186	1.000	Water
1676.4-1685.4	9.0	8.4	93.3	0.226	1.000	Water
1686.4-1699.0	12.6	11.4	90.5	0.229	1.000	Water
1700.0-1707.4	7.4	5.0	67.6	0.252	1.000	Water
1708.8-1711.8	3.0	2.8	93.3	0.224	1.000	Water
1713.0-1716.2	3.2	2.8	87.5	0.297	1.000	Water
1720.0-1721.8	1.8	1.6	88.9	0.193	1.000	Water
1725.2-1727.4	2.2	1.8	81.8	0.272	1.000	Water
1729.0-1730.8	1.8	1.6	88.9	0.221	1.000	Water
1735.4-1739.8	4.4	4.2	95.5	0.281	1.000	Water
1745.6-1751.0	5.4	4.6	85.2	0.224	1.000	Water
1755.8-1769.4	13.6	13.0	95.6	0.238	1.000	Water
1778.2-1780.2	2.0	1.6	80.0	0.213	1.000	Water
1794.6-1797.2	2.6	2.4	92.3	0.227	1.000	Water
1800.6-1802.6	2.0	1.6	80.0	0.223	1.000	Water
1807.4-1809.4	2.0	1.6	80.0	0.237	1.000	Water
1811.2-1870.6	59.4	58.8	99.0	0.233	1.000	Water
1877.0-1880.0	3.0	0.0	0.0	-	-	
1890.0-1896.0	6.0	5.4	90.0	0.228	1.000	Water
1901.0-1921.8	20.8	19.4	93.3	0.213	1.000	Water
1923.4-1926.8	3.4	2.8	82.4	0.203	1.000	Water
1928.0-1929.0	1.0	0.4	40.0	0.176	1.000	Water
1931.4-1936.0	4.6	4.0	87.0	0.227	1.000	Water
1938.0-1941.0	3.0	2.6	86.7	0.183	1.000	Water
1951.8-1953.6	1.8	1.6	88.9	0.211	1.000	Water
1954.0-1957.4	3.4	3.2	94.1	0.212	1.000	Water
1965.0-1966.0	1.0	0.6	60.0	0.191	1.000	Water
1969.4-1971.0	1.6	1.2	75.0	0.167	1.000	Water
1983.0-1994.6	11.6	11.0	94.8	0.243	1.000	Water
1996.4-1998.4	2.0	1.4	70.0	0.173	1.000	Water
1998.8-2015.0	16.2	15.2	93.8	0.215	1.000	Water

Gross Interval: (top) (base)	Thickness Gross	Thickness Net	Net to Gross (pct)	Net Averages Effective Porosity	Net Averages Sw	Interpreted Producible Fluid
2015.4-2023.2	7.8	7.2	92.3	0.212	1.000	Water
2025.2-2027.6	2.4	1.8	75.0	0.227	1.000	Water
2030.2-2034.8	4.6	3.6	78.3	0.189	1.000	Water
2041.6-2070.6	29.0	26.2	90.3	0.203	1.000	Water
2211.0-2242.0	31.0	18.4	59.4	0.182	0.329	Gas
2266.5-2284.0	17.5	15.2	86.9	0.191	0.321	Gas
2284.8-2286.0	1.2	0.6	50.0	0.154	0.621	Gas
2286.5-2292.4	5.9	5.2	88.1	0.169	0.398	Gas
2295.8-2306.0	10.2	9.8	96.1	0.183	0.481	Gas
2306.0-2309.4	3.4	3.0	88.2	0.160	0.572	Oil
2317.8-2320.0	2.2	2.2	100.0	0.193	0.774	Oil/Water
2320.0-2322.4	2.4	2.2	91.7	0.159	1.035	Water
2324.4-2326.0	1.6	1.2	75.0	0.192	0.988	Water
2332.4-2341.4	9.0	7.2	80.0	0.170	0.919	Water
2350.0-2364.8	14.8	9.2	62.2	0.171	1.015	Water
2371.4-2372.6	1.2	0.4	33.3	0.157	0.895	Water
2379.8-2384.0	4.2	4.2	100.0	0.172	1.014	Water
2396.8-2403.0	6.2	5.8	93.5	0.216	0.987	Water
2404.8-2413.0	8.2	4.8	58.5	0.174	0.899	Water
2415.0-2417.2	2.2	1.6	72.7	0.171	0.837	Water
2418.2-2423.4	5.2	4.4	84.6	0.175	1.002	Water
2425.8-2435.0	9.2	6.2	67.4	0.170	0.940	Water
2455.0-2461.0	6.0	5.0	83.3	0.179	0.896	Water
2489.4-2490.4	1.0	0.0	0.0	-	-	
2492.0-2495.2	3.2	1.2	37.5	0.148	0.948	Water
2505.0-2508.6	3.6	1.2	33.3	0.174	0.862	Water
2518.2-2521.8	3.6	2.8	77.8	0.187	1.041	Water
2529.6-2531.2	1.6	0.8	50.0	0.147	0.897	Water
2532.0-2537.6	5.6	2.4	42.9	0.181	0.923	Water
2538.4-2542.0	3.6	2.8	77.8	0.179	0.998	Water
2557.8-2563.2	5.4	2.8	51.9	0.160	0.877	Water
2565.0-2566.6	1.6	0.8	50.0	0.163	0.884	Water

TMF/38141/89-93

ANALYSIS SUMMARY.
MAJOR INTERVALS.

Net porosity cut-off.........: 0.13 v/v

TOP OF LATROBE TO 2600mKB (TD)

Gross Interval: (top) (base)	Thickness Gross	Net	Net to Gross (pct)	Net Averages Effective Porosity	Sw
1540.0-2600.0	1060.0	408.4	38.5	0.212	-

TOP OF LATROBE TO TOP OF VOLCANICS

Gross Interval: (top) (base)	Thickness Gross	Net	Net to Gross (pct)	Net Averages Effective Porosity	Sw
1540.0-2070.6	530.6	284.8	53.7	0.226	-

TOP OF HYDROCARBON TO 2600mKB (TD)

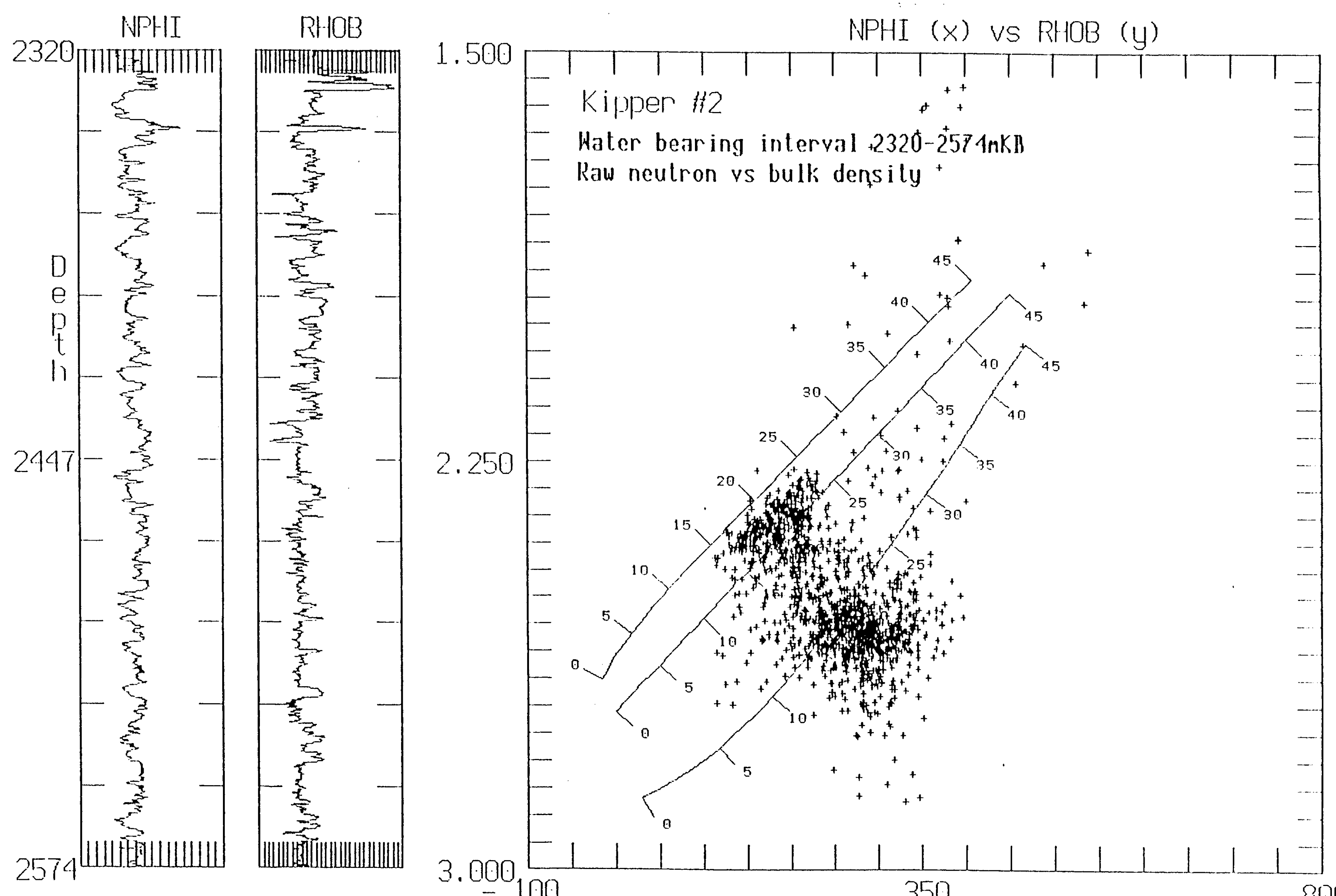
Gross Interval: (top) (base)	Thickness Gross	Net	Net to Gross (pct)	Net Averages Effective Porosity	Sw
2211.0-2600.0	389.0	123.6	31.8	0.179	-

GAS COLUMN

Gross Interval: (top) (base)	Thickness Gross	Net	Net to Gross (pct)	Net Averages Effective Porosity	Sw
2211.0-2306.0	95.0	49.2	51.8	0.183	0.368

OIL COLUMN

Gross Interval: (top) (base)	Thickness Gross	Net	Net to Gross (pct)	Net Averages Effective Porosity	Sw
2306.0-2320.0	14.0	5.2	37.1	0.174	0.658



KIPPER_2
Friday, June 5, 1987
9:27:13 am (AEST)

Fig. 1

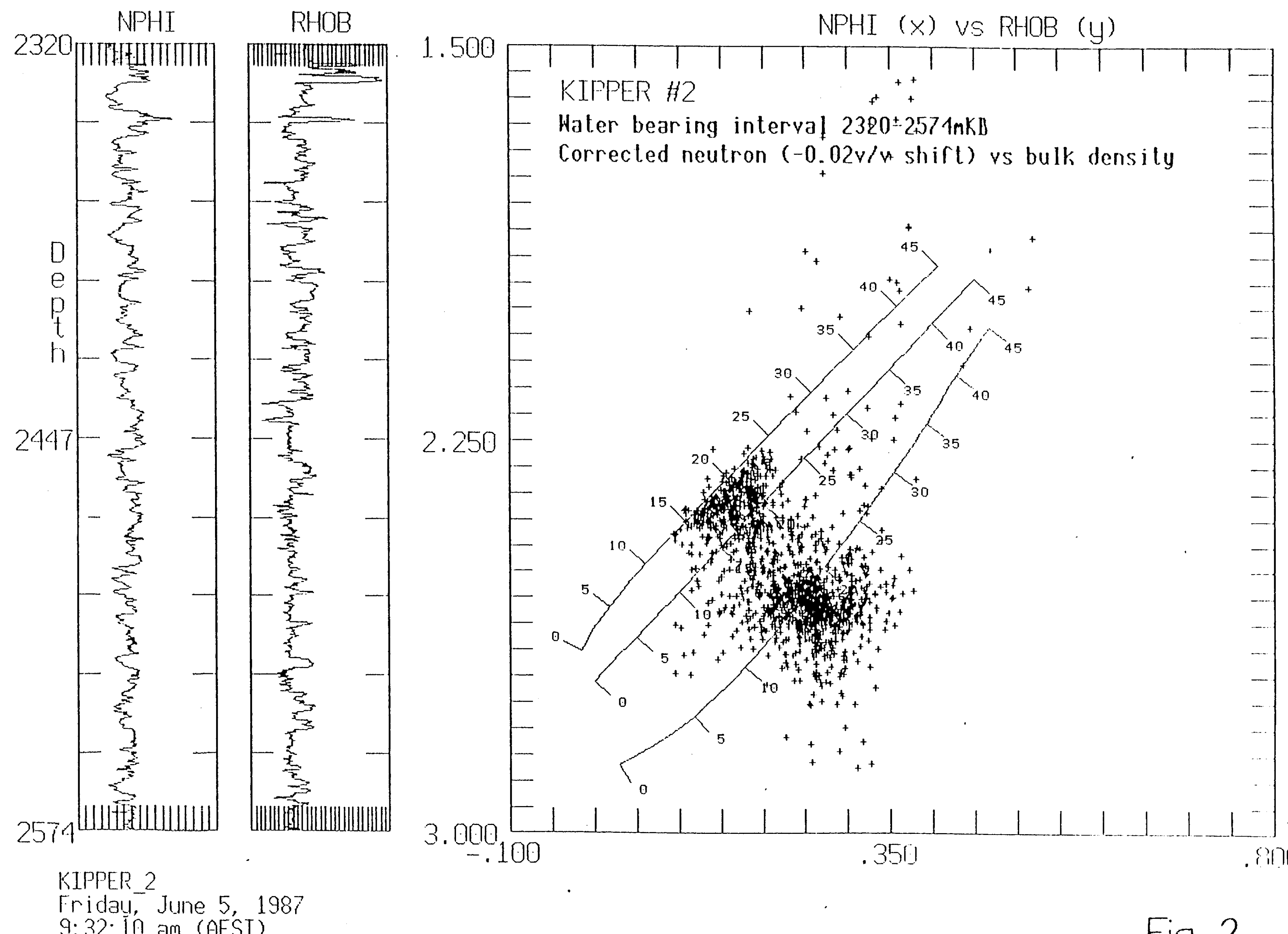
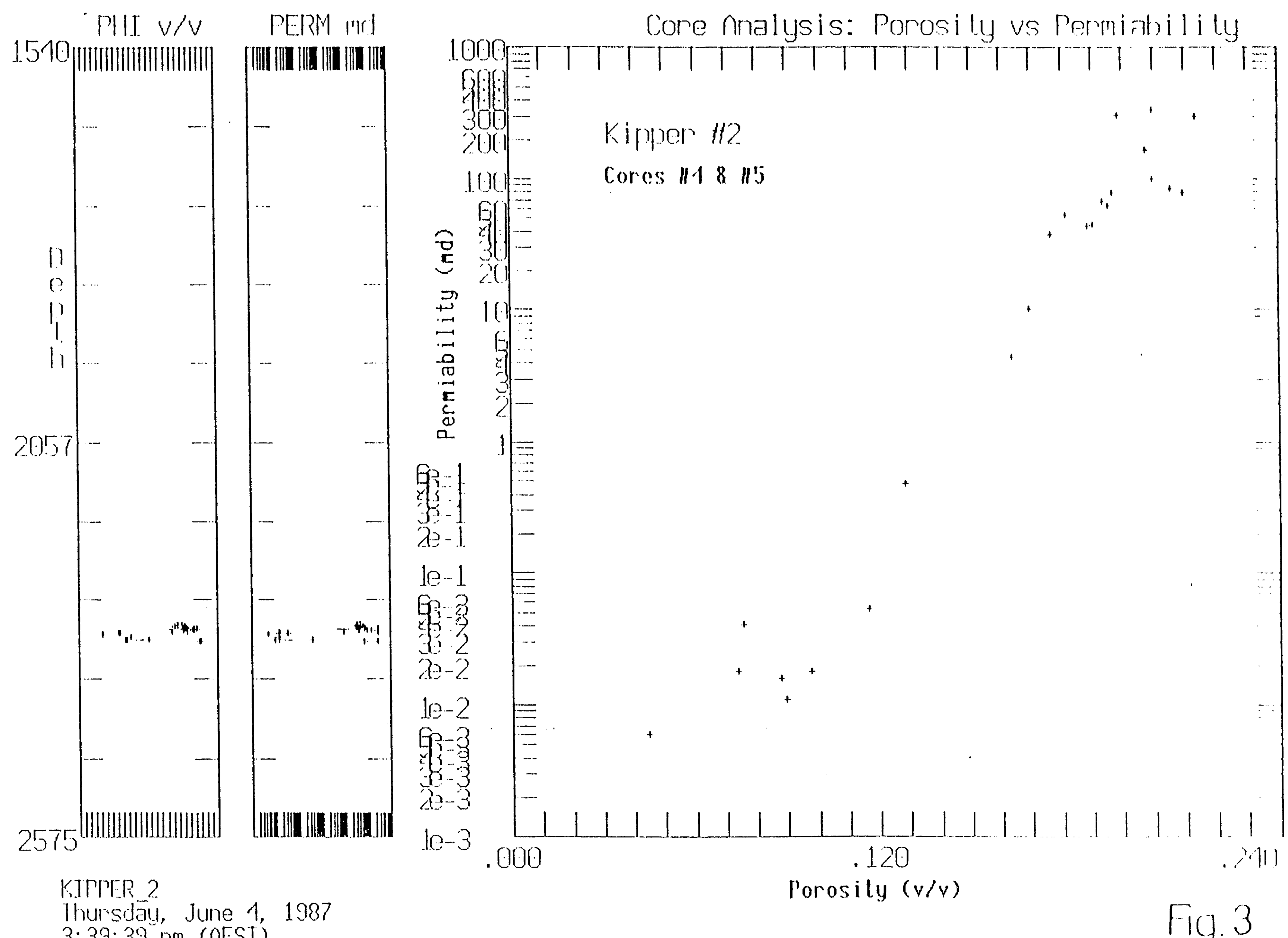

NPHI
RHOB
2320
2447
2574
Depth
NPHI (x) vs RHOB (y)
KIPPER #2
Water bearing interval 2320-2574mKB
Corrected neutron (-0.02v/v shift) vs bulk density
1.500
2.250
3.000
-.100
.350
.800
KIPPER_2
Friday, June 5, 1987
9:32:10 am (AEST)

Fig. 2



PHI v/v
PERM md
1540
Depth
2057
2575
Core Analysis: Porosity vs Permiability
Kipper #2
Cores #4 & #5
Permiability (md)
Porosity (v/v)
.000
.120
.240
1000
100
10
1
1e-1
1e-2
1e-3
KIPPER_2
Thursday, June 4, 1987
3:39:39 pm (AEST)

Fig. 3

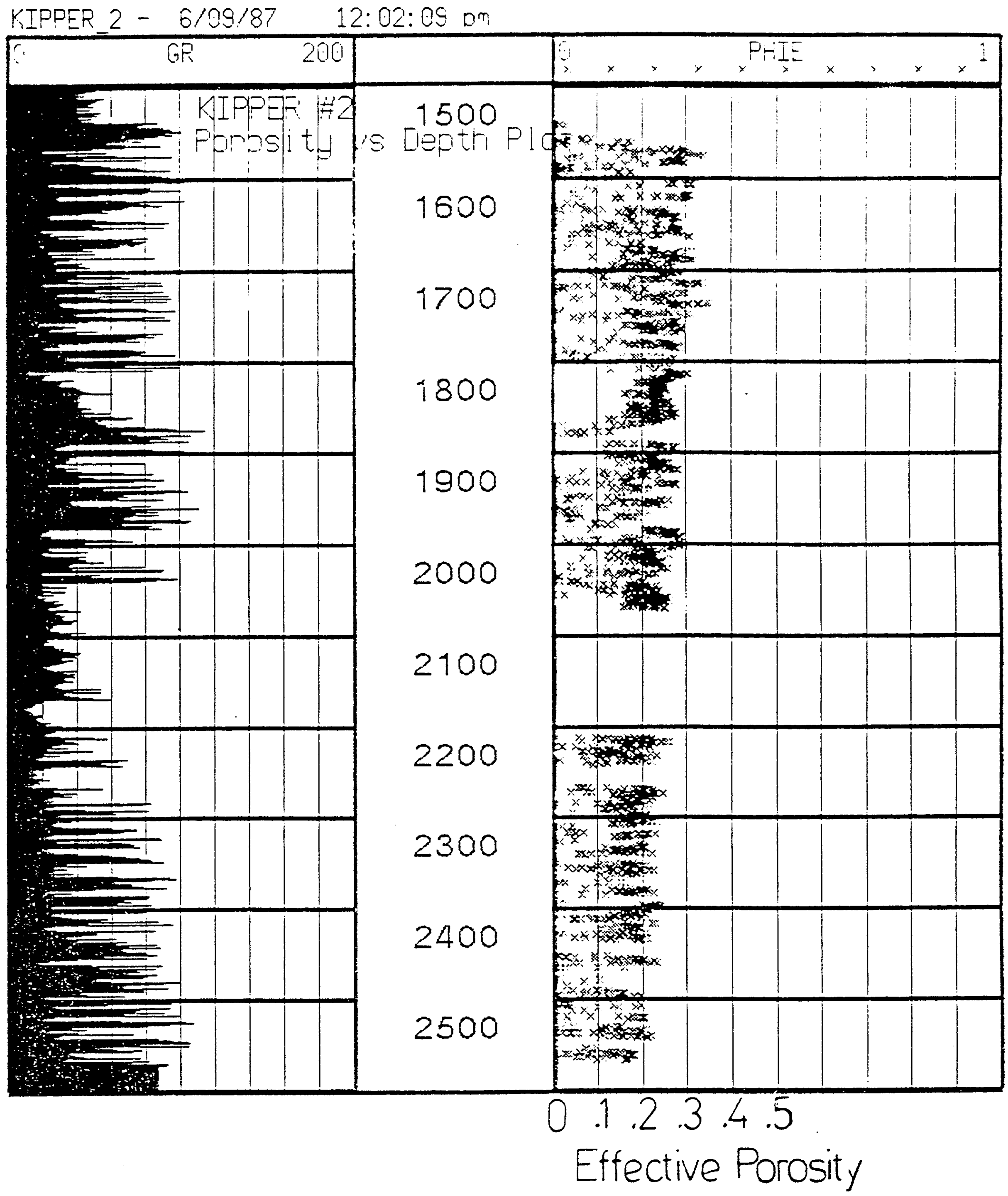

KIPPER_2 - 6/09/87 12:02:09 pm
GR 200
PHIE 1
KIPPER #2
Porosity vs Depth Plot
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
2500
0 .1 .2 .3 .4 .5
Effective Porosity

