WCR VOL-2

GRUNTER-1 (W879)

ESSO EXPLORATION AND PRODUCTION
AUSTRALIA INC.

WELL COMPLETION REPORT
GRUNTER-1
VOLUME 2
INTERPRETATIVE DATA

GIPPSLAND BASIN
VICTORIA

ESSO AUSTRALIA LIMITED

Compiled by: M.FITTALL

MARCH,1986

GRUNTER-1

WELL COMPLETION REPORT

VOLUME 2

(Interpretative Data)

CONTENTS

1. Geological and Geophysical Analysis

FIGURES

1. Stratigraphic Table

APPENDICES

1. Micropalaeontological Analysis
2. Palynological Analysis
3. Quantitative Log Analysis
4. Wireline Test Report
5. Production Test Report
6. Geochemical Report
7. Synthetic Seismic Trace
8. Sidewall Core Thin Section Descriptions

ENCLOSURES

1. Geological Cross Section (Dwg. No. 2260/OP/3)
2. Top of Latrobe Group Structure Map (Dwg. No. 2227/OP/8)
3. Base of Tuna-Flounder Channel Structure Map (Dwg. No. 2227/OP/9)
4. Mid Paleocene Marker Structure Map (Dwg. No. 2227/OP/12)
5. T. lilliei Marker Structure Map (Dwg. No. 2260/OP/19)
6. Well Completion Log
7. Graph才log (Mud Log), Added by DNRE 13/07/99

SEPARATE ATTACHMENT

1771L/18 CORELAB FINAL REPORT PE906100

GEOLOGICAL AND GEOPHYSICAL ANALYSIS

PROGNOSIS (KB = 21m ASL)

Formation/Horizon	Pre-drill Depth (mSS)	Post-drill Depth (mSS)
SEASPRAY GROUP	105	108
LATROBE GROUP	1820	1832
Base of Tuna-Flounder Channel	1860	1867
Mid Paleocene Seismic Marker	2420	2418
Top of T-1 Sand	2552	2574
TOTAL DEPTH	3500	3788

INTRODUCTION

Grunter-1 drilled a tilted fault block which forms part of the north-east extension of the Flounder anticline. The Flounder Field is situated approximately 7 km to the SW of Grunter-1 (Enclosure 2).

Three targets were tested by Grunter-1. The first target was a very small domal structure at the base of the Tuna-Flounder Channel. No hydrocarbons were encountered at this level. Post-drill mapping on this horizon shows that the closure is located to the east of Grunter-1. The second target was the T-1 sand top-sealed by overlying shale and laterally fault-sealed by juxtaposed shale. No hydrocarbons were encountered in the T-1 sand at the Grunter-1 location due to either leakage at the fault or lack of hydrocarbon migration into the structure. The third target was the deeper Latrobe Group section which successfully encountered hydrocarbons in reservoir sands sealed by intraformation shales.

GEOLOGICAL ANALYSIS

Stratigraphy (Figure 1; Appendix 1,2)

Grunter-1 penetrated 1724.0m of Miocene Gippsland limestone and interpreted Lakes Entrance Formation, comprised of limestone and calcareous siltstone/claystone respectively. The top of the Lakes Entrance Formation is tentatively placed at 1377 mKB, based on a change in log character at this depth. The base of the Lakes Entrance Formation is Early Miocene in age (H1 foraminiferal zone).

The Lakes Entrance Formation disconformably overlies 6.0m of glauconitic siltstone and very fine grained sandstone of Mid Eocene age (Lower N. asperus palynological zone). This greensand is interpreted to represent the condensed sequence deposited during the transgressive phase of the infilling of the channel (Marlin Channel) initiated by the 49.5 MY eustatic event.

The Mid Eocene greensand disconformably overlies 29.0m of fine grained sands, silts and shales of Early Eocene age (P. asperopolus and possibly Upper M. diversus palynological zones). These Flounder Formation sediments are interpreted to represent marine infilling of the 54.0 MY (Tuna-Flounder Channel complex) eustatic event. The Tuna-Flounder Channel complex is recognised elsewhere in this part of the Gippsland Basis as consisting of several channelling events.

The Flounder Formation unconformably overlies the remaining Latrobe Group sediments of Late Cretaceous to Paleocene age (T. lilliei to Upper L. balmei palynological zones). The Late Paleocene section (Upper L. balmei palynological zone) is similar to Stonefish-1, and consists of several channeling events infilled dominantly by sands which are interpreted as transgressive sequences. This section grades into the underlying Early Paleocene (Lower L. balmei palynological zone) sequence which becomes more shaly and coaly towards the Mid Paleocene seismic marker. This Lower L. balmei section is interpreted to have been deposited in a lower fluvial plain to coastal plain environment.

A sand, which is thicker than anticipated and is heavily dolomitised, underlies the Mid Paleocene seismic marker. It is interpreted to have been deposited in an estuarine to fluvial environment during the lowstand to transgressive phases of the 63 MY eustatic cycle. This sand is subsequently underlain by a thick shale sequence at the base of the Lower L. balmei section (see Enclosure 1). This marine shale is interpreted to have been deposited in an offshore to lower shoreface environment during the transgressive phase of the 68 MY eustatic cycle. The underlying T-1 sand is interpreted to have been deposited in an estuarine to foreshore environment during the lowstand phases of the 68 MY and 70.5 MY eustatic cycles.

The remaining T. longus and T. lilliei Latrobe Group section consists of interbedded sands, silts, shales and thin coals which are interpreted to have been deposited in a lower fluvial plain to coastal plain environment, with some marine influences (Appendix 2). This section is much thicker in Grunter-1 than the nearby Flounder-1 and Stonefish-1 wells (see Enclosure 1), indicating significant growth has occurred on the faults bounding the Grunter fault block during the deposition of the *T. longus* and *T. lilliei* section. The *T. lilliei* section towards the base of Grunter-1 also differs from nearby wells due to the very shaly and moderately carbonaceous nature of the section. The few sands present are of poor reservoir quality.

Structure and Seal

The Grunter prospect is mapped as a tilted fault block forming part of the northeast extension of the Flounder anticline. Anticlinal dip towards the northwest and southeast between two NW-SE trending faults provides closure to the structure (Enclosures 4 and 5).

The top of the Latrobe Group was penetrated 12m low to prediction, slightly changing the mapped gradient of the dip of the top of Latrobe Group at Grunter-1 (Enclosure 2).

The very small closure mapped at the Base of the Tuna-Flounder Channel is now interpreted to be present to the east of Grunter-1 (Enclosure 3). This marker was penetrated 7m low to prediction, hence moving the closure slightly away from the Grunter-1 location as originally mapped.

The Mid Paleocene Marker was penetrated 2m high to prediction, thus leaving the Mid Paleocene Structure Map unchanged from the pre-drill map. Fault-dependent closure of approximately 110m is mapped at Mid Paleocene level in Grunter-1 (Enclosure 4).

Post-drill mapping of a deep reflector (within the *T. lilliei* zone and approximately top of oil-bearing section) shows structuring is offset at depth (Enclosure 5). Approximately 100m of fault-dependent closure is mapped updip from Grunter-1 at this level.

The primary target of Grunter-1, the T-1 sand, is top-sealed by the overlying thick marine shale, and is interpreted to be fault-sealed by the juxtaposition of marine shale to the T-1 reservoir sand (Enclosure 1). The section immediately underlying the T-1 sand is also interpreted to be fault-sealed, thus possibly preventing the migration of hydrocarbons up the fault zone and into the T-1 sand. However, an alternative interpretation is that the T-1 sand is subject to leakage at the fault and thus no valid trapping mechanism exists for the primary target.

The gas sands of T. longus age and oil sands of T. lilliei age are top-sealed by intraformation shales and are interpreted to be laterally fault-sealed because of the low sand to shale ratios of the juxtaposed sections. Alternatively, it is possible each accumulation is trapped in a stratigraphically isolated point-bar sand.

Reservoir (Appendix 3)

Reservoir quality sands were encountered from below the base of the Tuna-Flounder Channel at 1888 mKB to approximately -3400m. Very few thin sands were encountered below this depth to T.D. at -3788m.

The Upper L. balmei Latrobe Group section is very sandy with a corresponding high net:gross. Sands in this interval have excellent reservoir quality with average porosities of 14% to 28%.

The Lower L. balmei Latrobe Group section down to the Mid Paleocene Marker at 2439 mKB is moderately sandy, with sands ranging in average porosity from 16% to 24%. The sandy sequence below the Mid Paleocene Marker is heavily dolomitised, but good quality sand is present with average porosities of 21% to 23%.

The primary target of the Grunter-1 well, the T-1 sand is present from 2595 mKB to 2641 mKB. The sand has good reservoir quality, with average porosities of 17% to 22% and an overall average porosity of 20%.

The T. longus and T. lilliei sections of the Latrobe Group in Grunter-1 are moderately shaly, but contain many sands 2m to 5m thick with moderate porosities which decrease with depth. Average porosities over the interval 2654 mKB to 3496 mKB range from 13% to 22%. Core analysis data over the interval 3389.05 mKB to 3398.90 mKB, from oil-bearing sands in Core-1, show porosities ranging from 9% to 17% with an average of 13%. However permeabilities are very poor, ranging from 0.3 md to 33 md with an average of 7 md. The description of sidewall core thin sections from 3571.0 mKB, 3665.8 mKB and 3683.5 mKB, show these fine grained sandstones contain considerable amounts of authigenic kaolinite and illite occupying intergranular pore space, hence greatly reducing porosity and permeability (Appendix 8).

Hydrocarbons

Grunter-1 encountered a total of 27.3m net gas bearing sands over the interval 2675.5 mKB to 3311.5 mKB, throughout the T. longus and L. balmei section of the Latrobe Group. The gas sands range in thickness from 1.3m net to 11.3m net, with porosities of 12% to 22%, and water saturations of 24% to 79% (Appendix 3). RFT pretest data indicates these gas bearing sands form at least six separate gas accumulations with GWC's interpreted at 2701 mKB (-2680m), 2733 mKB (-2712m), 2861 mKB (-2840m), 3096 mKB (-3075m), 3126 mKB (-3105m) and 3216 mKB (-3195m) (Appendix 4). The gas columns range from 20m to 56m, with no corresponding oil legs penetrated by Grunter-1, although thin oil legs could be present downdip. Wet gas/condensate samples were collected by RFT at 2702.5 mKB, 2861.3 mKB, 3044.7 mKB, 3053.1 mKB and 3310.6 mKB.

Grunter-1 also encountered 23.3m net oil-bearing sands over the interval 3323.0 mKB to 3495.5 mKB. However, based on water saturations calculated by log analysis, RFT sampling results, and the Production Test results, only 4.3 m is considered to contain producible oil (Appendix 3). The oil sands range in thickness from 0.5m net to 7.3m net, with porosities of 12% to 17%, and water saturations of 37% to 68%. Waxy oil was recovered by RFT at 3328.8 mKB (43.9° API), at 3353.0 mKB (32.8° API), and scums of oil at 3334.1 mKB and 3394.2 mKB. A Production Test was carried out over the interval 3392.5 mKB to 3400.5 mKB, which is the thickest oil-bearing sand, in order to prove hydrocarbon content because of inconclusive RFT sample results, and to determine productivity from sands at this depth. The sand produced fluid at an average rate of 508 B/D with an average water cut of 82%. Gas containing 56% CO_2 was also produced at an average rate of 234 KSCF/D. The 39° API oil produced was waxy, with a pour point of 32°C (Appendix 5). The water saturation of this sand is 62%. Combined with the Production Test and RFT results, this suggests that sands in this area at depths greater than -3300m require oil saturations greater than approximately 55% in order to produce clean oil.

RFT pretest pressures also show the oil-bearing sands are within the zone of overpressure, and are in separate pressure systems. It is interpreted that the complete sequence in the overpressured zone is fault-sealed due to the dominantly shaly nature of the section. However, an alternative interpretation is that each sand is a stratigraphically isolated point-bar within a fluvial floodplain sequence.

Geochemical analysis (Appendix 6) of cuttings samples indicate the Latrobe Group has good oil and gas source potential below approximately -3000m. In particular, the carbonaceous shaly sequence below -3500m is considered to have very good oil and gas source potential. Geochemical analysis indicates the Latrobe Group below approximately -3000 m is transitional in maturity, and is fully mature below -3500m. Geochemical analysis of the oils recovered from Grunter-1 show them to be medium to high gravity paraffinic oils, some waxy, which have been derived from terrestrial organic matter. The lower gravity, waxy oils are considered to be slightly less mature than the higher gravity oils.

It is considered the hydrocarbons encountered in Grunter-1 have been sourced off structure from the carbonaceous shaly sequence in the base of the *T. lilliei* section. This sequence is mature in this area. It is thought the generation of hydrocarbons in this low net to gross section has led to the presence of overpressure, which is interpreted to occur below -3200 m. Limited updip migration of liquid hydrocarbons has taken place, while gas has been able to preferentially leak further up the fault zones and has been trapped in the immature Latrobe Group section. It is believed Grunter-1 is one of the first wells in the Gippsland Basin to identify a specific source interval ie. the mature carbonaceous shaly interval from -3500m to -3788m.

GEOPHYSICAL ANALYSIS

Results

The main target of Grunter-1 was the marginal marine Flounder T-1 equivalent sequence below the Mid Paleocene Marker (MPM). The MPM is a trough arising from the interface between marginal marine sands and the overlying coal and shale dominated coastal plain package. The event is quite continuous in character between the Flounder wells and Stonefish-1 where it was tied. The results tabulated in Table 1 show an insignificant depth prediction error to the MPM. The actual two-way time is, however, 0.7% less than predicted. The errors are not such as to warrant re-mapping. It may safely be said that Grunter-1 was drilled on structure at the MPM level.

Table 1 - Drilling Results

	PREDICTED		ACTUAL	
	Zmss	TWT	Zmss	TWT
Top Latrobe	1820	1447	1832	1445
Base of Channel	1860	1470	1867	1464
Mid Paleocene Marker	2420	1807	2418	1794

Post-Drill Mapping

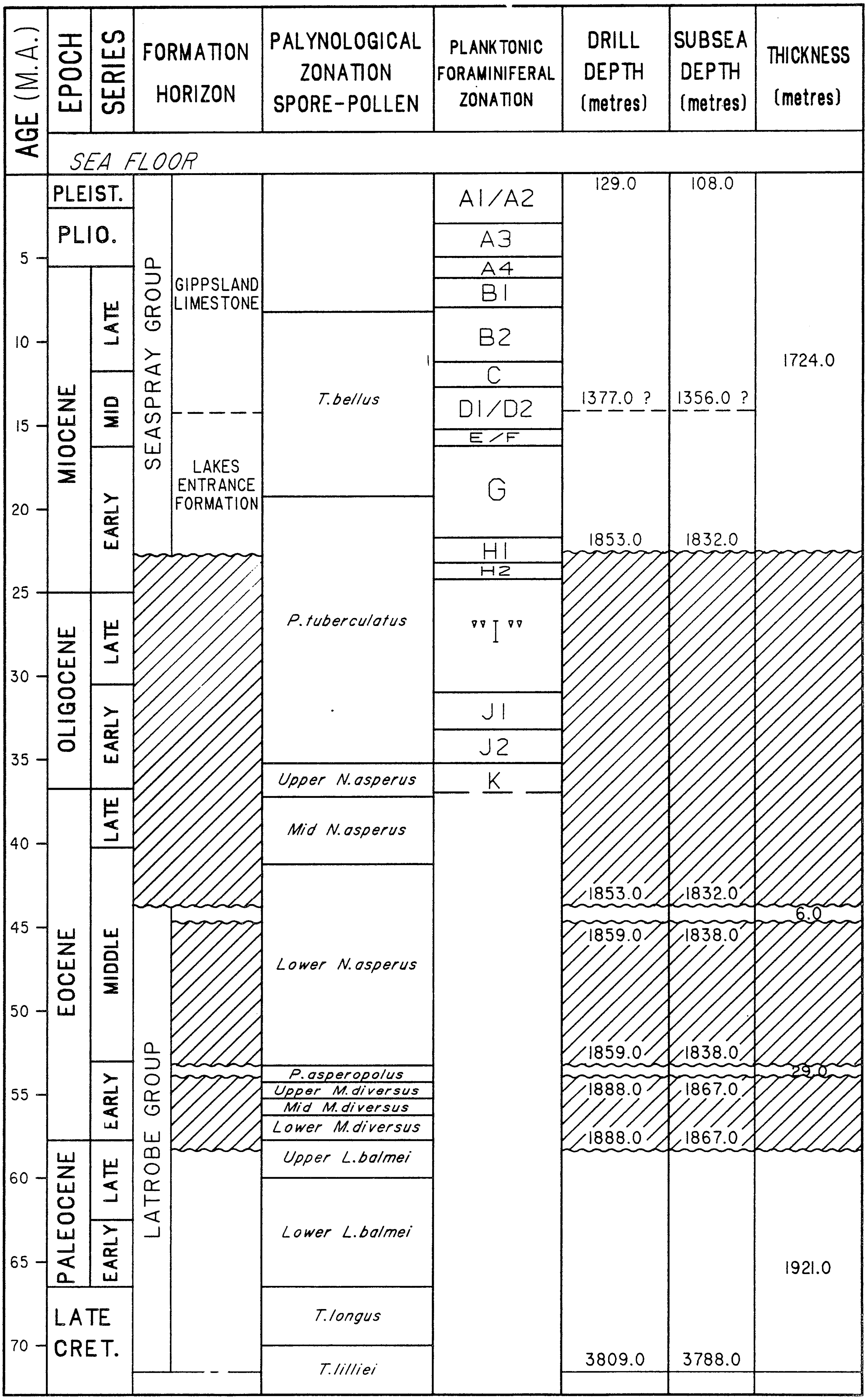
T. lilliei Marker - Structure Map (Enclosure 5)

Significant shows were encountered in Grunter-1 below about 3300 mKB, within the *T. lilliei* section. A seismic reflector of reasonable quality was tied into Grunter-1 at 3258 mKB, just above the oil occurrences, and into Stonefish-1, at 2891 mKB. The seismic marker is referred to as the *T. lilliei* marker since recent changes in the spore-pollen zones in Stonefish-1 put it into the *T. lilliei* section as the correlation to Grunter-1 suggests, rather than near the top of the *N. senectus* zone.

Depth conversion was effected by isopaching below the Top of Latrobe Group (TOL) using a smoothed DIX interval velocity. This shows a 90 m/sec gradient between Stonefish-1 and Grunter-1 apparently in response to compaction. The velocity to TOL also increases with depth.

The map exhibits northwest-southeast down-to-the-south faulting, although in the north there is a major east-west fault. This fault is inverted at TOL and becomes the Tuna bounding fault to the west. The important feature of the map is the positive trend extending from Flounder to the northeast; along which a number of downside fault-dependent closures are evident. Grunter-1 penetrated this level some 100m down-dip and Stonefish-1 penetrated on the edge of closure-to-spill.

GRUNTER-1
STRATIGRAPHIC TABLE



DFT.GRUNTER.STRAT.TABLE 11/85

DWG. 2260/OP/4

APPENDIX 1

APPENDIX 1

MICROPALEONTOLOGICAL ANALYSIS

FORAMINIFERAL ANALYSIS,

GRUNTER-1,

GIPPSLAND BASIN

by

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1458L

INTERPRETATIVE DATA

INTRODUCTION

TABLE 1: BIOSTRATIGRAPHIC SUMMARY, GRUNTER-1:

GEOLOGICAL COMMENTS

DISCUSSION OF ZONES

REFERENCES

FORAMINIFERAL DATA SHEET

TABLE 2: INTERPRETATIVE DATA, GRUNTER-1

INTRODUCTION

Twenty three sidewall core samples from Grunter-1 between 1750.0m and 1895.0m (KB depth) were processed for foraminiferal analysis. All samples were scrutinised for planktonic foraminifera while only Latrobe Group samples were checked for benthonic foraminifera. An additional sample from deep within the Latrobe Group (sidewall core at 3770.0m) was checked for calcareous microfossils (foraminifera and calcareous nannoplankton) but it proved to be barren.

Table 1 provides a summary of the biostratigraphic breakdown in Grunter-1. Tables 2 and 3 summarise the palaeontological analysis of Grunter-1 (basic and interpretative). A range chart for foraminifera is included as basic data.

TABLE 1: BIOSTRATIGRAPHIC SUMMARY, GRUNTER-1

AGE	UNIT	ZONE	DEPTH (mKB)
			* above 1750.0
Early Miocene	Lakes Entrance Formation	F	1750.0
------------------ log break at 1763m (Mid Miocene Marker) ------------------			
Early Miocene	Lakes Entrance Formation	G	1783.9-1818.9
Early Miocene		H1	1833.1-1851.9
------------ log break at 1853m (basal Early Miocene disconformity) -----------			
# Middle Eocene	intra-Latrobe greensand	Indeterm.	1854.0-1858.0
---------- log break at 1858.5m (basal Middle Eocene disconformity) -----------			
# Early Eocene	Flounder Formation	Indeterm.	1860.0-1887.0
------------ log break at 1888m (basal Early Eocene disconformity) ------------			
# Late Paleocene	Latrobe Group ("Coarse Clastics")	Indeterm.	1889.6-1895.0
			* below 1895.0

TD 3809 mKB

* not studied

\# age based on palynological analysis of Macphail (1985)

1458L

GEOLOGICAL COMMENTS

The Latrobe Group "Coarse Clastics" is disconformably overlain by the Flounder Formation. The log break at 1888m equates with the basal Early Eocene sequence boundary event (Tuna/Flounder Channel cutting event) of Vail et al. (1977). The Flounder Formation channel fill in Grunter-1 is P. asperopolus (and possibly Upper M. diversus) in age (Macphail, 1985). A typical Flounder Formation agglutinated foraminiferal fauna was found near the base of the unit in the sidewall core sample at 1870.0m. The fauna is of no value in estimating the palaeobathymetric setting of the Flounder Formation.

The Flounder Formation is disconformably overlain by an intra-Latrobe greensand of Lower N. asperus (Middle Eocene) age. The boundary between the units (log break at 1858.5m) equates with the basal Middle Eocene disconformity (Marlin Channel cutting event) of Vail et al. (1977). The intra-Latrobe greensand consists of glauconitic siltstone and fine grained sandstone. The unit also contains fish teeth remains. The intra-Latrobe greensand represents a condensed sequence deposited during a transgressive phase.

The intra-Latrobe greensand is disconformably overlain by Lakes Entrance Formation of Early Miocene (Zone H1) age. The log break at 1853m probably equates with the basal Early Miocene sequence event of Vail et al. (1977). The hiatus between the intra-Latrobe greensand and the Lakes Entrance Formation spans at least 14my.

The log break at 1763m probably represents the Mid Miocene Seismic Marker. This event equates with a widespread latest Early Miocene disconformity which was initiated during Zone F time in the Gippsland Basin (Rexilius, 1983).

BIOSTRATIGRAPHIC ANALYSIS

Indeterminate Interval: 1854.0-1895.0m

The interval is barren of in situ planktonic foraminifera and cannot be age-dated. Miocene planktonic foraminifera were recorded throughout the interval but these are downhole contaminants from the Lakes Entrance Formation. Palynological evidence indicates that the interval is assignable to the Upper L. balmei (SWC at 1895.0m), Upper M. diversus (1860.0-1887.0m) and Lower N. asperus (1854.0-1858.0m) Zones (Macphail, 1985). An agglutinated foraminiferal fauna comprising species of the genera Bathysiphon, Ammobaculites, Halpophragmoides and Textularia was recorded near the base of the Flounder Formation (SWC at 1887.0m) but this assemblage is not age-diagnostic.

Zone H1: 1833.1-1851.9m

The uphole entry of Globigerina woodi connecta at 1851.9m defines the base of Zone H1 in the well.

Zone G: 1783.9-1818.9m

The first uphole appearance of Globigerinoides trilobus at 1813.9m defines the base of Zone G.

Zone F: 1750.0m

The occurrence of Globigerinoides sicanus without its descendant Praeorbulina glomerosa indicates that the sidewall core sample at 1750.0m is assignable to Zone F.

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VAIL, P. R., MITCHUM, R. M., & THOMPSON, S., 1977. Global cycles of relative changes of sea level. In: PAYTON, C.E. (Editor), Seismic Stratigraphy - Applications to Hydrocarbon Exploration. Am. Assoc. Pet. Geol., Mem., 26:83-97.

TABLE 2

SUMMARY OF PALAEONTOLOGICAL ANALYSIS, GRUNTER-1, GIPPSLAND BASIN

INTERPRETATIVE DATA

NATURE OF SAMPLE	DEPTH (mKB)	PLANKTONIC FORAMINIFERAL YIELD	PRESERVATION	PLANKTONIC FORAMINIFERAL DIVERSITY	ZONE	AGE	COMMENTS
SWC189	3770.0	Barren	-	-	-	-	
SWC129	1895.0	Barren	-	-	-	-	Contains downhole contaminants
SWC130	1889.6	Barren	-	-	-	-	from Miocene section.
SWC131	1887.0	Barren	-	-	-	-	Contains agglutinated forams.
SWC134	1875.0	Barren	-	-	-	-	
SWC135	1870.0	Barren	-	-	-	-	
SWC136	1865.1	Barren	-	-	-	-	Contains Miocene downhole contaminants.
SWC137	1860.0	Barren	-	-	-	-	
SWC138	1858.0	Barren	-	-	-	-	Contains Miocene downhole contaminants.
SWC139	1856.0	Barren	-	-	-	-	
SWC140	1854.0	Barren	-	-	-	-	
SWC141	1851.9	High	Moderate	Moderate	H1	Early Miocene	
SWC142	1850.0	High	Good	Moderate	H1	Early Miocene	Fish teeth, echinoid spines.
SWC143	1848.1	High	Moderate/good	Moderate/low	H1	Early Miocene	Fish teeth.
SWC144	1846.1	High	Good	Moderate/high	H1	Early Miocene	Echinoid spines.
SWC145	1844.0	High	Good	Moderate/high	H1	Early Miocene	
SWC146	1842.0	High	Good	Moderate	H1	Early Miocene	
SWC147	1840.0	High	Good	Moderate	H1	Early Miocene	
SWC148	1837.0	High	Moderate	Moderate	H1	Early Miocene	Echinoid spines.
SWC149	1833.1	High	Good	Moderate/high	H1	Early Miocene	
SWC150	1818.9	High	Good	Moderate	G	Early Miocene	Echinoid spines.
SWC151	1800.0	High	Good	Moderate	G	Early Miocene	
SWC152	1783.1	High	Moderate/good	Moderate/high	G	Early Miocene	
SWC153	1750.0	High	Good	Moderate	F	Early Miocene	

1458L

BASIC DATA

TABLE 3: BASIC DATA, GRUNTER-1

RANGE CHART: FORAMINIFERA

TABLE 3

SUMMARY OF PALAEONTOLOGICAL ANALYSIS, GRUNTER-1, GIPPSLAND BASIN

BASIC DATA

NATURE OF	DEPTH	PLANKTONIC FORAMINIFERAL	PRESERVATION	PLANKTONIC FORAMINIFERAL DIVERSITY
SWC189	3770.0	Barren	-	-
SWC129	1895.0	Barren	-	-
SWC130	1889.6	Barren	-	-
SWC131	1887.0	Barren	-	-
SWC134	1875.0	Barren	-	-
SWC135	1870.0	Barren	-	-
SWC136	1865.1	Barren	-	-
SWC137	1860.0	Barren	-	-
SWC138	1858.0	Barren	-	-
SWC139	1856.0	Barren	-	-
SWC140	1854.0	Barren	-	-
SWC141	1851.9	High	Moderate	Moderate
SWC142	1850.0	High	Good	Moderate
SWC143	1848.1	High	Moderate/good	Moderate/low
SWC144	1846.1	High	Good	Moderate/high
SWC145	1844.0	High	Good	Moderate/high
SWC146	1842.0	High	Good	Moderate
SWC147	1840.0	High	Good	Moderate
SWC148	1837.0	High	Moderate	Moderate
SWC149	1833.1	High	Good	Moderate/high
SWC150	1818.9	High	Good	Moderate
SWC151	1800.0	High	Good	Moderate
SWC152	1783.1	High	Moderate/good	Moderate/high
SWC153	1750.0	High	Good	Moderate

1458L

Well Name Grunter-1 Basin Gippsland Sheet No. 1 of 1

SAMPLE TYPE OR NO. *	189	129	130	131	134	135	136	137	138	139	140	141	142	143	144	145	146	147	[illegible]	149	150	151	152	153
FOSSIL NAMES / DEPTHS	3770.0	1895.0	1889.6	1887.0	1875.0	1870.0	1865.1	1860.0	1858.0	1856.0	1854.0	1851.9	1850.0	1848.1	1846.1	1844.0	1842.0	1840.0	1837.0	1833.1	1818.9	1800.0	1783.1	1750.0
PLANKTONIC FORAMINIFERA																								
Globigerina praebulloides												▬	—	---	▬	—	—	—	—	—	—	—	---	---
Globigerina woodi connecta								C				—	▬	—	—	—	—	—	—	---	—			
Globigerina woodi woodi		C					C	C				—	▬	▬	—	▬	▬	▬	▬	▬	▬	▬	▬	▬
Globorotalia obesa												---			---					---				
Globoquadrina dehiscens								C				—	---	---	---	—	▬	▬	▬	---			—	—
Globoquadrina advena												—	—		—	—	---	—	---	---			---	
Catapsydrax dissimilis												—	—	---	—	—		—	---					
Globigerina venezuelana													—			---				---				
Globorotalia bella														---	---	---		---	---			---	---	
Globigerina falconensis															—									
Globorotalia praescitula																				▬	▬	▬	---	—
Globorotalia zealandica zealandica																					---			
Globigerinoides trilobus			C				C														▬	---	---	—
Globorotalia miozea miozea							C														---	—	▬	▬
Globigerinoides sicanus																								—
Globigerina bulloides			C				C																	
Orbulina universa		C	C				C																	
Globorotalia nana			C																					
Globorotalia miozea conoidea																								
SELECTED BENTHONIC FORAMINIFERA (LATROBE GROUP)																								
indeterminate rotalids										—														
Bathysiphon sp. A (large, fine-grained)				---																				
Bathysiphon sp. B (small, coarse-grained)				---																				
Textularia sp. A				---																				
Ammobaculites sp. A				---																				
Haplophragmoides sp. A				—																				
indeterminate agglutinates				---																				

* C=CORE S=SIDEWALL CORE
T=CUTTINGS J=JUNK BASKET

--- Rare
— Few
▬ Common
C Downhole contamination

PALAEO.CHART-2
DWG.1107/OP/287

APPENDIX 2

APPENDIX 2

PALYNOLOGICAL ANALYSIS

APPENDIX

PALYNOLOGICAL ANALYSIS OF GRUNTER-1, GIPPSLAND BASIN

by

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INTERPRETATIVE DATA

INTRODUCTION

SUMMARY TABLE

GEOLOGICAL COMMENTS

DISCUSSION OF AGE ZONES

TABLE-1: INTERPRETATIVE DATA

TABLE-2: ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE POLLEN

PALYNOLOGY DATA SHEET

TABLE-3: BASIC DATA

INTRODUCTION

Eighty eight sidewall core and six conventional core samples were processed and analysed for spore-pollen and dinoflagellates. Recovery and preservation were adequate to make confident age determinations in all sections of the well. Close sampling in the Late Cretaceous section has revealed several marine incursions predating the Maastrichtian I. druggii Zone transgression.

Lithological units and palynological zones from the base of the Lakes Entrance Formation to T.D. are summarized below. Anomalous and unusual occurrences of taxa are listed in Table 2. Basic data is given in Table 3.

SUMMARY

AGE	UNIT	ZONE	DEPTH (m)
Early Miocene	Lakes Entrance Fm.	P. tuberculatus	1850.1-1851.9
log break at 1853m			
Middle Eocene	Gurnard Fm.	Lower N. asperus	1854.0-1858.0
log break at 1858m			
Early Eocene	Flounder Fm.	P. asperopolus	1860.0-1887.0
log break at 1888m			
Paleocene		Upper L. balmei	1889.6-2213.0
Paleocene	Latrobe Group	Lower L. balmei	2244.6-2590.1
Maastrichtian	coarse clastics	Upper T. longus	2645.0-2961.0
Late Cretaceous		Lower T. longus	2975.0-3403.0
Late Cretaceous		T. lilliei	3423.9-3797.0

GEOLOGICAL COMMENTS

1. The Grunter-1 well contains a continuous sequence of sediments from the Late Cretaceous T. lilliei Zone to the Paleocene Upper L. balmei Zone. These are unconformably overlain by the Early Eocene, P. asperopolus Zone Flounder Formation which in turn is disconformably overlain by the Middle Eocene, Lower N. asperus Zone Gurnard Formation.

2. The greensand unit at the top of the Latrobe Group in Flounder-4 contains P. tuberculatus Zone spore-pollen and dinoflagellates. The confident Lower N. asperus Zone age for the Gurnard Formation in Grunter-1 supports Partridge's (1973) suggestion that the greensand unit in Flounder-4 was originally deposited in the Middle Eocene and later reworked during the Oligocene.

3. Whilst the upper section of the Flounder Formation [1870.0-1875.0m] in Grunter-1 is certainly P. asperopolus/K. edwardsii Zone in age, it is not clear whether the lower section [1875.0-1887.0m] which was sampled by only one sidewall core is Upper M. diversus or P. asperopolus Zone in age. Sediments of both ages are present in Flounder-4 where the Upper M. diversus Zone section is found associated with W. ornata Zone dinoflagellates (see Partridge 1973, 1976). In contrast, Flounder Formation sediments in Stonefish-1 are dated as wholly P. asperopolus Zone in age. Indicator dinoflagellate species are absent and this date is wholly based on spore-pollen evidence.

4. In Flounder-4, a unit dated as Lower M. diversus Zone is present between the Upper L. balmei/A. homomorpha Zone section and the base of the Tuna-Flounder Channel. This unit, assumed to also be a channel fill, is not present in Grunter-1 or Stonefish-1.

5. At least 8 distinct marine incursions can be recognized in the Late Cretaceous-Paleocene section in Grunter-1. Incursions which can be associated with named dinoflagellate zones are A. homomorpha Zone [1889.6-2213.0m], the T. evittii Zone [2554.0m]? and the I. druggii Zone [2774.0m, 2961.0m]. It appears likely that the I. druggii Zone incursion occurred in two separate 'pulses'. Incursions older than the Maastrichtian I. druggii Zone are represented at 3007.1m and 3125.0m in Lower T. longus Zone sediments, and 3446.0m and 3770.0m in T. lilliei Zone sediments.

6. All the Paleocene-Late Cretaceous marine-influenced sediments appear to have been deposited in marginal marine situations within a coastal plain environment, e.g. in fluvial/tidal channels or coastal lagoons analogous to those along the present-day Gippsland coast. This includes the 535m thick section of A. homomorpha Zone sediments [1889.6-2425.0m], interpreted seismically as Paleocene channel fill units.

7. The Grunter-1 well is likely to have bottomed in T. lilliei rather than, as predicted, N. senectus Zone sediments. The basal sidewall case sample in Stonefish-1 (10,424 ft) would, on present criteria, be dated as T. lilliei Zone [confidence rtg 2] due to occurrences of Gambierina rudata. Both wells demonstrate rapid sedimentation [1152m, 693m respectively] and therefore a period of major subsidence during the Late Cretaceous. The thinner total thickness of T. longus-T. lilliei Zone sediments at Sunfish-1 relative to Grunter-1 reflects its closer position relative to the northern margin of the basin.

BIOSTRATIGRAPHY

Zone boundaries have been established using criteria proposed by Stover & Partridge (1973) and subsequent proprietary reports, including Macphail (1983). Close sampling has revealed a number of discrepancies which are likely to lead to further modification of these criteria:

1. The I. druggii Zone appears to be coeval with the full, rather than merely the upper part of the Upper T. longus Zone. In Grunter-1, Isabelidinium druggii appears in two samples separated in part by coastal plain sediments. The first occurrence precedes the first appearance of the Upper T. longus Zone indicator species, Stereisporities punctatus, i.e. the dinoflagellate first appears in a typically Lower T. longus Zone spore-pollen assemblage.

2. Lower T. longus Zone palynofloras as defined by either the first appearance of Tricolpites longus or Quadraplanus brossus are initially dominated by Nothofagidites pollen. This dominance is more typical of T. lilliei or upper N. senectus Zone palynofloras. Dominance of Gambierina rudata first appears within the Lower T. longus Zone.

3. Proteacidites gemmatus extends from within the Lower T. longus to within the Upper L. balmei Zone, not, as previous data indicated, from the Upper T. longus to Lower L. balmei Zone.

4. The Grunter-1 data confirm previous suspicions that both Verrucosisporities kopukuensis and Apectodinium homomorpha first appear in Lower L. balmei Zone sediments [based on correlation with other wells]. It is still premature to define the lower boundary of the Upper L. balmei Zone by the first appearance of Proteacidites incurvatus and/or Cyathidites

gigantis since both are relatively uncommon. Other taxa which first appear within the Upper L. balmei Zone as defined by the first occurrence of V. kopukuensis are (relative frequency of occurrence in parentheses): Proteacidites annularis and Malvacipollis subtilis (frequent) and, Banksieacidites lunatus [ms sp.nov.], Cupanieidites orthoteichus and Triporopollenites ambiguus (infrequent to very rare). The first appearance of P. annularis and M. subtilis are used in this well to provisionally define the Upper/Lower L. balmei Zone boundary.

Tricolporites lilliei Zone: 3423.9 to 3797.0m

This section comprises palynofloras dominated by Nothofagidites and Proteacidites spp, less frequently by gymnosperms and Gambierina rudata. Although the first appearance of the zone indicator T. lilliei is at 3785.0m, the basal sidewall core at 3797.0m is provisionally assigned to this zone on the basis of a possible specimen of Gambierina rudata and the overall similarity of this to other T. lilliei Zone palynofloras. The upper boundary of the zone is defined by the highest occurrence of Tricolporites lilliei in an assemblage lacking T. longus Zone indicators.

Lower Tricolpites longus Zone: 2975.0 to 3403.0m

The base of this zone is picked at the first appearance of Tricolpites longus at 3403.0m. These are however two reasons for suspecting that this solitary record is anomolous and that the section may prove to be correlated with T. lilliei Zone sediments in adjacent wells. Firstly, the single specimen recorded is some 200m below the next lowest Lower T. longus Zone indicator species, (Quadraplanus brossus at 3204.0m). The specimen was recovered from a closely sampled core taken in carbonaceous siltstones. It would be extremely fortuitous for an equivalent occurrence to be found in sidewall cores. Secondly, the general appearance of palynofloras in this and adjacent samples is T. lilliei Zone in character, i.e. frequent to abundant Nothofagidites, Tricolporites lilliei and Triporopollenites sectilis. The first appearance of Quadraplanus brossus at 3204.0m provides an alternative pick for the lower boundary. Gambierina rudata dominates the palynofloras above 3007.1m and the upper boundary is picked at 2975.0m. This sample contains the highest occurrence of Tricolpites labrum. The sample at 3125.0m contains at least four dinoflagellate species, one of which (Apectodinium sp. cf. A. homomorpha) is frequent in occurrence.

Upper Tricolpites longus Zone: 2645.0 to 2961.0m

This section is characterized by Gambierina-Proteacidites dominated palynofloras, many of which also contain Tricolpites longus and Stereisporites punctatus. The lower boundary is provisionally picked on the first appearance of Isabelidinium druggii at 2961.0m. S. punctatus first occurs at 2877.0m but I. druggii does not reappear until 2774.1m Apparently non-marine environments are represented within the intervening section, at 2949.0m and 2836.0m. The upper boundary is defined by the last appearance of Tricolpites longus and abundant Gambierina at 2645.0m.

Lower Lygistepollenites balmei Zone: 2244.6 to 2590.1m

The lower boundary is placed at 2590.1m, the first occurrence of a gymmnosperm - Proteacidites palynoflora lacking in species restricted to the Late Cretaceous. Trithyrodinium evittii at 2554.0m confirms a Lower L. balmei Zone age for this sample. The same sample also contains the typically Late Cretaceous species Proteacidites otwayensis, apparently in situ. The upper boundary is provisionally picked at 2244.6m, the sample immediately below the first appearance of Proteacidites annularis and Malvacipollis subtilis. This sample is 180m above the first (simultaneous) appearance of Verrucosisporites kopukuensis and Apectodinium homomorpha.

Upper Lygistepollenites balmei: 1889.6 to 2213.0m

Samples within this section contain frequent to abundant Lygistepollenites balmei, Podocarpidites, Proteacidites and Apectodinium homomorpha. Gambierina spp. and Polycolpites langstonii are usually present. For reasons given above, the lower boundary is placed at 2213.0m Other first appearances within this zone are: Haloragacidites harrisii and Proteacidites incurvatus at 2103.0m, Banksieaeidites lunatus at 1975.6m, Cupanieidites orthoteichus at 1912.0m and Cyathidites gigantis at 1895.0m. The upper boundary at 1889.6m tightly defined by a L. balmei - dominated palynoflora containing P. incurvatus and C. gigantis as well as species which last appear in this zone e.g. Gambierina rudata and Polycolpites langstonii.

Proteacidites asperopolus Zone: 1860.0 to 1887.0m

Five samples are assigned to this zone, the upper one [1860.0m] provisionally so. The lower four, between 1865.1 and 1887.0m, contain Proteacidites pachypolus and Myrtaceidites tenuis, species which first appear in the Upper M. diversus Zone but which extend into the P. asperopolus Zone (M. tenuis) or higher (P. asperopolus). The only positive evidence of a P. asperopolus Zone age for the section is the occurrence of the dinoflagellate Kisselovia (Wetzeliella) edwardsii at 1875.0m. The sample at 1870.0 contains frequent occurrences of a Wetzeliella-group dinoflagellate closely resembling an Upper M. diversus Zone indicator species, Rhombodinium waipawaense. This species, provisionally identified as Wilsonidium (al. Wetzeliella) lineidentatum (Cookson & Eisenack 1961), has not been previously recorded in the Gippsland Basin.

Lower Nothofagidites asperus Zone: 1854.0 to 1858.0m

Occurrences of the dinoflagellates Areosphaeridium diktyoplokus at 1856.0 and 1858.0m, and Deflandrea heterophylcta at 1854.0m demonstrate this interval is Lower *N. asperus* Zone in age.

Proteacidites tuberculatus Zone: 1850 to 1851.9m

Occurrences of *Cyatheacidites annulatus* and *Protoellipsodinium simplex* at 1850.0 and 1851.9m demonstrate a *P. tuberculatus* Zone age from this section. Although the spore-pollen yield is very low and dominated by wind-dispersed types, one member of a taxon that is generally poorly dispersed was present - *Proteacidites rectomarginis* at 1851.9m. This sample also contains the first record in Gippsland of the Western Australian dinoflagellate, *Rottnestia borussia*.

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PALYNOLOGY DATA SHEET

BASIN: Gippsland | ELEVATION: KB: +21.0m | GL:

WELL NAME: Grunter-1 | TOTAL DEPTH: 3809m KB

AGE	PALYNOLOGICAL ZONES	HIGHEST DATA					LOWEST DATA				
		Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time
NEOGENE	*T. pleistocenicus*										
	M. lipsis										
	C. bifurcatus										
	T. bellus										
PALEOGENE	*P. tuberculatus*	1850.0	0				1851.9	0			
	Upper *N. asperus*										
	Mid *N. asperus*										
	Lower *N. asperus*	1854.0	2	1856.0	1		1858.0	1			
	P. asperopolus	1865.1	2	1875.0	0		1887.0	2	1875.0	0	
	Upper *M. diversus*										
	Mid *M. diversus*										
	Lower *M. diversus*										
	Upper *L. balmei*	1889.6	0				2213.0	1			
	Lower *L. balmei*	2244.6	2				2590.1	2			
LATE CRETACEOUS	Upper *R. longus*	2645.0	0				2961.0	2	2877.0	0	
	Lower *R. longus*	3007.1	1				3403.0	2	3204.0	1	
	T. lilliei	3423.9	1				3797.0	2	3770.0	0	
	N. senectus										
	T. apoxyexinus										
	P. mawsonii										
	A. distocarinatus										
EARLY CRET.	*P. pannosus*										
	C. paradoxa										
	C. striatus										
	C. hughesi										
	F. wonthaggiensis										
	C. australiensis										

COMMENTS: Kisselovia (Wetzeliella) edwardsii Zone 1875.0m
A. homomorpha Zone 1889.6-2425.0m;
?T. evittii Zone 2554.0m; I. druggii Zone 2774.1m, 2961.0m
Campanian marginal marine environments 3007.1m, 3125.0m, 3446.0m, 3770.0m.

CONFIDENCE RATING:
- 0: 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: M.K. Macphail | DATE: 12 May 1985

DATA REVISED BY: | DATE:

TABLE 1: SUMMARY OF INTERPRETATIVE PALYNOLOGICAL DATA

GRUNTER-1

SAMPLE NO.	DEPTH (m)	SPORE-POLLEN ZONE	DINOFLAGELLATE ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 142	1850.0	P. tuberculatus	-	Early Miocene	0	C. annulatus, P. simplex
SWC 141	1851.9	P. tuberculatus	-	Early Miocene	0	C. annulatus, P. simplex, P. rectomarginis
SWC 140	1854.0	Lower N. asperus	D. heterophylcta	Middle Eocene	1	N. falcatus, D. heterophylcta
SWC 139	1856.0	Lower N. asperus	A. diktyoplokus	Middle Eocene	1	A. diktyoplokus
SWC 138	1858.0	Lower N. asperus	A. diktyoplokus	Middle Eocene	1	A. diktyoplokus, D. flounderensis
SWC 137	1860.0	P. asperopolus	-	Early Eocene	2	P. pachypolus
SWC 136	1865.1	P. asperopolus	-	Early Eocene	2	P. pachypolus, M. tenuis
SWC 135	1870.0	P. asperopolus	-	Early Eocene	2	P. pachypolus, M. tenuis
SWC 134	1875.0	P. asperopolus	K. edwardsii	Early Eocene	0	K. edwardsii, P. pachypolus, M. tenuis
SWC 131	1887.0	Upper M. diversus	-	Early Eocene	2	P. pachypolus, M. tenuis
SWC 130	1889.6	Upper L. balmei	A. homomorpha	Paleocene	0	L. balmei common, C. gigantis, P. incurvatus, A. homomorpha
SWC 129	1895.0	Upper L. balmei	A. homomorpha	Paleocene	0	L. balmei common, C. gigantis, P. annularis
SWC 127	1911.0	Indet.	-	-	-	Caved Eocene spore-pollen
SWC 126	1912.0	Upper L. balmei	-	Paleocene	1	P. annularis, V. kopukuensis
SWC 125	1919.1	Upper L. balmei	A. homomorpha	Paleocene	1	P langstonii, P. annularis, abund. A. homomorpha
SWC 123	1940.0	Upper L. balmei	A. homomorpha	Paleocene	1	P langstonii, P. incurvatus, V. kopukuensis
SWC 122	1975.6	Upper L. balmei	A. homomorpha	Paleocene	2	M. subtilis, B. lunatus, A. homomorpha
SWC 121	1981.0	Upper L. balmei	-	Paleocene	2	L. balmei common, P. langstonii

SAMPLE NO.	DEPTH (m)	SPORE-POLLEN ZONE	DINOFLAGELLATE ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 120	2009.0	Upper L. balmei	A. homomorpha	Paleocene	2	A. homomorpha
SWC 119	2011.1	Upper L. balmei	A. homomorpha	Paleocene	1	A. homomorpha
SWC 115	2052.0	Indet.	-	-	-	
SWC 113	2103.0	Upper L. balmei	A. homomorpha	Paleocene	0	L. balmei freq., P. incurvatus, M. subtilis
SWC 110	2128.0	Upper L. balmei	A. homomorpha	Paleocene	2	
SWC 105	2176.0	Upper L. balmei	-	Paleocene	2	P. langstonii
SWC 102	2213.0	Upper L. balmei	-	Paleocene	1	P. langstonii, P. annularis, M. subtilis
SWC 179	2244.6	Lower L. balmei	A. homomorpha	Paleocene	2	A. homomorpha
SWC 175	2306.5	L. balmei	-	Paleocene	-	
SWC 96	2340.1	L. balmei	-	Paleocene	-	L. balmei common
SWC 91	2411.0	Lower L. balmei	A. homomorpha	Paleocene	2	A. homomorpha, D. medcalfii
SWC 90	2425.0	Lower L. balmei	A. homomorpha	Paleocene	2	L. balmei common, V. kopukuensis
SWC 84	2536.0	Lower L. balmei	-	Paleocene	2	Trithyrodinium
SWC 169	2539.1	Lower L. balmei	-	Paleocene	2	
SWC 82	2554.0	Lower L. balmei	? T. evittii	Paleocene	1	T. evittii
SWC 81	2570.1	L. balmei	-	Paleocene	-	D. medcalfii
SWC 80	2581.0	Indet.	-	-	-	C. inodes
SWC 79	2590.1	Lower L. balmei	-	Paleocene	2	G. retiintexta, C. inodes
SWC 78	2645.0	Upper T. longus	-	Maastrichtian	0	G. rudata abund., S. punctatus, T. longus
SWC 166	2649.0	Upper T. longus	-	Maastrichtian	2	T. longus, T. lilliei

TABLE 1: SUMMARY OF INTERPRETATIVE PALYNOLOGICAL DATA

GRUNTER-1

SAMPLE NO.	DEPTH (m)	SPORE-POLLEN ZONE	DINOFLAGELLATE ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 76	2673.1	Indet.	-	-	-	
SWC 75	2678.0	Indet.	-	-	-	
SWC 74	2683.1	Upper T. longus	-	Maastrichtian	0	S. punctatus; T. longus; abund. G. rudata
SWC 71	2751.1	Upper T. longus	-	Maastrichtian	0	S. punctatus; T. longus; abund. G. rudata
SWC 162	2774.1	Upper T. longus	? I. druggii	Maastrichtian	0	S. punctatus, I. cf druggii
SWC 69	2801.0	Upper T. longus	-	Maastrichtian	1	S. punctatus
SWC 68	2836.0	Upper T. longus	-	Maastrichtian	2	Spore-dominated palynoflora
SWC 67	2865.0	Upper T. longus	-	Maastrichtian	2	T. longus
SWC 160	2877.0	Upper T. longus	-	Maastrichtian	0	S. punctatus; T. longus; common G. rudata
SWC 65	2914.0	Upper T. longus	-	Late Cretaceous	2	G. rudata common, marginal marine?
SWC 64	2929.0	Upper T. longus	-	Late Cretaceous	2	G. rudata common, S. meridianus
SWC 63	2949.0	Upper T. longus	-	Late Cretaceous	2	G. rudata common, T. longus
SWC 159	2961.0	Upper T. longus	-	Late Cretaceous	2	G. rudata abund., T. longus, I. druggii
SWC 62	2975.0	No older than T. lilliei Zone		Late Cretaceous	-	T. lilliei, T. labrum
SWC 61	2993.0	Indet.	-	-	-	
SWC 60	3007.1	Lower T. longus	-	Late Cretaceous	1	G. rudata common, T. longus
SWC 58	3038.5	T. longus	-	Late Cretaceous	-	P gemmatus
SWC 57	3057.0	Lower T. longus	-	Late Cretaceous	-	G. rudata abund., Q. brossus
SWC 52	3112.0	No older than T. lilliei Zone		Late Cretaceous	-	T. lilliei
SWC 30	3125.0	No older than T. lilliei Zone		Late Cretaceous	-	Nothofagidites common, T. lilliei
SWC 27	3174.9	T. longus	-	Late Cretaceous	-	P. gemmatus, T. lilliei
SWC 24	3204.0	Lower T. longus	-	Late Cretaceous	1	Q. brossus

TABLE I: SUMMARY OF INTERPRETATIVE PALYNOLOGICAL DATA

GRUNTER-I

SAMPLE NO.	DEPTH (m)	SPORE-POLLEN ZONE	DINOFLAGELLATE ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 22	3233.0	No older than *T. lilliei* Zone		Late Cretaceous	-	*T. lilliei*, common *Nothofagidites*
SWC 21	3250.0	No older than *T. lilliei* Zone		Late Cretaceous	-	*T. lilliei*, common *Nothofagidites*, *T. verrucosus*
SWC 20	3267.1					
SWC 19	3282.0	No older than *T. lilliei* Zone		Late Cretaceous	-	*T. sectilis*, *G. rudata*
SWC 18	3300.0					
SWC 17	3317.5					
SWC 16	3330.1	Indet.	-	-	-	*L. amplus*
SWC 15	3344.8	No older than *T. lilliei* Zone		Late Cretaceous	-	*T. lilliei*, *T. sectilis*
SWC 14	3396.0	No older than *T. lilliei* Zone		Late Cretaceous	-	*T. lilliei*
Core 1	3397.0	Indet.				
Core 1	3400	No older than *T. lilliei* Zone		Late Cretaceous	-	*T. lilliei*, abund. *Nothofagidites*
Core 1	3403.0	Lower *T. longus*	-	Late Cretaceous	2	*T. longus*, common *Nothofagidites*
SWC 10	3423.9	*T. lilliei*	-	Late Cretaceous	1	*T. lilliei*, *N. flemingii*
Core 2	3434.0	*T. lilliei*	-	Late Cretaceous	1	*T. lilliei*
Core 2	3446.0	*T. lilliei*	-	Late Cretaceous	2	
Core 2	3450.8	*T. lilliei*	-	Late Cretaceous	1	*T. lilliei*, common *Nothofagidites*
SWC 5	3500.5	*T. lilliei*	-	Late Cretaceous	1	*T. lilliei*, *N. flemingii*
SWC 4	3527.0	*T. lilliei*	-	Late Cretaceous	1	*T. sectilis*, *G. rudata*, common *Nothofagidites*
SWC 243	3550.0	No older than *N. senectus* Zone		Late Cretaceous	-	*Nothfagidites* spp.
SWC 1	3559.5	Indet.	-	-	-	

1534L

TABLE I: SUMMARY OF INTERPRETATIVE PALYNOLOGICAL DATA

GRUNTER-1

SAMPLE NO.	DEPTH (m)	SPORE-POLLEN ZONE	DINOFLAGELLATE ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 213	3567.5	Indet.	-	-	-	
SWC 212	3571.0	Indet.	-	-	-	
SWC 210	3578.5	Indet.	-	-	-	
SWC 208	3604.0	Indet.	-	-	-	
SWC 207	3614.5	No older than *N. senectus* Zone		Late Cretaceous	-	*N. waipawaensis*
SWC 237	3618.5	Indet.	-	-	-	
SWC 235	3630.0	No older than *N. senectus* Zone		Late Cretaceous	-	*N. waipawaensis*
SWC 229	3676.0	*T. lilliei*	-	Late Cretaceous	1	*N. flemingii*
SWC 228	3679.0	*T. lilliei*	-	Late Cretaceous	1	*G. rudata*
SWC 192	3746.0	*T. lilliei*	-	Late Cretaceous	1	*G. rudata* frequent
SWC 219	3761.0	*T. lilliei*	-	Late Cretaceous	0	*T. lilliei*, *G. rudata*, common *Nothofagidites*
SWC 189	3770.0	*T. lilliei*	-	Late Cretaceous	0	*T. lilliei*, *T. sectilis*, *G. rudata*; marginal marine
SWC 187	3785.0	*T. lilliei*	-	Late Cretaceous	1	*T. lilliei*, *F. verrucatus*
SWC 185	3797.0	No older than *N. senectus* Zone		Late Cretaceous	-	Possible *G. rudata*

TABLE 2

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN GRUNTER-1

SAMPLE NO.	DEPTH(m)	ZONE	TAXON	COMMENTS
SWC 141	1851.9	P. tuberculatus (0)	Rottnestia borussica	First record of this West. Aust. dinoflagellate in Gippsland
SWC 141	1851.9	P. tuberculatus (0)	Proteacidites rectomarginis	Uncommon sp.
SWC 137	1860.0	Lower N. asperus (2)	Cupressaceae-Taxodiaceae	Modern taxon
SWC 137	1860.0	Lower N. asperus	Proteacidites callosus	Uncommon sp.
SWC 136	1865.1		Triporopollenites sectilis	Reworked Late Cretaceous sp.
SWC 136	1865.1	(P. asperopolus)	Dryptopollenites semilunatus	Rare sp.
SWC 136	1865.1	(P. asperopolus)	Peromonolites bacculatus	Rare sp.
SWC 135	1870.0	(P. asperopolus)	Wetzeliella lineidentata	West. Aust. dinoflagellate resembling R. waipawaense
SWC 135	1870.0	(P. asperopolus)	Cunoniaceae 3-p	Modern taxon
SWC 135	1870.0	(P. asperopolus)	Ornamentifera apiculatus	Rare ms sp. (M.K.M.)
SWC 134	1875.0	P. asperopolus (0)	Kisselovia edwardsii	Very rare dinoflagellate sp.
SWC 131	1887.0	(P. asperopolus)	Elphredripites notensis	Uncommon sp.
SWC 131	1887.0	Upper M. diversus (2)	Proteacidites xestoformis	Uncommon sp.
SWC 131	1887.0	Upper M. diversus (2)	Peromonolites baculatus	Rare sp.
SWC 130	1889.6	Upper L. balmei (0)	Liliacidites sernatus	Rare sp.
SWC 129	1895.0	Upper L. balmei (0)	Cupanieidites orthoteichus	Very rare below M. diversus Zone
SWC 129	1895.0	Upper L. balmei (0)	Jaxtacolpus pieratus	Rare above Lower L. balmei Zone
SWC 126	1912.0	Upper L. balmei (1)	Cupanieidites orthoteichus	As for SWC 129
SWC 126	1912.0	Upper L. balmei (1)	Umbelliferae	Modern taxon
SWC 125	1919.1	Upper L. balmei (1)	Liliacidites sernatus	As for SWC 130
SWC 125	1919.1	Upper L. balmei (1)	Triporopollenites ambiguus	Rare below

TABLE 2

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN GRUNTER-1

SAMPLE NO.	DEPTH(m)	ZONE	TAXON	COMMENTS
SWC 123	1940.0	(Upper L. balmei)	Proteacidites crassus, P. recavus, Liliacidites lanceolatus	Caved?
SWC 123	1940.0	(Upper L. balmei)	Elphredripites notensis	As for SWC 131
SWC 122	1975.6	Upper L. balmei (2)	Banksieaidites lunatus	Uncommon ms sp. (A.D.P.) first appearing in this zone
SWC 122	1975.6	Upper L. balmei (2)	Malvacipollis subtilis	Uncommon ms sp. (A.D.P.) first appearing in this zone
SWC 122	1975.6	Upper L. balmei (2)	Cunoniaceae 3-p	Modern taxon
SWC 122	1975.6	Upper L. balmei (2)	Periporopollenites vesicus	Rare below Eocene
SWC 122	1975.6	Upper L. balmei (2)	Simplicepollis meridianus	Planar tetrad form
SWC 121	1981.0	Upper L. balmei (2)	Cunoniaceae 3-p	as for SWC 122
SWC 121	1981.0	Upper L. balmei (2)	Proteacidites otwayensis	Seems in situ, non-marine sample
SWC 120	2009.0	Upper L. balmei (2)	Parvisaccites catastus	Uncommon sp.
SWC 119	2011.1	Upper L. balmei (2)	Triporopollenites delicatus	Rare sp.
SWC 113	2103.0	Upper L. balmei (1)	Proteacidites gemmatus	Very rare above Lower L. balmei Zone, possibly reworked: marine sample
SWC 105	2176.0	(Upper L. balmei)	Gephyrapollenites cranwellae	Uncommon sp.
SWC 105	2176.0	(Upper L. balmei)	Liliacidites lanceolatus	Not prev. recorded below M. diversus Zone
SWC 96	2340.1	(Upper L. balmei)	Gephyrapollenites cranwellae	As for SWC 105
SWC 90	2425.0	Upper L. balmei (2)	Gephyrapollenites cranwellae	As for SWC 105
SWC 90	2425.0	Upper L. balmei (2)	Elphredripites notensis	As for SWC 131
SWC 84	2536.0	Lower L. balmei (2)	Cunoniaceae 3-p	Modern taxon
SWC 84	2536.0	Lower L. balmei (2)	Amosopollis cruciformis	Unusually common in sample
SWC 169	2539.1	Lower L. balmei (2)	Cunoniaceae 3-p	Modern taxon
SWC 82	2554.0	Lower L. balmei (2)	Gambierina verrucatus	Rare ms sp. (M.K.M.)

TABLE 2

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN GRUNTER-I

SAMPLE NO.	DEPTH(m)	ZONE	TAXON	COMMENTS
SWC 82	2554.0	Lower L. balmei (I)	Proteacidites otwayensis	Very rare above T. longus Zone
SWC 82	2554.0	Lower L. balmei (I)	Trithyrodinium evittii	Uncommon dinoflagellate
SWC 77	2645.0	Upper T. longus (0)	Proteacidites protograndis	Rare ms sp. (M.K.M.)
SWC 74	2683.1	Upper T. longus (0)	Proteacidites protograndis	Rare ms sp. (M.K.M.)
SWC 162	274.1	Upper T. longus (0)	Jaxtacolpus pieratus	Rare sp.
SWC 64	2929.0	Upper T. longus (2)	Spinidinium/Apectodinium	Undescr. Late Cretaceous dinoflagellate
SWC 159	2961.0	Upper T. longus (2)	Dicktyotosporites speciosun	?Reworked Early Cretaceous sp.
SWC 159	2961.0	Upper T. longus (2)	Isobelidinium druggii	Uncommon dinoflagellate
SWC 62	2975.0	(T. longus)	Tricolpites labrum	Highest occurrence of sp. in well
SWC 62	2975.0	(T. longus)	Foveotriletes balteus	Rare in this zone
SWC 58	3038.5	(Lower T. longus)	Proteacidites gemmatus	Not prev. recorded below Upper T. longus Zone
SWC 30	3125.0	(Lower T. longus)	Spinidinium/Apectodinium	Undescr. Late Cretaceous dinoflagellate
SWC 30	3125.0	(Lower T. longus)	Grapnelispora cf evansii	Form with simple processes
SWC 27	3174.9	(Lower T. longus)	Proteacidites gemmatus	Not prev. recorded below Upper T. longus Zone
SWC 24	3204.0	Lower T. longus (I)	Quadraplanus brossus	Rare sp.
SWC 11	3250.0	(Lower T. longus)	Tetracolporites verrucosus	Rare below Upper T. longus Zone
SWC 14	3359.8	(Lower T. longus)	Triporopollenites sectilis, f. verrucatus	Uncommon variety
Core 1	3396.0	(Lower T. longus)	Tetracolporites verrucosus	As for SWC 21
Core 1	3400.0	(Lower T. longus)	Tetracolporites verrucosus	As for SWC 21
Core 1	3403.0	Lower T longus (I)	Tricolpites longus	In Nothofagidites - Proteacidites assemblage
Core 2	3446.0	T. lilliei (2)	Elphredripites notensis	Uncommon sp.
Core 2	3450.8	T. lilliei (I)	Tetracolporites verrucosus	Prolate and oblate specimens. As for SWC 21

TABLE 2

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN GRUNTER-1

SAMPLE NO.	DEPTH(m)	ZONE	TAXON	COMMENTS
SWC 4	3527.0	T. lilliei (1)	Ornamentifera sentosa	Rare sp.
SWC 4	3527.0	T. lilliei (1)	Tetracolporites verrucosus	As for SWC 21
SWC 192	3746.0	T. lilliei (1)	Tricolpites remarkensis	Rare sp.
SWC 192	3746.0	T. lilliei (1)	Gephyrapollenites cranwellae	Uncommon sp.
SWC 192	3746.0	T. lilliei (1)	Phyllocladidites verrucosus	Uncommon sp.
SWC 219	3761.0	T. lilliei (1)	cf Haloragacidites harrisii	In coal palynoflora
SWC 187	3785.0	T. lilliei (1)	Tricolporites lilliei	Verrucate var.
SWC 187	3785.0	T. lilliei (1)	Nothofagidites brachyspinulosus	Rare in Late Cretaceous

TABLE 3: SUMMARY OF BASIC PALYNOLOGICAL DATA

GRUNTER-1

DIVERSITY -	low	medium	high
S & P	less than 10	10-30	greater than 30
D	1-3	3-10	10

SAMPLE NO.	DEPTH (m)	YIELD SPORE-POLLEN	YIELD DINOS	DIVERSITY SPORE-POLLEN	DIVERSITY DINOS	PRESERVATION	LITHOLOGY	COMMENTS
SWC 142	1850.0	Low	Good	Low	Low	Variable	Slst., calc., glau.	
SWC 141	1851.9	Fair	Fair	Low	Medium	Fair	Slst., calc., glau.	
SWC 140	1850.0	Fair	Fair	Low	Medium	Poor	Slst., calc., glau.	
SWC 139	1856.0	Low	Low	Low	Low	Poor	Slst., calc., glau.	
SWC 138	1858.0	Low	Low	Low	Low	Poor	Slst., glau.	
SWC 137	1860.0	V. low	-	High	-	Good	Ss., carb.	
SWC 136	1865.1	Low	Low	Medium	Low	Fair	Ss., carb.	
SWC 135	1870.0	Low	V. low	Medium	Medium	Good	Slst., carb.	
SWC 134	1875.0	Good	Low	High	Low	Good	Slst., carb.	
SWC 131	1887.0	Fair	V. good	High	Medium	Fair	Slst.	Weakly pyritized
SWC 130	1884.6	V. good	V. low	Medium	Low	Fair	Slst.	
SWC 129	1895.0	V. good	V. low	Medium	Low	Good	Slst., laminated	Weakly pyritized
SWC 127	1911.0	Neglig.	-	Low	-	Good	Slst., carb.	
SWC 126	1912.0	Fair	-	High	-	Fair	Slst., carb.	
SWC 125	1919.1	Low	Good	Medium	Medium	Good	Slst.	Weakly pyritized
SWC 122	1975.6	Fair	V. low	High	Low	Good	Ss., carb.	
SWC 120	2009.0	Low	V. low	Low	Low	Variable	Slst., carb.	Weakly pyritized
SWC 119	2011.1	V. low	V. low	Low	Low	Good	Slst., carb.	
SWC 115	2052.0	-	-	-	-	-	Slst., carb.	

TABLE 3: SUMMARY OF BASIC PALYNOLOGICAL DATA

GRUNTER-1

DIVERSITY -	low	medium	high
S & P	less than 10	10-30	greater than 30
D	1-3	3-10	10

SAMPLE NO.	DEPTH (m)	YIELD SPORE-POLLEN	YIELD DINOS	DIVERSITY SPORE-POLLEN	DIVERSITY DINOS	PRESERVATION	LITHOLOGY	COMMENTS
SWC 113	2103.0	Good	Low	Medium	Low	Fair	Slst.	Mod. pyritized
SWC 110	2128.0	Good	Fair	Medium	Low	Fair	Slst., carb.	
SWC 105	2176.0	Fair	-	Medium	-	Fair	Slst., carb.	Mod. pyritized, rapid scan
SWC 102	2213.0	Fair	Low	Medium	Medium	Good	Slst.	Weakly pyritized
SWC 179	2244.6	Fair	V. low	Low	Low	Fair	Slst.	
SWC 175	2306.5	Good	-	Low	-	Poor	sh.	Rapid scan
SWC 96	2340.1	Low	Low	Medium	Medium	Poor	Slst., carb.	Mod. pyritized
SWC 91	2411.0	V. good	V. good	Medium	High	Variable	Slst.	Mod. pyritized
SWC 90	2425.0	V. good	V. good	High	Medium	Fair	Slst.	Strong pyritized
SWC 169	2539.1	Low	V. low	High	Low	Poor	Slst.	Weakly pyritized
SWC 84	2536.0	Good	V. low	Medium	Low	Fair	Slst.	Weakly pyritized
SWC 82	2554.0	Good	Fair	Medium	Medium	Poor	Slst.	Strongly pyritized
SWC 80	2581.0	V. low	V. low	Low	Low	Fair	Slst.	Mod. pyritized
SWC 79	2590.1	V. low	Fair	Medium	Medium	Variable	Slst.	Weakly pyritized
SWC 77	2645.0	Good	-	High	-	Fair	Slst.	Weakly pyritized
SWC 166	2649.0	Fair	-	Medium	-	Fair	Slst., laminated	Weakly pyritized
SWC 76	2673.1	V. low	-	Low	-	Fair	Slst., carb.	
SWC 75	2678.0	Neglig.	-	Low	-	Fair	Slst., carb.	
SWC 74	2683.1	V. good	-	high	-	Fair	Slst.	

