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APPENDIX 1
FORAMINIFERAL ANALYSIS, WHITING-1
GIPPSLAND BASIN

by

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INTRODUCTION

Twenty four (24) sidewall core samples were processed for foraminiferal analysis in Whiting-1, from 805 to 1288m. Only the planktonic foraminifera have been scrutinised. Adequate planktonic foraminiferal faunas occur in most samples of Gippsland Limestone (exception: SWC's 93, 130 and 131) and Lakes Entrance Formation (exception: SWC 82). With the exception of SWC 81 at 1280.4m, all samples of Gurnard Formation were barren of foraminifera. Sidewall core 81 only contained agglutinated foraminifera.

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

SUMMARY

AGE	UNIT	ZONE	DEPTH (m)
Recent/Early Pliocene	?	(not sampled)	(seafloor to 805m)
Early Pliocene/ Late Miocene	Gippsland	B-1 Indeterminate	805-898m 923m
Late Miocene	Limestone	B-2	953m
Mid Miocene		D-1/D-2	978-1168m
—log break at 1173m—			
Early Miocene	Lakes	F	1219m
Early Miocene	Entrance	G	1255-1272m
-	Formation	Indeterminate	1276.6m
—log break at 1277.5m—			
-	Gurnard Formation	Indeterminate	1280.4-1284m
—log break at 1287m—			
-	Latrobe Group (coarse clastics)	Indeterminate (not sampled)	1288m (1288m-TD)

GEOLOGICAL COMMENTS

Log character indicates that the base and top of the Gurnard Formation is at 1287m and 1277.5m. The Gurnard Formation in Whiting-1 cannot be age dated using foraminifera or spore pollen. The age of the basal part of the Lakes Entrance Formation is Early Miocene and is assignable to Zone G. The Lakes Entrance Formation rests disconformably on the Gurnard Formation at the Whiting-1 location. The lowermost sample of Lakes Entrance Formation in Whiting-1 (SWC 82 at 1276.6m) is strongly recrystallised. Recrystallisation at the base of the carbonate section in the Gippsland Basin is widespread.

On the basis of lithological and faunal character, the boundary between the Gippsland Limestone (prograding shelf carbonates) and the Lakes Entrance Formation (pelagic carbonate) is placed between 1168m and 1219m. Sidewall core 88 at 1219 is Zone F in age and consists essentially of a planktonic foraminiferal ooze. Planktonic foraminifera in this uppermost sample of Lakes Entrance Formation are abundant, well preserved and represent a dominant element (greater than 90%) of the foraminiferal assemblage. Sidewall core 89 at 1168m is a calcareous siltstone with bryozoan fragments and has been assigned to Zones D-1/D-2. Planktonic foraminifera in this lowermost sample of Gippsland Limestone are impoverished and poorly preserved. The boundary between the Gippsland Limestone and the Lakes Entrance Formation cannot be adequately picked on the basis of log character in Whiting-1. The boundary has been tentatively placed at 1173m on the basis of a subtle log change.

The absence of Zone C in Whiting-1 may indicate a possible disconformity or maybe the result of a gap in sampling.

A significant increase in the proportion of large, well rounded quartz grains was noted in SWC 131 at 923m. The sample consists of fine grained calcarenite (normal lithology of the Gippsland Limestone) but contains an anomalously high proportion of quartz (approximately 10% of the washed residue). The sample is not age diagnostic but on the basis of superposition can be assigned to Zones B-1 or B-2. The high proportion of quartz at 923m may reflect a relative fall in sea-level. Vail's Tertiary Global Cycle Chart indicates a type-1 unconformity at 6.6 Ma. This event coincides approximately with the boundary between Zones B-1 and B-2 in the Gippsland Basin. It is possible that a disconformity occurs at about this time in the Gippsland Basin but it cannot be confirmed by micropalaeontological evidence because its duration is beyond the biostratigraphic resolution of the local planktonic foraminiferal zonation.

DISCUSSION OF ZONES

The Tertiary biostratigraphy in Whiting-1 is based on the Gippsland Basin planktonic foraminiferal zonal scheme of Taylor (in prep).

Indeterminate Interval : 1276.6 - 1284m.

Sidewall cores at 1276.6, 1280.4 and 1284m cannot be age dated using planktonic foraminifera. Sidewall core 82 at 1276.6m contains indeterminate planktonics while samples at 1280.4 and 1284m are barren of planktonic foraminifera.

Zone G : 1255 - 1272m.

The uphole appearance of Globigerinoides trilobus at 1272m defines the base of Zone G in Whiting-1. The presence of advanced forms of Globigerinoides trilobus and Globorotalia miozea miozea indicates that SWC 83 at 1272m is high in Zone G. The top of the zone is defined by the evolutionary appearance of Globigerinoides bisphericus from G. trilobus at 1219m.

Zone F : 1219m.

A typical zone F planktonic foraminiferal assemblage comprising Globigerinoides bisphericus without the Praeorbulina-Orbulina plexus occurs in SWC 88 at 1219m.

Zones D-1/D-2 : 978 - 1168m.

The appearance of Orbulina universa at 1168m defines the base of Zone D-2 in Whiting-1. The extinction of Globorotalia miozea miozea at 978m defines the top of Zone D-1.

Zone B-2 : 953m.

The association of Globorotalia acostaensis and G. miotumida miotumida in SWC 97 at 953m indicates that the sample is assignable to Zone B-2.

Indeterminate Interval : 923m.

Sidewall core 131 at 923m is recrystallised and only contains an impoverished assemblage of indeterminate planktonic foraminifera.

Zone B-1 : 805 - 898m.