Fig. 4

APPENDIX 1
ALGORITHMS AND LOGIC USED IN THE QUANTITATIVE ANALYSIS

Initial shale volume calculated from GR response.

```
vsh = (gr-grmin)/(grmax-grmin)
vsh = (1.7-sqrt(3.38-((vshgr+0.7)**2)))
```

Apparent shale porosity calculated from density-neutron crossplot algorithm using apparent bulk density of shale and apparent neutron porosity (limestone matrix) of shale.

```
h = 2.71 - rhobsh + Ønsh*(rhof-2.71)
if (h.le.0)then
 rhoma = 2.71 - 0.64*h
else
 rhoma = 2.71 - 0.5*h
endif
Øsh = (rhoma-rhobsh)/(rhoma-rhof)
```

Bound water resistivity (rwb) calculated via Archie, using apparent shale porosity and apparent shale resistivity.

```
rwb = (rsh*(Øsh**m))/a
```

Initial estimate of total porosity from density-neutron crossplot algorithms, using bulk density and neutron porosity (limestone matrix, decimal p.u.) log values.

```
h = 2.71 - rhob + nphi*(rhof-2.71)
if (h.lt.0)then
 rhoma = 2.71 - 0.64*h
else
 rhoma = 2.71 - 0.5*h
endif
Øt = (rhoma-rhob)/(rhoma-rhof)
```

Water saturation (total) calculated using dual water relationship:

```
1/rt=(swt**n)*(Øt**m)/(a*rw)+swt**(n-1)*(swb*(Øt**m)/a)*((1/rwb)-(1/rw))
      This is solved for Sw by Newtons solution
```

```
exsw=0
sw  =0.9
aa  =((Øt**m)/(a*rw))
bb  =((Øt**m)*swb/a)*((1/rwb)-(1/rw))
dowhile(exsw.le.5)
 fx1=(aa*(sw**n))+(bb*(sw**(n-1,))-(1/rt)
 fx2=(n*aa*(  **(n-1)))+((n-1)*bb*(sw**(n-2)))
  if((abs(fx2)).lt.0.0001)then
   fx2=0.0001
  endif
swp=sw
sw =swp-(fx1/fx2)
if((abs(sw-swp)).le.0.01)then
 exitdo
endif
exsw=exsw+1
enddo
swt=sw
          where:swb = bound water saturation
                    = max(0,(min(1,(vsh*0sh/0t))))
```

If appropriate, invaded zone saturation (Sxo) is then calculated using the same algorithms, replacing Rt with Rxo, and Rw with Rmfi (resistivity of mud filtrate at formation temperature),where:

```
rmfi= rmf*((trmf+6.77)/(ti+6.77))
 where:   ti = temperature at zone of interest (degrees F)
             = ((bht-sbt)/(td-wd-kb))*(depth-wd-kb) + sbt
         rmf= measured rmf value
        trmf= temperature(F) at which rmf was measured
```

Alternatively, if no Rxo log is available, Sxo is estimated by the relationship Sxo = Sw**Z, where Z is an analyst input.

The bulk density and neutron porosity log responses are then corrected for hydrocarbon effects, using the following algorithms, which incorporate calculated Sxo and analyst input hydrocarbon density (rhoh).

```
rhobh=rhob+1.07*Øt*(1-sxot)*((1.11-0.1*p)*rhof-1.15*rhoh)
Ønh=nphi+(1.3*Øt*(1-sxot)*(rhof*(1-p)-1.5*rhoh+0.2))/(rhof*(1-p))
          where:   p = mud filtrate salinity in parts per unity
                     = 0.1778*(3/(rmf*(trmf+7)-1))**(1.05)
```

Total porosity is then recalculated from the density-neutron crossplot algorithm, using the hydrocarbon corrected porosity logs, Sw and Sxo recalculated, and replacement hydrocarbon corrections calculated using the latest Sxo. This process is repeated until the latest total porosity calculated is within 0.008pu (0.8% porosity) of the previously calculated value. At this stage, clay corrections are made to the hydrocarbon corrected bulk density and neutron porosity logs, and apparent matrix density calculated from the density-neutron crossplot algorithm.

```
rhobc = (rhobh - vsh*rhobsh)/(1 - vsh)
Ønc   = (Ønh - vsh*Ønsh)/(1 - vsh)
h  = 2.71 - rhobc + Ønc*(rhof-2.71)
if (h.lt.0)then
 rhogc= 2.71 - 0.64*h
else
 rhogc = 2.71 - 0.5*h
endif
```

The apparent matrix density is compared to the analyst input grain density window. If it falls within this window, effective porosity and water saturation are calculated, and the processing sequence finished. If it falls outside the specified grain density window, shale volume is incremented or decremented, and the whole processing sequence repeated, until the calculated grain density falls within the grain density window.

Effective porosity and water saturation are derived from calculated total porosity and water saturation as follows:

```
phie= Øt-(vsh*Øsh)
swe =1 - ((Øt/phie)*(1-swt))
sxo =1 - ((Øt/phie)*(1-sxot))
sxo = min(sxo,swe,1)
if (vsh.gt.0.4)then
 phie= phie*((0.6-vsh)/0.2)
 swe = 1-((1-swe)*((0.6-vsh)/0.2))
 sxo = 1-((1-sxo)*((0.6-vsh)/0.2))
if (vsh.gt.0.6)then
 phie=0
 swe =1
 sxoe=1
```

Sonic porosity, if used, is calculated as follows:

```
phis = 1-((dtma/dt)**(1/x))
     where, in clastics,
     dtma = 182.1
        x = 1.6
     (Raiga-Clemenceau et al.(paper G, 1986 SPWLA trans.))
```

PE601097

This is an enclosure indicator page.
The enclosure PE601097 is enclosed within the container PE902225 at this location in this document.

The enclosure PE601097 has the following characteristics:

```
      ITEM_BARCODE = PE601097
 CONTAINER_BARCODE = PE902225
              NAME = Computer Generated Log
             BASIN = GIPPSLAND
            PERMIT =
              TYPE = WELL
           SUBTYPE = WELL_LOG
       DESCRIPTION = Computer Generated Log (from appendix 2
                     of WCR vol.2) for Kipper-2
           REMARKS =
      DATE_CREATED = 06/03/1987
     DATE_RECEIVED = 28/10/1987
              W_NO = W953
         WELL_NAME = Kipper-2
        CONTRACTOR = SOLAR
      CLIENT_OP_CO = ESSO
```

(Inserted by DNRE - Vic Govt Mines Dept)

Appendix 3

APPENDIX 3

WIRELINE TEST REPORT

KIPPER-2 RFT REPORT

APRIL 9 - 11, 1987

OCTOBER 6, 1987

by: VICKY BINNS

ANALYSIS FOR KIPPER-2 RFT DATA

SUMMARY

An RFT survey was run on the Kipper-2 well over a three day period from April 9 - 11, 1987. As a result of the survey, the following conclusions have been drawn:

1. The S-1 Reservoir sands were normally pressured with little drawdown from the original basin gradient. This suggests limited communication with the producing fields. The PVT analysis supports the RFT data based conclusion of a continuous S-1 gas sand.

2. Overall the S-1 Reservoir gas sand pressure was consistent with the Kipper-1 pressure data, although the pressures appear to be around 5 psi lower, probably due to further basin drawdown and/or limitations in the repeatability of the pressure gauges.

3. The most likely gas-oil contact was positioned at 2284m TVDSS which is an intermediary depth between the low proved gas and high proved oil ascertained from the RFT sample data. The most likely oil-water contact was assessed at 2298m TVDSS which lies between the low proved oil and the high proved water depth.

4. A gross oil column of 14m ± 2m was revealed in the Kipper-2 well.

PROGRAM

A total of 33 seats were attempted during the RFT survey of Kipper-2. 24 seats for pretests only and 9 seats for samples. 3 pretest seats were aborted due to seal failure or the formation being too tight and one sample seat was aborted because of tight formation. In the 8 valid sample runs, gas and condensate were recovered from three samples, oil was recovered from three samples, and water recovered from two samples. Two oil and two gas, 1 gallon samples were preserved for laboratory analysis.

Further details of the RFT Survey are available in the attached pretest and sampling data sheets.

PRESSURE DATA INTERPRETATION

1. Upper Water Sands

Four valid pressure tests were taken at widely spaced intervals in the Latrobe sands above the volcanics and the S-1 gas reservoir. As evident from Figure 1 these points fall on a consistent gradient of 1.44 psi/m. This compares with 1.46 psi/m seen in the corresponding interval in Kipper-1. It is still slightly higher than the original Gippsland aquifer gradient of 1.42 psi/m. In the Kipper-1 RFT Report the interpretation of this slightly raised pressure gradient is that the drawdown due to basin production declines with depth. The pressures measured in this section of the formation in Kipper-2 are up to 12 psi below the Kipper-1 pressure levels. This is probably due to additional basin drawdown since the drilling of Kipper-1, influenced particularly by the higher production rates from the nearby Tuna and Flounder fields.

2. S-1 Reservoir Water Sands

The average gradient through the six valid S-1 water points below the oil reservoir is calculated to be 1.41 psi/m. This is in close agreement with the original basin water gradient of 1.42 psi/m. The pressures are very close to the original basin pressure and the drawdown due to production, if any, is within the uncertainty of our prediction of original basin pressure at this depth. No S-1 water gradient could be obtained in Kipper-1.

3. S-1 Reservoir Gas Sands

An average gas gradient of 0.275 psi/m was calculated from the RFT data taken in Kipper-2 (see Figure 2). This gradient is comparable with the PVT derived gas density of 0.268 psi/m. When considering only the lower gas sands (seats 9-15), the calculated average gradient was 0.327 psi/m (see Figure 3). This gradient variation with depth could be due to discontinuities in vertical permeability and supercharging which effect the measurement of pressure by an RFT tool in poor quality sands. It could also be a result of the influence the residual oil zone has on the gas composition although this is not supported by the hydrocarbon analysis.

The two Kipper-2 gas laboratory analyses indicate similar gas reservoir densities (0.188 g/cc and 0.186 g/cc) and are comparable to the gas density derived from the Kipper-1 RFS 1116 PVT analysis (0.192 g/cc), within the uncertainty of sampling. The dew point measured in the PVT analysis for Kipper-2 (Report RFS AD 1120) is lower than the reservoir pressure, that is 2990 psig and 3313 psig respectively. As the gas and oil are known to be in equilibrium within the reservoir, this discrepancy in pressure is probably the result of retrograde phenomena where a small amount of liquid was lost during sampling. The PVT sample supports the RFT data in respect to the consistency of one gas gradient throughout the gas sand.

4. Oil Sands

The most likely gas-oil contact was positioned at 2284m TVDSS which is an intermediate depth between the low proved gas and the high proved oil depth ascertained from RFT sample data (see Table 1). The oil-water contact was harder to place by sample data because the sample taken at 2296.4m TVDSS recovered very little oil and a lot of water/filtrate and could be in an oil and water transition zone. With the assistance of log analysis, the most likely oil-water contact was assessed at 2298m TVDSS which lies between the low proved oil and high proved water depth. If a gradient line is drawn through these estimated contact depths, an oil gradient of 0.93 psi/m results. This is consistent with the hydrocarbon analysis derived gradient of 0.94 psi/m. This oil gradient line passes within 0.6 psi of the one pretest seat (seat 8) in the oil column. Thus the RFT pressure data supports the estimated gross thickness of the oil column of 14m with a potential variance of 2m on both the up and the down side.

SAMPLE DATA

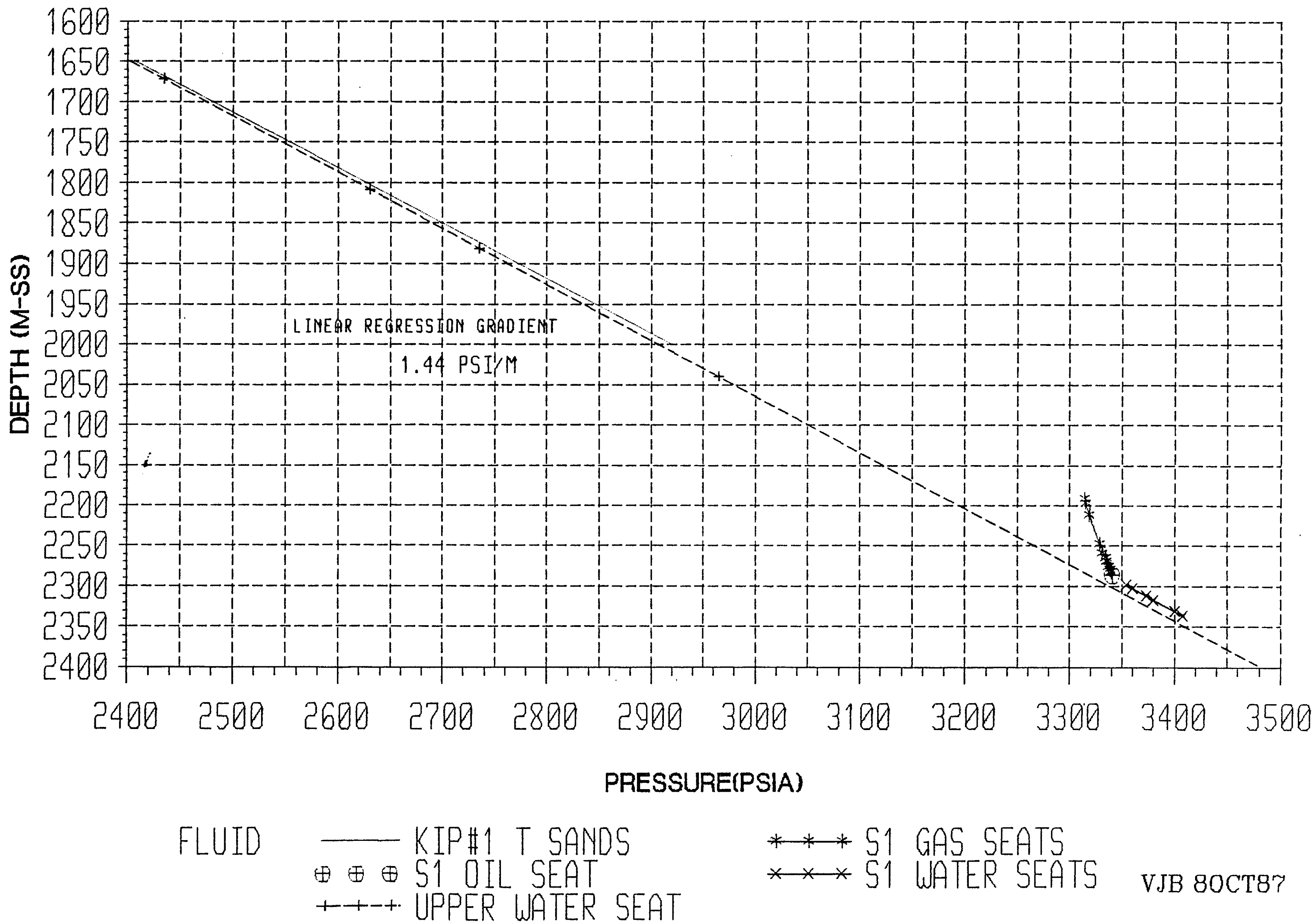
Sample runs were conducted to help define the depths of the fluid contacts as well as to recover hydrocarbon samples for analysis.

Table 1 summarises the most significant results of the sampling survey and further details of the sampling runs and the corresponding fluids recovered are included in Attachment 2.

TABLE 1: SUMMARY OF SAMPLING RESULTS

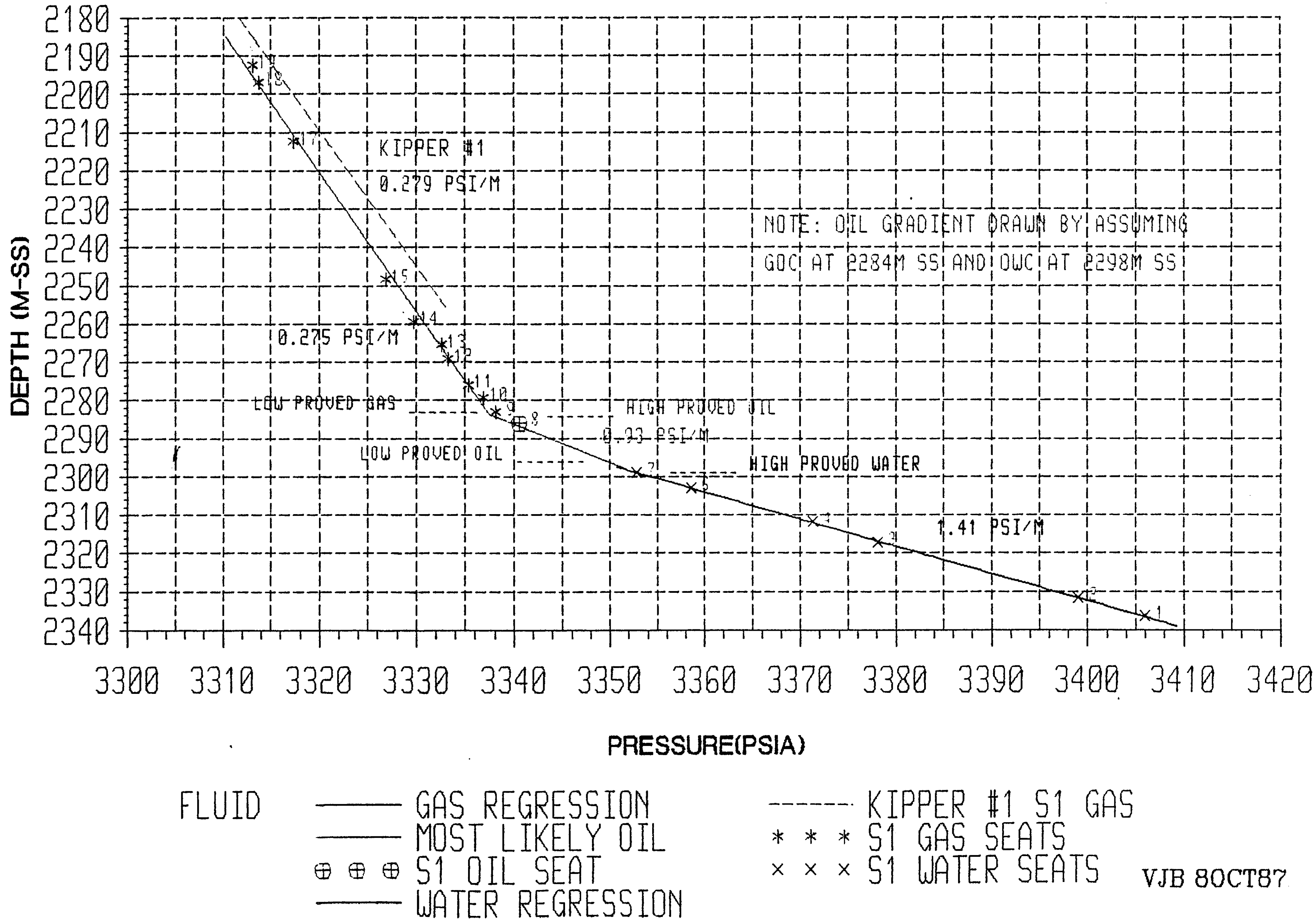
Run/Seat	Depth		Fluid Recovery				Comments
No.	mkB	mSS	GAS (SCF)	OIL (L)	WATER (L)	CONDENSATE (L)	
7/31	2277.2	2255.2	123.8	-	0.75	0.5	Good gas recovery. Preserved 1 gallon chamber.
4/28	2303.0	2281.0	121.8	-	1.5	0.5	Good Gas recovery. Preserved 1 gallon chamber.
5/29	2305.2	2283.2	41.5	-	14.5	0.25	Low Proved Gas. No trace of oil
9/33	2306.5	2284.5	34.4	9.25	4.0	-	High proved oil. Preserved 1 gallon chamber.
2/25	2308.0	2286.0	44.6	10.5	11.0	-	Preserved 1 gallon chamber.
3/27	2318.4	2296.4	5.0	0.25	20.0	-	Low proved oil. Water appears to be primarily filtrate.
8/32	2321.2	2299.2	-	-	20.5	-	High proved water; filtrate and formation water.
6/30	2334.2	2312.2	-	-	22.0	-	Formation water.

