



APPENDIX
FORAMINIFERAL ANALYSIS, WIRRAH-1
GIPPSLAND BASIN

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INTRODUCTION

Twenty three (23) sidewall core and four (4) cuttings samples were processed for foraminiferal analysis in Wirrah-1, from 848 to 1482m. Only the planktonic foraminifera have been scrutinized. Adequate planktonic foraminiferal faunas occur in most samples of Gippsland Limestone (exception: SWC's 124-126) and Lakes Entrance Formation (exception : SWC 115). With the exception of SWC 112 at 1476m, all samples of Gurnard Formation examined lacked foraminifera. SWC 112 contained rare, very poorly preserved, indeterminate planktonic foraminifera.

Tables 1 and 2 provide a summary (Basic and Interpretive) of the palaeontological analysis in Wirrah-1. A summary of the biostratigraphic breakdown of the stratigraphic units in Wirrah-1 is given below.

<u>AGE</u>	<u>UNIT</u>	<u>SUMMARY</u>	<u>DEPTH(m)</u>
Recent/Mid Miocene	?	(not sampled)	(seafloor to 848)
Mid Miocene		C	848 - 868
Mid Miocene	Gippsland	D-1/D-2	902 -1208.1
Early Miocene	Limestone	F	1242-1275.9
----- log break at 1291m -----			
Early Miocene		G	1305-1384
Early Miocene	Lakes	Indeterminate	1412
Early Miocene	Entrance	H-I	1446-1455
Late Oligocene	Formation	H-2 to I-1	1455-1465
----- log break at 1465m -----			
-	Gurnard	Indeterminate	1465-1482
	Formation	(not sampled)	(1488)
----- log break at 1488.5m -----			
-	Latrobe	(not sampled)	(1490-TD)
	Group		
	(Coarse clastics)		

GEOLOGICAL COMMENTS

Sonic log character indicates that the base and top of the Gurnard Formation is at 1490 and 1465m respectively. The uppermost sample of Gurnard Formation in Wirrah-1 (SWC 113 at 1472m) is Mid/Late Eocene in age and assignable to the Middle N. asperus palynological Zone (Macphail, 1983). The age of the basal part of the Lakes Entrance Formation is Late Oligocene and assignable to Zones H-2 to I-1 (see section on Discussion of Zones). It is probable that the Lakes Entrance Formation rests disconformably on the Gurnard Formation at the Wirrah-1 location. The possibility that a condensed sequence of Early Oligocene Lakes Entrance Formation is present in the well cannot be dismissed because cuttings samples for the interval 1460-1465m were not available for inspection. Planktonic foraminiferal assemblages assignable to Zones J-1/J-2 (Early Oligocene) were not detected in cuttings samples of Gurnard Formation (heavily caved with Lakes Entrance Formation) below 1465m.

On the basis of log character, the boundary between the Gippsland Limestone and the Lakes Entrance Formation is placed at 1291m. The Gippsland Limestone conformably overlies the Lakes Entrance Formation and the boundary between the two units occurs during Zone F or Zone G time.

DISCUSSION OF ZONES

The Tertiary biostratigraphy in Wirrah-1 is based on the Gippsland Basin planktonic foraminiferal zonal scheme of Taylor (in prep.). Studies by Jenkins (1960, 1971), Blow (1969, 1979), Postuma (1971), Stainforth et al (1975) and Hornibrook (1982) have also been consulted.

INDETERMINATE INTERVAL: 1465-1482m

Sidewall core samples of Gurnard Formation in Wirrah-1 between 1472 and 1482m cannot be age dated using planktonic foraminifera. With the exception of SWC 112 at 1476m, all samples were barren of foraminifera. Sidewall core 112 contains very poorly preserved indeterminate planktonic foraminifera. Palynological evidence indicates that the interval is Mid/Late Eocene in age and assignable to the Middle N. asperus Zone (Macphail, 1983). Cuttings between

1465 and 1475m contain planktonic foraminifera no older than Zone I-1. These assemblages are considered to be downhole contaminants from the Lakes Entrance Formation above 1465m.

ZONES H-2 to I-1 : 1455-1465.

The presence of Globigerina tripartita and the absence of Globigerina angiporoides in cuttings between 1455 and 1460m indicates that this interval is assignable to Zones H-2 to I-1. Cuttings between 1460 and 1465m (basal 5m of the Lakes Entrance Formation) were not available for inspection. However cuttings below the Lakes Entrance Formation (1465-1470m) contain planktonic foraminifera no older than Zone I-1. It is therefore concluded that the interval 1455 to 1465m is assignable to Zones H-2 to I-1.

