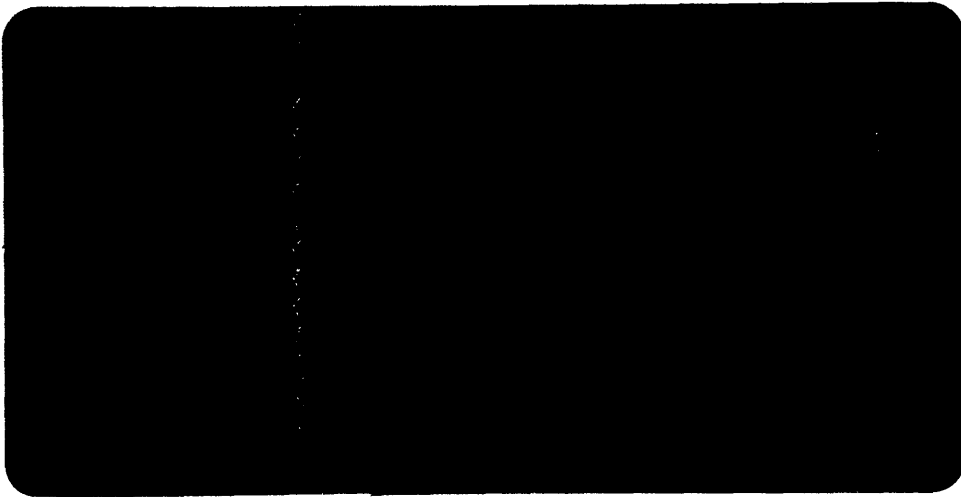


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NYRALLAH-1

ATTACHMENT 8 to WCR

ATTACHMENT 8 **CONFIDENTIAL**

FORAMINIFERAL SEQUENCE
AND CORRELATION OF
WYRALLAH NO. 1 W.C.R.
VIC/P17

26 FEB 1985

BY: DAVID TAYLOR

OIL and GAS DIVISION

FORAMINIFERAL SEQUENCE
and CORRELATION of
WYRALLAH # 1,
GIPPSLAND BASIN.

for: AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

June 21st, 1984.

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INTRODUCTION

Twelve sidewall cores were examined from WYRALLAH # 1, between 1075 and 785 metres. No foraminifera were found in the four basal samples (at 1075, 936.5, 880 and 878 metres); whilst numerically sparse, yet biostratigraphically diagnostic faunas were present in the other samples.

The sequence is divisible into FOUR UNITS. The upper three are clearly discernible on biostratigraphic, lithological and E-log characteristics and are separated from each other by unconformities. These units are numbered in ascending order from I (lowest) to IV (highest) and are discussed below in that order.

Table 1 (on page 4) gives a correlation of the Wyrallah # 1 sequence Units with similar sequences on the western margin of the Gippsland Basin; namely Kyarra # 1 and Woodside South # 1.

Table 2, at the back of this report, shows the distribution of foraminifera and other sediment grains.

UNIT I - 1075 to 878m (E-Log top at 875m) = Mid to Late Eocene on Palynological Criteria.

No foraminifera or other fossil fauna present in this unit. The residue sediment grains were predominated by frosted and fractured quartz grains which are indicative of aeolian mechanisms of transport and abrasion. This indication of the presence of a barrier bar, dune system in the vicinity of the depositional site of Wyrallah # 1, is confirmed by the sporadic distribution of dinoflagellates within the sequence (refer Palynology Report by Helene Martin). For comments regarding boundary at top of unit, see section on *Cobia Event* on next page.

UNIT II - 870 to 865m (E-Log top at 862m) = Early Oligocene (Zone J).

The planktonic faunas were numerically sparse; less than ten specimens present in each sample. However, the association of *Globigerina angiporoides angiporoides* and *G. tripartita* is typical of a lower Oligocene, minimal layer (shallow water) Zone J assemblage. A shallow water, high energy facies regime is confirmed by the benthonic assemblages; dominated by thick walled species of *Cassidulina* and *Cibicides*. Dark green pellet glauconite and recrystallised limestone help to correlate this unit with the *Greensand* and *Colquhoun Sands* Members of the *Lakes Entrance Formation*.

COBIA EVENT HIATUS at 862m (E-Log).