FIG 1 - KIPPER #2 RFT PRESSURE DATA
RUN #1 PRETESTS



VJB 8OCT87

FIG 2 - KIPPER #2 RFT PRESSURE DATA
RUN #1 PRETESTS



VJB 8OCT87

Attachment 1

RFT PRESSURE DATA

WELL: KIPPER #2

GEOLOGIST/ENGINEER: IAN D. PALMER/J. HENDRICH

DATE: 9/4/87

RFT No. Run/Seat	RFT TYPE	Depth m MDKB	Depth m TVDSS KB=22	Initial Hydrostatic HP / RFT gauge psia / psig	ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig	ppg	Temp °F	Time Retract	Final Hydrostatic HP / RFT gauge psia / psig	ppg	Comments (include Probe type) L = Long nose probe
1-1	PT	2358.5	2336.5	3905.3/3887.4	9.66	21:34		3405.77/3395	8.51	181.5	21:50	3904.2/3887*	9.66	RFT GAUGE SUSPECT - CALIB. PROBE? GOOD PERM - GOOD TEST. WATER
1-2	PT	2353.8	2331.8	3897.7/3882.7	9.67	21:58	3379.1	3398.88/3388.9	8.51		22:07	3896.6/3882.3	9.67	GOOD PERM - GOOD TEST. WATER
1-3	PT	2339.3	2317.3	3869.5/3860	9.67	22:16	3359.9	3377.90/3366.5	8.51	183.4	22:43	3873.9/3859*	9.67	GOOD PERM - GOOD TEST SLOW STABILIZATION. WATER
1-4	PT	2334.0	2312.0	3864.2/3851.3	9.67	22:54	3321	3371.09/3360	8.51	183.2	23:12	3864.9/3850.4	9.67	GOOD PERM - GOOD TEST WATER
1-5	PT	2325.3	2303.3	3850.6/3835	9.67	23:19	3807.9							SEAL FAILURE
1-6	PT	2325.0	2303.0	3849.1/3836.4	9.67	23:25	3287	3358.42/3346.5	8.51	183.0	23:48	3850.4/3836	9.67	FAIR PERM - GOOD TEST
1-7	PT	2321.0	2299.0	3844.5/3830	9.68	23:52	3266	3352.72/3340.8	8.51		24:02	3844.6/3830.0	9.68	FAIR PERM - GOOD TEST
1-8	PT	2308	2286.0	3822.4/3809.5	9.68	00:08	2607	3340.47/3327.7	8.53	182.9	00:33	3823.7/3808	9.67	TIGHTER - GOOD TEST
1-9	PT	2305.2	2283.2	3818.5/3804.5	9.68	00:43	2600	3337.93/3325.7	8.53	183.3	00:51	3817.9/3803.0	9.67	GOOD TEST
1-10	PT	2301.4	2279.4	3811.6/3798	9.68	00:57	2600	3336.65/3323.9	8.55	183.5	01:02	3812.0/3797.2	9.67	HIGH PRESSURE?? SUPERCHARGED

WELL: KIPPER #2
DATE: 10/4/87

GEOLOGIST/ENGINEER: V.J. BINNS/L. FINLAYSON

RFT No. Run/Seat	RFT TYPE	Depth m MDKB	m TVDSS KB=22	Initial Hydrostatic HP / RFT gauge psia / psig	ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig	ppg	Temp °F	Time Retract	Final Hydrostatic HP / RFT gauge psia / psig	ppg	Comments (include Probe type) L = Long nose probe
1-11	PT	2298	2276	3805.71/3791.8	9.67	01:09	3315	3335.09/3323.3	8.55	183.7	01:20	3805.9/3791.2	9.67	GOOD PERM. GOOD TEST
1-12	PT	2291.3	2269.3	3794.5/3780.7	9.67	01:28	3260	3333.05/3321.50	8.57	183.2	01:45	3795.1/3780.5	9.67	GOOD PERM. GOOD TEST
1-13	PT	2287.5	2265.5	3788.2/3774.8	9.68	01:52	2553	3332.39/3320.3	8.59	183.1	02:10	3788.4/3774.6	9.68	TIGHTER. FAIR PERM FAIR TEST
1-14	PT	2281.5	2259.5	3778.5/3764.9	9.68	02:22	3312	3329.63/3320.9	8.34	184.2	02:42	3777.4/3763.9	9.67	GOOD PERM. GOOD TEST
1-15	PT	2270.5	2248.5	3759.0/3746.8	9.68	02:50	3302	3326.59/3315.6	8.64	183.6	03:07	3759.7/3746.3	9.67	FAIR - GOOD PERM GOOD TEST
1-16	PT	2234.5	2212.0	3697.5/3685.3		03:18								SEAL FAILURE
1-17	PT	2234.5	2212.5	3701.0/3687.5	9.68	03:26	3295	3317.16/3308.0	8.75	181.5	03:40	3699.8/3687.8	9.68	GOOD PERM. GOOD TEST
1-18	PT	2219.0	2197.0	3673.0/3662.5	9.68	03:43	2971	3313.51/3302.0	8.80	181.6	04:10	3674.0/3662.0	9.68	TIGHTER FORMATION FAIR TEST - LONGER TO STABILISE
1-19	PT	2214.5	2192.5	3667.7/3654.3	9.68	04:22	2773	3312.87/3300.8	8.82	181.2	04:27	3667.7/3654.1	9.67	VERY GOOD TEST. QUICK TO STABILIZE. GOOD PERM
1-20	PT	2062.2	2040.2	3417.3/3405.7	9.68	04:51	2944	2963.04/2955.2	8.47	174.1	05:00	3418.0/3405.7	9.68	V. GOOD TEST GOOD PERM
1-21	PT	1914.0	1892.0	3174.9/3165.1	9.70	5:20	1025							TOO TIGHT
1-22	PT	1904.5	1882.5	3159.2/3147.3	9.69	5:35	2413	2733.54/2723.5	8.47	173.9	5:44	3159.2/3146.8	9.69	GOOD TEST. GOOD PERM
1-23	PT	1831.0	1809.0	3038.1/3027.2	9.69	5:50	2488	2629.14/2619.4	8.47	172.0	6:05	3038.4/3025.9	9.69	GOOD TEST. GOOD PERM
1-24	PT	1694.0	1672.0	2812.8/2799 3	9.69	6:19	2400	2432.80/2424.2	8.48	167.4	6:35	2814.2/2799.9	9.69	GOOD TEST. GOOD PERM

<u>Attachment 1</u> (cont'd)

RFT PRESSURE DATA

WELL: KIPPER #2

GEOLOGIST/ENGINEER: V. BINNS/L. FINLAYSON/ I. PALMER/Y. HEINDRICH

DATE: 10/4/87

RFT No. Run/Seat	RFT TYPE	Depth m MDKB	m TVDSS KB=22	Initial Hydrostatic HP / RFT gauge psia / psig	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig	Temp °F	Time Retract	Final Hydrostatic HP / RFT gauge psia / psig	Comments (include Probe type) M = Martineau probe
2-25	SAMPLE	2308.0	2386.0	3817.4/3805.3	09:08	2888	3337.46/3327.2	192	08:55	3815.6/3803.3	M. PROBE FORMATION PRESSURE IS FINAL BUILDUP
3-26	SAMPLE	2318.2	2296.2	3831.4/3819.6	12:56	900					TOO TIGHT FOR SAMPLE
3-27	SAMPLE	2318.4	2296.4	3832.01/3819.0	13:02	2970	3348.85/3335.5	196.2	13.23	3832.9/3818.4	GOOD PERM. QUICK SAMPLE
4-28	SAMPLE	2303.0	2281.0	3808.5/3794.7	16:48	2620	3337.0/3324.3	191.5	17:29	3808.2/3794.2	GOOD PERM. GOOD SAMPLE
5-29	SAMPLE	2305.2	2283.2	3811.6/3797.5	20:31	2717	3338.5/3325.6	192.2	21:06	3811.6/3796.4	GOOD
6-30	SAMPLE	2334.2	2312.2	3860.0/3847.7	23:54	2509	3371.5/3358.9	204.9	00:41	3857.0/3843.6	
7-31	SAMPLE	2277.2	2255.2	3766.0/3751.8	03:12	3254	3332.7/3319.9	194.0	03:27	3764.6/3749.7	VERY HIGH PERM
8-32	SAMPLE	2321.2	2299.2	3835.0/3823.0	06:38	2786	3351.1/3340.5	206.6	07:12	3835.0/3822.3	FAIR TEST
9-33		2306.5	2284.5	3815.0/3800.0	10:03		3341/3327.7	202.0	11:37	3811.0/3796.5	VALID - VERY TIGHT

(2127F:9)

Attachment 2

RFT SAMPLE TEST REPORT

Well : Kipper-2

OBSERVER : V.J. Binns/I.D. Palmer DATE : 10/4/87 RUN NO. : 2

	CHAMBER 1 (22.8 lit.)		CHAMBER 2 (3.8 lit.)	
SEAT NO.	2/25			
DEPTH	2308	mKB	2308	mKB
A. RECORDING TIMES				
Tool Set	09:07:01	hrs	-	hrs
Chamber Open	09:10:50	hrs	09:43:41	hrs
Chamber Full	09:43:10	hrs	09:49:35	hrs
Fill Time	32:20	mins	06:06	mins
Finish Build Up	-	hrs	09:53:50	hrs
Build Up Time	-	mins	04:15	mins
Tool Retract		hrs	09:54:00	hrs
Total Time		mins	47:00	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	3817.4	psia	-	psia
Initial Form'n Press.	3339.8	psia	-	psia
Initial Flowing Press.	72	psia	1080.5	psia
Final Flowing Press.	3337.8	psia	3328.8	psia
Final Formation Press.	-	psia	3337.4	psia
Final Hydrostatic	-	psia	3815.6	psia
C. TEMPERATURE				
Max. Tool Depth	2340	m	2340	m
Max. Rec. Temp	191	deg F	192	deg F
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	04:45 hrs	9/ 4/87	04:45 hrs	9/ 4/87
Time since Circ.	hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	1700	psig		psig
Amt Gas	44.6	cu ft		cu ft
Amt Oil	10.5	lit		lit
Amt Water (Total)	4.0	lit		lit
Amt Others	-	lit		lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1	19.764%	ppm		ppm
C2	5.881	ppm		ppm
C3	1.896	ppm		ppm
C4	0.612	ppm		ppm
C5	not measured	ppm		ppm
C6+	not measured	ppm		ppm
CO2/H2S	No H2S	%/ppm		%/ppm
Oil Properties	39 deg API@ 28	deg C	deg API@	deg C
Colour	tan-brown			
Fluorescence	pale yellow white bright			
GOR				
Pour Point	31°			
Water Properties				
Resistivity	0.238ohm-m @ 22	deg C	ohm-m @	deg C
NaCl Equivalent	27,500	ppm		ppm
Cl-titrated	19,100	ppm		ppm
Tritium	2756 / 2733	DPM		DPM
pH	7.2			
Est. Water Type	fitrate			
F. MUD FILTRATE PROPERTIES				
Resistivity	0.214ohm-m @ 17	deg C	ohm-m @	deg C
NaCl Equivalent	31,500	ppm		ppm
Cl-titrated	19,500	ppm		ppm
pH	10.6			
Tritium (in Mud)	3000 - 3200	DPM		DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6	ppg		ppg
Calc. Hydrostatic	3780	psig		psi
Serial No. (Preserved)	-		RFS AD 1129	
Choke Size/Probe Type	1x30/1000/Martineau		1x30/1000/Martineau	
REMARKS	Ca++ sample 230 mg/l Ca++ m.f. 60 mg/l			

PRESERVED SAMPLE

(2127F:10)

RFT SAMPLE TEST REPORT

Well : Kipper-2

OBSERVER : V.J. Binns/I.D. Palmer DATE : 10/4/87 RUN NO. : 3

	CHAMBER 1 (22.8 lit.)		CHAMBER 2 (3.8 lit.)	
SEAT NO.	3/27			
DEPTH	2318.4	mKB		mKB
A. RECORDING TIMES				
Tool Set	13:00:47	hrs		hrs
Chamber Open	13:03:09	hrs	13:14:00	hrs
Chamber Full	13:12:30	hrs	13:16:00	hrs
Fill Time	9:21	mins	2:00	mins
Finish Build Up	-	hrs	-	hrs
Build Up Time	-	mins	-	mins
Tool Retract	-	hrs	13:21:15	hrs
Total Time	-	mins	21:32	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	3832.0	psia	-	psia
Initial Form'n Press.	3349.1	psia	-	psia
Initial Flowing Press.	814.2	psia	890.4	psia
Final Flowing Press.	3311.6	psia	3341.9	psia
Final Formation Press.	-	psia	3348.9	psia
Final Hydrostatic	-	psia	3832.9	psia
C. TEMPERATURE				
Max. Tool Depth	2340	m	-	m
Max. Rec. Temp	189	deg F	-	deg F
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	04:45 hrs	9/ 4/87	04:45 hrs	9/ 4/87
Time since Circ.	hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	700	psig	approx. 50	psig
Amt Gas	5.0	cu ft	0.35	cu ft
Amt Oil	0.25	lit	0.25	lit
Amt Water (Total)	20.0	lit	3.0	lit
Amt Others	-	lit	-	lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1	70.28%	ppm	61.11%	ppm
C2	6.39%	ppm	5.28%	ppm
C3	1.56%	ppm	1.02%	ppm
C4	1.16%	ppm	0.89%	ppm
C5	not measured	ppm	-	ppm
C6+	not measured	ppm	-	ppm
CO2/H2S	No H2S	%/ppm	-	%/ppm
Oil Properties	39 deg API@	28 deg C	deg API@	deg C
Colour	brown		bright brown	
Fluorescence	bright pale yellow-white		bright pale yellow-white	
GOR				
Pour Point				
Water Properties				
Resistivity	0.238ohm-m @ 22	deg C	0.238ohm-m @ 22	deg C
NaCl Equivalent	28,500	ppm	27,000	ppm
Cl-titrated	19,100	ppm	18,200	ppm
Tritium	3030	DPM	2989	DPM
pH /Ca++	7.0 / 210		7.0 / 160	
Est. Water Type	fitrate		fitrate	
F. MUD FILTRATE PROPERTIES				
Resistivity	0.214ohm-m @ 17	deg C	0.214ohm-m @ 22	deg C
NaCl Equivalent	31,500	ppm	31,500	ppm
Cl-titrated	19,500	ppm	19,500	ppm
pH	10.6		10.6	
Tritium (in Mud)	2800 - 3000	DPM	2800 - 3000	DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6	ppg	9.6	ppg
Calc. Hydrostatic		psig		psi
Serial No. (Preserved)	-		-	
Choke Size/Probe Type	1x40/1000/Martineau		1x30/1000/Martineau	
REMARKS				

Attachment 2 (cont'd)

RFT SAMPLE TEST REPORT

Well : KIPPER-2

OBSERVER : V. BINNS DATE : 10/4/87 RUN NO. : 4

	CHAMBER 1 (22.8 lit.)		CHAMBER 2 (3.8 lit.)	
SEAT NO.	4/28			
DEPTH	2303.0	mKB		mKB
A. RECORDING TIMES				
Tool Set	16:48:13	hrs	-	hrs
Chamber Open	16:50:23	hrs	17:14:35	hrs
Chamber Full	17:12:43	hrs	17:16:35	hrs
Fill Time	22:20	mins	02:00	mins
Finish Build Up	-	hrs	17:20:25	hrs
Build Up Time	-	mins	00:03:50	mins
Tool Retract	-	hrs	17:29:30	hrs
Total Time	-	mins	41.17	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	3805.5	psia	-	psia
Initial Form'n Press.	3337.0	psia	-	psia
Initial Flowing Press.	34	psia	1068.0	psia
Final Flowing Press.	3318.3	psia	1500.0	psia
Final Formation Press.	-	psia	3302.0	psia
Final Hydrostatic	-	psia	3808.2	psia
C. TEMPERATURE				
Max. Tool Depth	2340	m	2340	m
Max. Rec. Temp	191.9	deg F	191.9	deg F
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	04:45 hrs	09/04/87	04:45 hrs	09/04/87
Time since Circ.	hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	2000	psia		psia
Amt Gas	121.8	cu ft		cu ft
Amt Oil	-	lit		lit
Amt Water (Total) mf	1.5	lit		lit
Amt Others: Condensate	0.5	lit		lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1	20.66%	ppm		ppm
C2	6.813%	ppm		ppm
C3	1.463%	ppm		ppm
C4	0.591%	ppm		ppm
C5	0.06%	ppm		ppm
C6+	N. MEASURED	ppm		ppm
CO2/H2S	NO H2S	%/ppm		%/ppm
Oil Properties	deg API@	deg C	deg API@	deg C
Colour				
Fluorescence				
GOR				
Pour Point				
Water Properties				
Resistivity	.263 ohm-m @ 22	deg C	ohm-m @	deg C
NaCl Equivalent	24,000	ppm		ppm
Cl-titrated	17,200	ppm		ppm
Tritium	2651	DPM		DPM
pH/Ca++	7.0			
Est. Water Type	FILTRATE			
F. MUD FILTRATE PROPERTIES				
Resistivity	0.214ohm-m @ 17	deg C	ohm-m @	deg C
NaCl Equivalent	31,500	ppm		ppm
Cl-titrated	19,500	ppm		ppm
pH	10.6			
Tritium (in Mud)	3000-3200	DPM		DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6	ppg	9.6	ppg
Calc. Hydrostatic	3772	psi	3772	psi
Serial No. (Preserved)	-		RFS AD 1062	
Choke Size/Probe Type	1x30/1000/ MARTINEAU		1x.03/ MARTINEAU	
REMARKS				

PRESERVED SAMPLE

(2127F:12)

Attachment 2 (cont'd)

RFT SAMPLE TEST REPORT

Well : KIPPER-2

OBSERVER : V. BINNS DATE : 11/4/87 RUN NO. : 5

	CHAMBER 1 (22.8 lit.)		CHAMBER 2 (3.8 lit.)	
SEAT NO.	5/29			
DEPTH	2305.2	mKB	2305.2	mKB
A. RECORDING TIMES				
Tool Set	20:31:45	hrs	-	hrs
Chamber Open	20:34:00	hrs	20:58:30	hrs
Chamber Full	20:57:00	hrs	21:06:00	hrs
Fill Time	23:00	mins	7:30	mins
Finish Build Up	-	hrs	21:05:20	hrs
Build Up Time	-	mins	00:06:50	mins
Tool Retract	-	hrs	21:08:15	hrs
Total Time	-	mins	-	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	3811.6	psia	-	psia
Initial Form'n Press.	3338.5	psia	-	psia
Initial Flowing Press.	80.0	psia	1036.0	psia
Final Flowing Press.	3260.5	psia	3315.1	psia
Final Formation Press.	-	psia	3338.0	psia
Final Hydrostatic	-	psia	3811.6	psia
C. TEMPERATURE				
Max. Tool Depth	2340	m	2340	m
Max. Rec. Temp	192.2	deg C	196.4	deg C
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	04:45 hrs	09/04/87	04:45 hrs	09/04/87
Time since Circ.	hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	1800	psia	1875	psia
Amt Gas	41.5	cu ft	14.8	cu ft
Amt Cond.	0.25	lit	SCUM	lit
Amt Water (Total) Filt.	14.5	lit	1.25	lit
Amt Others	-	lit		lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1	20.614%	ppm	20.627%	ppm
C2	6.468%	ppm	6.890%	ppm
C3	2.806%	ppm	3.627%	ppm
C4	0.812%	ppm	0.918%	ppm
C5	0.091%	ppm	0.087%	ppm
C6+	N. MEASURED	ppm	N. MEASURED	ppm
CO2/H2S	NO H2S	%/ppm	NO H2S	%/ppm
Oil Properties	deg API@	deg C	deg API@	deg C
Colour				
Fluorescence				
GOR				
Pour Point				
Water Properties				
Resistivity	0.231ohm-m @ 22	deg C	0.261ohm-m @ 22	deg C
NaCl Equivalent	28,000	ppm	23,500	ppm
Cl-titrated	19,500 @ 20	ppm	18,800 @ 20	ppm
Tritium	3030	DPM	-	DPM
pH/Ca++	7.0/220		7.0/160	
Est. Water Type	FILTRATE		FILTRATE	
F. MUD FILTRATE PROPERTIES				
Resistivity	0.214ohm-m @ 17	deg C	0.214ohm-m @ 17	deg C
NaCl Equivalent	31,500	ppm	31,500	ppm
Cl-titrated	19,500	ppm	19,500	ppm
pH	10.6		10.6	
Tritium (in Mud)	3000-3200	DPM	3000-3200	DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6	ppg	9.6	ppg
Calc. Hydrostatic	2307	psi	2307	psi
Serial No. (Preserved)	-			
Choke Size/Probe Type	1x40/1000/ MARTINEAU		1x30/1000/ MARTINEAU	
REMARKS				

RFT SAMPLE TEST REPORT

Well : Kipper-2

OBSERVER : V.J. Binns DATE : 10/4/87 RUN NO. : 6

	CHAMBER 1 (22.8 lit.)		CHAMBER 2 (3.8 lit.)	
SEAT NO.	6/30			
DEPTH	2334.2	mKB	2334.2	mKB
A. RECORDING TIMES				
Tool Set	23:54:25	hrs		hrs
Chamber Open	23:56:37	hrs	00:33:54	hrs
Chamber Full	00:33:15	hrs	00:37:51	hrs
Fill Time	38:50	mins	3:57	mins
Finish Build Up		hrs	00:41:44	hrs
Build Up Time		mins	7:50	mins
Tool Retract		hrs	00:41:44	hrs
Total Time		mins		mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	3860.0	psia	-	psia
Initial Form'n Press.	3371.5	psia	-	psia
Initial Flowing Press.	28	psia	125	psia
Final Flowing Press.	3368.99	psia	3369	psia
Final Formation Press.	-	psia	3371.0	psia
Final Hydrostatic	-	psia	3857.5	psia
C. TEMPERATURE				
Max. Tool Depth	2340	m	204.9	m
Max. Rec. Temp	197.8	deg F		deg F
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	04:45 hrs	9/ 4/87	04:45 hrs	9/ 4/87
Time since Circ.	hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	350	psig	320	psig
Amt Gas	-	cu ft	-	cu ft
Amt Oil	-	lit	-	lit
Amt Water (Total)	22.0	lit	3.75	lit
Amt Others	-	lit	-	lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1		ppm		ppm
C2		ppm		ppm
C3		ppm		ppm
C4		ppm		ppm
C5		ppm		ppm
C6+		ppm		ppm
CO2/H2S	No H2S	%/ppm	No H2S	%/ppm
Oil Properties	deg API@	deg C	deg API@	deg C
Colour				
Fluorescence				
GOR				
Pour Point				
Water Properties				
Resistivity	0.232ohm-m @ 21	deg C	0.238ohm-m @ 20	deg C
NaCl Equivalent	27,600	ppm	27,400	ppm
Cl-titrated	19,000	ppm	18,500	ppm
Tritium	2789	DPM	2240	DPM
pH / Ca++ ppm	7.0 / 180		7.0 / 200	
Est. Water Type	mostly filtrate		filtrate + formation H20	
F. MUD FILTRATE PROPERTIES				
Resistivity	0.214ohm-m @ 17	deg C	0.214ohm-m @ 17	deg C
NaCl Equivalent	31,500	ppm	31,500	ppm
Cl-titrated	19,500	ppm	19,500	ppm
pH	10.6		10.6	
Tritium (in Mud)	2800 - 3000	DPM	2800 - 3000	DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6	ppg	9.6	ppg
Calc. Hydrostatic	3823	psig	3823	psi
Serial No. (Preserved)	-		-	
Choke Size/Probe Type	1x30/1000/Martineau		1x30/1000/Martineau	
REMARKS				