TABLE 3: SUMMARY OF BASIC PALYNOLOGICAL DATA

GRUNTER-1

DIVERSITY -	low	medium	high
S & P	less than 10	10-30	greater than 30
D	1-3	3-10	10

SAMPLE NO.	DEPTH (m)	YIELD SPORE-POLLEN	YIELD DINOS	DIVERSITY SPORE-POLLEN	DIVERSITY DINOS	PRESERVATION	LITHOLOGY	COMMENTS
SWC 71	2751.1	Low	-	Medium	-	Poor	Slst.	
SWC 162	2774.1	Fair	V. low	Medium	Low	Fair	Slst.	
SWC 69	2801.0	Low	-	Low	-	Poor	Slst., carb.	Weakly pyritized
SWC 68	2836.0	Fair	-	Medium	-	Poor	Sh.	
SWC 67	2865.0	Low	-	Medium	-	Poor	Sh.	Mod. pyritized
SWC 160	2877.0	Fair	-	Medium	-	Poor	Slst., laminated	Mod. pyritized
SWC 65	2914.0	Fair	V. low	Medium	Low	Poor	Slst.	Strongly pyritized
SWC 64	2929.0	Fair	Low	Medium	Low	Fair	Slst., carb.	Mod. pyritized
SWC 63	2949.0	Low	-	Low	-	Poor	Slst.	
SWC 61	2993.0	Low	-	Low	-	Poor	Slst., carb.	
SWC 159	2961.0	Good	V. low	High	Low	Poor	Slst.	Strongly pyritized
SWC 62	2975.0	Fair	-	High	-	Good	Slst., carb.	Weakly pyritized
SWC 60	3007.1	Low	-	Medium	-	Poor	Slst., carb.	Mod. pyritized
SWC 58	3038.5	V. low	-	Medium	-	Good	Slst., carb.	
SWC 57	3057.0	Good	-	High	-	Good	Slst., carb.	
SWC 52	3112.0	Low	-	Low	-	Fair	Slst., carb.	
SWC 30	3125.0	Good	Low	Medium	Medium	Fair	Slst., carb.	No pyritization
SWC 27	3174.9	Good	-	Medium	-	Poor	Slst.	
SWC 24	3204.0	V. low	-	Medium	-	Poor	Slst., carb.	

TABLE 3: SUMMARY OF BASIC PALYNOLOGICAL DATA

GRUNTER-1

DIVERSITY -	low	medium	high
S & P	less than 10	10-30	greater than 30
D	1-3	3-10	10

SAMPLE NO.	DEPTH (m)	YIELD SPORE-POLLEN	YIELD DINOS	DIVERSITY SPORE-POLLEN	DIVERSITY DINOS	PRESERVATION	LITHOLOGY	COMMENTS
SWC 22	3233.0	Good	-	High	-	Poor	Slst., carb.-coaly	
SWC 21	3250.0	V. good	-	Medium	-	Poor	Slst., carb.	
SWC 19	3282.0	Low	-	Medium	-	V. poor	Slst., carb.	
SWC 16	3330.1	Neglig.	-	Low	-	Fair	Ss.	Rapid scan
SWC 14	3359.8	V. low	-	Low	-	Poor	Slst., carb.	
Core 1	3396.0	Low	-	Low	-	Poor	Slst.	
Core 1	3397.0	V. low	-	Low	-	Poor	Slst.	
Core 1	3400.0	Fair	-	Medium	-	Fair	Slst.	
Core 1	3403.0	Fair	-	Medium	-	Good	Slst.	
SWC 10	3423.9	Low	-	Medium	-	Poor	Slst.	
Core 2	3434.0	Low	-	Low	-	Fair	Ss.	
Core 2	3446.0	V. low	-	Medium	-	Variable	Slty. ss.	Mod. pyritized
Core 2	3450.8	Good	-	High	-	Fair	Slst.	
SWC 5	3500.5	Low	-	Medium	-	Poor	Slst., carb.	
SWC 4	3527.0	Fair	-	High	-	Good	Slst., carb.-coaly	
SWC 243	3550.0	Low	-	Medium	-	Poor	Sh., carb.	Weakly pyritized
SWC 1	3559.0	-	-	-	-	-	Ss.	
SWC 213	3567.5	-	-	-	-	-	Slst., carb.	
SWC 212	3571.0	Neglig.	-	Low	-	Poor	Ss.	

TABLE 3: SUMMARY OF BASIC PALYNOLOGICAL DATA

GRUNTER-1

DIVERSITY -	low	medium	high
S & P	less than 10	10-30	greater than 30
D	1-3	3-10	10

SAMPLE NO.	DEPTH (m)	YIELD SPORE-POLLEN	YIELD DINOS	DIVERSITY SPORE-POLLEN	DIVERSITY DINOS	PRESERVATION	LITHOLOGY	COMMENTS
SWC 210	3578.5	V. low	-	Low	-	Poor	Sh., carb.	Rapid scan
SWC 208	3604.0	V. low	-	Low	-	V. poor	Slst.	Rapid scan
SWC 207	3615.5	V. low	-	Low	-	V. poor	Slst., sandy	Rapid scan
SWC 237	3618.5	Neglig.	-	Low	-	V. poor	Sh., carb.-coaly	Rapid scan
SWC 235	3630.0	V. low	-	Low	-	V. poor	Sh., carb.-coaly	Rapid scan
SWC 229	3676.0	V. low	-	Low	-	V. poor	Slst., carb.	
SWC 228	3679.0	Fair	-	Low	-	V. poor	Coal	
SWC 224	3716.0	V. low	-	Low	-	V. poor	Sh., carb.	
SWC 222	3732.5	Low	-	Medium	-	V. poor	Coal	
SWC 192	3746.0	V. good	-	High	-	Poor	Sh., carb.	
SWC 219	3761.0	V. good	-	Medium	-	Poor	Coal	
SWC 189	3770.0	Low	-	Low	-	Poor	Slst.	Mod. pyritized
SWC 187	3785.0	V. low	-	Medium	-	V. poor	Slst.	
SWC 185	3797.0	V. low	-	Low	-	V. poor	Slst.	

APPENDIX 3

APPENDIX 3

QUANTITATIVE LOG ANALYSIS

GRUNTER-1

QUANTITATIVE LOG ANALYSIS

Interval: 1850 - 3800m KB

Analyst : L.J. Finlayson

Date : February, 1985

GRUNTER-1 QUANTITATIVE LOG ANALYSIS

Grunter-1 wireline logs have been analysed for effective porosity and water saturation over the interval 1850m - 3800m KB. Analysis was carried out over much of the logged section using a reiterative technique which incorporates hydrocarbon correction to the porosity logs, density-neutron crossplot porosities, a Dual Water saturation relationship and convergence on a preselected grain density window by shale volume adjustment. Below 3420m the hole was badly washed out and porosity was estimated from the sonic and VSH estimated from the Gamma Ray.

Logs Used

LLD, LLS (DLTE), MSFL, RHOB (LDTC), CAL, GR, NPHI (CNTH), BHC.

The MSFL and neutron porosity logs were corrected for borehole and environmental effects. The borehole corrected MSFL was used with the LLD and LLS to derive Rt and invasion diameter logs.

Log Quality

All logs appear to be of reasonable quality.

Analysis Parameters

a	1
m	2
N	2
Rmf @ 107°C (1850-3520m)	0.057 ohm.m
Rmf @ 124°C (3555-3800m)	0.025 ohm.m
Grain Density - lower limit	2.65 gm/cc
Grain Density - upper limit	2.67 gm/cc
Mud Filtrate Density (RHOF)	1.00 gm/cc
Bottom Hole Temperature	124°C

Depth Interval (m)	RHOBSH (gm/cc)	NPHISH (gm/cc)	RSH (ohm-m)
1850 - 1945	2.45	0.32	6
1945 - 2346	2.54	0.27	8
2346 - 2595	2.58	0.25	10
2595 - 2816	2.56	0.31	13
2816 - 2995	2.59	0.27	15
2995 - 3345	2.60	0.24	20
3345 - 3401	2.60	0.21	50
3401 - 3530	2.65	0.21	50
3530 - 3800	2.70	0.18	50

Shale Volume

A. 1850 - 3420m

An initial estimate of VSH was calculated from density-neutron separation.

$$VSHND = \frac{NPHI - \dfrac{2.65 - RHOB}{1.65}}{NPHISH - \dfrac{2.65 - RHOBSH}{1.65}} \qquad - 1$$

B. 3420 - 3800m

VSH was calculated from the Gamma Ray as follows:

$$VSHGR = \frac{GR - GR\ max}{GRmax - GRmin} \qquad - 2$$

where GRmax = 100 API units and GRmin = 30 API units

Total Porosities

A. From 1850-3420m, total porosity was calculated as follows:

Total porosity was initially calculated from a density-neutron logs using the following algorithms:

$$h = 2.71 - RHOB + NPHI\ (RHOF - 2.71) \qquad - 3$$

if h is greater than 0, then

$$\text{apparent matrix density, } RHOMa = 2.71 - h/2 \qquad - 4$$

if h is less than 0, then

$$\text{apparent matrix density, } RHOMa = 2.71 - 0.64h \qquad - 5$$

$$\text{Total porosity: } PHIT = \frac{RHOMa - RHOB}{RHOMa - RHOF} \qquad - 6$$

where RHOB = bulk density in gms/cc
NPHI = environ. corrected neutron porosity in limestone porosity units.
RHOF = fluid density (1.00 gms.cc)

B. From 3420-3810m, total porosity was calculated as follows:

$$PHITS = \frac{\text{delta T} - \text{delta Tmatrix}}{\text{delta Tfluid} - \text{delta Tmatrix}} \qquad - 7$$

where delta Tmatrix = 182.1 ms/m
delta Tfluid = 620 ms/m
delta T = transit time in ms/m from BHC

Free Formation Water (Rw) and Bound Water (Rwb) Resistivities

Apparent water resistivity (Rwa) was derived as follows:

$$Rwa = Rt * PHIT^{m} \quad (m = 2) \qquad - 8$$

Free formation water resistivity (Rw) was taken from the clean, water sand Rwa. Bound water resistivity (Rwb) was calculated from the input shale resistivity value (RSH) read directly from the Rt log.

Listed below are the selected Rw and Rwb values.

Depth Interval (m)	Salinity (ppm NaCleq.)
1850 - 1940	45,000
1940 - 2045	50,000
2045 - 2105	40,000
2105 - 2255	50,000
2255 - 2350	40,000
2350 - 2445	25,000
2445 - 2550	35,000
2550 - 2660	45,000
2660 - 2820	20,000
2820 - 3000	25,000
3000 - 3800	15,000

Water Saturations

Water saturations were determined from the Dual Water model which uses the following relationship:

$$\frac{1}{Rt} = SwT^{n} * \frac{PHIT^{m}}{aRw} + SwT^{(n-1)} \frac{Swb * PHIT^{m}}{a} \frac{1}{Rwb} - \frac{1}{Rw} \quad -9$$

or

$$\frac{1}{Rxo} = SxoT^{n} * \frac{PHIT^{n}}{aRmf} + SxoT^{(n-1)} \frac{Swb * PHIT^{m}}{a} \frac{1}{Rwb} - \frac{1}{Rmf} \quad -10$$

where: SwT and SxoT are "total" water saturations

and Swb (bound water saturation) $= \frac{VSH * PHISH}{PHIT}$ -11

where: PHISH = total porosity in shale derived from density-neutron crossplot or from BHC log below 3420m.

with a = 1
m = 2
n = 2

A. Between 1850-3420m

Hydrocarbon correction to the porosity logs utilised the following algorithms:

RHOB = RHOB(raw) + 1.07 PHIT (1-SxoT) [(1.11-0.15P)RHOF - 1.15RHOH] -12
(Hydrocarbon corrected)

NPHI = NPHI(raw) + 1.3 PHIT (1-SxoT) $\frac{RHOF(1-P)-1.5RHOH + 0.2}{RHOF(1-P)}$ -13
(Hydrocarbon corrected)

where: P = mud filtrate salinity in parts per unity
RHOF = mud filtrate density
RHOH = hydrocarbon density (0.70 gm/cc for oil, 0.25 gm/cc for gas)

The calculated "grain density" was derived by removing the shale component from the rock using the following algorithms:

RHOBSC = $\frac{\text{RHOB (hydrocarbon corrected) - VSH * RHOBSH}}{\text{1-VSH}}$ -14

NPHISC = $\frac{\text{NPHI (hydrocarbon corrected) - VSH * NPHISH}}{\text{1-VSH}}$ -15

The shale corrected density and neutron values were then entered into the cross-plot algorithms (equations 3, 4 and 5) to derive grain density (RHOG).

If calculated RHOG fell inside the specified grain density window, then PHIE and Swe were calculated as follows:

$$PHIE = PHIT - VSH * PHISH \qquad -16$$

$$Swe = 1 - \frac{PHIT}{PHIE} (1-SwT) \qquad -17$$

If VSH was greater than 0.50 and PHIE less than 0.10, Swe was set to 1.

If the calculated RHOG fell outside the specified grain density window, VSH was adjusted appropriately and the process repeated.

B. Below 3420m:

Effective porosity and water saturation was calculated as follows:-

$$PHIE = PHITS - PHISH * VSH \qquad -18$$

where PHISH = PHITS in shales (0.12)

$$Swe = 1 - \frac{PHITS}{PHIE} (1-SwT) \qquad -19$$

If VSH was greater than 0.50 and PHIE less than 0.10, Swe was set to 1.

Comments

1. The interval above 2675.5m KB is interpreted to be water wet.

2. Several hydrocarbon and water zones are interpreted below 2675.5m KB. They are as follows:

2675.50 - 2703.25m KB	Gas	(3.25m net sand)
2707.75 - 2806.00m KB	Water	(11.25m net sand)
2841.00 - 2861.75m KB	Gas	(11.25m net sand)
2867.25 - 2997.75m KB	Water	(19.00m net sand)
3040.25 - 3104.25m KB	Gas	(9.75m net sand)
3121.75 - 3153.50m KB	Water	(3.25m net sand)
3180.25 - 3181.50m KB	Gas	(1.25m net sand)
3228.75 - 3254.25m KB	Water	(3.75m net sand)
3309.75 - 3311.50m KB	Gas	(1.75m net sand)
3323.00 - 3495.50m KB	Oil	(4.25m net sand, 19.0m non net on RFT or Sw)

3. Below 3495.5m no net zones were encountered.

4. A production test over the interval 3392.5 - 3400.5m KB flowed 90% water at rates between 280 and 1000 barrels per day.

5. Produced water had a salinity of approximately 20,000 ppm NaCleq. This is close to the apparent water salinity (15,000 ppm NaCleq) calculated from the logs and used in the analysis.

6. Attached is a Porosity/Saturation Depth Plot (with Core Analysis Comparison) and a listing of results.

23351/48-52

GRUNTER #1

SUMMARY OF RESULTS

Interval Evaluated: 1850m to 3800m KB

Depth Interval (m KB)	Gross Thickness (m)	* Net Thickness (m)	*Porosity Average	* Swe Average	Fluid Content
1860.50 - 1863.00	2.75	1.75	0.178 ± 0.022	1.000	Water
1883.50 - 1885.25	1.75	1.50	0.161 ± 0.029	1.000	Water
1897.00 - 1898.50	1.50	1.50	0.249 ± 0.017	1.000	Water
1902.00 - 1903.25	1.25	1.25	0.230 ± 0.010	1.000	Water
1905.75 - 1910.25	4.50	4.00	0.219 ± 0.042	0.992	Water
1930.25 - 1932.50	2.25	2.25	0.227 ± 0.022	0.906	Water
1934.25 - 1935.25	1.00	1.00	0.179 ± 0.010	1.000	Water
1937.25 - 1938.75	1.5	1.5	0.226 ± 0.030	1.000	Water
1945.25 - 1972.75	27.5	27.5	0.249 ± 0.029	1.000	Water
1973.75 - 1975.75	2.0	2.0	0.147 ± 0.036	1.000	Water
1982.25 - 2008.25	26.00	26.00	0.227 ± 0.037	1.000	Water
2009.25 - 2010.50	1.25	1.00	0.135 ± 0.034	0.962	Water
2012.25 - 2017.25	5.0	5.0	0.221 ± 0.039	1.000	Water
2022.50 - 2024.75	2.25	1.75	0.158 ± 0.034	1.000	Water
2025.00 - 2033.50	8.75	8.75	0.236 ± 0.027	1.000	Water
2036.80 - 2038.25	1.5	1.5	0.214 ± 0.015	1.000	Water
2040.25 - 2042.25	2.0	2.0	0.269 ± 0.018	0.986	Water
2045.75 - 2051.25	5.5	5.5	0.230 ± 0.024	0.996	Water
2054.25 - 2057.25	3.0	3.0	0.250 ± 0.016	0.984	Water
2059.25 - 2064.75	5.5	5.5	0.279 ± 0.012	0.977	Water
2068.00 - 2070.25	2.25	2.25	0.246 ± 0.027	1.000	Water
2072.30 - 2115.50	43.25	42.00	0.242 ± 0.030	1.000	Water
2121.00 - 2124.25	3.25	2.25	0.170 ± 0.034	1.000	Water
2125.00 - 2132.00	7.00	7.00	0.237 ± 0.026	0.968	Water
2134.00 - 2137.50	3.5	3.0	0.213 ± 0.029	0.989	Water
2141.00 - 2142.25	1.25	1.25	0.224 ± 0.013	1.000	Water
2149.00 - 2151.25	2.25	1.75	0.203 ± 0.032	1.000	Water
2169.75 - 2171.25	1.50	1.50	0.260 ± 0.029	0.944	Water
2173.25 - 2176.50	3.25	2.25	0.221 ± 0.058	1.000	Water
2176.75 - 2199.25	22.75	22.75	0.221 ± 0.022	1.000	Water
2202.75 - 2208.00	5.25	5.25	0.194 ± 0.043	1.000	Water
2210.00 - 2211.75	1.75	1.25	0.153 ± 0.030	0.860	Water
2215.50 - 2224.00	8.5	8.5	0.225 ± 0.030	0.955	Water
2225.50 - 2226.50	1.0	1.0	0.211 ± 0.031	0.993	Water
2228.50 - 2235.50	7.0	6.75	0.210 ± 0.030	1.000	Water
2237.00 - 2240.75	3.75	2.75	0.165 ± 0.039	0.972	Water
2258.00 - 2265.75	7.75	7.75	0.244 ± 0.039	1.000	Water
2271.75 - 2273.25	1.5	1.5	0.226 ± 0.021	0.978	Water
2277.25 - 2280.75	3.5	3.5	0.224 ± 0.025	0.881	Water

2283.25 - 2284.50	1.25	1.25	0.170 ± 0.008	1.000	Water
2285.75 - 2295.75	10.00	10.00	0.182 ± 0.034	1.000	Water
2301.50 - 2302.50	1.0	1.0	0.174 ± 0.035	0.786	Water
2310.75 - 2312.50	1.75	1.75	0.211 ± 0.036	0.952	Water
2316.25 - 2325.75	9.5	9.00	0.198 ± 0.038	0.969	Water
2342.00 - 2345.50	3.5	3.5	0.238 ± 0.012	0.861	Water
2371.00 - 2373.25	2.25	1.75	0.160 ± 0.018	0.742	Water
2402.75 - 2409.00	6.25	6.00	0.187 ± 0.033	0.994	Water
2413.00 - 2414.00	1.00	1.00	0.136 ± 0.007	1.000	Water
2418.00 - 2423.00	5.00	4.25	0.214 ± 0.021	1.000	Water
2439.00 - 2442.75	3.75	3.50	0.212 ± 0.031	0.903	Water
2445.75 - 2458.75	13.00	13.00	0.225 ± 0.023	1.000	Water
2461.50 - 2466.25	4.75	4.0	0.209 ± 0.023	1.000	Water
2482.50 - 2496.75	14.25	14.25	0.217 ± 0.029	1.000	Water
2498.75 - 2519.75	21.00	20.75	0.211 ± 0.023	1.000	Water
2595.25 - 2597.50	2.25	2.25	0.222 ± 0.010	1.000	Water
2600.75 - 2602.10	1.25	1.25	0.165 ± 0.015	0.938	Water
2603.25 - 2625.75	22.50	22.25	0.199 ± 0.030	1.000	Water
2634.50 - 2641.00	6.5	6.00	0.215 ± 0.038	0.935	Water
2653.75 - 2655.00	1.25	1.25	0.164 ± 0.017	0.866	Water
2675.50 - 2676.75	1.25	1.25	0.161 ± 0.008	0.393	Gas
2685.75 - 2686.25	0.50	0.50	0.140 ± 0.027	0.524	Gas
2701.75 - 2703.25	1.5	1.5	0.184 ± 0.043	0.791	Gas (RFT 3)
2707.75 - 2710.75	3.0	3.0	0.211 ± 0.022	0.975	Water
2712.00 - 2714.00	2.0	1.5	0.140 ± 0.019	1.000	Water
2730.50 - 2731.50	0.75	0.75	0.161 ± 0.027	1.000	Water
2735.00 - 2737.75	2.75	2.50	0.135 ± 0.026	0.981	Water
2743.00 - 2744.10	1.0	1.0	0.126 ± 0.005	1.000	Water
2803.50 - 2806.00	2.5	2.5	0.160 ± 0.015	0.983	Water
2841.00 - 2846.75	5.75	5.75	0.224 ± 0.032	0.237	Gas
2855.75 - 2861.75	6.00	5.5	0.215 ± 0.028	0.415	Gas (RFT 2)
2867.25 - 2874.75	7.5	6.5	0.170 ± 0.039	0.970	Water
2880.25 - 2880.75	0.5	0.5	0.134 ± 0.011	1.000	Water
2907.25 - 2907.75	0.5	0.5	0.149 ± 0.012	0.733	Water - Thin
2922.75 - 2923.25	0.5	0.5	0.139 ± 0.024	1.000	Water
2944.50 - 2945.00	0.5	0.5	0.123 ± 0.014	1.000	Water
2950.50 - 2952.25	1.75	1.75	0.130 ± 0.013	1.000	Water
2955.25 - 2957.50	2.25	2.25	0.161 ± 0.046	1.000	Water
2982.50 - 2988.00	5.5	5.5	0.144 ± 0.022	1.000	Water
2996.75 - 2997.75	1.0	1.0	0.191 ± 0.023	1.000	Water
3040.25 - 3041.00	0.75	0.75	0.120 ± 0.004	0.713	Gas
3043.75 - 3045.25	1.50	1.50	0.167 ± 0.026	0.674	Gas (RFT 16)
3052.50 - 3053.75	1.25	1.25	0.160 ± 0.018	0.577	Gas (RFT 17)
3085.25 - 3086.25	1.00	1.00	0.140 ± 0.014	0.775	Gas
3089.50 - 3090.25	0.75	0.75	0.137 ± 0.031	0.670	Gas
3098.00 - 3104.25	6.25	4.5	0.131 ± 0.018	0.731	Gas
3121.75 - 3122.50	0.75	0.75	0.139 ± 0.021	0.942	Water

3147.50 - 3149.00	1.5	1.5	0.143 ± 0.023	0.923	Water
3152.50 - 3153.50	1.0	1.0	0.189 ± 0.027	0.754	Water - Thin
3180.25 - 3181.50	1.25	1.25	0.213 ± 0.046	0.370	Gas
3228.75 - 3230.25	1.5	1.5	0.176 ± 0.031	0.963	Water
3236.75 - 3237.75	1.0	1.0	0.132 ± 0.011	0.835	Water
3253.00 - 3254.25	1.25	1.25	0.121 ± 0.003	1.000	Water
3309.75 - 3311.50	1.75	1.75	0.148 ± 0.008	0.451	Gas (RFT 9)
3323.00 - 3324.25	1.25	1.25	0.146 ± 0.032	0.679	Oil-Non Net
3328.00 - 3329.25	1.25	1.25	0.157 ± 0.032	0.412	Oil (RFT 10)
3330.75 - 3337.25	6.5	6.5	0.155 ± 0.023	0.443	Oil - Non Net (RFT 15)
3352.25 - 3354.75	2.5	2.5	0.150 ± 0.019	0.441	Oil (RFT 6)
3392.75 - 3400.00	7.25	7.25	0.143 ± 0.016	0.621	Oil - Non Net (RFT 7, 13)
3421.75 - 3422.75	1.0	1.0	0.135 ± 0.014	0.575	Oil Non Net
3436.75 - 3439.75	3.0	3.0	0.165 ± 0.039	0.464	Oil - Non Net (RFT 5)
3494.75 - 3495.50	0.75	0.5	0.122 ± 0.007	0.367	Oil - Thin

23351/53-55

PE601197

This is an enclosure indicator page.
The enclosure PE601197 is enclosed within the container PE902456 at this location in this document.

The enclosure PE601197 has the following characteristics:

ITEM_BARCODE =	PE601197
CONTAINER_BARCODE =	PE902456
NAME =	Computer Generated Log
BASIN =	GIPPSLAND
PERMIT =	
TYPE =	WELL
SUBTYPE =	WELL_LOG
DESCRIPTION =	Computer Generated Log (from WCR) for Grunter-1
REMARKS =	
DATE_CREATED =	01/03/1986
DATE_RECEIVED =	01/05/1986
W_NO =	W879
WELL_NAME =	Grunter-1
CONTRACTOR =	ESSO
CLIENT_OP_CO =	ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX 4

APPENDIX 4

WIRELINE TEST REPORT

SUMMARY

A total of 18 RFT runs were made in the Grunter-1 exploration well in the period 2nd October to 12th November 1984.

The program confirmed:

(a) A series of up to 6 gas accumulations between 2649.0m SS (2670.0m KB) and 3170m SS (3191m KB). See Figure 1.

(b) The presence of a transition zone to overpressure starting at below 3200m SS (3221m KB) in which fluid content could not be distinguished by RFT pressure measurements, but which sampling showed to contain oil at 3307.8m SS (3328.8m KB) and gas/condensate at several other depths (Table 2). Each sand appeared to be in a different pressure system. The interval 3371.5 - 3379.5m SS (3392.5 - 3400.5m KB) was production tested and showed a low permeability sand which produced 39° API 2600 SCF/STB GOR oil with a high watercut (see separate report "Grunter-1 Production Test").

PROGRAM

Eighteen RFT runs were made in the Grunter-1 well in the period 2nd October to 12 November 1984.

Two runs (numbers 1 and 4) of 43 seats total were for pressure pre-testing. 32 valid pressures were obtained.

The remaining 16 runs were primarily to obtain samples although 23 valid pressures were obtained. Fourteen samples were recovered (Runs 8 and 14 lost seal whilst sampling).

Table 1 details the results of pressure pre-tests with final sampling pressure in brackets. Table 2 gives a summary of sample recovery. The results of the pressure tests are also shown on Figure 1.

INTERPRETATION

Figure 1 shows the pressure pre-test data and indicates the hydrocarbon accumulations interpreted by RFT pressure analysis. In summary, 6 separate gas accumulations were confirmed in the normally pressured zone (four by logs, sampling and pressure test, two by logs and pressure test). The estimated GWC's are marked.

The overpressure transition zone (below 3200m SS) was shown by sampling (Table 2) to be generally gas/condensate bearing but with at least one oil accumulation at 3307.8m SS (3328.8m KB). A production test between 3371.5 - 3379.5m SS (3392.5m SS - 3400.5m KB) recovered formation water and a 39° API oil with a GOR of 2600 SCF/STB from low permeability sand. (See Grunter-1 Production Test Report).

..... 2

The RFT pressure results showed that from 2575m SS (2596.0m KB) (the highest RFT seat) to approximately 2800m SS (2821m KB) the water gradient was the standard Gippsland Gradient of 1.4232 psi/m but was drawdown 19 psi from the original Gippsland pressure. Between 2800m SS (2821m KB) and approximately 3000m SS (3021m KB) the drawdown decreased to 14 psi. There was a transition zone from normal pressures to overpressure commencing below about 3200m SS (3221m KB). The pressures in the overpressured zone show the existence of several non-communicating sand bodies.

Figure 2 which is a plot of the difference between RFT measured pressure and a pressure calculated from the standard Gippsland Gradient less 19 psi (Pressure = 1.4232 metre SS + 60.8) shows the water gradient shifts more clearly than does Figure 1.

(6451f:1-2)

TABLE 1

RFT PRETEST PRESSURE - GRUNTER-1

Seat No.	Depth (m KB)	Formation Pressure (psia)	Sample Run
1/1	2596.0	3724.0	No
1/2	2670.0	3871.3	No
1/3	2676.0	3873.1	No
1/4	2686.0	3876.3	No
1/5	2702.0	3880.7	No
1/6	2710.0	3889.4	No
1/8	2730.7	3921.6	No
1/11	2735.7	3925.0	No
1/12	2804.0	4021.5	No
1/13	2842.0	4101.1	No
1/14	2856.0	4110.6	No
1/15	2861.3	4110.7	No
1/16	2874.0	4126.4	No
1/17	2997.0	4306.9	No
2/18	2861.3	4109.3	Yes
3/19	2702.5	3877.1	Yes
4/20	3495.0	Lost Seal	No
4/21	3495.3	Lost Seal	No
4/22	3495.6	Lost Seal	No
4/23	3494.6	Lost Seal	No
4/24	3472.5	Lost Seal	No
4/25	3472.3	Lost Seal	No
4/26	3472.7	Tight	No
4/27	3439.0	5279.6	No
4/28	3394.0	5177.9	No
4/29	3353.0	5048.1	No
4/30	3334.5	4986.7	No
4/31	3329.9	Tight	No
4/32	3328.7	4968.9	No
4/33	3324.3	4874.5	No
4/34	3310.0	4853.9	No
4/35	3253.5	4726.5	No

..... 2

TABLE 1 (cont'd)

RFT PRETEST PRESSURE - GRUNTER-1

Seat No.	Depth (m KB)	Formation Pressure (psia)	Sample Run
4/36	3230.0	4663.1	No
4/37	3181.0	4591.1	No
4/38	3152.5	Lost Seal	No
4/39	3152.7	4543.2	No
4/40	3122.0	Tight	No
4/41	3122.0	4602.9	No
4/42	3122.1	4613.7	No
4/43	2100.5	4490.9	No
4/44	3085.5	4477.4	No
4/45	3053.5	Tight	No
4/46	3053.1	4465.3	No
4/47	3044.8	4441.1	No
4/48	2997.0	4303.0	No
5/49	3339.0	5281.5 (5273.1)	Yes
6/50	3353.0	5050.0 (5048.3)	Yes
6/51	3152.7	4544.5	No
6/52	3014.6	Lost Seal	No
6/53	3014.8	Tight	No
6/54	2997.0	4301.7	No
7/55	3394.0	No Seal	Yes
7/56	3394.0	Lost Seal	Yes
7/57	3394.2	5169.8 (5150.2)	Yes
8/58	3310.0	Lost Seal	No
8/59	3310.0	Lost Seal	Yes
8/60	3310.3	Lost Seal	No
8/61	3310.9	Lost Seal	No
9/62	3310.6	4854.6 (4850.4)	Yes
10/63	3328.8	4970.9 (4967.2)	Yes
11/64	3394.2	Lost Seal	No
11/65	3394.4	5170.9	Yes
11/66	3394.8	Lost Seal	No

..... 3

TABLE 1 (cont'd)

RFT PRETEST PRESSURE - GRUNTER-1

Seat No.	Depth (m KB)	Formation Pressure (psia)	Sample Run
11/67	3394.8	Lost Seal	No
12/68	3394.6	Lost Seal	No
12/69	3394.6	Lost Seal	No
12/70	3394.0	5172.6 Blocked	Yes
13/71	3394.2	5178.8	No
13/72	3393.5	5171.2	No
13/73	3395.0	5182.8	No
13/74	3394.7	5178.1	No
13/75	3394.2	5148.7 (Short Time)	No
13/76	3394.3	5176.9 (5144)	Yes
14/77	3334.4	4489.2 Lost Seal	No
14/78	3334.5	Lost Seal	No
14/79	3334.6	Lost Seal	No
14/80	3336.2	Lost Seal	No
15/81	3334.5	Lost Seal	No
15/82	3334.1	4986.7 (4977.4)	Yes
15/83	3044.0	4440.0	Yes
17/84	3053.1	4466.6 (4464.4)	Yes
19/86	3778.0	Tight	No
19/87	3777.7	10093.5	No
19/88	3777.7	10096.8	No
19/89	3666.0	Tight	Yes
19/90	3666.0	Tight	No
19/91	3666.0	Tight	No
19/92	3665.8	Tight	No
19/93	3665.8	Tight	No
19/94	3666.2	Tight	No
19/95	3666.2	Tight	No
19/96	3520.0	Tight	No
19/97	3574.0	Tight	No
19/98	3572.5	Lost Seal	No
19/99	3572.5	Tight	Yes

Run 18 was incorrectly designated 19 on RFT logs.

(6451f:3-5)

TABLE 2

SAMPLE RESULTS

GRUNTER 1

Seating No.	Depth (m KB)	Chamber	Oil (L)	Cond. (L)	Gas (SCF)	Water/ Filtrate (L)
2/18	2861.3	6 Gallon		1.0	125.28	4.25
		2-3/4		0.45(55.5°API)	63.69	0.8
3/19	2702.5	6 Gallon		1.6	154.75	0.2
		1.0			36.78	0.1
5/49	3339.0	12 Gallon			5.63	42
		2-3/4			2.06	9.25
6/50	3353.0	12 Gallon	Trace oil Scum		2.1	43
		2-3/4	0.1 waxy Oil (36.3°)		2.4	9
7/57	3394.2	12 Gallon	Trace Oil Scum		2.0	41
		2-3/4	Trace Oil Scum		0.9	9.5
9/62	3310.6	12 Gallon		0.2	20.8	39.5
		2-3/4		0.4 (48.1°)	22.3	6.3
10/63	3328.8	12 Gallon	0.7 waxy		12.1	38.5
		2-3/4	1.0 waxy Oil (42.8°)		17.2	7.0
11/65	3394.4	12 Gallon			5.48	40.0
		2-3/4 (Not opened due to packer failure)				
12/70	3394.6	12 Gallon				1.0
		2-3/4 (Not opened due to probe plugging during sampling)				
13/76	3394.3	12 Gallon			8.25	42.5
		2-3/4			2.35	9.2
15/82	3334.1	12 Gallon			4.53	41
		2-3/4	Trace Oil scum		1.45	9.1
16/83	3044.7	12 Gallon		Condensate Scum (60°)	26.45	39
		2-3/4			3.4	8.5
17/84	3053.1	12 Gallon		2.0 (53°)	220.9	11
		2-3/4	(Chamber preserved)			
19/99	3572.2	6 Gallon				1.5 muddy water

(6451f:6)

GRUNTER 1 RFT RESULTS

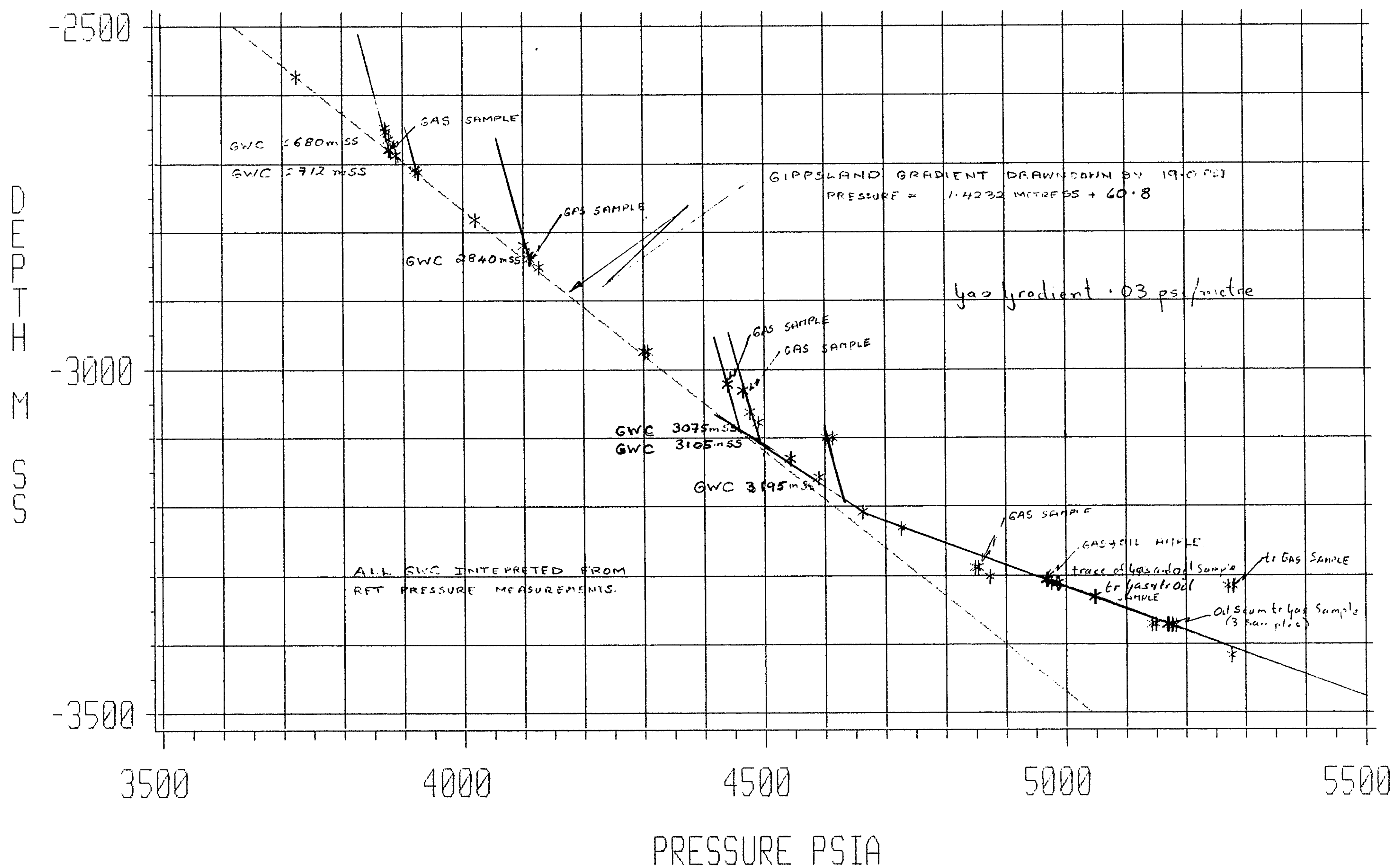


FIGURE 1

GRUNTER 1 RFT RESULTS

MEASURED PRESSURE MINUS GIPPSLAND WATER GRADIENT LESS 19.0 PSI

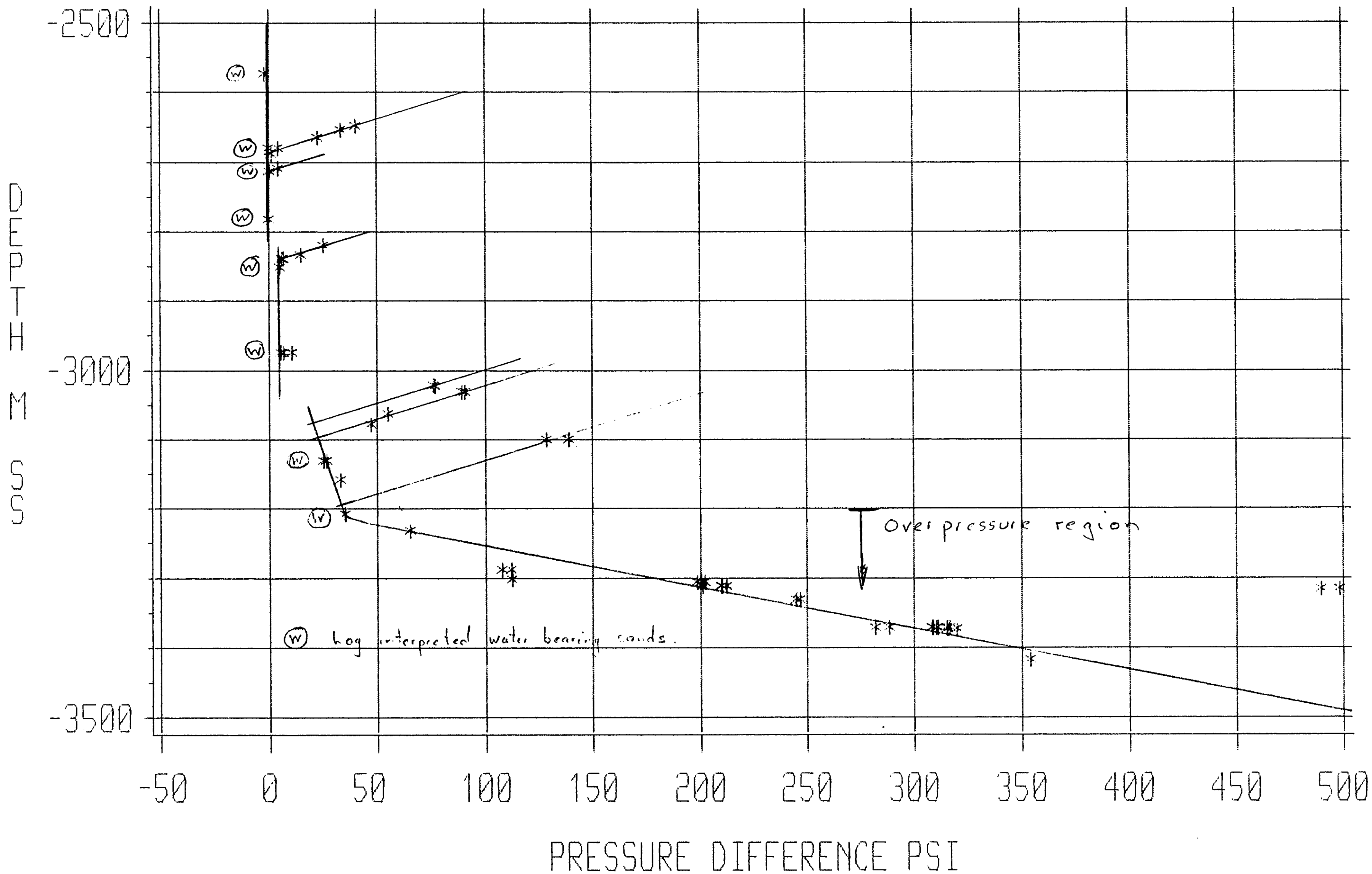


FIGURE 2

RFT PRESSURE DATA

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: J.L. ROCHE
DATE: 2.10.84

RFT No. Run/Seat	Depth m MDKB	m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP psia	Comments (include Probe type)
1/1	2596.0	2575.0	4356.0/4330 9.8 ppg	07:21	3610.0	3724.0/3701 8.4 ppg	88.2	7:25	4353.0	Valid L
1/2	2670.0	2649.0	4475.8/4447 9.8 ppg	07:40	3149.2	3871.3/3849 8.5 ppg	81.1	07:48	4475.4	Valid L
1/3	2676.0	2655.0	4485.8/4461 9.8 ppg	07:55	2537.4	3873.1/3851 8.5 ppg	87.8	08:03	4485.3	Valid L
1/4	2686.0	2665.0	4503.1/4477 9.8 ppg	08:14	1024.4	3876.3/3852 8.5 ppg	88.1	08:20	4485.3	Valid L
1/5	2702.5	2681.0	4528.7/4504 9.8 ppg	08:33	3731.3	3880.7/3858 8.4 ppg	88.3	08:39	4528.5	Valid L
1/6	2710.0	2689.0	4542.6/4517 9.8 ppg	08:50	3778.8	3889.4/3866 8.4 ppg	88.7	09:00	4541.0	Valid L

L = Long nose probe
M = Martineau probe

RFT PRESSURE DATA

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: J.L. ROCHE
DATE: 2.10.84

RFT No. Run/Seat	Depth m MDKB	Depth m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP psia	Comments (include Probe type)
1/7	2731.0	2710.0	4574.9/4550 9.8 ppg	09:16	-	-	-	-	-	No Seal L
1/8	2730.7	2709.7	4573.5/4549 9.8 ppg	09:30	3395.5	3921.6/3900 8.4 ppg	89.1	09:38	4573.3	Valid L
1/9	2735.5	2714.5	4582.1/4557 9.8 ppg	-	-	-	89.6	-	-	No Seal L
1/10	2735.7	2714.7	4580.9/4557 9.8 ppg	09:51	3082.0	-	89.8	09:56	-	Seal Failure L
1/11	2735.7	2714.7	4581.6/4557 9.8 ppg	09:57	3052.1	3925.0/3903 8.4 ppg	89.9	10:04	4580.0	Valid L
1/12	2804.0	2783.0	4692.9/4668 9.8 ppg	10:30	3830.1	4021.5/3998 8.4 ppg	91.1	10:50	4689.2	Valid L

L = Long nose probe
M = Martineau probe

RFT PRESSURE DATA

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: J.L. ROCHE
DATE: 2.10.84

RFT No. Run/Seat	Depth m MDKB	Depth m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP psia	Comments (include Probe type)
1/13	2842.0	2821.0	4750.2/4726 9.7 ppg	11:12	4083.0	4101.1/4079 8.5 ppg	92.1	11:18	4750.8	Valid L
1/14	2856.0	2835.0	4774.3/4749 9.7 ppg	11:32	3752.1	4110.6/4089 8.4 ppg	93.0	11:38	4774.7	Valid L
1/15	2861.3	2840.3	4781.6/4757 9.7 ppg	11:47	3525.9	4110.6/4088 8.4 ppg	93.5	11:53	4780.3	Valid L
1/16	2874.0	2853.0	4802.6/4778 9.7 ppg	12:08	4022.4	4126.4/4103 8.4 ppg	93.7	12:12	4801.7	Valid L
1/17	2997.0	2976.0	5003.8/4979 9.7 ppg	12:48	2791.1	4306.9/4282 8.4 ppg	98.5	12:52	5002.7	Valid L
2/18	2861.3	2840.3	4787.2/4762 9.8 ppg	16:11	3791.0	4111.8/4089 8.4 ppg	98.8	16:52	4787.2	Valid Pretest Sample Taken

L = Long nose probe
M = Martineau probe

RFT PRESSURE DATA

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: J.L. ROCHE (Runs 1, 2, 3)
DATE: 2.10.84/19.10.84 J.M. BROWN (Run 4)

RFT No. Run/Seat	Depth m MDKB	Depth m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP psia	Comments (include Probe type)
3/19	2702.5	2681.5	4518.5/4497 9.7 ppg	20:56	3383.0	3877.5/3857 8.4 ppg	93.1	21:25	4518.5	Valid Pretest Sample Taken
				19.10.84						
4/20	3495.0	3474.0	5751.3/5727 9.6 ppg	21:48	-	-	114.0	-	5752	Seal Failure L
4/21	3495.3	3474.3	5752.5/5727 9.6 ppg	21:51	-	-	115	-	5753.0	Seal Failure L
4/22	3495.6	3474.6	5753.5/5726 9.6 ppg	22:06	390	-	115	-	5754	Tight then Seal Failure L
4/23	3494.6	3473.6	5752.6/5723 9.6 ppg	22:15	-	-	115	-	5752	No Seal L
4/24	3472.5	3451.5	5709.6/5688 9.6 ppg	22:43	-	-	114	-	5709	Seal Failure L

L = Long nose probe
M = Martineau probe

RFT PRESSURE DATA

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: A. BOSTON/J.M. BROWN
DATE: 19.10.84/20.10.84

RFT No. Run/Seat	Depth m MDKB	m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP psia	Comments (include Probe type)
4/25	3472.3	3451.3	5710.2/5686 9.6 ppg	22:55	-	-	113	-	5710	No Seal L
4/26	3472.7	3451.7	5711.5/5686 9.6 ppg	23:07	201	-	113	23:12	5714	Tight L
4/27	3439.0	3418.0	5652.5/5636 9.6 ppg	23:33	5029.6	5279.6/5259 9.0 ppg	112	23:45	2756	Valid L
				20.10.84						
4/28	3394.0	3373.0	5583.0/5561 9.6 ppg	00:08	135.0	5177.9/5154 9.0 ppg	110	00:32	5586	Valid L
4/29	3353.0	3332.0	5515.7/5495 9.6 ppg	00:50	2775.0	5048.1/5029 8.8 ppg	108	01:07	5516	Valid L
4/30	3334.5	3313.5	5486.7/5465 9.6 ppg	01:27	4842.0	4986.7/4965 8.8 ppg	107	01:45	5488	Valid L

L = Long nose probe
M = Martineau probe

RFT PRESSURE DATA

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: A. BOSTON/J.M. BROWN
DATE: 20.10.84

RFT No. Run/Seat	Depth m MDKB	Depth m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP psia	Comments (include Probe type)
4/31	3329.0	3308.0	5481.6/5457 9.6 ppg	02:03	31.0	-	107	02:06	5481.0	Tight L
4/32	3328.7	3307.7	5479.4/5457 9.6 ppg	02:14	2530.0	4968.9/4947 8.8 ppg	107	02:29	5481.0	Valid L
4/33	3324.3	3303.5	5474.8/5450 9.6 ppg	02:40	4818.0	4874.5/4853 8.6 ppg	107	02:48	5474.0	Valid L
4/34	3310.0	3289.0	5452.6/5428 9.6 ppg	03:04	4030.6	4853.9/4832 8.6 ppg	107	03:09	5452.8	Valid L
4/35	3253.5	3232.5	5360.3/5339 9.6 ppg	03:35	14.2	4726.5/4705 8.5 ppg	106	03:47	5361.6	Valid (Possibly mud plugged at first) L
4/36	3230.0	3209.0	5324.1/5301 9.6 ppg	04:00	4507.6	4663.1/4641 8.5 ppg	106	04:07	5325.4	Valid L

L = Long nose probe
M = Martineau probe

RFT PRESSURE DATA

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: A. BOSTON/J.M. BROWN
DATE: 20.10.84

RFT No. Run/Seat	Depth m MDKB	Depth m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP psia	Comments (include Probe type)
4/37	3181.0	3160.0	5246.0/5223 9.6 ppg	04:43	4516.9	4591.1/4571 8.5 ppg	106	04:55	5249.0	Valid L
4/38	3152.5	3131.5	5199.7/5178 9.7 ppg	05:11	-	-	105	05:13	5199.7	No Seal L
4/39	3152.7	3131.7	5199.9/5179 9.6 ppg	05:18	4410.1	4543.2/4523 8.5 ppg	105	05:23	5200.5	Valid L
4/40	3122.0	3101.0	5150.6/5129 9.6 ppg	05:41	105.3	4610.9/4581 8.6 ppg	105	05:45	5151.2	Tight, (Supercharged) l
4/41	3122.0	3101.0	5151.6/5129 9.6 ppg	05:48	63.2	4602.9/4583 8.7 ppg	105	05:50	5151.7	Tight/Supercharged L
4/42	3122.1	3101.1	5151.6/5129 9.6 ppg	05:55	23.9	4615.5/4590 8.7 ppg	105	06:03	5152.5	Tight/Supercharged L

L = Long nose probe
M = Martineau probe

RFT PRESSURE DATA

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: A. BOSTON/J.M. BROWN
DATE: 20.10.84

RFT No. Run/Seat	Depth m MDKB	Depth m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP psia	Comments (include Probe type)
4/43	3100.5	3079.5	5117.0/5094 9.6 ppg	06:16	3488.6	4490.9/4472 8.5 ppg	105	06:24	5117.0	Valid L
4/44	3085.5	3064.5	5092.5/5070 9.6 ppg	06:32	4181.0	4477.4/4453 8.5 ppg	105	06:38	5092.9	Valid L
4/45	3053.5	3025.5	5040.2/5020 9.6 ppg	06:55	9.4	-	105	06:56	5040.2	Tight L
4/46	3053.1	3032.1	5040.8/5019 9.6 ppg	07:03	4800.0	4465.3/4444 8.6 ppg	105	07:14	5041.0	Valid L
4/47	3044.8	3023.8	5027.8/5006 9.6 ppg	07:21	4043.6	4441.1/4423 8.6 ppg	105	07:29	5027.0	Valid L
4/48	2997.0	2976.0	4949.2/4930 9.6 ppg	07:48	4073.2	4303.0/4284 8.4 ppg	104	08:04	4951.0	Valid L

L = Long nose probe
M = Martineau probe

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: A. BOSTON/J.M. BROWN
DATE: 20.10.84

RFT No. Run/Seat	Depth m MDKB	Depth m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP psia	Comments (include Probe type)
5/49	3439.0	3418.0	5657.1/5631 9.6 ppg	21.10.84 12:38	-	5281.5/5257 9.0 ppg	114	01:33	5657.0	Valid Pretest Sample Taken M
6/50	3353.0	3331.0	5511.8/5487 9.6 ppg	19:24	4663.7	5050.0/5026 8.8 ppg	110	21:01	5511.0	Valid Pretest Sample Taken M
6/51	3152.7	3131.7	5189.0/5169 9.6 ppg	21:49	2242.4	4544.5/4524 8.5 ppg	106	21:06	5190.0	Valid M
6/52	3014.6	2993.6	4967.0/4950 9.6 ppg	22:47	1400.0	-	104	22:48	4967.0	No Seal M
6/53	3014.8	2993.8	4967.8/4950 9.6 ppg	22:59	1336.6	-	104	22:22	-	Tight M

L = Long nose probe
M = Martineau probe

RFT PRESSURE DATA

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: A. BOSTON/J.M. BROWN
DATE: 20.10.84/21.10.84

RFT No. Run/Seat	Depth m MDKB	Depth m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP psia	Comments (include Probe type)
6/54	2997.0	2976.0	4939.3/4922 9.6 ppg	23:33	4300.0	4301.7/4285 8.4 ppg	104	23:38	4940.0	Valid M
7/55	3394.0	3373.0	5572.5/5552 9.6 ppg	21.10.84 05:02	-	-	115	05:03	5573.5	No Seal M
7/56	3394.0	3373.0	5573.6/5551 9.6 ppg	05:06	-	-	115	05:97	5573.9	No Seal M
7/57	3394.2	3373.2	5574.8/5552 9.6 ppg	05:17	4738.4	5169.9/5148 8.9 ppg	115	05:24	5576.2	Valid Pretest Sample Taken M
8/58	3310.0	3289.0	5436.0/5416 9.6 ppg	13:24	3909.2	4853.9/4835 8.6 ppg	113	13:33	-	Valid Pretest Seal Failure on Opening Chamber M
8/59	3310.0	3289.0	5436.0/5416 9.6 ppg	13:34	58.0	4853.7/4835 8.6 ppg	-	-	-	Valid Pretest Seal Failure on Opening Chamber M

L = Long nose probe
M = Martineau probe

RFT PRESSURE DATA

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: A. BOSTON/J.M. BROWN
DATE: 21.10.84/22.10.84 R. NEWPORT (Run 11)

RFT No. Run/Seat	Depth m MDKB	m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP psia	Comments (include Probe type)
8/60	3310.3	3289.3	5436.3/5415 9.6 ppg	13:55	4840.0	-	113	13:57	-	Seal Failure M
8/61	3310.9	3289.9	5438.4/5417 9.6 ppg	14:22	-	-	-	-	-	Seal Failure M
9/62	3310.6	3289.6	5434.7/5412 9.6 ppg	18:17	4543.0	4854.6/4834 8.6 ppg	113	19:27	5434.0	Valid Pretest Sample Taken M
10/63	3328.8	3307.8	5460.0/5438 9.6 ppg	22.10.84 01:04	4821.0	4970.8/4949 8.8 ppg	114	01:10	5459	Valid Pretest Sample Taken M
11/64	3394.2	3373.2	5551.6/5531 9.5 ppg	07:43	-	-	121	07:44	5550.0	Seal Failure M
11/65	3394.4	3373.4	5550.7/5531 9.5 ppg	07:59	4999.3	5170.0/5148 8.9 ppg	119	08:39	5562.0	Valid Pretest Seal Failure while sampling. M

L = Long nose probe
M = Martineau probe

RFT PRESSURE DATA

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: R. NEWPORT/J.M. BROWN
DATE: 22.10.84/23.10.84 A. BOSTON

RFT No. Run/Seat	Depth m MDKB	m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP psia	Comments (include Probe type)
11/66	3394.8	3373.8	5562.5/5539 9.6 ppg	08:52	-	-	119	08:53	5562.0	No Seal M
11/67	3394.8	3373.8	5562.5/5539 9.6 ppg	08:55	-	-	119	08:57	5562.0	No Seal M
12/68	3394.6	3373.6	5558.8/5543 9.6 ppg	23.10.84 02:20	-	-	93	02:21	-	No Seal M
12/69	3394.6	3373.6	5558.8/5543 9.6 ppg	02:23	-	-	93	02:27	-	Seal Failure M
12/70	3394.0	3373.0	5555.3/5540 9.5 ppg	02:34	1472.2	5172.6/5155 8.9 ppg	93	02:57	-	Valid Pretest Took Sample M
13/71	3394.2	3373.2	5555.9/5531 9.5 ppg	06:33	1867.0	5177.9/5154 9.0 ppg	101	06:43	-	Valid Pretest L

L = Long nose probe
M = Martineau probe

RFT PRESSURE DATA

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: A. BOSTON/J.M. BROWN
DATE: 23.10.84

RFT No. Run/Seat	Depth m MDKB	Depth m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP psia	Comments (include Probe type)
13/72	3393.5	3372.5	5552.9/5528 9.5 ppg	06:51	1865.4	5171.2/5146 8.9 ppg	100	07:00	5553.7	Valid Pretest L
13/73	3395.0	3374.0	5557.5/5530 9.5 ppg	07:10	669.0	5182.8/5158 9.0 ppg	101	07:14	5556.4	Valid Pretest L
13/74	3394.7	3373.7	5553.4/5530 9.5 ppg	07:25	955.1	5177.7/5153 8.9 ppg	101	07:28	5555.2	Valid Pretest L
13/75	3394.2	3373.2	5551.4/5529 9.5 ppg	07:34	968.2	-	101	07:35	-	Tight L
13/76	3394.3	3373.3	5551.5/5529 9.6 ppg	07:41	2616.4	5176.9/5153 8.9 ppg	101	08:00	-	Valid Pretest Sample Taken M
14/77	3334.4	3313.4	5449.7/5424 9.5 ppg	14:33	4779.4	4989.4/4964 8.8 ppg	104	14:44	-	Valid Pretest M

L = Long nose probe
M = Martineau probe

RFT PRESSURE DATA

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: A. BOSTON/J.M. BROWN
DATE: 23.10.84/24.10.84

RFT No. Run/Seat	Depth m MDKB	Depth m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp ^oC	Time Retract	Final Hydrostatic HP psia	Comments (include Probe type)	
14/78	3334.5	3313.5	5448.8/5423 9.5 ppg	14:56	4534.4	4989.3/4964 8.8 ppg	104	15:04	-	Valid Pretest	M
14/79	3334.6	3313.6	5448.6/5422 9.5 ppg	15:15	-	4987.7/4964 8.8 ppg	104	15:20	-	Valid Pretest	M
14/80	3336.2	3325.2	5450.4/5424 9.5 ppg	15:38	-	-	104	15:41	-	Seal Failure	M
15/81	3334.4	3313.4	5449.2/5426 9.5 ppg	18:45	-	-	107	18:46	5450.0	Seal Failure	M
15/82	3334.1	3313.1	5449.5/5426 9.5 ppg	18:52	4803.5	4986.8/4964 8.8 ppg	107	18:56	-	Valid Pretest Sample Taken	M
16/83	3044.7	3023.7	4986.0/4962 9.5 ppg	23:48	4211.6	4441.6/4418 8.6 ppg	104	00:25	-	Valid Pretest Sample Taken	M

L = Long nose probe
M = Martineau probe

RFT PRESSURE DATA

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: A. BOSTON/J.M. BROWN
DATE: 24.10.84/12.11.84 J. ROCHE (12.11.84)

RFT No. Run/Seat	Depth m MDKB	Depth m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psia (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP / RFT gauge psia / psig	Comments (include Probe type)
17/84	3053.1	3032.1	5001.8/4977 9.6 ppg	24.10.84 06:40	4382.3	4466.7/4443 8.6 ppg	105	06:45	-	Valid Pretest Sample Taken M
18/85	3557.0	3536.0	- /6939 11.4 ppg	20:11	-	-	103	20:12	6936	Seal Failure Tool Stuck
19/86	3778.0	3757.0	10393.9/10403 16.1 ppg	12.11.84 16:19	78 (psig)	-	122.5	16:21	-/10403	Tight
19/87	3777.7	3756.7	10385.0/10397 16.1 ppg	16:24	71 (psig)	-	122	16:28	10391.9/10403	Tight
19/88	3777.7	3756.7	10391.9/10403 16.1 ppg	16:28	33 (psig)	10093.5/10111 15.7 ppg	122	16:45	10334.8/10345	Tight Pretest; opened chamber, pressure did not build up after 5 minutes - closed chamber.

L = Long nose probe
M = Martineau probe

RFT PRESSURE DATA

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: J.L. ROCHE
DATE: 12.11.84

RFT No. Run/Seat	Depth m MDKB	m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psig (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP / RFT gauge psia / psig	Comments (include Probe type)
19/89	3666.0	3645.0	- /10022* 16.0 ppg	17:20	-	9294.3*/9334* 15.0 ppg	120	17:36	-/10018	As above.
19/90	3666.0	3645.0	10024.5/10018 16.0 ppg	17:37	180	-	-	17:39	-/10022	Tight
19/91	3666.0	3645.0	10020*/10023 16.0 ppg	17:44	126	-	-	17:47	-/10030	Tight
19/92	3665.8	3645.8	10026.2*/10040 16.0 ppg	17:47	45	-	-	17:49	-/10043	Tight

L = Long nose probe
M = Martineau probe

* = Not Stabilised.

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: J. ROCHE
DATE: 12.11.84

RFT No. Run/Seat	Depth m MDKB	Depth m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psig (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP / RFT gauge psia / psig	Comments (include Probe type)
19/93	3665.8	3644.8	10037.0/10044 16.0 ppg	17:49	16	-	-	17:51	-/10046	Tight
19/94	3666.2	3645.2	10042.3/10054 16.0 ppg	-	12	-	-	06:45	-/10054	Tight
19/95	3662.2	3641.2	10048.0*/10055 16.1 ppg	-	12	-	-	-	-/10059	Tight
19/96	3520.0	3499.0	9556.2*/9619 16.0 ppg	-	22	-	-	-	-/9624	Tool check in casing.
19/97	3574.0	3553.0	9764.9*/9784 16.0 ppg	-	21	7262.7*/7264* 12.0 ppg	-	-	-/9816	Tight

L = Long nose probe
M = Martineau probe

* = Not Stabilised.

RFT PRESSURE DATA

WELL: GRUNTER-1 GEOLOGIST/ENGINEER: J.L. ROCHE
DATE: 12.11.84

RFT No. Run/Seat	Depth m MDKB	Depth m TVDSS KB=21	Initial Hydrostatic HP / RFT gauge psia / psig ppg	Time Set	Minimum Flowing Pressure psig (Pretest)	Formation Pressure HP / RFT gauge psia / psig ppg	Temp °C	Time Retract	Final Hydrostatic HP / RFT gauge psia / psig	Comments (include Probe type)
19/98	3572.5	3551.0	9786.6/9810 16.1 ppg	-	-	-	-	-	-/9814	Seal Failure
19/99	3572.2	3551.2	9787.3*/9810 16.1 ppg	18:36	2946	7431.1*/7474* 12.3 ppg	-	19:43	-/9821	Valid Pretest Took Sample

L = Long nose probe
M = Martineau probe

* = Not Stabilised.

