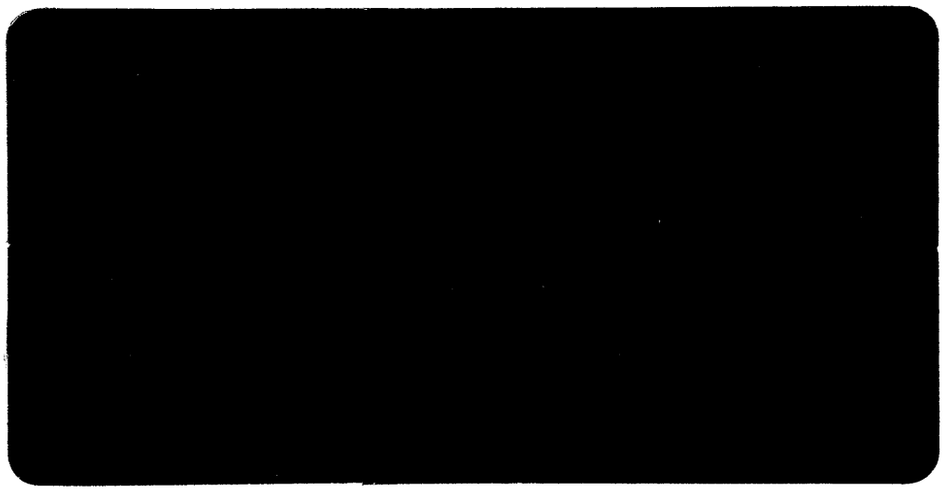


ATTACHMENT 7

WCR SPEKE-1

W870

ATTACHMENT No. 7

W870

FORAMINIFERAL SEQUENCE

OF

SPEKE No. 1

by : D. TAYLOR

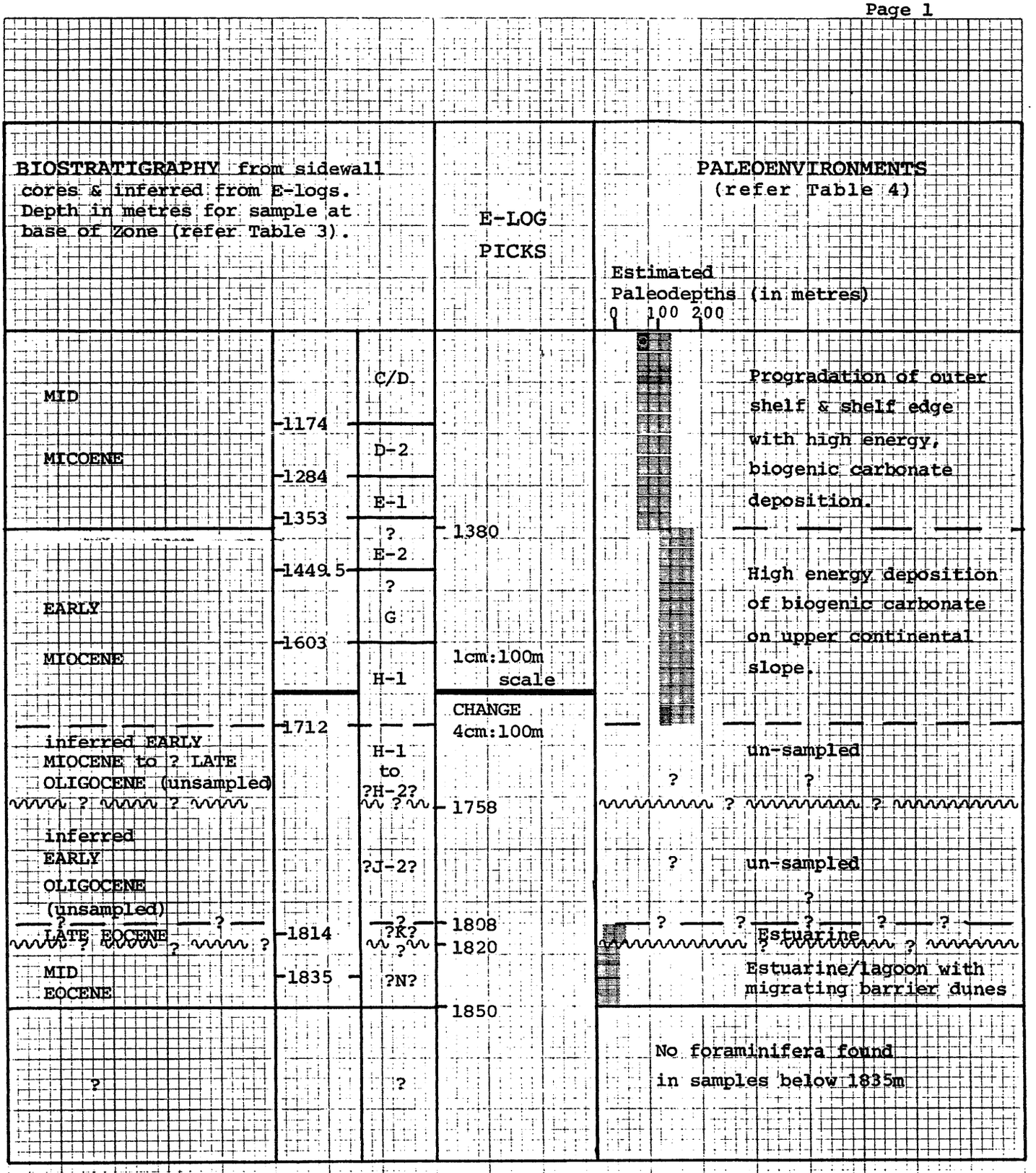
FORAMINIFERAL SEQUENCE and CORRELATION of SPEKE # 1, GIPPSLAND BASIN.

for: AUSTRALIAN AQUITAINE PETROLEUM PTY. LTD.