An unconformity was apparent between the sidewall core at 865 and 851 metres; in view of changes in both foraminiferal assemblages and residue grain character. The sample at 865m represented Zone J (early Oligocene) whilst that at 851 and 845m were placed high in Zone I-1 or within Zone H-1 (latest Oligocene). This implies that an hiatus was present with a time span of approximately 7 million years. Therefore this hiatus can be equated with the *Cobia Event* as is clearly illustrated in a core recovered from Woodside South # 1, on the western margin of the Gippsland Basin (Martin & Taylor, 1983). However, it is noted that the Early Oligocene (Zone J) sediment was either not deposited or not preserved in Woodside South, whilst an abbreviated representation of Early Oligocene was present in Wyrallah. Also it is uncertain whether sedimentation in Wyrallah was uninterrupted between the late Eocene and Early Oligocene because of unavoidable disruption of biostratigraphic control from palynological to planktonic foraminiferal methods.

UNIT III - 851 to 825m (E-Log top at 820m) = Late Oligocene to Early Miocene (Zone I-1 to H-1).

Although the planktonic assemblages are neither numerically abundant or specifically diverse, the presence of such species as *Globigerina euapertura*, *G. woodi woodi*, *Globoquadrina dehiscens*, *Globorotalia praescitula* and *Catapydrax dissimilis* is indicative of a chronostratigraphic position straddling the Oligo/Miocene boundary in the Austral region (Jenkins, 1974). Similar faunas were present above the *Cobia Event* in Woodside South # 1 (Martin & Taylor, 1983) and above a probable hiatus in Kyarra # 1 (Taylor, 1983 and discussion below).

The benthonic fauna were those of shallow, high energy, inner continental shelf environments. Presence of abraded fragments of echinoids, mollusca and bryozoa increased up section.

The lower two samples of the Unit, display the effects of reworking of older sediments as they contain both dark green pellet glauconite and frosted and fractured quartz sand grains. The highest sample at 825m is predominantly a biomicrite. The unit III is thus correlated with the *Marl Member* of the *Lakes Entrance Formation*.

UNIT IV - 815 to 785m = Mid Miocene (Zones E-1 & D).

The presence of *Orbulina suturalis* at 815m places the base of this unit at the very base of the Mid Miocene and consequently demonstrates that there was a bounding hiatus between Unit IV and the underlying Unit III. This hiatus had a time span of approximately 9 million years.

The sediment was a biogenic calcarenite; dominated by bryozoal fragments. Not only did the grain size coarsen up-sequence, but the bryozoa fragments became less abraded. This feature, together with the overall nature of the benthonic foraminiferal assemblages, suggest a low energy, shallow water, inner shelf regime. The Unit IV is correlated with the coarse grained *Bairnsdale Limestone Member* of the *Gippsland Limestone*.

Correlation between Wyrallah # 1, Kyarra # 1 and Woodside South # 1.
(refer to Martin & Taylor, 1983 and Taylor, 1983).

In all probability, the correlation on Table 1 (next page) is a realistic one, although because of sparse faunas or poor recoveries of micro floras, cannot be confirmed on biostratigraphic grounds.

REFERENCES.

JENKINS, D.G., 1974 - Paleogene Planktonic Foraminifera of New Zealand and the Austral Region. *Jour. Foram. Res.*4(4); 155-170.

MARTIN, Helene A & TAYLOR, David, 1983 - Biostratigraphy and Paleoenvironment of Woodside South # 1, Gippsland Basin. for Australian Aquitaine Petroleum Pty. Ltd. September 28, 1983.

TAYLOR, David, 1983 - Foraminiferal Sequence in Kyarra # 1, Gippsland Basin. for Australian Aquitaine Petroleum Pty. Ltd. March 14, 1983.

