FORAMINIFERAL SEQUENCE
in BALEEN #1

For:- HUDBAY OIL (AUSTRALIA) LTD.

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PALTECH PTY LTD
MARINE MICROPALEONTOLOGISTS
SYDNEY NEW SOUTH WALES
MIDLAND WESTERN AUSTRALIA

THE FORAMINIFERAL SEQUENCE

IN BALEEN #1

Fifty six samples from BALEEN #1 were examined for foraminiferal content although only fifty five side wall cores were examined (see footnote ¶). The following sequence was interpreted :-

Sidewall Cores Depth(m)	Approx. E-log Unit Boundary	Age	Zone*	Paleoenvironment
230.0 to 332.6		Pliocene to Mid Miocene	A to C	Inner Continental shelf (∿10-40m)
--------Transitional----------				
353.7 to 435.2		Mid Miocene	D to E	Canyon Head (∿40m)
--------Transitional----------				
458.0 to 538.0		Early Miocene	F to G	Mid shelf canyon (40-200m)
--------Transitional----------				
551.7.0 to 597.0		Early Miocene	H-1	Shelf edge canyon (∿200m)
--------Transitional----------				
612.0 to 627.0¶		Early Miocene	H	Upper slope fan (200-300m)
∿∿∿∿∿∿627.0∿∿∿∿∿∿				
627.0¶ to 632.0		Oligocene	J	Inner shelf (10-40m)
--------638.5----------				
640.0 to 651.0		Late Eocene	K	Estuarine entrance >10m
--------657.0 to 662.0----------				
658.0 to 698.0		?	No plank. forams found	Deltaic/Estuarine
--------base of sequence examined----------				

*Planktonic foraminiferal zonation after Taylor in prep.

¶SWC at 627 treated as two distinct samples as initial perusal showed two distinct lithologies, so it was split axially.

A list of side wall cores studied is shown on Tables I & 2. Planktonic foraminiferal content varied; being sporadic in the deltaic / estuarine sediments and consistantly diagnostic in the Early Miocene, but preservation precluded positive identification in some Mid Miocene samples from 458.0 to 332.6m.

Tables I & II (herein) detail the record summarised on page 1. A correlation diagram, Figure 1, is included, as is a micropaleontological data sheet, which shows the interpreted reliability of the planktonic zone determinations.

CORRELATION OF BALEEN #1 with ADJACENT WELLS and LAKES ENTRANCE

The fence diagram, Figure 1, demonstrates marked differences between Baleen and the other sequences in both biostratigraphic and approximate paleobathymetric correlations, in that: -

1) Oligocene sedimentation is poorly represented when compared with Flathead and the on shore sequence at Lakes Entrance. Thus the Oligocene hiatus, common to many Gippsland off shore sequences is indicated in Baleen. The Baleen hiatus represents a period of some 5 million years.

2) A paleodepth discrepancy is evident at the base of the Miocene (zone H) with Baleen sedimentation having occurred on the upper continental slope (estimated depths between 200 & 300m), whilst sedimentation in other sequences was on the inner continental shelf (approximately 40m). Structural adjustment during the late Oligocene was probably responsible for both the biostratigraphic hiatus and the paleobathymetric differences. Erosion was also evident with recycled Eo/Oligocene foraminifera being recorded in the basal Miocene samples in Baleen (refer Tables I & II). It is also noted that the Eo/Oligocene faunas in all sections, including Baleen, were of estuarine to inner shelf origin ($\sim$0-40m).

3) There was a much higher accumulation rate in Baleen during the basal Miocene (Zone H) when compared with the other sections. These basal Miocene, proximal carbonate turbidites, in Baleen, effectively filled the Oligocene depression created between 30 and 25 million years. Paleobathymetric equilibrium was achieved between sections (on Figure 1) by the Early/Mid Miocene boundary (Zones F/E) at 15 million years.

NOTES and EXPLANATORY REFERENCES

1) LAKES ENTRANCE OIL SHAFT: Biostratigraphic sequence, shown on Figure 1, was adapted from Jenkins, D.G, 1960 - Planktonic foraminifera from the Lakes Entrance oil shaft, Victoria, Australia. *Micropaleontology, 6(4); 345-371*. Additional data below 367m and above 65m was gathered from wells and outcrop in immediate vicinity and is lodged in *Paltech* files.

2) PREVIOUS WELLS DRILLED ADJACENT TO BALEEN AND WHALE on VIC/P11. Data shown on Figure 1 regarding FLATHEAD #1 is from *Paltech* files. However GANNET #1 and ALBATROSS #1 were precluded from correlation because of poor quality data, as the only samples available and examined were ditch cuttings.

3) PALEOBATHYMETRIC INTERPRETATIONS were derived from the distribution of depth sensitive, benthonic foraminifera (listed on Table II) recorded in *Paltech* files with collaboration from:- HAYWARD, B.W. & BUZAS, M.A., 1979- Taxonomy and paleoecology of early Miocene benthic foraminifera of Northern New Zealand and the North Tasman Sea. *Smithsonian Contribs. to Paleobiology 36;* and references cited therein.