September 12, 1984.

David Taylor,
23 Ballast Point Road,
BIRCHGROVE, NSW, 2041,
AUSTRALIA.

(02)810 5643



N.B. change of vertical scale at 1700m.

~?~ possible hiatus (inferred)

TABLE 1: INTERPRETED FORAMINIFERAL SEQUENCE in SPEKE # 1.

David Taylor, September 12, 1984.

INTRODUCTION

Twenty eight sidewall cores were examined from SPEKE # 1 between 2304 and 1051 metres.

No foraminifera were found in the basal four samples at 2304, 1946, 1907.5 and 1848.5 metres, although Helene Martin recovered dinoflagellates from four of these samples, thus indicating a marine influence.

Two sidewall cores were submitted, both with a *labelled depth* of 1825 metres. However, each represented a distinctly different facies; one beign an estuarine glauconitic mudstone with Mid Eocene foraminifera, whilst the other, barren of foraminifera, was probably dune sand.

Unfortunately, there was a gap in sidewall core sampling over the interval between 1814 and 1712 metres. Within this interval, there obviously occurred the rapid transition from Eocene estuarine deposition to the deep oceanic sediments of the Oligocene and the related *Cobia Event*. The composition of this unsampled interval is deduced from E-log interpretation (refer Table 1) and correlations with sequences in adjacent wells (refer Table 2).

The following tables are embodied in this report:-

TABLE 1: *INTERPRETED FORAMINIFERAL SEQUENCE in SPEKE # 1* - page 1 of this report.

TABLE 2: *INFERRED CORRELATION of SPEKE # 1 with ADJACENT WELLS for MID EOCENE to EARLY MIOCENE* - based on Planktonic Foraminiferal Biostratigraphy (Letter Zones) and Rock Stratigraphy - refer this text and Table 1, with data on adjacent wells in Taylor & Martin, 1983 and Taylor, 1983. - page 4 of this report.

TABLE 3: *PLANTKONIC FORAMINIFERAL DISTRIBUTION - SPEKE # 1* - back of this report.

TABLE 4: *BENTHONIC FORAMINIFERAL DISTRIBUTION and SEDIMENT GRAIN ANALYSIS - SPEKE # 1* - back of this report.

TABLE 5: *MICROPALEONTOLOGICAL DATA SHEET* with confidence ratings for biostratigraphic picks - back of this report.

BIOSTRATIGRAPHY, PALEOENVIRONMENT and LITHO-UNIT CORRELATIONS.

EOCENE - 2304 to 1907 metres: Despite reports of dinoflagellates, no foraminifera were found at 2304, 1946 and 1907.5 metres, despite the presence of dinoflagellates in these samples (see Palynology Report). This suggests very transient marine influence.

MID EOCENE - ? ZONE N - 1848.5 to 1825 metres ≡ *GURNARD FORMATION* (E-log interval 1850 to 1820m).

Samples at 1835 and 1825 metres (mudstone SWC # 29/Run 2) contained poorly biostratigraphically diagnostic, planktonic assemblages, probably representing Zone N at the top of the Mid Eocene; possibly straddling the Mid/Late Eocene boundary. It is noted that these samples revealed a ?Middle *N. asperus* microfloral assemblage and was thus designated, following convention, as ?Late Eocene in the accompanying palynological report. However, the dating of Middle *N. asperus* Zone is a contentious one, yet to be resolved.

The benthonic assemblages in these two samples were also of low specific diversity, with assemblages characteristic of estuarine environments during a marine transgressive phase. The transient nature of the transgression is clearly illustrated by the distinctly differing lithologies of the two sidewall cores with the identical depth labels of 1825m. The mudstone of SWC 29/Run 2 is of estuarine, marginal marine origin, being a glauconitic *Greensand* with foraminiferal and dinoflagellate assemblages (see above and Palynology Report), whilst the quartz sands and limonitic clay of SWC 50/Run 22 is indicative of dune sands and barren of foraminifera, dinoflagellates or other marine indicators; such as glauconite. These two sidewall cores were a minute part of a spatially and temporally migrating barrier dune, estuarine/lagoonal system, analagous to the present day regime of the Gippsland shoreline (refer Taylor, 1983). This unit can be correlated with the GURNARD FORMATION on faunal and lithological grounds; particularly the presence of non calcareous *Greensands* (refer Table 2 this report and Taylor, l.c.).

LATE EOCENE - ? ZONE K - 1814 metres ≡ COLQUHOUN FORMATION (E-log interval 1820 to 1808m).

The single sample (at 1814m) has a poor planktonic fauna assignable to Zone K at the very top of the Late Eocene. The benthonic fauna is very similar to that of the Mid Eocene unit directly below, thus suggesting the repetition of paleoenvironmental conditions after a hiatus of 2 to 3 million years between the two units.