RFT SAMPLE TEST REPORT

Well : KIPPER-2

OBSERVER : V. BINNS   DATE : 11/4/87   RUN NO. : 7

	CHAMBER 1 (22.8 lit.)		CHAMBER 2 (3.8 lit.)	
SEAT NO.	7/31			
DEPTH	2277.2	mKB	2277.3	mKB
A. RECORDING TIMES				
Tool Set	03:12:00	hrs	-	hrs
Chamber Open	03:14:45	hrs	03:22:30	hrs
Chamber Full	03:20:40	hrs	03:23:40	hrs
Fill Time	5:55	mins	1:10	mins
Finish Build Up	-	hrs	03:25:00	hrs
Build Up Time	-	mins	2:30	mins
Tool Retract	-	hrs	03:27:00	hrs
Total Time	-	mins	15.00	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	3766.0	psia	-	psia
Initial Form'n Press.	3332.7	psia	-	psia
Initial Flowing Press.	3000.0	psia	3169.0	psia
Final Flowing Press.	3225.0	psia	3200.0	psia
Final Formation Press.	-	psia	3330.5	psia
Final Hydrostatic	-	psia	3764.6	psia
C. TEMPERATURE				
Max. Tool Depth	2310	m	2310	m
Max. Rec. Temp	188.5	deg F	194.0	deg C
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	04:45 hrs	09/04/87	04:45 hrs	09/04/87
Time since Circ.	hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	2050	psia		psia
Amt Gas	123.8	cu ft		cu ft
Amt Oil	-	lit		lit
Amt Water (Total) mf	0.75	lit		lit
Amt Others: Condensate	0.5	lit		lit
E. SAMPLE PROPERTIES				
Gas Composition			PRESERVED SAMPLE	
C1	21.167%	ppm		ppm
C2	6.562%	ppm		ppm
C3	1.841%	ppm		ppm
C4	0.601%	ppm		ppm
C5	0.09%	ppm		ppm
C6+	N. MEASURED	ppm		ppm
CO2/H2S	NO H2S	%/ppm		%/ppm
Oil Properties	57 deg API@ 22.5deg C		deg API@	deg C
Colour	CLEAR PALE GREEN			
Fluorescence	BRIGHT BLUE WHITE			
GOR				
Pour Point				
Water Properties				
Resistivity	.32 ohm-m @ 19	deg C	ohm-m @	deg C
NaCl Equivalent	20,000	ppm		ppm
Cl-titrated	14,500	ppm		ppm
Tritium	2325	DPM		DPM
pH/Ca++	7 - 8 / 300			
Est. Water Type	FILTRATE & FORMATION			
F. MUD FILTRATE PROPERTIES				
Resistivity	0.214ohm-m @ 17	deg C	0.214ohm-m @ 17	deg C
NaCl Equivalent	31,500	ppm	31,500	ppm
Cl-titrated	19,500	ppm	19,500	ppm
pH	10.6		10.6	
Tritium (in Mud)	3600-3800	DPM	3600-3800	DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6	ppg	9.6	ppg
Calc. Hydrostatic	3730	psi	3730	psi
Serial No. (Preserved)	-		RFS AD 1120	
Choke Size/Probe Type	1x40/1000/ MARTINEAU		1x30/1000/ MARTINEAU	
REMARKS	CALCULATED VIA PHENALPTHALENE			

RFT SAMPLE TEST REPORT

Well : Kipper-2

OBSERVER : V.J. Binns DATE : 11/4/87 RUN NO. : 8

	CHAMBER 1 (22.8 lit.)		CHAMBER 2 (3.8 lit.)	
SEAT NO.	8/32			
DEPTH	2321.2	mKB	2321.2	mKB
A. RECORDING TIMES				
Tool Set	6:38:21	hrs	-	hrs
Chamber Open	6:40:31	hrs	7:05:02	hrs
Chamber Full	7:03:00	hrs	7:09:04	hrs
Fill Time	22:29	mins	4:02	mins
Finish Build Up	-	hrs	7:11:15	hrs
Build Up Time	-	mins	6:13	mins
Tool Retract	-	hrs	7:12:06	hrs
Total Time	-	mins	-	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	3835.0	psia	-	psia
Initial Form'n Press.	3351.1	psia	-	psia
Initial Flowing Press.	26	psia	202	psia
Final Flowing Press.	2374.0	psia	608.78	psia
Final Formation Press.	-	psia	3351.1	psia
Final Hydrostatic	-	psia	3835.0	psia
C. TEMPERATURE				
Max. Tool Depth	2340	m	2340	m
Max. Rec. Temp	196.3	deg F	206.6	deg F
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	04:45 hrs	9/ 4/87	04:45 hrs	9/ 4/87
Time since Circ.	hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	420	psig	290	psig
Amt Gas	-	cu ft	-	cu ft
Amt Oil	-	lit	-	lit
Amt Water (Total)	20.8	lit	3.7	lit
Amt Others	-	lit	-	lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1		ppm		ppm
C2		ppm		ppm
C3		ppm		ppm
C4		ppm		ppm
C5		ppm		ppm
C6+		ppm		ppm
CO2/H2S		%/ppm		%/ppm
Oil Properties	deg API@	deg C	deg API@	deg C
Colour				
Fluorescence				
GOR				
Pour Point				
Water Properties				
Resistivity	0.241ohm-m @ 26	deg C	0.245ohm-m @ 24	deg C
NaCl Equivalent	23,500	ppm	24,500	ppm
Cl-titrated	18,800	ppm	19,000	ppm
Tritium	1830	DPM	1258	DPM
pH / Ca++ ppm	7-8 / 200		7-8 / 240	
Est. Water Type	fitrate/formation		formation	
F. MUD FILTRATE PROPERTIES				
Resistivity	0.214ohm-m @ 17	deg C	0.214ohm-m @ 17	deg C
NaCl Equivalent	31,500	ppm	31,500	ppm
Cl-titrated	19,500	ppm	19,500	ppm
pH	10.6		10.6	
Tritium (in Mud)	2800 - 3000	DPM	2800 - 3000	DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6	ppg	9.6	ppg
Calc. Hydrostatic	3802	psig	3802	psi
Serial No. (Preserved)	-		-	
Choke Size/Probe Type	1x30/1000/Martineau		1x.03/1000/Martineau	
REMARKS				

(2127F:16)

RFT SAMPLE TEST REPORT

Well : KIPPER-2

OBSERVER : V. BINNS DATE : 11/4/87 RUN NO. : 9

	CHAMBER 1 (22.8 lit.)		CHAMBER 2 (3.8 lit.)	
SEAT NO.	9/33		9/33	
DEPTH	2306.5	mKB	2306.5	mKB
A. RECORDING TIMES				
Tool Set	10:03:45	hrs	-	hrs
Chamber Open	10:06:00	hrs	11:08:30	hrs
Chamber Full	-	hrs	11:20:00	hrs
Fill Time	-	mins	11:30	mins
Finish Build Up	-	hrs	-	hrs
Build Up Time	-	mins	-	mins
Tool Retract	-	hrs	11:37:00*	hrs
Total Time	-	mins		mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	3815.0	psia	-	psia
Initial Form'n Press.	3341.5	psia	-	psia
Initial Flowing Press.	50.2	psia	449.0	psia
Final Flowing Press.	1522.0	psia	3200.0	psia
Final Formation Press.	-	psia	-	psia
Final Hydrostatic	-	psia	3811.0	psia
C. TEMPERATURE				
Max. Tool Depth	2340	m	2340	m
Max. Rec. Temp	191.0	deg F	202.0	deg F
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	04:45 hrs	09/04/87	04:45 hrs	09/04/87
Time since Circ.	hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	1200	psia		psia
Amt Gas	34.4	cu ft		cu ft
Amt Oil Cond.	9.25	lit		lit
Amt Water (Total) mf	4.0	lit		lit
Amt Others	-	lit		lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1	20.269%	ppm		ppm
C2	7.935%	ppm		ppm
C3	3.073%	ppm		ppm
C4	0.860%	ppm		ppm
C5	0.054%	ppm		ppm
C6+	-	ppm		ppm
CO2/H2S	-	%/ppm		%/ppm
Oil Properties	34 deg API@ 26.1	deg C	deg API@	deg C
Colour	TAN BROWN			
Fluorescence	PALE YELL/WHITE(BRIGHT)			
GOR				
Pour Point				
Water Properties				
Resistivity	.235 ohm-m @ 21	deg C	ohm-m @	deg C
NaCl Equivalent	27,500	ppm		ppm
Cl-titrated	19,500	ppm		ppm
Tritium	3,332	DPM		DPM
pH/Ca++ ppm	7-8/280			
Est. Water Type	FILTRATE			
F. MUD FILTRATE PROPERTIES				
Resistivity	0.214ohm-m @ 17	deg C	ohm-m @	deg C
NaCl Equivalent	31,500	ppm		ppm
Cl-titrated	19,500	ppm		ppm
pH	10.6			
Tritium (in Mud)	2800-3000	DPM		DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6	ppg	9.6	ppg
Calc. Hydrostatic	3778	psi	3778	psi
Serial No. (Preserved)	-		-	
Choke Size/Probe Type	1x.03/ MARTINEAU		1x.03/ MARTINEAU	
REMARKS	* 6 Gal reopened after 1 Gal filled		RFS.ad.1123	

PRESERVED SAMPLE

Appendix 4

APPENDIX 4

GEOCHEMICAL REPORT

GEOCHEMICAL REPORT
KIPPER-2 WELL, GIPPSLAND BASIN
AUSTRALIA

by

B.J. Burns

Sample handling and Analyses by:

- H. Schiller) ESSO AUSTRALIA LTD.
- M. Sparke)
- D. Ford

Esso Australia Ltd. 9/9/87

Geochemical Report

2822L:1

List of Illustrations

KIPPER-2

INTRODUCTION

Canned cuttings and side-wall cores from the Kipper-2 well Gippsland Basin were analysed for their geochemical characteristics in order to determine the hydrocarbon source potential of the drilled section. Canned cuttings were recovered at 15-metre intervals from 1500m KB to total depth (T.D.) at 2600.5m KB.

Alternate 15-metre intervals were analyzed for headspace C_{1-4} hydrocarbon gases. Selected sidewall cores were analyzed for total organic carbon (TOC), Rock-Eval pyrolysis yields and kerogen elemental analysis. Visual kerogen descriptions were carried out by M.J. Hannah of Esso Australia Ltd. Selected sidewall cores were sent to Prof. A.C. Cook at Wollongong for vitrinite reflectance. Four oils recovered from wireline testing were analyzed for API gravity and two representative samples for whole oil gas chromatography. One sample was analysed for biomarkers by GCMS and in addition the di- and tri-aromatic fractions were separated and analysed by gas chromatography.

The results of these analyses are listed in Tables 1 through 8 and graphically displayed in Figures 1 through 10.

DISCUSSION OF RESULTS AND INTERPRETATIONS

RICHNESS

C_{1-4} headspace cuttings gas yields (Table 1, Figure 1a) are poor to fair throughout the Upper L. balmei section down to 1810mKB and fair to good over the remainder of the Latrobe Group sediments. If indigenous, these yields are considered indicative of the hydrocarbon source potential of the sedimentary section. The Total Organic Carbon (TOC) values (Table 2, Fig. 2) are unusually low for the Eocene P. asperopolus zone but for the remainder of the section down to Total Depth of 2600mKB the values are more typically 1-3% with the occasional higher values encountered in the more carbonaceous or coaly shales. The T. apoxyexinus zone from 2444mKB to 2580.1mKB shows a very consistant lithology (dark grey-black siltstone) with an average TOC of 2.52% and is rated as quite rich. However, as will be seen below, it appears to be mainly gas prone.

HYDROCARBON TYPES

The Rockeval Hydrogen Indices (HI), with only a few isolated exceptions, are very low over the entire Latrobe Group sequence. Only those samples at 1699.5mKB, 1944mKB, and 2235.6mKB (Table 3) have HI's greater than 200 which is considered the lower limit for oil generation. The rest of the section would be gas generative. Of particular interest is the T. apoxyexinus section from 2444mKB to 2580.1mKB which has the very rich TOC values (av. 2.52%) but Hydrogen Indices less than 90. Even allowing for a decrease in HI with increasing maturity, these samples are considered unlikely to have had original HI's greater than 100-150 and so this rich zone only represents a potential gas source (Fig. 3). In this respect the T. apoxyexinus zone in Kipper-2 is similar to the P. mawsonii zone in Kipper-1, representing a continuation of the same depositional environment at this time.

Elemental analysis of the kerogens (Table 4, Fig. 4) indicates a dominant Type III kerogen in all samples confirming their rating as potential gas producers.

MATURITY

The Vitrinite vs Depth profile (Fig. 5) shows a steady increase in R_V with depth to a maximum of 0.7% at Total Depth indicating that the entire section penetrated is immature and only just entering the transitional stage prior to significant hydrocarbon generation. Rockeval Tmax values (Table 3a) are all less than 435^{o}C confirming the low maturity level.

OIL ANALYSIS

Four oil samples were recovered on wireline testing over the interval 2305.2-2318.4mKB and the measured API gravities (Table 6) ranged from 40.4^{o} to 48.1^{o}. However the 48.1^{o} API sample at 2305.2m was collected just above the gas-oil contact at 2306m and we believe the higher API value is the result of mixing of oil and condensate. The representative value for the oil should be from 40.4 - 42.9^{o} API.

The oil from 2318.4mKB was analysed in more detail and the C_{15+} compositional breakdown is listed in Table 7 which shows a typical Gippsland composition, dominated by "Saturates" and with only minor quantities of high molecular weight asphaltenes. The "Whole Oil" chromatogram (Fig. 6) shows the oil to be dominated by n-alkanes with a bimodal distribution maximising at C_{15} and C_{25} and with only a moderate amount of light C_{8-10} gasoline components.

The same pattern is seen for the oil at 2308mKB (Figure 7). These oils are quite different from the oils and condensates encountered in Kipper-1, all of which were dominated by the light gasoline components. The relatively low amount of gasolines in the Kipper-2 oils is unexpected considering the large 'wet' gas cap above it. Most Gippsland oils that are in association with gas caps tend to have quite dominant gasoline components.

The sulphur content of the Kipper-2 oil, 2318.4mKB, is quite low and the FPD trace (Fig 8) shows that it is comprised mainly of a single unidentified sulphur bearing component.

The maturity at which the oil was generated can be estimated from several maturity sensitive biomarker ratios listed in Table 8. The sterane C_{29} 20S/(20S + 20R) ratio of 0.50 has not quite reached equilibrium and indicates an equivalent vitrinite of Rv 0.65%. This is considerably lower than the values estimated from the iso-sterane C_{29} IS/(IS+RS) ratio (R_V = 0.86) and the Methylphenanthrene Index MPI (R_V = 0.78). In this case, and for consistancy with other Gippsland oils, we prefer the MPI method of estimating the maturity of the Kipper-2, 2318.4m, oil, i.e. R_V = 0.78.

Information regarding the nature of the kerogen from which the oil was derived comes from several sources.

a) The predominance of high molecular weight paraffins indicates terrestrial higher plant source material.

b) The dominance of the C_{29} steranes (in m/e 218) over the C_{27} and C_{28} steranes (Table 1) clearly supports the higher plant input.

c) The Pristane/Phytane (Pr/Ph) ratio of 6.39 is similar to many other Gippsland oils (e.g. Remora-1) and indicates the relatively more oxidising environment typical of terrestrial source rocks.

d) The presence of biomarkers derived from plant resins, e.g. retene in the tri-aromatic fraction and the di-aromatics cadalene and agathalene (Fig 9), further support input from higher plant sources.

It is interesting to note the difference in estimated maturities for the Kipper-2 oil, at 2318-4m, (Rv=0.78 from biomarkers) and the associated Kipper-1 gas (Rv=1.6 estimated from isotopic analysis [see Kipper-1 Well Completion Report].) Clearly the gas and the oil have been generated from intervals of widely different maturities and have migrated separately into the trap.

Conclusions:

1. The Latrobe Group shales in Kipper-2 constitute fair to good source rocks but most are considered to be gas prone.

2. The section is immature to Total Depth.

3. The T.apoxyexinus zone in Kipper-2 has the same source character (i.e. uniform rich gas-prone kerogen) as the P. mawsonii zone in Kipper-1 suggesting a similar depositional environment such as a large lake.

4. The oil encountered below the main gas cap has an indicated maturity of Rv = 0.78 which is much lower than the gas maturity of Rv = 1.6 (from Kipper-1) indicating that the source has probably generated hydrocarbons from two distinct intervals at different positions downdip.

2822L/0

Table 1 C1-4 HYDROCARBON ANALYSIS 14:21 MONDAY, AUGUST 31, 1987

BASIN=GIPPSLAND WELL=KIPPER 2

SAMP_NO	DEPTH	METHANE C1	ETHANE C2	PROPANE C3	IBUTANE 1C4	NBUTANE NC4	WET C2-C4	TOTAL C1-C4	WET/TOTAL PERCENT	TOT M	TOT E	TOT P	TOT IB	TOT NB	WET E	WET P	WET IB	WET NB
78100 B	1570.00	1841	140	226	140	187	693	2534	27	73	6	9	6	7	20	33	20	27
78100 D	1600.00	1914	469	106	6	4	585	2499	23	77	19	4	0	0	80	18	1	1
78100 F	1630.00	3025	547	168	32	32	779	3804	20	80	14	4	1	1	70	22	4	4
78100 H	1660.00	24803	3535	899	89	64	4587	29390	16	84	12	3	0	0	77	20	2	1
78100 J	1690.00	5884	701	193	22	17	933	6817	14	86	10	3	0	0	75	21	2	2
78100 L	1720.00	7904	611	142	17	12	782	8686	9	91	7	2	0	0	78	18	2	2
78100 N	1750.00	18325	2475	515	45	38	3073	21398	14	86	12	2	0	0	81	17	1	1
78100 P	1780.00	1055	1214	370	36	27	1647	2702	61	39	45	14	1	1	74	22	2	2
78100 R	1810.00	11127	1908	810	115	139	2972	14099	21	79	14	6	1	1	64	27	4	5
78100 T	1840.00	890	237	102	14	16	369	1259	29	71	19	8	1	1	64	28	4	4
78100 V	1870.00	451	148	83	17	16	264	715	37	63	21	12	2	2	56	31	6	6
78100 X	1900.00	560	577	536	102	139	1354	1914	71	29	30	28	5	7	43	40	8	10
78100 Z	1930.00	448	269	293	66	102	730	1178	62	38	23	25	6	9	37	40	9	14
78101 B	1960.00	28054	7459	3100	390	461	11410	39464	29	71	19	8	1	1	65	27	3	4
78101 D	1990.00	2495	737	392	88	94	1311	3806	34	66	19	10	2	2	56	30	7	7
78101 F	2020.00	966	428	267	34	57	786	1752	45	55	24	15	2	3	54	34	4	7
78101 H	2050.00	271	117	65	18	25	225	496	45	55	24	13	4	5	52	29	8	11
78101 J	2080.00	139	66	80	19	25	190	329	58	42	20	24	6	8	35	42	10	13
78101 L	2110.00	493	288	202	46	73	609	1102	55	45	26	18	4	7	47	33	8	12
78101 N	2140.00	11	8	10	2	3	23	34	68	32	24	29	6	9	35	43	9	13
78101 P	2170.00	0	0	0	0	0	0	0										
78101 R	2200.00	25	9	8	3	8	28	53	53	47	17	15	6	15	32	29	11	29
78101 T	2245.00	1410	834	851	182	261	2128	3538	60	40	24	24	5	7	39	40	9	12
78101 V	2275.00	2536	698	461	73	122	1354	3890	35	65	18	12	2	3	52	34	5	9
78101 X	2305.00	142	39	29	8	6	82	224	37	63	17	13	4	3	48	35	10	7
78101 Z	2335.00	268	88	55	15	16	174	442	39	61	20	12	3	4	51	32	9	9
78102 B	2365.00	1125	308	107	10	11	436	1561	28	72	20	7	1	1	71	25	2	3
78102 D	2395.00	130	49	21	4	3	77	207	37	63	24	10	2	1	64	27	5	4
78102 F	2425.00	1367	346	81	11	4	442	1809	24	76	19	4	1	0	78	18	2	1
78102 H	2455.00	177	85	24	10	8	127	304	42	58	28	8	3	3	67	19	8	6
78102 J	2485.00	2298	442	102	18	7	569	2867	20	80	15	4	1	0	78	18	3	1
78102 L	2515.00	1655	108	30	10	7	155	1810	9	91	6	2	1	0	70	19	6	5
78102 N	2545.00	364	114	85	17	10	226	590	38	62	19	14	3	2	50	38	8	4
78102 P	2570.00	32	1	1	0	0	2	34	6	94	3	3	0	0	50	50	0	0
78102 R	2600.00	0	0	0	0	0	0	0										

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Table 2 TOTAL ORGANIC CARBON REPORT