MICROPALEONTOLOGICAL DATA SHEET

BASIN: GIPPSLAND ELEVATION: KB: 9.8m GL: 54.9m

WELL NAME: BALEEN # 1 TOTAL DEPTH:

AGE		FORAM. ZONULES	HIGHEST DATA					LOWEST DATA				
			Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time
PLEISTOCENE		A_1										
		A_2										
PLIOCENE		A_3										
		A_4						275.6	1			
MIOCENE	LATE	B_1	287.0	0				298.4	1			
		B_2	308.2	1				308.2	1			
		C	321.2	1				332.6	1			
	MIDDLE	D_1	353.3*	1								
		D_2										
		E_1										
		E_2										
	EARLY	F	469.0*	0				514.0	1			
		G	524.0	1				538.0	1			
		H_1	551.7	1				623.0	1	618.0	0	
OLIGOCENE	LATE	H_2	627.0¶					627.0¶	1			
		I_1										
		I_2										
	EARLY	J_1	627.0¶	1				632.0	1			
		J_2										
EOCENE		K	646.0	1				646.0	1			
		Pre-K										

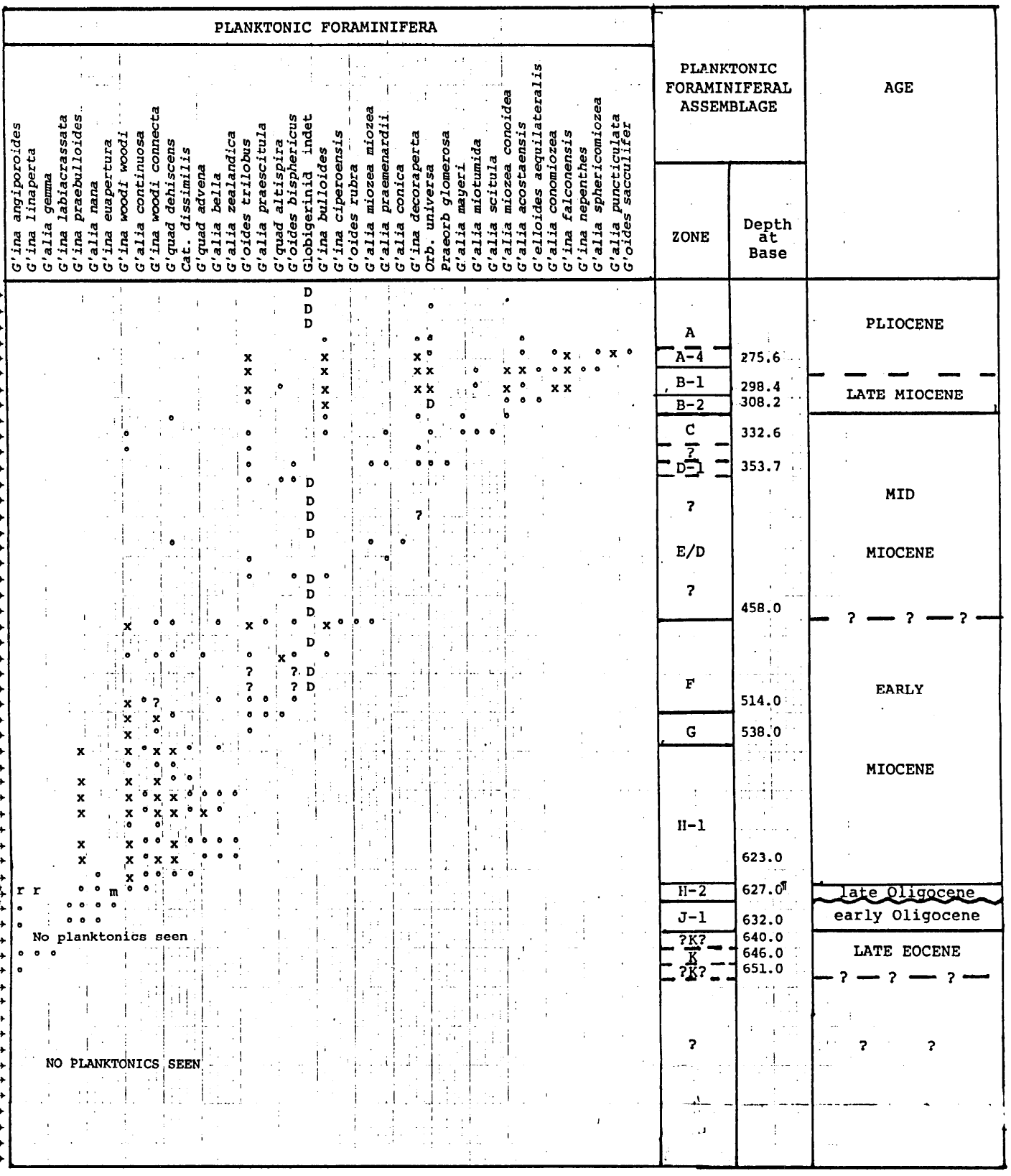
COMMENTS: * Interval from 469.0 to 366.0 can only be designated as E/D; being impossible to subdivide biostratigraphically due to poor preservation caused initially by canyon deposition & subsequent redistribution of carbonate and silica. This interval is represented by nine SWCs.
¶ SWC at 627 sampled across a disconformity between J-1 and H-2, thus sampling the widespread Gippsland late Oligocene hiatus. The higher sample contains a mixed fauna of recycled J with H-2.

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: *PALTECH PTY. LTD.* DATE: 4/1/1982.

DATA REVISED BY: DATE:



KEY: ° <20 specimens
x >20 specimens
D Dominant >60% of assemblage
r recycled Eo/Oliogcene specimens
m mixture of recycled & fresh specimens

* SWC at 627 contains two distinct assemblages.

¶SWC at 627 sampled across disconformity between J-1 & H-2, with upper portion containing mixed J & H-2 fauna.

TABLE 1: PLANKTONIC FORAMINIFERAL DISTRIBUTION - BALEEN # 1.

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