Most of the glauconite in this Late Eocene unit is oxidized, having the

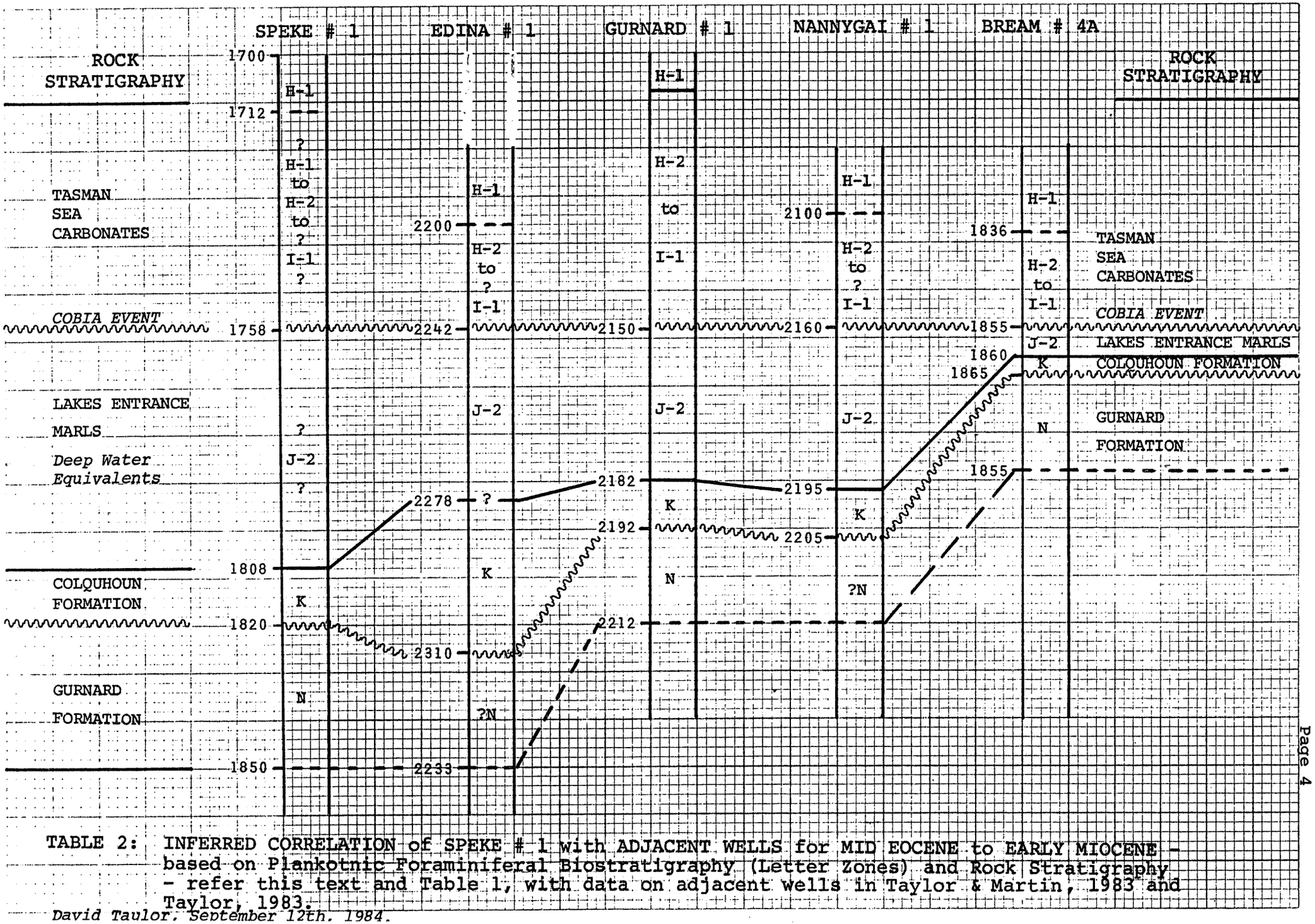


TABLE 2: INFERRED CORRELATION of SPEKE # 1 with ADJACENT WELLS for MID EOCENE to EARLY MIOCENE - based on Plankotnic Foraminiferal Biostratigraphy (Letter Zones) and Rock Stratigraphy - refer this text and Table 1, with data on adjacent wells in Taylor & Martin, 1983 and Taylor, 1983.

David Taulor. September 12th. 1984.

appearance of *Brownsand,* rather than that of the *Greensand* of the unit below. Also the Late Eocene sediment is weakly calcareous. Therefore, this Late Eocene unit is equated with the *COLQUHOUN FORMATION* (refer Table 2 this report and Taylor, 1983).

UNSAMPLED INTERVAL between 1814 and 1712 metres: The identities of units within this sequence have been deduced from E-log characters (Table 1 this report) and a knowledge of the sequences in previously drilled wells, adjacent to SPEKE # 1 (refer Table 2 this report).
These units are, in all probability:-

LOWER OLIGOCENE - ZONE J-2 ≡ LAKES ENTRANCE MARLS (E-Log interval 1808 to 1758m).