RFT SAMPLE TEST REPORT

WELL : GRUNTER-1

OBSERVER : J. ROCHE   DATE : 2/Oct/84   RUN NO. : 2

	CHAMBER 1 (22.7 lit.)		CHAMBER 2 (10.4 lit.)	
SEAT NO.	18		18	
DEPTH	2861.3	m	2861.3	m
A. RECORDING TIMES				
Tool Set	1611	hrs	-	hrs
Chamber Open	1619	hrs	1637	hrs
Chamber Full	1625	hrs	1641	hrs
Fill Time	6	mins	4	mins
Finish Build Up	1635	hrs	1646	hrs
Build Up Time	10	mins	5	mins
Tool Retract	-	hrs	1647	hrs
Total Time	25	mins	15	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	4782.2	psia	-	psia
Initial Form'n Press.	4111.8	psia	-	psia
Initial Flowing Press.	2052	psia	3261	psia
Final Flowing Press.	3110	psia	3330	psia
Final Formation Press.	4110.0	psia	4109.3	psia
Final Hydrostatic	-	psia	4787.9	psia
C. TEMPERATURE				
Max. Tool Depth	2861.3	m		m
Max. Rec. Temp	98.9	deg C		deg C
Length of Circ.	1.75	hrs		hrs
Time/Date Circ. Stopped	0845 hrs	1/Oct/84/	hrs	/ /
Time since Circ.	31 hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	2100	psia	2000	psia
Amt Gas	125.28	cu ft	63.69	cu ft
Amt Oil	-	lit	-	lit
Amt Water (Total)	4.25	lit	0.80	lit
Amt Others (Condensate)	1.00	cc	0.45	cc
E. SAMPLE PROPERTIES				
Gas Composition				
C1	295 455	ppm	233 615	ppm
C2	58 337	ppm	54 016	ppm
C3	30 236	ppm	23 408	ppm
C4	7 616	ppm	4 352	ppm
C5	2 234	ppm	744	ppm
C6+	615	ppm	212	ppm
CO2/H2S	tr/0	%/ppm	tr/0	%/ppm
Condensate Properties	55.5 deg API@ 15.6 deg C		55.5 deg API@ 15.6 deg C	
Colour				
Fluorescence				
GOR				
Pour Point				
Water Properties				
Resistivity	ohm-m @	deg C	0.204 ohm-m @ 15.5 deg C	
NaCl Equivalent		ppm	40 000	ppm
Cl-titrated	19000	ppm	19 000	ppm
Tritium	608 - 614	DPM	583 - 585	DPM
pH	8.0		8.0	
Est. Water Type	Filtrate		Filtrate	
F. MUD FILTRATE PROPERTIES				
Resistivity	0.187 ohm-m @	deg C	0.187 ohm-m @ 15.5 deg C	
NaCl Equivalent	44 000	ppm	44 000	ppm
Cl-titrated	-	ppm	-	ppm
pH	-		-	
Tritium (in Mud)	723 - 764	DPM	723 - 764	DPM
G. GENERAL CALIBRATION				
Mud Weight	9.5+	ppg		ppg
Calc. Hydrostatic	4637	psi		psi
Serial No. (Preserved)	-		-	
Choke Size/Probe Type	1 x 0.030"/Martineau		1 x 0.030"/Martineau	
REMARKS				
NO_3- (recovered water)	110	ppm	80	ppm

RFT SAMPLE TEST REPORT

WELL : GRUNTER-1

OBSERVER : J. ROCHE   DATE : 2/Oct/84   RUN NO. : 3

	CHAMBER 1 (22.7 lit.)		CHAMBER 2 (3.79 lit.)	
SEAT NO.	19		19	
DEPTH	2702.5	m	2702.5	m
A. RECORDING TIMES				
Tool Set	2056	hrs	-	hrs
Chamber Open	2104	hrs	2118	hrs
Chamber Full	2110	hrs	2120	hrs
Fill Time	6	mins	2	mins
Finish Build Up	2115	hrs	2122	hrs
Build Up Time	4	mins	2	mins
Tool Retract		hrs	2125	hrs
Total Time	19	mins	7	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	4518.5	psia	-	psia
Initial Form'n Press.	3877.5	psia	-	psia
Initial Flowing Press.	2542	psia	3748	psia
Final Flowing Press.	3537	psia	3747	psia
Final Formation Press.	3876.9	psia	3877.1	psia
Final Hydrostatic	-	psia	4518.5	psia
C. TEMPERATURE				
Max. Tool Depth	2702.5	m		m
Max. Rec. Temp	93.1	deg C		deg C
Length of Circ.	1.75	hrs		hrs
Time/Date Circ. Stopped	0845 hrs	1/Oct/84	hrs	/ /
Time since Circ.	36 hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	2100	psia	1990	psia
Amt Gas	154.75	cu ft	36.78	cu ft
Amt Oil	-	lit	-	lit
Amt Water (Total)	0.20	lit	0.10	lit
Amt Others (Condensate)	1.60	lit	-	lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1	248 002	ppm	485 222	ppm
C2	105 011	ppm	114 714	ppm
C3	65 659	ppm	60 006	ppm
C4	18 472	ppm	23 449	ppm
C5	3 937	ppm	4 618	ppm
C6+	988	ppm	975	ppm
CO2/H2S	tr / 0	%/ppm	1% / 0	%/ppm
Condensate Properties	56 deg API@ 15.6	deg C	deg API@	deg C
Colour				
Fluorescence				
GOR				
Pour Point				
Water Properties				
Resistivity	ohm-m @	deg C	0.411 ohm-m @ 18	deg C
NaCl Equivalent		ppm	16 000	ppm
Cl-titrated	9000	ppm		ppm
Tritium	299 - 306	DPM	0 - 0.2	DPM
pH	7.5			
Est. Water Type				
F. MUD FILTRATE PROPERTIES				
Resistivity	0.187 ohm-m @ 15.5	deg C	0.187 ohm-m @ 15.5	deg C
NaCl Equivalent	44 000	ppm	44 000	ppm
Cl-titrated	-	ppm	-	ppm
pH	-		-	
Tritium (in Mud)		DPM		DPM
G. GENERAL CALIBRATION				
Mud Weight	9.5+	ppg		ppg
Calc. Hydrostatic	4380	psi		psi
Serial No. (Preserved)	-		-	
Choke Size/Probe Type	1 x 0.030" /Martineau		1 x 0.030" /Martineau	
REMARKS				
NO_3- (recovered water)	160 ppm			

RFT SAMPLE TEST REPORT

WELL : GRUNTER-1

OBSERVER : A. BOSTON / J. BROWN DATE : 20/Oct/84 RUN NO. : 5

	CHAMBER 1 (45.4 lit.)		CHAMBER 2 (10.4 lit.)	
SEAT NO.	49		49	
DEPTH	3439.0	m	3439.0	m
A. RECORDING TIMES				
Tool Set	1235	hrs	-	hrs
Chamber Open	1243	hrs	1307	hrs
Chamber Full	1257	hrs	1310	hrs
Fill Time	14	mins	3	mins
Finish Build Up	1304	hrs	1323	hrs
Build Up Time	7	mins	13	mins
Tool Retract	-	hrs	1323	hrs
Total Time	29	mins	26	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	5657.1	psia		psia
Initial Form'n Press.	5281.5	psia		psia
Initial Flowing Press.	3210	psia	2629	psia
Final Flowing Press.	2897	psia	2457	psia
Final Formation Press.	-	psia	5273.1	psia
Final Hydrostatic	-	psia	-	psia
C. TEMPERATURE				
Max. Tool Depth	3439.0	m		m
Max. Rec. Temp	114.2	deg C		deg C
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	0000 hrs	19/Oct/84	hrs	/ /
Time since Circ.	37 hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	300	psia	300	psia
Amt Gas	5.63	cu ft	2.06	cu ft
Amt Oil	-	lit	-	lit
Amt Water (Total)	42.0	lit	9.25	lit
Amt Others	-	lit	-	lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1	293 099	ppm	112 250	ppm
C2	36 352	ppm	21 811	ppm
C3	15 052	ppm	15 769	ppm
C4	8 294	ppm	3 456	ppm
C5	796	ppm	1 194	ppm
C6+	131	ppm	35	ppm
CO2/H2S	greater than 60%/0	%/ppm	34% /o	%/ppm
Oil Properties	deg API@	deg C	deg API@	deg C
Colour				
Fluorescence				
GOR				
Pour Point				
Water Properties				
Resistivity	0.196 ohm-m @	21 deg C	0.209 ohm-m @	21 deg C
NaCl Equivalent	35 000	ppm	32 000	ppm
Cl-titrated	21 000	ppm	20 000	ppm
Tritium	468	DPM	403	DPM
pH	-		-	
Est. Water Type	Filtrate		Filtrate	
F. MUD FILTRATE PROPERTIES				
Resistivity	0.206 ohm-m @	14.5 deg C	0.206 ohm-m @	14.5 deg C
NaCl Equivalent	40 000	ppm	40 000	ppm
Cl-titrated (in mud)	22 000	ppm	22 000	ppm
pH	-		-	
Tritium (in Mud)	550	DPM	550	DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6	ppg		ppg
Calc. Hydrostatic	5622	psi		psi
Serial No. (Preserved)	-		-	
Choke Size/Probe Type	1 x 0.030"/Martineau		1 x 0.030"/Martineau	
REMARKS	K = 33md approx.			
NO_3-	40 ppm (rec) 210 (in mud)		50 ppm (rec) 210 (in mud)	
	20 lit water sample kept		4 lit water sample kept	

RFT SAMPLE TEST REPORT

WELL : GRUNTER-1

OBSERVER : A. BLSTON / J. BROWN DATE : 20/Oct/84 RUN NO. : 6

	CHAMBER 1 (45.4 lit.)		CHAMBER 2 (10.4 lit.)	
SEAT NO.	50		50	
DEPTH	3353.0	m	3353.0	m
A. RECORDING TIMES				
Tool Set	1924	hrs	-	hrs
Chamber Open	1933	hrs	2026	hrs
Chamber Full	2000	hrs	2031	hrs
Fill Time	27	mins	5	mins
Finish Build Up	2023	hrs	2057	hrs
Build Up Time	23	mins	26	mins
Tool Retract	-	hrs	2101	hrs
Total Time	59	mins	35	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	5511.8	psia	-	psia
Initial Form'n Press.	5050.0	psia	5045.7	psia
Initial Flowing Press.	650	psia	488	psia
Final Flowing Press.	973	psia	564	psia
Final Formation Press.	5039.0	psia	5048.3	psia
Final Hydrostatic	-	psia	5510.6	psia
C. TEMPERATURE				
Max. Tool Depth	3353.0	m		m
Max. Rec. Temp	109.8	deg C		deg C
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	0000 hrs	19/Oct/84	hrs	/ /
Time since Circ.	44 hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	180	psia	580.3	psia
Amt Gas	2.1	cu ft	2.4	cu ft
Amt Oil	trace	lit	0.10	lit
Amt Water (Total)	43.0	lit	9.0	lit
Amt Others	-	lit	-	lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1	246 328	ppm	212 029	ppm
C2	26 809	ppm	25 446	ppm
C3	10 035	ppm	11 110	ppm
C4	2 419	ppm	6 622	ppm
C5	217	ppm	746	ppm
C6+	tr	ppm	132	ppm
CO2/H2S	9%/0	%/ppm	22%/0	%/ppm
Oil Properties	deg API@	deg C	36.3 deg API@ 15.6	deg C
Colour	Medium brown		Medium brown	
Fluorescence	Bright yellow/white		Bright yellow/white	
GOR				
Pour Point			30	deg C
Water Properties				
Resistivity	0.200 ohm-m @ 20	deg C	0.198 ohm-m @ 19	deg C
NaCl Equivalent	35 500	ppm	36 000	ppm
Cl-titrated	20 000	ppm	20 000	ppm
Tritium	425	DPM	466	DPM
pH	6.8		6.7	
Est. Water Type	Filtrate		Filtrate	
F. MUD FILTRATE PROPERTIES				
Resistivity	0.206 ohm-m @ 14.5	deg C	0.206 ohm-m @ 14.5	deg C
NaCl Equivalent	40 000	ppm	40 000	ppm
Cl-titrated (in mud)	24 000	ppm	24 000	ppm
pH	-		-	
Tritium (in Mud)	629	DPM	629	DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6	ppg		ppg
Calc. Hydrostatic	5482	psi		psi
Serial No. (Preserved)	-			
Choke Size/Probe Type	1 x 0.030"/Martineau		1 x 0.030"/Martineau	
REMARKS	Waxy		Waxy, solid oil	
NO_3-	40ppm (rec) 160 (in mud)		25ppm (rec), 160 (in mud)	
	K = 15 - 25 md			

RFT SAMPLE TEST REPORT

WELL : GRUNTER-1

OBSERVER : A. BOSTON / J. BROWN DATE : 20/Oct/84 RUN NO : 7

	CHAMBER 1 (45.4 lit.)		CHAMBER 2 (10.4 lit.)	
SEAT NO.	57		57	
DEPTH	3394.2m	m	3394.2m	m
A. RECORDING TIMES				
Tool Set	0517	hrs	-	hrs
Chamber Open	0524	hrs	0634	hrs
Chamber Full	0548	hrs	0639	hrs
Fill Time	24	mins	5	mins
Finish Build Up	0626	hrs	0708	hrs
Build Up Time	38	mins	29	mins
Tool Retract	-	hrs	0740	hrs
Total Time	69	mins	76	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	5575	psia	-	psia
Initial Form'n Press.	5169.9	psia	-	psia
Initial Flowing Press.	896	psia	952	psia
Final Flowing Press.	933	psia	790	psia
Final Formation Press.	-	psia	5150.2	psia
Final Hydrostatic	-	psia	5576.2	psia
C. TEMPERATURE				
Max. Tool Depth	3405	m		m
Max. Rec. Temp	115.5	deg C		deg C
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	0000 hrs	19/Oct/84	hrs	/ /
Time since Circ.	54 hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	200	psia	350	psia
Amt Gas	2.01	cu ft	0.91	cu ft
Amt Oil	tr	lit	tr	lit
Amt Water (Total)	41.0	lit	9.5	lit
Amt Others	-	lit	-	lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1	302 453	ppm	215 147	ppm
C2	39 078	ppm	24 992	ppm
C3	15 948	ppm	8 960	ppm
C4	3 369	ppm	1 987	ppm
C5	323	ppm	261	ppm
C6+	tr	ppm	tr	ppm
CO2/H2S	10% /0	%/ppm	17% /0	%/ppm
Oil Properties	deg API@	deg C	deg API@	deg C
Colour				
Fluorescence				
GOR				
Pour Point				
Water Properties				
Resistivity	0.200 ohm-m @	18 deg C	0.196 ohm-m @	17.5 deg C
NaCl Equivalent	38 000	ppm	39 000	ppm
Cl-titrated	21 000	ppm	21 000	ppm
Tritium	408	DPM	484	DPM
pH	7.0		6.8	
Est. Water Type	Filtrate		Filtrate	
F. MUD FILTRATE PROPERTIES				
Resistivity	0.206 ohm-m @	14.5 deg C	0.206 ohm-m @	14.5 deg C
NaCl Equivalent	40 000	ppm	40 000	ppm
Cl-titrated	24 000	ppm	24 000	ppm
pH	-		-	
Tritium (in Mud)	600	DPM	600	DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6	ppg		ppg
Calc. Hydrostatic	5549	psi		psi
Serial No. (Preserved)	-			
Choke Size/Probe Type	1 x 0.030"/Martineau		1 x 0.30" /Martineau	
REMARKS				
NO_3-	55ppm(rec)	180 (in mud)	25ppm(rec)	180 (in mud)

RFT SAMPLE TEST REPORT

WELL : GRUNTER-1

OBSERVER : A. BOSTON / J. BROWN DATE : 21/Oct/84 RUN NO. : 8

	CHAMBER 1 (45.4 lit.)			CHAMBER 2 (10.4 lit.)	
SEAT NO.	58	59			
DEPTH	3310.0	3310.0	m		m
A. RECORDING TIMES					
Tool Set	1324	1334	hrs		hrs
Chamber Open	-	1338	hrs		hrs
Chamber Full	-		hrs		hrs
Fill Time	aborted		mins		mins
Finish Build Up			hrs		hrs
Build Up Time			mins		mins
Tool Retract			hrs		hrs
Total Time			mins		mins
B. SAMPLE PRESSURE					
Initial Hydrostatic	5435.9		psia		psia
Initial Form'n Press.	4853.9	4853.7	psia		psia
Initial Flowing Press.	-	58.0	psia		psia
Final Flowing Press.	-	-	psia		psia
Final Formation Press.	-	Seal	psia		psia
Final Hydrostatic	-	failed	psia		psia
C. TEMPERATURE					
Max. Tool Depth			m		m
Max. Rec. Temp			deg C		deg C
Length of Circ.			hrs		hrs
Time/Date Circ. Stopped		hrs	/ /	hrs	/ /
Time since Circ.		hrs	mins		hrs
D. SAMPLE RECOVERY					
Surface Pressure			psia		psia
Amt Gas			cu ft		cu ft
Amt Oil			lit		lit
Amt Water (Total)			lit		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		ohm-m @	deg C	ohm-m @	deg C
NaCl Equivalent			ppm		ppm
Cl-titrated			ppm		ppm
Tritium			DPM		DPM
pH					
Est. Water Type					
F. MUD FILTRATE PROPERTIES					
Resistivity		ohm-m @	deg C	ohm-m @	deg C
NaCl Equivalent			ppm		ppm
Cl-titrated			ppm		ppm
pH					
Tritium (in Mud)			DPM		DPM
G. GENERAL CALIBRATION					
Mud Weight			ppg		ppg
Calc. Hydrostatic			psi		psi
Serial No. (Preserved)					
Choke Size/Probe Type					
REMARKS	Seat 58 was aborted due Seat 59 was aborted due			to pressure fluctuations to seal failure	

RFT SAMPLE TEST REPORT

WELL : GRUNTER-1

OBSERVER : A. BOSTON / J. BROWN DATE : 21/Oct/84 RUN NO. : 9

	CHAMBER 1 (45.4 lit.)		CHAMBER 2 (10.4 lit.)	
SEAT NO.	9/62		9/62	
DEPTH	3310.6	m	3310.6	m
A. RECORDING TIMES				
Tool Set	1817	hrs	-	hrs
Chamber Open	1823	hrs	1902	hrs
Chamber Full	1850	hrs	1906	hrs
Fill Time	27	mins	4	mins
Finish Build Up	1901	hrs	1924	hrs
Build Up Time	0011	mins	18	mins
Tool Retract	-	hrs	1927	hrs
Total Time	54	mins	25	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	5434.7	psia		psia
Initial Form'n Press.	4854.6	psia	4849.6	psia
Initial Flowing Press.	4200	psia	3594	psia
Final Flowing Press.	4100	psia	3450	psia
Final Formation Press.	4848.4	psia	4850.4	psia
Final Hydrostatic	-	psia	5434.4	psia
C. TEMPERATURE				
Max. Tool Depth	3310.6	m		m
Max. Rec. Temp	113	deg C		deg C
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	hrs	/ /	hrs	/ /
Time since Circ.	hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	1000	psia	1500	psia
Amt Gas	20.8	cu ft	22.3	cu ft
Amt Oil	-	lit	-	lit
Amt Water (Total)	39.5	lit	6.3	lit
Amt Others (Condensate)	0.2	lit	0.4	lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1	411 586	ppm	410 696	ppm
C2	70 886	ppm	70 096	ppm
C3	43 008	ppm	42 318	ppm
C4	16 588	ppm	15 699	ppm
C5	4378	ppm	4069	ppm
C6+	1082	ppm	1082	ppm
CO2/H2S	18%/0	%/ppm	30%/0	%/ppm
Condensate Properties	46 deg API@ 15.6 deg C		48.1 deg API@ 15.6 deg C	
Colour	Very light tan		Very light tan	
Fluorescence	Bright white		Bright white	
GOR				
Pour Point				
Water Properties				
Resistivity	0.192 ohm-m @ 17.5 deg C		0.171 ohm-m @ 17.5 deg C	
NaCl Equivalent	39 000	ppm	44 000	ppm
Cl-titrated	22 000	ppm	21 000	ppm
Tritium	462	DPM	463	DPM
pH	6.7		7.0	
Est. Water Type				
F. MUD FILTRATE PROPERTIES				
Resistivity	0.206 ohm-m @ 14.5 deg C		0.206 ohm-m @ 14.5 deg C	
NaCl Equivalent	40 000	ppm	40 000	ppm
Cl-titrated	23 000	ppm	23 000	ppm
pH				
Tritium (in Mud)	700	DPM	700	DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6	ppg		ppg
Calc. Hydrostatic	5412	psi		psi
Serial No. (Preserved)	-		-	
Choke Size/Probe Type	1 x 0.030" /Martineau		1 x 0.030"/Martineau	
REMARKS	K = 15md approx.			
NO_3-	75ppm(rec) 220 (in mud)		75ppm(rec) 220 (in mud)	
	Possible flowline blockage			

RFT SAMPLE TEST REPORT

WELL : GRUNTER-1

OBSERVER : A. BOSTON / J. BROWN DATE : 22/Oct/84 RUN NO. : 10

	CHAMBER 1 (45.4 lit.)		CHAMBER 2 (10.4 lit.)	
SEAT NO.	63		63	
DEPTH	3328.8	m	3328.8	m
A. RECORDING TIMES				
Tool Set	0104	hrs	-	hrs
Chamber Open	0110	hrs	0131	hrs
Chamber Full	0121	hrs	0133	hrs
Fill Time	11	mins	2	mins
Finish Build Up	0131	hrs	0137	hrs
Build Up Time	6	mins	4	mins
Tool Retract	-	hrs	0143	hrs
Total Time	27	mins	12	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	5460.0	psia	-	psia
Initial Form'n Press.	4970.8	psia	-	psia
Initial Flowing Press.	4880	psia	4810	psia
Final Flowing Press.	4851	psia	4802	psia
Final Formation Press.	4967.7	psia	4967.2	psia
Final Hydrostatic	-	psia	5458.6	psia
C. TEMPERATURE				
Max. Tool Depth	3350	m		m
Max. Rec. Temp	115	deg C		deg C
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	hrs	/ /	hrs	/ /
Time since Circ.	hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	1150	psia	1400	psia
Amt Gas	28.06	cu ft	17.2	cu ft
Amt Oil	0.7	lit	1.0	lit
Amt Water (Total)	38.5	lit	6.8	lit
Amt Others		lit		lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1	386 641	ppm	374 169	ppm
C2	65 433	ppm	56 345	ppm
C3	38 707	ppm	27 596	ppm
C4	14 515	ppm	11 404	ppm
C5	3 124	ppm	2 246	ppm
C6+	327	ppm	372	ppm
CO2/H2S	22% /0	%/ppm	30% / 1	%/ppm
Oil Properties	44.0 deg API@ 15.6 deg C		42.8 deg API@ 15.6 deg C	
Colour	Medium brown		Med. light - med. brown	
Fluorescence	Bright light yellow/white		Bright light yellow/white	
GOR				
Pour Point	26		29	
Water Properties				
Resistivity	0.197 ohm-m @ 20.5 deg C		0.194 ohm-m @ 22.0 deg C	
NaCl Equivalent	35 000	ppm	34 000	ppm
Cl-titrated	21 000	ppm	20 000	ppm
Tritium	542	DPM	439	DPM
pH	6.5		6.7	
Est. Water Type	Filtrate		Filtrate	
F. MUD FILTRATE PROPERTIES				
Resistivity	0.206 ohm-m @ 14.5 deg C		0.206 ohm-m @ 14.5 deg C	
NaCl Equivalent	40 000	ppm	40 000	ppm
Cl-titrated	23 000	ppm	23 000	ppm
pH				
Tritium (in Mud)	680	DPM	680	DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6+	ppg		ppg
Calc. Hydrostatic	5454	psi		psi
Serial No. (Preserved)	-		-	
Choke Size/Probe Type	1 x 0.030" /Martineau		1 x 0.030"/Martineau	
REMARKS	K = 20md approx.			
NO_3-	40ppm(rec) 220 (in mud)		40ppm(rec) 220 (in mud)	

RFT SAMPLE TEST REPORT

WELL : GRUNTER-1

OBSERVER : R. NORTON / J. BROWN DATE : 22/Oct/1874 RUN NO. : 11

	CHAMBER 1 (45.4 lit.)		CHAMBER 2 (10.4 lit.)	
SEAT NO.	65			
DEPTH	3394.4	m		m
A. RECORDING TIMES				
Tool Set	0759	hrs		hrs
Chamber Open	0814	hrs		hrs
Chamber Full	-	hrs		hrs
Fill Time	-	mins		mins
Sealed Chember	0839	hrs		hrs
Build Up Time	-	mins		mins
Tool Retract	0842	hrs		hrs
Total Time	43	mins		mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	5550.7	psia		psia
Initial Form'n Press.	5170.0	psia		psia
Initial Flowing Press.	46	psia		psia
Final Flowing Press.	800	psia		psia
Final Formation Press.		psia		psia
Final Hydrostatic		psia		psia
C. TEMPERATURE				
Max. Tool Depth	3450	m		m
Max. Rec. Temp	119.2	deg C		deg C
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	hrs	/ /	hrs	/ /
Time since Circ.	hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	350	psia		psia
Amt Gas	5.48	cu ft		cu ft
Amt Oil		lit		lit
Amt Water (Total)		lit		lit
Amt Others Water/filtrate/mud	40.4	lit		lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1	258 800	ppm		ppm
C2	30 010	ppm		ppm
C3	11 827	ppm		ppm
C4	2 721	ppm		ppm
C5	646	ppm		ppm
C6+	55	ppm		ppm
CO2/H2S	20% /0	%/ppm		%/ppm
Oil Properties	deg API@	deg C	deg API@	deg C
Colour				
Fluorescence				
GOR				
Pour Point				
Water Properties				
Resistivity	0.199 ohm-m @	21 deg C	ohm-m @	deg C
NaCl Equivalent	37 000	ppm		ppm
Cl-titrated	18 000	ppm		ppm
Tritium	461	DPM		DPM
pH	7.3			
Est. Water Type	Mud/filtrate/water			
F. MUD FILTRATE PROPERTIES				
Resistivity	.206 ohm-m @	14.5 deg C	ohm-m @	deg C
NaCl Equivalent	40 000	ppm		ppm
Cl-titrated	23 000	ppm		ppm
pH				
Tritium (in Mud)	600	DPM		DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6	ppg		ppg
Calc. Hydrostatic	5549	psi		psi
Serial No. (Preserved)	-			
Choke Size/Probe Type	1 x 0.030" / Martineau			
REMARKS NO_3^-	Seal Failure while sampling 20ppm (rec) 180 (in mud)			

RFT SAMPLE TEST REPORT

WELL : GRUNTER-1

OBSERVER : R. NORTON / J. BROWN DATE : 23/Oct/84 RUN NO. : 12

	CHAMBER 1 (45.4 lit.)				CHAMBER 2 (10.4 lit.)	
SEAT NO.		70			70	
DEPTH		3394.0		m	10.4 lit chamber	m
A. RECORDING TIMES					not opened	
Tool Set	0220	0223	0234	hrs		hrs
Chamber Open	-	-	0242	hrs		hrs
Chamber Full	-	-		hrs		hrs
Fill Time	-	-		mins		mins
Finish Build Up	-	-		hrs		hrs
Build Up Time	-	-		mins		mins
Tool Retract	0221	0227	0257	hrs		hrs
Total Time	1	4	23	mins		mins
B. SAMPLE PRESSURE						
Initial Hydrostatic		5555.3		psia		psia
Initial Form'n Press.		5172.6		psia		psia
Initial Flowing Press.		200		psia		psia
Final Flowing Press.		400		psia		psia
Final Formation Press.		-		psia		psia
Final Hydrostatic		-		psia		psia
C. TEMPERATURE						
Max. Tool Depth		3394.0		m		m
Max. Rec. Temp		93.3		deg C		deg C
Length of Circ.				hrs		hrs
Time/Date Circ. Stopped		hrs		/ /	hrs	/ /
Time since Circ.		hrs		mins		hrs
D. SAMPLE RECOVERY						
Surface Pressure		0		psia		psia
Amt Gas		0		cu ft		cu ft
Amt Oil		-		lit		lit
Amt Water (Total)		1.0		lit		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		0.250 ohm-m @ 18.5		deg C	ohm-m @	deg C
NaCl Equivalent		28 000		ppm		ppm
Cl-titrated		14 000		ppm		ppm
Tritium		296		DPM		DPM
pH		8.3				
Est. Water Type		Filtrate/ water				
F. MUD FILTRATE PROPERTIES Resistivity		0.206 ohm-m @ 14.5		deg C	ohm-m @	deg C
NaCl Equivalent		40 000		ppm		ppm
Cl-titrated		24 000		ppm		ppm
pH						
Tritium (in Mud)		600		DPM		DPM
G. GENERAL CALIBRATION Mud Weight		9.6		ppg		ppg
Calc. Hydrostatic		5549		psi		psi
Serial No. (Preserved)		-				
Choke Size/Probe Type		1 x 0.030"/Martineau				
REMARKS	Reopened chamber because suspected flowline plugging.					
NO_3^-	Probably actually tight rock					
	10ppm(rec) 180 (in mud)					

RFT SAMPLE TEST REPORT

WELL : GRUNTER-1

OBSERVER : A. BOSTON , J. BROWN DATE : 23/Oct/84 RUN NO. : 13

	CHAMBER 1 (45.4 lit.)		CHAMBER 2 (10.4 lit.)	
SEAT NO.	76		76	
DEPTH	3394.3	m	3394.3	m
A. RECORDING TIMES				
Tool Set	0741	hrs	-	hrs
Chamber Open	0800	hrs	0933	hrs
Chamber Full	0900	hrs	0947	hrs
Fill Time	60	mins	14	mins
Finish Build Up	0930	hrs	1003	hrs
Build Up Time	15	mins	16	mins
Tool Retract	-	hrs	1023	hrs
Total Time	109	mins	50	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	5551.3	psia	-	psia
Initial Form'n Press.	5176.9	psia	-	psia
Initial Flowing Press.	4800	psia	3800	psia
Final Flowing Press.	550	psia	700	psia
Final Formation Press.	-	psia	5143 (not stabilized)	psia
Final Hydrostatic	-	psia	5550	psia
C. TEMPERATURE				
Max. Tool Depth	3394.3	m		m
Max. Rec. Temp	101	deg C		deg C
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	hrs	/ /	hrs	/ /
Time since Circ.	hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	700	psia	700	psia
Amt Gas	8.25	cu ft	3.35	cu ft
Amt Oil	-	lit	-	lit
Amt Water (Total)	42.5	lit	9.2	lit
Amt Others		lit		lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1	144 077	ppm	72 038	ppm
C2	14 950	ppm	4380	ppm
C3	2118	ppm	1144	ppm
C4	629	ppm	169	ppm
C5	169	ppm	12	ppm
C6+	80	ppm	tr	ppm
CO2/H2S	more than 60% / 0	%/ppm	more than 60% / 0	%/ppm
Oil Properties	deg API@	deg C	deg API@	deg C
Colour				
Fluorescence				
GOR				
Pour Point				
Water Properties				
Resistivity	0.204 ohm-m @	18 deg C	0.217 ohm-m @	18 deg C
NaCl Equivalent	36 000	ppm	33 000	ppm
Cl-titrated	17 000	ppm	15 000	ppm
Tritium	405	DPM	305	DPM
pH	6.9		6.6	
Est. Water Type	filtrate/water		filtrate/water	
F. MUD FILTRATE PROPERTIES				
Resistivity	0.206 ohm-m @	14.5 deg C	0.206 ohm-m @	14.5 deg C
NaCl Equivalent	40 000	ppm	40 000	ppm
Cl-titrated	24 000	ppm	24 000	ppm
pH				
Tritium (in Mud)	600	DPM	600	DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6	ppg		ppg
Calc. Hydrostatic	5549	psi		psi
Serial No. (Preserved)				
Choke Size/Probe Type	1 x 0.030" / Long-nose		1 x 0.030" / Long-nose	
REMARKS	K = 5 md approx.		trace hydrocarbon smell and greasy film on water.	
NO_3-	10ppm(rec): 180 (in mud)		10ppm(rec); 180 (in mud	

RFT SAMPLE TEST REPORT

WELL : GRUNTER-1

OBSERVER : A. BOSTON / R. NEWPORT DATE : 23/Oct/84 RUN NO. : 13

	CHAMBER 1 (45.4 lit.)		CHAMBER 2 (10.4 lit.)	
SEAT NO.	82		82	
DEPTH	3334.1	m	3334.1	m
A. RECORDING TIMES				
Tool Set	1852	hrs	-	hrs
Chamber Open	1856	hrs	1913	hrs
Chamber Full	1905	hrs	1915	hrs
Fill Time	9	mins	2	mins
Finish Build Up	1910	hrs	1930	hrs
Build Up Time	5	mins	15	mins
Tool Retract	-	hrs	1950	hrs
Total Time	18	mins	40	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	5449.5	psia	-	psia
Initial Form'n Press.	4986.8	psia	-	psia
Initial Flowing Press.	4660	psia	4698	psia
Final Flowing Press.	4970	psia	4974	psia
Final Formation Press.	4971.5	psia	4977.6	psia
Final Hydrostatic	-	psia	5447.5	psia
C. TEMPERATURE				
Max. Tool Depth	3375	m		m
Max. Rec. Temp	107	deg C		deg C
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	hrs	/ /	hrs	/ /
Time since Circ.	hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	400	psia	400	psia
Amt Gas	4.53	cu ft	1.45	cu ft
Amt Oil	0	lit	tr	lit
Amt Water (Total)	41	lit	9.1	lit
Amt Others		lit		lit
E. SAMPLE PROPERTIES				
Gas Composition C1	171 520	ppm	178 380	ppm
C2	20 556	ppm	16 819	ppm
C3	5 857	ppm	8 053	ppm
C4	2 048	ppm	2 158	ppm
C5	398	ppm	398	ppm
C6+	131	ppm	96	ppm
CO2/H2S	12% /0	%/ppm	19% / 0	%/ppm
Oil Properties	deg API@	deg C	Insufficient API@	deg C
Colour				
Fluorescence			v.weak,dull,yellow/white	
GOR				
Pour Point				
Water Properties Resistivity	0.192 ohm-m @ 21	deg C	0.203 ohm-m @ 21	deg C
NaCl Equivalent	36 000	ppm	33 000	ppm
Cl-titrated	19 000	ppm	17 000	ppm
Tritium	434	DPM	364	DPM
pH	6.6		6.4	
Est. Water Type	Filtrate/water		Filtrate/water	
F. MUD FILTRATE PROPERTIES Resistivity	ohm-m @	deg C	ohm-m @	deg C
NaCl Equivalent		ppm		ppm
Cl-titrated	19 000	ppm	19 000	ppm
pH				
Tritium (in Mud)	700	DPM	700	DPM
G. GENERAL CALIBRATION Mud Weight	9.6	ppg		ppg
Calc. Hydrostatic	5451	psi		psi
Serial No. (Preserved)	-			
Choke Size/Probe Type	1 x 0.030" / Martineau		1 x 0.030" / Martineau	
REMARKS	K = 34md approx.		trace oily scum	
NO_3-	15(rec): 10 (in mud)		10(rec); 110 (in mud)	

RFT SAMPLE TEST REPORT

WELL : GRUNTER-1

OBSERVER . J. BROWN DATE : 23/Oct/84 RUN NO. : 16

	CHAMBER 1 (45.4 lit.)		CHAMBER 2 (10.4 lit.)	
SEAT NO.	83		83	
DEPTH	3044.7	m	3044.7	m
A. RECORDING TIMES				
Tool Set	2348	hrs	0010	hrs
Chamber Open	2356	hrs		hrs
Chamber Full	0007	hrs	See remarks	hrs
Fill Time	11	mins	below	mins
Finish Build Up	0010	hrs		hrs
Build Up Time	3	mins		mins
Tool Retract	-	hrs	0025	hrs
Total Time	22	mins	15	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	4986.0	psia	-	psia
Initial Form'n Press.	4441.6	psia	-	psia
Initial Flowing Press.	4050	psia	4439	psia
Final Flowing Press.	4439	psia	4439	psia
Final Formation Press.	-	psia	4440.2	psia
Final Hydrostatic	-	psia	4984.8	psia
C. TEMPERATURE				
Max. Tool Depth		m		m
Max. Rec. Temp	3044.7	deg C		deg C
Length of Circ.	107	hrs		hrs
Time/Date Circ. Stopped	hrs	/ /	hrs	/ /
Time since Circ.	hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	1350	psia	1000	psia
Amt Gas	26.45	cu ft	3.4	cu ft
Amt Oil	-	lit	-	lit
Amt Water (Total)	39.0	lit	8.5	lit
Amt Others (condensate)	scum	lit	0	lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1	281 292	ppm	267 571	ppm
C2	37 352	ppm	23 360	ppm
C3	17 571	ppm	8 053	ppm
C4	1888	ppm	3821	ppm
C5	373	ppm	1492	ppm
C6+	39	ppm	164	ppm
CO2/H2S	3% / 0	%/ppm	1% / 0	%/ppm
Condensate Properties	60 deg API@ 15.6	deg C	- API@	deg C
Colour	Colourless		-	
Fluorescence	Bright light blue/white		-	
GOR			-	
Pour Point				
Water Properties				
Resistivity	0.191 ohm-m @ 21	deg C	0.192 ohm-m @ 21	deg C
NaCl Equivalent	36 000	ppm	36 000	ppm
Cl-titrated	19 000	ppm	19 000	ppm
Tritium	453	DPM	450	DPM
pH	7.3		7.5	
Est. Water Type				
F. MUD FILTRATE PROPERTIES				
Resistivity	ohm-m @	deg C	ohm-m @	deg C
NaCl Equivalent		ppm		ppm
Cl-titrated	19 000	ppm		ppm
pH				
Tritium (in Mud)		DPM		DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6	ppg		ppg
Calc. Hydrostatic	4978	psi		psi
Serial No. (Preserved)	-			
Choke Size/Probe Type	1 x 0.030" / Martineau		1 x 0.030" / Martineau	
REMARKS K = 30md(approx) NO_3-	API gravity from refractometer 18(rec); 110 (in mud)		Fault in RFT flowline; Ch.1&2 filled at same time 20(rec); 110 (in mud)	

RFT SAMPLE TEST REPORT

WELL : GRUNTER-1

OBSERVER : A. BOSTON /R. NEWPORT DATE : 24/Oct/84 RUN NO. : 17

	CHAMBER 1 (45.4 lit.)		CHAMBER 2 (10.4 lit.)	
SEAT NO.	84		84	
DEPTH	3053.1	m	3053.1	m
A. RECORDING TIMES				
Tool Set	0640	hrs	-	hrs
Chamber Open	0645	hrs	0700	hrs
Chamber Full	0655	hrs	0702	hrs
Fill Time	10	mins	2	mins
Finish Build Up	0657	hrs	0703	hrs
Build Up Time	2	mins	1	mins
Tool Retract	-	hrs	0706	hrs
Total Time	17	mins	6	mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	5001.8	psia	-	psia
Initial Form'n Press.	4466.7	psia	-	psia
Initial Flowing Press.	2642	psia	437	psia
Final Flowing Press.	4384	psia	437	psia
Final Formation Press.	4464.9	psia	4464.5	psia
Final Hydrostatic		psia	5001.9	psia
C. TEMPERATURE				
Max. Tool Depth	3065	m		m
Max. Rec. Temp	105	deg C		deg C
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	hrs	/ /	hrs	/ /
Time since Circ.	hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	2150	psia		psia
Amt Gas	220.9	cu ft		cu ft
Amt Oil	-	lit		lit
Amt Water (Total)	11.0	lit		lit
Amt Others	2.0	lit		lit
E. SAMPLE PROPERTIES				
Gas Composition				
C1	226 406	ppm		ppm
C2	27 097	ppm		ppm
C3	11 714	ppm		ppm
C4	4496	ppm		ppm
C5	1492	ppm		ppm
C6+	406	ppm		ppm
CO2/H2S	5% / 0	%/ppm		%/ppm
Condensate Properties	53 deg API@ 15.6	deg C	deg API@	deg C
Colour	Colourless - light yellow			
Fluorescence	Bright blue/white			
GOR				
Pour Point				
Water Properties				
Resistivity	0.177 ohm-m @ 19	deg C	ohm-m @	deg C
NaCl Equivalent	41 000	ppm		ppm
Cl-titrated	18 000	ppm		ppm
Tritium	424	DPM		DPM
pH	7.0			
Est. Water Type	Filtrate			
F. MUD FILTRATE PROPERTIES				
Resistivity	ohm-m @	deg C	ohm-m @	deg C
NaCl Equivalent		ppm		ppm
Cl-titrated	2000	ppm		ppm
pH				
Tritium (in Mud)	601	DPM		DPM
G. GENERAL CALIBRATION				
Mud Weight	9.6	ppg		ppg
Calc. Hydrostatic	4991	psi		psi
Serial No. (Preserved)				
Choke Size/Probe Type	1 x 0.030" / Martineau		1 x 0.030" / Martineau	
REMARKS	K = 55md (approx)		SAMPLE PRESERVED	
NO_3-	13ppm(rec); 120 (in mud)			

RFT SAMPLE TEST REPORT

WELL : GRUNTER-1

OBSERVER : J. ROCHE   DATE : 12/Nov/84   RUN NO. : 19

	CHAMBER 1 (22.7 lit.)			CHAMBER 2 (10.4 lit.)		
SEAT NO.	86					
DEPTH	3778.0		m			m
A. RECORDING TIMES						
Tool Set	1619		hrs			hrs
Chamber Open	-		hrs			hrs
Chamber Full	-		hrs			hrs
Fill Time	-		mins			mins
Finish Build Up	-		hrs			hrs
Build Up Time	-		mins			mins
Tool Retract	1621		hrs			hrs
Total Time			mins			mins
B. SAMPLE PRESSURE						
Initial Hydrostatic	10395.6		psia			psia
Initial Form'n Press.	-		psia			psia
Initial Flowing Press.	-		psia			psia
Final Flowing Press.	-		psia			psia
Final Formation Press.	-		psia			psia
Final Hydrostatic			psia			psia
C. TEMPERATURE						
Max. Tool Depth	3778.0		m			m
Max. Rec. Temp	122.5		deg C			deg C
Length of Circ.			hrs			hrs
Time/Date Circ. Stopped	0545	hrs	12/Nov/84		hrs	/ /
Time since Circ.	10	hrs	35 mins			hrs
D. SAMPLE RECOVERY						
Surface Pressure			psia			psia
Amt Gas			cu ft			cu ft
Amt Oil			lit			lit
Amt Water (Total)			lit			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		ohm-m @	deg C		ohm-m @	deg C
NaCl Equivalent			ppm			ppm
Cl-titrated			ppm			ppm
Tritium			DPM			DPM
pH						
Est. Water Type						
F. MUD FILTRATE PROPERTIES						
Resistivity		ohm-m @	deg C		ohm-m @	deg C
NaCl Equivalent			ppm			ppm
Cl-titrated			ppm			ppm
pH						
Tritium (in Mud)			DPM			DPM
G. GENERAL CALIBRATION						
Mud Weight	16.0		ppg			ppg
Calc. Hydrostatic	10294		psi			psi
Serial No. (Preserved)						
Choke Size/Probe Type	Long-nose					
REMARKS	Tight					

RFT SAMPLE TEST REPORT

WELL : GRUNTER-1

OBSERVER : J. ROCHE DATE : 12/Nov/84 RUN NO. : 19

	CHAMBER 1 (22.7 lit.)		CHAMBER 2 (10.4 lit.)	
SEAT NO.	87			
DEPTH	3777.7	m		m
A. RECORDING TIMES				
Tool Set	1624	hrs		hrs
Chamber Open	-	hrs		hrs
Chamber Full	-	hrs		hrs
Fill Time	-	mins		mins
Finish Build Up	-	hrs		hrs
Build Up Time	-	mins		mins
Tool Retract	1628	hrs		hrs
Total Time	4	mins		mins
B. SAMPLE PRESSURE				
Initial Hydrostatic	10385.0	psia		psia
Initial Form'n Press.	-	psia		psia
Initial Flowing Press.	19	psia		psia
Final Flowing Press.	-	psia		psia
Final Formation Press.	-	psia		psia
Final Hydrostatic	-	psia		psia
C. TEMPERATURE				
Max. Tool Depth		m		m
Max. Rec. Temp		deg C		deg C
Length of Circ.		hrs		hrs
Time/Date Circ. Stopped	0545 hrs	12/Nov/84	hrs	/ /
Time since Circ.	hrs	mins		hrs
D. SAMPLE RECOVERY				
Surface Pressure	-	psia		psia
Amt Gas	-	cu ft		cu ft
Amt Oil	-	lit		lit
Amt Water (Total)	-	lit		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	ohm-m @	deg C	ohm-m @	deg C
NaCl Equivalent		ppm		ppm
Cl-titrated		ppm		ppm
Tritium		DPM		DPM
pH				
Est. Water Type				
F. MUD FILTRATE PROPERTIES				
Resistivity	ohm-m @	deg C	ohm-m @	deg C
NaCl Equivalent		ppm		ppm
Cl-titrated		ppm		ppm
pH				
Tritium (in Mud)		DPM		DPM
G. GENERAL CALIBRATION				
Mud Weight	16.0	ppg		ppg
Calc. Hydrostatic	10293	psi		psi
Serial No. (Preserved)				
Choke Size/Probe Type	/ Long-nose			
REMARKS	Tight			

APPENDIX 5

APPENDIX 5

PRODUCTION TEST REPORT

GRUNTER-1 PRODUCTION TEST

On November 19 and 20, 1984, a production test was carried out on the Grunter-1 exploration well over the interval 3392.5 - 3400.5m MDKB (3371.5 - 3379.5m SS). This interval of low porosity was to be tested for productivity, evidence of depletion, reservoir description and fluid completion. The initial flow period was continued for 20.5 hours at an average total fluid rate of 380 b/d and final separator total fluid rate of 508 b/d and a gas rate of 234 kscf/d at a THP of 105 psig with water cuts of 82-90%. As a result of the high water cuts, no second flow period was attempted.

The 39° API oil produced had a GOR of 2600 scf/stb and a pour point of 32°C. The produced water contained gave final tritum readings of 9 DPM and had 11000 ppm chlorides, zero nitrates and RMF of 0.318 at 20°C. The gas contained 56% CO_2 and had a specific gravity of 1.18.

Wellbore hydraulics calculations indicate a bottomhole pressure drawdown of 1200 psi and a corresponding PI of 0.4 STB/d psi, in agreement with the estimated permeability of 12 md based on correlation of log and core data.

Test Descripton

The wellhead pressure was bled from 2720 to 1775 psig before perforating at 1250, 19/10/84, with the tubing containing with 64 barrels of diesel and 32 barrels of nitrogen giving an expected underbalance of 500 psi. The tubing head pressure built up at about 5-6 psi minute. At 1325, the perforating gun was pulled out of the hole, and the well was opened to flare on 32/64 variable choke at 1448. The tubing head pressure dropped from 1978 to zero psig at 1518 as the nitrogen was displaced. At 1622 diesel surfaced and flowed to the tanks at a THP of 3-15 psig and an average rate of 310 b/d until 1900 when the rate began to increase to over 1000 b/d and the THP increased to 107 psig at 1950. Gas and oil were then observed at the surface, followed by mud at 2009. The choke setting was gradually increased to 64/64 adjustable. Shakeouts indicated 5-10% of 39° green-brown API oil. The gas contained 57% CO_2.

At 2223 flow was again diverted to the tanks at an average rate of 510 b/d total fluid and a THP of 85-100 psig. Tritium in water decreased from 295 DPM (at 2145) to 16.9 DPM (at 0630, 20/11/84) indicating that the mud filtrate was being produced together with increasing amounts of formation water.

At 0645 the flow was diverted to the separator to measure the gas-oil ratio. Flow continued at an average rate of 91.8 stb/d oil, 416.5 b/d water, and 233.6 kscf/d gas until the well was shut-in at 1120. The separator results give an average water cut of 82% and an average GOR of 2600 scf/stb.

(0404f:42)

COMPLETION DATA

Well GRUNTER-1 Test PRODUCTION TEST # 1 Date 19-11/84

Company Supervisor D. COLLINS

Test Engineer J. BOUDREAU/D. WRIGHT

1. Interval 3392.5 - 3400.5m
2. Well loading fluid NITROGEN & DIESEL
3. Approximate Differential (p_{f-p_w}) 500 (psi)
4. Type of perforating gun SCHLUMBERGER 2-1/8" ENERJET
5. Perforation density 4 (spf)
6. Mud weight 9.5 (ppg) NO_3^- N/A (ppm)
7. Cl^- of filtrate 14000 (ppm) Tritium 38 (DPM)
8. Cl^- of mud filtrate at time of drilling 20,000 (ppm) NO_3^- 130 (ppm)
   Tritium 654 (DPM)

9. Casing:		10. Liner:		11. Tubing:	
Size	9-5/8 (in.)	Size	- (in.)	Size	3-1/2 (in.)
Weight	47 (lb/ft)	Weight	- (lb/ft)	Inside Diameter	2.992 (in.)
Grade	N-80	Grade	-	Weight	9.3 (lb/ft)
Capacity	0.0732 (bbl/ft)	Capacity	- (bbl/ft)	Grade	L80
Shoe	3549 (m)	Top	- (m)	Capacity	0.00870 (bbl/ft)
Burst	psig	Shoe	- (m)	Connections	3-1/2" EVE
				Burst pressure	15000 psig

12. Plugged back total depth 3450 (m)
13. Depth of packer 3377 (m)
14. Tubing volume 96 (bbl)
15. Volume between packer and lowest perforation 5.6 (bbl)
16. Rathole volume 11.9 (bbl)
17. Depth of tailpipe 3380.6 + .58 = 3381.2 (m) (Muleshoe) Depth of XN ______ (m)
18. Location of pressure gauges: depth - (ft) gauge number -
    depth - (ft) gauge number -
19. Initial WHP before well open 2720 (before perforating)

PERFORATION

Well GRUNTER-1 Test PT # 1 Perforation 3392.5-3400.5m MDKB Date 19-11-84

1. Geologists(s): J. ROCHE
2. Test Engineer(s): P. BOUDREAU/D. WRIGHT
3. Service Company/Engineer: SCHLUMBERGER/D. DAWSON
4. Distance between CCL and top of gun: 1.4m
5. Number of Runs: 1 (104 shots)
6. Wellhead pressure bled down to zero before perforating?

   ____ (Yes) XX (No)
7. Wellhead pressure before perforating: 1775 psi
8. Time of perforation: 1250 (local time)
9. After perforating, record pressure versus time every minute for the first 10 minutes and every 5 minutes thereafter until pressure stabilizes.

Time (Local)	WHP (PSIG)	WHT. °F
1250	1775	65
1251	1780	65
1252	1793	65
1253	1800	65
1254	1806	65
1255	1812	65

Time (Local)	WHP (PSIG)	WHT. °F
1256	1816	65
1257	1822	65
1258	1827	65
1259	1832	65
1300	1838	65
1305	1857	65
1310	1876	
1315	1890	
1320	1903	
1325	1917 - POOH w/SCHLUM	
1330	1927	
1345	1943	
1400	1955	

10. Other perforating runs:

Time	Run	Interval	WHP

11. Remarks: Annulus p 320 psi. Bled wellhead pressure from 2720 to 1775 psig prior to perforating well to obtain underbalance.

INITIAL FLOW PERIOD DATA*

Well GRUNTER-1 Test PT # 1 Perforation 3392.5 - 3400.5m Date 19-11-84

1. Wellhead pressure prior to opening well 1978 (psi)

2. Time well opened 1448 19-11-84

3. Initial choke size 32 - variable (64ths)

4. Well response: (Well (flowed, died)
   - Time diesel surfaced 1622
   - Time gas surfaced 1950
   - Time mud surfaced 2009
   - Time formation fluid surfaced 1950

5. Well data just prior to shut in
   - Flowing wellhead pressure 105 (psi)
   - Choke size 64 (64ths)
   - Pressure downstream of the choke 55 (psi)
   - Rate 61 stb/d (measured, estimated)

6. Time of shut in 1120 20-11-84

7. Total length of initial flow 20 hrs 32 mins (min, hr)

8. Cumulative production 325 total fluids (bbl) (measured, estimated)

9. Description of produced fluids:
   - Oil 10 %   39 °API
   - Water 90 % Cl^- 12000 (ppm)
   - Gas: Sp Gr

C_1 27000 (ppm)		C_5^+ 5800 (ppm)	
C_2 54000 (ppm)		C_6 1600 (ppm)	
C_3 33000 (ppm)		CO_2 57% (ppm, %)	
C_4 17000 (ppm)		H_2S nil-trace (ppm, %)	

*If extended initial flow (clean up) is run, enter production data at 30 min. intervals on Production Test Data Sheet (D-5).

If well is swabbed, fill out swab report (D-3).

PRODUCTION TEST DATA SHEET

Well GRUNTER-1 Test PT # 1 Perforations 3392.5-3400.5 MDKB Date 19-11-84 Page 1 of 8

DATE TIME	REMARKS	WELLHEAD PRESSURE PSI	WELLHEAD TEMPERATURE °F	CASING PRESSURE PSI	CHOKE 64TH	CUMULATIVE PRODUCTION OIL STB	WATER BBLS	GAS MSCF	RATES OIL STB/D	WATER B/D	GAS MSCF/D	GOR	CONDENSATE GAS RATIO	GRAVITY OIL °API @ 60°	GAS AIR=1
1250	Perforate	1775	65	320	-										
1300		1838	65	320	-										
1325	Pulled out of hole w/- Schlumberger-all shots fired	1917	72	360	-										
1448	Open well to flare	1978	72	360	-										
1454		1320	66	360	32										
1500		480	63	360	32										
1518	Well very weak	0	63	360	32										
1622	Diesel at surface	10	67	410	32										
1625	11.0" = 0.0 bbl	10	68	480	32	0.0									
1630	12.0" = 0.4 bbl	14	69	480	32	0.4			115						
1635	14.5" = 1.4 bbl	15	70	480	32	1.4			288						
1640		15	70	490	32										

PRODUCTION TEST DATA SHEET

Well GRUNTER-1 Test PT # 1 Perforations 3392.5-3400.5 MDKB Date 19-11-84

1" = .411 bbl

DATE TIME	REMARKS	WELLHEAD PRESSURE PSI	WELLHEAD TEMPERATURE °F	CASING PRESSURE PSI	CHOKE 64TH	CUMULATIVE PRODUCTION OIL STB	WATER BBLS	GAS MSCF	RATES OIL STB/D	WATER B/D	GAS MSCF/D	GOR	CONDENSATE GAS RATIO	GRAVITY OIL °API @ 60°	GAS AIR=1
1645	20.0" = 3.7 bbl	14	70	490	32	3.7			331						
1650	23.0" = 4.9 bbl	14	70	490	32	4.9			346						
1655	26.0" = 6.2 bbl	12	70	520	32	6.2			374						
1700	28.5" = 7.2 bbl	12	70	520	32	7.2			288						
1705	31.0" = 8.2 bbl	10	71	420	32	8.2			288						
1710		9	72	420	32										
1715	37.0" = 10.7 bbl	6	72	420	32	10.7			360						
1720	39.5" = 11.7 bbl	6	73	420	32	11.7			288						
1725	42.0" = 12.7 bbl	5	73	420	32	12.7			288						
1730	45.0" = 14.0 bbl	5	73	420	32	14.0			374						
1745	53.0" = 17.3 bbl	5	73	480	32	17.3			317						
1800	61.5" = 20.8 bbl	5	73	490	32	20.8			336						
1815	69.5" = 24.0 bbl	4.5	73	390	32	24.0			307						

PRODUCTION TEST DATA SHEET

Well GRUNTER-1 Test PT # 1 Perforations 3392.5-3400.5 MDKB Date 19-11-84 Page 3 of 8

1" = .411 bbl

DATE TIME	REMARKS	WELLHEAD PRESSURE PSI	WELLHEAD TEMPERATURE °F	CASING PRESSURE PSI	CHOKE 64TH	CUMULATIVE PRODUCTION OIL STB	CUMULATIVE PRODUCTION WATER BBLS	CUMULATIVE PRODUCTION GAS MSCF	RATES OIL STB/D	RATES WATER B/D	RATES GAS MSCF/D	GOR	CONDENSATE GAS RATIO	GRAVITY OIL °API @ 60°	GRAVITY GAS AIR=1
1830	77.5" = 27.3 bbl	4	72	395	32	27.3			317						
1845	85.0" = 30.4 bbl	3.5	70	420	32	30.4			298						
1900	11.0" = 200 (new tank)	3.5	70	420	32	30.4									
1915	29.5" = 7.6 bbl	5	68	460	32	38.0			806						
1930	39.0" = 11.5 bbl	9	70	460	32	41.9			374						
1945	58.5" = 19.5 bbl	62	71	370	32	49.9			768						
1950	70.0" = 24.2 bbl	107	72	370	32	54.6			1353						
	Divert flow to burner (gas at surface)														
1955	Choke to 40/64A	70	73	370	40A										
2009	Mud at surface	64	73	390	40A										
2015		110	73	400	40A										
2027	Choke to 44/64A				44A										
2030	Choke to 44/64+	187	70	420	44+										

PRODUCTION TEST DATA SHEET

Well GRUNTER-1 Test PT # 1 Perforations 3392.5-3400.5 MDKB Date 19-11-84

1" = .411 bbl

DATE TIME	REMARKS	WELLHEAD PRESSURE PSI	WELLHEAD TEMPERATURE °F	CASING PRESSURE PSI	CHOKE 64TH	CUMULATIVE PRODUCTION OIL STB	WATER BBLS	GAS MSCF	RATES OIL STB/D	WATER B/D	GAS MSCF/D	GOR OR CONDENSATE GAS RATIO	GRAVITY OIL °API @ 60°	GAS AIR=1
2036 2045	45% CO_2, 0 H_2S Choke to 56/64	142	80	440	56A									
2100		102	82	520	56A									
2115		60	82	360	56A									
2130		75	82	400	56A									
2145		75	83	440	56A									
2146	Choke to 64/64A				64A									
2200	71% CO_2	70	82	460	64A									
2215		72	82	350	64A								41.0	
2223	Divert flow from tank	85	82	360	64A									
2230	Initial level = 26	92	82	360	64A									
2245	26.0" = 0.0	50	82		64A								41.7	
2300	32.0" = 3.1	55	84	430	64A					298				

PRODUCTION TEST DATA SHEET

Well GRUNTER-1 Test PT # 1 Perforations 3392.5-3400.5 MDKB Date 19-11-84

1" = .411 bbl

DATE TIME	REMARKS	WELLHEAD PRESSURE PSI	WELLHEAD TEMPERATURE OF	CASING PRESSURE PSI	CHOKE 64TH	CUMULATIVE PRODUCTION OIL STB	CUMULATIVE PRODUCTION WATER BBLS	CUMULATIVE PRODUCTION GAS MSCF	RATES OIL STB/D	RATES WATER B/D	RATES GAS MSCF/D	GOR OR CONDENSATE GAS RATIO	GRAVITY OIL °API @ 60°	GRAVITY GAS AIR=1
2315	42.0" = 8.3	85	85	460	64A					499				
2330	56"=15.6, *45" water= 9.9	85	87	460	64A					701				
2345	68"=21.8, *50" water=12.5	85	90	500	64A					595				

* About 2/3 of "oil" settled out as water

PRODUCTION TEST DATA SHEET

Well GRUNTER-1 Test PT # 1 Perforations 3392.5-3400.5 MDKB Date 20-11-84

1" = .519 bbl

DATE TIME	REMARKS	WELLHEAD PRESSURE PSI	WELLHEAD TEMPERATURE °F	CASING PRESSURE PSI	CHOKE 64TH	CUMULATIVE PRODUCTION OIL STB	CUMULATIVE PRODUCTION WATER BBLS	CUMULATIVE PRODUCTION GAS MSCF	RATES OIL STB/D	RATES WATER B/D	RATES GAS MSCF/D	GOR	CONDENSATE GAS RATIO	GRAVITY OIL °API @ 60°	GRAVITY GAS AIR=1
2400	Initial level 18.0" = 0.0 bbl	77	90	360	64A										
0015	28.0" = 5.2 bbl	77	90	400	64A					499					
0030	41.0" = 11.9 bbl	89	90	430	64A					643					
0045	50.0" = 16.6 bbl	80	90	450	64A					451					
0100	60.0" = 21.8 bbl	80	90	480	64A					499					
0115	68.0" = 26.0 bbl	90	90	500	64A					403					
0130	Change tank 78.3" = 31.1 bbl	90	90	340	64A					490					
0145	12.0" = 4.7 bbl	85	91	360	64A					451					
0200	23.0" = 10.4 bbl	85	92	380	64A					547					
0215	33.0" = 15.6 bbl	85	93	400	64A					461					
0230	43.0" = 20.8 bbl	85	94	370	64A					499					
0245	54.0" = 26.5 bbl	85	94	300	64A					547					
0300	65.0" = 32.2 bbl	90	94	320	64A					547					

PRODUCTION TEST DATA SHEET

Well GRUNTER-1 Test PT # 1 Perforations 3392.5-3400.5 MDKB Date 20-11-84

1" = .519 bbl

DATE TIME	REMARKS	WELLHEAD PRESSURE PSI	WELLHEAD TEMPERATURE °F	CASING PRESSURE PSI	CHOKE 64TH	CUMULATIVE PRODUCTION OIL STB	CUMULATIVE PRODUCTION WATER BBLS	CUMULATIVE PRODUCTION GAS MSCF	RATES OIL STB/D	RATES WATER B/D	RATES GAS MSCF/D	GOR OR CONDENSATE GAS RATIO	GRAVITY OIL °API @ 60°	GRAVITY GAS AIR=1
0315	3" Initial level 13.0" = 5.2 bbl	90	94	340	64A					499				
0330	24.0" = 10.9 bbl	92	94	360	64A					547				
0345	35.0" = 16.6 bbl	96	95	370	64A					547				
0400	45.0" = 21.8 bbl	92	96	480	64A					499				
0415	54.0" = 26.5 bbl	94	98	420	64A					451				
0430	64.0" = 31.7 bbl	97	99	420	64A					499				
0445	73.0" = 36.3 bbl	97	100	450	64A					441				
0500	3" Initial level 13.0" = 5.2 bbl	99	99	460	64A					499				
0515	23.0" = 10.4 bbl	99	96	470	64A					499				
0530	33.0" = 15.6 bbl	93	95	320	64A					499				
0545	44.0" = 21.3 bbl	95	95	340	64A					547				
0600	54.0" = 26.5 bbl									499				

PRODUCTION TEST DATA SHEET

Well GRUNTER-1 Test PT # 1 Perforations 3392.5-3400.5 MDKB
1" = .519 bbl
Date 20-11-84 Page 7 of 8

DATE TIME	REMARKS	WELLHEAD PRESSURE PSI	WELLHEAD TEMPERATURE °F	CASING PRESSURE PSI	CHOKE 64TH	CUMULATIVE PRODUCTION OIL STB	CUMULATIVE PRODUCTION WATER BBLS	CUMULATIVE PRODUCTION GAS MSCF	RATES OIL STB/D	RATES WATER B/D	RATES GAS MSCF/D	GOR	CONDENSATE GAS RATIO	GRAVITY OIL °API @ 60°	GRAVITY GAS AIR=1
0615	63.0" = 31.1 bbl	94	95	390	64A					445					
0630	75.0" = 37.4 bbl	100	95	400	64A					602					
0645	Divert flow 3" to separator 15.0" = 6.2 bbl	98	95	410	64A					598					
0700		105	90	420	64A										
0715		125	90	420	64A										
0730		150	89	420	64A										
0745		158	90	430	64A										
0800		159	90	440	64A										
0815		160	90	440	64A										
0830		150	89	440	64A										
0845		120	90	450	64A					527					

PRODUCTION TEST DATA SHEET

Well GRUNTER-1 Test PT # 1 Perforations 3392.5-3400.5 MDKB Date 20-11-84

1" = .519 bbl

DATE TIME	REMARKS	WELLHEAD PRESSURE PSI	WELLHEAD TEMPERATURE °F	CASING PRESSURE PSI	CHOKE 64TH	CUMULATIVE PRODUCTION OIL STB	CUMULATIVE PRODUCTION WATER BBLS	CUMULATIVE PRODUCTION GAS MSCF	RATES OIL STB/D	RATES WATER B/D	RATES GAS MSCF/D	GOR OR CONDENSATE GAS RATIO	GRAVITY OIL °API @ 60°	GRAVITY GAS AIR=1
0900		104	89	470	64A					527				
0915		105	89	300	64A					527				
0930		105	89	340	64A					424				
0945		104	89	350	64A					454				
1000		100	88	370	64A					455				
1015		105	88	380	64A					686				
1120	SHUT-IN WELL													

SEPARATOR DATA SHEET

D-6

Well GRUNTER-1 Test PT # 1 Date 20-11-84

DATE TIME	SEPARATOR		OIL METER		WATER METER		GAS METER DATA Gas Meter Dia. ____ Type ____				GAS GRAVITY	REMARKS
	PRESS PSIG	TEMP °F	READING BBLS	DIFF. BBLS	READING BBLS	DIFF. BBLS	STATIC PSIA	DIFF. IN.H_2O	TEMP °F	PLATE IN.		
0745			400.5									
0800			402.5	192.0								
0830			409.0	312.0								
0845			410.9	182.4								
0900			412.4	144.0								
0915			413.9	144.0								
0930			414.8	86.4								
0945			416.0	115.2								
1000			416.7	67.2								
1015			419.3	249.6								
1030			421.2	182.4								

TANK FACTOR = ______ BBL/IN

OIL RATE CALCULATIONS

Well GRUNTER-1 Test PT # 1 STO Gravity 39.0 Date 20-11-84

DATE TIME	TIME	OIL 0.519 b/inch $V_o = V_{lk} (1-\frac{BSW}{100})$								CORRECTED VALUES			REMARKS
		TEMP °F	GRAVITY °API@60°	TANK READING ins.	DIFF.	METER FACTOR	SHRINKAGE	TEMP. CORR.	1- BSW %	CUM.PROD STB	RATE STB/D	GOR SCF/STB	
0830		142		40									39° API
0845		142		48	4.15			.9603	25	.9963	95.64	3042	Water by meter
0900		142		56	4.15			.9603	25	.9963	95.64	2593	144.0
0915		142		65	4.67			.9603	25	1.1200	107.65	2310	144.0
0930		126		72	3.63			.9680	25	.8700	84.4	2960	86.4
0945		120		79	3.63			.9709	25	.8800	84.6	2774	115.2
1000		114		87	4.15			.9738	25	1.0100	97.04	2334	67.2
1015		114		96	4.67			.9738	25	1.1300	109.1	1596	249.6
1030		114		101	2.595			.9738	25	.6310	60.6	3216	182.4
						Average total rate = $\frac{19.8}{.25}$ + 141.3 = 508.3							

GAS RATE CALCULATIONS

Well GRUNTER Test PT # 1 Date 20-11-84

Daniels meter 3.826 inch meter run

DATE TIME	GAS METER STATIC (p_f) PSIA	DIFF. (h_w) IN H_2O	TEMP. °F	PLATE IN.	BASIC ORIFICE FACTOR F_b	FLOWING TEMP FACTOR F_{tf}	SPECIFIC GRAVITY FACTOR Y_2	SUPER-COMPRESS IBILITY F_{pv}	ORIGINAL CONSTANT $C' = F_b \cdot F_{tf} \cdot Y_2 \cdot F_{pv}$	RATE $Q = .024C' \sqrt{h_w p_f}$ (Mcf/D)	REMARKS Y2
0700	99.73	64	68	0.5	50.234	.9923	1.0042	1.0272	51.43	1136	90.78
0715	104.73	80	78	"	"	.9813	1.0051	1.0268	50.97	1126	103.07
0730	104.73	84	80	"	"	.9813	1.0053	1.0264	50.87	1123	105.42
0745	119.73	100	90	"	"	.9723	1.0055	1.0284	50.51	1116	122.11
0800	136.73	101	94	"	"	.9688	1.0049	1.0316	50.45	1114	130.99
0845	44.73	100	118	1.0	202.9	.9485	1.0149	1.0090	197.10	4354	291.20
0900	39.73	82	118	"	"	.9485	1.0138	1.0080	196.60	4345	248.02
0915	39.73	82	115	"	"	.9509	1.0138	1.0081	197.20	4357	248.70
0930	39.73	82	110	"	"	.9551	1.0138	1.0083	198.10	4377	249.80
0945	34.73	82	105	"	"	.9593	1.0158	1.0075	199.20	4401	234.80
1000	34.73	76	102	"	"	.9619	1.0146	1.0076	199.50	4408	226.50
1015	49.73	32	100	"	"	.9636	1.0042	1.0111	198.50	4386	174.9
1030	54.73	36	100	"	"	.9636	1.0045	1.0120	198.70	4391	194.9

LIQUID SAMPLE FIELD ANALYSIS RECORD

Well GRUNTER-1 Test PT # 1 Date 19-11-84

TIME SAMPLED	SAMPLE POINT	SHAKE OUT			API° @ 60°F	Cl^- (ppm)	TRITIUM	pH	NO_3^-	POUR POINT °C
		OIL	WATER	BS&W						
2115	CHOKE	91.0	8.7	0.3	36.1	Dark Green/Brown				
2130	CHOKE	91.0	8.7	0.3	37.6					
2145	CHOKE	5.0	90.0	5.0	41.6	13500	294.8		40	
2215	CHOKE	5.0	90.0	5.0	41.6	13200	208.0		40	
2230	CHOKE	4.0	94.0	1.0		12500	147.2		40	
2245	CHOKE	4.0	94.0	1.0	41.7					
2300	CHOKE	9.9	90.0	0.1		12200	88.4		40	
2330	CHOKE	10.0	90.0	-		11200	73.8		40	
2400	CHOKE	9.9	90.0	0.1		11000	62.5		35	
0030	CHOKE	4.9	95.0	0.1		12200	56.8		30	
0100	CHOKE	9.9	90.0	0.1		12000	37.2		20	29
0130	CHOKE	9.9	90.0	0.1			40.6			
0200	CHOKE	9.9	90.0	0.1		11700	30.7		0	32
0230	CHOKE					11700	32.8		0	
0300	CHOKE	9.9	90.0	0.1	38.3	11500	27.5		0	32
0330	CHOKE	9.9	90.0	0.1		11400	25.3		0	
0400	CHOKE	9.9	90.0	0.1	39.0	11500	23.0		0	28
0430	CHOKE					11500	21.1		0	
0500	TANK	9.9	90.0	0.1	(70% OIL IN TANK SAMPLE)					30
0500	CHOKE					11500	14.4		0	
0530	CHOKE						24.1			
0600	CHOKE	9.9	90.0	0.1	39.0	10800	16.7		0	31

LIQUID SAMPLE FIELD ANALYSIS RECORD

Well GRUNTER-1 Test PT # 1 Date 20-11-84

TIME SAMPLED	SAMPLE POINT	SHAKE OUT			API° @ 60°F	Cl^- (ppm)	TRITIUM	pH	NO_3^-	POUR POINT °C
		OIL	WATER	BS&W						
0630							16.9			
0700	CHOKE				39.9	10500	11.8		0	31
0715	TANK				37.5					32
0730	CHOKE						14.9			
0800	CHOKE				40.0	11000	9.76		0	32
0830	CHOKE						10.23			
0900	CHOKE				37.9	11000	9.94		0	33
1000	CHOKE				38.8	11200	9.27		0	33
1030	CHOKE						0			
1045	CHOKE				40.1	11000	9.46		0	33

GAS SAMPLE FIELD ANALYSIS RECORD

Well GRUNTER-1 Test PT # 1 Date 19-11-84

TIME SAMPLED	SAMPLE POINT	COMPONENTS							
		C_1 PPM	C_2 PPM	C_3 PPM	C_4 PPM	C_5 PPM	H_2S PPM	CO_2 (%)	C_6
2130	CHOKE	271155	49786	34503	17248	6226	-	78	486
2330	CHOKE	271096	48691	34236	16186	6096	-	80	426

GAS SAMPLE FIELD ANALYSIS RECORD

Well GRUNTER-1 Test PT # 1 Date 20-11-84

TIME SAMPLED	SAMPLE POINT	COMPONENTS							
		C_1 PPM	C_2 PPM	C_3 PPM	C_4 PPM	C_5 PPM	H_2S PPM	CO_2 (%)	C_6
0030	CHOKE	277934	53616	31503	15488	4280	-	58	753
0130	CHOKE	264376	46382	31503	16896	5660	-	52	1702
0230	CHOKE	267765	52850	33003	15840	5836	-	55	1580
0330	CHOKE	268762	53616	33000	18022	4390	-	57	1845
0430	CHOKE	267765	53616	32908	17101	5836	trace	58	1580
0530	CHOKE	26878	53500	32908	17192	5836	trace	57	1580
0630	CHOKE	260986	53233	32853	15488	5690	trace	57	1337
0730	CHOKE	280916	53616	32703	17011	5852	trace	57	1580
0830	CHOKE	280812	52500	22703	17011	5852	trace	56	1580
0930	CHOKE	280916	53616	32908	17101	5836	-	56	1580
1030	CHOKE	271155	54765	30912	17283	5350	-	56	1459

SEPARATOR SAMPLE DATA

Well GRUNTER-1 Test PT # 1 Date 20-11-84

Production Interval 3392.5 - 3400.5m

Initial Reservoir Pressure 5170 psia @ 3394 m

Reservoir Temperature 239 °C @ 3394 m

	Liquid Sample No. 1	Liquid Sample No. 2	Gas Sample No. 1	Gas Sample No. 2
Date	20-11-84	20-11-84	20-11-84	20-11-84
Time Sampled	0430	0830	1030	1045
Length of Time Well was Produced	OIL & WATER 13.7h	WATER 17.7h	19.7h	19.95h
Container No.	JERRY CAN	JERRY CAN (PLASTIC)	P346164	P347549
Container Volume	5 GALLON	5 GALLON	11 LITRE	11 LITRE
Separator Pressure	-	-	45 PSIG	45 PSIG
Separator Temperature (°F)	-	-	100°F	100°F
Wellhead Pressure	97 PSIG	150 PSIG	104 PSIG	104 PSIG
Wellhead Temperature (°F)	99°F	89°F	88°F	88°F
Flowing Bottom-hole Pressure (psia)	-	-	-	-
Flowing Bottom-hole Temperature (°C)	-	-	-	-
Separator Rate (Sep. bbl/D)*	N/A	99.6	62.2	62.2
Separator Gas Rate (MSCF/D)	N/A	291.2	194.9	194.9
Separator GOR (SCF/Sep. bbl)	-	2924	3133	3133
Well Rate (STB/D)+	499 B/D TOTAL	95.6 OIL	60.6 OIL	60.6 OIL
Well GOR (SCF/STB)+	N/A	3042	3216	3216
Full Wellstream Water Cut	90%	90%	90%	90%

How Outage was taken on Liquid Samples -

Gas Sampling Method EVACUTATED CYLINDER

Liquid Sampling Method ATMOSPHERIC SAMPLES

Special Instruction for Lab

Sampled by DON McKAY (CORELAB)/OTIS

* Rates based on Meter Readings corrected for Meter Factor Only.
\+ Rates corrected to Stock-Tank Conditions as per Form D-7.