ZONE H-1 : 1446-1455m.

SWC 114 at 1446m contains Globigerina woodi connecta without Globigerinoides trilobus and can be assigned to Zone H-1. Cuttings between 1450 and 1455m lack Globigerina tripartita and are also considered to be Zone H-1 in age.

INDETERMINATE INTERVAL : 1412m.

SWC 115 at 1412m contains an impoverished planktonic foraminiferal assemblage which is not age diagnostic. On the basis of superposition the sample is assignable to Zones H-1 or G.

ZONE G : 1305-1384m

The appearance uphole of Globigerinoides trilobus at 1305m defines the base of Zone G in Wirrah-1. The top of the zone is defined by the evolutionary appearance of Globigerinoides bisphericus from G. trilobus at 1275.9m.

ZONE F : 1242 - 1275.9m

A typical Zone F planktonic foraminiferal assemblage comprising Globigerinoides bisphericus without the Praeorbulina - Orbulina plexus occurs within the interval 1242-1275.9m.

ZONES D-1 to D-2 : 902 - 1208.1m

The appearance of Orbulina universa at 1208.1m defines the base of Zone D-2 in Wirrah-1. The extinction of Globorotalia praescitula at 902m defines the top of Zone D-1.

ZONE C : 848-868m.

The association of Globorotalia miotumida miotumida and Globorotalia mayeri in samples at 848 and 868m indicates that the interval is assignable to Zone C.

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TABLE 1
SUMMARY OF PALAEOONTOLOGICAL ANALYSIS - WIRRAH-1, GIPPSLAND BASIN
INTERPRETATIVE DATA

NATURE OF SAMPLE	DEPTH (M)	MICROFOSSIL YIELD	PRESERVATION	DIVERSITY	ZONE	AGE	COMMENTS
SWC 132	848	Moderate	Moderate-Poor	Moderate	C	Mid Miocene	
SWC 131	868	High	Moderate	Moderate	C	Mid Miocene	
SWC 130	902	High	Moderate	Low	D-1/D-2	Mid Miocene	Sponge
SWC 129	936	High	Moderate	Low	D-1/D-2	Mid Miocene	spicules
SWC 128	970	Moderate	Moderate-Poor	Low	D-1/D-2	Mid Miocene	rare
SWC 127	1005	Moderate	Moderate-Poor	Low	D-1/D-2	Mid Miocene	to
SWC 126	1038	Moderate	Poor	Very low	Indeterminate	-	common.
SWC 125	1072	Moderate	Poor	Very low	Indeterminate	-	Bryozoa rare - only
SWC 124	1106	Very low	Very Poor	Very low	Indeterminate	-	present at 902
SWC 123	1141	Moderate	Moderate-Poor	Moderate	D-1/D-2	Mid Miocene	and 1141m.
SWC 122	1171	Moderate	Moderate	Moderate	D-1/D-2	Mid Miocene	
SWC 121	1208.1	Moderate	Moderate	Moderate	D-1/D-2	Mid Miocene	
SWC 120	1242	Moderate	Poor	Moderate	F	Early Miocene	
SWC 119	1275.9	High	Good	High	F	Early Miocene	
SWC 118	1305	Moderate	Poor	Moderate	G	Early Miocene	

TABLE 1
SUMMARY OF PALAEOLOGICAL ANALYSIS - WIRRAH-1, GIPPSLAND BASIN
INTERPRETATIVE DATA

NATURE OF SAMPLE	DEPTH (M)	MICROFOSSIL YIELD	PRESERVATION	DIVERSITY	ZONE	AGE	COMMENTS
SWC 117	1344	High	Good	High	G	Early Miocene	Bryozoa fragments.
SWC 116	1384	High	Good	High	G	Early Miocene	
SWC 115	1412	Moderate-Low	Poor	Very low	Indeterminate	-	
SWC 114	1446	High	Moderate	Moderate-High	H-1	Early Miocene	
CTS	1450-55	High	Moderate-Good	Moderate-High	H-1	Early Miocene	
CTS	1455-60	High	Moderate-Good	Moderate-High	H-2 to I-1	Late Oligocene	Downhole
CTS	1465-70	-	-	-	-	-	contamination
CTS	1470-75	-	-	-	-	-	severe
SWC 113	1472	Barren	-	-	-	-	
SWC 112	1476	Very low	Very poor	Very low	Indeterminate	-	
SWC 102	1479	Barren	-	-	-	-	Rare fish teeth
SWC 101	1482	Barren	-	-	-	-	

BASIC DATA

TABLE - 2 : FORAMINIFERAL DATA, WIRRAH-1.