Probably a unit of calcareous shales, deposited in rapidly increasing depth, truncated by the mid to late Oligocene Hiatus of the *COBIA EVENT* at 1758m. Table 2 shows that this unit was thicker in SPEKE than in other wells. This may be a reflection of variation in depositional rates relative to the shoreline. For instance, the *COLQUHOUN FORMATION* may have persisted longer in EDINA and in fact, may have been deposited in part during J-2 times; this infers that EDINA was closer to availability of terrigenous detritus than SPEKE.

LATE OLIGOCENE to EARLY MIOCENE - ZONES I-1, H-2 and H-1 (E-log interval 1728 to 1712m).

No doubt the interval contained the oceanic *TASMAN SEA CARBONATES;* a conclusion supported by the correlation Table 2 and remarks below regarding the EARLY to MID MIOCENE sequence.

EARLY to MID MIOCENE - ZONES H-1 to D-2 to ? ZONE C.

There appears to have been uninterrupted sedimentation from the Early to Mid Miocene, although assemblages representing every Zone could not be identified due to extreme carbonate diagenesis at some levels; for example, Zone F could not be designated. Richly biogenic carbonate deposition was on the upper continental slope during the Early Miocene, with faunal evidence suggesting progradation of the shelf edge in the Mid Miocene (note E-log change at 1380m). This pattern of shelf progradation was apparent also in the adjacent wells, with sedimentation on the Oligo/Miocene boundary commencing in fairly deep water and rapidly shallowing during the Early Miocene. Thus the unsampled Oligo/Miocene, between 1758 and 1712m in SPEKE # 1 may have been of deeper water origin than that evident at and above 1712m.

REFERENCES.

TAYLOR, David & MARTIN, Helene A, 1983 - Biostratigraphic and Paleoenvironmental Data Package # 1 for Gippsland Basin. for Australian Aquitaine Petroleum Pty. Ltd. July 20, 1983.

TAYLOR, David, 1983 - Time-Facies Relationships of Eocene Marginal-Marine Sediments - Gippsland Basin. for Australian Aquitaine Petroleum Pty. Ltd. November 29, 1983.