PRODUCTION TEST SUMMARY

Well GRUNTER-1 Test PT # 1 Date 19-11-84 to 20-11-84

Test Data:

1. Interval 3392.5 - 3400.5m MDKB
2. Produced fluid WATER, OIL, GAS
3. Cumulative production 325 BBL TOTAL FLUID, 325 STB OIL, 293 STB WATER
4. Stabilized rate 92 STB/D OIL (KSCF/D)
5. Length of flow period 20.5 (hr)
6. Choke 32 TO 64 (64ths)
7. Gravity of oil or condensate 39 (°API @ 60°F)
8. GOR or Condensate - Gas Ratio 2603 (SCF/STB)
9. Water cut 90 (%)
10. Chlorides 11500 (ppm)
11. H_2S TRACE (%, ppm)
12. CO_2 56 (%)
13. Stabilized flowing wellhead pressure 105 (psig)
14. Stabilized flowing wellhead temperature 89 (°F)
15. Wellhead pressure at end of buildup N/A (psig)
16. Initial reservoir pressure 5170 (psia) @ 3394 (m)
17. Final flowing pressure - (psia) @ - (m)
18. Productivity index N/A 0.4 (MMSCF/D / psi)
19. Maximum bottom-hole temperature N/A (°C) @ ______ (m)
20. Samples taken: 3 ATMOSPHERIC LIQUID SAMPLES (3 X 5 GALLON)
    2 GAS SAMPLES AT PRESSURE (2 X 11 LITRES)
21. Remarks: HAND SAMPLE FOR RESISTIVITY READINGS TAKEN
    BY J. ROCHE

SEPARATOR SAMPLE DATA

Well GRUNTER-1 Test PT # 1 Date 20-11-84

Production Interval 3392.5 - 3400.5m

Initial Reservoir Pressure 5170 psia @ 3394 m

Reservoir Temperature 239 °C @ 3394 m

	Liquid		Gas	
	Sample No. 3	Sample No. 2	Sample No. 1	Sample No. 2
Date	20-11-84			
Time Sampled	1000 OIL			
Length of Time Well was Produced				
Container No.	JERRY CAN			
Container Volume	5 GALLON			
Separator Pressure				
Separator Temperature (°F)				
Wellhead Pressure	100			
Wellhead Temperature (°F)	88			
Flowing Bottom-hole Pressure (psia)	-			
Flowing Bottom-hole Temperature (°C)	-			
Separator Rate (Sep. bbl/D)*				
Separator Gas Rate (MSCF/D)				
Separator GOR (SCF/Sep. bbl)				
Well Rate (STB/D)+				
Well GOR (SCF/STB)+				
Full Wellstream Water Cut				

How Outage was taken on Liquid Samples

Gas Sampling Method

Liquid Sampling Method ATMOSPHERIC SAMPLE

Special Instruction for Lab

Sampled by DON McKAY (CORELAB)

* Rates based on Meter Readings corrected for Meter Factor Only.
+ Rates corrected to Stock-Tank Conditions as per Form D-7.

SURFACE SAMPLING DATA

OEC—877-1-B

TEST NUMBER	RATE NUMBER	AREA	DATE (DAY MO YR.)	PAGE	OF
P.T. #1	1	B. STRAIT	20NOV84	1	1

CUSTOMER	WELL NAME OR NUMBER	FIELD	FORMATION
ESSO AUSTRALIA LIMITED	GRUNTER #1	WILDCAT	SANDSTONE

ELEVATION (FEET)	STANDARD CONDITIONS	TIME WELL FLOWING OR SHUT IN BEFORE SAMPLING	INTERVAL TESTED (FEET)
--	☐ 14.73 psi 60°F ☐ OTHER 14.73 PRESS. 60 TEMP.	19.5 HOURS	3392.5-3400.5 M

SAMPLE # 1

TIME TAKEN	CONTAINER #	CONTAINER VOL. (cc) or (gal)	INITIALLY FILLED WITH (a)	VOL. OF FILL REMAINING WITH SAMPLE (b)	SAMPLE TYPE	SAMPLE TAKEN AT	SAMPLING PRESSURE (psig)	SAMPLING TEMP. (°F)	ATMOSPHERIC PRESS. (psi)	ATMOS. TEMP. (°F)	TIME TO TAKE SAMP (min)
1030	P 347549	11 LITRE	EVACUATED	-	GAS	SEPARATOR	45	100	14.73	65	15

FIELD READINGS AND FACTORS USED

WELL HEAD PRESS. (psig)	WELL HEAD TEMP. (°F)	CHOKE SIZE (64th INCH)	HI STAGE SEP. PRESS. (psig)	HI STAGE SEP. TEMP. (°F)	LO STAGE SEP. PRESS. (psig)	LO STAGE SEP. TEMP. (°F)	BOTTOM HOLE PRESS. (psig) @ FT	BOTTOM HOLE TEMP. (°F) @ FT	OIL GRAVITY @ 60 °F (°API)	OIL BSW (%)	OIL C_f (c)	OIL W_f (c)	GAS GRAVITY (AIR=1)	GAS F_{PV}	TOTAL GAS/~~OIL~~ FLOW RATE AT ☐ STOCK TANK ☑ SEP. COND. ~~(BPD)~~ (MMCF/D)	☑ GOR ☐ OGR ☐ STOCK TANK ☐ SEP. COND. ~~(MCF/BBL)~~ (BBL/MMCF)	WATER FLOW RATE (BPD)
104	88	64	45	100	--	--	--	--	39.0	75	--	--	1.18	1.0139	194.59	3.20	369

SAMPLE # 2

TIME TAKEN	CONTAINER #	CONTAINER VOL. (cc) or (gal)	INITIALLY FILLED WITH (a)	VOL. OF FILL REMAINING WITH SAMPLE (b)	SAMPLE TYPE	SAMPLE TAKEN AT	SAMPLING PRESSURE (psig)	SAMPLING TEMP. (°F)	ATMOSPHERIC PRESS. (psi)	ATMOS. TEMP. (°F)	TIME TO TAKE SAMP (min)
1045	P 346164	11 LITRE	EVACUATED	-	GAS	SEPARATOR	45	100	14.73	65	10

FIELD READINGS AND FACTORS USED

WELL HEAD PRESS. (psig)	WELL HEAD TEMP. (°F)	CHOKE SIZE (64th INCH)	HI STAGE SEP. PRESS. (psig)	HI STAGE SEP. TEMP. (°F)	LO STAGE SEP. PRESS. (psig)	LO STAGE SEP. TEMP. (°F)	BOTTOM HOLE PRESS. (psig) @ FT	BOTTOM HOLE TEMP. (°F) @ FT	OIL GRAVITY @ 60 °F (°API)	OIL BSW (%)	OIL C_f (c)	OIL W_f (c)	GAS GRAVITY (AIR=1)	GAS F_{PV}	TOTAL GAS/~~OIL~~ FLOW RATE AT ☐ STOCK TANK ☑ SEP. COND. ~~(BPD)~~ (MMCF/D)	☑ GOR ☐ OGR ☐ STOCK TANK ☐ SEP. COND. ~~(MCF/BBL)~~ (BBL/MMCF)	WATER FLOW RATE (BPD)
104	88	64	45	100	--	--	--	--	39.0	75	--	--	1.18	1.0139	194.59	3.20	369

SAMPLE

TIME TAKEN	CONTAINER #	CONTAINER VOL. (cc) or (gal)	INITIALLY FILLED WITH (a)	VOL. OF FILL REMAINING WITH SAMPLE (b)	SAMPLE TYPE	SAMPLE TAKEN AT	SAMPLING PRESSURE (psig)	SAMPLING TEMP. (°F)	ATMOSPHERIC PRESS. (psi)	ATMOS. TEMP. (°F)	TIME TO TAKE SAMP (min)

FIELD READINGS AND FACTORS USED

WELL HEAD PRESS. (psig)	WELL HEAD TEMP. (°F)	CHOKE SIZE (64th INCH)	HI STAGE SEP. PRESS. (psig)	HI STAGE SEP. TEMP. (°F)	LO STAGE SEP. PRESS. (psig)	LO STAGE SEP. TEMP. (°F)	BOTTOM HOLE PRESS. (psig) @ FT	BOTTOM HOLE TEMP. (°F) @ FT	OIL GRAVITY @ 60 °F (°API)	OIL BSW (%)	OIL C_f (c)	OIL W_f (c)	GAS GRAVITY (AIR=1)	GAS F_{PV}	TOTAL GAS/OIL FLOW RATE AT ☐ STOCK TANK ☐ SEP. COND. (BPD) (MMCF/D)	☐ GOR ☐ OGR ☐ STOCK TANK ☐ SEP. COND. (MCF/BBL) (BBL/MMCF)	WATER FLOW RATE (BPD)

(a) CONTAINER MAY BE INITIALLY FILLED WITH WATER OR MER... Y (Hg) OR BE EVACUATED (VACUUM).
(b) VOLUME OF WATER OR MERCURY LEFT WITH WELL EFFLUE... MPLE.
(c) C_f IS MEASURED CORRECTION FACTOR FOR CORRECTING OIL VOLUME FROM SEPARATOR TO STOCK TANK CONDITIONS. IT INCLUDES

SAMPLED BY

APPENDIX 6

APPENDIX 6

GEOCHEMICAL REPORT

GEOCHEMICAL REPORT
GRUNTER-1 WELL, GIPPSLAND BASIN
VICTORIA

by

T.R. BOSTWICK

Sample Handling and Analysis by:

- D.M. Hill	)
- D.M. Ford	)
- H. Schiller	) ESSO Australia Ltd
- J. McCardle	)
- M.A. Sparke	)
- Exxon Production Research Company	
- Geochem Laboratories	
- A.C. Cook	University of Wollongong

Esso Australia Ltd.
Geochemical Report. November, 1985

1962L:1

CONTENTS

INTRODUCTION
SUMMARY OF INTERPRETATIONS
DISCUSSION OF RESULTS AND INTERPRETATIONS
CONCLUSIONS

List of Tables

1) C_{1-4} Headspace Cuttings Gas Data
2) Total Organic Carbon Report
3a) Rock-Eval Pyrolysis Report - yields
3b) Rock-Eval Pyrolysis Report - ratios
4a) Kerogen Elemental Analysis Report
4b) Kerogen Elemental Atomic Ratios Report
5) Light Gasoline (C_{4-7}) Summary
6) Vitrinite Reflectance Report
7) C_{15}+ Liquid Chromatography Results
8) Oil Gravities of Grunter-1 oils

List of Figures

1a) C_{1-4} Headspace Cuttings Gas Log
1b) % Wet (C_{2-4}) Gas Log
2) Rock-Eval Maturation and Organic Matter Type
3) Atomic H/C vs Atomic O/C - Modified Van Krevelen Plot
4) Vitrinite Reflectance vs Depth
5) C_{4-7} Gasoline-Range Hydrocarbon Log

C15+ ROCK EXTRACT SATURATE GAS CHROMATOGRAMS

6) Grunter-1, 720-750 m KB - Gippsland Limestone
7) Grunter-1, 1140-55 m KB - Gippsland Limestone
8) Grunter-1, 1650-65 m KB-Lakes Entrance Fm
9) Grunter-1, 1860-75 m KB - Flounder Fm
10) Grunter-1, 2445-60 m KB - Latrobe Group
11) Grunter-1, 2745-60 m KB - Latrobe Group
12) Grunter-1, 3015-30 m KB - Latrobe Group
13) Grunter-1, 3195-3210 m KB - Latrobe Group
14) Grunter-1, 3315-30 m KB - Latrobe Group
15) Grunter-1, 3360-75 m KB - Latrobe Group
16) Grunter-1, 3655-70 m KB - Latrobe Group
17) Grunter-1, 3805-09 m KB - Latrobe Group

WHOLE OIL GAS CHROMATOGRAMS

18) Grunter-1, RFT-2 at 2702.5 m KB

List of Figures (cont'd)

19) Grunter-1, RFT-18 at 2861.3 m KB
20) Grunter-1, RFT-16/83 at 3044.7 m KB
21) Grunter-1, RFT-17/84 at 3053.1 m KB
22) Grunter-1, RFT-9/62 at 3310.6 m KB
23) Grunter-1, RFT-10/63 at 3328.8 m KB
24) Grunter-1, RFT-6/50 at 3353 m KB

Appendix

1) Detailed C_{4-7} sheets.
2) Detailed Vitrinite Reflectance and Exinite Fluorescence Data - Report by A.C. Cook.

INTRODUCTION

Canned cuttings and sidewall cores collected during the drilling of the Grunter-1 well have been analysed for their geochemical characteristics. The canned cuttings were composited over 30 metre intervals from 270 m KB to 840 m KB, and over 15 metre intervals from 840 m KB to Total Depth (T.D.) at 3809 m KB. Light hydrocarbon (C_{1-4}) headspace gases were determined for alternate samples between 270 m KB and 3805 m KB. Succeeding alternate samples between 300 m KB and T.D. were analysed for gasoline range (C_{4-7}) hydrocarbons. Selected samples were analysed for Total Organic Carbon (TOC), Rock-Eval pyrolysis, kerogen isolation and elemental analysis, vitrinite reflectance and C_{15}+ liquid and gas chromatography. Results of these analyses are recorded in Figures 1 through 17 and Tables 1 through 7.

Seven liquid hydrocarbon samples (RFT-2 at 2702.5 m KB, RFT-18 at 2861.3 m KB, RFT-16/83 at 3044.7 m KB, RFT-17/84 at 3053.1 m KB, RFT-9/62 at 3310.6 m KB, RFT-10/63 at 3328.8 m KB and RFT-6/50 at 3353 m KB, were analysed by 'whole oil' gas chromatography and for API gravity. Results for these analyses are shown in Figures 18 through 24 and Table 8.

Interpretations

The source potential of the section encountered by the Grunter-1 well may be summarized as follows:

Depth Interval M.D.K.B.	Formation	Source Potential	Maturity	Indigenous Hydrocarbons Expected
270 - 1377	Gippsland Lmst	Poor	Immature	Gas (if any)
1377 - 1853	Lakes Entrance	Poor	Immature	Gas (if any)
1853 - 1859	Gurnard Fm	Poor	Immature	Gas (if any)
1859 - 1888	Flounder Fm	Poor	Immature	Gas (if any)
1888 - 2610	Latrobe Group*	Poor - Fair	Immature	Gas and oil
2645 - 3000	Latrobe Group+	Poor - Fair	Immature	Gas and oil
3000 - 3500	Latrobe Group+	Fair - V. good	Transitional	Gas and oil
3500 - 3809	Latrobe Group+	V. Good	Mature	Oil and gas

* Paleocene

\+ Late Cretaceous

The liquid hydrocarbons recovered from Grunter-1 consist of (a) high gravity, paraffinic condensates t 2702.5 m KB, 2861.3 m KB, 3044.7 m KB, 3053.1 m KB and 3310.6 m KB, and (b) medium gravity, high wax paraffinic crudes at 3328.8 m KB and 3353 m KB. The oils have been derived from terrestrial organic matter, and the different oil types are most likely a consequence of maturity differences - the medium gravity, high wax crudes being the least mature.

Discussion of Results and Interpretations

Richness

The detailed headspace cuttings gas data are listed in Table 1. Vertical profiles of the total C_{1-4} gases and percent 'wet' (C_{2-4}) gas are displayed in Figures 1a and 1b respectively. Cuttings gas yields are poor to fair in the Gippsland Limestone and generally fair to good in the Latrobe Group sediments. Wet gas yields are correspondingly poor (less than 10 ppm) in the Gippsland Limestone and Lakes Entrance Formations and richer in the Latrobe sediments.

TOC measurements (Table 2) indicate that the Gippsland Limestone and Lakes Entrance Formations are organic poor (TOC's are less than 0.6%) whereas the Latrobe sediments are organic rich (most TOCs are in excess of 1.0%). Rock Eval pyrolysis yields (Table 3a) confirm the above interpretations and indicate that portions of the Late Cretaceous Latrobe section have moderate (S_2 yields between 2-6 mg/gm) to very good (S_2 yields greater than 10 mg/gm) hydrocarbon source potential. The Gurnard and Flounder Formations (top Latrobe), though organic rich have very poor source potential due to poor quality organic matter.

C_{15}+ extraction data for selected cuttings samples are recorded in Table 7. Excellent yields indicative of very good source potential in the Latrobe Group were encountered at the 3655-70 m KB and 3805-3809 m KB levels (Late Cretaceous). Fair to good yields were obtained at 3015-30 m KB and 3315-30 m KB.

Organic Matter Types

Hydrogen indicies (HI) less than 60 (Table 3b) were observed in the Lakes Entrance and Gurnard Formations suggesting the presence of hydrogen-poor, gas-prone (Type III kerogen) organic matter in these formations (Figure 2). Larger hydrogen indices indicative of more a hydrogen-rich organic facies

(Type II & III kerogen) were obtained for portions of the Latrobe Group section (Figure 2). This is particularly characteristic of the Late Cretaceous sediments analysed below 3189 m KB (Table 3B). Hydrogen indic .s (greater than 300) indicative of the 'best' (potentially oil-prone) organic matter encountered in the section were recorded at 2306.5 m KB, 2836.0 m KB, 3112.0 m KB and 3250.0 m KB.

Elemental analyses of selected kerogen samples isolated from sidewall cores are recorded in Table 4a. Approximate hydrogen: carbon (H/C), oxygen: carbon (O/C) and nitrogen:carbon (N/C) atomic ratios for these samples are listed in Table 4b. These ratios are approximate since the oxygen percent is calculated by difference, and the naturally occurring sulphur content (which may be up to a few percent) was not determined. H/C and O/C ratios for the Latrobe sediments when plotted on the modified Van Krevelen diagram (Figure 3) confirm that while Type III, gas-prone kerogen predominates in these sediments, some Type II oil-prone material has also been incorporated in the Latrobe Group sediments.

Maturity

Vitrinite reflectance measurements (Figure 4, Table 6) indicate that maturity for this terrestrially (Type III kerogen) dominated section is reached around 3500 m KB (R_o = 0.75). T-max values (Table 3a) are consistently above 435°C from the 3495.5 m KB level. This correlates well with the maturity interpretation from the vitrinite reflectance data.

Light gasoline (C_{4-7}) yields (Table 5) are very low to 1995 m KB most likely due to immaturity. Between 2085 m KB and 3480 m KB the C_{4-7} yields are increased and parallel the TOC yields. While the early generation of hydrocarbons from Type II kerogen may explain the C_{4-7} yields in excess of 10 ppm to 3000 m KB (R_o = 0.60%), some migration of these light hydrocarbons from an offstructure location is also possible. From 3510 m KB to 3809 m KB the C_{4-7} yields exceed 100 ppm confirming the presence of a mature, oil-prone source.

Normal paraffin chromatograms (Figures 6-17) of extracts from selected composite cuttings samples have characteristic immature patterns to the 3360-3375 m KB level. The extract from the 3805-3809 m KB level appears fully mature and that at the intermediate 3655-3670 m KB level can be considered transitionally mature. These observations are not inconsistent with the other maturity indicators discussed above.

Thus, the drilled section is rated as being immature to 3000 m KB (R_o = 0.60) transitional in maturity between 3000 m KB and 3500 m KB (R_o = 0.75) and fully mature from 3500 m KB to 3809 m KB (T.D.).

Hydrocarbons

The whole oil chromatograms for seven liquid hydrocarbon samples recovered from Grunter-1 are displayed in Figures 18 through 24. The API gravities are listed in Table 8. The samples from 2702.5 m KB, 2861.3 m KB, 3044.7 m KB, 3053.1 m KB and 3310.6 m KB are paraffinic condensates. The 3044.7 m KB and 3310.6 m KB samples have more C_{15}+ hydrocarbons than the other condensates (see chromatograms) which explains their lower API gravities (45.5° and 46.7°).

At 3328.8 m KB and 3353 m KB the liquids are very paraffinic, medium gravity crudes. Their chromatograms have an immature bimodal character with a remnant odd/even carbon preference in the high molecular weight normal alkanes. The sample at 3328.8 m KB (43.9° API) is enriched in the gasoline-range (C_{4-12}) compounds relative to the 3353 m KB (32.8° API) sample. This enrichment may be due to its slightly higher maturity. Both samples are of course less mature than the condensates.

As a consequence of their paraffinic character and the high pristane/phytane (Pr/Ph) ratios (and the remnant odd/even carbon preference in the oils) a terrestrial source is interpreted for both the oils and condensates. Based on the maturity interpretations, these hydrocarbon liquids are not indigenous to the section.

Conclusions

1. The section penetrated by Grunter-1 is immature to 3000 m KB, transitional in maturity between 3000 m KB and 3500 m KB, and fully mature from 3500 m KB to T.D. at 3809 m KB.

2. Late Cretaceous Latrobe Group shales are rated as having very good oil and gas source potential.

3. Oils and condensates recovered by the Grunter-1 well are paraffinic and have most likely originated from terrestrial source material deeper in the section.

11/10/85 **TABLE 1**

ESSO AUSTRALIA LTD.

C1-C4 HYDROCARBON ANALYSES

REPORT A - HEADSPACE GAS

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO.	DEPTH	GAS CONCENTRATION (VOLUME GAS PER BILLION VOLUMES CUTTINGS) METHANE C1	ETHANE C2	PROPANE C3	IBUTANE IC4	NBUTANE C4	WET C2-C4	TOTAL C1-C4	WET/TOTAL PERCENT	GAS COMPOSITION (PERCENT) TOTAL GAS M	TOTAL GAS E	TOTAL GAS P	TOTAL GAS IB	TOTAL GAS NB	WET GAS E	WET GAS P	WET GAS IB	WET GAS NB
77725 A	300.00	22	4	1	0	0	5	27	18.52	81.	15.	4.	0.	0.	80.	20.	0.	0.
77725 C	360.00	6	0	0	0	0	0	6	.00	100.	0.	0.	0.	0.	0.	0.	0.	0.
77725 E	420.00	4	1	0	0	0	1	5	20.00	80.	20.	0.	0.	0.	100.	0.	0.	0.
77725 G	480.00	11	4	1	0	0	5	16	31.25	69.	25.	6.	0.	0.	80.	20.	0.	0.
77725 I	540.00	844	34	19	7	4	64	908	7.05	93.	4.	2.	1.	0.	53.	30.	11.	6.
77725 K	600.00	667	15	9	7	2	33	700	4.71	95.	2.	1.	1.	0.	45.	27.	21.	6.
77725 M	660.00	861	31	14	9	2	56	917	6.11	94.	3.	2.	1.	0.	55.	25.	16.	4.
77725 O	720.00	262	19	4	1	0	24	286	8.39	92.	7.	1.	0.	0.	79.	17.	4.	0.
77725 Q	780.00	891	46	9	3	1	59	950	6.21	94.	5.	1.	0.	0.	78.	15.	5.	2.
77725 S	840.00	1141	47	14	4	2	67	1208	5.55	94.	4.	1.	0.	0.	70.	21.	6.	3.
77725 U	870.00	3576	139	53	18	8	218	3794	5.75	94.	4.	1.	0.	0.	64.	24.	8.	4.
77725 W	900.00	2815	121	29	7	4	161	2976	5.41	95.	4.	1.	0.	0.	75.	18.	4.	2.
77725 Y	930.00	5920	147	45	16	7	215	6135	3.50	96.	2.	1.	0.	0.	68.	21.	7.	3.
77726 A	960.00	10666	171	62	24	10	267	10933	2.44	98.	2.	1.	0.	0.	64.	23.	9.	4.
77726 C	990.00	10028	194	68	22	11	295	10323	2.86	97.	2.	1.	0.	0.	66.	23.	7.	4.
77726 E	1020.00	4437	172	48	14	7	241	4678	5.15	95.	4.	1.	0.	0.	71.	20.	6.	3.
77726 G	1050.00	3400	225	52	14	7	298	3698	8.06	92.	6.	1.	0.	0.	76.	17.	5.	2.
77726 I	1080.00	3157	170	37	11	5	223	3380	6.60	93.	5.	1.	0.	0.	76.	17.	5.	2.
77726 K	1110.00	1913	106	40	20	6	172	2085	8.25	92.	5.	2.	1.	0.	62.	23.	12.	3.
77726 M	1140.00	2921	71	49	23	11	154	3075	5.01	95.	2.	2.	1.	0.	46.	32.	15.	7.
77726 O	1170.00	4061	23	12	4	2	41	4102	1.00	99.	1.	0.	0.	0.	56.	29.	10.	5.
77726 Q	1200.00	4579	93	64	30	13	200	4779	4.18	96.	2.	1.	1.	0.	46.	32.	15.	6.
77726 S	1230.00	26925	145	84	28	14	271	27196	1.00	99.	1.	0.	0.	0.	54.	31.	10.	5.
77726 U	1260.00	10101	156	126	52	23	357	10458	3.41	97.	1.	1.	0.	0.	44.	35.	15.	6.
77726 W	1290.00	8292	107	84	30	15	236	8528	2.77	97.	1.	1.	0.	0.	45.	36.	13.	6.
77726 Y	1320.00	21046	211	221	80	40	552	21598	2.56	97.	1.	1.	0.	0.	38.	40.	14.	7.
77727 A	1350.00	3261	33	35	15	6	89	3350	2.66	97.	1.	1.	0.	0.	37.	39.	17.	7.
77727 E	1410.00	1898	12	11	5	2	30	1928	1.56	98.	1.	1.	0.	0.	40.	37.	17.	7.
77727 G	1440.00	16982	144	113	54	22	333	17315	1.92	98.	1.	1.	0.	0.	43.	34.	16.	7.
77727 I	1470.00	4183	36	27	13	5	81	4264	1.90	98.	1.	1.	0.	0.	44.	33.	16.	6.
77727 K	1500.00	5253	34	28	13	6	81	5334	1.52	98.	1.	1.	0.	0.	42.	35.	16.	7.
77727 M	1530.00	5997	64	49	24	9	146	6143	2.38	98.	1.	1.	0.	0.	44.	34.	16.	6.
77727 O	1560.00	11360	129	97	39	17	282	11642	2.42	98.	1.	1.	0.	0.	46.	34.	14.	6.
77727 Q	1590.00	5010	49	43	16	8	116	5126	2.26	98.	1.	1.	0.	0.	42.	37.	14.	7.
77727 S	1620.00	2595	35	31	14	5	85	2680	3.17	97.	1.	1.	1.	0.	41.	36.	16.	6.
77727 U	1650.00	5844	67	69	26	13	175	6019	2.91	97.	1.	1.	0.	0.	38.	39.	15.	7.
77727 W	1680.00	6021	82	80	36	17	215	6236	3.45	97.	1.	1.	1.	0.	38.	37.	17.	8.
77727 Y	1710.00	9014	92	91	29	18	230	9244	2.49	98.	1.	1.	0.	0.	40.	40.	13.	8.
77728 A	1740.00	10082	157	139	47	25	368	10450	3.52	96.	2.	1.	0.	0.	43.	38.	13.	7.
77728 C	1770.00	11133	214	172	42	21	449	11582	3.88	96.	2.	1.	0.	0.	48.	38.	9.	5.
77728 E	1800.00	7443	134	161	50	32	377	7820	4.82	95.	2.	2.	1.	0.	36.	43.	13.	8.
77728 G	1830.00	6946	331	481	182	113	1107	8053	13.75	86.	4.	6.	2.	1.	30.	43.	16.	10.
77728 I	1860.00	6397	164	259	102	125	650	7047	9.22	91.	2.	4.	1.	2.	25.	40.	16.	19.
77728 K	1890.00	16746	879	951	419	258	2507	19253	13.02	87.	5.	5.	2.	1.	35.	38.	17.	10.
77728 M	1935.00	2389	229	169	42	46	486	2875	16.90	83.	8.	6.	1.	2.	47.	35.	9.	9.
77728 O	2010.00	374	41	39	12	11	103	477	21.59	78.	9.	8.	3.	2.	40.	38.	12.	11.
77728 Q	2040.00	299	72	46	10	10	138	437	31.58	68.	16.	11.	2.	2.	52.	33.	7.	7.

C1-C4 HYDROCARBON ANALYSES

REPORT A - HEADSPACE GAS

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO.	DEPTH	METHANE C1	ETHANE C2	PROPANE C3	IBUTANE IC4	NBUTANE C4	WET C2-C4	TOTAL C1-C4	WET/TOTAL PERCENT	TOTAL GAS M	TOTAL GAS E	TOTAL GAS P	TOTAL GAS IB	TOTAL GAS NB	WET GAS E	WET GAS P	WET GAS IB	WET GAS NB
		GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS)								GAS COMPOSITION (PERCENT)								
77728 S	2070.00	2563	658	382	71	87	1198	3761	31.85	68.	17.	10.	2.	2.	55.	32.	6.	7.
77728 U	2100.00	188	63	51	13	14	141	329	42.86	57.	19.	16.	4.	4.	45.	36.	9.	10.
77728 W	2130.00	569	202	154	37	37	430	999	43.04	57.	20.	15.	4.	4.	47.	36.	9.	9.
77728 Y	2160.00	5218	1641	927	157	159	2884	8102	35.60	64.	20.	11.	2.	2.	57.	32.	5.	6.
77729 A	2190.00	3045	862	469	83	88	1502	4547	33.03	67.	19.	10.	2.	2.	57.	31.	6.	6.
77729 C	2220.00	5189	1081	704	154	156	2095	7284	28.76	71.	15.	10.	2.	2.	52.	34.	7.	7.
77729 E	2250.00	1166	361	287	64	68	780	1946	40.08	60.	19.	15.	3.	3.	46.	37.	8.	9.
77729 G	2280.00	13791	1598	519	79	60	2256	16047	14.06	86.	10.	3.	0.	0.	71.	23.	4.	3.
77729 I	2310.00	11145	1683	692	135	132	2642	13787	19.16	81.	12.	5.	1.	1.	64.	26.	5.	5.
77729 K	2340.00	29711	4326	1538	256	265	6385	36096	17.69	82.	12.	4.	1.	1.	68.	24.	4.	4.
77729 M	2370.00	33950	5905	1651	130	86	7772	41722	18.63	81.	14.	4.	0.	0.	76.	21.	2.	1.
77729 O	2400.00	20411	3131	1525	158	164	4978	25389	19.61	80.	12.	6.	1.	1.	63.	31.	3.	3.
77729 P	2445.00	7824	1355	668	87	92	2202	10026	21.96	78.	14.	7.	1.	1.	62.	30.	4.	4.
77729 R	2475.00	14642	1735	746	89	94	2664	17306	15.39	85.	10.	4.	1.	1.	65.	28.	3.	4.
77729 T	2505.00	3400	353	189	29	28	599	3999	14.98	85.	9.	5.	1.	1.	59.	32.	5.	5.
77729 V	2535.00	7442	1231	542	102	109	1984	9426	21.05	79.	13.	6.	1.	1.	62.	27.	5.	5.
77729 X	2565.00	567	366	669	221	233	1489	2056	72.42	28.	18.	33.	11.	11.	25.	45.	15.	16.
77729 Z	2595.00	562	988	1550	268	346	3152	3714	84.87	15.	27.	42.	7.	9.	31.	49.	9.	11.
77730 B	2625.00	579	476	689	123	161	1449	2028	71.45	29.	23.	34.	6.	8.	33.	48.	8.	11.
77730 D	2655.00	960	667	863	200	159	2089	3049	68.51	31.	28.	28.	7.	5.	42.	41.	10.	8.
77730 F	2685.00	8536	4276	2958	428	474	8136	16672	48.80	51.	26.	18.	3.	3.	53.	36.	5.	6.
77730 H	2715.00	12035	3956	1538	161	159	5814	17849	32.57	67.	22.	9.	1.	1.	68.	26.	3.	3.
77730 J	2745.00	72758	13984	3854	330	370	18538	91296	20.31	80.	15.	4.	0.	0.	75.	21.	2.	2.
77730 L	2775.00	10762	1216	238	31	17	1502	12264	12.25	88.	10.	2.	0.	0.	81.	16.	2.	1.
77730 N	2805.00	35170	4407	1357	128	77	5969	41139	14.51	85.	11.	3.	0.	0.	74.	23.	2.	1.
77730 P	2835.00	391	135	40	4	4	183	574	31.88	68.	24.	7.	1.	1.	74.	22.	2.	2.
77730 T	2895.00	9585	643	170	19	13	845	10430	8.10	92.	6.	2.	0.	0.	76.	20.	2.	2.
77730 V	2925.00	2318	290	116	18	11	435	2753	15.80	84.	11.	4.	1.	0.	67.	27.	4.	3.
77730 X	2955.00	28454	2286	352	54	25	2717	31171	8.72	91.	7.	1.	0.	0.	84.	13.	2.	1.
77730 Z	2985.00	22780	3929	1320	114	78	5441	28221	19.28	81.	14.	5.	0.	0.	72.	24.	2.	1.
77731 B	3015.00	10032	2887	2619	551	489	6546	16578	39.49	61.	17.	16.	3.	3.	44.	40.	8.	7.
77731 D	3045.00	20463	4537	1806	246	277	6866	27329	25.12	75.	17.	7.	1.	1.	66.	26.	4.	4.
77731 F	3075.00	1651	540	216	28	25	809	2460	32.89	67.	22.	9.	1.	1.	67.	27.	3.	3.
77731 H	3105.00	7256	1364	417	49	46	1876	9132	20.54	79.	15.	5.	1.	1.	73.	22.	3.	2.
77731 J	3135.00	2856	782	240	38	23	1083	3939	27.49	73.	20.	6.	1.	1.	72.	22.	4.	2.
77731 L	3165.00	4327	1759	1023	165	140	3107	7434	41.79	58.	24.	14.	2.	2.	57.	33.	6.	5.
77731 N	3195.00	29617	4992	1549	213	140	6894	36511	18.88	81.	14.	4.	1.	0.	72.	22.	3.	2.
77731 P	3225.00	16338	1916	668	130	80	2794	19132	14.60	85.	10.	4.	1.	0.	68.	25.	5.	3.
77731 R	3255.00	15765	2327	928	185	95	3535	19300	18.32	82.	12.	5.	1.	0.	66.	26.	5.	3.
77731 T	3285.00	7441	871	151	29	10	1061	8502	12.48	88.	10.	2.	0.	0.	82.	14.	3.	1.
77731 V	3315.00	28554	1653	517	71	43	2284	30838	7.41	93.	5.	2.	0.	0.	72.	23.	3.	2.
77731 X	3345.00	6235	982	465	83	56	1586	7821	20.28	80.	13.	6.	1.	1.	62.	29.	5.	4.
77731 Z	3375.00	26347	2678	1167	168	137	4350	30697	14.17	86.	9.	4.	1.	0.	66.	27.	4.	3.
77732 B	3420.00	14664	1505	468	74	52	2099	16763	12.52	87.	9.	3.	0.	0.	72.	22.	4.	2.
77732 D	3465.00	15676	1547	502	84	47	2180	17856	12.21	88.	9.	3.	0.	0.	71.	23.	4.	2.
77732 F	3495.00	11716	1350	508	80	44	1982	13698	14.47	86.	10.	4.	1.	0.	68.	26.	4.	2.
77732 H	3521.00	27130	4152	1909	306	205	6572	33702	19.50	80.	12.	6.	1.	1.	63.	29.	5.	3.

C1-C4 HYDROCARBON ANALYSES

REPORT A - HEADSPACE GAS

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO.	DEPTH	METHANE C1	ETHANE C2	PROPANE C3	IBUTANE IC4	NBUTANE C4	WET C2-C4	TOTAL C1-C4	WET/TOTAL PERCENT	TOTAL GAS M	TOTAL GAS E	TOTAL GAS P	TOTAL GAS IB	TOTAL GAS NB	WET GAS E	WET GAS P	WET GAS IB	WET GAS NB
		GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS)								GAS COMPOSITION (PERCENT)								
77732 I	3535.00	16032	3268	1857	267	234	5626	21658	25.98	74.	15.	9.	1.	1.	58.	33.	5.	4.
77732 P	3595.00	81821	20840	9153	1147	820	31960	113781	28.09	72.	18.	8.	1.	1.	65.	29.	4.	3.
77732 U	3625.00	46860	14515	5488	561	503	21067	67927	31.01	69.	21.	8.	1.	1.	69.	26.	3.	2.
77732 O	3655.00	40913	17692	8091	762	917	27462	68375	40.16	60.	26.	12.	1.	1.	64.	29.	3.	3.
77732 S	3685.00	22064	8181	3144	266	356	11947	34011	35.13	65.	24.	9.	1.	1.	68.	26.	2.	3.
77732 H	3715.00	77031	21611	6666	861	995	32133	109164	29.44	71.	20.	8.	1.	1.	67.	27.	3.	3.
77732 W	3745.00	9348	9978	11459	1558	2752	25747	35095	73.36	27.	28.	33.	4.	8.	39.	45.	6.	11.
77732 Y	3775.00	25091	11799	6640	787	1136	20362	45453	44.80	55.	26.	15.	2.	2.	58.	33.	4.	6.
77733 A	3805.00	33887	4521	2398	222	391	7532	41419	18.18	82.	11.	6.	1.	1.	60.	32.	3.	5.

TOTAL ORGANIC CARBON REPORT

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO.	DEPTH	AGE	FORMATION	AN	TOC%	AN	TOC%	AN	CO3%	DESCRIPTION
77725 B	330.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.07					V PALE GRN MARL
77725 D	390.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.08					V PALE GRN MARL
77725 F	450.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.08					V PALE GRN MARL
77725 H	510.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.15					V PALE GRN LMST
77725 J	570.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.17					GRN/GY LMST, CALC
77725 N	690.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.17					GRN/GY LMST, CALC
77725 P	750.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.19					PALE GRN LMST
77725 R	810.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.23					PALE GRN LMST
77725 T	855.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.33					PALE GRN LMST
77725 V	885.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.37					GRN/GY CLYST, CALC
77725 Z	945.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.52					GRN/GY CLYST, CALC
77726 B	975.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.49					GRN/GY CLYST, CALC
77726 F	1035.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.46					GRN/GY CLYST, CALC
77726 J	1095.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.33					GRN/GY CLYST, CALC
77726 N	1155.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.47					GRN/GY CLYST, CALC
77726 R	1215.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.49					GRN/GY CLYST, CALC
77726 T	1245.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.47					GRN/GY CLYST, CALC
77726 X	1305.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.52					GRN/GY CLYST, CALC
77727 B	1365.00	PLEIST-MID MIOCENE	GIPPSLAND LMST	2	0.46					GRN/GY CLYST
77727 F	1425.00	MID-EARLY MIOCENE	LAKES ENTRANCE	2	0.49					GY/GRN CLYST, CALC
77727 J	1485.00	MID-EARLY MIOCENE	LAKES ENTRANCE	2	0.60					GY/GRN CLYST, CALC
77727 N	1545.00	MID-EARLY MIOCENE	LAKES ENTRANCE	2	0.52					GY/GRN CLYST, CALC
77727 R	1605.00	MID-EARLY MIOCENE	LAKES ENTRANCE	2	0.46					GY/GRN CLYST, CALC
77727 V	1665.00	MID-EARLY MIOCENE	LAKES ENTRANCE	2	0.51					GY/GRN CLYST, CALC
77727 Z	1725.00	MID-EARLY MIOCENE	LAKES ENTRANCE	2	0.58					GY/GRN CLYST, CALC
77610 C	1750.00	MID-EARLY MIOCENE	LAKES ENTRANCE	1	0.49			1	26.78	M GY CLYST
77610 B	1783.10	MID-EARLY MIOCENE	LAKES ENTRANCE	1	0.39			1	32.53	M GY CLYST
77728 D	1785.00	MID-EARLY MIOCENE	LAKES ENTRANCE	2	0.46					GY/GRN CLYST, CALC
77609 Z	1818.90	MID-EARLY MIOCENE	LAKES ENTRANCE	1	0.38			1	53.13	M GY CLYST
77728 H	1845.00	MID-EARLY MIOCENE	LAKES ENTRANCE	2	0.50					GY/GRN CLYST, CALC
77609 P	1854.00	MIDDLE EOCENE	LATROBE GP/GURNARD FM	1	1.42			1	25.94	M BRN SH, QTZ, GLAUC, CARB
77609 O	1856.00	MIDDLE EOCENE	LATROBE GP/GURNARD FM	1	0.97			1	15.57	DK GY BRN SLTST, MICA
77609 N	1858.00	MIDDLE EOCENE	LATROBE GP/GURNARD FM	1	1.38			1	9.92	DK BRN MED GRAINED SH
77609 J	1875.00	EARLY EOCENE	LATROBE GP/FLOUNDER FM	1	0.95			1	4.67	LT GY SLTST, CALC
77728 J	1875.00	EARLY EOCENE	LATROBE GP/FLOUNDER FM	2	0.56					GY/GRN CLYST, CALC
77609 I	1887.00	EARLY EOCENE	LATROBE GP/FLOUNDER FM	1	1.08			1	2.88	M-DK GY SLTST, MICA
77728 L	1905.00	PALEOCENE	LATROBE GROUP	2	0.56					GY/GRN CLYST, CALC
77609 E	1912.00	PALEOCENE	LATROBE GROUP	1	0.68			1	2.49	M GY SLTST, CARB
77609 C	1940.00	PALEOCENE	LATROBE GROUP	1	1.52			1	2.54	M-DK GY SLTST, CARB,
77728 N	1995.00	PALEOCENE	LATROBE GROUP	2	0.52					GY/GRN CLYST, CALC
77608 Z	2009.00	PALEOCENE	LATROBE GROUP	1	0.47			1	4.13	M-DK GY SLTST, CARB, MICA
77608 W	2052.00	PALEOCENE	LATROBE GROUP	1	0.69			1	2.33	M-DK GY SLTST, MICA, CARB
77608 V	2103.00	PALEOCENE	LATROBE GROUP	1	3.31			1	5.11	M-DK GY SLTST, MICA
77608 S	2145.00	PALEOCENE	LATROBE GROUP	1	3.38			1	3.8	M-DK GY SLTST, MICA
77608 Q	2167.00	PALEOCENE	LATROBE GROUP	1	1.19			1	2.92	M GY FINE SH
77608 P	2172.00	PALEOCENE	LATROBE GROUP	1	3.43			1	2.21	M-DK GY SH, MICA
77608 O	2176.00	PALEOCENE	LATROBE GROUP	1	1.31			1	4.11	M-DK GY SLTST, CARB, MICA

Table 2 cont'd

TOTAL ORGANIC CARBON REPORT

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO.	DEPTH	AGE	FORMATION	AN	TOC%	AN	TOC%	AN	CO3%	DESCRIPTION
77608 N	2201.60	PALEOCENE	LATROBE GROUP	1	1.14			1	3.27	DK GY SH, LT BRN SST
77729 B	2205.00	PALEOCENE	LATROBE GROUP	2	0.85					M GY CLYST
77608 M	2213.00	PALEOCENE	LATROBE GROUP	1	0.55			1	5.49	M GY/M-DK GY SLTST
77610 W	2244.60	PALEOCENE	LATROBE GROUP	1	3.29			1	2.17	M-DK GY SLTST, MICA
77729 F	2265.00	PALEOCENE	LATROBE GROUP	2	5.94					M GY CLYST
77729 H	2295.00	PALEOCENE	LATROBE GROUP	2	1.35					M GY CLYST, CALC
77610 T	2306.50	PALEOCENE	LATROBE GROUP	1	15.54			1	0.43	DK GY SH, CARB
77729 J	2325.00	PALEOCENE	LATROBE GROUP	2	43.90					COAL
77608 I	2340.10	PALEOCENE	LATROBE GROUP	1	1.79			1	3.51	M GY SLTST, MICA
77729 L	2355.00	PALEOCENE	LATROBE GROUP	2	6.36					M GY CLYST, TR COAL
77608 H	2374.00	PALEOCENE	LATROBE GROUP	1	2.08			1	4.36	M GY SLTST, MICA
77729 N	2385.00	PALEOCENE	LATROBE GROUP	2	5.40					M-DK GY CLYST
77608 E	2425.00	PALEOCENE	LATROBE GROUP	1	3.47			1	4.92	M-DK GY/DK GY SLTST, MICA
77729 Q	2460.00	PALEOCENE	LATROBE GROUP	2	0.39					LT OL GY CLYST, CALC
77729 S	2490.00	PALEOCENE	LATROBE GROUP	2	0.65					LT OL GY CLYST, CALC
77729 U	2520.00	PALEOCENE	LATROBE GROUP	2	0.43					LT OL GY CLYST, CALC
77608 B	2536.00	PALEOCENE	LATROBE GROUP	1	0.45			1	5.13	M GY SLTST, CARB
77729 W	2550.00	PALEOCENE	LATROBE GROUP	2	0.36					LT OL GY CLYST, CALC
77608 A	2554.00	PALEOCENE	LATROBE GROUP	1	1.54			1	4.47	M-DK GY SLTST, MICA
77729 Y	2580.00	PALEOCENE	LATROBE GROUP	2	0.39					LT OL GY CLYST, CALC
77607 Y	2581.00	PALEOCENE	LATROBE GROUP	1	1.15			1	9.03	M GY SLTST, SL MICA
77730 A	2610.00	PALEOCENE	LATROBE GROUP	2	0.39					LT OL GY CLYST, CALC
77607 W	2645.00	LATE CRETACEOUS	LATROBE GROUP	1	1.50			1	3.62	M-DK GY SLTST, MICA
77610 L	2660.50	LATE CRETACEOUS	LATROBE GROUP	1	3.34			1	3.36	M-DK GY SLTST, CARB, MICA
77730 E	2670.00	LATE CRETACEOUS	LATROBE GROUP	2	47.80					COAL
77607 T	2683.10	LATE CRETACEOUS	LATROBE GROUP	1	1.24			1	4.41	M-DK GY SLTST, CARB, MICA
77730 G	2700.00	LATE CRETACEOUS	LATROBE GROUP	2	1.08					LT OL GY CLYST, CALC
77730 I	2730.00	LATE CRETACEOUS	LATROBE GROUP	2	0.48					LT OL GY CLYST, CALC
77607 R	2751.10	LATE CRETACEOUS	LATROBE GROUP	1	2.59			1	17	M-DK GY SLTST, CARB, MICA
77730 K	2760.00	LATE CRETACEOUS	LATROBE GROUP	2	0.47					LT OL GY CLYST, CALC
77730 M	2790.00	LATE CRETACEOUS	LATROBE GROUP	2	5.90					GY/BLK CLYST, COALY
77730 O	2820.00	LATE CRETACEOUS	LATROBE GROUP	2	4.64					LT GY SLTST, COAL
77607 P	2836.00	LATE CRETACEOUS	LATROBE GROUP	1	10.16			1	1.98	DK GY SH, MICA, CARB, ARG
77730 S	2880.00	LATE CRETACEOUS	LATROBE GROUP	2	3.64					M-DK GY SLTST, CLYST, CALC
77607 N	2887.10	LATE CRETACEOUS	LATROBE GROUP	1	1.54			1	6.15	M-DK GY SLTST, CARB, ARG
77730 U	2910.00	LATE CRETACEOUS	LATROBE GROUP	2	0.50					LT OL GY CLYST, CALC
77607 M	2914.00	LATE CRETACEOUS	LATROBE GROUP	1	1.51			1	5.67	DK GY SLTST, MICA
77730 W	2940.00	LATE CRETACEOUS	LATROBE GROUP	2	1.57					LT GY SLTST, OL GY CLYST
77607 K	2949.00	LATE CRETACEOUS	LATROBE GROUP	1	6.53			1	8.19	M-DK GY SLTST, MICA
77610 G	2968.10	LATE CRETACEOUS	LATROBE GROUP	1	1.84			1	4.37	M-DK GY SLTST, MICA
77730 Y	2970.00	LATE CRETACEOUS	LATROBE GROUP	2	2.12					LT GY SLTST, TR COAL
77731 A	3000.00	LATE CRETACEOUS	LATROBE GROUP	2	0.72					LT GY SST, V FINE GRN
77607 H	3007.10	LATE CRETACEOUS	LATROBE GROUP	1	1.47			1	9.93	M-DK GY SLTST, CARB, MICA
77731 C	3030.00	LATE CRETACEOUS	LATROBE GROUP	2	0.50					LT OL GY CLYST, CALC
77607 E	3057.00	LATE CRETACEOUS	LATROBE GROUP	1	2.68			1	4.1	M-DK GY SLTST, CARB, MICA
77731 E	3060.00	LATE CRETACEOUS	LATROBE GROUP	2	0.43					LT OL GY CLYST, CALC
77731 G	3090.00	LATE CRETACEOUS	LATROBE GROUP	2	0.00					70% M GY SLTST, CLYST

TOTAL ORGANIC CARBON REPORT

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO.	DEPTH	AGE	FORMATION	AN	TOC%	AN	TOC%	AN	CO3%	DESCRIPTION
77606 Z	3112.00	LATE CRETACEOUS	LATROBE GROUP	1	6.30			1	1.03	BRN-GY SLTST,CARB,ARG
77731 I	3120.00	LATE CRETACEOUS	LATROBE GROUP	2	1.88					LT OL GY CLYST,CALC
77606 Y	3125.00	LATE CRETACEOUS	LATROBE GROUP	1	1.90			1	2.62	M-DK GY SLTST,CARB,MICA
77606 X	3140.00	LATE CRETACEOUS	LATROBE GROUP	1	0.49			1	4.72	M-DK GY SLTST,SL CARB
77731 K	3150.00	LATE CRETACEOUS	LATROBE GROUP	2	7.21					OL GY CLYST,CALC
77606 V	3174.90	LATE CRETACEOUS	LATROBE GROUP	1	0.94			1	5.21	M GY SLTST,MICA,CARB,QTZ
77731 M	3180.00	LATE CRETACEOUS	LATROBE GROUP	2	0.53					LT OL GY CLYST,CALC
77606 T	3189.10	LATE CRETACEOUS	LATROBE GROUP	1	6.11			1	2.36	DIRTY FINE GR SST
77606 S	3204.00	LATE CRETACEOUS	LATROBE GROUP	1	5.65			1	4.28	M-DK GY SLTST,CARB,MICA
77606 Q	3233.00	LATE CRETACEOUS	LATROBE GROUP	1	1.43			1	4.87	M GY SLTST,MICA,CARB
77731 Q	3240.00	LATE CRETACEOUS	LATROBE GROUP	2	7.95					DK GY SH,COAL LAMINAE
77606 P	3250.00	LATE CRETACEOUS	LATROBE GROUP	1	6.79			1	4.73	M-DK GY SLTST,V CARB,ARG
77606 O	3267.10	LATE CRETACEOUS	LATROBE GROUP	1	2.09			1	6.45	M GY SH,MUD CONT
77731 S	3270.00	LATE CRETACEOUS	LATROBE GROUP	2	16.20					GY/BLK COAL,SLTY
77606 N	3282.00	LATE CRETACEOUS	LATROBE GROUP	1	3.35			1	5.09	M-DK GY SLTST,CARB,MICA
77606 M	3300.00	LATE CRETACEOUS	LATROBE GROUP	1	1.56			1	4.77	M GY SLTST,MICA,QTZ
77731 U	3300.00	LATE CRETACEOUS	LATROBE GROUP	2	6.00					COAL,COALY SH
77731 W	3330.00	LATE CRETACEOUS	LATROBE GROUP	2	1.14					V LT GY SST,V FINE GRN
77606 J	3344.80	LATE CRETACEOUS	LATROBE GROUP	1	2.68			1	18.13	M GY SLTST,CARB,AGR
77606 I	3359.80	LATE CRETACEOUS	LATROBE GROUP	1	2.73			1	6.26	M-DK GY SLTST,CARB,MICA
77731 Y	3360.00	LATE CRETACEOUS	LATROBE GROUP	2	13.30					SLTY COAL
77732 A	3390.00	LATE CRETACEOUS	LATROBE GROUP	2	3.78					LT OL GY CLYST,CALC
77606 G	3406.00	LATE CRETACEOUS	LATROBE GROUP	1	6.21			1	13.11	BRN/GY SLTST,CARB BAND
77606 F	3423.90	LATE CRETACEOUS	LATROBE GROUP	1	5.67			1	1.96	M-DK GY SLTST,MICA
77606 E	3450.00	LATE CRETACEOUS	LATROBE GROUP	1	0.63			1	9.07	M-DK GY SH,MUD CONT
77732 E	3480.00	LATE CRETACEOUS	LATROBE GROUP	2	0.55					M GY CLYST,M-LT GY SST
77606 D	3495.50	LATE CRETACEOUS	LATROBE GROUP	1	1.78			1	9.49	M-DK GY SLTST,ARG,MICA
77606 C	3500.50	LATE CRETACEOUS	LATROBE GROUP	1	5.81			1	0.75	M-DK GY SLTST,ARG
77732 G	3510.00	LATE CRETACEOUS	LATROBE GROUP	2	0.97					DK GY SLTST
77606 B	3527.00	LATE CRETACEOUS	LATROBE GROUP	1	6.87			1	2.38	M-DK GY SLTST,COAL,ARG
77622 B	3550.00	LATE CRETACEOUS	LATROBE GROUP	1	14.07			1	6.97	V DK SH,V CARB
77732 J	3550.00	LATE CRETACEOUS	LATROBE GROUP	2	40.80					DK GY SLTST,COAL
77621 L	3567.50	LATE CRETACEOUS	LATROBE GROUP	1	1.18			1	11.45	M GY SLTST,MUD CONT
77621 J	3578.50	LATE CRETACEOUS	LATROBE GROUP	1	10.94			1	5.81	DK GY SH,CARB
77732 N	3610.00	LATE CRETACEOUS	LATROBE GROUP	2	7.40					GY/BLK SLTST
77621 Y	3618.50	LATE CRETACEOUS	LATROBE GROUP	1	7.44			1	14.91	V DK GY SH,V CARB
77621 X	3630.00	LATE CRETACEOUS	LATROBE GROUP	1	20.54			1	2.35	GY BLK V CARB SH
77732 P	3640.00	LATE CRETACEOUS	LATROBE GROUP	2	14.27					GY/BLK COAL,BRN/GY SLTST
77621 W	3642.50	LATE CRETACEOUS	LATROBE GROUP	1	9.70			1	4.48	DK GY SH,CARB
77732 R	3670.00	LATE CRETACEOUS	LATROBE GROUP	2	14.27					DK GY SH,COALY
77621 S	3681.00	LATE CRETACEOUS	LATROBE GROUP	1	16.77			1	8.68	BLK COAL,LIKE SH
77621 R	3689.30	LATE CRETACEOUS	LATROBE GROUP	1	5.86			1	2.92	DK GY CARB SH
77732 T	3700.00	LATE CRETACEOUS	LATROBE GROUP	2	13.63					DK GY SH,COALY
77621 Q	3702.00	LATE CRETACEOUS	LATROBE GROUP	1	2.10			1	5.02	DK BRN FINE CARB SH
77621 P	3716.00	LATE CRETACEOUS	LATROBE GROUP	1	9.98			1	15.42	V DK GY SH,V CARB
77621 E	3729.50	LATE CRETACEOUS	LATROBE GROUP	1	1.28			1	19.74	M GY SLTST
77732 V	3730.00	LATE CRETACEOUS	LATROBE GROUP	2	11.71					DK BRN/GY SH,SLTY

TOTAL ORGANIC CARBON REPORT

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO.	DEPTH	AGE	FORMATION	AN	TOC%	AN	TOC%	AN	CO3%	DESCRIPTION
77621 D	3746.00	LATE CRETACEOUS	LATROBE GROUP	1	1.31			1	21.33	DK BRN-GY SH
77732 X	3760.00	LATE CRETACEOUS	LATROBE GROUP	2	8.64					DK BRN/GY SH, SLTY
77621 B	3785.00	LATE CRETACEOUS	LATROBE GROUP	1	0.20			1	1	LT BRN FINE SST
77732 Z	3790.00	LATE CRETACEOUS	LATROBE GROUP	2	23.10					DK GY SH, COA[illegible]
77621 A	3797.00	LATE CRETACEOUS	LATROBE GROUP	1	1.26			1	13.39	M GY SDY SH, QTZ, MIC
77733 B	3809.00	LATE CRETACEOUS	LATROBE GROUP	2	10.70					BRN/GY SLTST, MNR CO

ROCK EVAL ANALYSES

BASIN - GIPPSLAND
WELL - GRUNTER 1

REPORT A - SULPHUR & PYROLYZABLE CARBON

SAMPLE NO.	DEPTH	SAMPLE TYPE	AGE	TMAX	S1	S2	S3	PI	S2/S3	PC	COMMENTS
77610 C	1750.0	SWC	MID-EARLY MIOCENE	406.	.05	.08	.13	.39	.61	.01	
77610 B	1783.1	SWC	MID-EARLY MIOCENE	405.	.05	.06	.07	.44	.82	.01	
77609 Z	1818.9	SWC	MID-EARLY MIOCENE	411.	.04	.15	.07	.21	2.21	.02	
77609 P	1854.0	SWC	MIDDLE EOCENE	416.	.08	.14	.20	.37	.70	.02	
77609 O	1856.0	SWC	MIDDLE EOCENE	419.	.02	.14	.11	.11	1.31	.01	
77609 N	1858.0	SWC	MIDDLE EOCENE	422.	.07	.27	.26	.21	1.03	.03	
77609 J	1875.0	SWC	EARLY EOCENE	419.	.10	.16	.05	.37	3.40	.02	
77609 I	1887.0	SWC	EARLY EOCENE	422.	.13	.63	.16	.17	4.06	.06	
77609 E	1912.0	SWC	PALEOCENE	423.	.06	.17	.21	.26	.77	.02	
77609 C	1940.0	SWC	PALEOCENE	413.	.22	1.56	.29	.13	5.33	.15	
77608 Z	2009.0	SWC	PALEOCENE	404.	.09	.16	.09	.35	1.89	.02	
77608 W	2052.0	SWC	PALEOCENE	415.	.09	.36	.10	.20	3.70	.04	
77608 V	2103.0	SWC	PALEOCENE	415.	.34	2.43	.54	.12	4.49	.23	
77608 S	2145.0	SWC	PALEOCENE	417.	.24	2.96	.58	.07	5.10	.26	
77608 Q	2167.0	SWC	PALEOCENE	421.	.34	1.94	.37	.15	5.26	.19	
77608 P	2172.0	SWC	PALEOCENE	410.	.34	5.73	.41	.05	14.43	.52	
77608 O	2176.0	SWC	PALEOCENE	415.	.20	.60	.42	.25	1.43	.07	
77608 N	2201.6	SWC	PALEOCENE	420.	.10	.56	.32	.15	1.76	.05	
77608 M	2213.0	SWC	PALEOCENE	402.	.08	.16	.14	.32	1.13	.02	
77610 W	2244.6	SWC	PALEOCENE	413.	.54	4.42	.50	.11	8.86	.41	
77610 T	2306.5	SWC	PALEOCENE	414.	3.81	57.40	1.28	.06	44.75	5.09	
77608 I	2340.1	SWC	PALEOCENE	415.	.19	1.51	.27	.11	5.57	.14	
77608 H	2374.0	SWC	PALEOCENE	417.	.19	1.41	.12	.12	11.31	.13	
77608 E	2425.0	SWC	PALEOCENE	420:	.56	3.10	.44	.15	7.09	.30	
77608 B	2536.0	SWC	PALEOCENE	408.	.13	.12	.05	.52	2.60	.02	
77608 A	2554.0	SWC	PALEOCENE	420.	.11	.52	.12	.17	4.15	.05	
77607 Y	2581.0	SWC	PALEOCENE	420.	.10	.19	.09	.34	2.10	.02	
77607 W	2645.0	SWC	LATE CRETACEOUS	427.	.10	.40	.09	.20	4.56	.04	
77610 L	2660.5	SWC	LATE CRETACEOUS	432.	.21	2.41	.22	.08	10.83	.22	
77607 T	2683.1	SWC	LATE CRETACEOUS	426.	.14	.01	.01	.15	85.00	.08	
77607 R	2751.1	SWC	LATE CRETACEOUS	430.	.33	3.01	.07	.10	40.33	.28	
77607 P	2836.0	SWC	LATE CRETACEOUS	423.	1.33	31.41	.80	.04	39.07	2.72	
77607 N	2887.1	SWC	LATE CRETACEOUS	421.	.10	.33	.01	.24	35.00	.04	
77607 M	2914.0	SWC	LATE CRETACEOUS	423.	.13	.39	.08	.25	4.56	.04	
77607 K	2949.0	SWC	LATE CRETACEOUS	432.	.42	5.17	.34	.08	15.22	.46	
77610 G	2968.1	SWC	LATE CRETACEOUS	427.	.11	.78	.03	.11	34.00	.09	
77607 H	3007.1	SWC	LATE CRETACEOUS	421.	.25	.68	.05	.27	15.20	.08	
77607 E	3057.0	SWC	LATE CRETACEOUS	431.	.45	2.63	.17	.15	15.22	.26	
77606 Z	3112.0	SWC	LATE CRETACEOUS	428.	1.21	26.73	.19	.04	143.21	2.34	
77606 Y	3125.0	SWC	LATE CRETACEOUS	435.	.41	2.31	.07	.15	33.86	.23	
77606 X	3140.0	SWC	LATE CRETACEOUS	422.	.11	.17	.00	.37	.19	.03	
77606 V	3174.9	SWC	LATE CRETACEOUS	428.	.19	.70	.00	.21	.70	.07	

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

11/10/85 Table 3a (cont'd) ESSO AUSTRALIA LTD.

ROCK EVAL ANALYSES

BASIN - GIPPSLAND
WELL - GRUNTER 1

REPORT A - SULPHUR & PYROLYZABLE CARBON

SAMPLE NO.	DEPTH	SAMPLE TYPE	AGE	TMAX	S1	S2	S3	PI	S2/S3	PC	COMMENTS
77606 T	3189.1	SWC	LATE CRETACEOUS	429.	1.03	13.75	.25	.07	55.00	1.23	
77606 S	3204.0	SWC	LATE CRETACEOUS	433.	1.24	15.98	.24	.07	66.58	1.43	
77606 Q	3233.0	SWC	LATE CRETACEOUS	432.	.41	1.25	.00	.25	.00	.13	
77606 P	3250.0	SWC	LATE CRETACEOUS	426.	1.47	21.79	.22	.06	99.04	1.93	
77606 O	3267.1	SWC	LATE CRETACEOUS	432.	.57	2.86	.12	.17	23.83	.28	
77606 N	3282.0	SWC	LATE CRETACEOUS	433.	.88	5.87	.14	.13	41.92	.56	
77606 M	3300.0	SWC	LATE CRETACEOUS	432.	.41	1.20	.00	.26	.00	.13	
77606 J	3344.8	SWC	LATE CRETACEOUS	440.	.76	3.17	.13	.19	24.38	.32	
77606 I	3359.8	SWC	LATE CRETACEOUS	436.	.51	2.78	.04	.16	69.50	.27	
77606 G	3406.0	SWC	LATE CRETACEOUS	431.	1.21	13.98	.16	.08	87.37	1.26	
77606 F	3423.9	SWC	LATE CRETACEOUS	436.	1.43	9.47	.21	.13	45.09	.90	
77606 E	3450.0	SWC	LATE CRETACEOUS	432.	.31	.63	.10	.33	6.30	.07	
77606 D	3495.5	SWC	LATE CRETACEOUS	438.	.42	1.54	.04	.21	38.50	.16	
77606 C	3500.5	SWC	LATE CRETACEOUS	435.	1.40	14.15	.26	.09	54.42	1.29	
77606 B	3527.0	SWC	LATE CRETACEOUS	436.	2.65	18.19	.21	.13	86.61	1.73	
77622 B	3550.0	SWC	LATE CRETACEOUS	435.	3.71	39.36	.43	.09	91.53	3.58	
77621 L	3567.5	SWC	LATE CRETACEOUS	440.	.44	.73	.24	.38	3.04	.09	
77621 J	3578.5	SWC	LATE CRETACEOUS	438.	2.21	17.15	.44	.11	38.97	1.61	
77621 Y	3618.5	SWC	LATE CRETACEOUS	439.	2.49	17.23	.29	.13	59.41	1.64	
77621 X	3630.0	SWC	LATE CRETACEOUS	439.	7.06	55.38	.61	.11	90.78	5.20	
77621 W	3642.5	SWC	LATE CRETACEOUS	443.	3.58	19.36	.21	.16	92.19	1.91	
77621 S	3681.0	SWC	LATE CRETACEOUS	442.	8.54	48.79	.42	.15	116.16	4.77	
77621 R	3689.3	SWC	LATE CRETACEOUS	444.	2.25	8.26	.34	.21	24.29	.87	
77621 Q	3702.0	SWC	LATE CRETACEOUS	449.	.76	1.43	.31	.35	4.61	.18	
77621 P	3716.0	SWC	LATE CRETACEOUS	443.	4.04	20.17	.38	.17	53.07	2.01	
77621 E	3729.5	SWC	LATE CRETACEOUS	448.	.62	1.25	.19	.33	6.57	.15	
77621 D	3746.0	SWC	LATE CRETACEOUS	445.	.82	1.10	.18	.43	6.11	.16	
77621 G	3765.0	SWC	LATE CRETACEOUS	450.	.25	.07	.17	.78	.41	.02	
77621 A	3797.0	SWC	LATE CRETACEOUS	447.	.47	.72	.18	.40	4.00	.09	

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

ROCK EVAL ANALYSES

BASIN - GIPPSLAND
WELL - GRUNTER 1

REPORT B - TOTAL CARBON, H/O INDICES

SAMPLE NO.	DEPTH	SAMPLE TYPE	FORMATION	TC	HI	OI	HI/OI	COMMENTS
77610 C	1750.0	SWC	LAKES ENTRANCE	.49	16.	27.	.61	
77610 B	1783.1	SWC	LAKES ENTRANCE	.39	16.	19.	.82	
77609 Z	1818.9	SWC	LAKES ENTRANCE	.38	38.	17.	2.21	
77609 P	1854.0	SWC	LATROBE GP/GURNARD FM	1.42	10.	14.	.70	
77609 O	1856.0	SWC	LATROBE GP/GURNARD FM	.97	15.	11.	1.31	
77609 N	1858.0	SWC	LATROBE GP/GURNARD FM	1.38	20.	19.	1.03	
77609 J	1875.0	SWC	LATROBE GP/FLOUNDER FM	.95	17.	5.	3.40	
77609 I	1887.0	SWC	LATROBE GP/FLOUNDER FM	1.08	50.	14.	4.06	
77609 E	1912.0	SWC	LATROBE GROUP	.68	24.	32.	.77	
77609 C	1940.0	SWC	LATROBE GROUP	1.52	103.	19.	5.33	
77608 Z	2009.0	SWC	LATROBE GROUP	.47	35.	18.	1.89	
77608 W	2052.0	SWC	LATROBE GROUP	.69	52.	14.	3.70	
77608 V	2103.0	SWC	LATROBE GROUP	3.31	73.	16.	4.49	
77608 S	2145.0	SWC	LATROBE GROUP	3.38	87.	17.	5.12	
77608 Q	2167.0	SWC	LATROBE GROUP	1.19	163.	31.	5.26	
77608 P	2172.0	SWC	LATROBE GROUP	3.43	173.	12.	14.43	
77608 O	2176.0	SWC	LATROBE GROUP	1.31	46.	32.	1.43	
77608 N	2201.6	SWC	LATROBE GROUP	1.14	49.	28.	1.76	
77608 M	2213.0	SWC	LATROBE GROUP	.55	29.	26.	1.13	
77610 W	2244.6	SWC	LATROBE GROUP	3.29	134.	15.	8.86	
77610 T	2306.5	SWC	LATROBE GROUP	15.54	370.	8.	44.75	
77608 I	2340.1	SWC	LATROBE GROUP	1.79	84.	15.	5.57	
77608 H	2374.0	SWC	LATROBE GROUP	2.08	68.	6.	11.31	
77608 E	2425.0	SWC	LATROBE GROUP	3.47	87.	13.	7.09	
77608 B	2536.0	SWC	LATROBE GROUP	.45	27.	11.	2.60	
77608 A	2554.0	SWC	LATROBE GROUP	1.54	33.	8.	4.15	
77607 Y	2581.0	SWC	LATROBE GROUP	1.15	17.	8.	2.10	
77607 W	2645.0	SWC	LATROBE GROUP	1.50	26.	6.	4.56	
77610 L	2660.5	SWC	LATROBE GROUP	3.34	72.	7.	10.83	
77607 T	2683.1	SWC	LATROBE GROUP	1.24	66.	1.	85.00	
77607 R	2751.1	SWC	LATROBE GROUP	2.59	116.	3.	40.33	
77607 P	2836.0	SWC	LATROBE GROUP	10.16	307.	8.	39.07	
77607 N	2887.1	SWC	LATROBE GROUP	1.54	21.	1.	35.00	
77607 M	2914.0	SWC	LATROBE GROUP	1.51	26.	6.	4.56	
77607 K	2949.0	SWC	LATROBE GROUP	6.53	77.	5.	15.22	
77610 G	2968.1	SWC	LATROBE GROUP	1.84	53.	2.	34.00	
77607 H	3007.1	SWC	LATROBE GROUP	1.47	47.	3.	15.20	
77607 E	3057.0	SWC	LATROBE GROUP	2.68	98.	6.	15.22	
77606 Z	3112.0	SWC	LATROBE GROUP	6.30	427.	3.	143.21	
77606 Y	3125.0	SWC	LATROBE GROUP	1.90	121.	4.	33.86	
77606 X	3140.0	SWC	LATROBE GROUP	.49	39.	0.	.00	
77606 V	3174.9	SWC	LATROBE GROUP	.94	75.	0.	.00	

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

11/10/85 Table 3b (cont'd) ESSO AUSTRALIA LTD.