The presence of Globorotalia miotumida conomiozea s.s. in the absence of Globorotalia puncticulata in this interval defines Zone B-1 in Whiting-1.

REFERENCES

TAYLOR, D.J. (in prep). Observed Gippsland biostratigraphic sequences of planktonic foraminiferal assemblages.

MACPHAIL, M.K., 1983. Palynological analysis, Whiting-1, Gippsland Basin. Eso Australia Ltd., Palaeontology Report, 1983/27.

MICROPALAEONTOLOGICAL DATA SHEET

Basin: GIPPSLAND
 Well Name: WHITING-1

Elevation: KB: 21.0m GL: 53.0m
 Total Depth: 3011m.

AGE	POPAL. ZONULES	HIGHEST DATA					LOWEST DATA				
		Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time
PLEIS-TOCENE	A ₁										
	A ₂										
PLIO-CENE	A ₃										
	A ₄										
MIOCENE	LATE	B ₁	805	1			898	1			
		B ₂	953	1			953	1			
		C									
	MIDDLE	D ₁	978	1							
		D ₂					1168	1			
		E ₁									
		E ₂									
	EARLY	F	1219	0			1219	0			
		G	1255	0			1272	0			
		H ₁									
OLIGOCENE	LATE	H ₂									
		I ₁									
	EARLY	I ₂									
		J ₁									
Eocene	Pre-K	J ₂									
		K									

COMMENTS: The absence of Zone C may be attributed to hiatus or a gap in sampling.

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

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

DATA RECORDED BY: J.P. Roxilius

DATE: 2/5/83.

DATA REVISION BY: J.P. Roxilius

DATE: 2/7/83.

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

NATURE OF SAMPLE	DEPTH (M)	MICROFOSSIL YIELD	PRESERVATION	DIVERSITY	ZONE	AGE	
SWC 102	805	Low	Moderate	Low	B-1	Early Pliocene/Late Miocene	
SWC 132	841	Moderate	Moderate	Moderate	B-1	Early Pliocene/Late Miocene	
SWC 100	872	Very low	Poor	Low	B-1	Early Pliocene/Late Miocene	
SWC 99	898	Moderate	Moderate	Low	B-1	Early Pliocene/Late Miocene	
SWC 131	923	Very low	Poor	Very low	Indeterminate	-	
SWC 97	953	Low	Poor	Moderate	B-2	Late Miocene	
SWC 96	978	Low	Moderate/poor	Moderate	D-2/D-2	Mid Miocene	
SWC 95	1003	Moderately low	Moderate/poor	Moderately low	D-1/D-2	Mid Miocene	
SWC 94	1038	Moderately low	Moderate/poor	Moderate	D-1/D-2	Mid Miocene	
SWC 93	1069	Low	Poor	Low	Indeterminate	-	
SWC 92	1095	High	Moderate	Moderate	D-1/D-2	Mid Miocene	
SWC 130	1114	Very low	Very poor	Very low	Indeterminate	-	
SWC 90	1148	Moderate	Moderate/poor	Moderate	D-1/D-2	Mid Miocene	
SWC 89	116	Very low	Poor	Low	?D-1/D-2	? Mid Miocene	
SWC 88	1219	High	Good	Moderate	F	Early Miocene	
SWC 87	1255	High	Good	Moderate	G	Early Miocene	
SWC 86	1259	High	Good	High	G	Early Miocene	
SWC 85	1264	High	Moderate/good	Moderate	G	Early Miocene	
SWC 84	1268	High	Good	High	G	Early Miocene	
SWC 83	1272	High	Good	Moderate	G	Early Miocene	
SWC 82	1276.6	Low	Very poor	Very low	Indeterminate	-	Sample recrystallised
SWC 81	1280.4	Barren	-	-	-	-	Agglutinated foraminife
SWC 80	1284	Barren	-	-	-	-	Fish teeth
SWC 79	1288	Barren	-	-	-	-	

BASIC DATA

TABLE-2 : FORAMINIFERAL DATA, WHITING-1.
RANGE CHART : TERTIARY PLANKTONIC FORAMINIFERA

TABLE-2
SUMMARY OF PALAEOONTOLOGICAL ANALYSIS, WHITING-1, GIPPSLAND BASIN.
BASIC DATA

NATURE OF SAMPLE	DEPTH (M)	MICROFOSSIL YIELD	PRESERVATION	DIVERSITY	COMMENTS
SWC 102	805	Low	Moderate	Low	
SWC 132	841	Moderate	Moderate	Moderate	
SWC 100	872	Very low	Poor	Low	
SWC 99	898	Moderate	Moderate	Low	
SWC 131	923	Very low	Poor	Very low	
SWC 97	953	Low	Poor	Moderate	
SWC 96	978	Low	Moderate/poor	Moderate	
SWC 95	1003	Moderately low	Moderate/poor	Moderately low	
SWC 94	1038	Moderately low	Moderate/poor	Moderate	
SWC 93	1069	Low	Poor	Low	
SWC 92	1095	High	Moderate	Moderate	
SWC 130	1114	Very low	Very poor	Very low	
SWC 90	1148	Moderate	Moderate/poor	Moderate	
SWC 89	116	Very low	Poor	Low	
SWC 88	1219	High	Good	Moderate	
SWC 87	1255	High	Good	Moderate	
SWC 86	1259	High	Good	High	
SWC 85	1264	High	Moderate/good	Moderate	
SWC 84	1268	High	Good	High	
SWC 83	1272	High	Good	Moderate	
SWC 82	1276.6	Low	Very poor	Very low	Sample recrystallised
SWC 81	1280.4	Barren	-	-	Agglutinated foraminifera
SWC 80	1284	Barren	-	-	Fish teeth
SWC 79	1288	Barren	-	-	