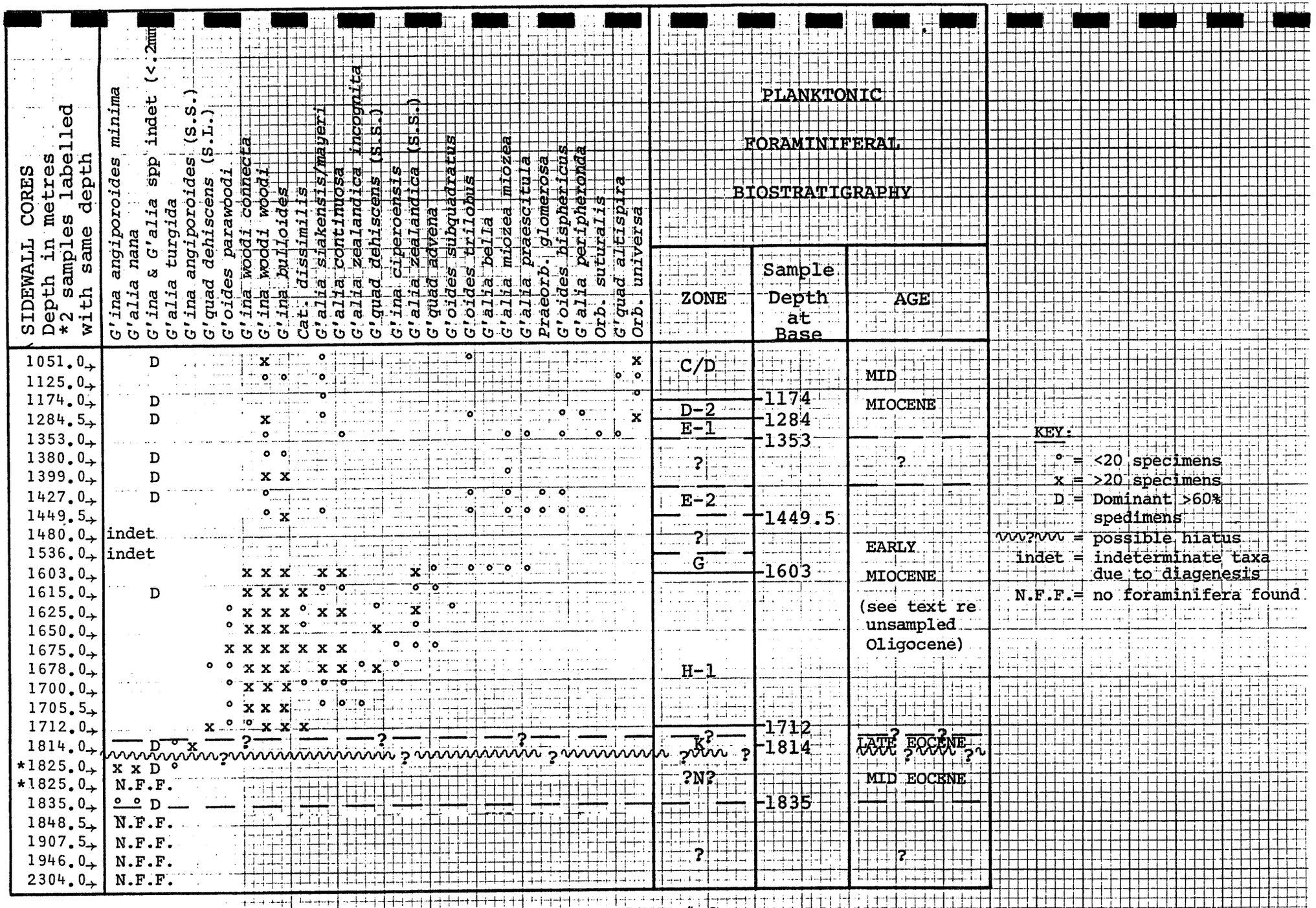
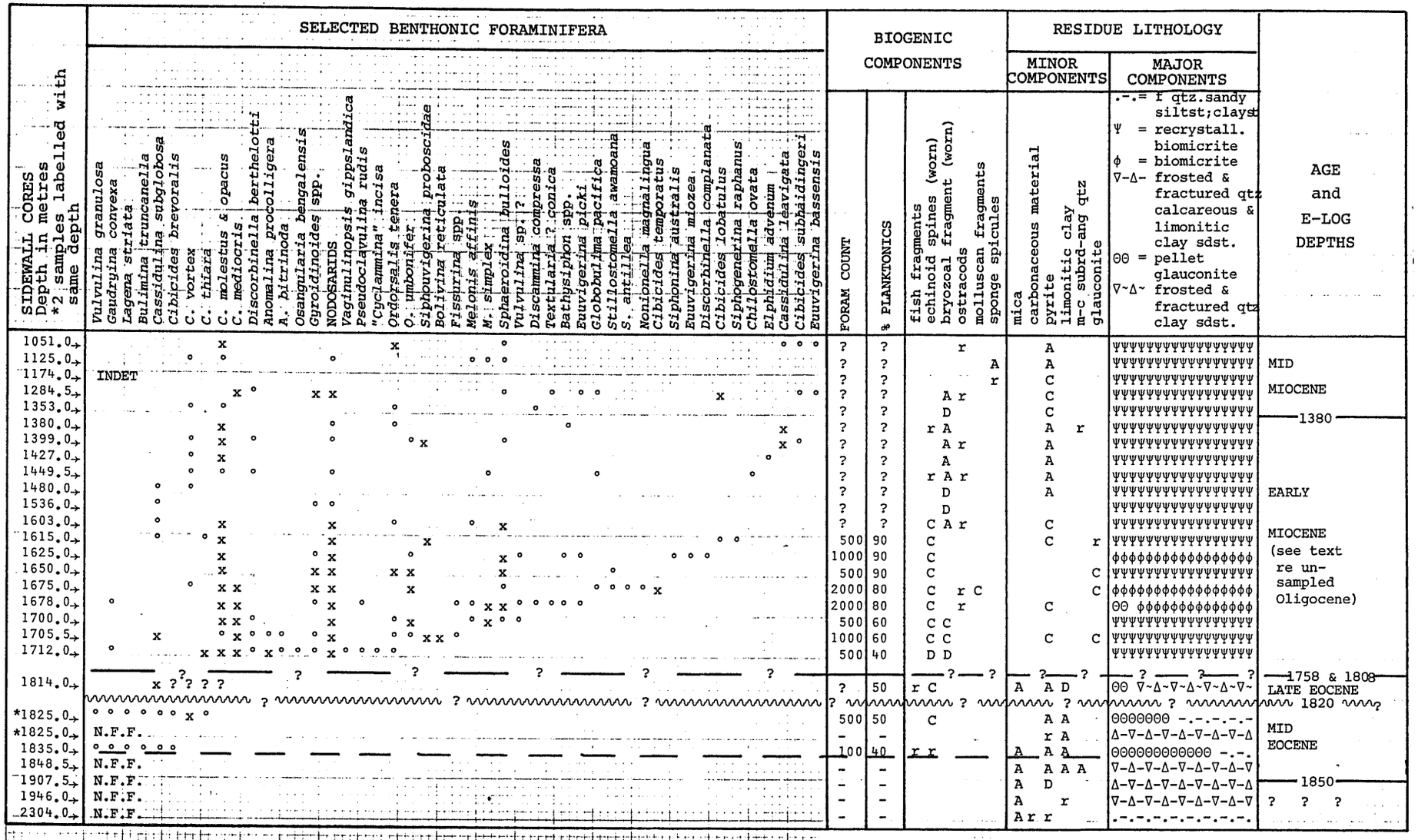


TABLE 3: PLANKTONIC FORAMINIFERAL DISTRIBUTION - SPEKE # 1

David Taylor, September 6, 1984.



KEY: ° = <20 specimens
x = >20 specimens
D = Dominant >60% specimens
N.F.F. = No foraminifera found
INDET = indeterminate taxa due to diagenesis
∿?∿ = possible hiatus

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

TABLE 4: BENTHONIC FORAMINIFERAL DISTRIBUTION and SEDIMENT GRAIN ANALYSIS - SPEKE # 1.

David Taylor, September 10, 1984.