BASIN - GIPPSLAND
WELL - KIPPER 2

SAMPLE NO.	DEPTH	AGE	FORMATION	AN	TOC%	AN	TOC%	AN	CO3%	DESCRIPTION
78089 L	1523.90	P. TUBERCULATUS	SEASPRAY GROUP	1	0.34		0.00	1	47.33	OL-GY SH,V CALC
78089 K	1531.00	P. TUBERCULATUS	SEASPRAY GROUP	1	0.20		0.00	1	73.66	M GY SLTST,QTZ,V CALC
78089 J	1538.10	P. TUBERCULATUS	SEASPRAY GROUP	1	0.28		0.00	1	52.71	DK GY SLTST,QTZ,V CALC
78089 I	1544.00	L.N. ASPERUS	LATROBE GP/GURNARD FM	1	0.77		0.00	1	11.67	GY-BRN SLTST,SDY
78089 H	1550.10	P. ASPEROPOLUS	LATROBE GROUP	1	0.73		0.00	1	5.32	M GY SLTST,SDY,SL CALC
78089 G	1555.10	P. ASPEROPOLUS	LATROBE GROUP	1	0.85		0.00	1	4.80	LT-M GY SLTST,SDY,CALC
78089 E	1577.00	L.M. DIVERSUS	LATROBE GROUP	1	0.74		0.00	1	4.46	LT-M GY SLTST
78089 A	1623.50	U.L. BALMEI	LATROBE GROUP	1	1.19		0.00	1	4.63	M GY SLTST
78088 Z	1652.50	U.L. BALMEI	LATROBE GROUP	1	2.30		0.00	1	4.56	GYISH BLK SH,QTZ
78088 Y	1675.50	U.L. BALMEI	LATROBE GROUP	1	1.04		0.00	1	7.71	DK GY SLTST,SDY LAM
78088 X	1699.50	U.L. BALMEI	LATROBE GROUP	1	8.49		0.00	1	4.41	BLK SH,GLAUC,QTZ
78088 W	1723.50	U.L. BALMEI	LATROBE GROUP	1	0.59		0.00	1	3.61	LT GY SLTST,SDY,QTZ,CALC
78088 V	1742.50	U.L. BALMEI	LATROBE GROUP	1	1.32		0.00	1	3.04	BRN-GY SLTST,QTZ,MICA
78088 S	1809.50	U.L. BALMEI	LATROBE GROUP	1	1.27		0.00	1	2.73	DK GY SLTST,SDY,QTZ
78088 R	1871.50	L.L. BALMEI	LATROBE GROUP	1	1.11		0.00	1	8.34	M GY SDY SLTST,QTZ
78088 Q	1880.60	U.T. LONGUS	LATROBE GROUP	1	2.34		0.00	1	6.61	BLK-WHT SLTST,V CARB
78088 P	1888.00	U.T. LONGUS	LATROBE GROUP	1	1.00		0.00	1	4.36	LT GY SDY SLTST
78088 M	1944.00	U.T. LONGUS	LATROBE GROUP	1	6.86		0.00	1	3.21	BLK SH,COAL LAM,V CARB
78088 K	1969.00	L.T. LONGUS	LATROBE GROUP	1	2.13		0.00	1	6.36	DK GY-BLK SLTST
78088 J	1982.50	L.T. LONGUS	LATROBE GROUP	1	7.25		0.00	1	6.69	LT GY-BLK SLTST,V CARB
78088 I	1999.00	L.T. LONGUS	LATROBE GROUP	1	0.89		0.00	1	3.43	BRN-GY SLTST,QTZ,SDY
78088 G	2030.00	L.T. LONGUS	LATROBE GROUP	1	2.66		0.00	1	4.48	DK GY SLTST,CARB LAM
78088 F	2041.50	L.T. LONGUS	LATROBE GROUP	1	1.01		0.00	1	4.98	M GY SLTST
78087 Z	2235.60	N. SENECTUS	LATROBE GROUP	1	1.68		0.00	1	2.55	M-DK GY CLYST,CARB
78087 Y	2242.10	N. SENECTUS	LATROBE GROUP	1	0.62		0.00	1	4.98	M GY CLYST
78087 U	2364.40	T. APOXYEXINUS	LATROBE GROUP	1	0.29		0.00	1	16.06	M-DK GY SLTST,QTZ,CALC
78087 R	2413.50	T. APOXYEXINUS	LATROBE GROUP	1	0.54		0.00	1	5.11	M-DK GY SLTST
78087 Q	2444.00	T. APOXYEXINUS	LATROBE GROUP	1	2.23		0.00	1	9.36	DK GY SLTST,QTZ
78087 P	2461.00	T. APOXYEXINUS	LATROBE GROUP	1	2.92		0.00	1	7.83	DK GY SLTST,QTZ
78087 N	2491.00	T. APOXYEXINUS	LATROBE GROUP	1	3.14		0.00	1	6.14	DK GY SLTST,SDY
78087 M	2503.50	T. APOXYEXINUS	LATROBE GROUP	1	1.95		0.00	1	9.95	DK GY-BLK SLTST
78087 L	2517.00	T. APOXYEXINUS	LATROBE GROUP	1	2.86		0.00	1	5.21	DK GY-BLK SLTST
78087 K	2528.50	T. APOXYEXINUS	LATROBE GROUP	1	1.45		0.00	1	9.99	DK GY SLTST,QTZ,SL CALC
78087 J	2544.10	T. APOXYEXINUS	LATROBE GROUP	1	2.04		0.00	1	7.00	DK GY-BLK SLTST
78087 H	2580.10	T. APOXYEXINUS	LATROBE GROUP	1	3.60		0.00	1	10.21	DK GY-BLK SLTST

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ROCKEVAL ANALYSES

BASIN - GIPPSLAND
WELL - KIPPER 2

Table 3a REPORT A - PYROLYZABLE CARBON

SAMPLE NO.	DEPTH	SAMPLE TYPE	AGE	TMAX	S1	S2	S3	PI	S2/S3	PC	COMMENTS
78089 A	1623.50	CRSW	U.L. BALMEI	406	0.04	0.51	0.06	0.07	8.83	0.05	
78088 Z	1652.50	CRSW	U.L. BALMEI	411	0.22	2.93	0.15	0.07	19.19	0.26	
78088 Y	1675.50	CRSW	U.L. BALMEI	411	0.04	0.73	0.06	0.05	11.29	0.06	
78088 X	1699.50	CRSW	U.L. BALMEI	415	0.96	17.26	1.21	0.05	14.22	1.51	
78088 V	1742.50	CRSW	U.L. BALMEI	411	0.05	1.15	0.43	0.04	2.70	0.10	
78088 S	1809.50	CRSW	U.L. BALMEI	413	0.05	0.77	0.36	0.06	2.14	0.07	
78088 R	1871.50	CRSW	L.L. BALMEI	409	0.05	0.30	0.28	0.13	1.06	0.03	LOW S2
78088 Q	1880.60	CRSW	U.T. LONGUS	405	0.15	1.51	0.68	0.09	2.22	0.14	
78088 P	1888.00	CRSW	U.T. LONGUS	419	0.05	0.22	0.00	0.18		0.02	LOW S2
78088 M	1944.00	CRSW	U.T. LONGUS	431	0.84	20.03	1.63	0.04	12.32	1.73	
78088 K	1969.00	CRSW	L.T. LONGUS	416	0.10	1.13	0.60	0.08	1.89	0.10	
78088 J	1982.50	CRSW	L.T. LONGUS	431	0.84	3.84	1.52	0.18	2.52	0.39	
78088 G	2030.00	CRSW	L.T. LONGUS	423	0.41	5.22	0.51	0.07	10.32	0.47	
78088 F	2041.50	CRSW	L.T. LONGUS	420	0.10	0.88	0.18	0.11	4.89	0.08	
78087 Z	2235.60	CRSW	N. SENECTUS	421	0.41	4.56	0.36	0.08	12.65	0.41	
78087 Q	2444.00	CRSW	T. APOXYEXINUS	430	0.09	1.99	0.24	0.04	8.42	0.17	
78087 P	2461.00	CRSW	T. APOXYEXINUS	429	0.08	2.02	0.25	0.04	8.11	0.17	
78087 N	2491.00	CRSW	T. APOXYEXINUS	429	0.09	1.48	0.20	0.06	7.52	0.13	
78087 M	2503.50	CRSW	T. APOXYEXINUS	423	0.06	0.77	0.15	0.08	5.00	0.07	
78087 L	2517.00	CRSW	T. APOXYEXINUS	424	0.09	1.92	0.61	0.05	3.17	0.17	
78087 K	2528.50	CRSW	T. APOXYEXINUS	422	0.05	0.67	0.00	0.06		0.06	
78087 J	2544.10	CRSW	T. APOXYEXINUS	420	0.05	0.46	0.13	0.09	3.50	0.04	LOW S2
78087 H	2580.10	CRSW	T. APOXYEXINUS	425	0.18	1.27	0.22	0.12	5.87	0.12	

PI=PRODUCTIVITY INDEX PC=PYROLYZABLE CARBON TC=TOTAL CARBON HI=HYDROGEN INDEX OI=OXYGEN INDEX

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ESSO AUSTRALIA LTD.

ROCKEVAL ANALYSES

BASIN - GIPPSLAND
WELL - KIPPER 2

Table 3b REPORT B - TOTAL CARBON, H/O INDICES

SAMPLE NO.	DEPTH	SAMPLE TYPE	FORMATION	TC	HI	OI	HI/OI	COMMENTS
78089 A	1623.50	CRSW	LATROBE GROUP	1.19	42	3	13.25	
78088 Z	1652.50	CRSW	LATROBE GROUP	2.30	127	10	13.35	
78088 Y	1675.50	CRSW	LATROBE GROUP	1.04	70	4	19.75	
78088 X	1699.50	CRSW	LATROBE GROUP	8.49	203	11	18.06	
78088 V	1742.50	CRSW	LATROBE GROUP	1.32	87	4	23.80	
78088 S	1809.50	CRSW	LATROBE GROUP	1.27	61	4	15.80	
78088 R	1871.50	CRSW	LATROBE GROUP	1.11	27	4	6.60	LOW S2
78088 Q	1880.60	CRSW	LATROBE GROUP	2.34	65	6	10.12	
78088 P	1888.00	CRSW	LATROBE GROUP	1.00	22	5	4.60	LOW S2
78088 M	1944.00	CRSW	LATROBE GROUP	6.86	292	12	23.78	
78088 K	1969.00	CRSW	LATROBE GROUP	2.13	53	5	11.00	
78088 J	1982.50	CRSW	LATROBE GROUP	7.25	53	12	4.57	
78088 G	2030.00	CRSW	LATROBE GROUP	2.66	196	15	12.72	
78088 F	2041.50	CRSW	LATROBE GROUP	1.01	87	10	8.45	
78087 Z	2235.60	CRSW	LATROBE GROUP	1.68	271	24	11.14	
78087 Q	2444.00	CRSW	LATROBE GROUP	2.23	89	4	21.90	
78087 P	2461.00	CRSW	LATROBE GROUP	2.92	69	3	24.33	
78087 N	2491.00	CRSW	LATROBE GROUP	3.14	47	3	15.80	
78087 M	2503.50	CRSW	LATROBE GROUP	1.95	39	3	12.14	
78087 L	2517.00	CRSW	LATROBE GROUP	2.86	67	3	20.30	
78087 K	2528.50	CRSW	LATROBE GROUP	1.45	46	3	14.80	
78087 J	2544.10	CRSW	LATROBE GROUP	2.04	22	2	9.80	LOW S2
78087 H	2580.10	CRSW	LATROBE GROUP	3.60	35	5	7.05	

PI=PRODUCTIVITY INDEX PC=PYROLYZABLE CARBON TC=TOTAL CARBON HI=HYDROGEN INDEX OI=OXYGEN INDEX

31/08/87 ESSO AUSTRALIA LTD.

Table 4a KEROGEN ELEMENTAL ANALYSIS REPORT

BASIN - GIPPSLAND
WELL - KIPPER 2

SAMPLE NO.	DEPTH	SAMPLE TYPE	N%	C%	H%	S%	O%	ASH%	COMMENTS
			--- ELEMENTAL % (ASH FREE) ---						
78089 I	1544.00	KEROGEN	1.21	62.20	4.59	0.00	32.01	3.02	
78089 H	1550.10	KEROGEN	1.67	64.59	4.93	0.00	28.80	7.99	
78089 G	1555.10	KEROGEN	1.92	65.13	5.69	0.00	27.25	8.42	
78089 F	1565.00	KEROGEN	1.18	62.17	4.57	0.00	32.08	3.03	
78089 E	1577.00	KEROGEN	1.15	63.67	4.79	0.00	30.39	0.60	
78089 B	1603.00	KEROGEN	1.16	66.23	5.31	0.00	27.31	6.14	
78089 A	1623.50	KEROGEN	0.42	68.48	4.45	0.00	26.65	7.62	
78088 Z	1652.50	KEROGEN	0.90	60.77	5.19	0.00	33.13	5.29	
78088 X	1699.50	KEROGEN	0.78	70.00	5.37	0.00	23.85	6.20	
78088 V	1742.50	KEROGEN	0.87	68.16	4.64	0.00	26.33	6.98	
78088 U	1754.00	KEROGEN	1.12	64.81	5.53	0.00	30.56	3.05	
78088 S	1809.50	KEROGEN	0.97	71.80	4.55	0.00	22.68	5.12	
78088 Q	1880.60	KEROGEN	0.82	72.82	4.25	0.00	22.11	7.77	
78088 P	1888.00	KEROGEN	1.19	75.68	4.18	0.00	18.95	0.74	
78088 M	1944.00	KEROGEN	1.25	74.79	6.06	0.00	17.90	4.60	
78088 L	1954.00	KEROGEN	1.13	74.31	4.61	0.00	19.94	3.92	
78088 K	1969.00	KEROGEN	0.68	74.72	4.05	0.00	20.55	6.14	
78088 J	1982.50	KEROGEN	1.04	75.35	4.02	0.00	19.59	1.55	
78088 I	1999.00	KEROGEN	0.79	70.05	4.82	0.00	24.34	8.89	
78088 H	2015.50	KEROGEN	1.35	74.59	4.86	0.00	19.21	6.39	
78088 G	2030.00	KEROGEN	0.79	71.37	5.34	0.00	22.49	4.00	
78088 F	2041.50	KEROGEN	1.44	77.51	4.84	0.00	16.21	4.25	
78088 E	2055.10	KEROGEN	1.17	72.78	5.48	0.00	20.58	6.15	
78087 Z	2235.60	KEROGEN	0.39	74.38	5.90	0.00	19.33	9.87	
78087 Y	2242.10	KEROGEN	1.17	78.46	4.29	0.00	16.08	7.94	
78103 E	2314.53	KEROGEN	1.33	76.78	4.93	0.00	16.96	0.49	
78103 D	2330.00	KEROGEN	1.12	75.19	5.37	0.00	18.33	5.13	
78087 S	2403.60	KEROGEN	0.47	74.55	3.65	0.00	21.33	0.13	
78089 M	2439.00	KEROGEN	1.82	73.32	3.99	0.00	20.86	0.81	
78087 Q	2444.00	KEROGEN	1.45	78.51	4.31	0.00	15.73	2.14	
78087 P	2461.00	KEROGEN	2.00	79.63	4.28	0.00	14.08	1.66	
78087 O	2475.00	KEROGEN	2.04	71.46	4.74	0.00	21.76	4.04	
78087 N	2491.00	KEROGEN	1.17	77.03	3.96	0.00	17.83	5.39	
78087 M	2503.50	KEROGEN	3.04	78.37	3.93	0.00	14.65	2.13	
78087 L	2517.00	KEROGEN	1.78	74.29	4.73	0.00	19.21	6.04	
78087 K	2528.50	KEROGEN	1.81	76.14	4.44	0.00	17.62	5.88	
78087 J	2544.10	KEROGEN	1.36	77.94	3.84	0.00	16.87	5.09	
78087 I	2564.00	KEROGEN	1.77	78.05	4.39	0.00	15.79	3.70	
78087 H	2580.10	KEROGEN	1.69	70.86	4.83	0.00	22.62	9.06	
78087 G	2590.10	KEROGEN	1.22	77.20	3.99	0.00	17.58	5.99	
78089 N	2600.00	KEROGEN	1.32	75.01	3.65	0.00	20.03	4.34	

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Table 4b KEROGEN ELEMENTAL ANALYSIS REPORT

BASIN - GIPPSLAND
WELL - KIPPER 2

SAMPLE NO.	DEPTH	SAMPLE TYPE	AGE	FORMATION	ATOMIC RATIOS			COMMENTS
					H/C	O/C	N/C	
78089 I	1544.00	KEROGEN	L.N. ASPERUS	LATROBE GP/GURNARD FM	0.89	0.39	0.02	
78089 H	1550.10	KEROGEN	P. ASPEROPOLUS	LATROBE GROUP	0.92	0.33	0.02	
78089 G	1555.10	KEROGEN	P. ASPEROPOLUS	LATROBE GROUP	1.05	0.31	0.03	
78089 F	1565.00	KEROGEN	P. ASPEROPOLUS	LATROBE GROUP	0.88	0.39	0.02	
78089 E	1577.00	KEROGEN	L.M. DIVERSUS	LATROBE GROUP	0.90	0.36	0.02	
78089 B	1603.00	KEROGEN	U.L. BALMEI	LATROBE GROUP	0.96	0.31	0.02	
78089 A	1623.50	KEROGEN	U.L. BALMEI	LATROBE GROUP	0.78	0.29	0.01	
78088 Z	1652.50	KEROGEN	U.L. BALMEI	LATROBE GROUP	1.03	0.41	0.01	
78088 X	1699.50	KEROGEN	U.L. BALMEI	LATROBE GROUP	0.92	0.26	0.01	
78088 V	1742.50	KEROGEN	U.L. BALMEI	LATROBE GROUP	0.82	0.29	0.01	
78088 U	1754.00	KEROGEN	U.L. BALMEI	LATROBE GROUP	1.02	0.35	0.01	
78088 S	1809.50	KEROGEN	U.L. BALMEI	LATROBE GROUP	0.76	0.24	0.01	
78088 Q	1880.60	KEROGEN	U.T. LONGUS	LATROBE GROUP	0.70	0.23	0.01	
78088 P	1888.00	KEROGEN	U.T. LONGUS	LATROBE GROUP	0.66	0.19	0.01	
78088 M	1944.00	KEROGEN	U.T. LONGUS	LATROBE GROUP	0.97	0.18	0.01	
78088 L	1954.00	KEROGEN	U.T. LONGUS	LATROBE GROUP	0.74	0.20	0.01	
78088 K	1969.00	KEROGEN	L.T. LONGUS	LATROBE GROUP	0.65	0.21	0.01	
78088 J	1982.50	KEROGEN	L.T. LONGUS	LATROBE GROUP	0.64	0.20	0.01	
78088 I	1999.00	KEROGEN	L.T. LONGUS	LATROBE GROUP	0.83	0.26	0.01	
78088 H	2015.50	KEROGEN	L.T. LONGUS	LATROBE GROUP	0.78	0.19	0.02	
78088 G	2030.00	KEROGEN	L.T. LONGUS	LATROBE GROUP	0.90	0.24	0.01	
78088 F	2041.50	KEROGEN	L.T. LONGUS	LATROBE GROUP	0.75	0.16	0.02	
78088 E	2055.10	KEROGEN	L.T. LONGUS	LATROBE GROUP	0.90	0.21	0.01	
78087 Z	2235.60	KEROGEN	N. SENECTUS	LATROBE GROUP	0.95	0.19	0.00	
78087 Y	2242.10	KEROGEN	N. SENECTUS	LATROBE GROUP	0.66	0.15	0.01	
78103 E	2314.53	KEROGEN	T. APOXYEXINUS	LATROBE GROUP	0.77	0.17	0.01	
78103 D	2330.00	KEROGEN	T. APOXYEXINUS	LATROBE GROUP	0.86	0.18	0.01	
78087 S	2403.60	KEROGEN	T. APOXYEXINUS	LATROBE GROUP	0.59	0.21	0.01	
78089 M	2439.00	KEROGEN	T. APOXYEXINUS	LATROBE GROUP	0.65	0.21	0.02	
78087 Q	2444.00	KEROGEN	T. APOXYEXINUS	LATROBE GROUP	0.66	0.15	0.02	
78087 P	2461.00	KEROGEN	T. APOXYEXINUS	LATROBE GROUP	0.65	0.13	0.02	
78087 O	2475.00	KEROGEN	T. APOXYEXINUS	LATROBE GROUP	0.80	0.23	0.02	
78087 N	2491.00	KEROGEN	T. APOXYEXINUS	LATROBE GROUP	0.62	0.17	0.01	
78087 M	2503.50	KEROGEN	T. APOXYEXINUS	LATROBE GROUP	0.60	0.14	0.03	
78087 L	2517.00	KEROGEN	T. APOXYEXINUS	LATROBE GROUP	0.76	0.19	0.02	
78087 K	2528.50	KEROGEN	T. APOXYEXINUS	LATROBE GROUP	0.70	0.17	0.02	
78087 J	2544.10	KEROGEN	T. APOXYEXINUS	LATROBE GROUP	0.59	0.16	0.01	
78087 I	2564.00	KEROGEN	T. APOXYEXINUS	LATROBE GROUP	0.68	0.15	0.02	
78087 H	2580.10	KEROGEN	T. APOXYEXINUS	LATROBE GROUP	0.82	0.24	0.02	
78087 G	2590.10	KEROGEN	T. APOXYEXINUS	LATROBE GROUP	0.62	0.17	0.01	
78089 N	2600.00	KEROGEN	T. APOXYEXINUS	LATROBE GROUP	0.58	0.20	0.02	

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Table 5 VITRINITE REFLECTANCE REPORT

BASIN - GIPPSLAND
WELL - KIPPER 2

SAMPLE NO.	DEPTH	AGE	FORMATION	AN	MAX RV	FLUORESCENCE	COUNTS	MACERAL TYPE
78089 B	1603.00	U.L. BALMEI	LATROBE GROUP	5	0.38	GRN YEL-YEL	28	DOM SPARSE, V>E>I
78088 M	1944.00	U.T. LONGUS	LATROBE GROUP	5	0.45	YEL-OR-BRN	30	DOM ABUNDANT, E>V>I
78088 G	2030.00	L.T. LONGUS	LATROBE GROUP	5	0.50	YEL-OR	28	DOM ABUNDANT, V>E>I
78087 Z	2235.60	N. SENECTUS	LATROBE GROUP	5	0.51	YEL-OR,OR	27	DOM ABUNDANT, E>I>V
78087 Y	2242.10	N. SENECTUS	LATROBE GROUP	5	0.58	OR-DUL OR	20	DOM COMMON, I>V>E
78087 V	2267.60	N. SENECTUS	LATROBE GROUP	5	0.59	DUL OR,OR	26	DOM SPARSE-COMMON, V>I>E
78087 Q	2444.00	T. APOXYEXINUS	LATROBE GROUP	5	0.63	OR-DUL OR	30	DOM ABUNDANT
78087 H	2580.10	T. APOXYEXINUS	LATROBE GROUP	5	0.68	OR-DUL OR	28	DOM ABUNDANT, I>>V>E
78087 G	2590.10	T. APOXYEXINUS	LATROBE GROUP	5	0.69	OR-DUL OR	27	DOM ABUNDANT, I>V>E

ESSO AUSTRALIA LTD.