WYRALLAH # 1	KYARRA # 1	WOODSIDE SOUTH # 1
MID MIOCENE UNIT IV (Bairnsdale Lst.) 820m - ? ~~~~~	No samples submitted	EARLY/MID MIOCENE 410m - ? Base of unit may have been just below mid/Early Miocene boundary ~~~~~ ? ~~~~~ ? ~~~~~ ~~~~~ ? ~~~~~ ? ~~~~~
~~~~~ EARLY MIOCENE/LATE OLIGOCENE UNIT III Marl Member - Lakes Entrance Formation 851 - 825m ~~~~~	EARLY MIOCENE to ? LATE OLIGOCENE 1003.5-980m  ~~~~~ COBIA EVENT ~~~~~	EARLY MIOCENE to LATE OLIGOCENE 410m - 598.4m Top of Unit may be slightly younger = Zone G, but base purely on cuttings.
EARLY OLIGOCENE UNIT II Greensand and Colquhoun Members of Lakes Entrance Formation. 870 - 865m ----- ? ----- ? -----	? Age Greensand 1026-1013m	Correlate not represented  ~~~~~
LATE EOCENE UNIT I ?Colquhoun Sands? 936.5 - 878m	?	LATE EOCENE glauconitic clay ≈600 - 598.4m

TABLE 1: CORRELATION OF BIOSTRATIGRAPHIC, LITHOLOGICAL  
and E-LOG UNITS in WYRALLAH # 1 with KYARRA # 1  
and WOODSIDE SOUTH # 1.

by David Taylor, June 21st, 1984.

refer also to Martin & Taylor (1983) and Taylor (1983).

SIDEWALL CORES Depth in metres	PLANKTONIC FORAMINIFERA	SHALLOW WATER BENTHONIC FORAMINIFERA	BIOGENIC COMPONENTS		RESIDUE LITHOLOGY		ZONE & E-LOG UNIT DEPTHS	
			% PLANKS		MINOR COMPONENTS	MAJOR COMPONENTS		
785.0 _±	<i>G'ina angiporoides</i> (S.S.) <i>G'ina praebulloides</i> <i>G'ina tripartita</i> <i>G'ina euapertura</i> <i>G'ina woodi woodi</i> <i>G'quad dehiscens</i> (S.L.) <i>Cat. dissimilis</i> <i>G'alia praescitula</i> <i>Orb. suturalis</i> <i>G'ina bulloides</i> <i>G'oides trilobus</i> <i>G'oides bisphericus</i> <i>Orb. universa</i>	<i>Cassidulina subglobosa</i> <i>Cibicides molestus</i> <i>C. perforatus</i> <i>C. vortex</i> <i>C. brevoralis</i> <i>Anomalina macroglabra</i> <i>Gyroidina zealandica</i> <i>Guttulina problema</i> NODOSARIDS <i>Cibicides thiara</i> <i>Notorotalia crassimurra</i> <i>Elphidium crespinae</i> <i>Cibicides novozealandica</i> <i>Anomalina vitrinoda</i> <i>Pseudoclavulina rudis</i> <i>Karrerria maoria</i> <i>Bathysiphon</i> sp. <i>Cibicides subhaidingeri</i> <i>Massilina torquayensis</i> <i>Sphaeroidina bulloides</i> <i>Discorotalia arenca</i> <i>Notorotalia miocenica</i> <i>Siphouvigerina canariensis</i> <i>Anomalina procolligera</i> <i>Cibicides mediocris</i> <i>Carpentaria rotaliformis</i> <i>Massilina lapidera</i> <i>Eponides repandus</i> <i>Vulvulina kalimnensis</i> <i>Textularia sagitula</i> <i>Ammosphaeroidina</i> sp.	100	2	A	D	C	UNIT IV D to E-1
805.0 _±	°	x x	100	-	A C	A D	r	
815.0 _±	°	x	250	10	A A	D	C	
825.0 _±	°	°	100	5	A r r	C	r	
845.0 _±	°	x ° x ° ° ° ° °	100	2	C	r	r	UNIT III H-1 to D
851.0 _±	°	°	50	-	C C	A	A	
865.0 _±	°	x x x x x	500	2	A C r r	A C	r	UNIT II J
870.0 _±	°	D x x x x ° ° ° °	250	3	r A	r A	r	
878.0 _±	N.F.F.	°	-	-		A r	r	UNIT I 875.0 _± ?
880.0 _±	N.F.F.	°	-	-				
936.5 _±	N.F.F.	°	-	-				
1075.0 _±	N.F.F.	°	-	-				

KEY:  
° = <20 specimens  
x = >20 specimens  
D = Dominant >60% specimens  
N.F.F. = no foraminifera found

° = definite hiatus  
°°°° = possible hiatus

D = Dominant 5-10% grains  
A = Abundant 1-5% grains  
C = Common >20 grains  
r = rare <20 grains

TABLE 2:- FORAMINIFERAL DISTRIBUTION and SEDIMENT GRAIN ANALYSIS - WYRALLIAH # 1.

David Taylor,  
May 31, 1984.