ROCK EVAL ANALYSES

REPORT B - TOTAL CARBON,H/O INDICES

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO.	DEPTH	SAMPLE TYPE	FORMATION	TC	HI	OI	HI/OI	COMMENTS
77606 T	3189.1	SWC	LATROBE GROUP	6.11	225.	4.	56.25	
77606 S	3204.0	SWC	LATROBE GROUP	5.65	282.	4.	70.50	
77606 Q	3233.0	SWC	LATROBE GROUP	1.43	87.	0.	.00	
77606 P	3250.0	SWC	LATROBE GROUP	6.79	320.	3.	106.67	
77606 O	3267.1	SWC	LATROBE GROUP	2.09	136.	5.	27.20	
77606 N	3282.0	SWC	LATROBE GROUP	3.55	165.	3.	55.00	
77606 M	3300.0	SWC	LATROBE GROUP	1.56	76.	0.	.00	
77606 J	3344.8	SWC	LATROBE GROUP	2.68	118.	4.	29.50	
77606 I	3359.8	SWC	LATROBE GROUP	2.73	101.	1.	101.00	
77606 G	3406.0	SWC	LATROBE GROUP	6.21	225.	2.	112.50	
77606 F	3423.9	SWC	LATROBE GROUP	5.67	167.	3.	55.67	
77606 E	3450.0	SWC	LATROBE GROUP	.63	100.	15.	6.67	
77606 D	3495.5	SWC	LATROBE GROUP	1.78	86.	2.	43.00	
77606 C	3500.5	SWC	LATROBE GROUP	5.81	243.	4.	60.75	
77606 B	3527.0	SWC	LATROBE GROUP	6.87	264.	3.	88.00	
77622 R	3550.0	SWC	LATROBE GROUP	14.07	279.	3.	93.00	
77621 L	3567.5	SWC	LATROBE GROUP	1.18	61.	20.	3.05	
77621 J	3578.5	SWC	LATROBE GROUP	10.94	156.	4.	39.00	
77621 Y	3618.5	SWC	LATROBE GROUP	7.44	231.	3.	77.00	
77621 X	3630.0	SWC	LATROBE GROUP	20.54	269.	2.	134.50	
77621 W	3642.5	SWC	LATROBE GROUP	9.70	199.	2.	99.50	
77621 S	3681.0	SWC	LATROBE GROUP	16.77	290.	2.	145.00	
77621 R	3689.3	SWC	LATROBE GROUP	5.86	140.	5.	28.00	
77621 Q	3702.0	SWC	LATROBE GROUP	2.10	68.	14.	4.86	
77621 P	3716.0	SWC	LATROBE GROUP	9.98	202.	3.	67.33	
77621 E	3729.5	SWC	LATROBE GROUP	1.28	97.	14.	6.93	
77621 D	3746.0	SWC	LATROBE GROUP	1.31	83.	13.	6.38	
77621 B	3785.0	SWC	LATROBE GROUP	.20	35.	85.	.41	
77621 A	3797.0	SWC	LATROBE GROUP	1.26	57.	14.	4.07	

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

11/10/85 Table 4a

ESSO AUSTRALIA LTD.

KEROGEN ELEMENTAL ANALYSIS REPORT

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO.	DEPTH	SAMPLE TYPE	--- ELEMENTAL % (ASH FREE) --- N%	C%	H%	S%	O%	ASH%	COMMENTS
77609 U	1856.00	SWC	2.48	62.05	4.66	.00	30.81	12.86	HIGH ASH
77609 N	1858.00	SWC	1.98	66.29	4.64	.00	27.09	7.12	
77609 K	1870.00	SWC	1.93	46.48	5.10	.00	46.50	8.36	
77609 J	1875.00	SWC	1.68	65.59	5.11	.00	27.63	1.54	
77609 H	1889.60	SWC	1.35	61.61	4.91	.00	32.13	2.57	
77609 G	1895.00	SWC	1.39	51.09	4.74	.00	42.79	3.28	
77609 F	1911.00	SWC	.87	65.55	4.72	.00	28.86	6.62	
77609 D	1919.10	SWC	1.06	64.10	4.51	.00	30.33	3.51	
77609 C	1940.00	SWC	.77	53.65	5.24	.00	40.34	7.79	
77608 Z	2009.00	SWC	1.44	49.20	4.42	.00	44.94	6.38	
77608 Y	2011.10	SWC	1.00	62.25	3.97	.00	32.78	3.87	
77608 W	2052.00	SWC	4.79	64.25	4.39	.00	26.58	.36	
77608 V	2103.00	SWC	.41	50.06	4.51	.00	45.02	10.38	HIGH ASH
77608 T	2126.00	SWC	.89	54.81	4.72	.00	39.57	9.84	HIGH ASH
77608 P	2172.00	SWC	.73	78.69	6.27	.00	14.31	17.69	HIGH ASH
77608 O	2175.00	SWC	.86	63.94	4.67	.00	30.53	3.01	
77608 M	2213.00	SWC	.87	66.38	4.73	.00	28.02	4.44	
77610 [illegible]	2244.60	SWC	.51	69.12	4.98	.00	25.39	6.49	
77610 T	2306.50	SWC	.55	68.75	6.32	.00	24.39	6.63	
77608 I	2340.10	SWC	.95	69.57	4.67	.00	24.82	6.16	
77608 F	2411.00	SWC	1.08	72.13	5.13	.00	21.65	11.33	HIGH ASH
77608 E	2425.00	SWC	1.08	71.78	4.83	.00	22.31	8.44	
77610 F	2539.10	SWC	1.07	73.45	4.41	.00	21.12	5.06	
77608 A	2554.00	SWC	1.15	71.54	4.69	.00	22.62	7.70	
77607 Y	2581.00	SWC	1.27	73.53	3.67	.00	21.53	6.08	
77607 X	2590.10	SWC	1.26	74.57	3.79	.00	20.37	4.32	
77607 W	2645.00	SWC	1.32	75.52	4.35	.00	18.80	4.89	
77610 O	2649.00	SWC	1.24	75.61	4.41	.00	18.73	5.19	
77610 N	2654.00	SWC	1.14	75.52	4.30	.00	19.04	3.43	
77610 M	2656.60	SWC	1.08	74.54	5.46	.00	18.92	.62	
77607 V	2673.10	SWC	1.40	77.65	4.28	.00	16.67	1.41	
77607 U	2678.00	SWC	1.48	78.97	3.57	.00	15.98	3.09	
77607 T	2683.10	SWC	1.52	77.90	4.43	.00	16.15	3.59	
77607 S	2725.10	SWC	1.25	76.02	6.30	.00	16.43	1.07	
77607 R	2751.10	SWC	1.54	77.68	5.04	.00	15.54	1.70	
77610 K	2774.10	SWC	1.53	78.50	4.87	.00	15.09	2.91	
77607 [illegible]	2801.00	SWC	1.26	79.68	3.62	.00	15.44	2.51	
77607 F	2836.00	SWC	.91	79.73	4.91	.00	14.45	1.29	
77607 U	2865.00	SWC	1.40	76.59	4.05	.00	17.96	4.49	
77610 I	2877.00	SWC	1.47	77.45	3.96	.00	17.11	3.04	
77607 L	2887.10	SWC	1.48	75.87	3.97	.00	18.67	5.37	
77607 M	2914.00	SWC	1.54	76.13	4.42	.00	17.91	5.18	
77607 K	2949.00	SWC	1.56	79.10	4.33	.00	15.00	1.94	
77610 H	2961.00	SWC	1.51	78.50	4.26	.00	15.73	4.15	
77607 J	2975.00	SWC	1.51	78.47	4.63	.00	15.40	7.07	

11/10/85

Table 4a (cont'd)

ESSO AUSTRALIA LTD.

KEROGEN ELEMENTAL ANALYSIS REPORT

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO.	DEPTH	SAMPLE TYPE	N%	C%	H%	S%	O%	ASH%	COMMENTS
			--- ELEMENTAL % (ASH FREE) ---						
77607 I	2993.00	SWC	1.36	81.00	4.36	.00	13.28	7.30	
77607 H	3007.10	SWC	1.59	76.23	4.99	.00	17.19	8.34	
77607 F	3038.50	SWC	1.46	77.76	4.77	.00	16.01	1.77	
77607 E	3057.00	SWC	1.58	80.35	5.66	.00	12.41	7.23	
77607 B	3091.00	SWC	1.09	74.60	5.07	.00	19.24	.58	
77606 Z	3112.00	SWC	1.20	76.72	6.84	.00	15.24	2.57	
77606 Y	3125.00	SWC	1.11	81.34	6.69	.00	10.86	13.43	HIGH ASH
77606 W	3155.00	SWC	1.26	80.96	4.93	.00	12.85	3.73	
77606 V	3174.90	SWC	1.12	80.32	4.73	.00	13.83	9.97	HIGH ASH
77606 T	3189.10	SWC	1.10	79.82	5.60	.00	13.48	4.24	
77606 S	3204.00	SWC	1.10	74.28	6.11	.00	18.51	.80	
77606 Q	3233.00	SWC	1.17	80.63	5.46	.00	12.74	9.19	
77606 P	3250.00	SWC	1.36	80.03	6.54	.00	12.07	5.16	
77606 O	3267.10	SWC	1.04	82.79	5.84	.00	10.33	10.94	HIGH ASH
77606 N	3282.90	SWC	1.02	79.79	5.55	.00	13.64	2.72	
77606 M	3300.00	SWC	1.28	83.16	4.94	.00	10.62	8.75	
77606 L	3317.50	SWC	1.28	83.62	4.93	.00	10.17	1.65	
77606 K	3330.10	SWC	.77	83.97	4.29	.00	10.97	.99	
77606 J	3344.80	SWC	1.50	81.42	5.46	.00	11.63	2.49	
77606 I	3359.60	SWC	1.05	79.65	4.94	.00	14.36	2.80	
77618 A	3396.00	CORE	1.51	84.03	4.45	.00	10.01	.52	
77618 B	3397.00	CORE	1.60	83.05	4.30	.00	11.04	2.67	
77618 C	3400.00	CORE	1.65	80.92	5.74	.00	11.69	5.10	
77618 D	3403.00	CORE	1.35	82.53	5.32	.00	10.80	3.95	
77606 G	3406.00	SWC	1.47	81.11	5.60	.00	11.82	4.10	
77606 F	3423.90	SWC	1.11	80.41	5.13	.00	13.35	2.09	
77618 E	3434.00	CORE	1.28	82.72	4.92	.00	11.08	2.99	
77618 F	3443.25	CORE	1.06	80.59	4.58	.00	13.77	3.66	
77618 G	3446.00	CORE	1.16	79.17	4.89	.00	14.78	7.44	
77606 E	3450.00	SWC	1.33	82.00	6.09	.00	10.58	19.38	HIGH ASH
77618 H	3450.80	CORE	1.77	79.50	5.37	.00	13.37	2.36	
77606 C	3500.50	SWC	1.27	80.60	5.91	.00	12.22	4.16	
77606 B	3527.00	SWC	1.36	81.46	6.04	.00	11.15	3.58	
77622 [illegible]	3550.00	SWC	2.00	80.71	5.46	.00	11.83	3.37	
77621 [illegible]	3571.00	SWC	1.62	81.84	4.58	.00	12.56	1.87	
77621 J	3574.50	SWC	1.71	80.48	4.88	.00	12.93	1.99	
77621 I	3604.00	SWC	.98	83.72	4.58	.00	10.72	3.66	
77621 [illegible]	3614.50	SWC	1.03	81.46	4.46	.00	13.05	1.02	
77621 Y	3616.50	SWC	1.85	81.61	5.19	.00	11.35	1.84	
77621 X	3630.00	SWC	1.57	82.30	5.36	.00	10.77	1.68	
77621 U	3676.00	SWC	1.96	81.33	5.95	.00	10.76	1.01	
77621 P	3716.00	SWC	1.92	84.03	5.47	.00	8.57	1.18	
77621 Q	3732.50	SWC	1.56	83.61	5.39	.00	9.44	1.83	
77621 D	3746.00	SWC	1.52	81.20	5.27	.00	12.01	7.32	
77621 H	3761.00	SWC	2.11	88.58	5.50	.00	3.82	.46	

11/10/85 Table 4a (cont'd) ESSO AUSTRALIA LTD.

KEROGEN ELEMENTAL ANALYSIS REPORT

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO.	DEPTH	SAMPLE TYPE	--- ELEMENTAL % (ASH FREE) --- N%	C%	H%	S%	O%	ASH%	COMMENTS
77621 C	3770.00	SWC	1.48	81.55	5.18	.00	11.79	6.11	
77621 A	3797.00	SWC	1.47	84.66	5.05	.00	8.82	4.38	

KEROGEN ELEMENTAL ANALYSIS REPORT

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO.	DEPTH	SAMPLE TYPE	AGE	FORMATION	ATOMIC RATIOS H/C	ATOMIC RATIOS O/C	ATOMIC RATIOS N/C	COMMENTS
77609 O	1856.00	SWC	MIDDLE EOCENE	LATROBE GP/GURNARD FM	.90	.37	.03	HIGH ASH
77609 N	1858.00	SWC	MIDDLE EOCENE	LATROBE GP/GURNARD FM	.84	.31	.03	
77609 K	1870.00	SWC	EARLY EOCENE	LATROBE GP/FLOUNDER FM	1.32	.75	.04	
77609 J	1875.00	SWC	EARLY EOCENE	LATROBE GP/FLOUNDER FM	.93	.32	.02	
77609 H	1889.60	SWC	PALEOCENE	LATROBE GROUP	.96	.39	.02	
77609 G	1895.00	SWC	PALEOCENE	LATROBE GROUP	1.11	.63	.02	
77609 F	1911.00	SWC	PALEOCENE	LATROBE GROUP	.86	.33	.01	
77609 D	1919.10	SWC	PALEOCENE	LATROBE GROUP	.84	.35	.01	
77609 C	1940.00	SWC	PALEOCENE	LATROBE GROUP	1.17	.56	.01	
77608 Z	2009.00	SWC	PALEOCENE	LATROBE GROUP	1.08	.69	.03	
77608 Y	2011.10	SWC	PALEOCENE	LATROBE GROUP	.77	.39	.01	
77608 W	2052.00	SWC	PALEOCENE	LATROBE GROUP	.82	.31	.06	
77608 V	2103.00	SWC	PALEOCENE	LATROBE GROUP	1.08	.67	.01	HIGH ASH
77608 T	2128.00	SWC	PALEOCENE	LATROBE GROUP	1.03	.54	.01	HIGH ASH
77608 P	2172.00	SWC	PALEOCENE	LATROBE GROUP	.96	.14	.01	HIGH ASH
77608 O	2176.00	SWC	PALEOCENE	LATROBE GROUP	.88	.36	.01	
77608 M	2213.00	SWC	PALEOCENE	LATROBE GROUP	.86	.32	.01	
77610 W	2244.60	SWC	PALEOCENE	LATROBE GROUP	.87	.28	.01	
77610 T	2306.50	SWC	PALEOCENE	LATROBE GROUP	1.10	.27	.01	
77608 I	2340.10	SWC	PALEOCENE	LATROBE GROUP	.81	.27	.01	
77608 F	2411.00	SWC	PALEOCENE	LATROBE GROUP	.85	.23	.01	HIGH ASH
77608 E	2425.00	SWC	PALEOCENE	LATROBE GROUP	.81	.23	.01	
77610 P	2539.10	SWC	PALEOCENE	LATROBE GROUP	.72	.22	.01	
77608 A	2554.00	SWC	PALEOCENE	LATROBE GROUP	.79	.24	.01	
77607 Y	2581.00	SWC	PALEOCENE	LATROBE GROUP	.60	.22	.01	
77607 X	2590.10	SWC	PALEOCENE	LATROBE GROUP	.61	.20	.01	
77607 W	2645.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.69	.19	.02	
77610 O	2649.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.70	.19	.01	
77610 N	2654.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.68	.19	.01	
77610 M	2656.60	SWC	LATE CRETACEOUS	LATROBE GROUP	.88	.19	.01	
77607 V	2673.10	SWC	LATE CRETACEOUS	LATROBE GROUP	.66	.16	.02	
77607 U	2678.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.54	.15	.02	
77607 T	2683.10	SWC	LATE CRETACEOUS	LATROBE GROUP	.68	.16	.02	
77607 S	2725.10	SWC	LATE CRETACEOUS	LATROBE GROUP	.99	.16	.01	
77607 R	2751.10	SWC	LATE CRETACEOUS	LATROBE GROUP	.78	.15	.02	
77610 K	2774.10	SWC	LATE CRETACEOUS	LATROBE GROUP	.74	.14	.02	
77607 Q	2801.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.55	.15	.01	
77607 P	2836.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.74	.14	.01	
77607 O	2865.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.63	.18	.02	
77610 I	2877.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.61	.17	.02	
77607 N	2887.10	SWC	LATE CRETACEOUS	LATROBE GROUP	.63	.18	.02	
77607 M	2914.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.70	.18	.02	
77607 K	2949.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.66	.14	.02	
77610 H	2961.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.65	.15	.02	
77607 J	2975.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.71	.15	.02	

ESSO AUSTRALIA LTD.

KEROGEN ELEMENTAL ANALYSIS REPORT

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO.	DEPTH	SAMPLE TYPE	AGE	FORMATION	ATOMIC RATIOS H/C	O/C	N/C	COMMENTS
77607 I	2993.00	SWC			.65	.12	.01	
77607 H	3007.10	SWC	LATE CRETACEOUS	LATROBE GROUP	.78	.17	.02	
77607 F	3036.50	SWC	LATE CRETACEOUS	LATROBE GROUP	.74	.15	.02	
77607 E	3057.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.85	.12	.02	
77607 B	3091.00	SWC			.82	.19	.01	
77606 Z	3112.00	SWC	LATE CRETACEOUS	LATROBE GROUP	1.07	.15	.01	
77606 Y	3125.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.99	.10	.01	HIGH ASH
77606 W	3155.00	SWC			.73	.12	.01	
77606 V	3174.90	SWC	LATE CRETACEOUS	LATROBE GROUP	.71	.13	.01	HIGH ASH
77606 T	3189.10	SWC	LATE CRETACEOUS	LATROBE GROUP	.84	.13	.01	
77606 S	3204.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.99	.19	.01	
77606 Q	3233.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.81	.12	.01	
77606 P	3250.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.98	.11	.01	
77606 O	3267.10	SWC	LATE CRETACEOUS	LATROBE GROUP	.85	.09	.01	HIGH ASH
77606 N	3282.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.83	.13	.01	
77606 M	3300.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.71	.10	.01	
77606 L	3317.50	SWC			.71	.09	.01	
77606 K	3330.10	SWC	LATE CRETACEOUS	LATROBE GROUP	.61	.10	.01	
77606 J	3344.80	SWC	LATE CRETACEOUS	LATROBE GROUP	.80	.11	.02	
77606 I	3359.60	SWC	LATE CRETACEOUS	LATROBE GROUP	.74	.14	.01	
77618 A	3396.00	CORE	LATE CRETACEOUS	LATROBE GROUP	.64	.09	.02	
77618 B	3397.00	CORE	LATE CRETACEOUS	LATROBE GROUP	.62	.10	.02	
77618 C	3400.00	CORE	LATE CRETACEOUS	LATROBE GROUP	.85	.11	.02	
77618 D	3403.00	CORE	LATE CRETACEOUS	LATROBE GROUP	.77	.10	.01	
77606 G	3406.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.83	.11	.02	
77606 F	3423.90	SWC	LATE CRETACEOUS	LATROBE GROUP	.77	.12	.01	
77618 E	3434.00	CORE	LATE CRETACEOUS	LATROBE GROUP	.71	.10	.01	
77618 F	3443.25	CORE	LATE CRETACEOUS	LATROBE GROUP	.68	.13	.01	
77618 G	3446.00	CORE	LATE CRETACEOUS	LATROBE GROUP	.74	.14	.01	
77606 E	3450.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.89	.10	.01	HIGH ASH
77618 H	3459.60	CORE	LATE CRETACEOUS	LATROBE GROUP	.81	.13	.02	
77606 C	3500.50	SWC	LATE CRETACEOUS	LATROBE GROUP	.88	.11	.01	
77606 B	3527.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.89	.10	.01	
77622 F	3550.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.81	.11	.02	
77621 A	3571.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.67	.12	.01	
77621 J	3575.50	SWC	LATE CRETACEOUS	LATROBE GROUP	.73	.12	.02	
77621 I	3604.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.66	.10	.01	
77621 H	3614.50	SWC	LATE CRETACEOUS	LATROBE GROUP	.66	.12	.01	
77621 Y	3618.50	SWC	LATE CRETACEOUS	LATROBE GROUP	.76	.10	.02	
77621 X	3630.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.78	.10	.02	
77621 U	3676.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.88	.10	.02	
77621 P	3716.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.78	.08	.02	
77621 O	3732.50	SWC	LATE CRETACEOUS	LATROBE GROUP	.77	.08	.02	
77621 D	3746.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.78	.11	.02	
77621 H	3761.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.74	.03	.02	

11/10/85 Table 4b (cont'd)

ESSO AUSTRALIA LTD.

KEROGEN ELEMENTAL ANALYSIS REPORT

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO.	DEPTH	SAMPLE TYPE	AGE	FORMATION	ATOMIC RATIOS H/C	ATOMIC RATIOS O/C	ATOMIC RATIOS N/C	COMMENTS
77621 C	3770.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.76	.11	.02	
77621 A	3797.00	SWC	LATE CRETACEOUS	LATROBE GROUP	.72	.08	.01	

LIGHT GASOLINES (C4-C7) SUMMARY

BASIN - GIPPSLAND
WELL - GRUNTER 1

Significant Ratios

SAMPLE NO.	DEPTH	FORMATION	AGE	TOC%	TOTAL C4-C7 (PPM)	C1/C2	A/D2	C1/D2	CH/MCP	N-PENT/ I-PENT
77725 B	330.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.07	0.14	.	.	.	.	0.14
77725 D	390.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.08	0.05	.	.	.	.	0.00
77725 F	450.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.08	0.10	.	.	.	.	0.00
77725 H	510.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.15	0.06	.	.	.	.	0.01
77725 J	570.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.17	0.18	.	.	.	.	0.00
77725 N	690.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.17	0.09	.	.	.	.	0.00
77725 P	750.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.19	0.07	.	.	.	.	0.00
77725 R	810.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.23	0.00	.	.	.	.	.
77725 T	855.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.33	0.20	3.25	.	.	0.00	0.40
77725 V	885.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.37	0.25	0.72	6.13	2.33	0.00	0.56
77725 Z	945.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.52	0.37	0.51	9.16	4.33	0.39	0.39
77726 B	975.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.49	0.48	1.12	6.36	7.81	0.40	0.35
77726 F	1035.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.46	0.20	0.00	.	.	0.00	0.32
77726 J	1095.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.33	0.47	0.65	8.32	8.27	0.15	0.32
77726 N	1155.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.47	0.85	0.55	10.11	6.40	0.16	0.25
77726 R	1215.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.49	0.58	0.56	9.44	4.83	0.21	0.26
77726 T	1245.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.47	0.45	0.72	10.00	6.16	0.19	0.31
77726 X	1305.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.52	0.59	0.50	8.06	5.60	0.10	0.27
77727 B	1365.00	GIPPSLAND LMST	PLEIST-MID MIOCENE	0.46	0.70	0.69	.	.	0.00	0.17
77727 F	1425.00	LAKES ENTRANCE	MID-EARLY MIOCENE	0.49	0.23	1.90	.	.	0.24	0.36
77727 J	1485.00	LAKES ENTRANCE	MID-EARLY MIOCENE	0.60	0.36	0.86	4.40	3.26	0.14	0.42
77727 N	1545.00	LAKES ENTRANCE	MID-EARLY MIOCENE	0.52	0.50	1.09	3.47	5.79	0.15	0.30
77727 R	1605.00	LAKES ENTRANCE	MID-EARLY MIOCENE	0.46	0.18	0.86	5.55	2.16	0.00	0.43
77727 V	1665.00	LAKES ENTRANCE	MID-EARLY MIOCENE	0.51	0.23	2.12	4.61	9.37	0.22	0.40
77727 Z	1725.00	LAKES ENTRANCE	MID-EARLY MIOCENE	0.58	0.22	2.58	9.35	12.95	0.27	0.69
77728 D	1785.00	LAKES ENTRANCE	MID-EARLY MIOCENE	0.46	0.10	1.22	.	.	0.00	0.49
77728 H	1845.00	LAKES ENTRANCE	MID-EARLY MIOCENE	0.50	0.68	1.82	12.63	14.40	0.92	1.10
77728 J	1875.00	LATROBE GP/FLOUNDER FM	OLIGOCENE-EOCENE	0.56	0.88	0.68	11.33	5.06	0.46	1.10
77728 L	1905.00	LATROBE GROUP	PALEOCENE	0.56	1.21	1.31	8.15	13.91	0.65	1.05
77728 N	1995.00	LATROBE GROUP	PALEOCENE	0.52	0.70	1.60	8.73	12.57	0.62	1.68
77728 T	2085.00	LATROBE GROUP	PALEOCENE	0.00	60.56	1.10	9.03	14.09	0.00	1.02
77728 X	2145.00	LATROBE GROUP	PALEOCENE	0.00	9.41	1.16	6.08	12.97	0.62	1.12
77728 Z	2175.00	LATROBE GROUP	PALEOCENE	0.00	4.88	0.53	7.58	17.22	0.29	0.94
77729 B	2205.00	LATROBE GROUP	PALEOCENE	0.85	2.42	0.96	7.34	16.76	0.56	1.17
77729 F	2265.00	LATROBE GROUP	PALEOCENE	5.94	16.09	1.06	2.25	8.59	0.54	0.92
77729 H	2295.00	LATROBE GROUP	PALEOCENE	1.35	4.83	0.68	2.84	10.54	0.39	0.78
77729 J	2325.00	LATROBE GROUP	PALEOCENE	43.90	20.17	0.69	12.01	22.25	0.54	1.06
77729 L	2355.00	LATROBE GROUP	PALEOCENE	6.36	39.44	0.53	3.33	7.64	1.36	1.74
77729 N	2385.00	LATROBE GROUP	PALEOCENE	5.40	12.53	0.12	3.30	1.83	0.08	0.68
77729 Q	2460.00	LATROBE GROUP	PALEOCENE	0.39	0.56	1.19	9.31	15.45	0.48	0.92
77729 S	2490.00	LATROBE GROUP	PALEOCENE	0.65	1.36	0.90	10.74	9.18	0.47	1.05
77729 U	2520.00	LATROBE GROUP	PALEOCENE	0.43	0.63	1.15	8.83	11.17	0.37	0.57
77729 W	2550.00	LATROBE GROUP	PALEOCENE	0.36	0.73	1.43	7.98	14.48	0.59	1.05
77729 Y	2580.00	LATROBE GROUP	PALEOCENE	0.39	0.12	0.69	.	.	0.00	0.89
77730 A	2610.00	LATROBE GROUP	PALEOCENE	0.39	0.17	2.40	.	.	0.98	0.87
77730 E	2670.00	LATROBE GROUP	LATE CRETACEOUS	47.80	14.49	1.25	10.06	14.79	0.50	0.73

LIGHT GASOLINES (C4-C7) SUMMARY

BASIN - GIPPSLAND
WELL - GRUNTER 1

Significant Ratios

SAMPLE NO.	DEPTH	FORMATION	AGE	TOC%	TOTAL C4-C7 (PPM)	C1/C2	A/D2	C1/D2	CH/MCP	N-PENT/ I-PENT
77730 G	2700.00	LATROBE GROUP	LATE CRETACEOUS	1.08	11.48	2.60	7.53	10.74	1.04	1.30
77730 I	2730.00	LATROBE GROUP	LATE CRETACEOUS	0.48	0.54	1.78	7.05	10.04	0.87	0.70
77730 K	2760.00	LATROBE GROUP	LATE CRETACEOUS	0.47	0.25	2.77	6.99	4.33	0.53	0.92
77730 M	2790.00	LATROBE GROUP	LATE CRETACEOUS	5.90	14.42	0.86	9.63	8.50	0.19	0.57
77730 O	2820.00	LATROBE GROUP	LATE CRETACEOUS	4.64	30.72	0.64	9.11	7.01	0.27	0.67
77730 S	2880.00	LATROBE GROUP	LATE CRETACEOUS	3.64	38.61	2.23	12.87	21.98	1.28	2.22
77730 U	2910.00	LATROBE GROUP	LATE CRETACEOUS	0.50	1.15					0.60
77730 W	2940.00	LATROBE GROUP	LATE CRETACEOUS	1.57	4.16	0.91	8.73	12.85	0.30	0.94
77730 Y	2970.00	LATROBE GROUP	LATE CRETACEOUS	2.12	5.36	0.77	8.26	11.39	0.25	0.73
77731 A	3000.00	LATROBE GROUP	LATE CRETACEOUS	0.72	0.40	1.12			0.32	2.64
77731 C	3030.00	LATROBE GROUP	LATE CRETACEOUS	0.50	1.02	3.49	6.53	17.78	1.51	1.24
77731 E	3060.00	LATROBE GROUP	LATE CRETACEOUS	0.43	0.60	3.04	7.75	17.98	1.48	1.24
77731 G	3090.00	LATROBE GROUP	LATE CRETACEOUS	0.00	15.73	1.92	7.03	12.42	1.05	1.16
77731 I	3120.00	LATROBE GROUP	LATE CRETACEOUS	1.88	18.32	2.05	13.63	27.78	0.98	1.73
77731 K	3150.00	LATROBE GROUP	LATE CRETACEOUS	7.21	36.43	2.59	26.88	44.42	1.94	1.24
77731 M	3180.00	LATROBE GROUP	LATE CRETACEOUS	0.53	0.43	1.23	6.70	8.56	0.46	0.74
77731 U	3240.00	LATROBE GROUP	LATE CRETACEOUS	7.95	29.46	1.13	13.70	31.65	0.57	1.56
77731 S	3270.00	LATROBE GROUP	LATE CRETACEOUS	16.20	20.63	1.31	6.37	9.42	0.40	1.54
77731 U	3300.00	LATROBE GROUP	LATE CRETACEOUS	6.00	0.02					1.37
77731 W	3330.00	LATROBE GROUP	LATE CRETACEOUS	1.14	7.12	1.24	6.05	7.37	0.42	0.88
77731 Y	3360.00	LATROBE GROUP	LATE CRETACEOUS	13.30	76.18	2.57	13.44	25.41	1.05	0.73
77732 A	3390.00	LATROBE GROUP	LATE CRETACEOUS	3.78	0.93	1.64	4.52	12.36	0.80	0.64
77732 C	3435.00	LATROBE GROUP	LATE CRETACEOUS	0.00	31.70	1.56	4.13	7.89	0.68	0.89
77732 L	3480.00	LATROBE GROUP	LATE CRETACEOUS	0.55	46.13	1.44	2.90	6.04	0.45	0.92
77732 G	3510.00	LATROBE GROUP	LATE CRETACEOUS	0.97	223.14	0.33	2.38	3.57	0.40	[illegible]
77732 J	3550.00	LATROBE GROUP	LATE CRETACEOUS	40.80	282.61	0.52	1.66	5.84	0.82	2.10
77732 M	3610.00	LATROBE GROUP	LATE CRETACEOUS	7.40	546.29	0.44	0.26	0.83	0.24	0.80
77732 P	3640.00	LATROBE GROUP	LATE CRETACEOUS	14.27	624.65	0.91	1.60	5.11	0.91	1.04
77732 R	3670.00	LATROBE GROUP	LATE CRETACEOUS	14.27	571.79	0.50	2.03	5.46	0.74	1.11
77732 T	3700.00	LATROBE GROUP	LATE CRETACEOUS	13.63	1.55	36.6	2.22	1.78	0.00	1.97
77732 V	3730.00	LATROBE GROUP	LATE CRETACEOUS	11.71	211.65	4.13	8.14	16.67	2.06	1.98
77732 X	3760.00	LATROBE GROUP	LATE CRETACEOUS	8.64	191.53	4.22	8.08	18.58	2.14	2.20
77732 Z	3790.00	LATROBE GROUP	LATE CRETACEOUS	23.10	338.35	3.05	11.27	27.49	1.74	2.99
77733 B	3609.00	LATROBE GROUP	LATE CRETACEOUS	10.70	102.95	1.44	10.86	6.13	0.67	1.35

VITRINITE REFLECTANCE REPORT

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO.	DEPTH	AGE	FORMATION	AN	MAX. RO	FLUOR. COLOUR	NO.CNTS.	MACERAL TYPE
77610 B	1783.10	EARLY MIOCENE	LAKES ENTRANCE	5	.32	GRN/YEL-OR	1	E>I>V,DOM SPARSE
77608 Z	2009.00	PALEOCENE	LATROBE GROUP	5	.41	OR-DULL OR	5	V>E>I,DOM RARE
77608 M	2213.00	PALEOCENE	LATROBE GROUP	5	.39	YEL-OR	6	E>V>I,DOM RARE
77608 I	2340.10	PALEOCENE	LATROBE GROUP	5	.42	YEL-OR	26	I>V>E,DOM ABUNDANT
77608 E	2425.00	PALEOCENE	LATROBE GROUP	5	.46	YEL-OR	28	I>V>E,DOM ABUNDANT
77607 W	2645.00	LATE CRETACEOUS	LATROBE GROUP	5	.55	YEL-DULL OR	28	I>V>E,DOM ABUNDANT
77607 P	2836.00	LATE CRETACEOUS	LATROBE GROUP	5	.64	YEL-DULL OR	27	E>I>V,DOM MAJOR
77606 Y	3125.00	LATE CRETACEOUS	LATROBE GROUP	5	.57	YEL-DULL OR	27	I>E>V,DOM ABUNDANT
77606 I	3359.80	LATE CRETACEOUS	LATROBE GROUP	5	.65	YEL-OR	28	I>V>E,DOM ABUNDANT
77606 B	3527.00	LATE CRETACEOUS	LATROBE GROUP	5	.74	YEL-OR	40	V>E>I,DOM ABUNDANT
77261 J	3578.50	LATE CRETACEOUS	LATROBE GROUP	5	.94	YEL-DULL OR	27	V>I>E,DOM SPARSE
77621 T	3679.00	LATE CRETACEOUS	LATROBE GROUP	5	.84	DULL OR	27	V>>?E>I,DOM RARE
77621 D	3746.00	LATE CRETACEOUS	LATROBE GROUP	5	.76	OR	1	I>?E>V,DOM RARE
77621 A	3797.00	LATE CRETACEOUS	LATROBE GROUP	5	.83		14	I>OR=V,NO E,DOM RARE

13/11/85 Table 7 **ESSO AUSTRALIA LTD.** PAGE

C15+ EXTRACT ANALYSES (OILS FLAGGED BY %)

BASIN - GIPPSLAND
WELL - GRUNTER 1

REPORT A - EXTRACT DATA - PPM (OIL=%)

SAMPLE NO.	DEPTH	TYPE	AN	AGE	TOTAL EXTRACT	*--- HYDROCARBONS SATS.	AROMS.	TOTAL H/CARBS ---*	*--- NON-HYDROCARBONS ASPH.	ELUTED NSO	NON-ELT NSO	TOTAL NSO	SULPHUR	TOTAL NON/HC
77725 P	750.00	CTS	2	PLEIST-MID MIOCENE	147.	0.	0.	0.	112.	0.	0.	0.	0.	112
77726 N	1155.00	CTS	2	PLEIST-MID MIOCENE	206.	0.	0.	0.	147.	0.	0.	0.	0.	147
77727 V	1665.00	CTS	2	MID-EARLY MIOCENE	217.	0.	0.	0.	169.	0.	0.	0.	0.	169
77728 J	1875.00	CTS	2	EARLY EOCENE	296.	0.	0.	0.	203.	0.	0.	0.	0.	203
77729 Q	2460.00	CTS	2	PALEOCENE	327.	0.	0.	0.	235.	0.	0.	0.	0.	235
77730 K	2760.00	CTS	2	LATE CRETACEOUS	383.	29.	26.	55.	252.	32.	19.	51.	25.	328
77731 C	3030.00	CTS	2	LATE CRETACEOUS	1198.	228.	112.	340.	643.	108.	16.	124.	91.	858
77731 O	3210.00	CTS	2	LATE CRETACEOUS	353.	30.	25.	55.	219.	26.	3.	29.	50.	298
77731 W	3330.00	CTS	2	LATE CRETACEOUS	2747.	443.	554.	997.	1306.	402.	42.	444.	0.	1750
77731 Z	3375.00	CTS	2	LATE CRETACEOUS	557.	22.	32.	54.	308.	37.	14.	51.	144.	503
77732 R	3670.00	CTS	2	LATE CRETACEOUS	9396.	1767.	2042.	3809.	3722.	1357.	508.	1865.	0.	5587
77733 B	3809.00	CTS	2	LATE CRETACEOUS	8159.	2227.	1478.	3705.	3417.	923.	114.	1037.	0.	4454

01/11/85 TABLE 7 (cont'd)

ESSO AUSTRALIA LTD.

C15+ EXTRACT ANALYSES (OILS FLAGGED BY %)

BASIN - GIPPSLAND
WELL - GRUNTER 1

REPORT B - EXTRACTS % OF TOTAL

SAMPLE NO.	DEPTH	FORMATION	*HYDROCARBONS* SAT. %	ARUM.%	*- NON-HYDROCARBONS -* NSO. %	ASPH.%	SULPH%	*	SAT/AR	*	HC/NHC	*	COMMENTS
77725 P	750.00	GIPPSLAND LOST	.0	.0	.0	76.2	.0	*	.0	*	.0	*	
77726 N	1155.00	GIPPSLAND LIST	.0	.0	.0	71.4	.0	*	.0	*	.0	*	
77727 V	1665.00	LAKES ENTRANCE	.0	.0	.0	77.9	.0	*	.0	*	.0	*	
77728 J	1675.00	LATROBE GP/GURNARD FM	.0	.0	.0	68.6	.0	*	.0	*	.0	*	
77729 O	2460.00	LATROBE GROUP	.0	.0	.0	71.9	.0	*	.0	*	.0	*	
77730 K	2760.00	LATROBE GROUP	7.6	6.8	13.3	65.8	6.5	*	1.1	*	.2	*	
77731 C	3030.00	LATROBE GROUP	19.0	9.3	10.4	53.7	7.6	*	2.0	*	.4	*	
77731 O	3210.00	LATROBE GROUP	8.5	7.1	8.2	62.0	14.2	*	1.2	*	.2	*	
77731 W	3330.00	LATROBE GROUP	16.1	20.2	16.2	47.5	.0	*	.8	*	.6	*	
77731 7	3375.00	LATROBE GROUP	3.9	5.7	9.2	55.3	25.9	*	.7	*	.1	*	
77732 R	3670.00	LATROBE GROUP	18.8	21.7	19.8	39.6	.0	*	.9	*	.7	*	
77733 B	3609.00	LATROBE GROUP	27.3	18.1	12.7	41.9	.0	*	1.5	*	.8	*	

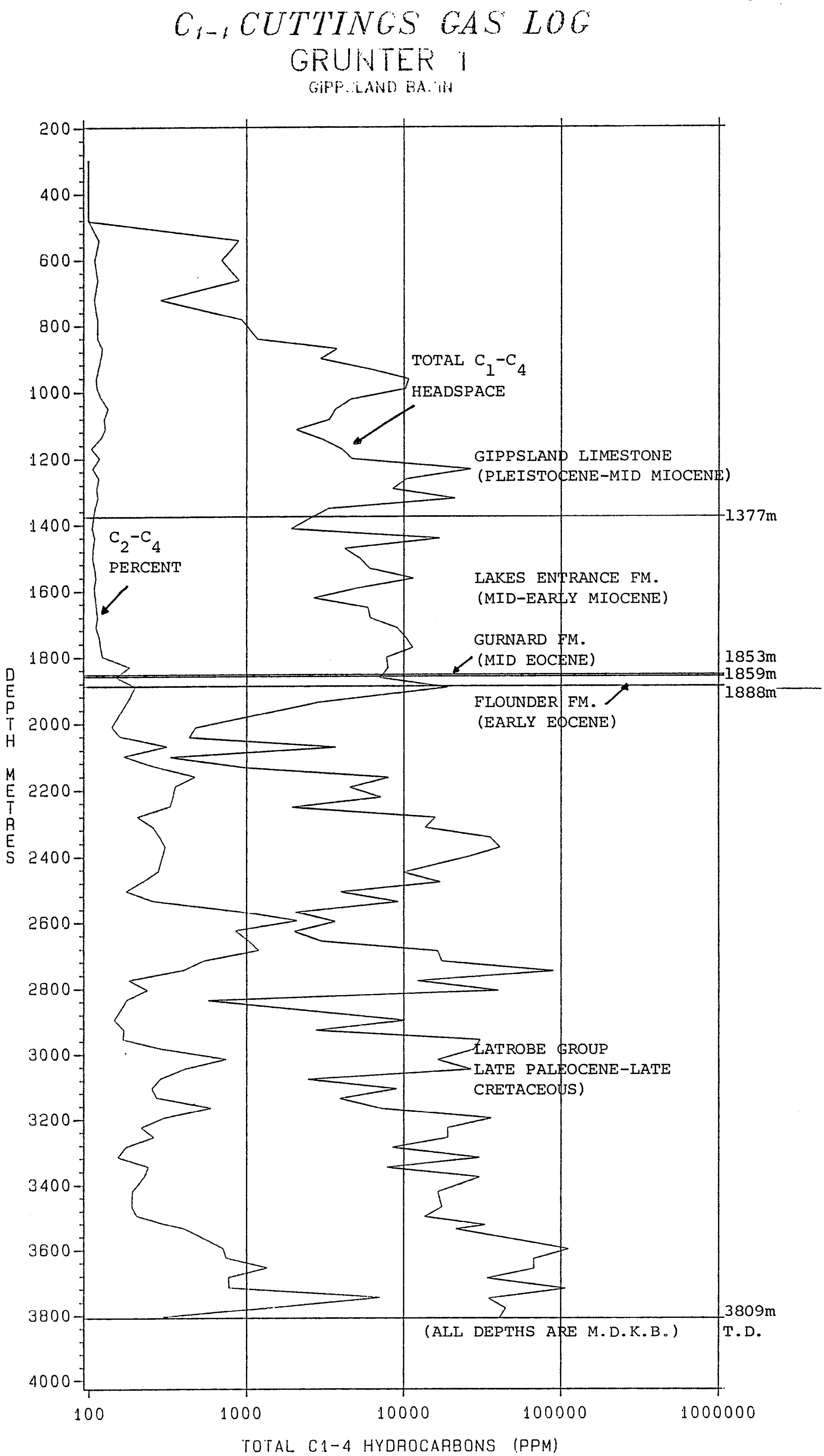
13/11/85 Table 8

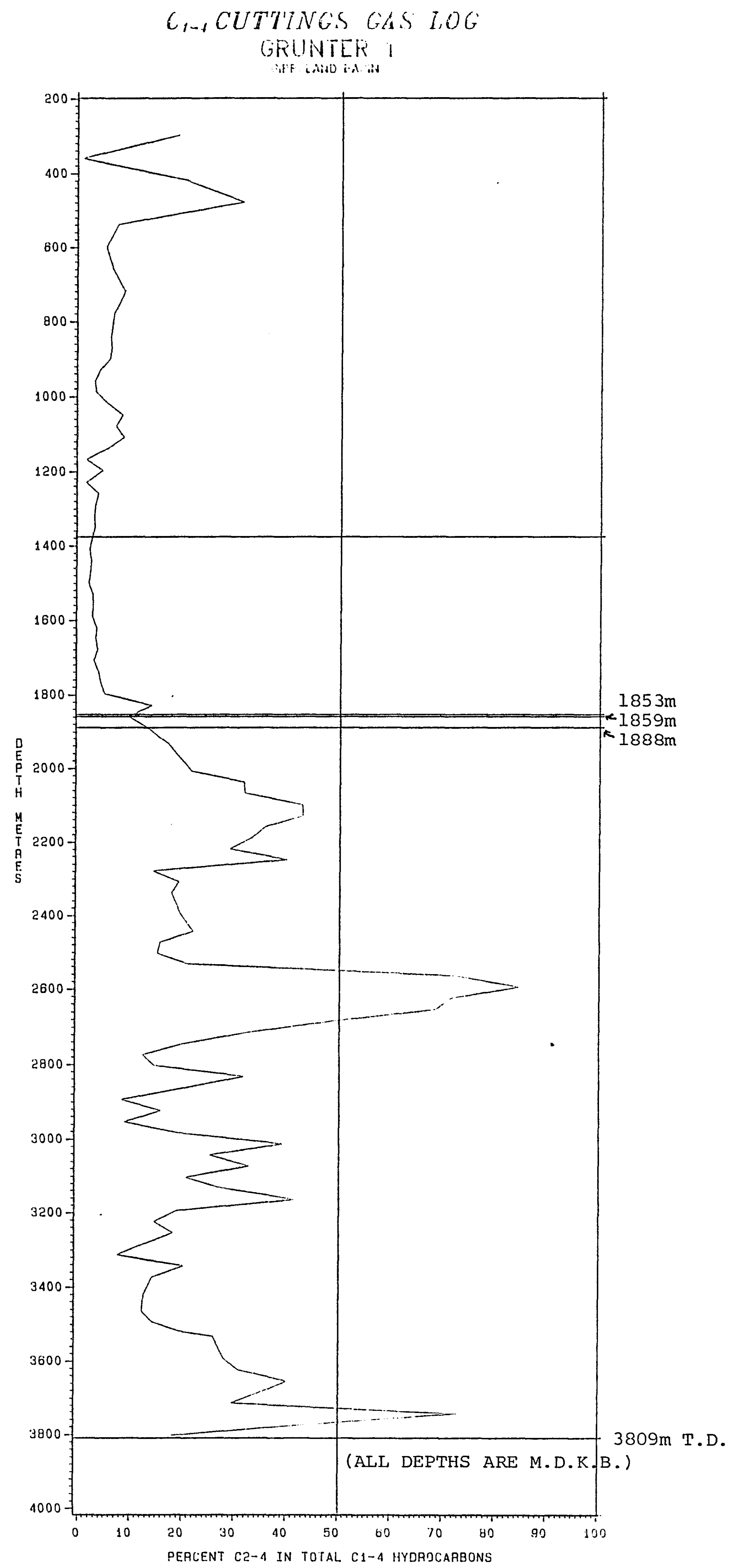
ESSO AUSTRALIA LTD.

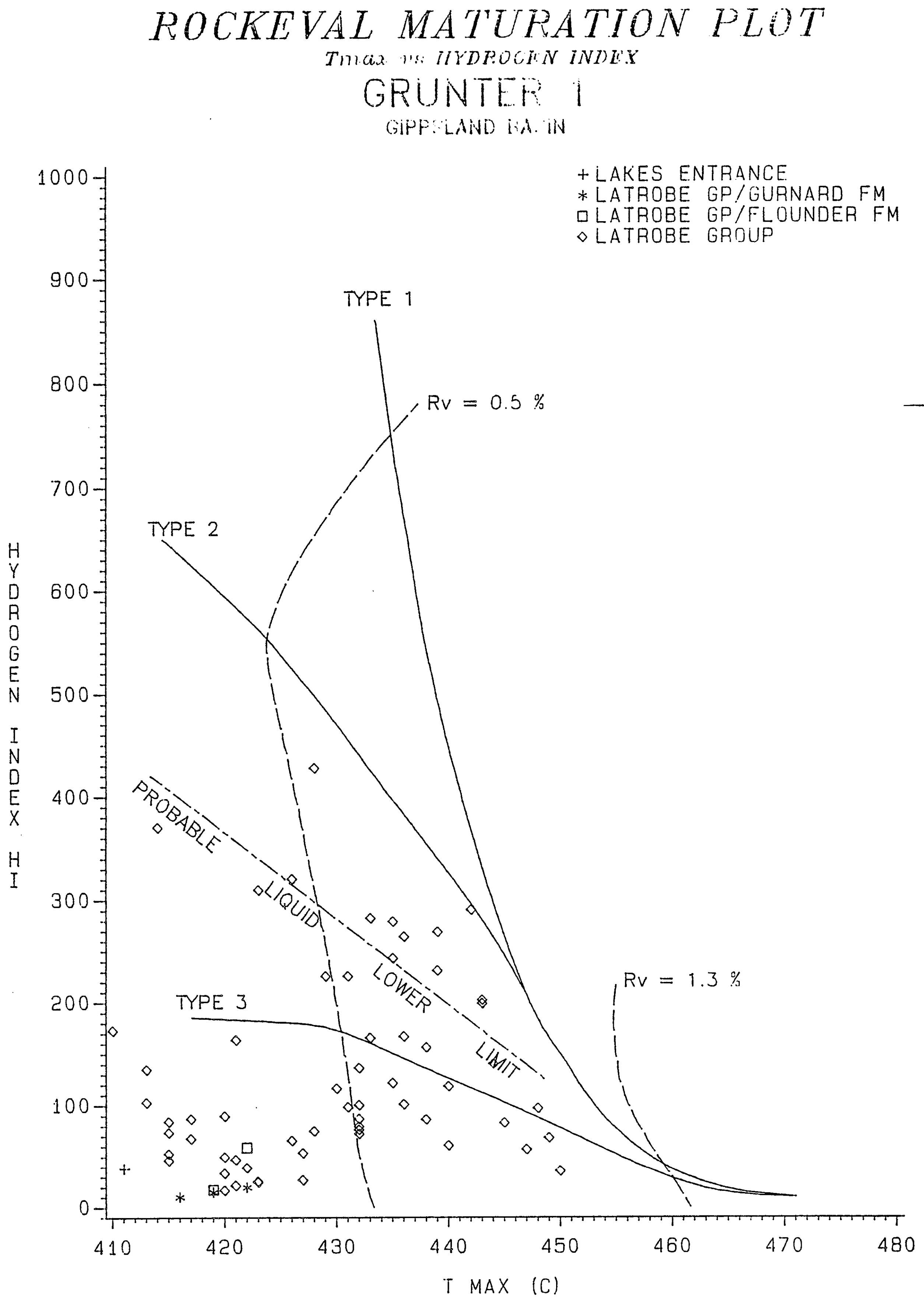
OIL - API GRAVITY, POUR POINT & SULPHUR %

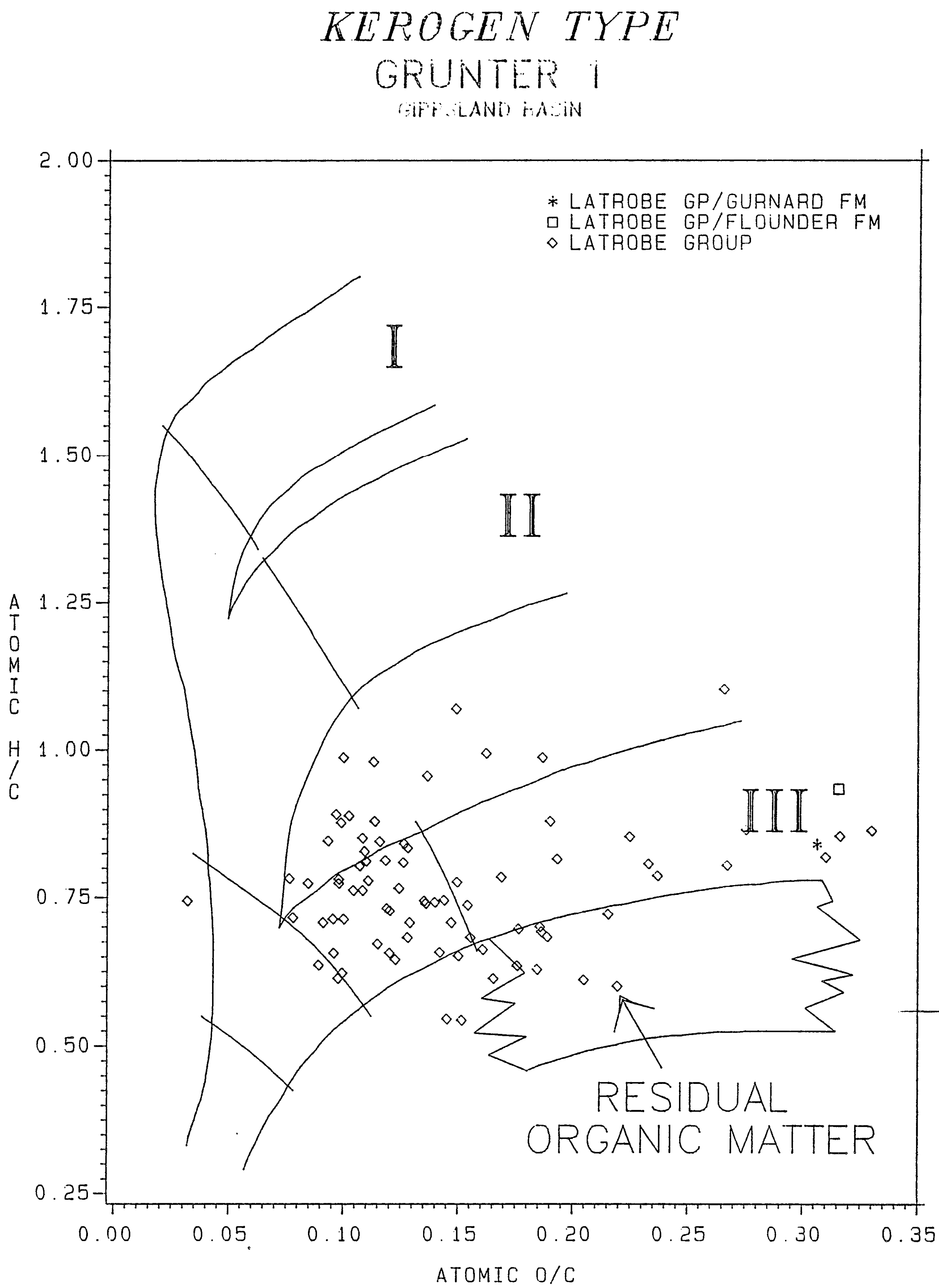
BASIN - GIPPSLAND
WELL - GRUNTER 1

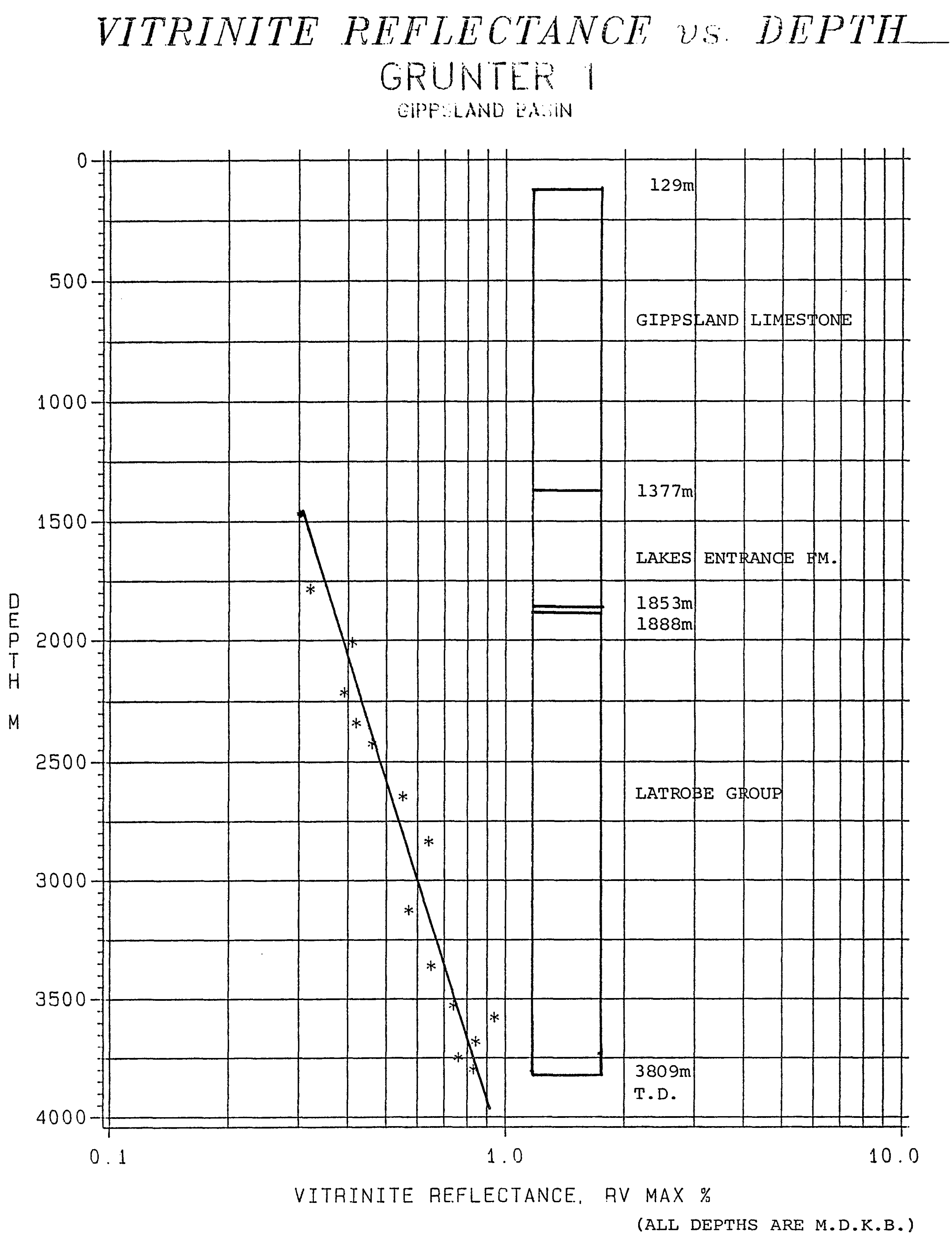
SAMPLE NO.	DEPTH	AGE	FORMATION	API GRAVITY	POUR PT. (OF)	SULPHUR %	COMMENTS
77698 Q	2702.50	LATE CRETACEOUS	LATROBE GROUP	55.07	.00	.00	
77698 R	2861.30	LATE CRETACEOUS	LATROBE GROUP	55.83	.00	.00	
77686 Y	3044.70	LATE CRETACEOUS	LATROBE GROUP	46.73	.00	.00	
77686 Z	3053.10	LATE CRETACEOUS	LATROBE GROUP	50.59	.00	.00	
77687 B	3328.80	LATE CRETACEOUS	LATROBE GROUP	43.93	.00	.00	
77687 A	3310.60	LATE CRETACEOUS	LATROBE GROUP	45.51	.00	.00	
77687 C	3353.00	LATE CRETACEOUS	LATROBE GROUP	32.80	.00	.00	


C_{1-4} CUTTINGS GAS LOG
GRUNTER 1
GIPPSLAND BASIN
TOTAL C_1-C_4 HEADSPACE
C_2-C_4 PERCENT
GIPPSLAND LIMESTONE
(PLEISTOCENE-MID MIOCENE)
1377m
LAKES ENTRANCE FM.
(MID-EARLY MIOCENE)
GURNARD FM.
(MID EOCENE)
1853m
1859m
1888m
FLOUNDER FM.
(EARLY EOCENE)
LATROBE GROUP
LATE PALEOCENE-LATE CRETACEOUS)
3809m
T.D.
(ALL DEPTHS ARE M.D.K.B.)
DEPTH METRES
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
100
1000
10000
100000
1000000
TOTAL C1-4 HYDROCARBONS (PPM)


C1-4 CUTTINGS GAS LOG
GRUNTER 1
DEPTH METRES
PERCENT C2-4 IN TOTAL C1-4 HYDROCARBONS
1853m
1859m
1888m
3809m T.D.
(ALL DEPTHS ARE M.D.K.B.)


ROCKEVAL MATURATION PLOT
Tmax vs HYDROGEN INDEX
GRUNTER 1
GIPPSLAND BASIN
+ LAKES ENTRANCE
* LATROBE GP/GURNARD FM
□ LATROBE GP/FLOUNDER FM
◇ LATROBE GROUP
TYPE 1
TYPE 2
TYPE 3
Rv = 0.5 %
Rv = 1.3 %
PROBABLE LIQUID LOWER LIMIT
HYDROGEN INDEX HI
T MAX (C)
1000
900
800
700
600
500
400
300
200
100
0
410
420
430
440
450
460
470
480


KEROGEN TYPE
GRUNTER 1
GIPPSLAND BASIN
* LATROBE GP/GURNARD FM
□ LATROBE GP/FLOUNDER FM
◇ LATROBE GROUP
I
II
III
RESIDUAL ORGANIC MATTER
ATOMIC H/C
ATOMIC O/C
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35



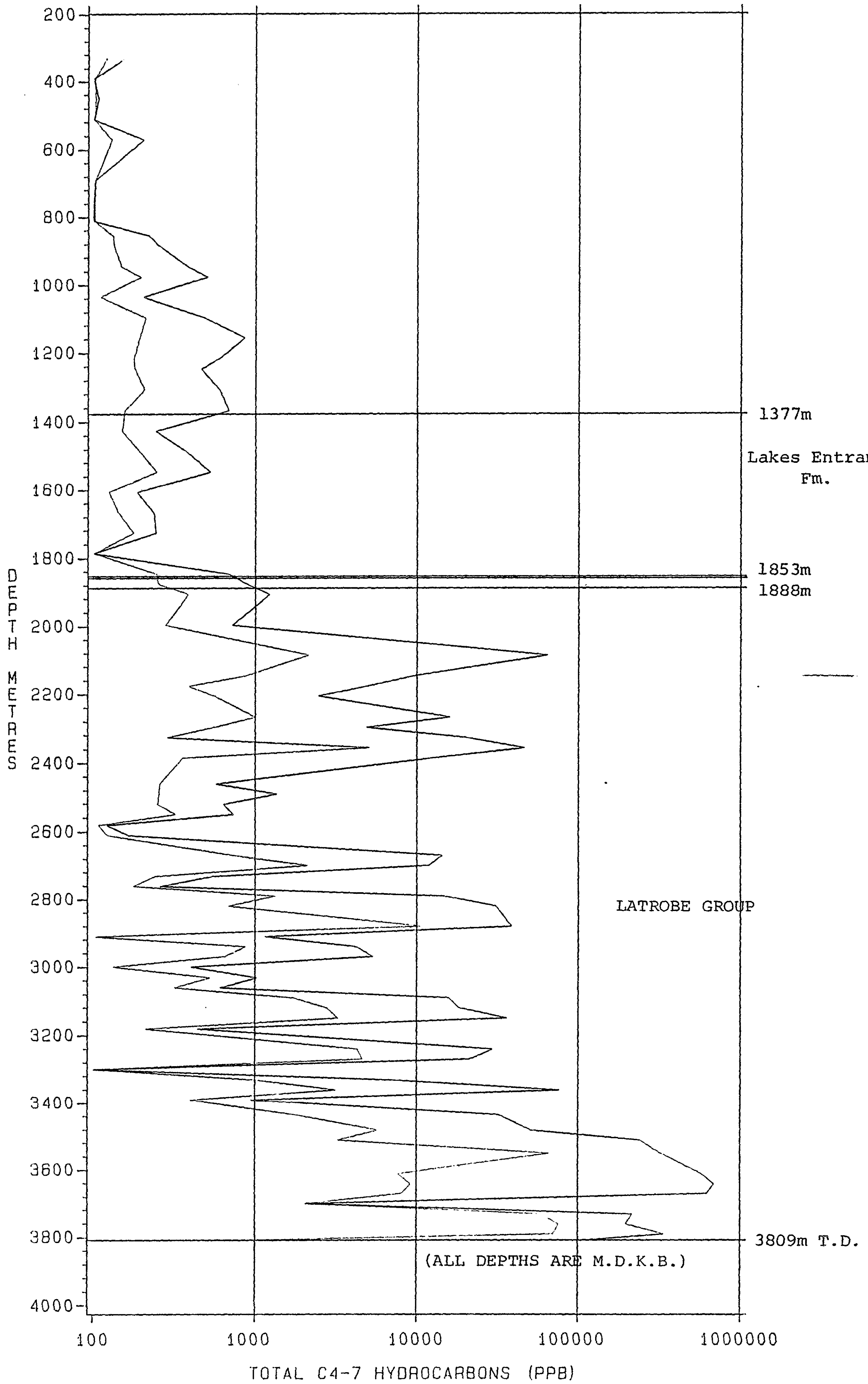
VITRINITE REFLECTANCE vs. DEPTH
GRUNTER 1
GIPPSLAND BASIN
0
500
1000
1500
2000
2500
3000
3500
4000
DEPTH M
129m
GIPPSLAND LIMESTONE
1377m
LAKES ENTRANCE FM.
1853m
1888m
LATROBE GROUP
3809m
T.D.
0.1
1.0
10.0
VITRINITE REFLECTANCE, RV MAX %
(ALL DEPTHS ARE M.D.K.B.)