Table 6 OIL - API GRAVITY, POUR POINT & SULFUR %

BASIN - GIPPSLAND
WELL - KIPPER 2

SAMPLE NO.	DEPTH	AGE	FORMATION	AN	API GRAVITY	POUR POINT	SULFUR %	COMMENTS
78087 D	2305.20	N. SENECTUS	LATROBE GROUP	1	48.11			
78087 E	2306.50	N. SENECTUS	LATROBE GROUP	1	42.91			
78087 B	2308.00	N. SENECTUS	LATROBE GROUP	1	40.60			
78087 A	2318.40	T. APOXYEXINUS	LATROBE GROUP	1	40.35	35.00		

Table 7. CHROMATOGRAPHY SUMMARY

		PCT	NORMALIZED TO 100% RES OR EXT							INSOL AND LOSS FREE BASIS					
NUMBER	SAMPLE	RES/EXT	SAT	ARO	NSO	S	N-EL	ASPH	I+L	SAT	ARO	NSO	S	N-EL	ASPH
93918	Kipper-2 2318.4m	71.6423	75.3	14.4	3.8	0.0	2.1	2.5	1.9	76.8	14.7	3.9	0.0	2.1	2.5

Table 8. Biomarker Ratios, Kipper-2 Oil

	RFT 3 2318.4m
MATURITY PARAMETERS	
Sterane C_{29} 20S/(20S+20R)	0.50
Estimated R_V	0.65
Sterane C_{29} 1S/(IS+RS)	0.62
Estimated R_V	0.86
Hopane C_{32} 22S/(22S+22R)	0.55
Methylphenanthrene Index (tri-aromatics)	0.63
R_V calc. (MPI)	0.78
SOURCE PARAMETERS	
Pristane/Phytane	6.39
Sterane C_{27}: C_{28}:C_{29}	21:24:55

2819L:7

C_{1-4} CUTTINGS GAS LOG

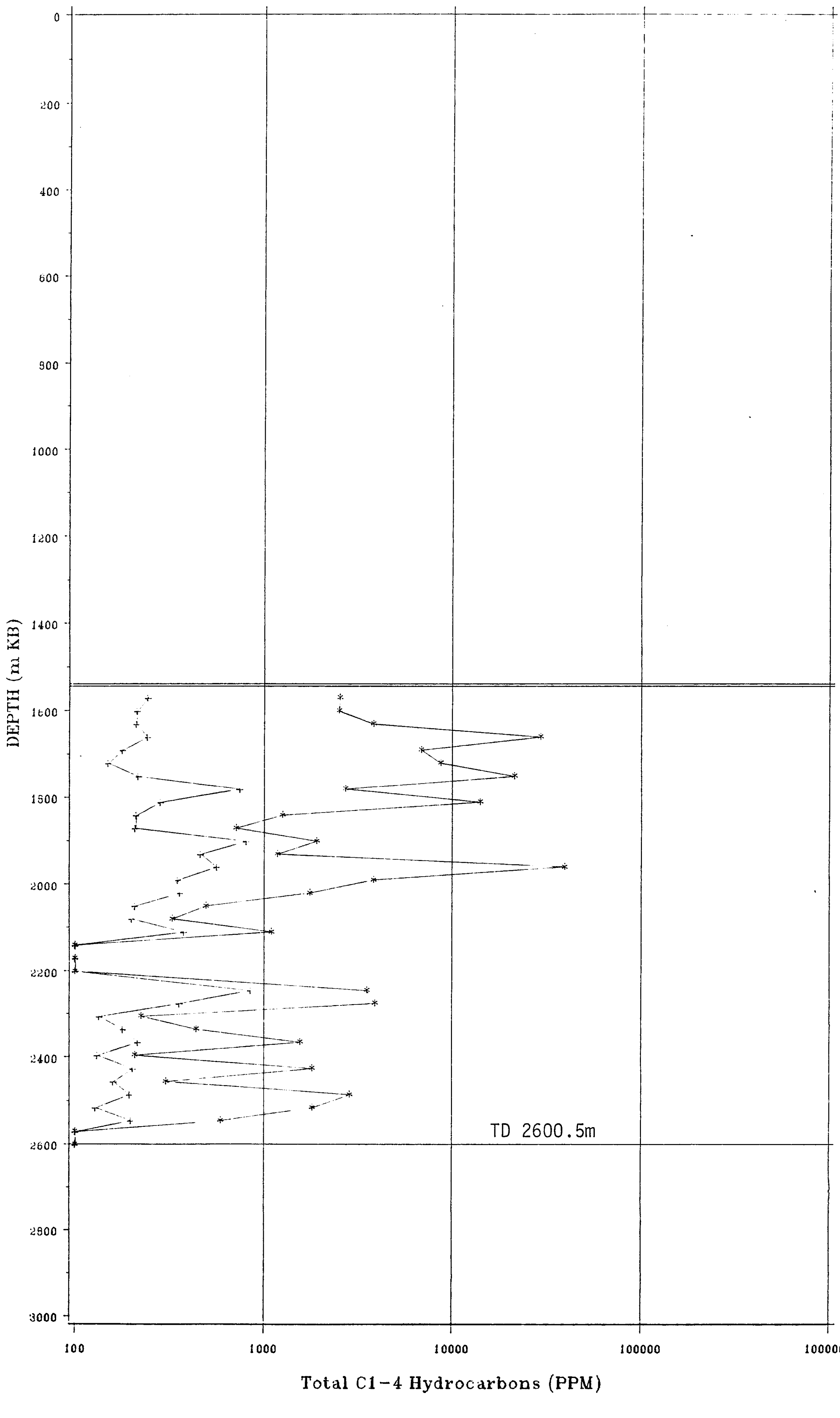
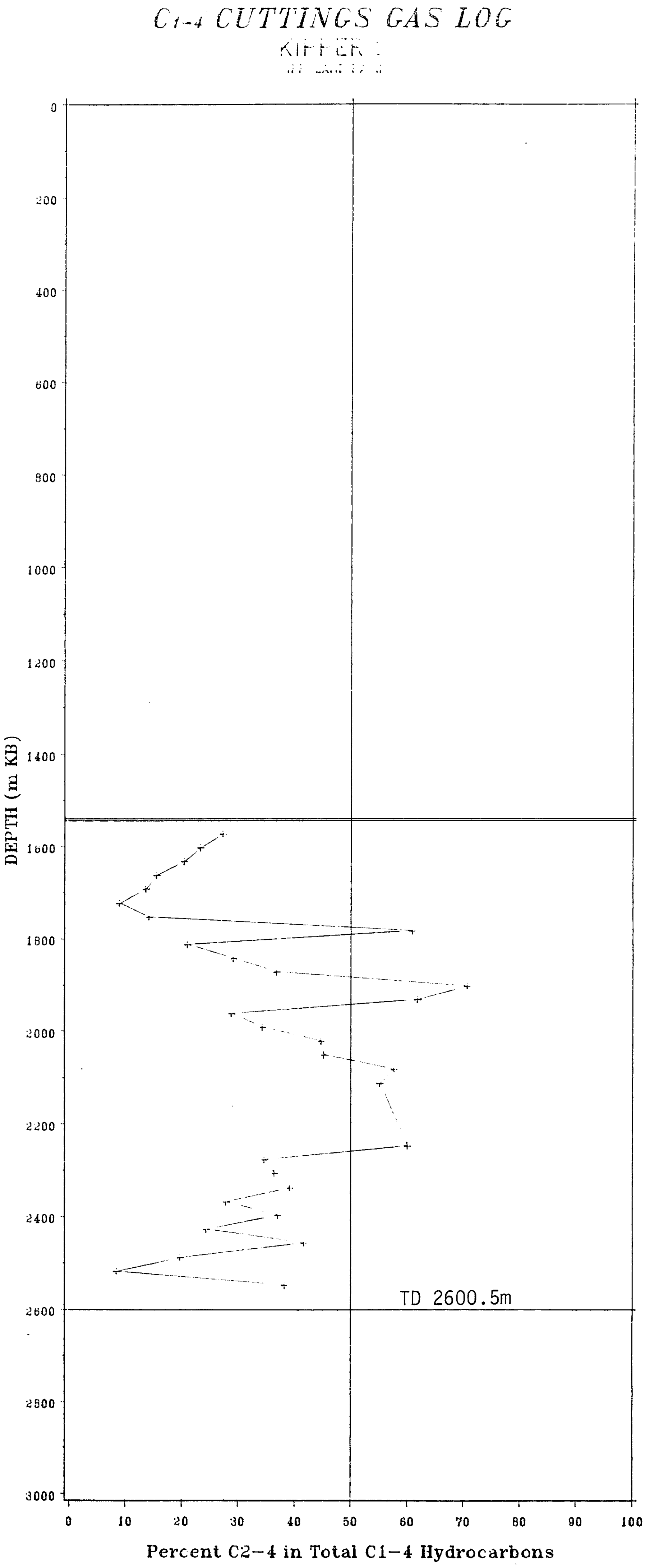


Figure 1b


C1-4 CUTTINGS GAS LOG
KIFFER 1
DEPTH (m KB)
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
TD 2600.5m
0
10
20
30
40
50
60
70
80
90
100
Percent C2-4 in Total C1-4 Hydrocarbons

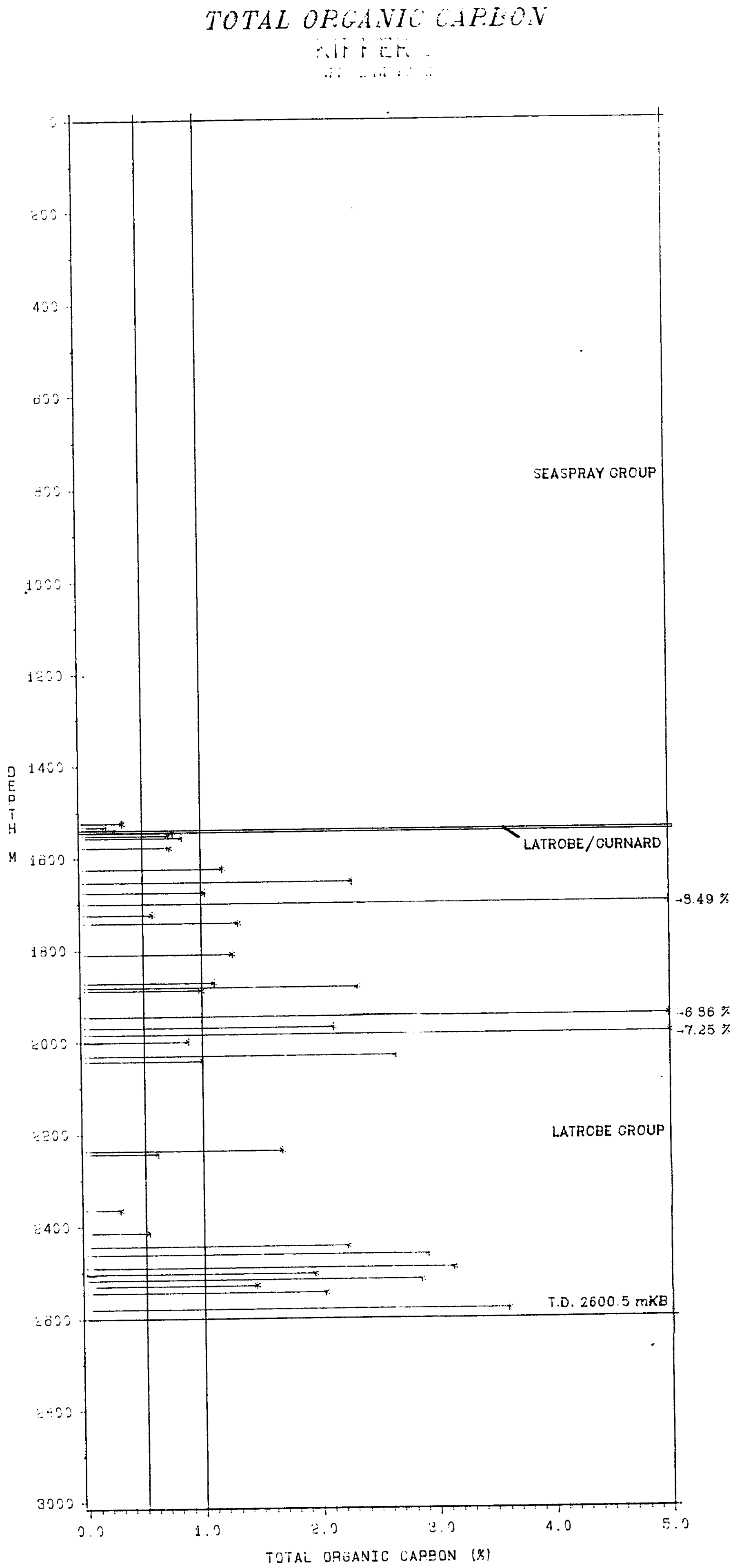
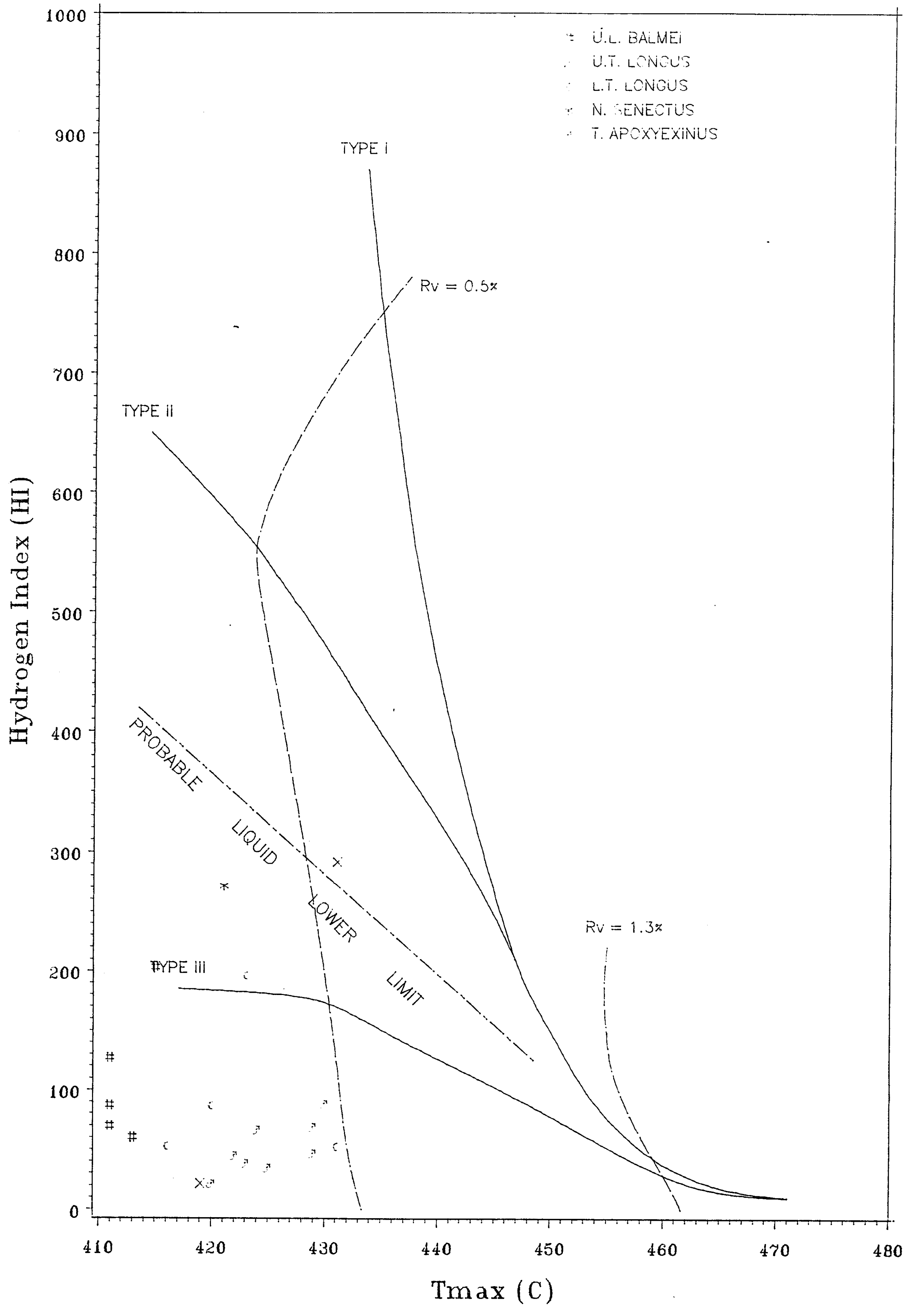

TOTAL ORGANIC CARBON
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
DEPTH M
SEASPRAY GROUP
LATROBE/GURNARD
→8.49 %
→6.96 %
→7.25 %
LATROBE GROUP
T.D. 2600.5 mKB
0.0
1.0
2.0
3.0
4.0
5.0
TOTAL ORGANIC CARBON (%)