TABLE 5

MICROPALEONTOLOGICAL DATA SHEET

BASIN: GIPPSLAND ELEVATION: KB: 22.0m GL: -55.0m

WELL NAME: SPEKE # 1 TOTAL DEPTH: 2770m

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										
MIOCENE	LATE	B_1										
		B_2										
		C	1051	2								
	MIDDLE	D_1						1174	2			
		D_2	1284.5	1				1284.5	1			
		E_1	1353	1				1353	1			
	EARLY	E_2	1427	1				1449.5	0			
		F										
		G	1603	0				1603	0			
		H_1	1615	1				1712	1			
OLIGOCENE	LATE	H_2	*(i)					*(i)				
		I_1	*(i)					*(i)				
		I_2										
	EARLY	J_1										
		J_2	*(ii)					*(ii)				
EOCENE		K	1815	2				1815	2			
		Pre-K ¶	1825					1835	2			

COMMENTS: Based on sidewall cores, depth in metres.

*Interval between 1712 and 1815m unsampled; deduced units = (i) between 1758 and 1712m; (ii) between 1808 and 1758m.

¶ Mid Eocene assemblage probably representing Zone N.

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: David Taylor. DATE: September 12, 1984.

DATA REVISED BY: _____ DATE: _____

REFERENCES.

COOKSON, I.C. & PIKE, K.M., 1953 - The Tertiary occurrence and distribution of *Podocarpus* (section *Dacrycarpus*) in Australia and Tasmania. *Aust. J. Bot.-1;* 71-82.

DETTMANN, M.E., 1963 - Upper Mesozoic Microfloras from South-eastern Australia. *Proc. Roy. Soc. Vict. 77;* 1-40.

LENTIN, J.K. & WILLIAMS, G.L., 1977 - Fossil Dinoflagellates: Index to Genera and Species. *Bedford Institute of Oceanography Report Series/Bl-R-77-8 July, 1977.*

MARTIN, H.A., 1973 - The Palynology of some Tertiary Pleistocene Deposits, Lachlan River Valley, New South Wales. *Aust. J. Bot. Suppl. Ser. 6;* 1-57.

PARTRIDGE, A.D., 1976 - The Geological Expression of Eustacy in the Early Tertiary of the Gippsland Basin. *APEA Jl, 16;* 73-79.

STOVER, L.E. & EVITT, R.W., 1978 - Analyses of Pre-Pleistocene organic-walled dinoflagellates. *Stanford University Publications, Geological Sciences Vol. 15.*

STOVER, L.E., HELBY, R.J . & PARTRIDGE, A.D., 1979 - Introduction to Dinoflagellates. *Earth Resources Foundation, University of Sydney,* August 13-17, 1979.

STOVER, L.E. & PARTRIDGE, A.D., 1973 - Tertiary and Late Cretaceous Spores and Pollen from the Gippsland Basin, Southeastern Australia. *Roy. Soc. Vict. Proc., 85;* 237-286.

STOVER, L.E. & PARTRIDGE, A.D., 1982 - Eocene spore-pollen from the Werillup Formation, Western Australia. *Palynology 6:* 69-95.