Figure 5

C_{4-7} HYDROCARBON LOG

GRUNTER 1

GIPPSLAND BASIN



C_{15+} Paraffin-Naphthene (P-N) Hydrocarbon

GeoChem Sample No. E675-006

Identification No. 77725-P

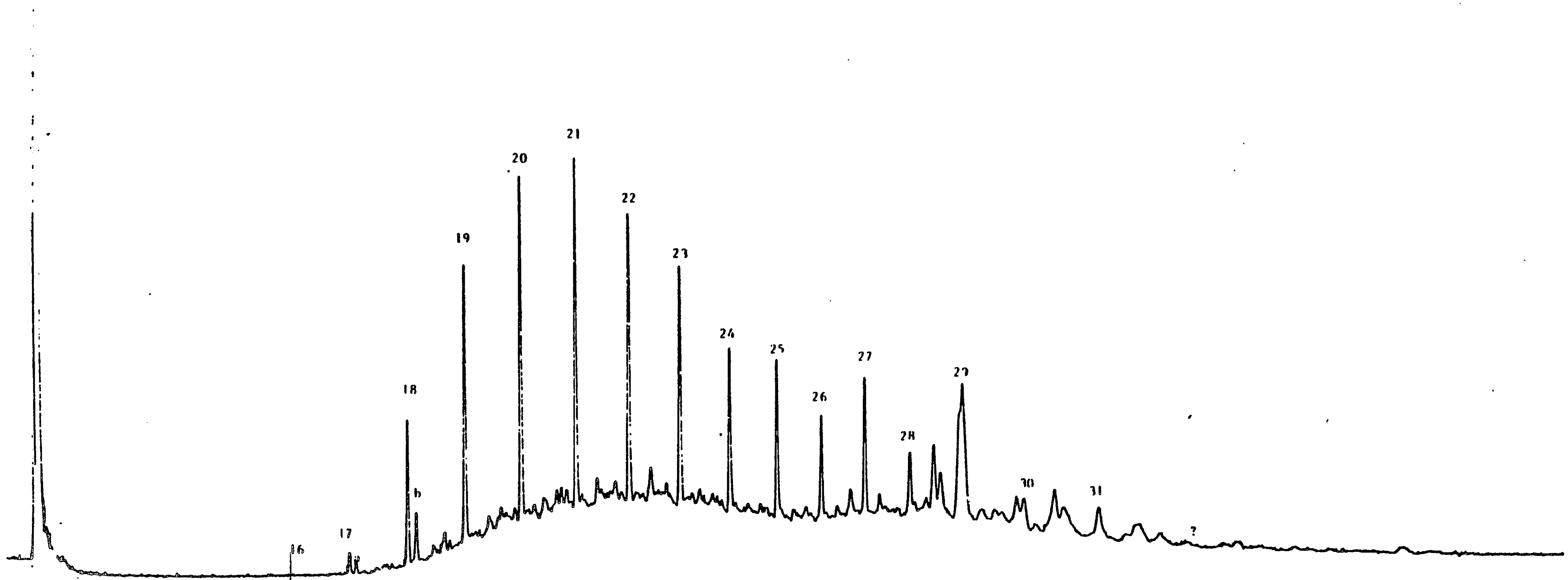


Figure 6: C_{15}+ Extract - Grunter-1, Gippsland Limestone, 720-750 m KB

C_{15+} **Paraffin-Naphthene (P-N) Hydrocarbon**

GeoChem Sample No. E675-007

Exxon Identification No. 77726-N

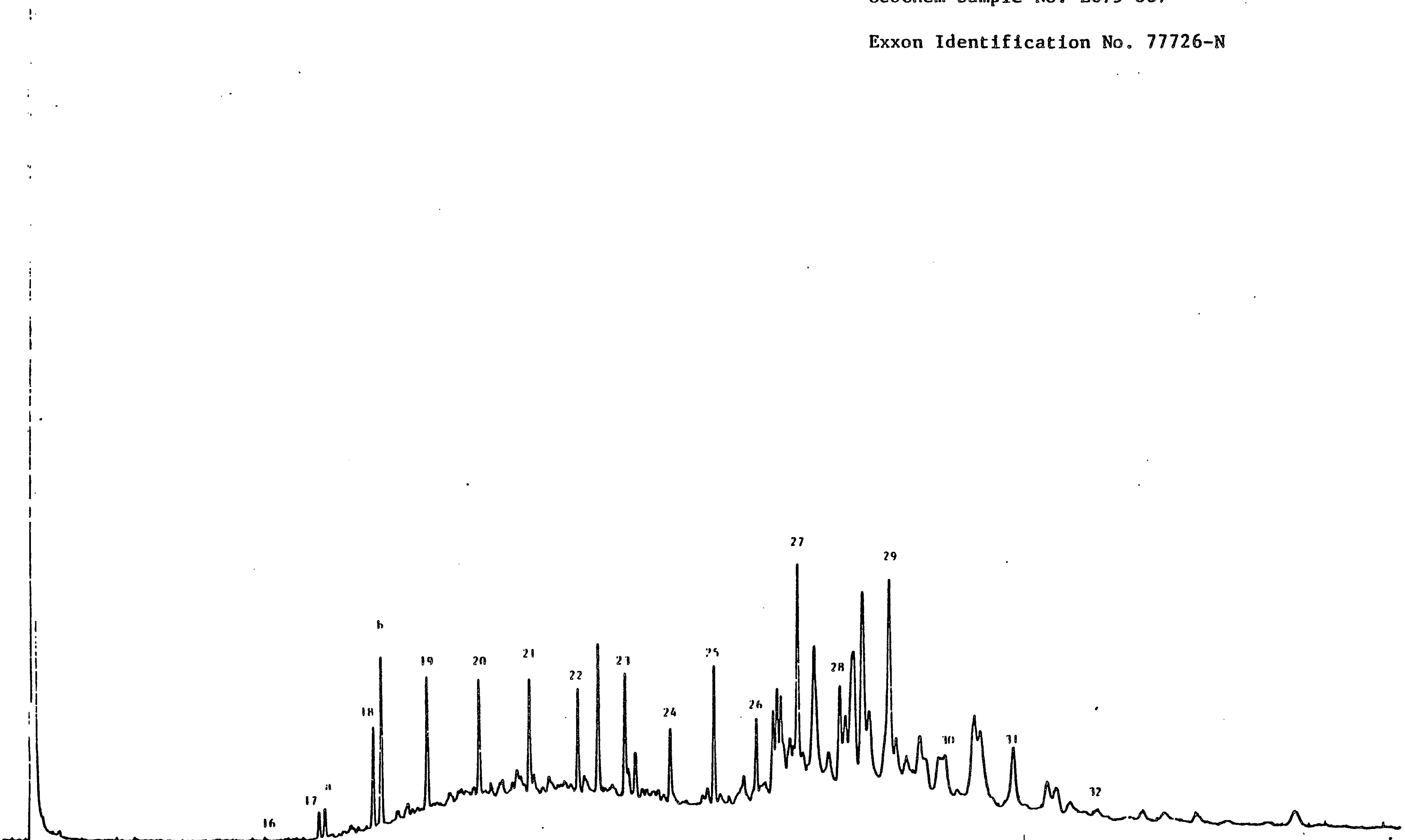


Figure 7: C_{15}+ Extract - Grunter-1, Gippsland Limestone, 1140-55 m KB

C_{15+} Paraffin-Naphthene (P-N) Hydrocarbon

GeoChem Sample No. E675-008

Exxon Identification No. 77727-V

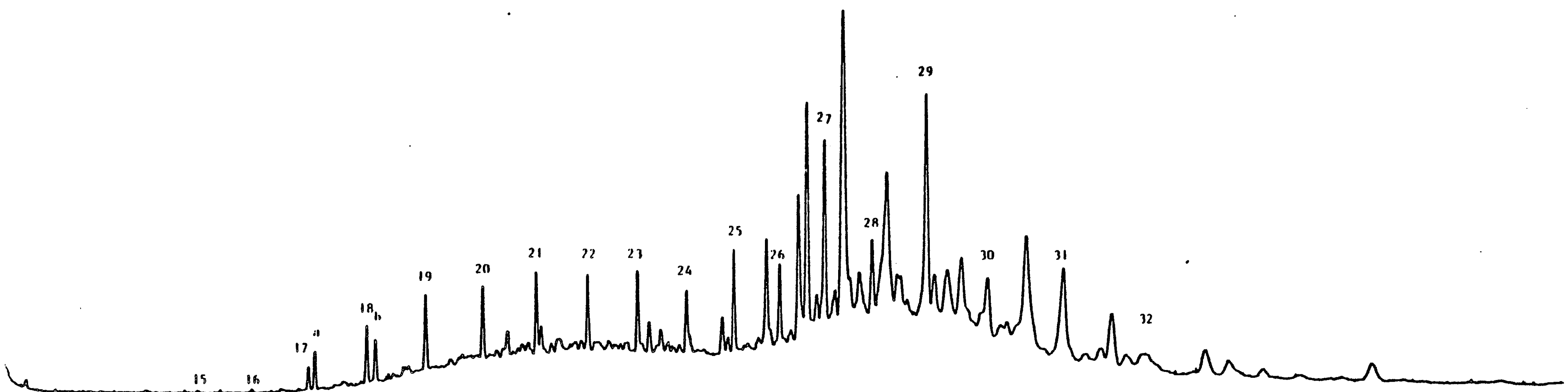


Figure 8: C_{15}+ Extract - Grunter-1, Lakes Entrance Fm., 1650-65 m KB

C_{15+} Paraffin-Naphthene (P-N) Hydrocarbon

GeoChem Sample No. E675-008

Exxon Identification No. 77727-V

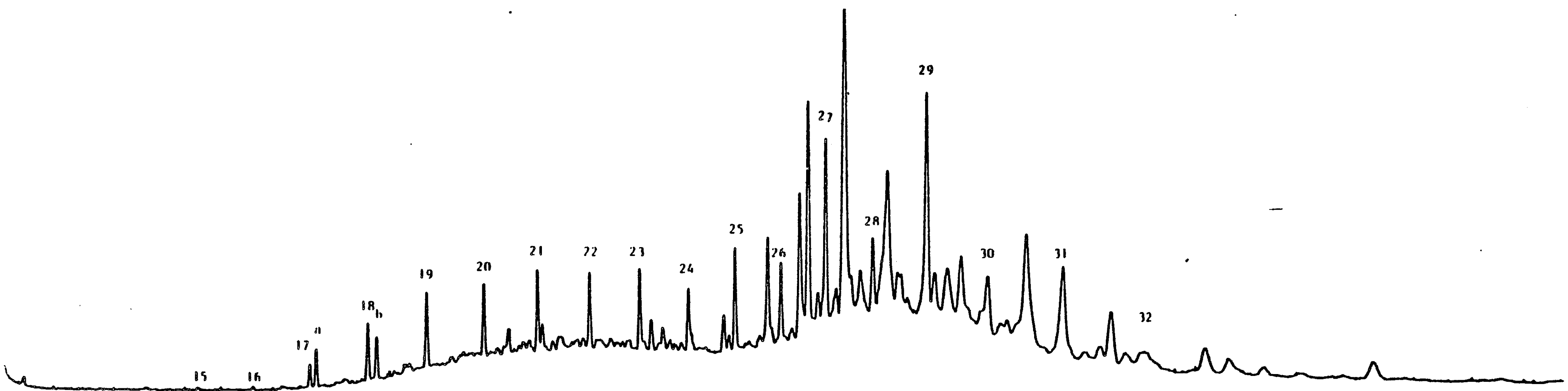


Figure 8: C_{15}+ Extract - Grunter-1, Lakes Entrance Fm., 1650-65 m KB

C_{15+} Paraffin-Naphthene (P-N) Hydrocarbon

GeoChem Sample No. E675-009

Exxon Identification No. 77728-J

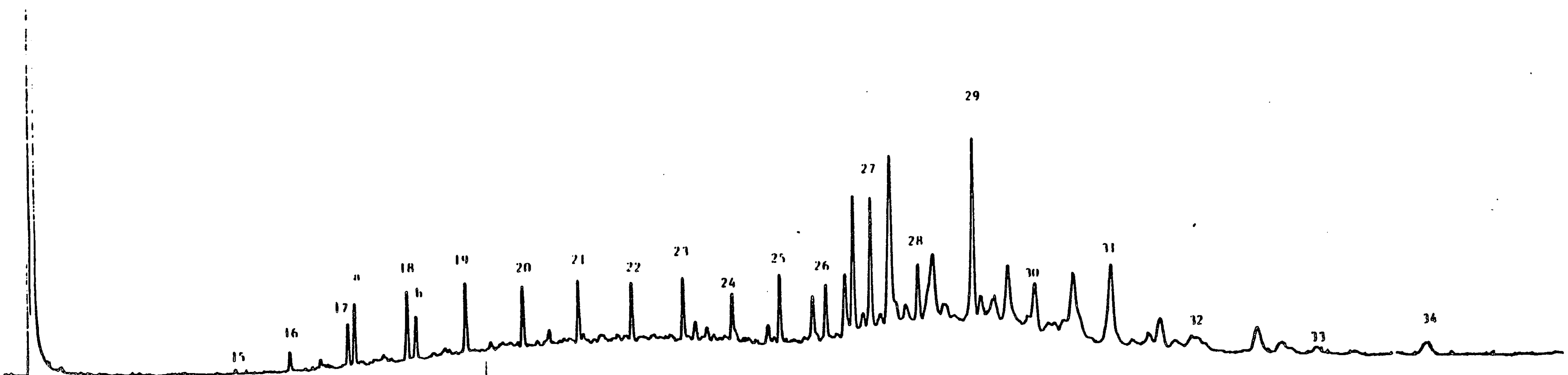


Figure 9: C_{15}+ Extract - Grunter-1, Latrobe Group - Flounder Fm., 1860-75 m KB

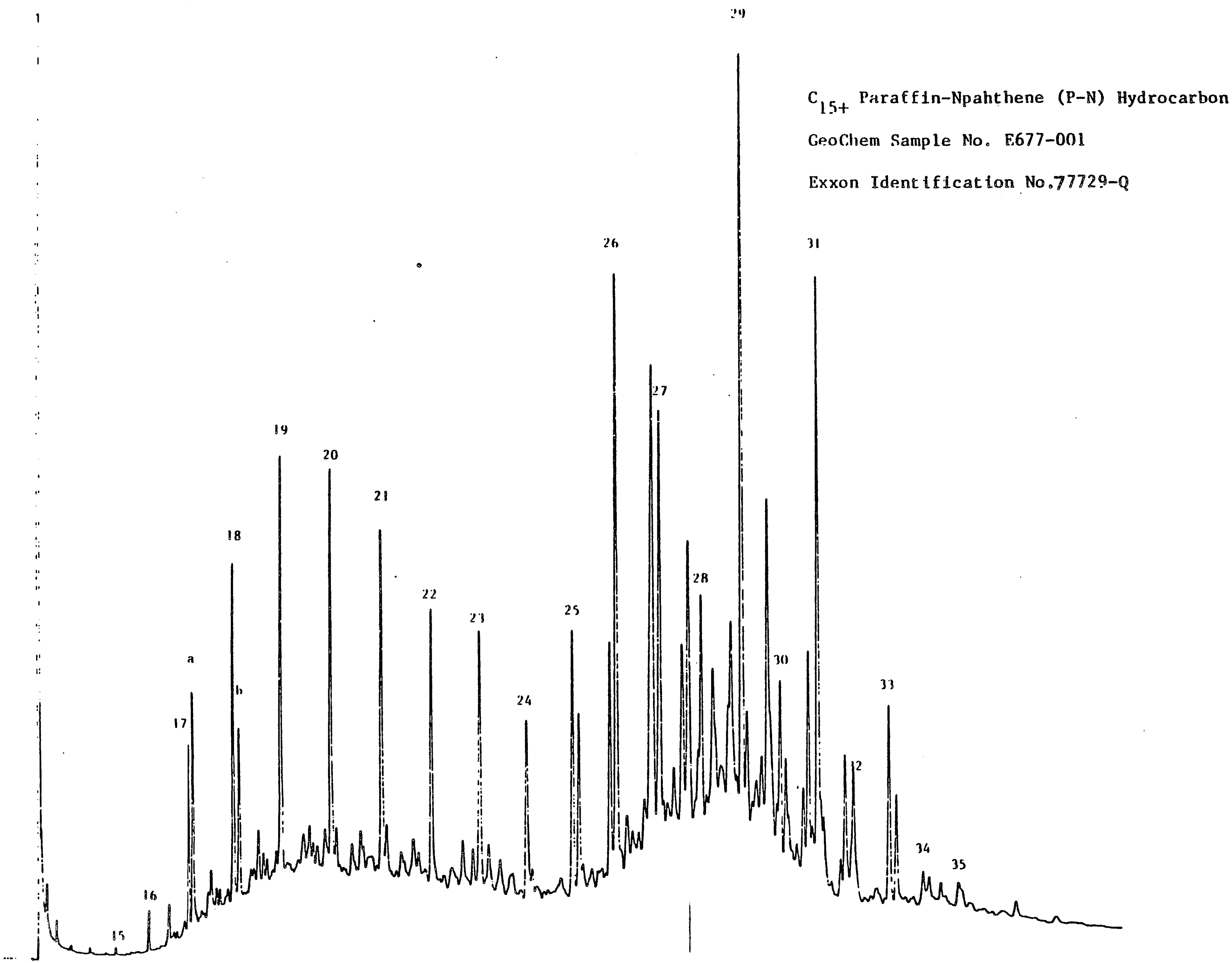


Figure 10: C_{15+} Extract - Grunter-1, Latrobe Group, 2445-60 m KB

C_{15}+ Paraffin-Naphthene (P-N) Hydrocarbon
GeoChem Sample No. E677-001
Exxon Identification No. 77730-K

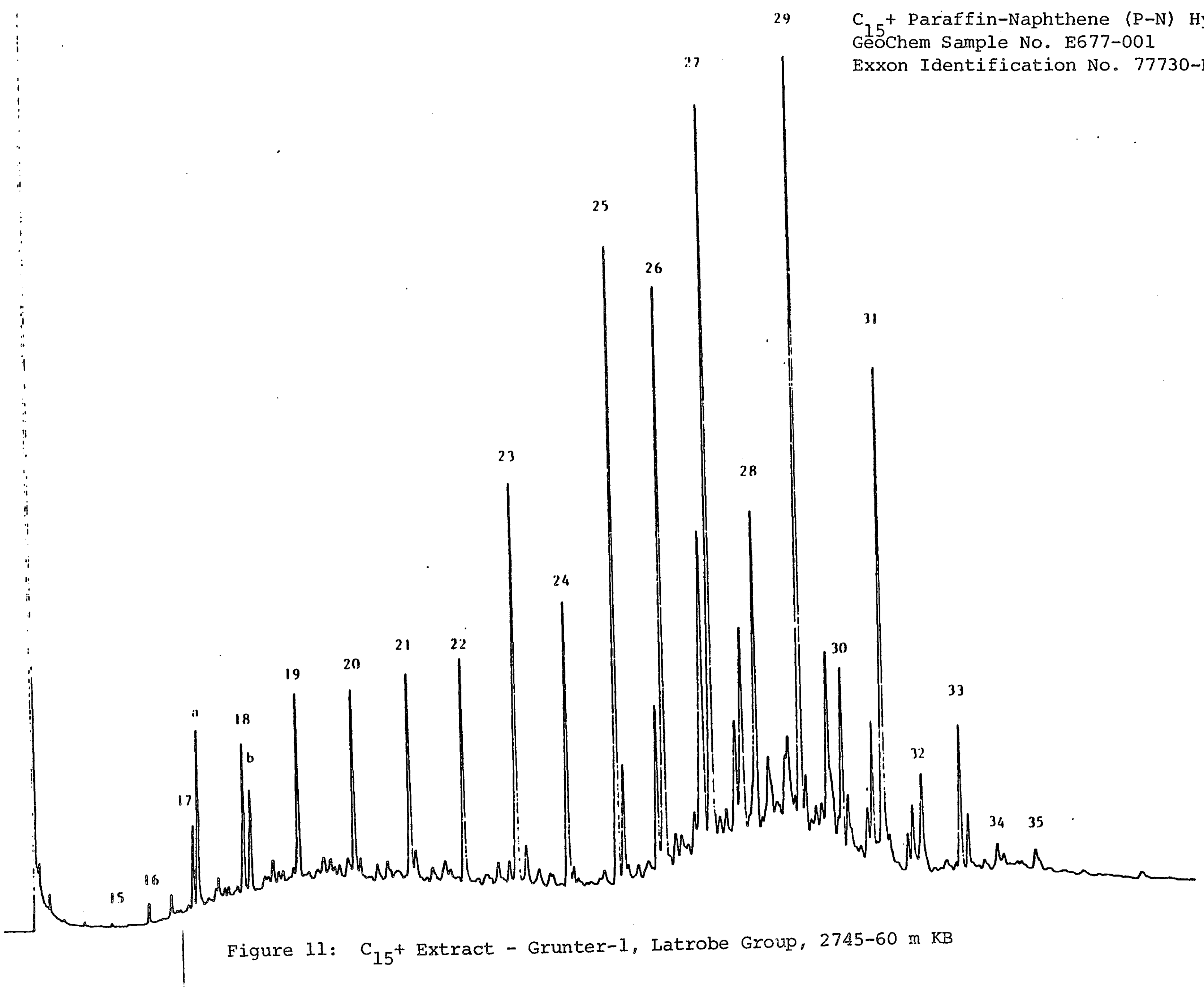


Figure 11: C_{15}+ Extract - Grunter-1, Latrobe Group, 2745-60 m KB

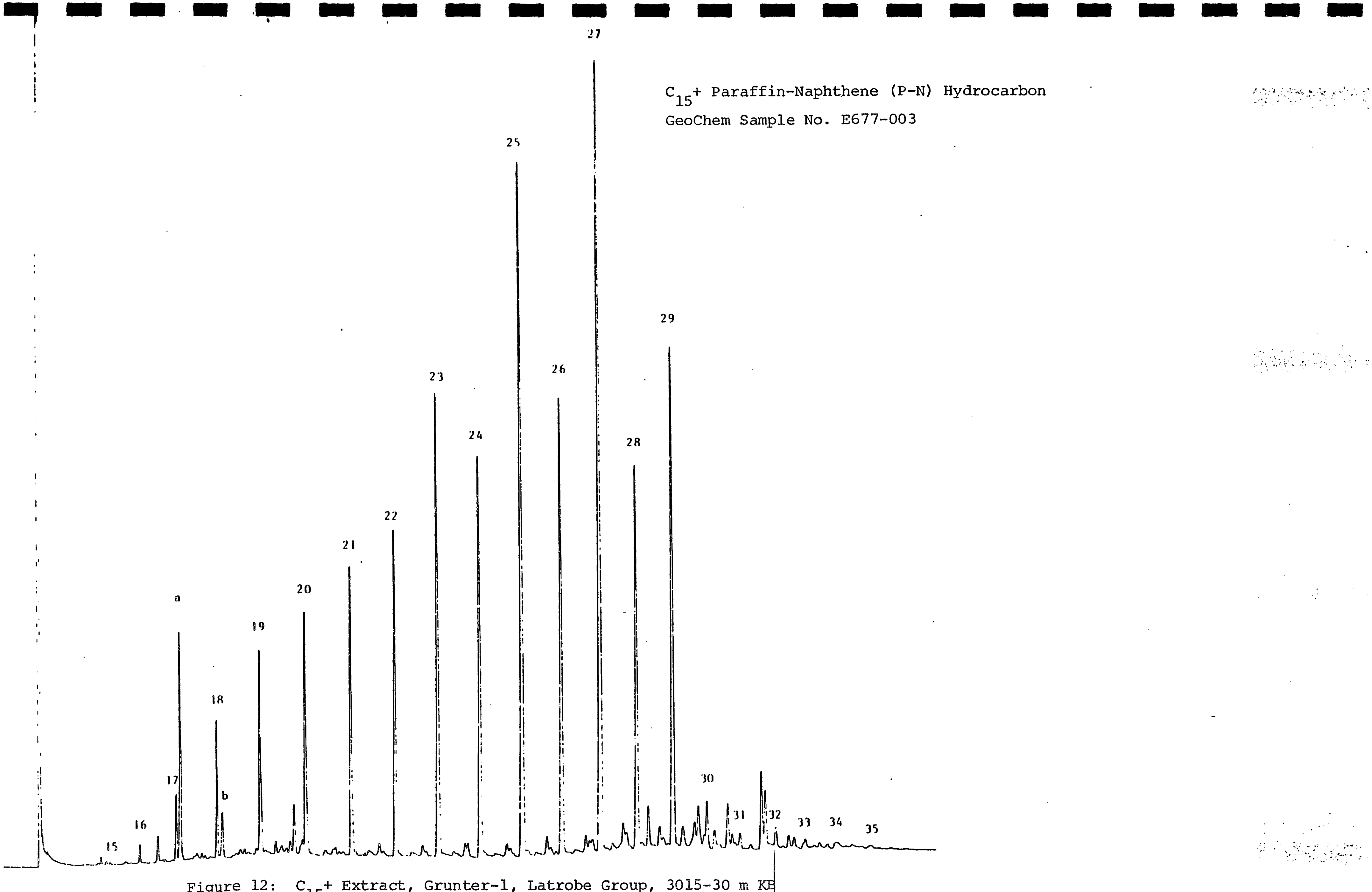


Figure 12: C_{15}+ Extract, Grunter-1, Latrobe Group, 3015-30 m KB

C_{15+} Paraffin-Naphthene (P-N) Hydrocarbon

GeoChem Sample No. E675-010

Exxon Identification No. 77731-0

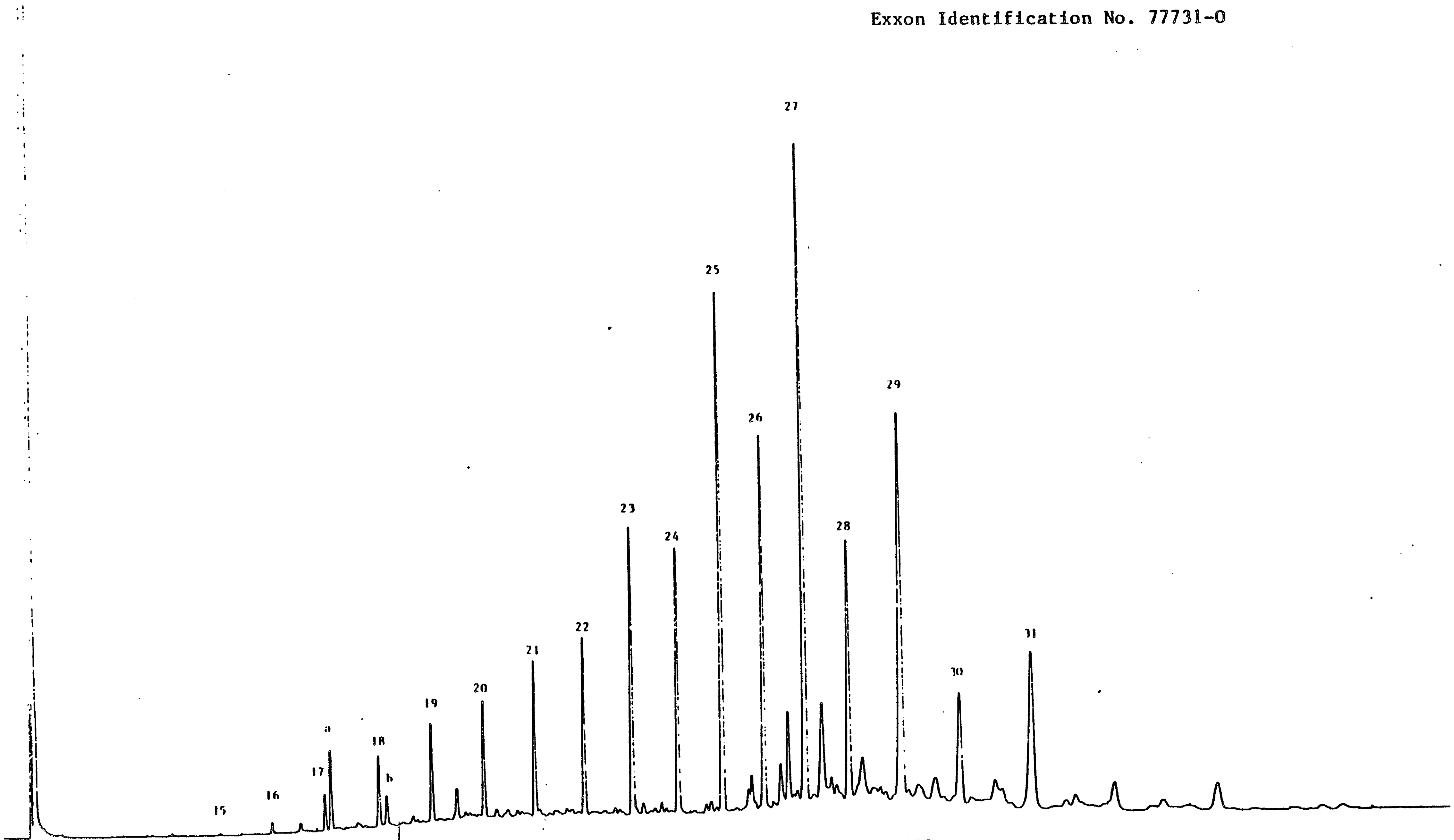


Figure 13: $C_{15}+$ Extract - Grunter-1, Latrobe Group, 3195-3210 m KB

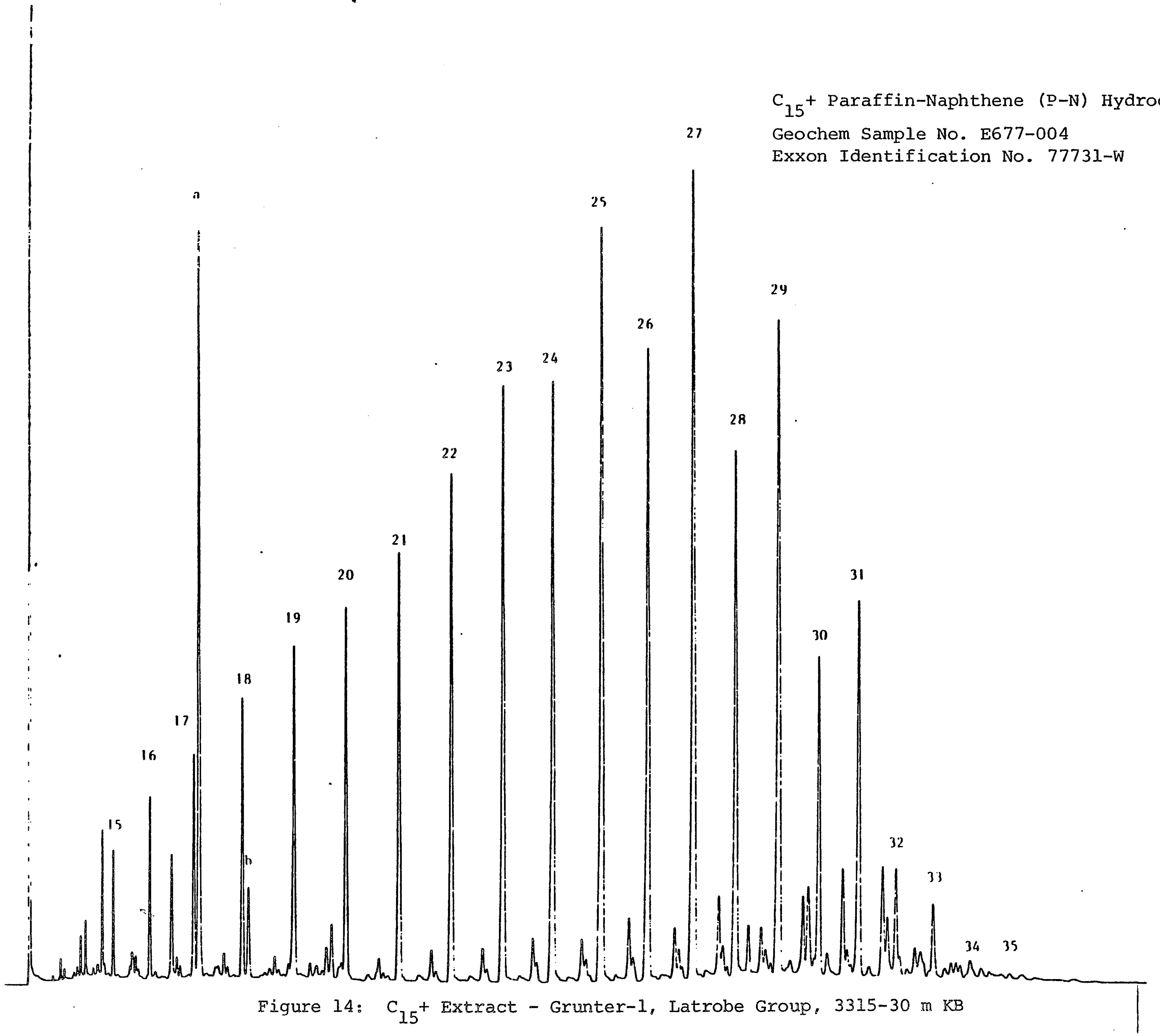


Figure 14: C_{15}+ Extract - Grunter-1, Latrobe Group, 3315-30 m KB

C_{15+} Paraffin-Naphthene (P-N) Hydrocarbon

GeoChem Sample No. E675-011

Exxon Identification No. 77731-Z

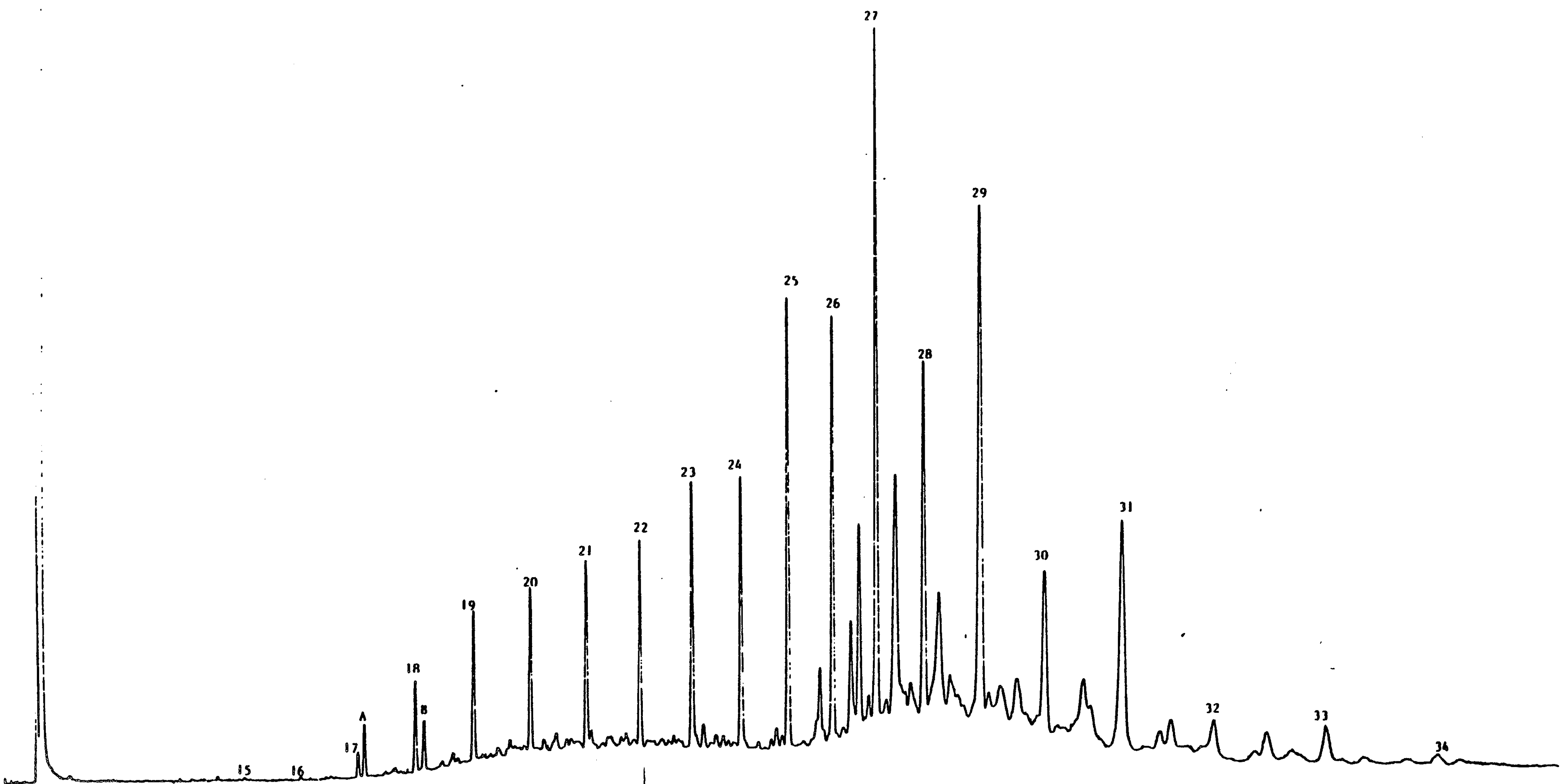
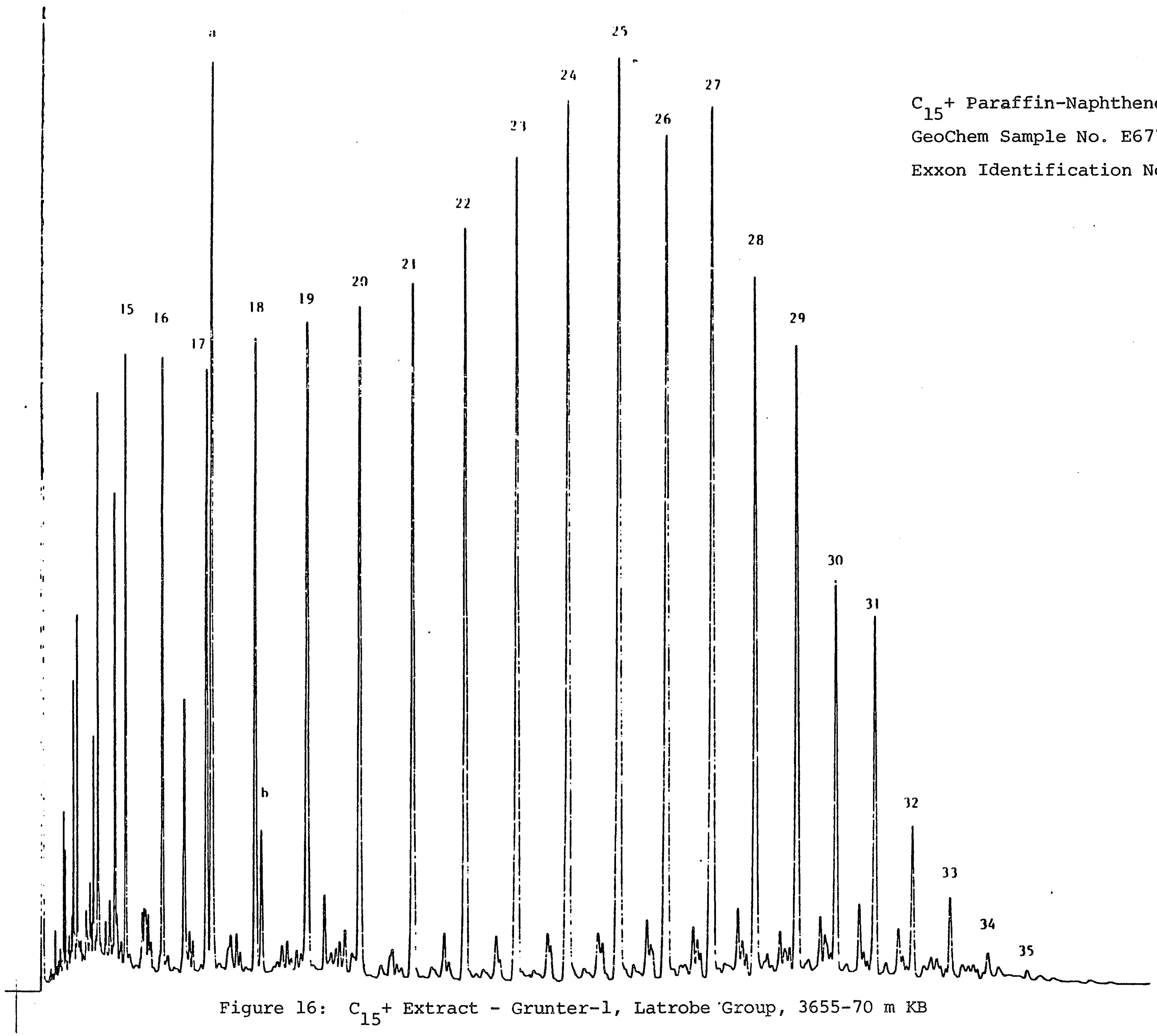


Figure 15: C_{15}+ Chromatogram - Grunter-1, Latrobe Group, 3360-75 m KB



C_{15}+ Paraffin-Naphthene (P-N) Hydrocarbon
GeoChem Sample No. E677-005
Exxon Identification No. 77732-R

Figure 16: C_{15}+ Extract - Grunter-1, Latrobe Group, 3655-70 m KB

C_{15}+ Paraffin-Naphthene (P_N) Hydrocarbon

Geochem Sample No. E677-006

Exxon Identification No. 77733-B

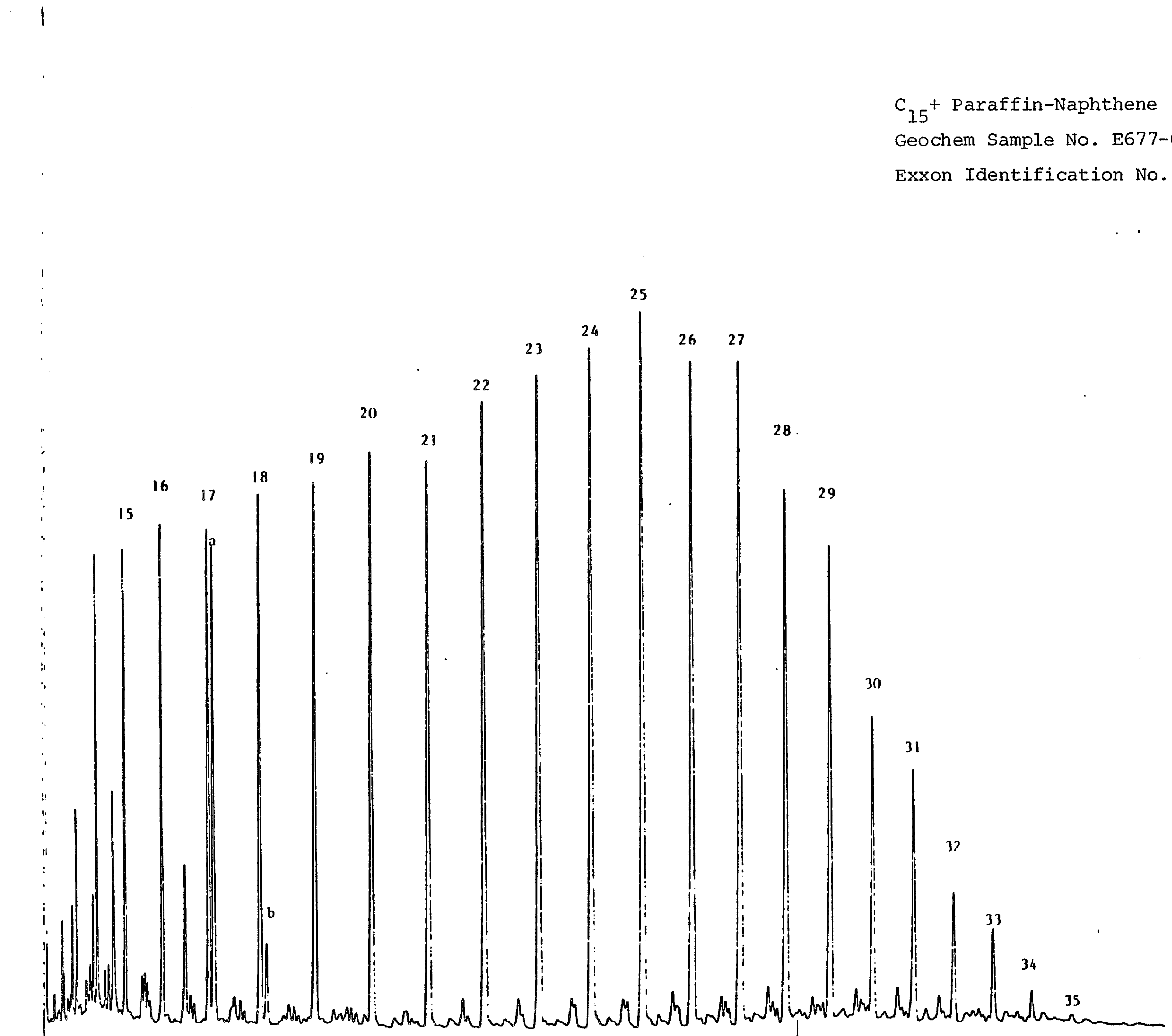


Figure 17: C_{15}+ Extract - Grunter-1, Latrobe Group, 3805-09 m KB

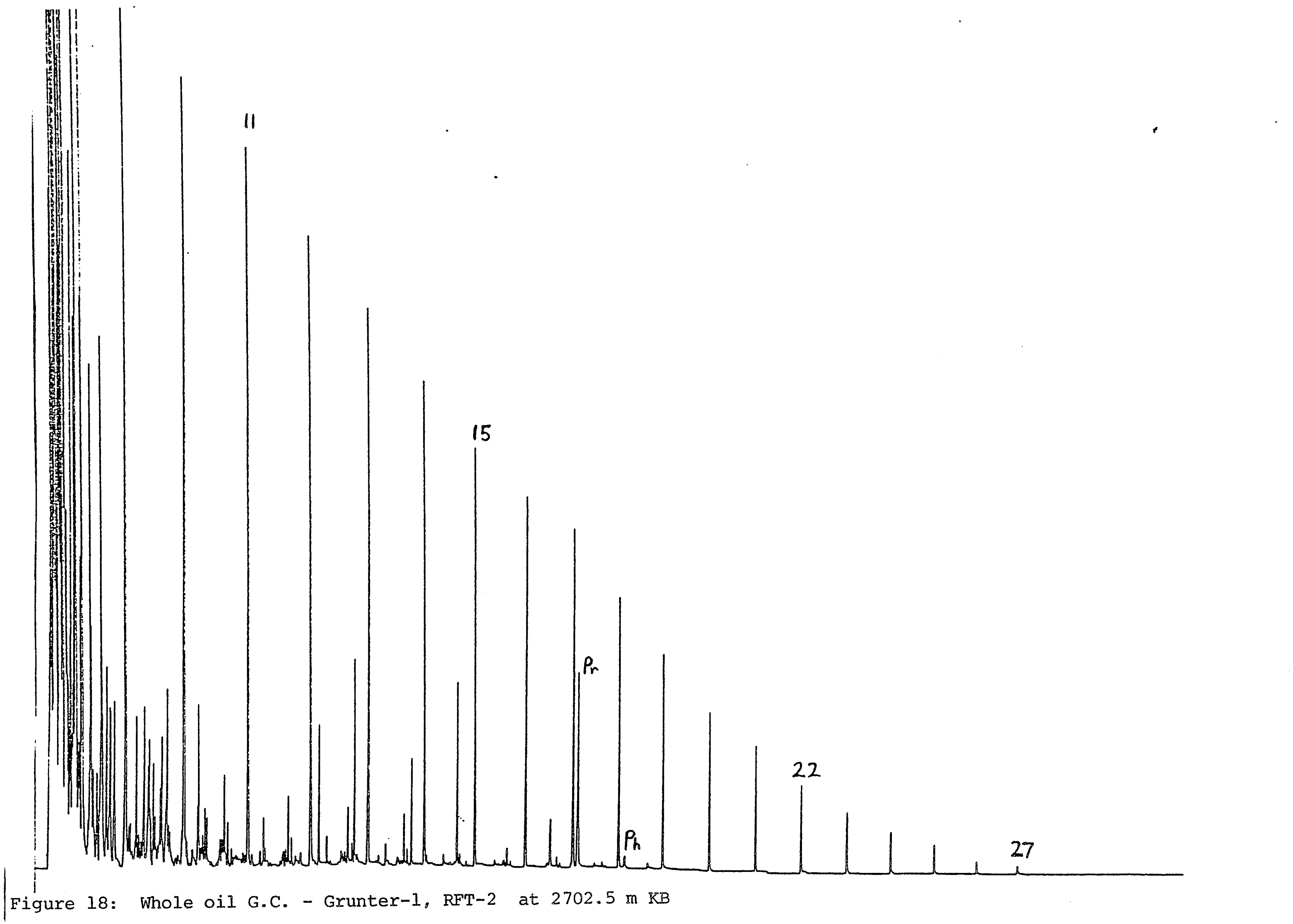


Figure 18: Whole oil G.C. - Grunter-1, RFT-2 at 2702.5 m KB

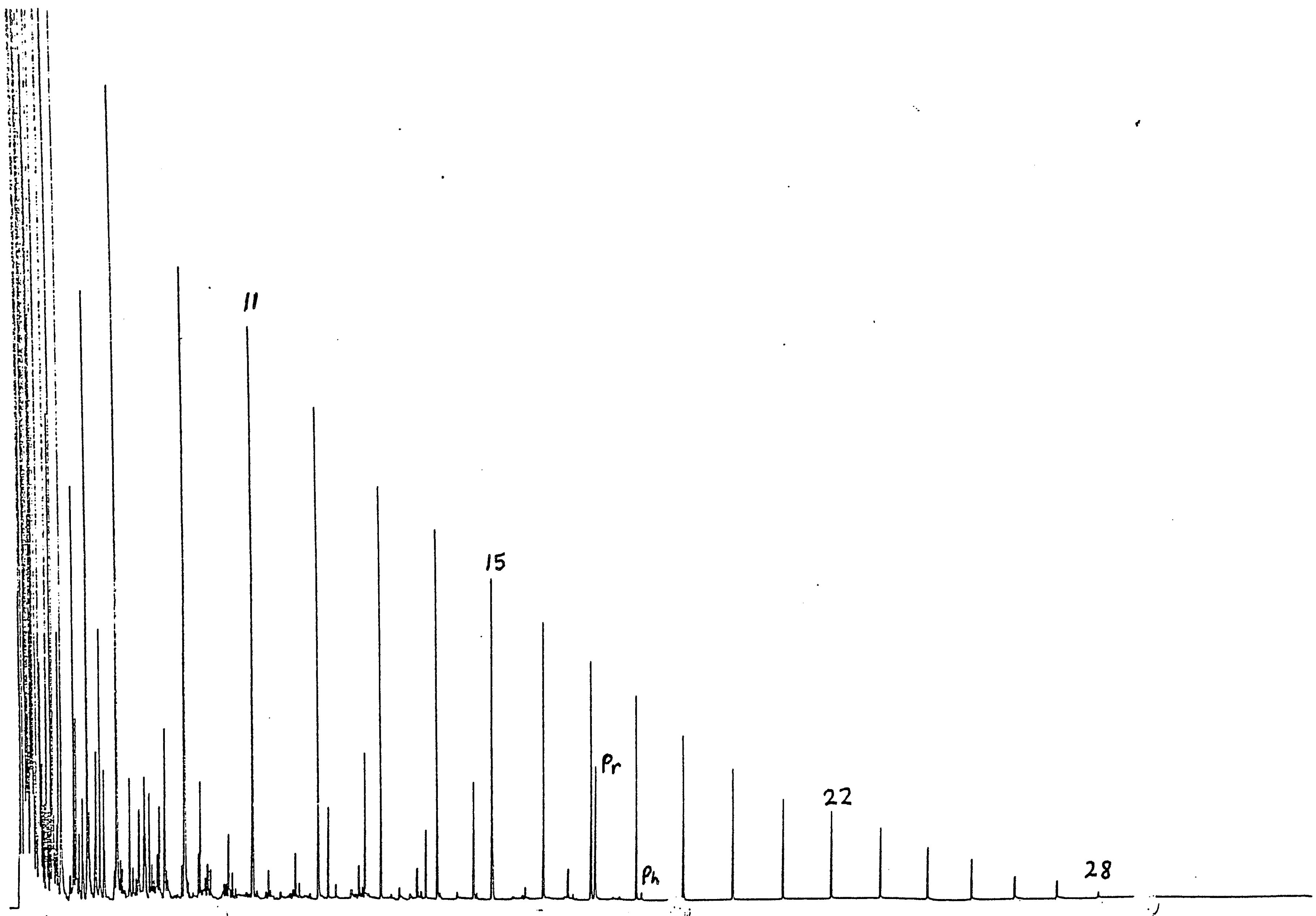


Figure 19: Whole oil G.C. - Grunter-1, RFT-18 at 2861.3 m KB

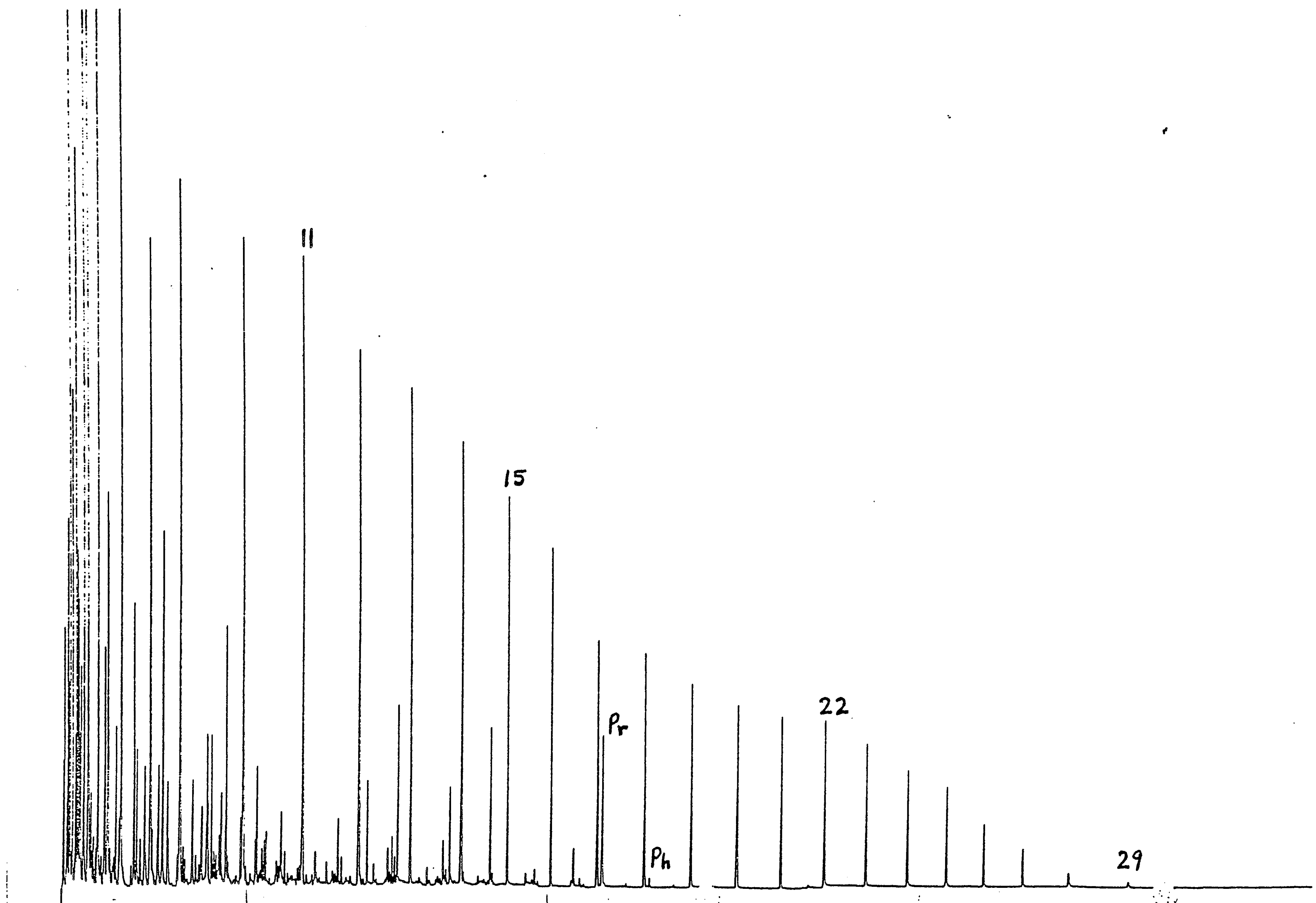


Figure 20: Whole oil G.C. - Grunter-1, RFT-16/83 at 3044.7 m KB

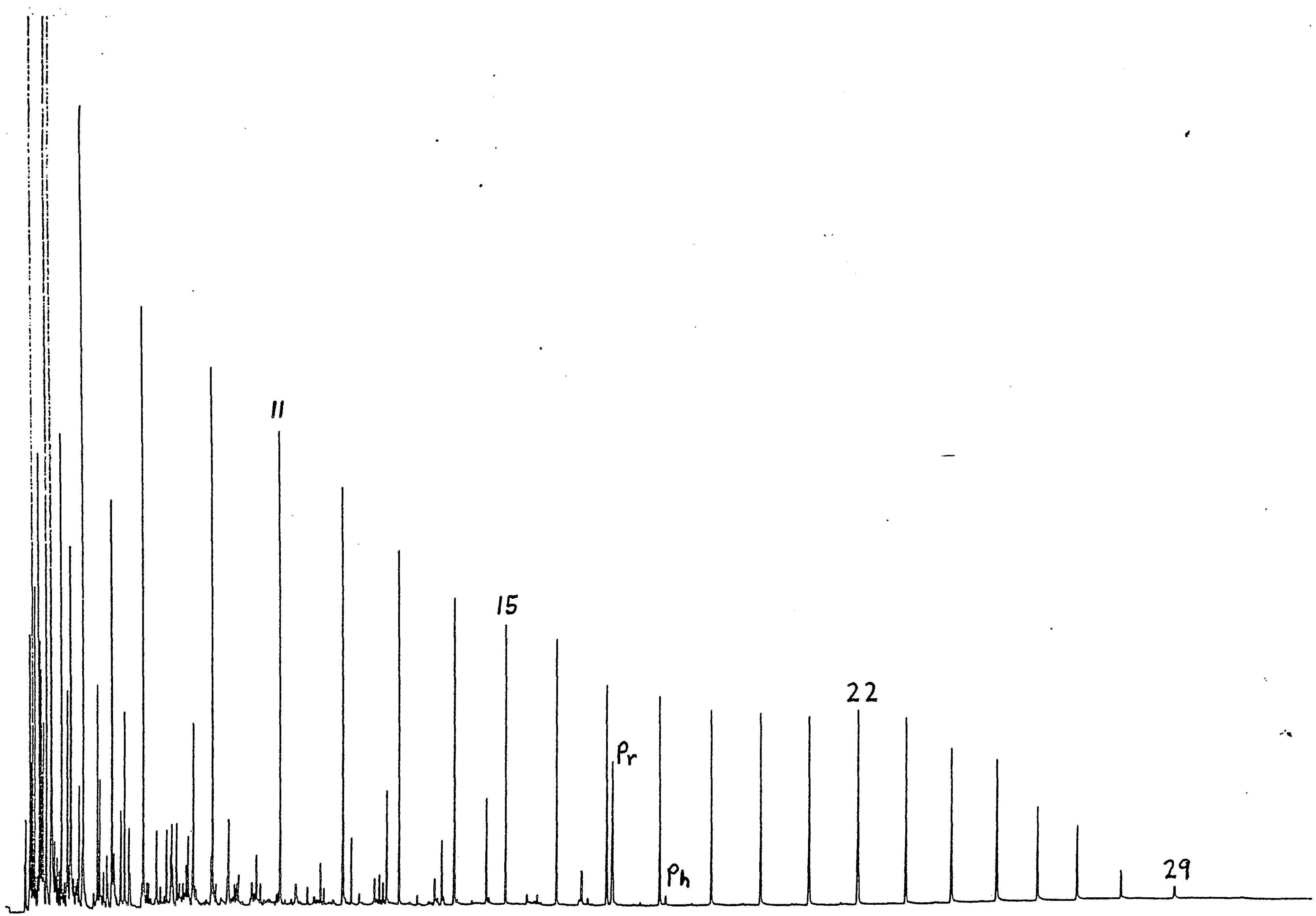


Figure 21: Whole oil G.C. - Grunter-1, RFT-9/62 at 3310.6 m KB

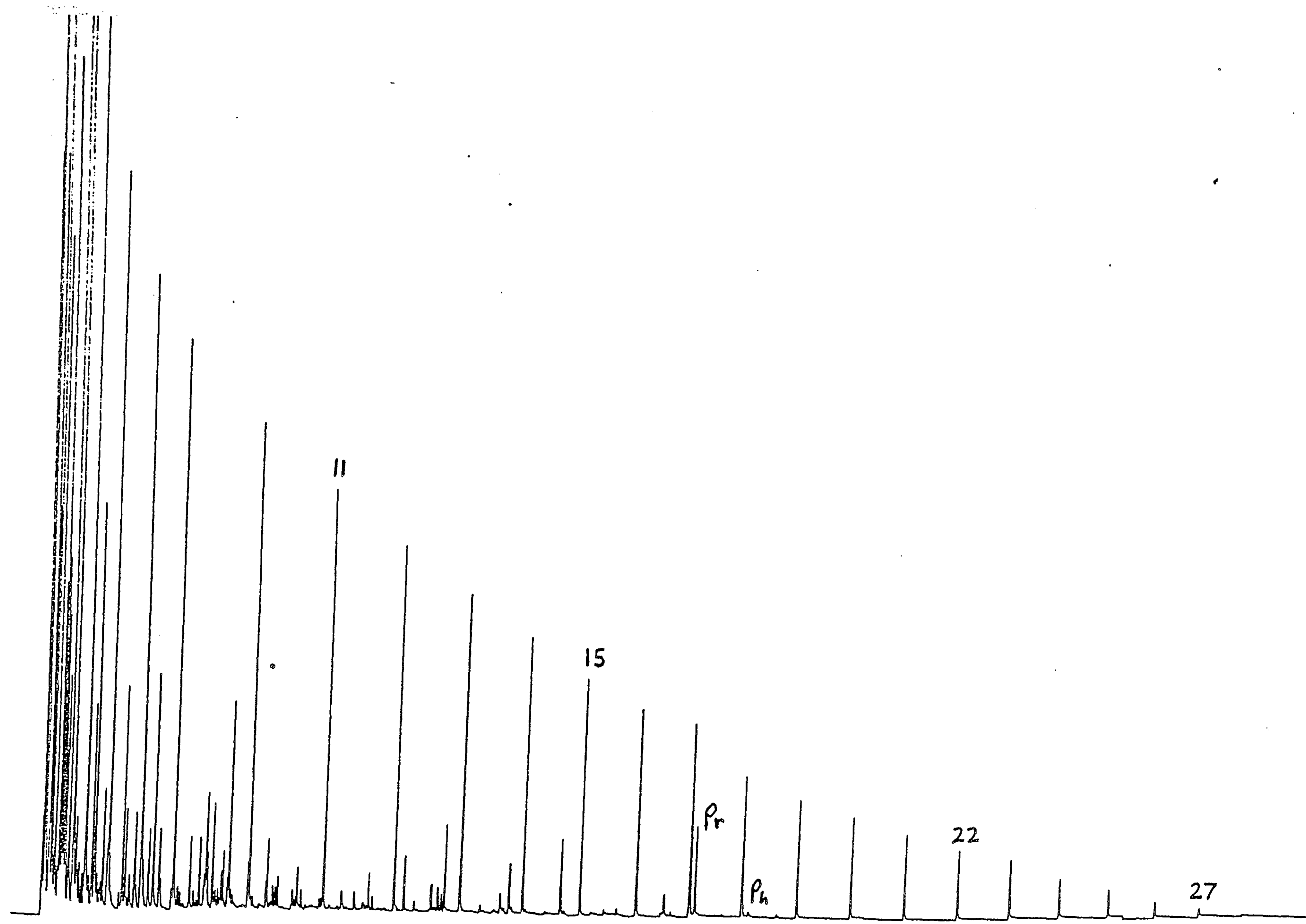


Figure 22: Whole oil G.C. - Grunter-1, RFT-17/84 at 3053.1 m KB

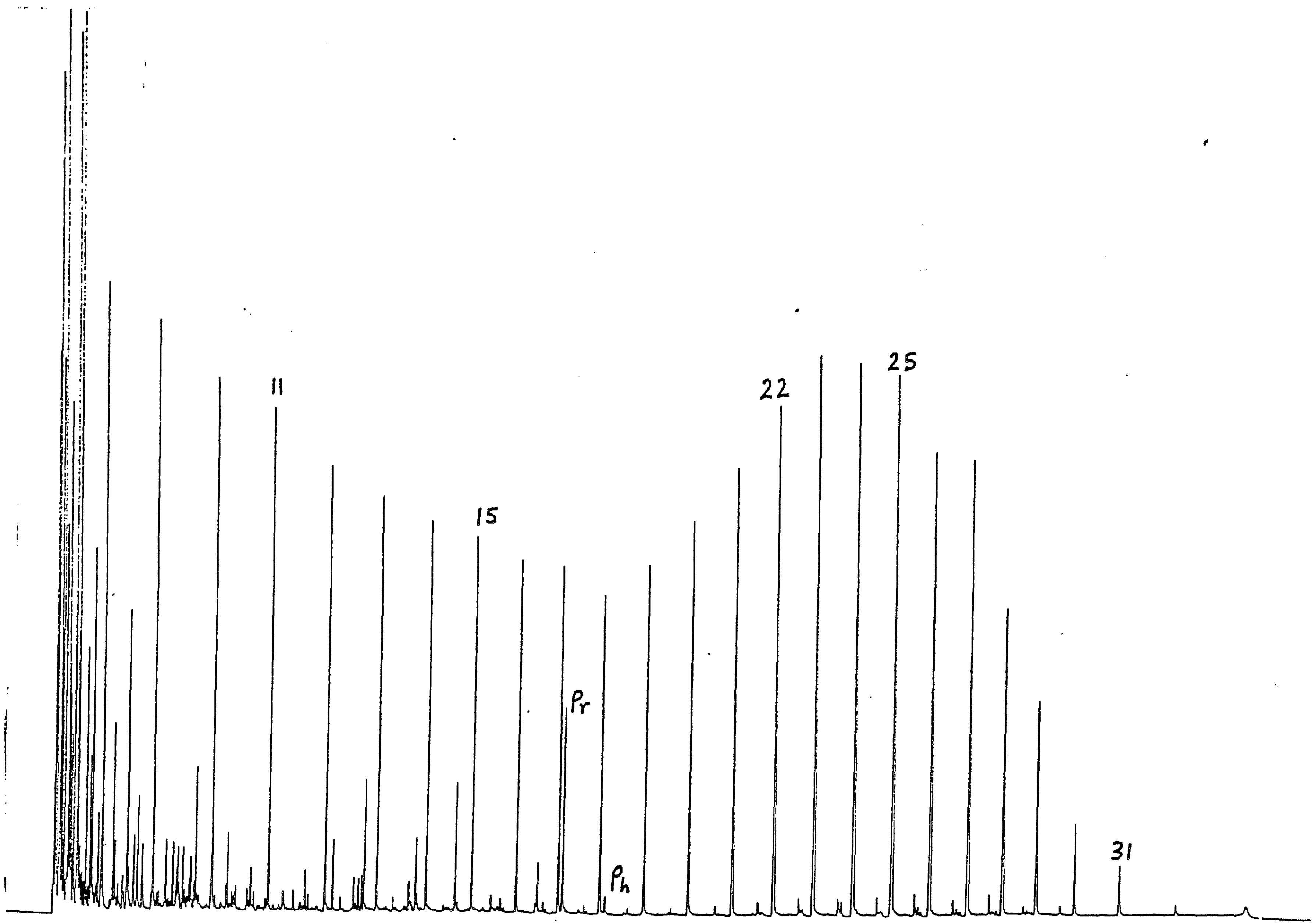


Figure 23. Whole oil G.C. - Grunter-1, RFT-10/63 at 3328.8 m KB

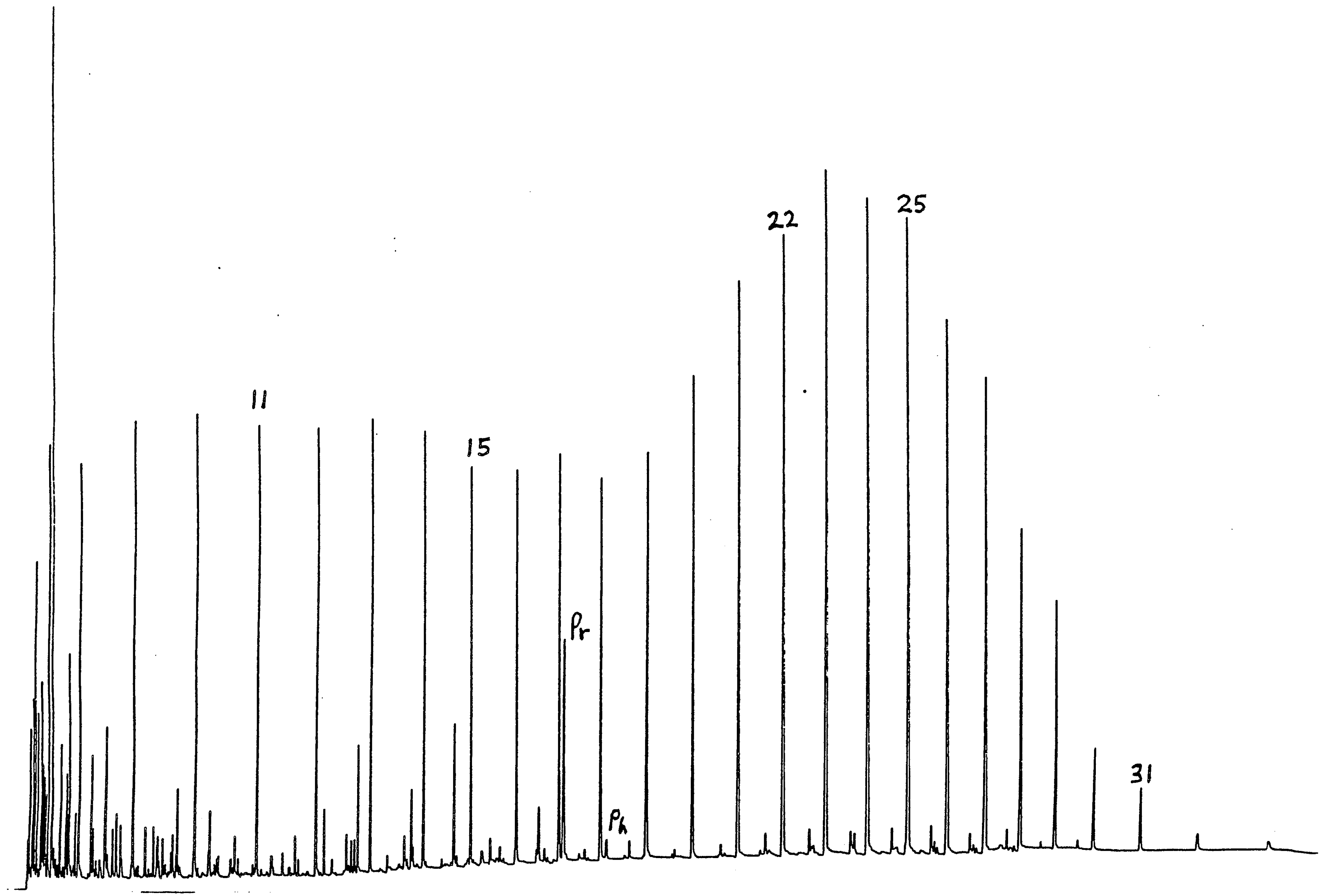


Figure 24: Whole oil G.C. - Grunter-1, RFT 6/50 at 3353 m KB

APPENDIX 1

Detailed C_{4-7} Data Sheets

1962L:8

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77725 B DEPTH(M) = 330.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	42.2	23.75	3-EPENT	.0	.00
IBUTANE	5.6	3.15	224-TMP	.0	.00
NBUTANE	42.9	24.14	NHEPTANE	14.6	8.22
IPENTANE	15.4	8.67	1C2-DMCP	.0	.00
NPENTANE	2.1	1.18	MCH	.0	.00
22-DMB	19.9	11.20			
CPENTANE	.0	.00			
23-DMB	.0	.00			
2-MP	3.0	1.69			
3-MP	3.5	1.97			
NHEXANE	11.6	6.53			
MCP	.0	.00			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	16.9	9.51			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT
ALL COMP	178.	
GASOLINE	135.	
NAPTHENES	0.	.00
C6-7	43.	31.81