RANGE CHART : TERTIARY PLANKTONIC FORAMINIFERA.

TABLE 2
BASIC DATA - WIRRAH-1.

NATURE OF SAMPLE	DEPTH (M)	MICROFOSSIL YIELD	PRESERVATION	DIVERSITY	COMMENTS
SWC 132	848	Moderate	Moderate-Poor	Moderate	
SWC 131	868	High	Moderate	Moderate	
SWC 130	902	High	Moderate	Low	
SWC 129	936	High	Moderate	Low	
SWC 128	970	Moderate	Moderate-Poor	Low	Sponge
SWC 127	1005	Moderate	Moderate-Poor	Low	spicules
SWC 126	1038	Moderate	Poor	Very low	rare to
SWC 125	1072	Moderate	Poor	Very low	common
SWC 124	1106	Very low	Very Poor	Very low	Bryozoa rare -
SWC 123	1141	Moderate	Moderate-Poor	Moderate	only present
SWC 122	1171	Moderate	Moderate	Moderate	at 902 and
SWC 121	1208.1	Moderate	Moderate	Moderate	1141m.
SWC 120	1242	Moderate	Poor	Moderate	
SWC 119	1275.9	High	Good	High	
SWC 118	1305	Moderate	Poor	Moderate	
SWC 117	1344	High	Good	High	Bryozoa fragme
SWC 116	1384	High	Good	High	
SWC 115	1412	Moderate-Low	Poor	Very low	
SWC 114	1446	High	Moderate	Moderate-High	
CTS	1450-55	High	Moderate-Good	Moderate-High	
CTS	1455-60	High	Moderate-Good	Moderate-High	Downhole
CTS	1465-70	-	-	-	contamination
CTS	1470-75	-	-	-	severe
SWC 113	1472	Barren	-	-	
SWC 112	1476	Very low	Very poor	Very low	
SWC 102	1479	Barren	-	-	Rare fish
					teeth
SWC 101	1482	Barren	-	-	

FOSSIL TYPE: PLANKTONIC FORAMINIFERA

Well Name WIRRAH-1

Basin GIPPSLAND

Sheet No. 1 of 1

SAMPLE TYPE OR NO.	DEPTHS		902		916		970		1005		1013		1072		1105		1141		1171		1208.1		1242		1272		1305		1341		1364		1412		1446		1450-51		1455-62		1465-72		1470-75		1472		1475		1479-81	
		S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S			
<i>Globorotalia mayri</i>																																																		
<i>Globorotalia miotumida</i>																																																		
<i>Indeterminate globigerinids</i>																																																		
<i>Orbulina universa</i>																																																		
<i>Globigerinoides bisphericus</i>																																																		
<i>Globigerinoides trilobus</i>																																																		
<i>Globigerina woodi</i>																																																		
<i>Globorotalia scitula</i>																																																		
<i>Globorotalia menardii</i>																																																		
<i>Globigerina bulloides</i>																																																		
<i>Globorotalia miozea conoidea</i>																																																		
<i>Globorotalia praescitula</i>																																																		
<i>Globoquadrina dehiscens s.s.</i>																																																		
<i>Globorotalia praemenardii</i>																																																		
<i>Globoquadrina advena</i>																																																		
<i>Globigerina praebulloides</i>																																																		
<i>Globorotalia continuosa</i>																																																		
<i>Globorotalia miozea miozea</i>																																																		
<i>Globorotalia bella</i>																																																		
<i>Globigerina obesa</i>																																																		
<i>Globigerina ouachitaensis</i>																																																		
<i>Globigerina woodi connecta</i>																																																		
<i>Globigerina euapertura</i>																																																		
<i>Globoquadrina dehiscens s.l.</i>																																																		
<i>Globigerina tripartita</i>																																																		
<i>Globorotalia zealandica</i>																																																		
<i>Praeorbulina glomerosa</i>																																																		
<i>Globorotalia opima</i>																																																		
<i>Indeterminate planktonics</i>																																																		

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

--- Rare
 - - - Few
 [] Common
 [] Abundant

PALAEO.CHART-2
 DWG.H07/0P/287