Figure 3

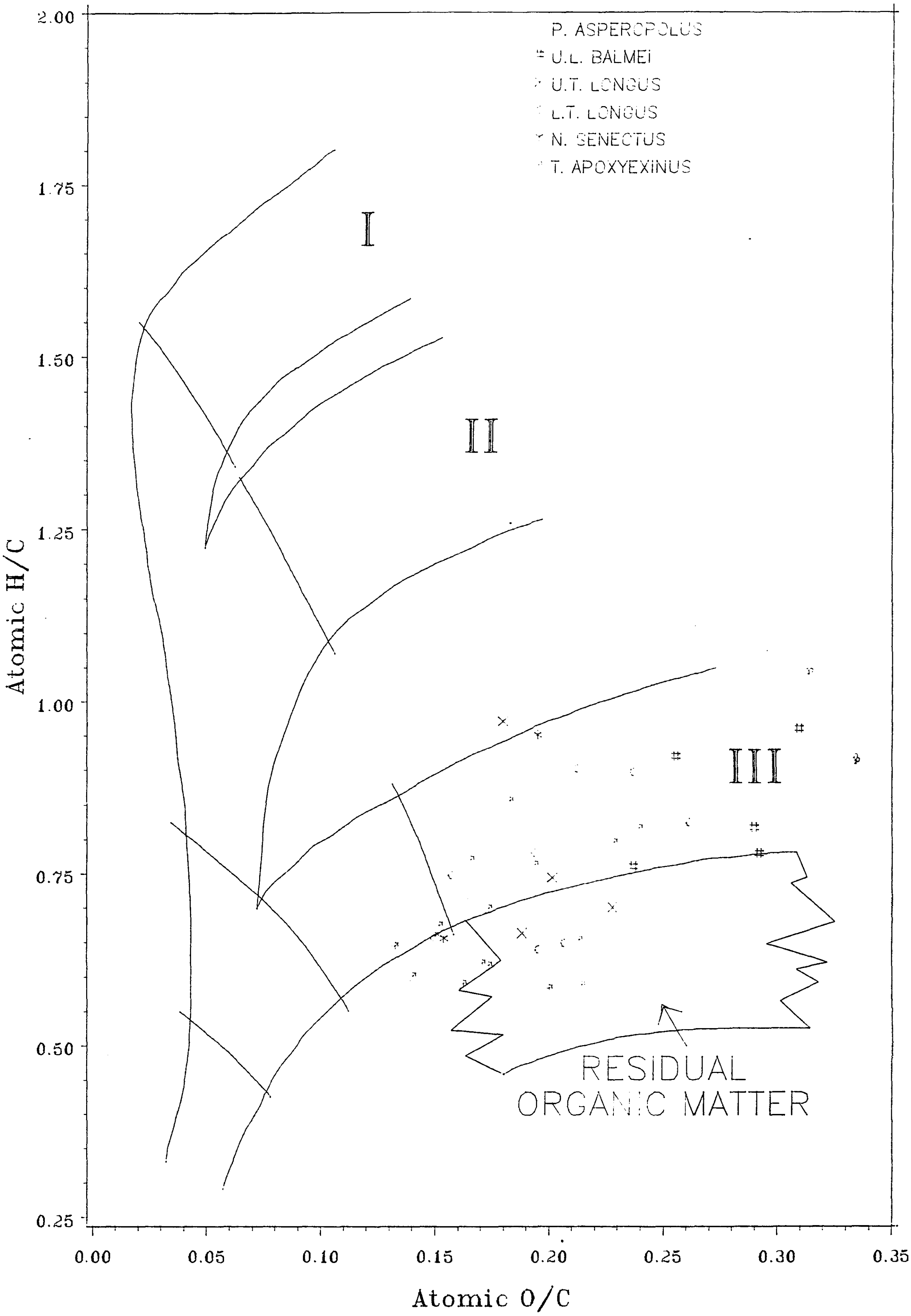
ROCKEVAL MATURATION PLOT



KEROGEN TYPE

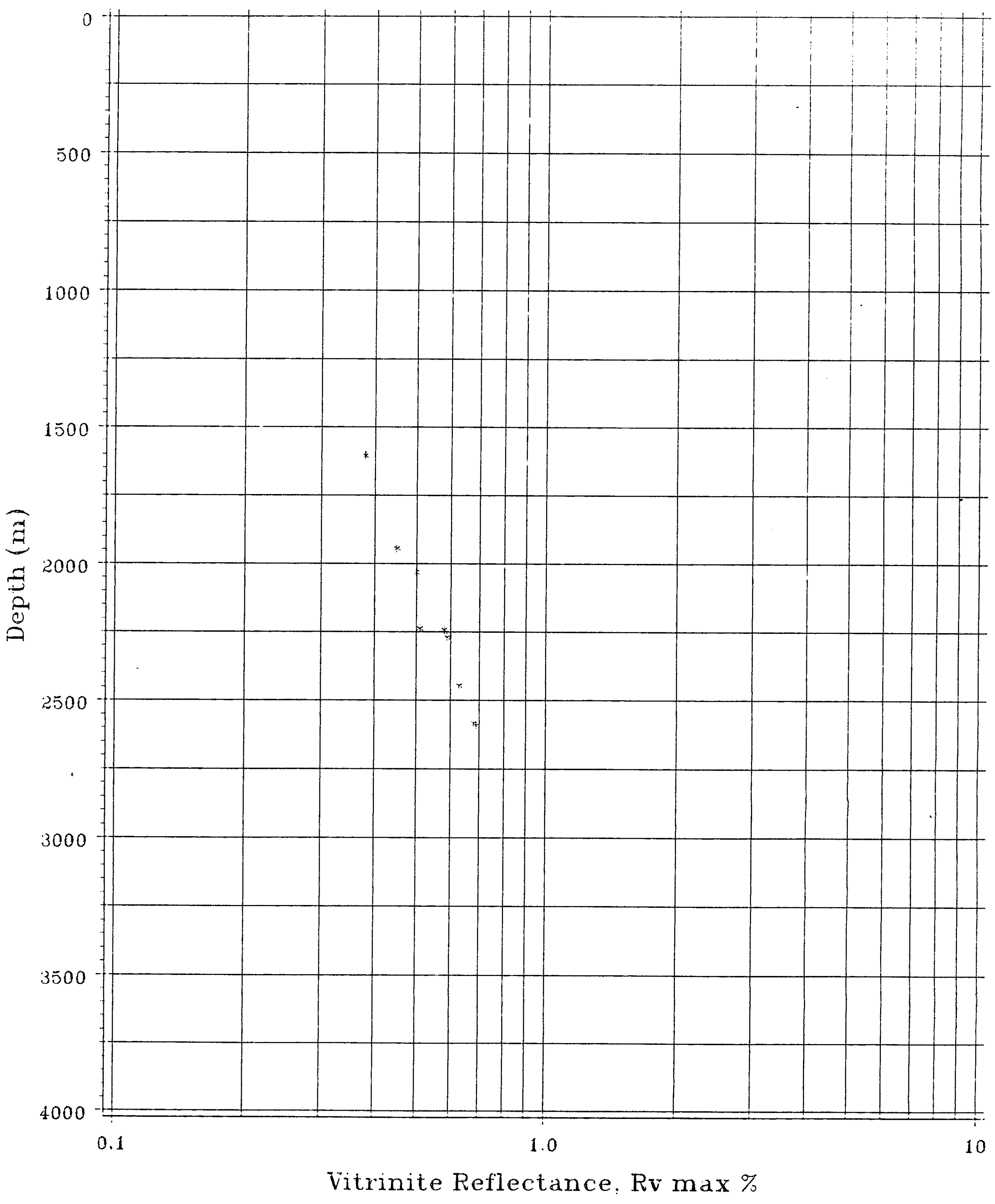
[illegible]

[illegible]



VITRINITE REFLECTANCE vs. DEPTH

KIPPER



WHOLE OIL

KIPPER-2 2318.4m

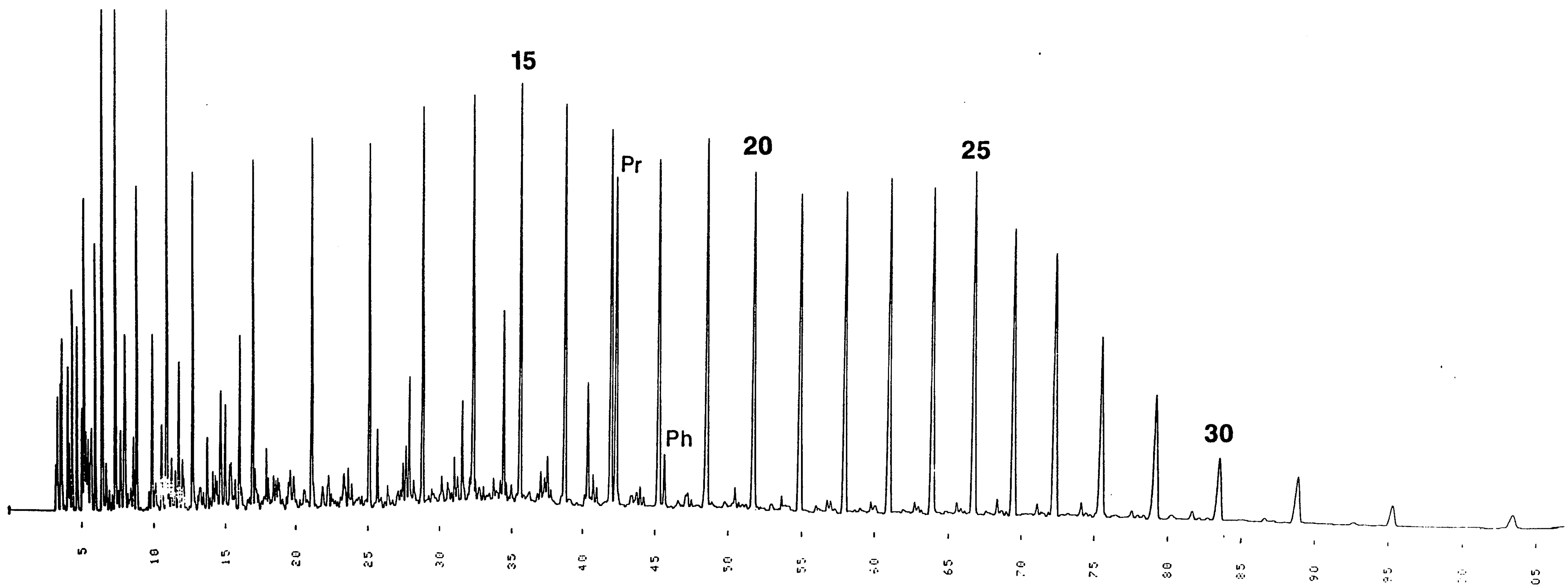


Figure 6

WHOLE OIL

KIPPER-2 2308m

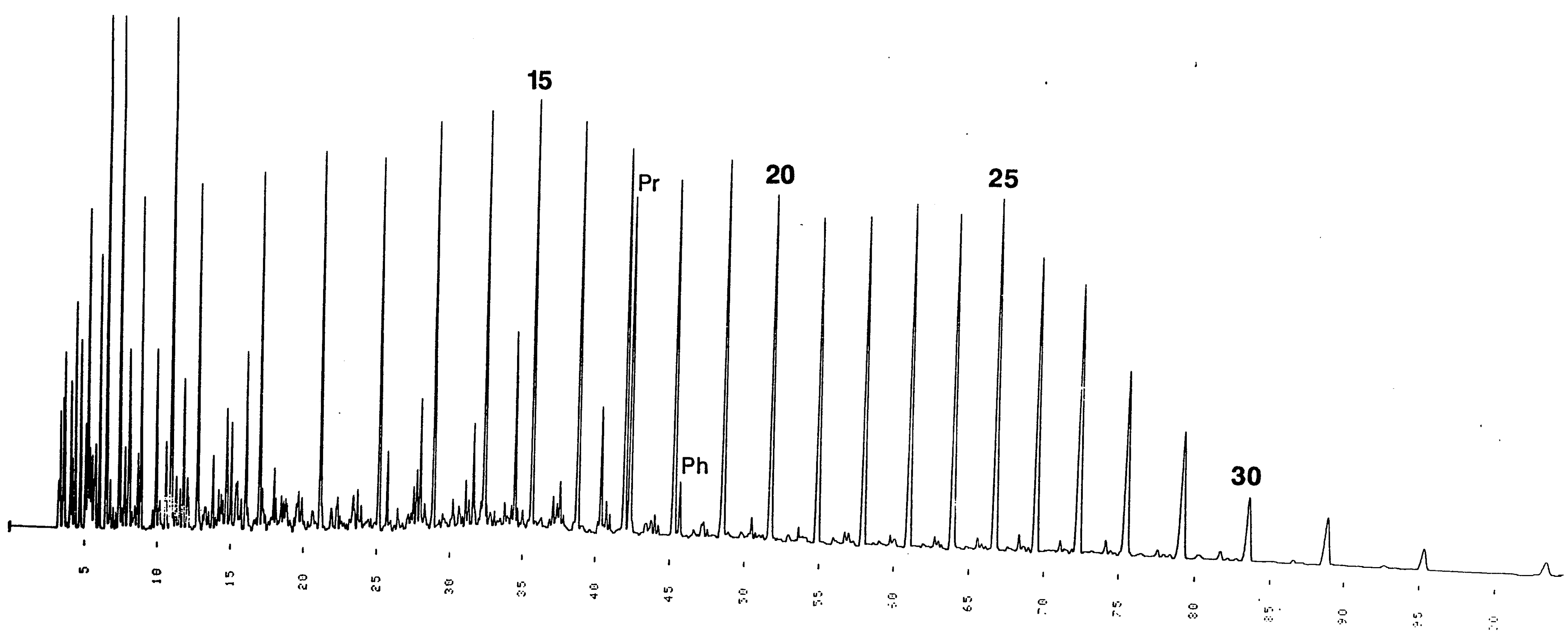
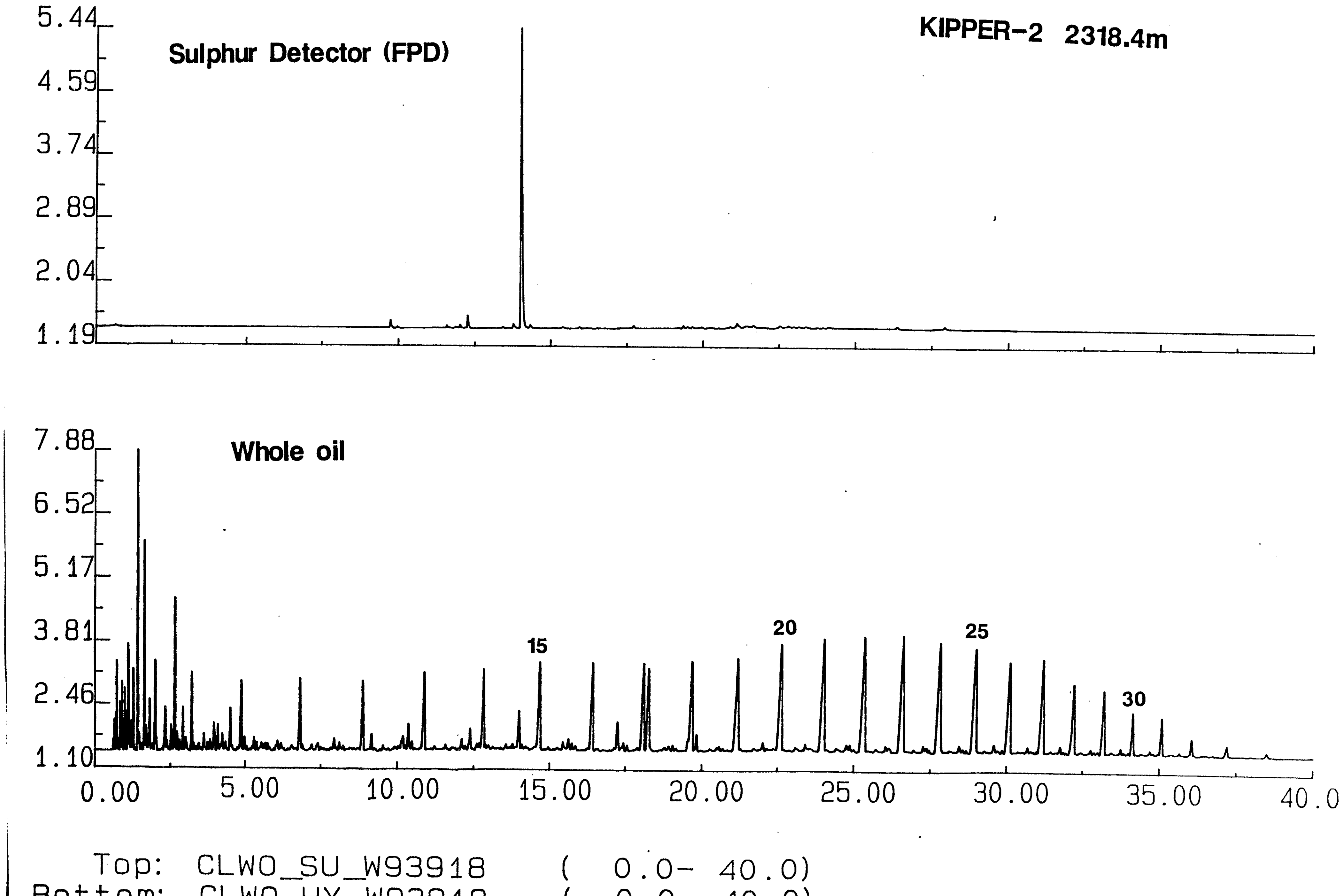


Figure 7



KIPPER-2 2318.4m
Sulphur Detector (FPD)
5.44
4.59
3.74
2.89
2.04
1.19
Whole oil
7.88
6.52
5.17
3.81
2.46
1.10
15
20
25
30
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
Top: CLWO_SU_W93918 (0.0- 40.0)
Bottom: CLWO_HY_W93918 (0.0- 40.0)

Figure 8

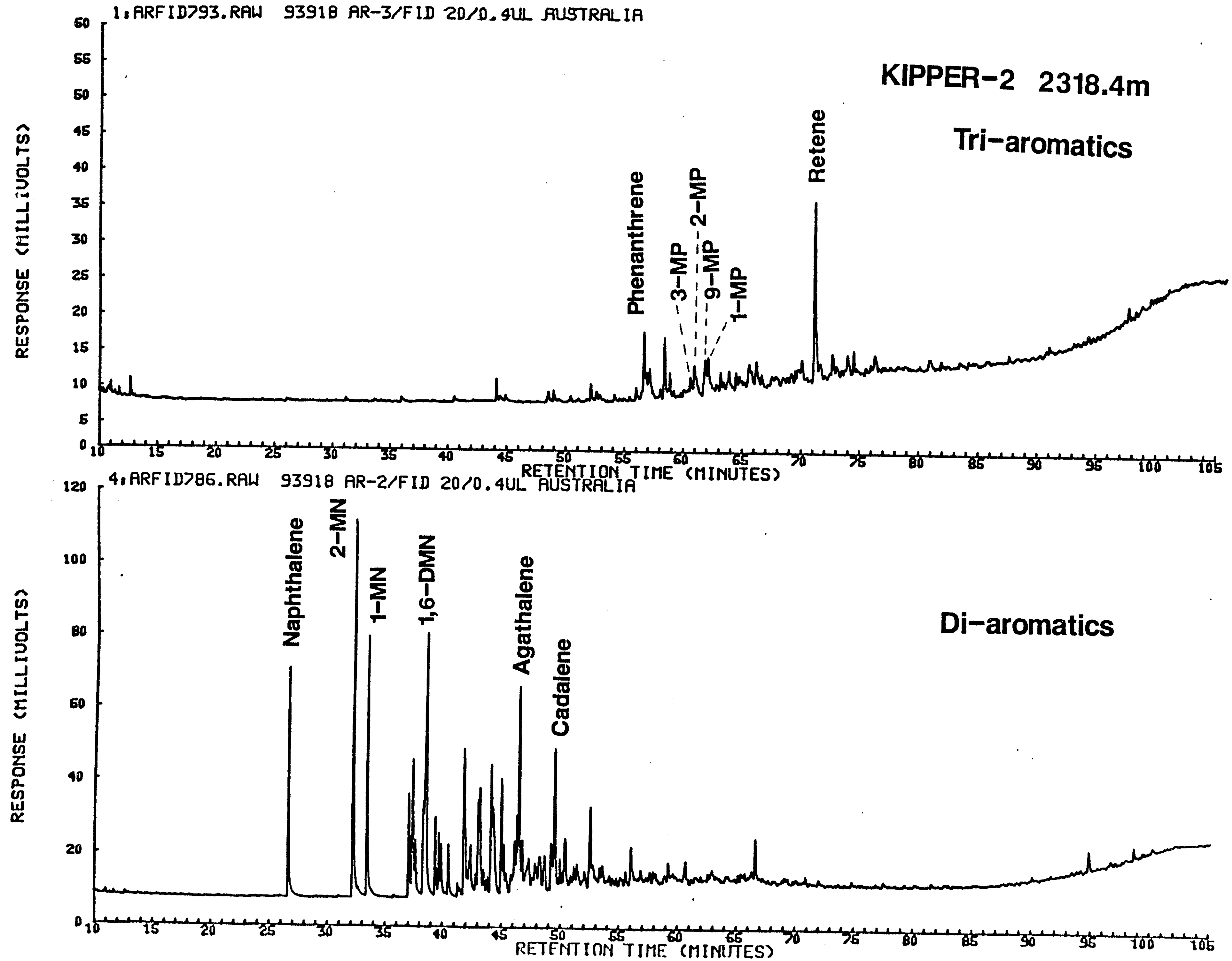

1:ARFID793.RAW 93918 AR-3/FID 20/0.4UL AUSTRALIA
KIPPER-2 2318.4m
Tri-aromatics
Phenanthrene
3-MP
2-MP
9-MP
1-MP
Retene
RESPONSE (MILLIVOLTS)
RETENTION TIME (MINUTES)
4:ARFID786.RAW 93918 AR-2/FID 20/0.4UL AUSTRALIA
Di-aromatics
Naphthalene
2-MN
1-MN
1,6-DMN
Agathalene
Cadalene
RESPONSE (MILLIVOLTS)
RETENTION TIME (MINUTES)

Figure 9

PE906061

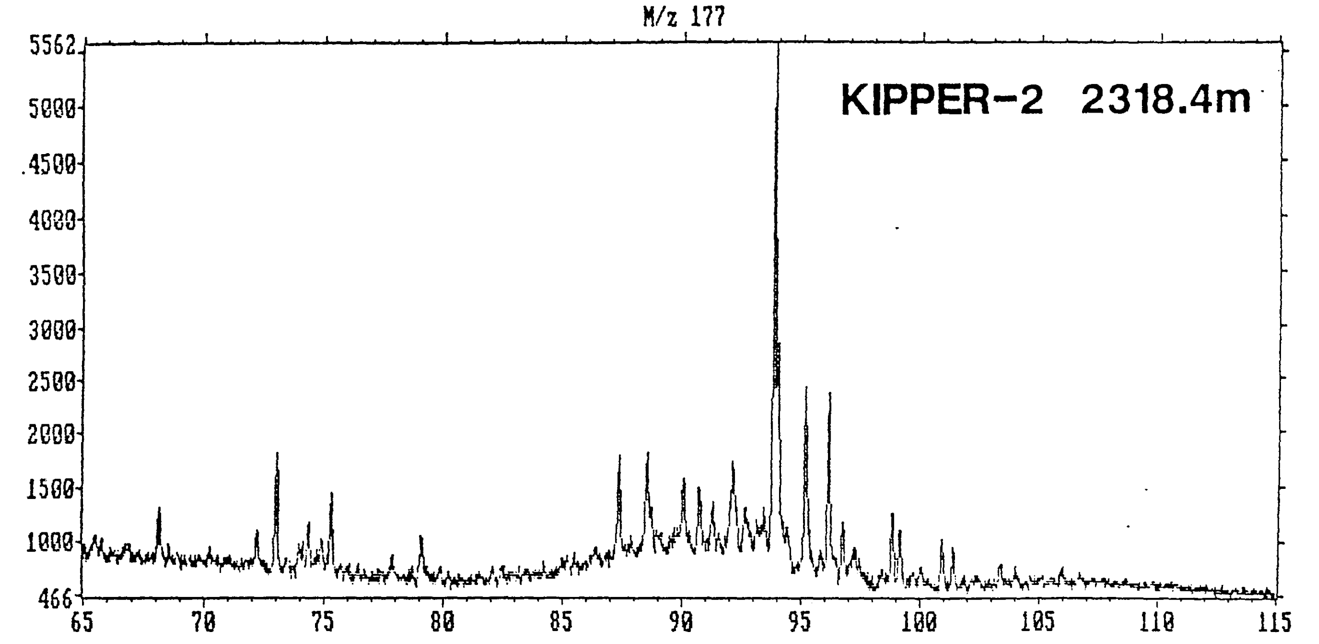
This is an enclosure indicator page.
The enclosure PE906061 is enclosed within the container PE902225 at this location in this document.