SIG COMP RATIOS

C1/C2	16.90
A /D2	26.20
C1/D2	16.90
CH/MCP	.00
PENT/IPENT	.14

	PPB	NORM PERCENT
MCP	.0	.0
CH	.0	.0
MCH	.0	.0
TOTAL	.0	.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1   SAMPLE NO. = 77725 D   DEPTH(M) = 390.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	23.1	32.77	3-EPENT	.0	.00
IBUTANE	5.2	7.38	224-TMP	.0	.00
NBUTANE	21.1	29.93	NHEPTANE	.0	.00
IPENTANE	17.8	25.25	1C2-DMCP	.0	.00
NPENTANE	.0	.00	MCH	.0	.00
22-DMB	.0	.00			
CPENTANE	.0	.00			
23-DMB	.0	.00			
2-MP	.0	.00			
3-MP	.0	.00			
NHEXANE	3.3	4.68			
MCP	.0	.00			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	.0	.00			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	70.		C1/C2	.00
GASOLINE	47.		A /D2	3.30
NAPTHENES	0.	.00	C1/D2	.00
C6-7	3.	6.96	CH/MCP	.00
			PENT/IPENT	.00

	PPB	NORM PERCENT
MCP	.0	.0
CH	.0	.0
MCH	.0	.0
TOTAL	.0	.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77725 F DEPTH(M) = 450.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	32.6	23.94	3-EPENT	.0	.00
IBUTANE	9.4	6.90	224-TMP	.0	.00
NBUTANE	30.8	22.61	NHEPTANE	.0	.00
IPENTANE	26.2	19.24	1C2-DMCP	.0	.00
NPENTANE	.0	.00	MCH	.0	.00
22-DMB	18.9	13.88			
CPENTANE	.0	.00			
23-DMB	.0	.00			
2-MP	1.3	.95			
3-MP	1.7	1.25			
NHEXANE	10.5	7.71			
MCP	.0	.00			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	4.8	3.52			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT
ALL COMP	136.	
GASOLINE	104.	
NAPTHENES	0.	.00
C6-7	15.	14.77

SIG COMP RATIOS	
C1/C2	4.80
A /D2	10.50
C1/D2	4.80
CH/MCP	.00
PENT/IPENT	.00

	PPB	NORM PERCENT
MCP	.0	.0
CH	.0	.0
MCH	.0	.0
TOTAL	.0	.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77725 H DEPTH(M) = 510.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	29.5	31.28	3-EPENT	.0	.00
IBUTANE	.4	.42	224-TMP	.0	.00
NBUTANE	24.6	26.09	NHEPTANE	5.9	6.26
IPENTANE	13.5	14.32	1C2-DMCP	.0	.00
NPENTANE	.1	.11	MCH	.0	.00
22-DMB	8.9	9.44			
CPENTANE	.0	.00			
23-DMB	.0	.00			
2-MP	1.3	1.38			
3-MP	1.7	1.80			
NHEXANE	8.4	8.91			
MCP	.0	.00			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	.0	.00			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	94.		C1/C2	.00
GASOLINE	65.		A /D2	14.30
NAPTHENES	0.	.00	C1/D2	.00
C6-7	14.	22.07	CH/MCP	.00
			PENT/IPENT	.01

	PPB	NORM PERCENT
MCP	.0	.0
CH	.0	.0
MCH	.0	.0
TOTAL	.0	.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77725 J DEPTH(M) = 570.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	34.0	15.59	3-EPENT	.0	.00
IBUTANE	14.7	6.74	224-TMP	.0	.00
NBUTANE	28.9	13.25	NHEPTANE	12.1	5.55
IPENTANE	69.9	32.05	1C2-DMCP	.0	.00
NPENTANE	.2	.09	MCH	7.3	3.35
22-DMB	11.6	5.32			
CPENTANE	.0	.00			
23-DMB	.0	.00			
2-MP	3.9	1.79			
3-MP	3.9	1.79			
NHEXANE	11.8	5.41			
MCP	.0	.00			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	19.8	9.08			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	218.		C1/C2	27.10
GASOLINE	184.		A /D2	23.90
NAPTHENES	7.	3.97	C1/D2	27.10
C6-7	51.	27.70	CH/MCP	.00
			PENT/IPENT	.00

	PPB	NORM PERCENT
MCP	.0	.0
CH	.0	.0
MCH	7.3	100.0
TOTAL	7.3	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77725 N DEPTH(M) = 690.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	27.9	24.58	3-EPENT	.0	.00
IBUTANE	5.1	4.49	224-TMP	.0	.00
NBUTANE	21.6	19.03	NHEPTANE	5.9	5.20
IPENTANE	13.5	11.89	1C2-DMCP	.0	.00
NPENTANE	.0	.00	MCH	.0	.00
22-DMB	9.3	8.19			
CPENTANE	.0	.00			
23-DMB	.0	.00			
2-MP	2.5	2.20			
3-MP	4.4	3.88			
NHEXANE	7.4	6.52			
MCP	.0	.00			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	15.9	14.01			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	113.		C1/C2	15.90
GASOLINE	86.		A /D2	13.30
NAPTHENES	0.	.00	C1/D2	15.90
C6-7	29.	34.11	CH/MCP	.00
			PENT/IPENT	.00

	PPB	NORM PERCENT
MCP	.0	.0
CH	.0	.0
MCH	.0	.0
TOTAL	.0	.0

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ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1
SAMPLE NO. = 77725 P DEPTH(M) = 750.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	33.9	31.53	3-EPENT	.0	.00
IBUTANE	5.1	4.74	224-TMP	.0	.00
NBUTANE	25.4	23.63	NHEPTANE	.0	.00
IPENTANE	21.1	19.63	1C2-DMCP	.0	.00
NPENTANE	.0	.00	MCH	.0	.00
22-DMB	9.8	9.12			
CPENTANE	.0	.00			
23-DMB	.0	.00			
2-MP	3.4	3.16			
3-MP	2.3	2.14			
NHEXANE	6.5	6.05			
MCP	.0	.00			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	.0	.00			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	107.		C1/C2	.00
GASOLINE	74.		A /D2	6.50
NAPTHENES	0.	.00	C1/D2	.00
C6-7	7.	8.83	CH/MCP	.00
			PENT/IPENT	.00

	PPB	NORM PERCENT
MCP	.0	.0
CH	.0	.0
MCH	.0	.0
TOTAL	.0	.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1
SAMPLE NO. = 77725 R DEPTH(M) = 810.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	.0	.00	3-EPENT	.0	.00
IBUTANE	.0	.00	224-TMP	.0	.00
NBUTANE	.0	.00	NHEPTANE	.0	.00
IPENTANE	.0	.00	1C2-DMCP	.0	.00
NPENTANE	.0	.00	MCH	.0	.00
22-DMB	.0	.00			
CPENTANE	.0	.00			
23-DMB	.0	.00			
2-MP	.0	.00			
3-MP	.0	.00			
NHEXANE	.0	.00			
MCP	.0	.00			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	.0	.00			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	0.		C1/C2	.00
GASOLINE	0.		A /D2	.00
NAPTHENES	0.	.00	C1/D2	.00
C6-7	0.	.00	CH/MCP	.00
			PENT/IPENT	.00

	PPB	NORM PERCENT
MCP	.0	.0
CH	.0	.0
MCH	.0	.0
TOTAL	.0	.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77725 T DEPTH(M) = 855.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	33.4	14.12	3-EPENT	.0	.00
IBUTANE	3.0	1.27	224-TMP	.0	.00
NBUTANE	27.1	11.45	NHEPTANE	6.7	2.83
IPENTANE	65.4	27.64	1C2-DMCP	.0	.00
NPENTANE	26.0	10.99	MCH	8.4	3.55
22-DMB	.0	.00			
CPENTANE	.0	.00			
23-DMB	1.4	.59			
2-MP	16.4	6.93			
3-MP	7.4	3.13			
NHEXANE	14.5	6.13			
MCP	8.3	3.51			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	18.6	7.86			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	237.		C1/C2	3.25
GASOLINE	203.		A /D2	21.20
NAPTHENES	17.	8.22	C1/D2	27.00
C6-7	56.	27.81	CH/MCP	.00
			PENT/IPENT	.40

	PPB	NORM PERCENT
MCP	8.3	49.7
CH	.0	.0
MCH	8.4	50.3
TOTAL	16.7	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77725 V DEPTH(M) = 885.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	4.0	1.32
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	54.9	18.09	3-EPENT	.0	.00
IBUTANE	11.0	3.62	224-TMP	.0	.00
NBUTANE	32.5	10.71	NHEPTANE	12.8	4.22
IPENTANE	64.1	21.12	1C2-DMCP	.0	.00
NPENTANE	36.0	11.86	MCH	4.6	1.52
22-DMB	.0	.00			
CPENTANE	.0	.00			
23-DMB	2.0	.66			
2-MP	22.9	7.55			
3-MP	10.3	3.39			
NHEXANE	20.9	6.89			
MCP	9.5	3.13			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	8.2	2.70			
23-DMP	.0	.00			
3-MHEX	5.5	1.81			
1C3-DMCP	4.3	1.42			

	TOTALS PPB	NORM PERCENT
ALL COMP	303.	
GASOLINE	249.	
NAPTHENES	22.	9.01
C6-7	70.	28.08

SIG COMP RATIOS

C1/C2	.72
A /D2	6.13
C1/D2	2.33
CH/MCP	.00
PENT/IPENT	.56

	PPB	NORM PERCENT
MCP	9.5	67.4
CH	.0	.0
MCH	4.6	32.6
TOTAL	14.1	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

BASIN - GIPPSLAND
WELL - GRUNTER 1

REPORT = UNSPEC. ANALYSIS
SAMPLE NO. = 77725 Z DEPTH(M) = 945.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	7.3	1.80
ETHANE	.0		1T2-DMCP	7.7	1.90
PROPANE	31.8	7.84	3-EPENT	.0	.00
IBUTANE	16.6	4.09	224-TMP	.0	.00
NBUTANE	29.9	7.37	NHEPTANE	9.6	2.37
IPENTANE	117.6	28.98	1C2-DMCP	.0	.00
NPENTANE	45.4	11.19	MCH	.0	.00
22-DMB	2.4	.59			
CPENTANE	1.5	.37			
23-DMB	3.7	.91			
2-MP	40.8	10.05			
3-MP	16.4	4.04			
NHEXANE	29.8	7.34			
MCP	15.3	3.77			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	1.2	.30			
CHEXANE	6.0	1.48			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	12.6	3.10			
23-DMP	.0	.00			
3-MHEX	4.3	1.06			
1C3-DMCP	5.9	1.45			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	406.		C1/C2	.51
GASOLINE	374.		A /D2	9.16
NAPTHENES	44.	11.68	C1/D2	4.33
C6-7	100.	26.66	CH/MCP	.39
			PENT/IPENT	.39

	PPB	NORM PERCENT
MCP	15.3	71.8
CH	6.0	28.2
MCH	.0	.0
TOTAL	21.3	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77726 B DEPTH(M) = 975.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	9.9	1.94
ETHANE	.0		1T2-DMCP	13.8	2.71
PROPANE	29.3	5.75	3-EPENT	.0	.00
IBUTANE	11.5	2.25	224-TMP	.0	.00
NBUTANE	26.4	5.18	NHEPTANE	15.2	2.98
IPENTANE	138.5	27.16	1C2-DMCP	.0	.00
NPENTANE	48.2	9.45	MCH	24.9	4.88
22-DMB	3.0	.59			
CPENTANE	2.8	.55			
23-DMB	4.6	.90			
2-MP	44.6	8.75			
3-MP	20.6	4.04			
NHEXANE	34.4	6.75			
MCP	18.2	3.57			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	3.6	.71			
CHEXANE	7.3	1.43			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	28.7	5.63			
23-DMP	4.0	.78			
3-MHEX	7.8	1.53			
1C3-DMCP	12.7	2.49			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	510.		C1/C2	1.12
GASOLINE	481.		A /D2	6.36
NAPTHENES	90.	18.64	C1/D2	7.81
C6-7	180.	37.55	CH/MCP	.40
			PENT/IPENT	.35

	PPB	NORM PERCENT
MCP	18.2	36.1
CH	7.3	14.5
MCH	24.9	49.4
TOTAL	50.4	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

BASIN - GIPPSLAND
WELL - GRUNTER 1

REPORT = UNSPEC. ANALYSIS
SAMPLE NO. = 77726 F   DEPTH(M) = 1035.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	29.8	12.86	3-EPENT	.0	.00
IBUTANE	12.5	5.39	224-TMP	.0	.00
NBUTANE	25.9	11.17	NHEPTANE	.0	.00
IPENTANE	76.3	32.91	1C2-DMCP	.0	.00
NPENTANE	24.2	10.44	MCH	.0	.00
22-DMB	.0	.00			
CPENTANE	.0	.00			
23-DMB	2.7	1.16			
2-MP	25.4	10.96			
3-MP	9.9	4.27			
NHEXANE	19.2	8.28			
MCP	5.9	2.55			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	.0	.00			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	232.		C1/C2	.00
GASOLINE	202.		A /D2	19.20
NAPTHENES	6.	2.92	C1/D2	.00
C6-7	25.	12.43	CH/MCP	.00
			PENT/IPENT	.32

	PPB	NORM PERCENT
MCP	5.9	100.0
CH	.0	.0
MCH	.0	.0
TOTAL	5.9	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77726 J DEPTH(M) = 1095.00

	TOTAL PPB	NORM PERCENT
METHANE	.0	
ETHANE	.0	
PROPANE	30.2	6.09
IBUTANE	9.4	1.90
NBUTANE	24.2	4.88
IPENTANE	118.5	23.90
NPENTANE	38.3	7.72
22-DMB	1.9	.38
CPENTANE	1.6	.32
23-DMB	4.9	.99
2-MP	44.2	8.91
3-MP	18.6	3.75
NHEXANE	37.6	7.58
MCP	31.5	6.35
22-DMP	.0	.00
24-DMP	.0	.00
223-TMB	.0	.00
CHEXANE	4.6	.93
33-DMP	.0	.00
11-DMCP	.0	.00
2-MHEX	23.4	4.72
23-DMP	4.3	.87
3-MHEX	6.6	1.33
1C3-DMCP	16.2	3.27
1T3-DMCP	16.2	3.27
1T2-DMCP	19.7	3.97
3-EPENT	.0	.00
224-TMP	.0	.00
NHEPTANE	17.3	3.49
1C2-DMCP	.0	.00
MCH	26.6	5.37

	TOTALS PPB	NORM PERCENT
ALL COMP	496.	
GASOLINE	466.	
NAPTHENES	116.	25.00
C6-7	204.	43.81

SIG COMP RATIOS	
C1/C2	.65
A /D2	8.32
C1/D2	8.27
CH/MCP	.15
PENT/IPENT	.32

	PPB	NORM PERCENT
MCP	31.5	50.2
CH	4.6	7.3
MCH	26.6	42.4
TOTAL	62.7	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN = GIPPSLAND
WELL = GRUNTER 1
SAMPLE NO. = 77726 N   DEPTH(M) = 1155.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	14.8	1.69
ETHANE	.0		1T2-DMCP	12.9	1.47
PROPANE	27.7	3.16	3-EPENT	.0	.00
IBUTANE	41.7	4.75	224-TMP	.0	.00
NBUTANE	52.4	5.97	NHEPTANE	27.0	3.08
IPENTANE	318.1	36.25	1C2-DMCP	.0	.00
NPENTANE	79.6	9.07	MCH	23.9	2.72
22-DMB	5.5	.63			
CPENTANE	6.2	.71			
23-DMB	8.0	.91			
2-MP	72.7	8.29			
3-MP	27.6	3.15			
NHEXANE	53.9	6.14			
MCP	51.5	5.87			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	8.1	.92			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	19.2	2.19			
23-DMP	5.2	.59			
3-MHEX	8.0	.91			
1C3-DMCP	13.4	1.53			

	TOTALS PPB	NORM PERCENT
ALL COMP	877.	
GASOLINE	850.	
NAPTHENES	131.	15.39
C6-7	238.	28.00

SIG COMP RATIOS

C1/C2	.55
A /D2	10.11
C1/D2	6.40
CH/MCP	.16
PENT/IPENT	.25

	PPB	NORM PERCENT
MCP	51.5	61.7
CH	8.1	9.7
MCH	23.9	28.6
TOTAL	83.5	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

BASIN - GIPPSLAND
WELL - GRUNTER 1

REPORT = UNSPEC. ANALYSIS
SAMPLE NO. = 77726 R DEPTH(M) = 1215.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	10.7	1.75
ETHANE	.0		1T2-DMCP	7.4	1.21
PROPANE	30.6	5.00	3-EPENT	.0	.00
IBUTANE	25.5	4.17	224-TMP	.0	.00
NBUTANE	49.5	8.09	NHEPTANE	24.3	3.97
IPENTANE	194.2	31.73	1C2-DMCP	.0	.00
NPENTANE	50.5	8.25	MCH	13.4	2.19
22-DMB	2.3	.38			
CPENTANE	4.7	.77			
23-DMB	5.5	.90			
2-MP	54.7	8.94			
3-MP	22.0	3.59			
NHEXANE	42.7	6.98			
MCP	34.9	5.70			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	7.4	1.21			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	13.5	2.21			
23-DMP	2.7	.44			
3-MHEX	7.1	1.16			
1C3-DMCP	8.5	1.39			

	TOTALS PPB	NORM PERCENT
ALL COMP	612.	
GASOLINE	581.	
NAPTHENES	87.	14.96
C6-7	173.	29.68

SIG COMP RATIOS

C1/C2	.56
A /D2	9.44
C1/D2	4.83
CH/MCP	.21
PENT/IPENT	.26

	PPB	NORM PERCENT
MCP	34.9	62.7
CH	7.4	13.3
MCH	13.4	24.1
TOTAL	55.7	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1
SAMPLE NO. = 77726 T DEPTH(M) = 1245.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	8.1	1.69
ETHANE	.0		1T2-DMCP	5.9	1.23
PROPANE	26.3	5.50	3-EPENT	.0	.00
IBUTANE	18.2	3.81	224-TMP	.0	.00
NBUTANE	33.5	7.00	NHEPTANE	24.7	5.16
IPENTANE	130.9	27.37	1C2-DMCP	.0	.00
NPENTANE	40.4	8.45	MCH	17.5	3.66
22-DMB	.0	.00			
CPENTANE	3.0	.63			
23-DMB	4.2	.88			
2-MP	44.8	9.37			
3-MP	16.7	3.49			
NHEXANE	36.3	7.59			
MCP	29.6	6.19			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	5.6	1.17			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	14.5	3.03			
23-DMP	3.3	.69			
3-MHEX	6.1	1.28			
1C3-DMCP	8.7	1.82			

	TOTALS PPB	NORM PERCENT
ALL COMP	478.	
GASOLINE	452.	
NAPTHENES	78.	17.35
C6-7	160.	35.46

SIG COMP RATIOS

C1/C2	.72
A /D2	10.00
C1/D2	6.16
CH/MCP	.19
PENT/IPENT	.31

	PPB	NORM PERCENT
MCP	29.6	56.2
CH	5.6	10.6
MCH	17.5	33.2
TOTAL	52.7	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77726 X DEPTH(M) = 1305.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	13.5	2.17
ETHANE	.0		1T2-DMCP	10.5	1.69
PROPANE	31.3	5.03	3-EPENT	.0	.00
IBUTANE	30.7	4.94	224-TMP	.0	.00
NBUTANE	34.9	5.61	NHEPTANE	26.8	4.31
IPENTANE	169.8	27.30	1C2-DMCP	5.5	.88
NPENTANE	45.4	7.30	MCH	26.3	4.23
22-DMB	.0	.00			
CPENTANE	3.8	.61			
23-DMB	5.7	.92			
2-MP	52.4	8.42			
3-MP	21.1	3.39			
NHEXANE	42.5	6.83			
MCP	52.9	8.50			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	5.2	.84			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	16.7	2.68			
23-DMP	5.0	.80			
3-MHEX	8.6	1.38			
1C3-DMCP	13.4	2.15			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	622.		C1/C2	.50
GASOLINE	591.		A /D2	8.06
NAPTHENES	131.	22.19	C1/D2	5.60
C6-7	227.	38.41	CH/MCP	.10
			PENT/IPENT	.27

	PPB	NORM PERCENT
MCP	52.9	62.7
CH	5.2	6.2
MCH	26.3	31.2
TOTAL	84.4	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77727 B DEPTH(M) = 1365.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	20.6	2.87	3-EPENT	.0	.00
IBUTANE	19.3	2.69	224-TMP	.0	.00
NBUTANE	35.1	4.89	NHEPTANE	28.3	3.94
IPENTANE	321.0	44.70	1C2-DMCP	.0	.00
NPENTANE	54.9	7.65	MCH	33.4	4.65
22-DMB	.0	.00			
CPENTANE	4.8	.67			
23-DMB	6.2	.86			
2-MP	74.8	10.42			
3-MP	25.8	3.59			
NHEXANE	45.8	6.38			
MCP	48.1	6.70			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	.0	.00			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	718.		C1/C2	.69
GASOLINE	697.		A /D2	74.10
NAPTHENES	86.	12.37	C1/D2	33.40
C6-7	156.	22.31	CH/MCP	.00
			PENT/IPENT	.17

	PPB	NORM PERCENT
MCP	48.1	59.0
CH	.0	.0
MCH	33.4	41.0
TOTAL	81.5	100.0

27/08/85

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C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77727 F DEPTH(M) = 1425.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	21.5	8.48	3-EPENT	.0	.00
IBUTANE	5.6	2.21	224-TMP	.0	.00
NBUTANE	16.8	6.63	NHEPTANE	21.0	8.29
IPENTANE	52.1	20.56	1C2-DMCP	.0	.00
NPENTANE	18.9	7.46	MCH	16.7	6.59
22-DMB	.0	.00			
CPENTANE	.0	.00			
23-DMB	1.6	.63			
2-MP	26.2	10.34			
3-MP	12.9	5.09			
NHEXANE	28.7	11.33			
MCP	16.6	6.55			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	4.0	1.58			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	10.8	4.26			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT
ALL COMP	253.	
GASOLINE	232.	
NAPTHENES	37.	16.08
C6-7	98.	42.17

SIG COMP RATIOS

C1/C2	1.90
A /D2	49.70
C1/D2	31.50
CH/MCP	.24
PENT/IPENT	.36

	PPB	NORM PERCENT
MCP	16.6	44.5
CH	4.0	10.7
MCH	16.7	44.8
TOTAL	37.3	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77727 J DEPTH(M) = 1485.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	7.1	1.76
ETHANE	.0		1T2-DMCP	5.2	1.29
PROPANE	41.0	10.18	3-EPENT	.0	.00
IBUTANE	5.6	1.39	224-TMP	.0	.00
NBUTANE	28.7	7.13	NHEPTANE	25.4	6.31
IPENTANE	66.3	16.46	1C2-DMCP	.0	.00
NPENTANE	27.9	6.93	MCH	25.0	6.21
22-DMB	.0	.00			
CPENTANE	.9	.22			
23-DMB	3.8	.94			
2-MP	42.0	10.43			
3-MP	17.1	4.25			
NHEXANE	32.3	8.02			
MCP	28.0	6.95			
22-DMP	.0	.00			
24-DMP	1.3	.32			
223-TMB	.0	.00			
CHEXANE	4.0	.99			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	13.7	3.40			
23-DMP	5.2	1.29			
3-MHEX	13.1	3.25			
1C3-DMCP	9.1	2.26			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	403.		C1/C2	.86
GASOLINE	362.		A /D2	4.40
NAPTHENES	79.	21.92	C1/D2	3.26
C6-7	169.	46.83	CH/MCP	.14
			PENT/IPENT	.42

	PPB	NORM PERCENT
MCP	28.0	49.1
CH	4.0	7.0
MCH	25.0	43.9
TOTAL	57.0	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO. = 77727 N   DEPTH(M) = 1545.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	11.0	2.08
ETHANE	.0		1T2-DMCP	10.1	1.91
PROPANE	26.4	4.99	3-EPENT	.0	.00
IBUTANE	7.2	1.36	224-TMP	.0	.00
NBUTANE	25.7	4.86	NHEPTANE	25.5	4.82
IPENTANE	100.8	19.07	1C2-DMCP	5.9	1.12
NPENTANE	30.1	5.69	MCH	52.6	9.95
22-DMB	.0	.00			
CPENTANE	1.4	.26			
23-DMB	5.9	1.12			
2-MP	53.4	10.10			
3-MP	22.3	4.22			
NHEXANE	28.7	5.43			
MCP	38.3	7.24			
22-DMP	.0	.00			
24-DMP	2.8	.53			
223-TMB	.0	.00			
CHEXANE	5.6	1.06			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	32.1	6.07			
23-DMP	10.1	1.91			
3-MHEX	15.6	2.95			
1C3-DMCP	17.2	3.25			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	529.		C1/C2	1.09
GASOLINE	502.		A /D2	3.47
NAPTHENES	142.	28.29	C1/D2	5.79
C6-7	255.	50.87	CH/MCP	.15
			PENT/IPENT	.30

	PPB	NORM PERCENT
MCP	38.3	39.7
CH	5.6	5.8
MCH	52.6	54.5
TOTAL	96.5	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1   SAMPLE NO. = 77727 R   DEPTH(M) = 1605.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	28.3	13.43	3-EPENT	.0	.00
IBUTANE	8.0	3.80	224-TMP	.0	.00
NBUTANE	17.5	8.30	NHEPTANE	10.3	4.89
IPENTANE	42.2	20.02	1C2-DMCP	.0	.00
NPENTANE	18.1	8.59	MCH	6.7	3.18
22-DMB	.0	.00			
CPENTANE	.0	.00			
23-DMB	2.1	1.00			
2-MP	24.6	11.67			
3-MP	10.3	4.89			
NHEXANE	18.0	8.54			
MCP	12.8	6.07			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	4.3	2.04			
23-DMP	2.5	1.19			
3-MHEX	5.1	2.42			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	211.		C1/C2	.86
GASOLINE	182.		A /D2	5.55
NAPTHENES	20.	10.68	C1/D2	2.16
C6-7	60.	32.71	CH/MCP	.00
			PENT/IPENT	.43

	PPB	NORM PERCENT
MCP	12.8	65.6
CH	.0	.0
MCH	6.7	34.4
TOTAL	19.5	100.0

27/08/85

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C4-C7 HYDROCARBON ANALYSES

BASIN - GIPPSLAND
WELL - GRUNTER 1

REPORT = UNSPEC. ANALYSIS
SAMPLE NO. = 77727 V   DEPTH(M) = 1665.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	22.3	9.01	3-EPENT	.0	.00
IBUTANE	9.2	3.72	224-TMP	.0	.00
NBUTANE	13.9	5.62	NHEPTANE	.0	.00
IPENTANE	52.1	21.06	1C2-DMCP	.0	.00
NPENTANE	21.1	8.53	MCH	22.5	9.09
22-DMB	.0	.00			
CPENTANE	1.1	.44			
23-DMB	3.3	1.33			
2-MP	30.1	12.17			
3-MP	10.7	4.32			
NHEXANE	18.9	7.64			
MCP	14.1	5.70			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	3.1	1.25			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	12.8	5.17			
23-DMP	4.1	1.66			
3-MHEX	4.1	1.66			
1C3-DMCP	4.0	1.62			

	TOTALS PPB	NORM PERCENT
ALL COMP	247.	
GASOLINE	225.	
NAPTHENES	45.	19.90
C6-7	84.	37.14

SIG COMP RATIOS

C1/C2	2.12
A /D2	4.61
C1/D2	9.37
CH/MCP	.22
PENT/IPENT	.40

	PPB	NORM PERCENT
MCP	14.1	35.5
CH	3.1	7.8
MCH	22.5	56.7
TOTAL	39.7	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1
SAMPLE NO. = 77727 Z   DEPTH(M) = 1725.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	4.9	2.00
ETHANE	.0		1T2-DMCP	2.4	.98
PROPANE	29.3	11.98	3-EPENT	.0	.00
IBUTANE	3.5	1.43	224-TMP	.0	.00
NBUTANE	15.3	6.26	NHEPTANE	23.6	9.65
IPENTANE	27.7	11.32	1C2-DMCP	.0	.00
NPENTANE	19.2	7.85	MCH	22.9	9.36
22-DMB	.0	.00			
CPENTANE	.8	.33			
23-DMB	.0	.00			
2-MP	16.9	6.91			
3-MP	6.9	2.82			
NHEXANE	16.6	6.79			
MCP	9.7	3.97			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	2.6	1.06			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	30.2	12.35			
23-DMP	3.2	1.31			
3-MHEX	4.3	1.76			
1C3-DMCP	4.6	1.88			

	TOTALS PPB	NORM PERCENT
ALL COMP	245.	
GASOLINE	215.	
NAPTHENES	48.	22.25
C6-7	125.	58.06

SIG COMP RATIOS

C1/C2	2.58
A /D2	9.35
C1/D2	12.95
CH/MCP	.27
PENT/IPENT	.69

	PPB	NORM PERCENT
MCP	9.7	27.6
CH	2.6	7.4
MCH	22.9	65.1
TOTAL	35.2	100.0

27/08/85 ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77728 D DEPTH(M) = 1785.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	24.5	19.73	3-EPENT	.0	.00
IBUTANE	5.1	4.11	224-TMP	.0	.00
NBUTANE	16.3	13.12	NHEPTANE	9.1	7.33
IPENTANE	21.2	17.07	1C2-DMCP	.0	.00
NPENTANE	10.4	8.37	MCH	6.2	4.99
22-DMB	.0	.00			
CPENTANE	.0	.00			
23-DMB	.0	.00			
2-MP	9.8	7.89			
3-MP	4.0	3.22			
NHEXANE	12.5	10.06			
MCP	5.1	4.11			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	.0	.00			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT
ALL COMP	124.	
GASOLINE	100.	
NAPTHENES	11.	11.33
C6-7	33.	33.00

SIG COMP RATIOS

C1/C2	1.22
A /D2	21.60
C1/D2	6.20
CH/MCP	.00
PENT/IPENT	.49

	PPB	NORM PERCENT
MCP	5.1	45.1
CH	.0	.0
MCH	6.2	54.9
TOTAL	11.3	100.0

27/08/85

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C4-C7 HYDROCARBON ANALYSES

BASIN - GIPPSLAND
WELL - GRUNTER 1

REPORT = UNSPEC. ANALYSIS
SAMPLE NO. = 77728 H   DEPTH(M) = 1845.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	5.6	.80
ETHANE	.0		1T2-DMCP	7.4	1.06
PROPANE	20.3	2.90	3-EPENT	.0	.00
IBUTANE	25.6	3.66	224-TMP	.0	.00
NBUTANE	59.4	8.49	NHEPTANE	37.0	5.29
IPENTANE	91.7	13.10	1C2-DMCP	.0	.00
NPENTANE	100.6	14.37	MCH	63.8	9.12
22-DMB	.9	.13			
CPENTANE	7.7	1.10			
23-DMB	8.6	1.23			
2-MP	51.1	7.30			
3-MP	25.9	3.70			
NHEXANE	69.1	9.87			
MCP	45.9	6.56			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	42.3	6.04			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	14.9	2.13			
23-DMP	6.2	.89			
3-MHEX	8.4	1.20			
1C3-DMCP	7.5	1.07			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	700.		C1/C2	1.82
GASOLINE	680.		A /D2	12.63
NAPTHENES	180.	26.52	C1/D2	14.40
C6-7	308.	45.34	CH/MCP	.92
			PENT/IPENT	1.10

	PPB	NORM PERCENT
MCP	45.9	30.2
CH	42.3	27.8
MCH	63.8	42.0
TOTAL	152.0	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO. = 77728 J DEPTH(M) = 1875.00

	TOTAL PPB	NORM PERCENT
METHANE	.0	
ETHANE	.0	
PROPANE	21.0	2.33
IBUTANE	24.5	2.72
NBUTANE	60.0	6.66
IPENTANE	134.2	14.89
NPENTANE	148.2	16.44
22-DMB	2.3	.26
CPENTANE	7.6	.84
23-DMB	13.4	1.49
2-MP	88.5	9.82
3-MP	44.3	4.92
NHEXANE	131.2	14.56
MCP	75.4	8.37
22-DMP	.0	.00
24-DMP	1.7	.19
223-TMB	.0	.00
CHEXANE	35.0	3.88
33-DMP	.0	.00
11-DMCP	.0	.00
2-MHEX	18.5	2.05
23-DMP	8.4	.93
3-MHEX	14.0	1.55
1C3-DMCP	9.9	1.10

	TOTAL PPB	NORM PERCENT
1T3-DMCP	5.7	.63
1T2-DMCP	12.7	1.41
3-EPENT	.0	.00
224-TMP	.0	.00
NHEPTANE	27.4	3.04
1C2-DMCP	.0	.00
MCH	17.4	1.93

	TOTALS PPB	NORM PERCENT
ALL COMP	901.	
GASOLINE	880.	
NAPTHENES	164.	18.60
C6-7	357.	40.59

SIG COMP RATIOS

C1/C2	.68
A /D2	11.33
C1/D2	5.06
CH/MCP	.46
PENT/IPENT	1.10

	PPB	NORM PERCENT
MCP	75.4	59.0
CH	35.0	27.4
MCH	17.4	13.6
TOTAL	127.8	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77728 L DEPTH(M) = 1905.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	19.0	1.53
ETHANE	.0		1T2-DMCP	30.2	2.44
PROPANE	28.5	2.30	3-EPENT	.0	.00
IBUTANE	36.1	2.92	224-TMP	.0	.00
NBUTANE	92.2	7.45	NHEPTANE	47.7	3.85
IPENTANE	145.9	11.78	1C2-DMCP	6.9	.56
NPENTANE	153.7	12.41	MCH	147.7	11.93
22-DMB	3.7	.30			
CPENTANE	12.0	.97			
23-DMB	14.7	1.19			
2-MP	78.8	6.36			
3-MP	41.3	3.33			
NHEXANE	99.8	8.06			
MCP	116.1	9.38			
22-DMP	.0	.00			
24-DMP	2.6	.21			
223-TMB	.0	.00			
CHEXANE	75.1	6.06			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	29.0	2.34			
23-DMP	19.2	1.55			
3-MHEX	18.1	1.46			
1C3-DMCP	20.1	1.62			

	TOTALS PPB	NORM PERCENT
ALL COMP	1238.	
GASOLINE	1210.	
NAPTHENES	427.	35.30
C6-7	631.	52.19

SIG COMP RATIOS

C1/C2	1.31
A /D2	8.15
C1/D2	13.91
CH/MCP	.65
PENT/IPENT	1.05

	PPB	NORM PERCENT
MCP	116.1	34.3
CH	75.1	22.2
MCH	147.7	43.6
TOTAL	338.9	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77728 N DEPTH(M) = 1995.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	9.4	1.29
ETHANE	.0		1T2-DMCP	14.4	1.98
PROPANE	29.9	4.11	3-EPENT	.0	.00
IBUTANE	8.4	1.15	224-TMP	.0	.00
NBUTANE	80.1	11.00	NHEPTANE	35.1	4.82
IPENTANE	67.0	9.20	1C2-DMCP	.0	.00
NPENTANE	112.6	15.47	MCH	87.7	12.05
22-DMB	.0	.00			
CPENTANE	4.7	.65			
23-DMB	7.1	.98			
2-MP	44.9	6.17			
3-MP	23.3	3.20			
NHEXANE	64.4	8.85			
MCP	55.8	7.67			
22-DMP	.0	.00			
24-DMP	1.5	.21			
223-TMB	.0	.00			
CHEXANE	34.4	4.73			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	21.2	2.91			
23-DMP	4.9	.67			
3-MHEX	11.4	1.57			
1C3-DMCP	9.7	1.33			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	728.		C1/C2	1.60
GASOLINE	698.		A /D2	8.73
NAPTHENES	216.	30.96	C1/D2	12.57
C6-7	350.	50.13	CH/MCP	.62
			PENT/IPENT	1.68

	PPB	NORM PERCENT
MCP	55.8	31.4
CH	34.4	19.3
MCH	87.7	49.3
TOTAL	177.9	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77728 T DEPTH(M) = 2085.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	996.1	1.58
ETHANE	.0		1T2-DMCP	845.9	1.34
PROPANE	2590.7	4.10	3-EPENT	.0	.00
IBUTANE	3264.2	5.17	224-TMP	.0	.00
NBUTANE	7556.4	11.97	NHEPTANE	1610.4	2.55
IPENTANE	7663.8	12.14	1C2-DMCP	107.5	.17
NPENTANE	7837.3	12.41	MCH	5055.4	8.01
22-DMB	184.1	.29			
CPENTANE	936.0	1.48			
23-DMB	706.6	1.12			
2-MP	4048.7	6.41			
3-MP	2176.8	3.45			
NHEXANE	4588.3	7.27			
MCP	6041.8	9.57			
22-DMP	.0	.00			
24-DMP	110.7	.18			
223-TMB	29.6	.05			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	4617.5	7.31			
23-DMP	685.1	1.08			
3-MHEX	686.6	1.09			
1C3-DMCP	813.0	1.29			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	63152.		C1/C2	1.10
GASOLINE	60562.		A /D2	9.03
NAPTHENES	14796.	24.43	C1/D2	14.09
C6-7	26188.	43.24	CH/MCP	.00
			PENT/IPENT	1.02

	PPB	NORM PERCENT
MCP	6041.8	54.4
CH	.0	.0
MCH	5055.4	45.6
TOTAL	11097.2	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77728 X DEPTH(M) = 2145.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	163.0	1.69
ETHANE	.0		1T2-DMCP	249.8	2.59
PROPANE	238.4	2.47	3-EPENT	.0	.00
IBUTANE	362.6	3.76	224-TMP	.0	.00
NBUTANE	1102.6	11.43	NHEPTANE	139.8	1.45
IPENTANE	1131.8	11.73	1C2-DMCP	23.9	.25
NPENTANE	1271.9	13.19	MCH	1105.6	11.46
22-DMB	24.6	.26			
CPENTANE	120.8	1.25			
23-DMB	105.7	1.10			
2-MP	590.0	6.12			
3-MP	319.6	3.31			
NHEXANE	694.2	7.20			
MCP	925.7	9.60			
22-DMP	.0	.00			
24-DMP	11.7	.12			
223-TMB	.0	.00			
CHEXANE	572.1	5.93			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	102.0	1.06			
23-DMP	84.7	.88			
3-MHEX	137.2	1.42			
1C3-DMCP	168.3	1.74			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	9646.		C1/C2	1.16
GASOLINE	9408.		A /D2	6.08
NAPTHENES	3329.	35.39	C1/D2	12.97
C6-7	4378.	46.54	CH/MCP	.62
			PENT/IPENT	1.12

	PPB	NORM PERCENT
MCP	925.7	35.6
CH	572.1	22.0
MCH	1105.6	42.5
TOTAL	2603.4	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

BASIN - GIPPSLAND
WELL - GRUNTER 1

REPORT = UNSPEC. ANALYSIS
SAMPLE NO. = 77728 Z   DEPTH(M) = 2175.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	117.3	2.13
ETHANE	.0		1T2-DMCP	92.3	1.67
PROPANE	631.3	11.45	3-EPENT	.0	.00
IBUTANE	442.5	8.03	224-TMP	.0	.00
NBUTANE	1120.0	20.32	NHEPTANE	53.5	.97
IPENTANE	618.5	11.22	1C2-DMCP	13.0	.24
NPENTANE	580.6	10.53	MCH	297.3	5.39
22-DMB	4.0	.07			
CPENTANE	92.0	1.67			
23-DMB	38.5	.70			
2-MP	193.6	3.51			
3-MP	121.0	2.20			
NHEXANE	164.0	2.98			
MCP	608.0	11.03			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	175.9	3.19			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	21.1	.38			
23-DMP	.0	.00			
3-MHEX	28.7	.52			
1C3-DMCP	98.3	1.78			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	5511.		C1/C2	.53
GASOLINE	4880.		A /D2	7.58
NAPTHENES	1494.	30.62	C1/D2	17.22
C6-7	1669.	34.21	CH/MCP	.29
			PENT/IPENT	.94

	PPB	NORM PERCENT
MCP	608.0	56.2
CH	175.9	16.3
MCH	297.3	27.5
TOTAL	1081.2	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

BASIN - GIPPSLAND
WELL - GRUNTER 1

REPORT = UNSPEC. ANALYSIS
SAMPLE NO. = 77729 B   DEPTH(M) = 2205.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	78.4	3.17
ETHANE	.0		1T2-DMCP	70.9	2.87
PROPANE	50.8	2.06	3-EPENT	.0	.00
IBUTANE	67.6	2.74	224-TMP	.0	.00
NBUTANE	203.2	8.23	NHEPTANE	50.2	2.03
IPENTANE	253.6	10.27	1C2-DMCP	6.8	.28
NPENTANE	296.9	12.02	MCH	301.4	12.21
22-DMB	5.7	.23			
CPENTANE	32.0	1.30			
23-DMB	25.2	1.02			
2-MP	152.5	6.18			
3-MP	93.6	3.79			
NHEXANE	167.0	6.76			
MCP	298.5	12.09			
22-DMP	.0	.00			
24-DMP	1.6	.06			
223-TMB	.0	.00			
CHEXANE	167.4	6.78			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	27.4	1.11			
23-DMP	26.4	1.07			
3-MHEX	29.6	1.20			
1C3-DMCP	62.6	2.54			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	2469.		C1/C2	.96
GASOLINE	2418.		A /D2	7.34
NAPTHENES	1018.	42.09	C1/D2	16.76
C6-7	1288.	53.26	CH/MCP	.56
			PENT/IPENT	1.17

	PPB	NORM PERCENT
MCP	298.5	38.9
CH	167.4	21.8
MCH	301.4	39.3
TOTAL	767.3	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

BASIN - GIPPSLAND
WELL - GRUNTER 1

REPORT = UNSPEC. ANALYSIS
SAMPLE NO. = 77729 F DEPTH(M) = 2265.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	237.7	1.47
ETHANE	.0		1T2-DMCP	528.9	3.26
PROPANE	118.6	.73	3-EPENT	.0	.00
IBUTANE	583.6	3.60	224-TMP	.0	.00
NBUTANE	2350.9	14.51	NHEPTANE	279.5	1.72
IPENTANE	2224.1	13.72	1C2-DMCP	46.3	.29
NPENTANE	2037.4	12.57	MCH	1935.6	11.94
22-DMB	36.9	.23			
CPENTANE	232.5	1.43			
23-DMB	158.2	.98			
2-MP	779.4	4.81			
3-MP	484.0	2.99			
NHEXANE	519.9	3.21			
MCP	1814.9	11.20			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	976.8	6.03			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	139.4	.86			
23-DMP	111.9	.69			
3-MHEX	355.3	2.19			
1C3-DMCP	255.7	1.58			

	TOTALS PPB	NORM PERCENT
ALL COMP	16207.	
GASOLINE	16089.	
NAPTHENES	6028.	37.47
C6-7	7202.	44.76

SIG COMP RATIOS

C1/C2	1.06
A /D2	2.25
C1/D2	8.59
CH/MCP	.54
PENT/IPENT	.92

	PPB	NORM PERCENT
MCP	1814.9	38.4
CH	976.8	20.7
MCH	1935.6	40.9
TOTAL	4727.3	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77729 H DEPTH(M) = 2295.00

	TOTAL PPB	NORM PERCENT
METHANE	.0	
ETHANE	.0	
PROPANE	74.3	1.51
IBUTANE	281.5	5.74
NBUTANE	726.6	14.81
IPENTANE	671.8	13.70
NPENTANE	526.6	10.74
22-DMB	10.6	.22
CPENTANE	76.6	1.56
23-DMB	51.8	1.06
2-MP	219.9	4.48
3-MP	154.1	3.14
NHEXANE	134.7	2.75
MCP	601.0	12.25
22-DMP	.0	.00
24-DMP	.0	.00
223-TMB	.0	.00
CHEXANE	235.3	4.80
33-DMP	.0	.00
11-DMCP	.0	.00
2-MHEX	25.0	.51
23-DMP	42.0	.86
3-MHEX	69.1	1.41
1C3-DMCP	122.1	2.49
1T3-DMCP	116.1	2.37
1T2-DMCP	214.9	4.38
3-EPENT	.0	.00
224-TMP	.0	.00
NHEPTANE	61.7	1.26
1C2-DMCP	20.7	.42
MCH	468.1	9.54

	TOTALS PPB	NORM PERCENT
ALL COMP	4904.	
GASOLINE	4830.	
NAPTHENES	1855.	38.40
C6-7	2111.	43.70

SIG COMP RATIOS

C1/C2	.68
A /D2	2.84
C1/D2	10.54
CH/MCP	.39
PENT/IPENT	.78

	PPB	NORM PERCENT
MCP	601.0	46.1
CH	235.3	18.0
MCH	468.1	35.9
TOTAL	1304.4	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77729 J DEPTH(M) = 2325.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	115.9	.52
ETHANE	.0		1T2-DMCP	197.7	.88
PROPANE	2301.7	10.24	3-EPENT	.0	.00
IBUTANE	2323.5	10.34	224-TMP	.0	.00
NBUTANE	5605.8	24.95	NHEPTANE	80.9	.36
IPENTANE	3253.6	14.48	1C2-DMCP	17.5	.08
NPENTANE	3450.4	15.35	MCH	509.6	2.27
22-DMB	24.2	.11			
CPENTANE	342.8	1.53			
23-DMB	148.5	.66			
2-MP	751.6	3.34			
3-MP	364.5	1.62			
NHEXANE	605.1	2.69			
MCP	1339.0	5.96			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	727.9	3.24			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	32.9	.15			
23-DMP	57.1	.25			
3-MHEX	57.1	.25			
1C3-DMCP	164.7	.73			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	22472.		C1/C2	.69
GASOLINE	20170.		A /D2	12.01
NAPTHENES	3415.	16.93	C1/D2	22.25
C6-7	3905.	19.36	CH/MCP	.54
			PENT/IPENT	1.06

	PPB	NORM PERCENT
MCP	1339.0	52.0
CH	727.9	28.3
MCH	509.6	19.8
TOTAL	2576.5	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77729 L DEPTH(M) = 2355.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	1104.4	2.79
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	86.9	.22	3-EPENT	2301.5	5.82
IBUTANE	215.7	.55	224-TMP	.0	.00
NBUTANE	953.0	2.41	NHEPTANE	.0	.00
IPENTANE	3989.0	10.09	1C2-DMCP	749.6	1.90
NPENTANE	6952.9	17.59	MCH	754.5	1.91
22-DMB	97.2	.25			
CPENTANE	994.9	2.52			
23-DMB	.0	.00			
2-MP	580.2	1.47			
3-MP	3196.6	8.09			
NHEXANE	1849.5	4.68			
MCP	2337.9	5.91			
22-DMP	7338.1	18.56			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	3182.6	8.05			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	307.4	.78			
23-DMP	536.2	1.36			
3-MHEX	555.3	1.40			
1C3-DMCP	1444.9	3.66			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	39528.		C1/C2	.53
GASOLINE	39441.		A /D2	3.33
NAPTHENES	10569.	26.80	C1/D2	7.64
C6-7	22462.	56.95	CH/MCP	1.36
			PENT/IPENT	1.74

	PPB	NORM PERCENT
MCP	2337.9	37.3
CH	3182.6	50.7
MCH	754.5	12.0
TOTAL	6275.0	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77729 N DEPTH(M) = 2385.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	118.0	.93
ETHANE	.0		1T2-DMCP	196.2	1.55
PROPANE	112.3	.89	3-EPENT	.0	.00
IBUTANE	373.8	2.96	224-TMP	.0	.00
NBUTANE	1825.3	14.44	NHEPTANE	43.2	.34
IPENTANE	3059.2	24.20	1C2-DMCP	.0	.00
NPENTANE	2077.5	16.44	MCH	53.0	.42
22-DMB	9.7	.08			
CPENTANE	253.5	2.01			
23-DMB	176.3	1.39			
2-MP	1009.1	7.98			
3-MP	504.3	3.99			
NHEXANE	440.3	3.48			
MCP	1815.6	14.37			
22-DMP	.0	.00			
24-DMP	7.9	.06			
223-TMB	.0	.00			
CHEXANE	154.3	1.22			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	61.4	.49			
23-DMP	70.9	.56			
3-MHEX	146.5	1.16			
1C3-DMCP	130.6	1.03			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	12639.		C1/C2	.12
GASOLINE	12527.		A /D2	3.30
NAPTHENES	2721.	21.72	C1/D2	1.83
C6-7	3238.	25.85	CH/MCP	.08
			PENT/IPENT	.68

	PPB	NORM PERCENT
MCP	1815.6	89.8
CH	154.3	7.6
MCH	53.0	2.6
TOTAL	2022.9	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77729 Q DEPTH(M) = 2460.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	9.7	1.63
ETHANE	.0		1T2-DMCP	17.3	2.91
PROPANE	29.1	4.90	3-EPENT	.0	.00
IBUTANE	16.9	2.84	224-TMP	.0	.00
NBUTANE	49.5	8.33	NHEPTANE	28.1	4.73
IPENTANE	65.7	11.06	1C2-DMCP	.0	.00
NPENTANE	60.7	10.22	MCH	77.0	12.96
22-DMB	.0	.00			
CPENTANE	6.2	1.04			
23-DMB	5.5	.93			
2-MP	41.0	6.90			
3-MP	23.0	3.87			
NHEXANE	41.7	7.02			
MCP	60.1	10.12			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	29.0	4.88			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	9.9	1.67			
23-DMP	5.7	.96			
3-MHEX	7.5	1.26			
1C3-DMCP	10.5	1.77			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	594.		C1/C2	1.19
GASOLINE	565.		A /D2	9.31
NAPTHENES	210.	37.13	C1/D2	15.45
C6-7	296.	52.48	CH/MCP	.48
			PENT/IPENT	.92

	PPB	NORM PERCENT
MCP	60.1	36.2
CH	29.0	17.5
MCH	77.0	46.4
TOTAL	166.1	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO. = 77729 S DEPTH(M) = 2490.00

	TOTAL PPB	NORM PERCENT
METHANE	.0	
ETHANE	.0	
PROPANE	162.8	10.71
IBUTANE	85.7	5.64
NBUTANE	242.7	15.97
IPENTANE	184.2	12.12
NPENTANE	192.9	12.69
22-DMB	2.0	.13
CPENTANE	20.9	1.38
23-DMB	14.5	.95
2-MP	97.1	6.39
3-MP	47.7	3.14
NHEXANE	111.6	7.34
MCP	108.5	7.14
22-DMP	.0	.00
24-DMP	1.9	.13
223-TMB	.0	.00
CHEXANE	50.8	3.34
33-DMP	.0	.00
11-DMCP	.0	.00
2-MHEX	16.2	1.07
23-DMP	10.7	.70
3-MHEX	14.7	.97
1C3-DMCP	13.3	.88

	TOTAL PPB	NORM PERCENT
1T3-DMCP	10.5	.69
1T2-DMCP	16.8	1.11
3-EPENT	.0	.00
224-TMP	.0	.00
NHEPTANE	46.3	3.05
1C2-DMCP	.0	.00
MCH	67.9	4.47

	TOTALS PPB	NORM PERCENT
ALL COMP	1520.	
GASOLINE	1357.	
NAPTHENES	289.	21.28
C6-7	469.	34.58

SIG COMP RATIOS

C1/C2	.90
A /D2	10.74
C1/D2	9.18
CH/MCP	.47
PENT/IPENT	1.05

	PPB	NORM PERCENT
MCP	108.5	47.8
CH	50.8	22.4
MCH	67.9	29.9
TOTAL	227.2	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1   SAMPLE NO. = 77729 U   DEPTH(M) = 2520.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	12.4	1.86
ETHANE	.0		1T2-DMCP	13.3	1.99
PROPANE	35.6	5.34	3-EPENT	.0	.00
IBUTANE	12.8	1.92	224-TMP	.0	.00
NBUTANE	70.3	10.54	NHEPTANE	45.8	6.87
IPENTANE	105.2	15.78	1C2-DMCP	4.0	.60
NPENTANE	59.7	8.95	MCH	74.9	11.23
22-DMB	.0	.00			
CPENTANE	8.1	1.21			
23-DMB	6.8	1.02			
2-MP	48.7	7.30			
3-MP	17.0	2.55			
NHEXANE	37.2	5.58			
MCP	50.0	7.50			
22-DMP	.0	.00			
24-DMP	2.6	.39			
223-TMB	.0	.00			
CHEXANE	18.3	2.74			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	11.8	1.77			
23-DMP	11.2	1.68			
3-MHEX	9.4	1.41			
1C3-DMCP	11.6	1.74			

	TOTALS PPB	NORM PERCENT
ALL COMP	667.	
GASOLINE	631.	
NAPTHENES	193.	30.52
C6-7	302.	47.93

SIG COMP RATIOS

C1/C2	1.15
A /D2	8.83
C1/D2	11.17
CH/MCP	.37
PENT/IPENT	.57

	PPB	NORM PERCENT
MCP	50.0	34.9
CH	18.3	12.8
MCH	74.9	52.3
TOTAL	143.2	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77729 W DEPTH(M) = 2550.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	11.2	1.48
ETHANE	.0		1T2-DMCP	22.5	2.98
PROPANE	26.9	3.56	3-EPENT	.0	.00
IBUTANE	18.6	2.46	224-TMP	.0	.00
NBUTANE	41.7	5.51	NHEPTANE	38.8	5.13
IPENTANE	72.7	9.61	1C2-DMCP	.0	.00
NPENTANE	76.2	10.08	MCH	121.6	16.08
22-DMB	.0	.00			
CPENTANE	6.2	.82			
23-DMB	6.6	.87			
2-MP	54.9	7.26			
3-MP	30.9	4.09			
NHEXANE	58.5	7.74			
MCP	73.3	9.69			
22-DMP	.0	.00			
24-DMP	2.1	.28			
223-TMB	.0	.00			
CHEXANE	43.2	5.71			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	11.9	1.57			
23-DMP	9.7	1.28			
3-MHEX	12.2	1.61			
1C3-DMCP	16.5	2.18			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	756.		C1/C2	1.43
GASOLINE	729.		A /D2	7.98
NAPTHENES	294.	40.38	C1/D2	14.48
C6-7	421.	57.80	CH/MCP	.59
			PENT/IPENT	1.05

	PPB	NORM PERCENT
MCP	73.3	30.8
CH	43.2	18.1
MCH	121.6	51.1
TOTAL	238.1	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO. = 77729 Y   DEPTH(M) = 2580.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	27.7	18.58	3-EPENT	.0	.00
IBUTANE	4.3	2.88	224-TMP	.0	.00
NBUTANE	21.6	14.49	NHEPTANE	12.8	8.58
IPENTANE	17.4	11.67	1C2-DMCP	.0	.00
NPENTANE	15.4	10.33	MCH	6.8	4.56
22-DMB	.0	.00			
CPENTANE	1.5	1.01			
23-DMB	.0	.00			
2-MP	12.5	8.38			
3-MP	5.6	3.76			
NHEXANE	13.7	9.19			
MCP	9.8	6.57			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	.0	.00			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT
ALL COMP	149.	
GASOLINE	121.	
NAPTHENES	18.	14.91
C6-7	43.	35.50

SIG COMP RATIOS	
C1/C2	.69
A /D2	26.50
C1/D2	6.80
CH/MCP	.00
PENT/IPENT	.89

	PPB	NORM PERCENT
MCP	9.8	59.0
CH	.0	.0
MCH	6.8	41.0
TOTAL	16.6	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77730 A DEPTH(M) = 2610.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	24.1	12.51	3-EPENT	.0	.00
IBUTANE	7.2	3.74	224-TMP	.0	.00
NBUTANE	18.5	9.61	NHEPTANE	.0	.00
IPENTANE	27.6	14.33	1C2-DMCP	.0	.00
NPENTANE	24.1	12.51	MCH	22.3	11.58
22-DMB	.0	.00			
CPENTANE	1.5	.78			
23-DMB	1.6	.83			
2-MP	14.0	7.27			
3-MP	7.1	3.69			
NHEXANE	13.5	7.01			
MCP	15.7	8.15			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	15.4	8.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	.0	.00			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT
ALL COMP	193.	
GASOLINE	168.	
NAPTHENES	55.	32.58
C6-7	67.	39.70

SIG COMP RATIOS

C1/C2	2.40
A /D2	13.50
C1/D2	37.70
CH/MCP	.98
PENT/IPENT	.87

	PPB	NORM PERCENT
MCP	15.7	29.4
CH	15.4	28.8
MCH	22.3	41.8
TOTAL	53.4	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO. = 77730 E   DEPTH(M) = 2670.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	150.7	.99
ETHANE	.0		1T2-DMCP	235.0	1.54
PROPANE	769.9	5.05	3-EPENT	.0	.00
IBUTANE	1533.7	10.05	224-TMP	.0	.00
NBUTANE	2298.2	15.06	NHEPTANE	638.5	4.18
IPENTANE	1988.2	13.03	1C2-DMCP	.0	.00
NPENTANE	1450.1	9.50	MCH	1449.5	9.50
22-DMB	10.6	.07			
CPENTANE	209.0	1.37			
23-DMB	157.9	1.03			
2-MP	787.8	5.16			
3-MP	347.9	2.28			
NHEXANE	841.6	5.52			
MCP	1144.8	7.50			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	576.0	3.78			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	150.6	.99			
23-DMP	161.5	1.06			
3-MHEX	147.1	.96			
1C3-DMCP	209.5	1.37			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	15258.		C1/C2	1.25
GASOLINE	14488.		A /D2	10.06
NAPTHENES	3975.	27.43	C1/D2	14.79
C6-7	5705.	39.38	CH/MCP	.50
			PENT/IPENT	.73

	PPB	NORM PERCENT
MCP	1144.8	36.1
CH	576.0	18.2
MCH	1449.5	45.7
TOTAL	3170.3	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77730 G DEPTH(M) = 2700.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	133.8	1.16
ETHANE	.0		1T2-DMCP	239.6	2.08
PROPANE	30.2	.26	3-EPENT	.0	.00
IBUTANE	39.1	.34	224-TMP	.0	.00
NBUTANE	576.2	5.01	NHEPTANE	1125.5	9.78
IPENTANE	1040.4	9.04	1C2-DMCP	30.5	.27
NPENTANE	1354.9	11.77	MCH	2205.2	19.16
22-DMB	19.2	.17			
CPENTANE	110.2	.96			
23-DMB	92.6	.80			
2-MP	686.5	5.97			
3-MP	320.8	2.79			
NHEXANE	1150.1	9.99			
MCP	704.8	6.13			
22-DMP	.0	.00			
24-DMP	28.7	.25			
223-TMB	2.4	.02			
CHEXANE	731.4	6.36			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	307.6	2.67			
23-DMP	137.9	1.20			
3-MHEX	302.2	2.63			
1C3-DMCP	137.1	1.19			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	11507.		C1/C2	2.60
GASOLINE	11477.		A /D2	7.53
NAPTHENES	4293.	37.40	C1/D2	10.74
C6-7	7237.	63.06	CH/MCP	1.04
			PENT/IPENT	1.30

	PPB	NORM PERCENT
MCP	704.8	19.4
CH	731.4	20.1
MCH	2205.2	60.6
TOTAL	3641.4	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77730 I DEPTH(M) = 2730.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	7.7	1.33
ETHANE	.0		1T2-DMCP	9.0	1.56
PROPANE	33.9	5.87	3-EPENT	.0	.00
IBUTANE	16.0	2.77	224-TMP	.0	.00
NBUTANE	63.8	11.05	NHEPTANE	33.5	5.80
IPENTANE	75.0	12.98	1C2-DMCP	.0	.00
NPENTANE	52.5	9.09	MCH	66.7	11.55
22-DMB	3.6	.62			
CPENTANE	4.5	.78			
23-DMB	4.1	.71			
2-MP	36.2	6.27			
3-MP	17.3	3.00			
NHEXANE	44.8	7.76			
MCP	37.5	6.49			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	32.8	5.68			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	11.9	2.06			
23-DMP	7.4	1.28			
3-MHEX	11.1	1.92			
1C3-DMCP	8.3	1.44			

	TOTALS PPB	NORM PERCENT
ALL COMP	578.	
GASOLINE	544.	
NAPTHENES	167.	30.62
C6-7	271.	49.79

SIG COMP RATIOS

C1/C2	1.78
A /D2	7.05
C1/D2	10.04
CH/MCP	.87
PENT/IPENT	.70

	PPB	NORM PERCENT
MCP	37.5	27.4
CH	32.8	23.9
MCH	66.7	48.7
TOTAL	137.0	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1
SAMPLE NO. = 77730 K
DEPTH(M) = 2760.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	24.5	9.02	3-EPENT	.0	.00
IBUTANE	5.6	2.06	224-TMP	.0	.00
NBUTANE	21.2	7.80	NHEPTANE	38.6	14.21
IPENTANE	23.8	8.76	1C2-DMCP	.0	.00
NPENTANE	22.0	8.10	MCH	23.8	8.76
22-DMB	.0	.00			
CPENTANE	.0	.00			
23-DMB	2.7	.99			
2-MP	21.5	7.91			
3-MP	9.8	3.61			
NHEXANE	30.6	11.26			
MCP	15.5	5.70			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	8.2	3.02			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	10.9	4.01			
23-DMP	3.1	1.14			
3-MHEX	9.9	3.64			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT
ALL COMP	272.	
GASOLINE	247.	
NAPTHENES	47.	19.22
C6-7	141.	56.88

SIG COMP RATIOS

C1/C2	2.77
A /D2	6.99
C1/D2	4.33
CH/MCP	.53
PENT/IPENT	.92

	PPB	NORM PERCENT
MCP	15.5	32.6
CH	8.2	17.3
MCH	23.8	50.1
TOTAL	47.5	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77730 M DEPTH(M) = 2790.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	254.0	1.75
ETHANE	.0		1T2-DMCP	375.4	2.59
PROPANE	91.7	.63	3-EPENT	.0	.00
IBUTANE	212.3	1.46	224-TMP	.0	.00
NBUTANE	561.9	3.87	NHEPTANE	1149.8	7.92
IPENTANE	2603.5	17.93	1C2-DMCP	47.1	.32
NPENTANE	1471.3	10.14	MCH	1538.4	10.60
22-DMB	7.4	.05			
CPENTANE	201.9	1.39			
23-DMB	216.4	1.49			
2-MP	1329.3	9.16			
3-MP	437.6	3.01			
NHEXANE	1216.8	8.38			
MCP	1492.9	10.28			
22-DMP	.0	.00			
24-DMP	24.7	.17			
223-TMB	.0	.00			
CHEXANE	281.6	1.94			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	269.7	1.86			
23-DMP	216.5	1.49			
3-MHEX	245.8	1.69			
1C3-DMCP	270.6	1.86			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	14517.		C1/C2	.86
GASOLINE	14425.		A /D2	9.63
NAPTHENES	4462.	30.93	C1/D2	8.50
C6-7	7383.	51.18	CH/MCP	.19
			PENT/IPENT	.57

	PPB	NORM PERCENT
MCP	1492.9	45.1
CH	281.6	8.5
MCH	1538.4	46.4
TOTAL	3312.9	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1   SAMPLE NO. = 77730 0   DEPTH(M) = 2820.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	341.2	1.07
ETHANE	.0		1T2-DMCP	513.7	1.61
PROPANE	1185.1	3.71	3-EPENT	.0	.00
IBUTANE	3353.2	10.51	224-TMP	.0	.00
NBUTANE	5550.0	17.40	NHEPTANE	1206.9	3.78
IPENTANE	4786.4	15.00	1C2-DMCP	40.2	.13
NPENTANE	3191.2	10.00	MCH	1367.8	4.29
22-DMB	26.4	.08			
CPENTANE	396.0	1.24			
23-DMB	354.0	1.11			
2-MP	2261.3	7.09			
3-MP	817.5	2.56			
NHEXANE	1932.1	6.06			
MCP	2523.3	7.91			
22-DMP	.0	.00			
24-DMP	29.3	.09			
223-TMB	3.0	.01			
CHEXANE	693.7	2.17			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	353.9	1.11			
23-DMP	269.9	.85			
3-MHEX	344.7	1.08			
1C3-DMCP	364.3	1.14			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	31905.		C1/C2	.64
GASOLINE	30720.		A /D2	9.11
NAPTHENES	6240.	20.31	C1/D2	7.01
C6-7	9984.	32.50	CH/MCP	.27
			PENT/IPENT	.67