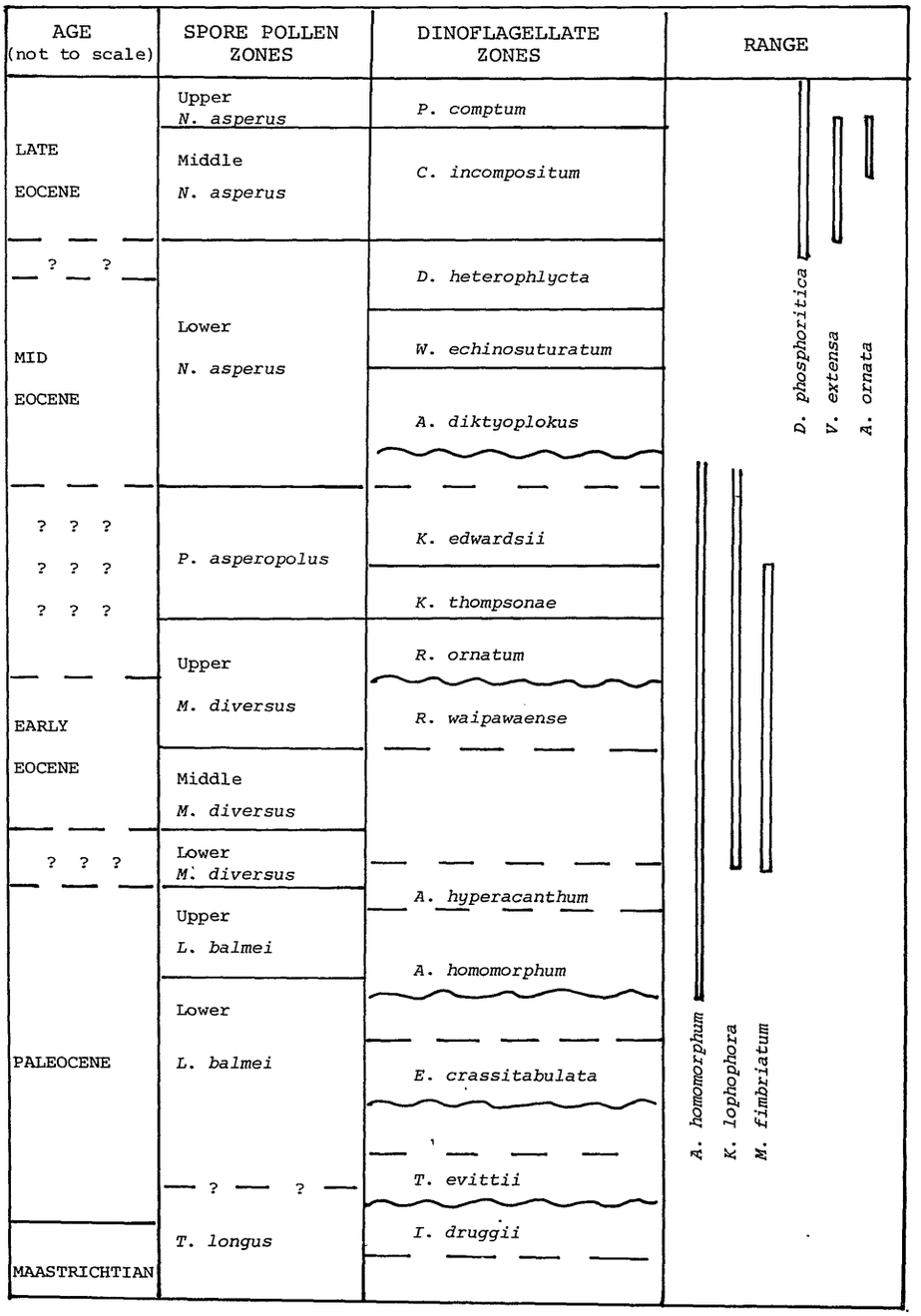
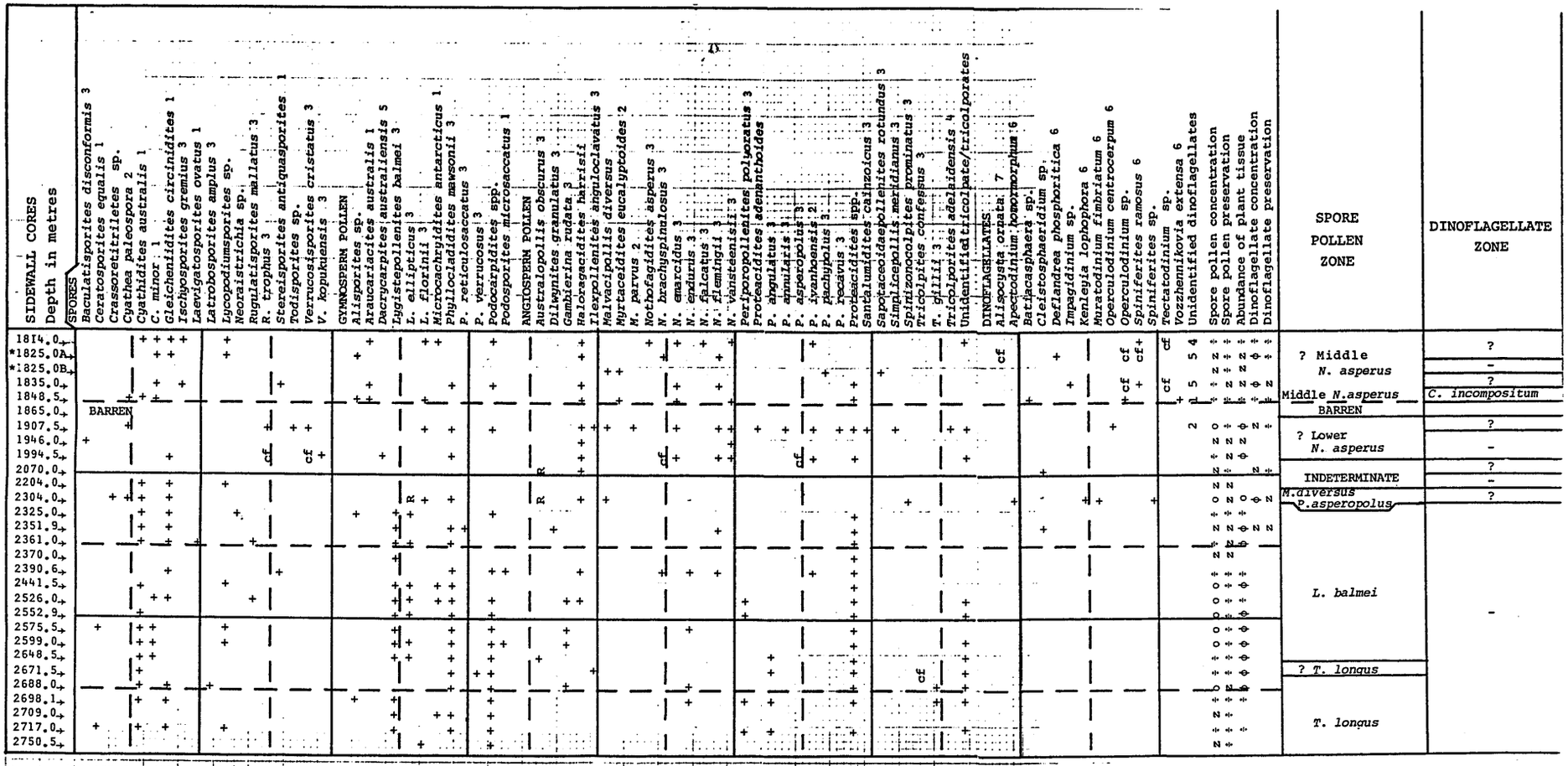


FIGURE 2: DINOFLAGELLATE RANGE CHART. Ranges from Stover, Helby & Partridge, 1979.