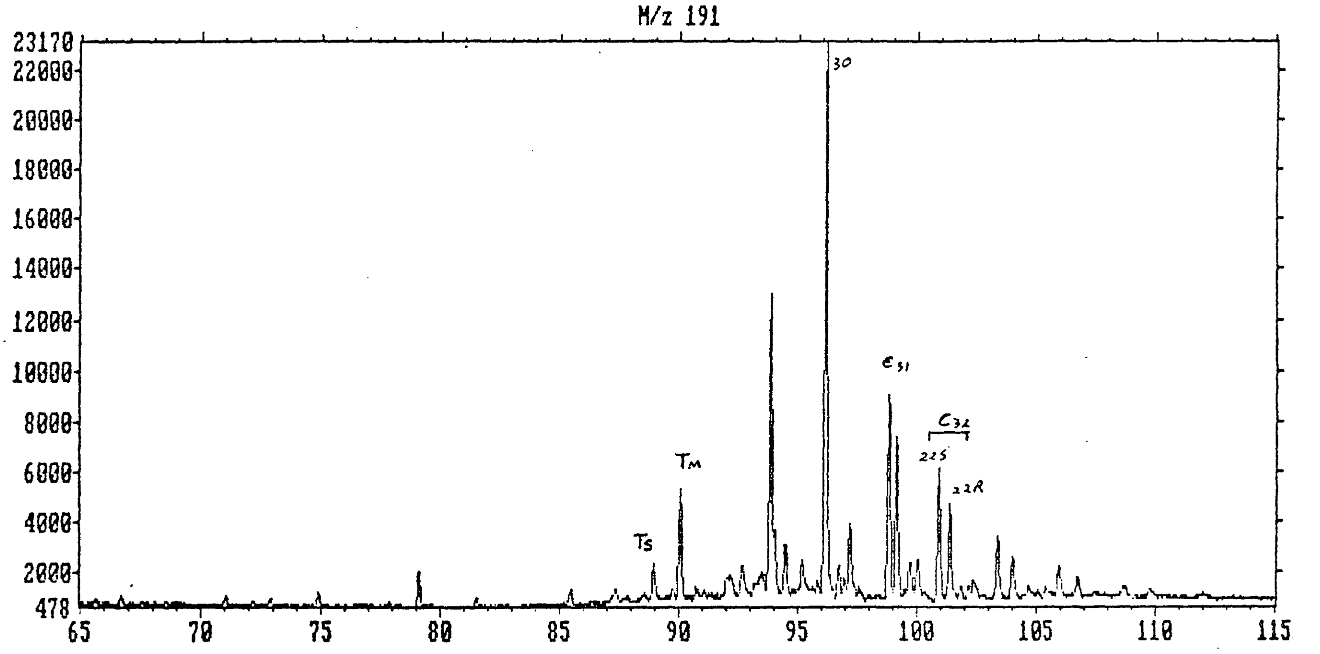
The enclosure PE906061 has the following characteristics:

ITEM_BARCODE = PE906061
CONTAINER_BARCODE = PE902225
NAME = Composite Geochemical Profile
BASIN = GIPPSLAND
PERMIT = VIC/P19
TYPE = WELL
SUBTYPE = DIAGRAM
DESCRIPTION = Composite Geochemical Profile (from apendix 4 of WCR vol.2) for Kipper-2
REMARKS =
DATE_CREATED = 09/09/1987
DATE_RECEIVED = 28/10/1987
W_NO = W953
WELL_NAME = KIPPER-2
CONTRACTOR =
CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

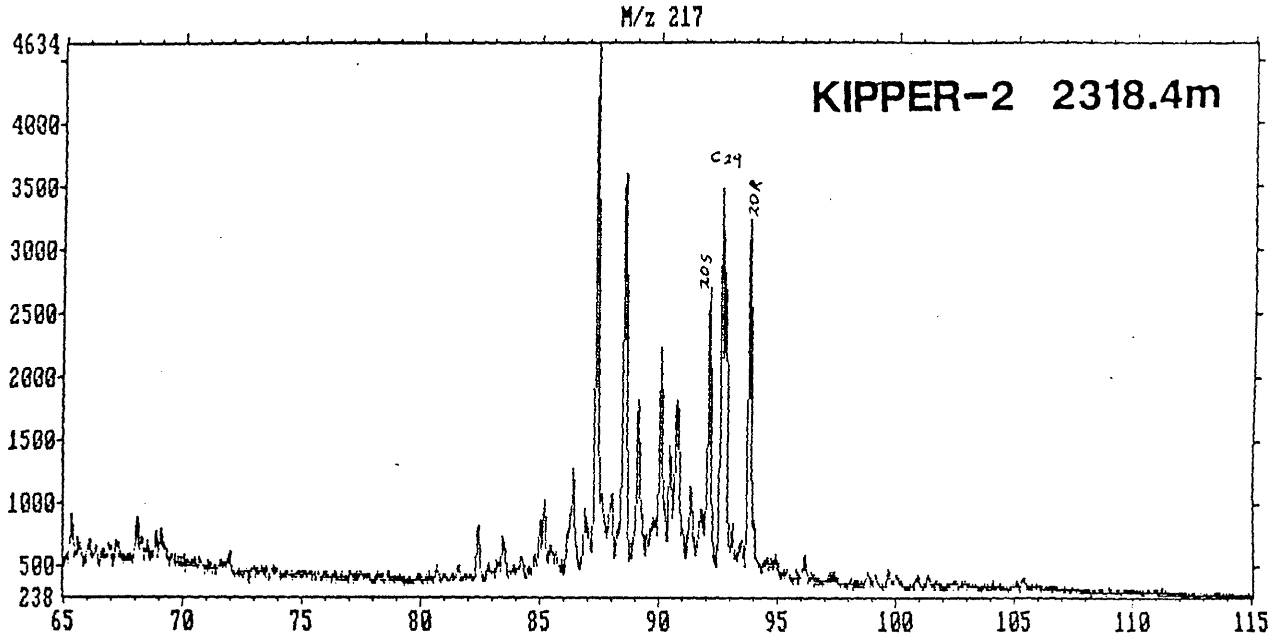
(Inserted by DNRE - Vic Govt Mines Dept)

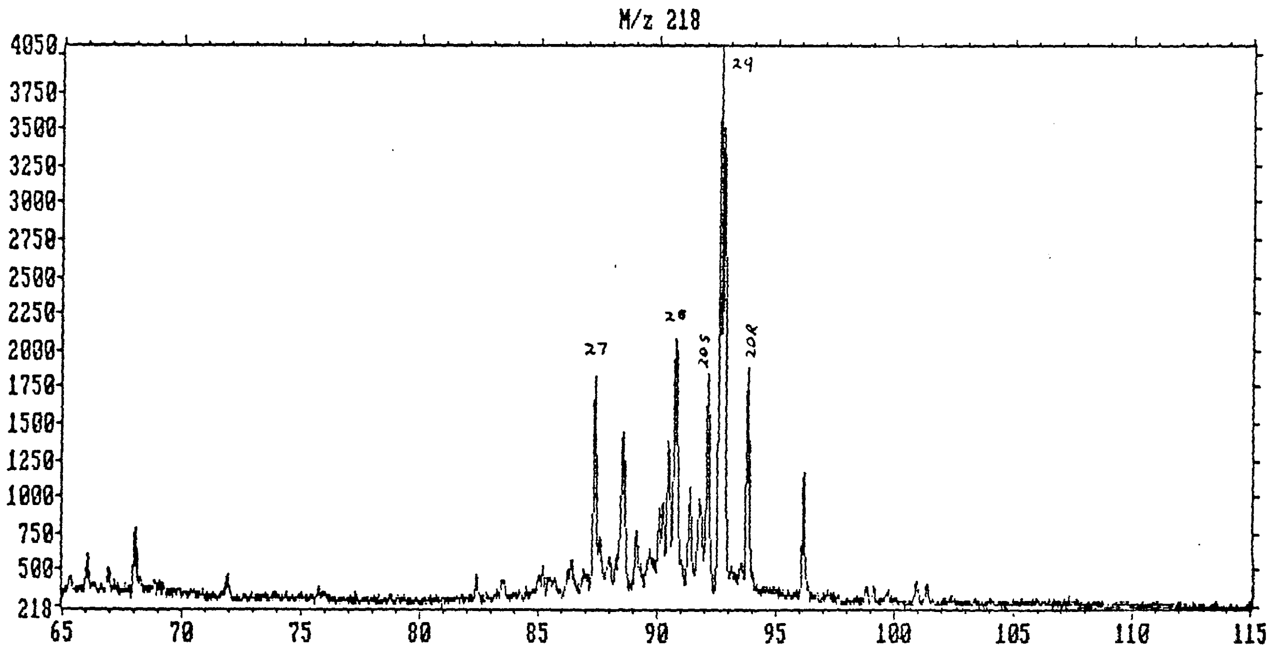
APPENDIX



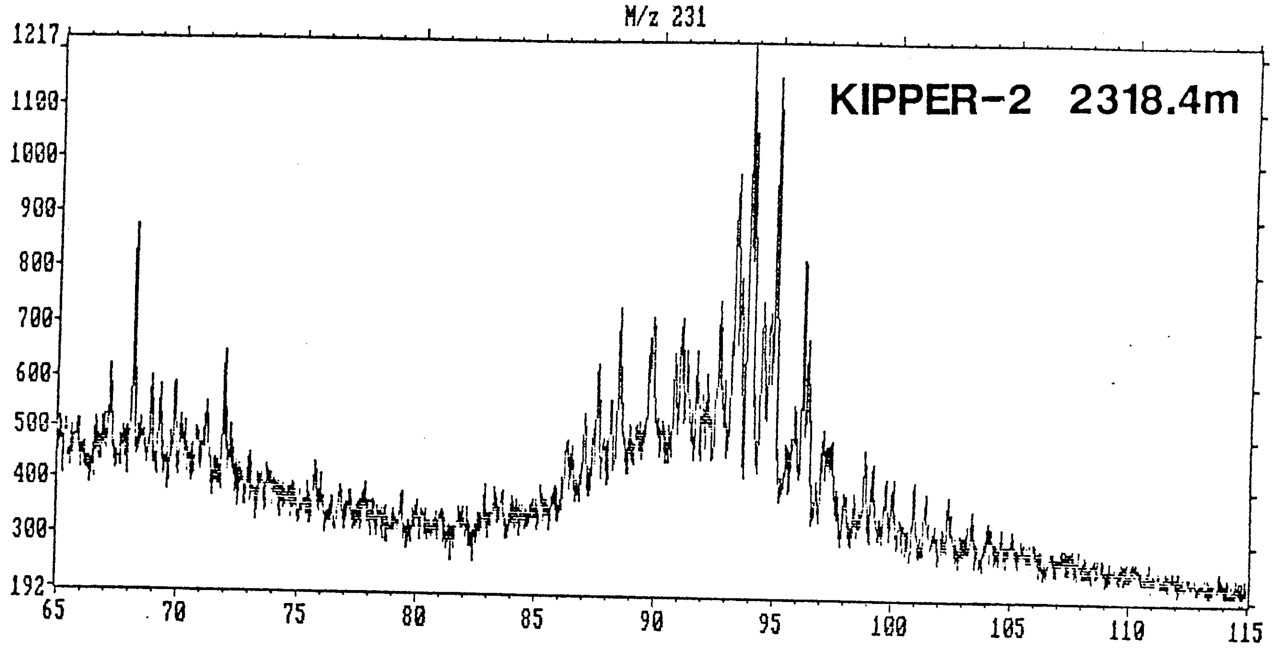


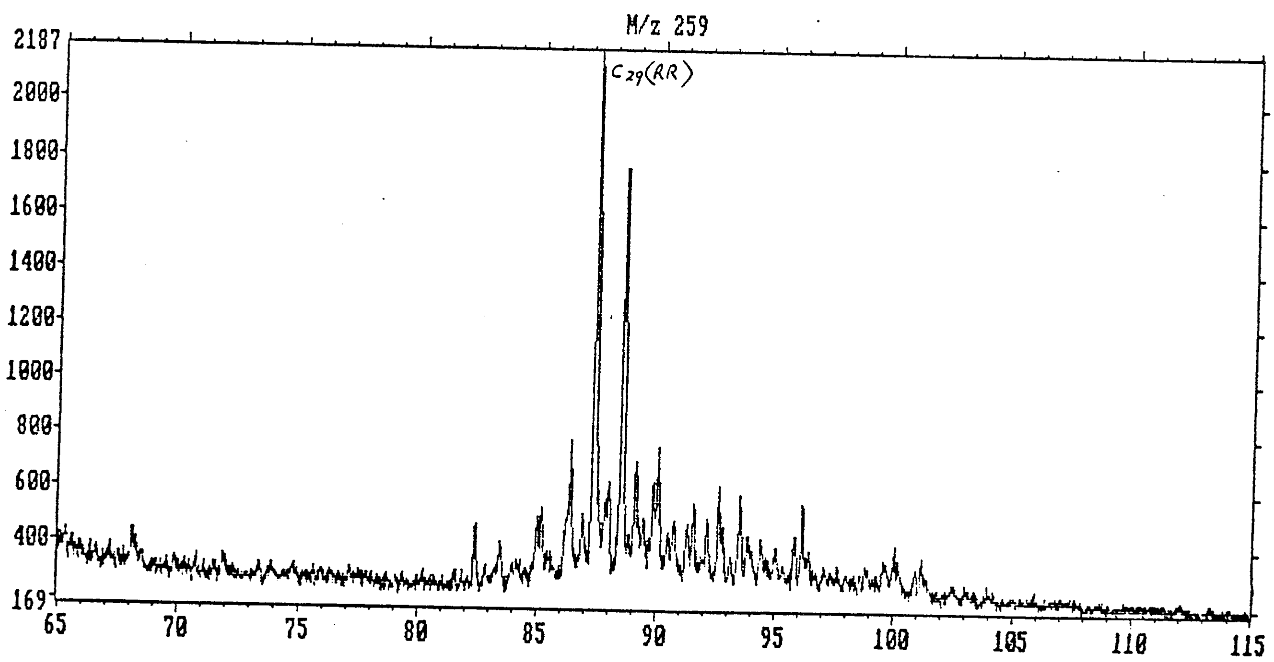
93918
4201 scans acquired on 4 Jun,1987 at 12:35:25. Rate = 1 seconds/scan
93918 UM, SAI(oil)Australia, Gippsland Basin, Kipper No. 2, 2318.4 m
20000 ng, 6 millisecond integration, averaging 21 times
EI/CI Instrument



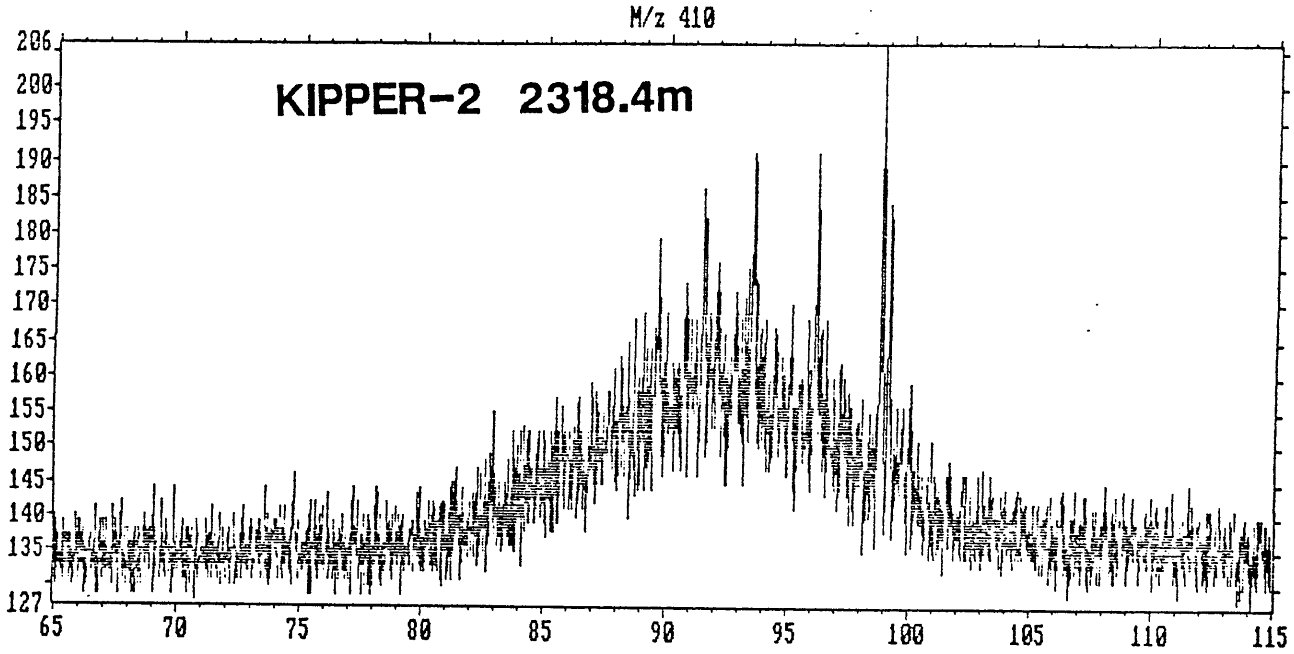


93918
4201 scans acquired on 4 Jun,1987 at 12:35:25. Rate = 1 seconds/scan
93918 UN, SAT(oil)Australia, Gippsland Basin, Kipper No. 2, 2318·4 m
20000 ng, 6 millisecond integration, averaging 21 times
EI/CI Instrument





93918
4201 scans acquired on 4 Jun,1987 at 12:35:25. Rate = 1 seconds/scan
93918 UN, SAI(oil)Australia, Gippsland Basin, Kipper No. 2, 2318·4 m
20000 ng, 6 millisecond integration, averaging 21 times
EI/CI Instrument



93918
4201 scans acquired on 4 Jun,1987 at 12:35:25. Rate = 1 seconds/scan
93918 UN, SAI(oil)Australia, Gippsland Basin, Kipper No. 2, 2318.4 m
20000 ng, 6 millisecond integration, averaging 21 times
EI/CI Instrument

Appendix 5

APPENDIX 5

SYNTHETIC SEISMIC TRACE

Doc. 2811L/21

SYNTHETIC SEISMIC TRACE

PARAMETERS

WELL :	KIPPER-2
T.D. :	2600 metres KB
KB :	22 metres
WATER DEPTH :	107.3 metres
POLARITY :	Trough represents acoustic impedance increase.
PULSE TYPE :	Zero phase, second derivative gaussian function.
PEAK FREQUENCY :	24 Hz
SAMPLE INTERVAL :	3 metres
CHECK SHOT CORRECTIONS :	Sonic tied to checkshots by drift curve.

Doc. 28111/20

PE902226

This is an enclosure indicator page.
The enclosure PE902226 is enclosed within the container PE902225 at this location in this document.

The enclosure PE902226 has the following characteristics:

ITEM_BARCODE = PE902226
CONTAINER_BARCODE = PE902225
NAME = Synthetic Seismic Trace
BASIN = GIPPSLAND
PERMIT = VIC/P19
TYPE = WELL
SUBTYPE = SYNTH_SEISMOGRAM
DESCRIPTION = Synthetic Seismic Trace & Time Depth Curve (from appendix 5 of WCR) for Kipper-2
REMARKS =
DATE_CREATED = 30/09/1987
DATE_RECEIVED = 28/10/1987
W_NO = W953
WELL_NAME = Kipper-2
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

Enclosures

PE902227

This is an enclosure indicator page.
The enclosure PE902227 is enclosed within the container PE902225 at this location in this document.

The enclosure PE902227 has the following characteristics:

ITEM_BARCODE = PE902227
CONTAINER_BARCODE = PE902225
NAME = Geological Cross Section A-A'
BASIN = GIPPSLAND
PERMIT = VIC/P19
TYPE = WELL
SUBTYPE = CROSS_SECTION
DESCRIPTION = Geological Cross Section A-A' (enclosure from WCR vol.2) for Kipper-2
REMARKS =
DATE_CREATED = 31/10/1987
DATE_RECEIVED = 28/10/1987
W_NO = W953
WELL_NAME = Kipper-2
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902229

This is an enclosure indicator page.
The enclosure PE902229 is enclosed within the container PE902225 at this location in this document.

The enclosure PE902229 has the following characteristics:

ITEM_BARCODE = PE902229
CONTAINER_BARCODE = PE902225
NAME = Structure Map top of Latrobe group
BASIN = GIPPSLAND
PERMIT = VIC/P19
TYPE = SEISMIC
SUBTYPE = HRZN_CONTR_MAP
DESCRIPTION = Structure Map top of Latrobe group (enclosure from WCR vol.2) for Kipper-2
REMARKS =
DATE_CREATED = 30/09/1987
DATE_RECEIVED = 28/10/1987
W_NO = W953
WELL_NAME = Kipper-2
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902228

This is an enclosure indicator page.
The enclosure PE902228 is enclosed within the container PE902225 at this location in this document.

The enclosure PE902228 has the following characteristics:

ITEM_BARCODE =	PE902228
CONTAINER_BARCODE =	PE902225
NAME =	Structure Map top of S-1 Gas (Base of Volcanics)
BASIN =	GIPPSLAND
PERMIT =	VIC/P19
TYPE =	SEISMIC
SUBTYPE =	HRZN_CONTR_MAP
DESCRIPTION =	Structure Map top of S-1 Gas (Base of Volcanics), enclosure from WCR vol.2, for Kipper-2
REMARKS =	
DATE_CREATED =	30/09/1987
DATE_RECEIVED =	28/10/1987
W_NO =	W953
WELL_NAME =	Kipper-2
CONTRACTOR =	ESSO
CLIENT_OP_CO =	ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE601098

This is an enclosure indicator page.
The enclosure PE601098 is enclosed within the container PE902225 at this location in this document.

The enclosure PE601098 has the following characteristics:

ITEM_BARCODE = PE601098
CONTAINER_BARCODE = PE902225
NAME = Well Completion Log
BASIN = GIPPSLAND
PERMIT = VIC/P19
TYPE = WELL
SUBTYPE = COMPLETION_LOG
DESCRIPTION = Well Completion Log (enclosure from WCR) for Kipper-2
REMARKS =
DATE_CREATED = 22/04/1987
DATE_RECEIVED = 28/10/1987
W_NO = W953
WELL_NAME = Kipper-2
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)