	PPB	NORM PERCENT
MCP	2523.3	55.0
CH	693.7	15.1
MCH	1367.8	29.8
TOTAL	4584.8	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77730 S DEPTH(M) = 2880.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	520.7	1.35
ETHANE	.0		1T2-DMCP	984.0	2.54
PROPANE	64.8	.17	3-EPENT	.0	.00
IBUTANE	74.5	.19	224-TMP	.0	.00
NBUTANE	392.6	1.02	NHEPTANE	2740.5	7.09
IPENTANE	759.5	1.96	1C2-DMCP	208.8	.54
NPENTANE	1689.7	4.37	MCH	8290.4	21.43
22-DMB	36.9	.10			
CPENTANE	516.5	1.34			
23-DMB	355.1	.92			
2-MP	3103.8	8.02			
3-MP	1545.6	4.00			
NHEXANE	5560.3	14.38			
MCP	4091.8	10.58			
22-DMP	.0	.00			
24-DMP	71.6	.19			
223-TMB	12.9	.03			
CHEXANE	5256.8	13.59			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	633.3	1.64			
23-DMP	562.1	1.45			
3-MHEX	645.1	1.67			
1C3-DMCP	560.2	1.45			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	38677.		C1/C2	2.23
GASOLINE	38613.		A /D2	12.87
NAPTHENES	20429.	52.91	C1/D2	21.98
C6-7	30138.	78.05	CH/MCP	1.28
			PENT/IPENT	2.22

	PPB	NORM PERCENT
MCP	4091.8	23.2
CH	5256.8	29.8
MCH	8290.4	47.0
TOTAL	17639.0	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1
SAMPLE NO. = 77730 U DEPTH(M) = 2910.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	188.6	14.05	3-EPENT	.0	.00
IBUTANE	203.9	15.19	224-TMP	.0	.00
NBUTANE	242.1	18.04	NHEPTANE	.0	.00
IPENTANE	293.2	21.85	1C2-DMCP	.0	.00
NPENTANE	176.4	13.15	MCH	.0	.00
22-DMB	.0	.00			
CPENTANE	24.6	1.83			
23-DMB	23.2	1.73			
2-MP	140.7	10.49			
3-MP	49.2	3.67			
NHEXANE	.0	.00			
MCP	.0	.00			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	.0	.00			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	1342.		C1/C2	.00
GASOLINE	1153.		A /D2	.00
NAPTHENES	25.	2.13	C1/D2	.00
C6-7	0.	.00	CH/MCP	.00
			PENT/IPENT	.60

	PPB	NORM PERCENT
MCP	.0	.0
CH	.0	.0
MCH	.0	.0
TOTAL	.0	.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO. = 77730 W   DEPTH(M) = 2940.00

	TOTAL PPB	NORM PERCENT
METHANE	.0	
ETHANE	.0	
PROPANE	31.1	.74
IBUTANE	10.2	.24
NBUTANE	152.1	3.63
IPENTANE	533.4	12.74
NPENTANE	503.3	12.02
22-DMB	1.7	.04
CPENTANE	97.8	2.34
23-DMB	45.8	1.09
2-MP	311.3	7.43
3-MP	129.8	3.10
NHEXANE	292.0	6.97
MCP	545.1	13.02
22-DMP	.0	.00
24-DMP	3.8	.09
223-TMB	.0	.00
CHEXANE	161.1	3.85
33-DMP	.0	.00
11-DMCP	.0	.00
2-MHEX	73.6	1.76
23-DMP	52.1	1.24
3-MHEX	63.0	1.50
1C3-DMCP	90.4	2.16

	TOTAL PPB	NORM PERCENT
1T3-DMCP	119.5	2.85
1T2-DMCP	117.5	2.81
3-EPENT	.0	.00
224-TMP	.0	.00
NHEPTANE	257.7	6.15
1C2-DMCP	20.5	.49
MCH	574.9	13.73

	TOTALS PPB	NORM PERCENT
ALL COMP	4188.	
GASOLINE	4157.	
NAPTHENES	1727.	41.54
C6-7	2371.	57.05

SIG COMP RATIOS

C1/C2	.91
A /D2	8.73
C1/D2	12.85
CH/MCP	.30
PENT/IPENT	.94

	PPB	NORM PERCENT
MCP	545.1	42.5
CH	161.1	12.6
MCH	574.9	44.9
TOTAL	1281.1	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77730 Y DEPTH(M) = 2970.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	130.1	2.39
ETHANE	.0		1T2-DMCP	121.1	2.22
PROPANE	85.1	1.56	3-EPENT	.0	.00
IBUTANE	353.5	6.49	224-TMP	.0	.00
NBUTANE	563.7	10.36	NHEPTANE	234.8	4.31
IPENTANE	757.8	13.92	1C2-DMCP	17.5	.32
NPENTANE	555.0	10.20	MCH	531.5	9.76
22-DMB	.0	.00			
CPENTANE	100.8	1.85			
23-DMB	53.0	.97			
2-MP	369.1	6.78			
3-MP	157.7	2.90			
NHEXANE	321.9	5.91			
MCP	631.6	11.60			
22-DMP	.0	.00			
24-DMP	5.9	.11			
223-TMB	.0	.00			
CHEXANE	160.3	2.95			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	75.8	1.39			
23-DMP	54.0	.99			
3-MHEX	67.4	1.24			
1C3-DMCP	95.5	1.75			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	5443.		C1/C2	.77
GASOLINE	5358.		A /D2	8.26
NAPTHENES	1788.	33.38	C1/D2	11.39
C6-7	2447.	45.68	CH/MCP	.25
			PENT/IPENT	.73

	PPB	NORM PERCENT
MCP	631.6	47.7
CH	160.3	12.1
MCH	531.5	40.2
TOTAL	1323.4	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77731 A DEPTH(M) = 3000.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	50.8	11.23	3-EPENT	.0	.00
IBUTANE	33.3	7.36	224-TMP	.0	.00
NBUTANE	107.6	23.79	NHEPTANE	12.8	2.83
IPENTANE	41.5	9.18	1C2-DMCP	.0	.00
NPENTANE	109.7	24.26	MCH	17.0	3.76
22-DMB	.0	.00			
CPENTANE	4.9	1.08			
23-DMB	1.6	.35			
2-MP	15.7	3.47			
3-MP	8.7	1.92			
NHEXANE	20.7	4.58			
MCP	21.2	4.69			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	6.7	1.48			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	.0	.00			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT
ALL COMP	452.	
GASOLINE	401.	
NAPTHENES	50.	12.41
C6-7	78.	19.53

SIG COMP RATIOS

C1/C2	1.12
A /D2	33.50
C1/D2	23.70
CH/MCP	.32
PENT/IPENT	2.64

	PPB	NORM PERCENT
MCP	21.2	47.2
CH	6.7	14.9
MCH	17.0	37.9
TOTAL	44.9	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1
SAMPLE NO. = 77731 C DEPTH(M) = 3030.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	13.5	1.30
ETHANE	.0		1T2-DMCP	24.2	2.32
PROPANE	26.1	2.51	3-EPENT	.0	.00
IBUTANE	8.7	.84	224-TMP	.0	.00
NBUTANE	44.1	4.24	NHEPTANE	68.1	6.54
IPENTANE	59.3	5.69	1C2-DMCP	.0	.00
NPENTANE	73.8	7.09	MCH	287.6	27.62
22-DMB	1.6	.15			
CPENTANE	6.9	.66			
23-DMB	8.6	.83			
2-MP	62.3	5.98			
3-MP	32.1	3.08			
NHEXANE	81.5	7.83			
MCP	64.8	6.22			
22-DMP	.0	.00			
24-DMP	3.3	.32			
223-TMB	.0	.00			
CHEXANE	98.1	9.42			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	21.4	2.06			
23-DMP	18.4	1.77			
3-MHEX	22.9	2.20			
1C3-DMCP	14.0	1.34			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	1041.		C1/C2	3.49
GASOLINE	1015.		A /D2	6.53
NAPTHENES	509.	50.15	C1/D2	17.78
C6-7	718.	70.71	CH/MCP	1.51
			PENT/IPENT	1.24

	PPB	NORM PERCENT
MCP	64.8	14.4
CH	98.1	21.8
MCH	287.6	63.8
TOTAL	450.5	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO. = 77731 E

REPORT = UNSPEC. ANALYSIS
DEPTH(M) = 3060.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	6.7	1.07
ETHANE	.0		1T2-DMCP	9.0	1.44
PROPANE	24.2	3.86	3-EPENT	.0	.00
IBUTANE	8.7	1.39	224-TMP	.0	.00
NBUTANE	38.1	6.08	NHEPTANE	34.7	5.54
IPENTANE	48.8	7.79	1C2-DMCP	.0	.00
NPENTANE	60.6	9.68	MCH	125.9	20.11
22-DMB	.0	.00			
CPENTANE	7.0	1.12			
23-DMB	6.5	1.04			
2-MP	37.6	6.00			
3-MP	20.0	3.19			
NHEXANE	52.1	8.32			
MCP	43.5	6.95			
22-DMP	.0	.00			
24-DMP	1.0	.16			
223-TMB	.0	.00			
CHEXANE	64.4	10.28			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	11.1	1.77			
23-DMP	8.1	1.29			
3-MHEX	11.2	1.79			
1C3-DMCP	7.0	1.12			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	626.		C1/C2	3.04
GASOLINE	602.		A /D2	7.75
NAPTHENES	263.	43.77	C1/D2	17.98
C6-7	375.	62.24	CH/MCP	1.48
			PENT/IPENT	1.24

	PPB	NORM PERCENT
MCP	43.5	18.6
CH	64.4	27.5
MCH	125.9	53.8
TOTAL	233.8	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77731 G DEPTH(M) = 3090.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	188.3	1.19
ETHANE	.0		1T2-DMCP	334.5	2.12
PROPANE	60.3	.38	3-EPENT	.0	.00
IBUTANE	146.9	.93	224-TMP	.0	.00
NBUTANE	1464.5	9.28	NHEPTANE	871.1	5.52
IPENTANE	1657.6	10.50	1C2-DMCP	38.6	.24
NPENTANE	1919.8	12.16	MCH	2289.0	14.50
22-DMB	21.4	.14			
CPENTANE	255.2	1.62			
23-DMB	136.3	.86			
2-MP	966.3	6.12			
3-MP	482.9	3.06			
NHEXANE	1347.9	8.54			
MCP	1290.3	8.17			
22-DMP	.0	.00			
24-DMP	23.5	.15			
223-TMB	1.2	.01			
CHEXANE	1350.7	8.55			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	282.3	1.79			
23-DMP	149.5	.95			
3-MHEX	315.7	2.00			
1C3-DMCP	195.6	1.24			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	15789.		C1/C2	1.92
GASOLINE	15729.		A /D2	7.03
NAPTHENES	5942.	37.78	C1/D2	12.42
C6-7	8678.	55.17	CH/MCP	1.05
			PENT/IPENT	1.16

	PPB	NORM PERCENT
MCP	1290.3	26.2
CH	1350.7	27.4
MCH	2289.0	46.4
TOTAL	4930.0	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO. = 77731 I DEPTH(M) = 3120.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	306.4	1.67
ETHANE	.0		1T2-DMCP	319.3	1.74
PROPANE	42.4	.23	3-EPENT	.0	.00
IBUTANE	54.5	.30	224-TMP	.0	.00
NBUTANE	292.1	1.59	NHEPTANE	1109.8	6.05
IPENTANE	1396.6	7.61	1C2-DMCP	.0	.00
NPENTANE	2413.8	13.15	MCH	3481.7	18.96
22-DMB	22.9	.12			
CPENTANE	325.9	1.78			
23-DMB	200.3	1.09			
2-MP	1390.7	7.58			
3-MP	654.2	3.56			
NHEXANE	1625.9	8.86			
MCP	1915.0	10.43			
22-DMP	.0	.00			
24-DMP	23.3	.13			
223-TMB	.0	.00			
CHEXANE	1873.9	10.21			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	220.6	1.20			
23-DMP	304.7	1.66			
3-MHEX	200.7	1.09			
1C3-DMCP	184.3	1.00			

	TOTALS PPB	NORM PERCENT
ALL COMP	18359.	
GASOLINE	18317.	
NAPTHENES	8406.	45.90
C6-7	11566.	63.14

SIG COMP RATIOS

C1/C2	2.05
A /D2	13.63
C1/D2	27.78
CH/MCP	.98
PENT/IPENT	1.73

	PPB	NORM PERCENT
MCP	1915.0	26.3
CH	1873.9	25.8
MCH	3481.7	47.9
TOTAL	7270.6	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77731 K DEPTH(M) = 3150.00

	TOTAL PPB	NORM PERCENT
METHANE	.0	
ETHANE	.0	
PROPANE	48.4	.13
IBUTANE	92.9	.25
NBUTANE	387.7	1.06
IPENTANE	3422.8	9.38
NPENTANE	4239.4	11.62
22-DMB	33.1	.09
CPENTANE	646.2	1.77
23-DMB	458.8	1.26
2-MP	4199.7	11.51
3-MP	1484.1	4.07
NHEXANE	3258.8	8.93
MCP	1660.4	4.55
22-DMP	.0	.00
24-DMP	398.5	1.09
223-TMB	.0	.00
CHEXANE	3221.5	8.83
33-DMP	.0	.00
11-DMCP	.0	.00
2-MHEX	143.1	.39
23-DMP	636.8	1.75
3-MHEX	228.4	.63
1C3-DMCP	1037.5	2.84

	TOTAL PPB	NORM PERCENT
1T3-DMCP	146.1	.40
1T2-DMCP	1076.7	2.95
3-EPENT	.0	.00
224-TMP	.0	.00
NHEPTANE	2880.8	7.90
1C2-DMCP	.0	.00
MCH	6781.3	18.59

	TOTALS PPB	NORM PERCENT
ALL COMP	36483.	
GASOLINE	36435.	
NAPTHENES	14570.	39.99
C6-7	21470.	58.93

SIG COMP RATIOS

C1/C2	2.59
A /D2	26.88
C1/D2	44.42
CH/MCP	1.94
PENT/IPENT	1.24

	PPB	NORM PERCENT
MCP	1660.4	14.2
CH	3221.5	27.6
MCH	6781.3	58.1
TOTAL	11663.2	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77731 M DEPTH(M) = 3180.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	6.0	1.33
ETHANE	.0		1T2-DMCP	8.5	1.88
PROPANE	21.1	4.66	3-EPENT	.0	.00
IBUTANE	16.9	3.74	224-TMP	.0	.00
NBUTANE	37.3	8.24	NHEPTANE	22.3	4.93
IPENTANE	63.5	14.04	1C2-DMCP	.0	.00
NPENTANE	46.7	10.32	MCH	45.8	10.12
22-DMB	.0	.00			
CPENTANE	3.5	.77			
23-DMB	4.0	.88			
2-MP	36.6	8.09			
3-MP	16.9	3.74			
NHEXANE	35.3	7.80			
MCP	39.1	8.64			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	17.9	3.96			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	9.9	2.19			
23-DMP	6.3	1.39			
3-MHEX	8.6	1.90			
1C3-DMCP	6.2	1.37			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	452.		C1/C2	1.23
GASOLINE	431.		A /D2	6.70
NAPTHENES	127.	29.45	C1/D2	8.56
C6-7	206.	47.74	CH/MCP	.46
			PENT/IPENT	.74

	PPB	NORM PERCENT
MCP	39.1	38.0
CH	17.9	17.4
MCH	45.8	44.6
TOTAL	102.8	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

BASIN - GIPPSLAND
WELL - GRUNTER 1

REPORT = UNSPEC. ANALYSIS
SAMPLE NO. = 77731 Q DEPTH(M) = 3240.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	256.4	.87
ETHANE	.0		1T2-DMCP	1029.0	3.47
PROPANE	167.0	.56	3-EPENT	.0	.00
IBUTANE	227.2	.77	224-TMP	.0	.00
NBUTANE	672.7	2.27	NHEPTANE	1184.2	4.00
IPENTANE	1310.8	4.43	1C2-DMCP	132.6	.45
NPENTANE	2043.3	6.90	MCH	4884.4	16.49
22-DMB	68.1	.23			
CPENTANE	646.2	2.18			
23-DMB	507.1	1.71			
2-MP	3155.3	10.65			
3-MP	1447.9	4.89			
NHEXANE	2296.0	7.75			
MCP	5098.1	17.21			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	2920.8	9.86			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	237.9	.80			
23-DMP	472.3	1.59			
3-MHEX	254.1	.86			
1C3-DMCP	610.8	2.06			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	29622.		C1/C2	1.13
GASOLINE	29455.		A /D2	13.70
NAPTHENES	15578.	52.89	C1/D2	31.65
C6-7	19377.	65.78	CH/MCP	.57
			PENT/IPENT	1.56

	PPB	NORM PERCENT
MCP	5098.1	39.5
CH	2920.8	22.6
MCH	4884.4	37.9
TOTAL	12903.3	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77731 S DEPTH(M) = 3270.00

	TOTAL PPB	NORM PERCENT
METHANE	.0	
ETHANE	.0	
PROPANE	33.7	.16
IBUTANE	75.3	.36
NBUTANE	159.8	.77
IPENTANE	671.3	3.25
NPENTANE	1031.4	4.99
22-DMB	16.9	.08
CPENTANE	219.8	1.06
23-DMB	319.2	1.54
2-MP	2522.7	12.21
3-MP	1083.7	5.24
NHEXANE	2018.3	9.77
MCP	2481.2	12.01
22-DMP	.0	.00
24-DMP	52.5	.25
223-TMB	4.3	.02
CHEXANE	986.0	4.77
33-DMP	.0	.00
11-DMCP	.0	.00
2-MHEX	703.3	3.40
23-DMP	432.0	2.09
3-MHEX	585.1	2.83
1C3-DMCP	489.7	2.37

	TOTAL PPB	NORM PERCENT
1T3-DMCP	458.1	2.22
1T2-DMCP	701.5	3.39
3-EPENT	.0	.00
224-TMP	.0	.00
NHEPTANE	1706.9	8.26
1C2-DMCP	89.0	.43
MCH	3824.2	18.50

	TOTALS PPB	NORM PERCENT
ALL COMP	20666.	
GASOLINE	20632.	
NAPTHENES	9249.	44.83
C6-7	14532.	70.43

SIG COMP RATIOS

C1/C2	1.31
A /D2	6.37
C1/D2	9.42
CH/MCP	.40
PENT/IPENT	1.54

	PPB	NORM PERCENT
MCP	2481.2	34.0
CH	986.0	13.5
MCH	3824.2	52.4
TOTAL	7291.4	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

BASIN - GIPPSLAND
WELL - GRUNTER 1

REPORT = UNSPEC. ANALYSIS
SAMPLE NO. = 77731 U DEPTH(M) = 3300.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	23.6	51.87	3-EPENT	.0	.00
IBUTANE	.9	1.98	224-TMP	.0	.00
NBUTANE	13.5	29.67	NHEPTANE	.0	.00
IPENTANE	1.9	4.18	1C2-DMCP	.0	.00
NPENTANE	2.6	5.71	MCH	.0	.00
22-DMB	.0	.00			
CPENTANE	.0	.00			
23-DMB	.0	.00			
2-MP	.0	.00			
3-MP	.0	.00			
NHEXANE	3.0	6.59			
MCP	.0	.00			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	.0	.00			
23-DMP	.0	.00			
3-MHEX	.0	.00			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT
ALL COMP	45.	
GASOLINE	22.	
NAPTHENES	0.	.00
C6-7	3.	13.70

SIG COMP RATIOS

C1/C2	.00
A /D2	3.00
C1/D2	.00
CH/MCP	.00
PENT/IPENT	1.37

	PPB	NORM PERCENT
MCP	.0	.0
CH	.0	.0
MCH	.0	.0
TOTAL	.0	.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1
SAMPLE NO. = 77731 W DEPTH(M) = 3330.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	160.9	2.25
ETHANE	.0		1T2-DMCP	132.7	1.86
PROPANE	25.7	.36	3-EPENT	.0	.00
IBUTANE	23.0	.32	224-TMP	.0	.00
NBUTANE	134.2	1.88	NHEPTANE	450.9	6.31
IPENTANE	1058.8	14.82	1C2-DMCP	19.5	.27
NPENTANE	934.2	13.08	MCH	824.2	11.54
22-DMB	7.2	.10			
CPENTANE	89.0	1.25			
23-DMB	97.5	1.36			
2-MP	739.5	10.35			
3-MP	310.5	4.35			
NHEXANE	621.5	8.70			
MCP	620.5	8.69			
22-DMP	.0	.00			
24-DMP	17.5	.24			
223-TMB	.0	.00			
CHEXANE	261.7	3.66			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	221.4	3.10			
23-DMP	92.9	1.30			
3-MHEX	177.4	2.48			
1C3-DMCP	123.3	1.73			

	TOTALS PPB	NORM PERCENT
ALL COMP	7144.	
GASOLINE	7118.	
NAPTHENES	2232.	31.35
C6-7	3724.	52.32

SIG COMP RATIOS

C1/C2	1.24
A /D2	6.05
C1/D2	7.37
CH/MCP	.42
PENT/IPENT	.88

	PPB	NORM PERCENT
MCP	620.5	36.4
CH	261.7	15.3
MCH	824.2	48.3
TOTAL	1706.4	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77731 Y DEPTH(M) = 3360.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	337.3	.44
ETHANE	.0		1T2-DMCP	1397.5	1.82
PROPANE	705.2	.92	3-EPENT	.0	.00
IBUTANE	4656.7	6.06	224-TMP	.0	.00
NBUTANE	7483.2	9.73	NHEPTANE	4618.2	6.01
IPENTANE	9386.9	12.21	1C2-DMCP	134.4	.17
NPENTANE	6892.9	8.96	MCH	12917.8	16.80
22-DMB	98.4	.13			
CPENTANE	684.8	.89			
23-DMB	706.3	.92			
2-MP	5077.9	6.60			
3-MP	2272.1	2.96			
NHEXANE	5657.8	7.36			
MCP	5018.2	6.53			
22-DMP	.0	.00			
24-DMP	748.3	.97			
223-TMB	.0	.00			
CHEXANE	5250.0	6.83			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	1263.3	1.64			
23-DMP	134.4	.17			
3-MHEX	764.7	.99			
1C3-DMCP	681.3	.89			

	TOTALS PPB	NORM PERCENT
ALL COMP	76888.	
GASOLINE	76182.	
NAPTHENES	26421.	34.68
C6-7	38923.	51.09

SIG COMP RATIOS	
C1/C2	2.57
A /D2	13.44
C1/D2	25.41
CH/MCP	1.05
PENT/IPENT	.73

	PPB	NORM PERCENT
MCP	5018.2	21.6
CH	5250.0	22.6
MCH	12917.8	55.7
TOTAL	23186.0	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77732 A DEPTH(M) = 3390.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	23.3	2.52
ETHANE	.0		1T2-DMCP	32.1	3.47
PROPANE	.0	.00	3-EPENT	.0	.00
IBUTANE	43.3	4.68	224-TMP	.0	.00
NBUTANE	70.3	7.60	NHEPTANE	44.6	4.82
IPENTANE	104.6	11.30	1C2-DMCP	12.3	1.33
NPENTANE	67.0	7.24	MCH	197.4	21.33
22-DMB	.0	.00			
CPENTANE	6.8	.73			
23-DMB	3.4	.37			
2-MP	49.2	5.32			
3-MP	23.0	2.49			
NHEXANE	52.2	5.64			
MCP	66.5	7.19			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	52.9	5.72			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	14.1	1.52			
23-DMP	14.1	1.52			
3-MHEX	21.4	2.31			
1C3-DMCP	26.8	2.90			

	TOTALS PPB	NORM PERCENT
ALL COMP	925.	
GASOLINE	925.	
NAPTHENES	418.	45.19
C6-7	558.	60.27

SIG COMP RATIOS

C1/C2	1.64
A /D2	4.52
C1/D2	12.36
CH/MCP	.80
PENT/IPENT	.64

	PPB	NORM PERCENT
MCP	66.5	21.0
CH	52.9	16.7
MCH	197.4	62.3
TOTAL	316.8	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77732 C DEPTH(M) = 3435.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	404.2	1.26
ETHANE	.0		1T2-DMCP	745.7	2.33
PROPANE	293.1	.92	3-EPENT	.0	.00
IBUTANE	1294.0	4.04	224-TMP	.0	.00
NBUTANE	4119.8	12.88	NHEPTANE	1133.4	3.54
IPENTANE	3895.1	12.18	1C2-DMCP	154.1	.48
NPENTANE	3481.5	10.88	MCH	3939.3	12.31
22-DMB	68.4	.21			
CPENTANE	701.9	2.19			
23-DMB	229.1	.72			
2-MP	1689.5	5.28			
3-MP	931.2	2.91			
NHEXANE	2262.1	7.07			
MCP	2493.4	7.79			
22-DMP	.0	.00			
24-DMP	91.7	.29			
223-TMB	6.4	.02			
CHEXANE	1704.8	5.33			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	839.6	2.62			
23-DMP	328.6	1.03			
3-MHEX	822.2	2.57			
1C3-DMCP	362.0	1.13			

	TOTALS PPB	NORM PERCENT
ALL COMP	31991.	
GASOLINE	31698.	
NAPTHENES	10505.	33.14
C6-7	15287.	48.23

SIG COMP RATIOS

C1/C2	1.56
A /D2	4.13
C1/D2	7.89
CH/MCP	.68
PENT/IPENT	.89

	PPB	NORM PERCENT
MCP	2493.4	30.6
CH	1704.8	20.9
MCH	3939.3	48.4
TOTAL	8137.5	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

BASIN - GIPPSLAND
WELL - GRUNTER 1

REPORT = UNSPEC. ANALYSIS
SAMPLE NO. = 77732 E DEPTH(M) = 3480.00

	TOTAL PPB	NORM PERCENT
METHANE	.0	
ETHANE	.0	
PROPANE	.0	.00
IBUTANE	265.2	.57
NBUTANE	1068.3	2.32
IPENTANE	6189.3	13.42
NPENTANE	5679.0	12.31
22-DMB	94.0	.20
CPENTANE	944.9	2.05
23-DMB	.0	.00
2-MP	397.7	.86
3-MP	3628.2	7.87
NHEXANE	1799.1	3.90
MCP	3973.8	8.61
22-DMP	3685.0	7.99
24-DMP	.0	.00
223-TMB	4.9	.01
CHEXANE	1784.6	3.87
33-DMP	.0	.00
11-DMCP	.0	.00
2-MHEX	2216.5	4.81
23-DMP	743.7	1.61
3-MHEX	1659.1	3.60
1C3-DMCP	638.0	1.38
1T3-DMCP	723.6	1.57
1T2-DMCP	1270.6	2.75
3-EPENT	.0	.00
224-TMP	.0	.00
NHEPTANE	3005.6	6.52
1C2-DMCP	333.9	.72
MCH	6022.2	13.06

	TOTALS PPB	NORM PERCENT
ALL COMP	46127.	
GASOLINE	46127.	
NAPTHENES	15692.	34.02
C6-7	27861.	60.40

SIG COMP RATIOS

C1/C2	1.44
A /D2	2.90
C1/D2	6.04
CH/MCP	.45
PENT/IPENT	.92

	PPB	NORM PERCENT
MCP	3973.8	33.7
CH	1784.6	15.1
MCH	6022.2	51.1
TOTAL	11780.6	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77732 G DEPTH(M) = 3510.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	2215.4	.99
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	1007.6	.45	3-EPENT	3581.0	1.60
IBUTANE	5543.4	2.47	224-TMP	.0	.00
NBUTANE	23066.8	10.29	NHEPTANE	.0	.00
IPENTANE	43777.5	19.53	1C2-DMCP	12937.8	5.77
NPENTANE	32335.1	14.43	MCH	292.0	.13
22-DMB	293.9	.13			
CPENTANE	3609.9	1.61			
23-DMB	.0	.00			
2-MP	2713.8	1.21			
3-MP	23749.8	10.60			
NHEXANE	9206.2	4.11			
MCP	21797.3	9.72			
22-DMP	15028.2	6.70			
24-DMP	.0	.00			
223-TMB	53.5	.02			
CHEXANE	8675.2	3.87			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	4841.0	2.16			
23-DMP	3900.9	1.74			
3-MHEX	3868.0	1.73			
1C3-DMCP	1649.3	.74			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	224143.		C1/C2	.33
GASOLINE	223136.		A /D2	2.38
NAPTHENES	51177.	22.94	C1/D2	3.57
C6-7	88046.	39.46	CH/MCP	.40
			PENT/IPENT	.74

	PPB	NORM PERCENT
MCP	21797.3	70.9
CH	8675.2	28.2
MCH	292.0	.9
TOTAL	30764.5	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77732 J DEPTH(M) = 3550.00

	TOTAL PPB	NORM PERCENT
METHANE	.0	
ETHANE	.0	
PROPANE	.0	.00
IBUTANE	2159.3	.76
NBUTANE	2941.7	1.04
IPENTANE	5100.8	1.80
NPENTANE	10698.8	3.79
22-DMB	432.0	.15
CPENTANE	5454.3	1.93
23-DMB	.0	.00
2-MP	3651.6	1.29
3-MP	34917.0	12.36
NHEXANE	15504.4	5.49
MCP	45877.2	16.23
22-DMP	31250.7	11.06
24-DMP	.0	.00
223-TMB	120.2	.04
CHEXANE	37803.0	13.38
33-DMP	.0	.00
11-DMCP	.0	.00
2-MHEX	16071.6	5.69
23-DMP	1632.4	.58
3-MHEX	9331.0	3.30
1C3-DMCP	6068.3	2.15
1T3-DMCP	5754.8	2.04
1T2-DMCP	.0	.00
3-EPENT	10444.0	3.70
224-TMP	.0	.00
NHEPTANE	.0	.00
1C2-DMCP	36795.2	13.02
MCH	598.0	.21

	TOTALS PPB	NORM PERCENT
ALL COMP	282606.	
GASOLINE	282606.	
NAPTHENES	138351.	48.96
C6-7	217251.	76.87

SIG COMP RATIOS

C1/C2	.52
A /D2	1.66
C1/D2	5.84
CH/MCP	.82
PENT/IPENT	2.10

	PPB	NORM PERCENT
MCP	45877.2	54.4
CH	37803.0	44.9
MCH	598.0	.7
TOTAL	84278.2	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77732 N DEPTH(M) = 3610.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	12978.4	2.36
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	4072.5	.74	3-EPENT	12978.4	2.36
IBUTANE	14272.3	2.59	224-TMP	.0	.00
NBUTANE	76057.5	13.82	NHEPTANE	.0	.00
IPENTANE	107169.2	19.47	1C2-DMCP	30042.9	5.46
NPENTANE	86185.0	15.66	MCH	751.4	.14
22-DMB	857.2	.16			
CPENTANE	.0	.00			
23-DMB	.0	.00			
2-MP	7408.6	1.35			
3-MP	956.4	.17			
NHEXANE	15579.6	2.83			
MCP	41874.1	7.61			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	9848.7	1.79			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	39021.4	7.09			
23-DMP	16014.4	2.91			
3-MHEX	59775.2	10.86			
1C3-DMCP	14521.2	2.64			

	TOTALS PPB	NORM PERCENT
ALL COMP	550364.	
GASOLINE	546292.	
NAPTHENES	110017.	20.14
C6-7	253386.	46.38

SIG COMP RATIOS

C1/C2	.44
A /D2	.26
C1/D2	.83
CH/MCP	.24
PENT/IPENT	.80

	PPB	NORM PERCENT
MCP	41874.1	79.8
CH	9848.7	18.8
MCH	751.4	1.4
TOTAL	52474.2	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77732 N DEPTH(M) = 3610.00

	TOTAL PPB	NORM PERCENT
METHANE	.0	
ETHANE	.0	
PROPANE	4072.5	.74
IBUTANE	14272.3	2.59
NBUTANE	76057.5	13.82
IPENTANE	107169.2	19.47
NPENTANE	86185.0	15.66
22-DMB	857.2	.16
CPENTANE	.0	.00
23-DMB	.0	.00
2-MP	7408.6	1.35
3-MP	956.4	.17
NHEXANE	15579.6	2.83
MCP	41874.1	7.61
22-DMP	.0	.00
24-DMP	.0	.00
223-TMB	.0	.00
CHEXANE	9848.7	1.79
33-DMP	.0	.00
11-DMCP	.0	.00
2-MHEX	39021.4	7.09
23-DMP	16014.4	2.91
3-MHEX	59775.2	10.86
1C3-DMCP	14521.2	2.64
1T3-DMCP	12978.4	2.36
1T2-DMCP	.0	.00
3-EPENT	12978.4	2.36
224-TMP	.0	.00
NHEPTANE	.0	.00
1C2-DMCP	30042.9	5.46
MCH	751.4	.14

	TOTALS PPB	NORM PERCENT
ALL COMP	550364.	
GASOLINE	546292.	
NAPTHENES	110017.	20.14
C6-7	253386.	46.38

SIG COMP RATIOS

C1/C2	.44
A /D2	.26
C1/D2	.83
CH/MCP	.24
PENT/IPENT	.80

	PPB	NORM PERCENT
MCP	41874.1	79.8
CH	9848.7	18.8
MCH	751.4	1.4
TOTAL	52474.2	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO. = 77732 P DEPTH(M) = 3640.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	4621.1	.73
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	10138.5	1.60	3-EPENT	9988.8	1.57
IBUTANE	23350.2	3.68	224-TMP	.0	.00
NBUTANE	44268.0	6.97	NHEPTANE	.0	.00
IPENTANE	93611.9	14.75	1C2-DMCP	5510.8	.87
NPENTANE	97599.3	15.38	MCH	710.0	.11
22-DMB	1336.9	.21			
CPENTANE	11420.0	1.80			
23-DMB	.0	.00			
2-MP	6659.0	1.05			
3-MP	61340.5	9.66			
NHEXANE	28161.6	4.44			
MCP	71882.2	11.32			
22-DMP	45017.0	7.09			
24-DMP	.0	.00			
223-TMB	212.0	.03			
CHEXANE	65512.1	10.32			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	23724.5	3.74			
23-DMP	4742.7	.75			
3-MHEX	17614.2	2.77			
1C3-DMCP	7365.8	1.16			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	634787.		C1/C2	.91
GASOLINE	624648.		A /D2	1.60
NAPTHENES	167022.	26.74	C1/D2	5.11
C6-7	285063.	45.64	CH/MCP	.91
			PENT/IPENT	1.04

	PPB	NORM PERCENT
MCP	71882.2	52.0
CH	65512.1	47.4
MCH	710.0	.5
TOTAL	138104.2	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1
SAMPLE NO. = 77732 R DEPTH(M) = 3670.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	3346.9	.56
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	20847.7	3.52	3-EPENT	9071.0	1.53
IBUTANE	74833.9	12.63	224-TMP	.0	.00
NBUTANE	8688.4	1.47	NHEPTANE	.0	.00
IPENTANE	76821.9	12.96	1C2-DMCP	39529.1	6.67
NPENTANE	85424.3	14.41	MCH	699.1	.12
22-DMB	1114.2	.19			
CPENTANE	10058.1	1.70			
23-DMB	.0	.00			
2-MP	5149.3	.87			
3-MP	48049.8	8.11			
NHEXANE	22904.1	3.86			
MCP	64440.4	10.87			
22-DMP	36666.9	6.19			
24-DMP	.0	.00			
223-TMB	141.4	.02			
CHEXANE	47563.9	8.03			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	13321.3	2.25			
23-DMP	6840.0	1.15			
3-MHEX	11288.3	1.90			
1C3-DMCP	5833.3	.98			

	TOTALS PPB	NORM PERCENT
ALL COMP	592633.	
GASOLINE	571785.	
NAPTHENES	171471.	29.99
C6-7	261645.	45.76

SIG COMP RATIOS

C1/C2	.50
A /D2	2.03
C1/D2	5.46
CH/MCP	.74
PENT/IPENT	1.11

	PPB	NORM PERCENT
MCP	64440.4	57.2
CH	47563.9	42.2
MCH	699.1	.6
TOTAL	112703.3	100.0

27/08/85

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C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1　　SAMPLE NO. = 77732 T　　DEPTH(M) = 3700.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	.0	.00
ETHANE	.0		1T2-DMCP	.0	.00
PROPANE	17.3	1.10	3-EPENT	.0	.00
IBUTANE	1.7	.11	224-TMP	.0	.00
NBUTANE	2.7	.17	NHEPTANE	662.3	42.29
IPENTANE	4.0	.26	1C2-DMCP	.0	.00
NPENTANE	7.9	.50	MCH	28.5	1.82
22-DMB	.0	.00			
CPENTANE	.0	.00			
23-DMB	.0	.00			
2-MP	1.3	.08			
3-MP	1.7	.11			
NHEXANE	10.3	.66			
MCP	14.7	.94			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	.0	.00			
CHEXANE	.0	.00			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	510.2	32.58			
23-DMP	.0	.00			
3-MHEX	303.4	19.37			
1C3-DMCP	.0	.00			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	1566.		C1/C2	36.65
GASOLINE	1549.		A /D2	2.22
NAPTHENES	43.	2.79	C1/D2	1.78
C6-7	1529.	98.75	CH/MCP	.00
			PENT/IPENT	1.97

	PPB	NORM PERCENT
MCP	14.7	34.0
CH	.0	.0
MCH	28.5	66.0
TOTAL	43.2	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO. = 77732 V DEPTH(M) = 3730.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	2891.6	1.37
ETHANE	.0		1T2-DMCP	5549.4	2.62
PROPANE	56.0	.03	3-EPENT	.0	.00
IBUTANE	126.8	.06	224-TMP	.0	.00
NBUTANE	374.0	.18	NHEPTANE	26657.9	12.59
IPENTANE	4706.6	2.22	1C2-DMCP	688.9	.33
NPENTANE	9297.2	4.39	MCH	64743.4	30.58
22-DMB	371.2	.18			
CPENTANE	1771.9	.84			
23-DMB	1389.3	.66			
2-MP	12665.4	5.98			
3-MP	6377.1	3.01			
NHEXANE	19527.7	9.22			
MCP	11743.0	5.55			
22-DMP	.0	.00			
24-DMP	527.1	.25			
223-TMB	57.2	.03			
CHEXANE	24248.3	11.45			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	5567.2	2.63			
23-DMP	4654.7	2.20			
3-MHEX	5673.2	2.68			
1C3-DMCP	2044.8	.97			

	TOTALS PPB	NORM PERCENT
ALL COMP	211710.	
GASOLINE	211654.	
NAPTHENES	113681.	53.71
C6-7	174574.	82.48

SIG COMP RATIOS	
C1/C2	4.13
A /D2	8.14
C1/D2	16.67
CH/MCP	2.06
PENT/IPENT	1.98

	PPB	NORM PERCENT
MCP	11743.0	11.7
CH	24248.3	24.1
MCH	64743.4	64.3
TOTAL	100734.7	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1 SAMPLE NO. = 77732 X DEPTH(M) = 3760.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	2751.6	1.44
ETHANE	.0		1T2-DMCP	5535.2	2.89
PROPANE	3.7	.00	3-EPENT	.0	.00
IBUTANE	82.7	.04	224-TMP	.0	.00
NBUTANE	265.2	.14	NHEPTANE	25254.2	13.19
IPENTANE	2157.0	1.13	1C2-DMCP	718.9	.38
NPENTANE	4740.1	2.47	MCH	65550.2	34.22
22-DMB	251.8	.13			
CPENTANE	1534.0	.80			
23-DMB	1109.3	.58			
2-MP	9612.6	5.02			
3-MP	4899.6	2.56			
NHEXANE	15618.9	8.15			
MCP	11071.9	5.78			
22-DMP	.0	.00			
24-DMP	417.8	.22			
223-TMB	55.3	.03			
CHEXANE	23659.9	12.35			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	4792.5	2.50			
23-DMP	4168.7	2.18			
3-MHEX	5060.0	2.64			
1C3-DMCP	2220.3	1.16			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	191531.		C1/C2	4.22
GASOLINE	191528.		A /D2	8.08
NAPTHENES	113042.	59.02	C1/D2	18.58
C6-7	166875.	87.13	CH/MCP	2.14
			PENT/IPENT	2.20

	PPB	NORM PERCENT
MCP	11071.9	11.0
CH	23659.9	23.6
MCH	65550.2	65.4
TOTAL	100281.9	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO. = 77732 Z   DEPTH(M) = 3790.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	4366.6	1.29
ETHANE	.0		1T2-DMCP	9112.3	2.69
PROPANE	204.1	.06	3-EPENT	.0	.00
IBUTANE	405.7	.12	224-TMP	.0	.00
NBUTANE	1695.8	.50	NHEPTANE	27319.4	8.07
IPENTANE	6444.2	1.90	1C2-DMCP	844.7	.25
NPENTANE	19271.8	5.69	MCH	90725.3	26.80
22-DMB	408.9	.12			
CPENTANE	7540.4	2.23			
23-DMB	2310.2	.68			
2-MP	19729.1	5.83			
3-MP	9681.0	2.86			
NHEXANE	34049.8	10.06			
MCP	31097.1	9.19			
22-DMP	.0	.00			
24-DMP	295.8	.09			
223-TMB	48.5	.01			
CHEXANE	54043.2	15.96			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	4977.6	1.47			
23-DMP	4788.9	1.41			
3-MHEX	5446.9	1.61			
1C3-DMCP	3749.8	1.11			

	TOTALS PPB	NORM PERCENT
ALL COMP	338557.	
GASOLINE	338353.	
NAPTHENES	201479.	59.55
C6-7	270866.	80.05

SIG COMP RATIOS

C1/C2	3.05
A /D2	11.27
C1/D2	27.49
CH/MCP	1.74
PENT/IPENT	2.99

	PPB	NORM PERCENT
MCP	31097.1	17.7
CH	54043.2	30.7
MCH	90725.3	51.6
TOTAL	175865.5	100.0

27/08/85

ESSO AUSTRALIA LTD.

C4-C7 HYDROCARBON ANALYSES

REPORT = UNSPEC. ANALYSIS

BASIN - GIPPSLAND
WELL - GRUNTER 1

SAMPLE NO. = 77733 B   DEPTH(M) = 3809.00

	TOTAL PPB	NORM PERCENT		TOTAL PPB	NORM PERCENT
METHANE	.0		1T3-DMCP	216.3	.21
ETHANE	.0		1T2-DMCP	530.5	.51
PROPANE	802.0	.77	3-EPENT	.0	.00
IBUTANE	2987.4	2.88	224-TMP	.0	.00
NBUTANE	14402.4	13.88	NHEPTANE	2340.0	2.26
IPENTANE	18561.2	17.89	1C2-DMCP	41.3	.04
NPENTANE	25111.3	24.20	MCH	3460.3	3.34
22-DMB	182.2	.18			
CPENTANE	2354.2	2.27			
23-DMB	658.2	.63			
2-MP	7223.3	6.96			
3-MP	3614.6	3.48			
NHEXANE	11127.9	10.73			
MCP	4451.3	4.29			
22-DMP	.0	.00			
24-DMP	.0	.00			
223-TMB	105.9	.10			
CHEXANE	2977.4	2.87			
33-DMP	.0	.00			
11-DMCP	.0	.00			
2-MHEX	1166.4	1.12			
23-DMP	146.8	.14			
3-MHEX	1240.5	1.20			
1C3-DMCP	52.6	.05			

	TOTALS PPB	NORM PERCENT	SIG COMP RATIOS	
ALL COMP	103754.		C1/C2	1.44
GASOLINE	102952.		A /D2	10.86
NAPTHENES	14084.	13.68	C1/D2	6.13
C6-7	27857.	27.06	CH/MCP	.67
			PENT/IPENT	1.35

	PPB	NORM PERCENT
MCP	4451.3	40.9
CH	2977.4	27.3
MCH	3460.3	31.8
TOTAL	10889.0	100.0

APPENDIX 2

Detailed Vitrinite Reflectance and Exinite Fluorescence
- Report by A.C. Cook

1962L:9

GRUNTER NO. 1

KK No.	Esso No.	Depth m	$\bar{R}_v$ max %	Range R_v max %	N	Exinite fluorescence (Remarks)
			Lakes Entrance Formation			
x1572	77610-B	1783.1 SWC	0.32	-	1	Sparse phytoplankton, greenish yellow to yellow orange, rare sporinite, orange. (Claystone.
		$\bar{R}_I$	1.05	0.92-1.16	4	Dom sparse, E>I>V. Exinite sparse, inertinite and vitrinite rare. Sparse foraminifer tests. Common carbonate. Abundant pyrite.)
			Latrobe Group			
x1573	77608-Z 2009m	0.41 SWC	0.31-0.54		5	Rare cutinite, orange to dull orange. (Sandy siltstone. Dom rare, V>E>I. All macerals rare.
		$\bar{R}_I$	1.24	0.88-1.48	3	Abundant pyrite.)
x1574	77608-M 2213m	0.39 SWC	0.30-0.51		6	Rare liptodetrinite, yellow to orange, rare cutinite, orange. (Sandy siltstone. Dom rare
		$\bar{R}_I$	1.25	1.20-1.29	2	to sparse, E>V>I. All macerals rare. Abundant carbonate and pyrite.)
x1575	77608-I	2340.1 SWC	0.42	0.32-0.53	26	Sparse phytoplankton and sporinite, yellow to orange, rare cutinite, yellow orange to orange, rare resinite, orange. (Sandy siltstone. Dom abundant, I>V>E. Inertinite abundant, vitrinite common, exinite sparse. Sparse carbonate. Abundant pyrite.)
x1576	77608-E	2425 SWC	0.46	0.35-0.62	28	Sparse sporinite and phytoplankton, yellow to orange, rare cutinite, yellow orange to orange. (Silty claystone. Dom abundant, I>V>E. Inertinite abundant, vitrinite common to abundant, exinite common. Abundant pyrite.)
x1577	77607-W	2645 SWC	0.55	0.40-0.66	28	Sparse sporinite and liptodetrinite, yellow to orange, sparse cutinite, yellow to dull orange. (Siltstone. Dom abundant, I>V>E. Inertinite abundant, vitrinite and exinite common. Abundant carbonate and pyrite.)
x1578	77607-P	2836 SWC	0.64	0.54-0.79	27	Abundant sporinite and cutinite, yellow to dull orange, common resinite, orange. (Claystone>>coal. Coal rare, V>E>I. Duroclarite. Dom major, E>I>V. Exinite and inertinite major, vitrinite abundant. Coaly inclusions of duroclarite common in claystone.)
x1579	77606-Y	3125 SWC	0.57	0.50-0.67	27	Abundant sporinite and cutinite, yellow orange to dull orange. (Siltstone. Dom abundant, I>E>V. All macerals abundant. Abundant pyrite.)
x1580	77606-I	3359.8 SWC	0.65	0.49-0.79	28	Sparse sporinite, orange to dull orange, rare cutinite, yellow to orange. (Siltstone. Dom abundant, I>V>E. Inertinite and vitrinite abundant, exinite sparse. Abundant carbonate and pyrite.)
x1581	77606-B	3527 SWC	0.74	0.61-0.85	40	Common sporinite, yellow to orange, sparse cutinite, yellow orange. (Claystone. Dom abundant, V>E>I. Vitrinite abundant, exinite common, inertinite sparse. Common pyrite.)

GRUNTER NO. 1

KK No.	Esso No.	Depth m	$\bar{R}_v$ max %	Range R_v max %	N	Exinite fluorescence (Remarks)
x1627	77261-J	3578.5 SWC	0.94	0.80-1.06	27	Rare sporinite and rare cutinite, dull orange, rare ?tasmanitids, yellow. (Coal>>siltstone. Coal dominant, V>>E, vitrite>>clarite. Dom sparse, V>I>E. Vitrinite sparse, inertinite and exinite rare. Common active green oil cut from vitrite.)
x1628	77621-T	3679 SWC	0.84	0.73-0.93	27	Sparse ?sporinite, dull orange. (Shaly coal, V>>?E>I. Common active green oil cuts. Abundant pyrite.)
x1629	77621-D	3746 SWC	0.76	-	1	Rare ?liptodetrinite, orange. (Claystone. Dom rare, I>?E>V. Inertinite sparse, ?exinite and vitrinite rare. Mineral fluorescence, strong, yellow orange. Rare carbonate.)
		$\bar{R}_I$	1.74	1.54-1.84	5	
x1630	77621-A	3797 SWC	0.83	0.72-0.93	14	No exinite fluorescence. (Siltstone>coal. Coal sparse, V=I, vitrite and inertite. Dom rare. I>or=V. Inertinite and vitrinite rare, exinite absent. Common carbonate. Rare pyrite.)

APPENDIX 7

APPENDIX 7

SYNTHETIC SEISMIC TRACE

SYNTHETIC SEISMIC TRACE

PARAMETERS

WELL:	Grunter-1
TD:	3809m KB
KB:	21 m
WATER DEPTH:	108 mSS
POLARITY:	Trough represents acoustic impedance increase.
PULSE TYPE:	Zero phase, second derivative gaussian function.
PEAK FREQUENCY:	25 hz
SAMPLE INTERVAL:	2m
CHECK SHOT CORRECTIONS:	Linear interpolation after calculating reflection coefficients.

2061L/49

PE902457

This is an enclosure indicator page.
The enclosure PE902457 is enclosed within the container PE902456 at this location in this document.

The enclosure PE902457 has the following characteristics:

ITEM_BARCODE = PE902457
CONTAINER_BARCODE = PE902456
NAME = Synthetic Seismic trace
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = SYNTH_SEISMOGRAM
DESCRIPTION = Synthetic Seismic trace
REMARKS =
DATE_CREATED = 01/01/1986
DATE_RECEIVED = 01/05/1986
W_NO = W879
WELL_NAME = Grunter-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX 8

APPENDIX 8

SIDEWALL CORE THIN SECTION DESCRIPTIONS

A PETROLOGICAL STUDY OF SIDEWALL CORE SAMPLES FROM GRUNTER NO. 1, GIPPSLAND BASIN, VICTORIA

by

Kenneth Richard Martin MSc, PhD

A report to:

Esso Australia Ltd.,
127 Kent Street,
Sydney, New South Wales

23rd April, 1985

C O N T E N T S

	Page
SUMMARY	
1. INTRODUCTION	1
2. SAMPLING PROGRAM	1
3. ANALYTICAL PROGRAM	1
3.1 Thin-section Analysis	
3.2 X-Ray Diffraction Analysis	
4. TEXTURE	2
4.1 Grain Size	
4.2 Sorting	
Table 1. Grain size Analyses	
5. COMPOSITION	4
5.1 Thin-section Analysis	
Table 2. Thin-section Analyses	
5.2 Clay Mineralogy	
Table 3. Clay Mineralogy	
6. DIAGENESIS	7
7. RESERVOIR QUALITY	9
8. CONCLUSIONS	10
Appendix 1. Grain size comparison table	

SUMMARY

The three sidewall core samples from Grunter #1 are fine and very fine grained, moderately sorted sandstones with relatively low quartz content but containing significant amounts of rock fragments, mica and feldspar.

Porosity loss has resulted from the widespread growth of two authigenic clays, kaolinite and illite containing a small mixed layer smectite component. These clays have developed following the breakdown of unstable framework grains such as feldspars, micas and micaceous rock fragments and clays have occupied virtually all available intergranular space. Further porosity reduction has also resulted from grain suturing, quartz overgrowth cementation and siderite cementation although these processes are less important than authigenic clay formation.

The resulting sandstones are clay-rich and microporous with low porosity and permeability. The high clay content in what had been previously interpreted as clean sands is the likely explanation for differences between neutron and density log porosities recorded over the interval.

1. INTRODUCTION

This study was undertaken in order to identify the cause of discrepancies between density and neutron log porosities within what had been interpreted as clean sands in Grunter #1.

2. SAMPLING PROGRAM

Three sidewall core samples were provided from the following depths:-

Sidewall Core No.	Depth
212	3571.0m
231	3665.8m
198	3683.5m

In many instances sidewall cores may suffer severe textural disruption due to the impact of the coring device, but in this case thin-sections of the samples showed that damage was minimal in Cores 212 and 198 and although more grain shattering was evident in Core 231, the rock had not suffered serious textural disruption.

3. ANALYTICAL PROGRAM

3.1 Thin-Section Analysis

The thin-sections were impregnated with blue dyed epoxy resin to assist in pore space recognition and all sections were cut and ground in kerosene to reduce any risk of sample damage due to freshwater sensitivity. Mineral composition and visible porosity were determined by point counting 300 points per sample.

Grain size analysis was carried out in thin-section by measuring the long dimension of 100 grains in each sample. From this measurement the mean grain size and the sorting (standard deviation) were calculated.

Thin-sections were also used to study the diagenetic changes which had occurred in the sandstones during their burial and photomicrographs of each thin-section were taken to illustrate the characteristics of the sandstones, particularly their porosity and the effects of diagenesis.

3.2 X-Ray Diffraction Analysis

XRD analysis was used to determine the clay mineralogy of the samples. Analysis of a separated fine fraction enables detection and identification of clay minerals even when they are present in only small amounts. The procedure involves analysis of an orientated clay sample first in air-dried form and then after treatment with ethylene glycol to identify any swelling clays present. This qualitative analysis of the fine fraction can also generally be used to identify other cementing minerals such as carbonates which may be present in the samples.

Semi-quantitative XRD analysis was used to measure the amount of each of the major clays present in the samples. This technique uses selective scanning of specific clay peaks which are calibrated against an internal standard. The analysis is carried out on a powdered whole rock sample.

4. TEXTURE

The results of the grain size analyses are listed in Table 1. Grain size measurements were recorded in Phi (ϕ) units using 0.25ϕ class intervals. The use of Phi units enables the ready quantifying of parameters such as sorting. A Wentworth and Phi grain size comparison table is included as Appendix 1.

4.1 Grain Size

Core 231 is the most coarse grained of the three samples. Its mean grain size (2.25ϕ, 0.21mm) places it in the upper part of the fine sand range. The other two samples are both very fine sandstones, the finest being Core 212 with a mean grain size of 3.82ϕ (0.071mm) which places it near the siltstone boundary. Core 198 is slightly coarser with a mean grain size of 3.50ϕ, (0.088mm).

The very fine grained nature of Core 212 and its depth with reference to the gamma ray log, suggests that it may have come from just above the main sand body which is likely to be coarser grained than this sample. The other two samples appear to come from within well defined sands, assuming there are no discrepancies between driller and logger depths.

4.2 Sorting

Sorting may be quantified using the ϕ Standard Deviation with the following class divisions usually applied:

Class	ϕ Standard Deviation
well sorted	$<0.5\phi$
moderately sorted	0.5-1.0ϕ
poorly sorted	1.0-2.0ϕ
very poorly sorted	$>2.0\phi$

All three samples are moderately sorted with very similar sorting values which range from 0.70ϕ in Core 212 to 0.76ϕ in Core 231.

Core No.	Depth	Mean Grain Size		Sorting	
		ϕ	mm	ϕ Std. Dev.	Class
212	3571.0m	3.82	0.071	0.70	Moderate
231	3665.8m	2.25	0.21	0.76	Moderate
198	3683.5m	3.50	0.088	0.73	Moderate

TABLE 1. GRAIN SIZE ANALYSES

5. COMPOSITION

5.1 Thin-Section Analysis

Results of the thin-section point count analyses are given in Table 2. These results indicate that the three samples clearly do not represent clean sands. Quartz content is low and averages only 41.5% with Core 212 being the lowest at 29.9%. Small amounts of chert (av. 1.0%) are also present.

The two finer grained samples (Cores 212 and 198) each contain 5.0% feldspar whereas in Core 231 only traces (0.7%) of feldspar are present. Many of the feldspar grains in all samples are highly altered to clays making specific identification difficult, but the majority of grains appear to be potash feldspars (orthoclase) although some relatively fresh grains of plagioclase (oligoclase) were also visible.

All samples contain considerable amounts of rock fragments which collectively average 11.2% of the rocks. Of this total, metamorphic rock fragments are most abundant (av. 5.6%) followed by sedimentary rock fragments (av. 3.6%) and igneous rock fragments (av. 2.0%).

The metamorphic rock fragments consist mostly of mica schist and phyllite while sedimentary rock fragments are micaceous siltstone and shale. The igneous rock fragments are difficult to specifically identify due to their degree of alteration but most appear to be of acid volcanic origin.

Mica is also an abundant constituent of the samples. It averages 7.3% with the finer grained rocks containing most mica. Most of the fresh mica present is muscovite whereas biotite is usually highly altered and has often partly decomposed to illite or in some places, has been replaced by siderite.

Core No.	Depth	Quartz	Chert	Feldspar	Igneous Rock Fragments	Metamorphic Rock Fragments	Sedimentary Rock Fragments	Mica	Heavy Minerals	Opaque Material	Carbonate	Clay	Visible Porosity
212	3571.0m	29.9	0.3	5.0	1.0	3.7	3.3	10.3	0.3	5.0	13.6	27.6	–
231	3665.8m	45.7	1.0	0.7	3.0	8.3	4.3	4.0	–	1.0	1.7	29.7	0.7
198	3683.5m	49.0	1.7	5.0	2.0	4.7	3.3	7.7	0.3	–	0.6	25.3	0.3

TABLE 2. THIN-SECTION ANALYSES

Non-opaque heavy minerals are rare and occur as no more than a few isolated grains in the three samples. Tourmaline is the most abundant mineral but a few grains of zircon were also noted.

Opaque material in the rocks is predominantly carbonaceous fragments which are most abundant in Core 212. Small amounts of leucoxene were also seen.

Siderite is the only carbonate mineral to occur in the rocks. It is present in all three samples but is abundant only in Core 212 where it makes up 13.6% of the rock. The siderite occurs mostly as irregularly distributed patches consisting of aggregates of fine grained, granular crystals which are usually below 100μm in diameter (Plate 1,Figure 2). The appearance of the larger patches of siderite suggests that they are a replacement of other fragments, possibly shale or mud-stone clasts although some siderite has replaced biotite mica and a small amount of the siderite is disseminated throughout the rock.

Clay content in all three samples is high and averages 27.5%. Clay content measured in thin-section includes variable amounts of microporosity which is interstitial between the clay crystals and cannot be separately resolved under the optical microscope. Consequently these clay values are usually higher than those obtained by semi-quantitative XRD analysis which does not include the microporosity.

Visible porosity is a measure of the larger pores which can be seen under the optical microscope. Microporosity is excluded from this measure. Visible porosity is low in all three samples which is a reflection of the clay-rich and microporous character of the rocks.

5.2 Clay Mineralogy

Results of the XRD analyses are given in Table 3. The main clay present in all three samples is kaolinite. This clay appears to be mainly of authigenic origin and has developed from the decomposition of unstable grains such as feldspars, micas and some rock fragments. Particularly in Core 231, much of this kaolinite is extremely coarse grained with crystal sizes around 30µm apparent in many parts of the rock. The kaolinite occurs as a pore filling of randomly orientated platy crystals (Plate 1, Figure 4).

The other main clay present is illite which contains a very small mixed layer component of smectite (probably around 10%) which results in a slight swelling tendency in this clay. The illite also seems to be mainly authigenic in origin and has formed from the breakdown of micas and micaceous rock fragments. As well as this authigenic clay, some of the illite component probably includes very fine grained detrital mica.

Semi-quantitative XRD analysis results indicate more variation in clay content than is suggested from thin-sections. This may indicate some sample inhomogeneity within the sidewall cores. Core 231 has an extremely high clay content (28%) despite being the coarsest of the three samples. This high value is due not only to almost complete filling of all intergranular space by clay but also to the extensive alteration of many rock fragments to clay.

Core 198 has the lowest clay content (9%) with kaolinite only slightly more abundant than illite.

6. DIAGENESIS

Diagenetic changes have been responsible for considerable loss of porosity and permeability in the three samples. The most important and widespread diagenetic process is the formation

		QUALITATIVE XRD ANALYSIS CLAY FRACTION			SEMI-QUANTITATIVE XRD ANALYSIS WHOLE ROCK SAMPLE		
Core No.	Depth	Kaolinite	Illite	Smectite	Kaolinite	Illite	Total Clay
212	3571.0m	X	X	T	10	5	15
231	3665.8m	X	X	T	16	12	28
198	3683.5m	X	X	-	5	4	9

X = Major   M = Minor   T = Trace   (Relative abundance in clay fraction)

TABLE 3. CLAY MINERALOGY

of authigenic clays. These clays have occupied all available pore space causing porosity reduction and also causing almost all remaining porosity to be of the microporosity type and not conducive to high permeability. These clays have developed following the decomposition of a variety of unstable grains including feldspars, micas and micaceous rock fragments.

Dissolution at grain margins to form sutured grain contacts has also contributed to porosity reduction. This process is best developed in Core 212 but also occurs to a lesser extent in Core 198 and occasionally in Core 231. The effect of grain suturing is to cause the grains to become tightly interlocked with little or no intergranular porosity between them. This process appears to occur following the commencement of decomposition of micas and micaceous rock fragments with the result that the grain contacts are often lined with partly decomposed mica or illite.

Cementation is not the main cause of porosity reduction in these samples although some porosity loss is attributable to the effects of cementation. Quartz overgrowth cements are moderately well developed in only one sample (Core 198) where in some places the overgrowths have completely eliminated intergranular porosity (Plate 2,Figure 2). Quartz overgrowths are only poorly developed in Core 212 and they have been almost totally inhibited by the presence of clay in Core 231. Siderite cement also makes some contribution to porosity reduction particularly in Core 212 but most of the siderite occurs as grain replacements rather than as intergranular pore-filling cement.

In Cores 231 and 198 a few isolated, unstable grains have dissolved to form rare secondary pores. However, such pores are isolated and make little contribution to porosity and permeability.

7. RESERVOIR QUALITY

All three samples are poor quality reservoir rocks. They have low porosity and contain considerable clay. Almost all the remaining porosity in the rocks is microporosity which is interstitial between crystals of authigenic clay. In such sandstones irreducible water saturations are likely to be high and permeabilities will be low. They are clearly not clean sands as had been originally interpreted.

The abundance of clay in the samples is the most probable cause of the discrepancy between density and neutron log porosities as the neutron log will tend to read the clay-filled intergranular spaces as porosity whereas the clay will increase the bulk density and hence supress the density porosity values.

8. CONCLUSIONS

1. The three sidewall cores studied are fine and very fine grained, moderately sorted sandstones with relatively low quartz content. They contain considerable amounts of mica, rock fragments and some feldspar and many of these grains are extensively decomposed to clays.

2. Clay content is high with almost all pore space filled by clays. Kaolinite and illite are the main clays present and both are predominantly of authigenic origin.

3. Diagenetic changes have caused porosity reduction with authigenic clay formation being the most important process. Additional porosity loss has resulted from grain suturing, quartz overgrowth cementation and minor siderite cementation.

4. The three samples are poor quality reservoir rocks. They are clay-rich and microporous and the abundance of clay appears to provide and explanation for the difference between density and neutron log porosities within the interval.

APPENDIX 1 GRAIN SIZE COMPARISON CHART

Millimetres		Microns	Phi (φ)	Wentworth Size Class	
	4096		-12	Boulder (-8 to -12φ)	GRAVEL
	1024		-10		
	256		- 8	Cobble (-6 to -8φ)	
	64		- 6		
	16		- 4	Pebble (-2 to -6φ)	
	4		- 2		
	3.36		- 1.75	Granule	
	2.83		- 1.5		
	2.38		- 1.25		
	2.00		- 1.0		
	1.68		- 0.75	Very coarse sand	SAND
	1.41		- 0.5		
	1.19		- 0.25		
	1.00		0.0		
	0.84		0.25	Coarse sand	
	0.71		0.5		
	0.59		0.75		
1/2	0.50	500	1.0		
	0.42	420	1.25	Medium sand	
	0.35	350	1.5		
	0.30	300	1.75		
1/4	0.25	250	2.0		
	0.210	210	2.25	Fine sand	
	0.177	177	2.5		
	0.149	149	2.75		
1/8	0.125	125	3.0		
	0.105	105	3.25	Very fine sand	
	0.088	88	3.5		
	0.074	74	3.75		
1/16	0.0625	62.5	4.0		
	0.053	53	4.25	Coarse silt	MUD
	0.044	44	4.5		
	0.037	37	4.75		
1/32	0.031	31	5.0		
1/64	0.0156	15.6	6.0	Medium silt	
1/128	0.0078	7.8	7.0	Fine silt	
1/256	0.0039	3.9	8.0	Very fine silt	
	0.0020	2.0	9.0	Clay	
	0.00098	0.98	10.0		
	0.00049	0.49	11.0		
	0.00024	0.24	12.0		
	0.00012	0.12	13.0		
	0.00006	0.06	14.0		

ENCLOSRUES

PE902462

This is an enclosure indicator page.
The enclosure PE902462 is enclosed within the container PE902456 at this location in this document.

The enclosure PE902462 has the following characteristics:

ITEM_BARCODE = PE902462
CONTAINER_BARCODE = PE902456
NAME = Geological Cross Section
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = CROSS_SECTION
DESCRIPTION = Geological Cross Section
REMARKS =
DATE_CREATED = 01/05/1985
DATE_RECEIVED = 01/05/1986
W_NO = W879
WELL_NAME = Grunter-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902458

This is an enclosure indicator page.
The enclosure PE902458 is enclosed within the container PE902456 at this location in this document.

The enclosure PE902458 has the following characteristics:

ITEM_BARCODE = PE902458
CONTAINER_BARCODE = PE902456
NAME = Depth Structure Map Top of Latrobe Group
BASIN = GIPPSLAND
PERMIT =
TYPE = SEISMIC
SUBTYPE = HRZN_CONTR_MAP
DESCRIPTION = Depth Structure Map Top of Latrobe Group
REMARKS =
DATE_CREATED = 01/05/1984
DATE_RECEIVED = 01/05/1986
W_NO = W879
WELL_NAME = Grunter-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902459

This is an enclosure indicator page.
The enclosure PE902459 is enclosed within the container PE902456 at this location in this document.

The enclosure PE902459 has the following characteristics:

ITEM_BARCODE = PE902459
CONTAINER_BARCODE = PE902456
NAME = Depth Structure Map Base of Tuna-Founder Channel
BASIN = GIPPSLAND
PERMIT =
TYPE = SEISMIC
SUBTYPE = HRZN_CONTR_MAP
DESCRIPTION = Depth Structure Map Base of Tuna-Flounder Channel (enclosure from WCR) for Grunter-1
REMARKS =
DATE_CREATED = 01/05/1984
DATE_RECEIVED = 01/05/1986
W_NO = W879
WELL_NAME = Grunter-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

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PE902460

This is an enclosure indicator page.
The enclosure PE902460 is enclosed within the container PE902456 at this location in this document.

The enclosure PE902460 has the following characteristics:

ITEM_BARCODE =	PE902460
CONTAINER_BARCODE =	PE902456
NAME =	Depth Structure Map Mid Paleocene Marker
BASIN =	GIPPSLAND
PERMIT =	
TYPE =	SEISMIC
SUBTYPE =	HRZN_CONTR_MAP
DESCRIPTION =	Depth Structure Map Mid Paleocene Marker
REMARKS =	
DATE_CREATED =	01/05/1984
DATE_RECEIVED =	01/05/1986
W_NO =	W879
WELL_NAME =	Grunter-1
CONTRACTOR =	ESSO
CLIENT_OP_CO =	ESSO

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PE902461

This is an enclosure indicator page.
The enclosure PE902461 is enclosed within the container PE902456 at this location in this document.

The enclosure PE902461 has the following characteristics:

ITEM_BARCODE =	PE902461
CONTAINER_BARCODE =	PE902456
NAME =	Structure Map T.lilliei Seismic Marker
BASIN =	GIPPSLAND
PERMIT =	
TYPE =	SEISMIC
SUBTYPE =	HRZN_CONTR_MAP
DESCRIPTION =	Structure Map T.lilliei Seismic Marker
REMARKS =	
DATE_CREATED =	01/03/1986
DATE_RECEIVED =	01/05/1986
W_NO =	W879
WELL_NAME =	Grunter-1
CONTRACTOR =	ESSO
CLIENT_OP_CO =	ESSO

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PE601198

This is an enclosure indicator page.
The enclosure PE601198 is enclosed within the container PE902456 at this location in this document.

The enclosure PE601198 has the following characteristics:

ITEM_BARCODE = PE601198
CONTAINER_BARCODE = PE902456
NAME = Well Completion Log
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = COMPLETION_LOG
DESCRIPTION = Well Completion Log
REMARKS =
DATE_CREATED = 28/11/1984
DATE_RECEIVED = 01/05/1986
W_NO = W879
WELL_NAME = Grunter-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)