AUSTRALIAN AQUITAINE PETROLEUM SPEKE # 1.

Helene A Martin, September 1984.



*1825.0A - clay
*1825.0B - sand & silt

REFERENCES:

1. Dettmann, 1963
2. Martin, 1973
3. Stover & Partridge, 1973
4. Stover & Partridge, 1982
5. Cookson & Pike, 1953
6. Lentin & Williams, 1977
7. Stover & Evitt, 1978

KEY to SYMBOLS:

ϕ : Good, above average
o : average
ǂ : poor, below average
z : exceedingly poor, trace occurrence
cf : similar to, but with some doubt identification because of poor preservation
R : reworked

TABLE 1: SPORES, POLLEN and DINOFLAGELLATES IDENTIFIED in AUSTRALIAN AQUITAINE PETROLEUM SPEKE No. 1.

Helene A Martin, September 1984.

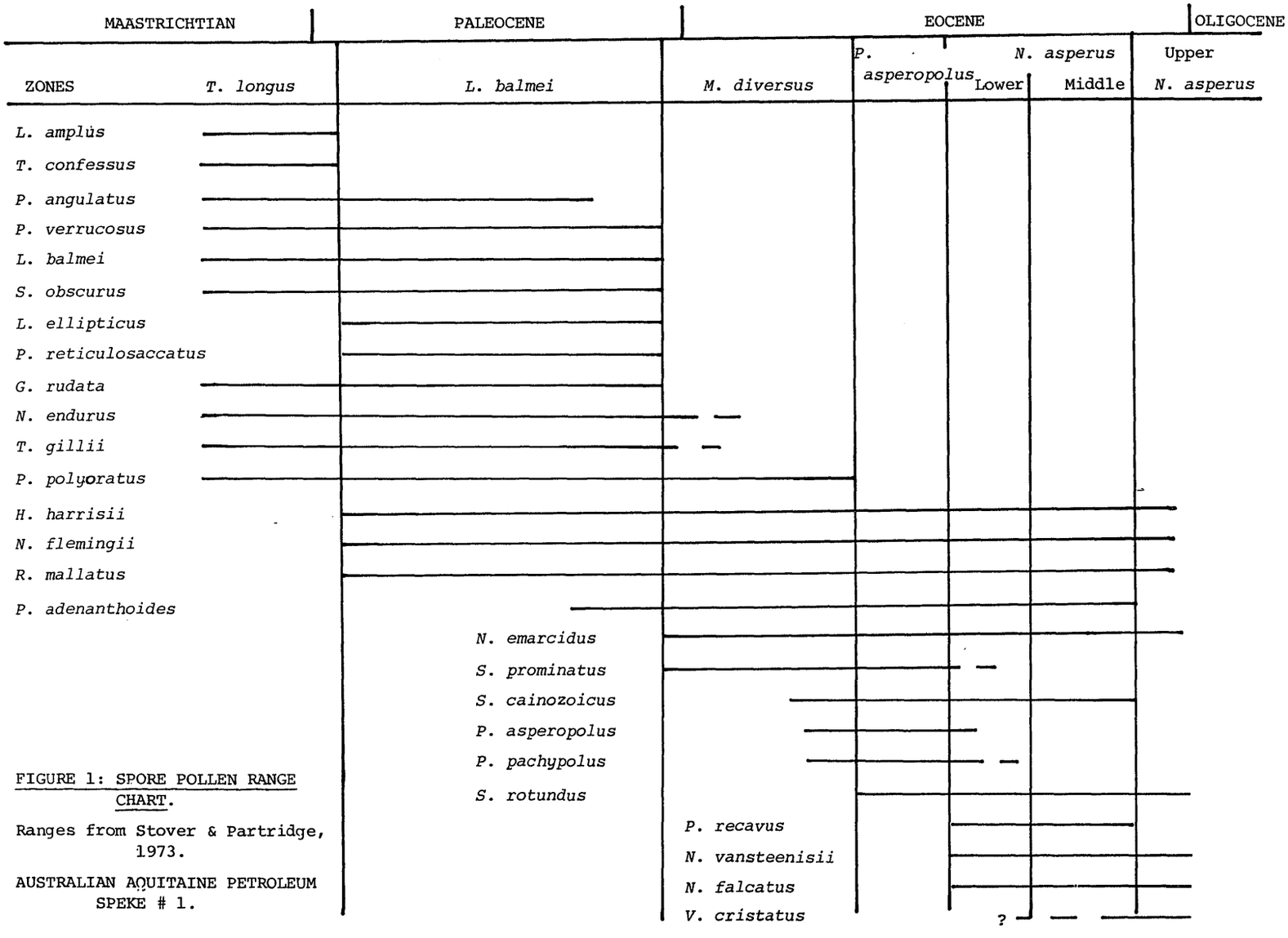


FIGURE 1: SPORE POLLEN RANGE CHART.

Ranges from Stover & Partridge, 1973.

AUSTRALIAN AQUITAINE PETROLEUM SPEKE # 1.

Helene A Martin, September 1984.