



PE990879

MICROPALAEONTOLOGICAL REPORT,  
EAST KINGFISH-1,  
GIPPSLAND BASIN

by

J.P. REXILIUS

Esso Australia Ltd.

Palaeontology Report 1985/8

March, 1985

1455L

INTERPRETATIVE DATA

INTRODUCTION

TABLE 1: MICROPALAEONTOLOGICAL SUMMARY, EAST KINGFISH-1:

GEOLOGICAL COMMENTS

DISCUSSION OF ZONES

REFERENCES

FORAMINIFERAL DATA SHEET

TABLE 2: INTERPRETATIVE DATA, EAST KINGFISH-1

## INTRODUCTION

Ten sidewall core samples from East Kingfish-1 between 2440.01 m and 2497.1 m (KB depth) were processed for foraminiferal and calcareous nannoplankton analysis. Table 1 summarises the biostratigraphy of the units in East Kingfish-1. Tables 2 and 3 summarise the palaeontological analysis of East Kingfish-1 (basic and interpretative data). A range chart for planktonic foraminifera and calcareous nannoplankton is included as basic data.

TABLE 1: BIOSTRATIGRAPHIC SUMMARY, EAST KINGFISH-1

Age	Unit	Plank Foram Zone	Nannofossil Zone	Depth (mKB)
				# above 2440.01
Early Miocene		G	CN1a-CN1b	2440.01
Early Miocene	Lakes Entrance	H2 or younger	CN1a-CN1b	2445.09
Early Miocene	Formation	I1 or younger	CN1a-CN1b	2450.05-2475.03
Late Oligocene		I1 or younger	CP19	2480.08
-		Indeterm.	Indeterm.	2491.06
----- log break at 2493m -----				
-	"Gurnard	Indeterm.	Indeterm.	2493.91-2495.08
* Late Eocene	Formation"	Indeterm.	Indeterm.	2496.02
----- log break at 2497m (basal Late Eocene disconformity) -----				
* Early Eocene	Latrobe Group	Indeterm.	Indeterm.	2497.1
	("Coarse Clastics")			# below 2497.1

TD 2638m

# Not studied.

\* Age based on Marshall, N.G. (Provisional Palynological Report No. 1, East Kingfish-1).

1455L

## GEOLOGICAL COMMENTS

The Latrobe Group "Coarse Clastics" is disconformably overlain by the "Gurnard Formation". The log break at 2497m probably represents the basal Late Eocene disconformity of Vail et al. (1977). Sidewall core samples immediately below (SWC at 2497.1m) and above (SWC at 2496.02m) the disconformity have been assigned to the Early Eocene Lower M. diversus and Late Eocene Middle N. asperus spore/pollen Zones respectively (see Marshall, N. G. - Provisional Palynological Report No. 1, East Kingfish-1). The hiatus between the Latrobe Group "Coarse Clastics" and "Gurnard Formation" spans at least 10 my. The "Gurnard Formation" consists of glauconitic and pyritic sandstone with glauconite representing a minor component. The unit is very poorly sorted in sidewall core samples at 2495.8 and 2496.1m with quartz grains ranging from very coarse to fine. The "Gurnard Formation" in East Kingfish-1 has a distinct log response with high sonic, bulk density and PEF readings, and no significant evidence of caving. The overlying Lakes Entrance Formation however is severely caved. Several sidewall core samples shot in the "Gurnard Formation" contain low yields of poorly preserved planktonic foraminifera and calcareous nannoplankton which are not age-diagnostic. These assemblages are considered to be mud contaminants.

The "Gurnard Formation" may be conformably or disconformably overlain by the Lakes Entrance Formation. Poor sample control over the basal 13m of the Lakes Entrance Formation in East Kingfish-1 has prevented age-dating of this interval. The Early Oligocene may be represented in this 13m interval. Because of poor hole conditions only one of seven attempted sidewall shots was recovered between 2480.08 and 2493.91m, and this sidewall core sample (SWC at 2491.06m) represents a severely recrystallised limestone which is barren of calcareous microfossils. Definite Late Oligocene-Early Miocene calcareous shales of the Lakes Entrance Formation occur between 2440.01 and 2480.08m. Age-dating of this interval has been mainly reliant on calcareous nannoplankton.

## BIOSTRATIGRAPHIC ANALYSIS

The Gippsland Basin planktonic foraminiferal zonal scheme of Taylor (in prep.) is used in this investigation. The CN-CP calcareous nannoplankton letter scheme of Bukry (1981) is used in this study. Calcareous nannoplankton studies by Edwards (1971), Edwards & Perch-Nielsen (1975) and Siesser (1979) have also been consulted.

### Indeterminate Interval: 2491.06-2497.1m

The interval is barren of in situ calcareous microfossils. Low yields of planktonic foraminifera and calcareous nannoplankton which are not age-diagnostic occur throughout the interval and are suspected to be contaminants from the Lakes Entrance Formation.

### Zone CP19: 2480.08m

The presence of common Discoaster deflandre, Cyclicargolithus floridanus and Coccolithus eupelagicus, associated with rare Zygrhablithus bijugatus, and without Chiasmolithus oamaruensis, indicates assignment to Zone CP19 of Bukry (1981). The extinction of Zygrhablithus bijugatus at or near the top of Zone CP19 is well established in New Zealand (Edwards, 1971) and in the Torquay Basin of Victoria (Siesser, 1979). Likewise, Chiasmolithus oamaruensis has been found not to range higher than Zone I2 in the Gippsland Basin (e.g. Bullseye-1, Barracouta-5). The assemblage recorded at 2480.8m is similar to that recorded by Siesser (1979) in the Nerita-1 and Birdrock sections in the Torquay Basin. He equated his assemblage with the Late Oligocene NP24 and NP25 Zones of Martini, 1971 (= Zone CP19 of Bukry, 1981).

Zone II or younger: 2450.05-2480.08m

The appearance uphole of Globoquadrina dehiscens at 2480.08m indicates an age no older than Zone II. Neither Globigerina woodi or G. woodi connecta (Zone H2 and H1 indicators) could be positively identified in the interval. The poor preservational nature of the planktonic foraminiferal assemblages in the interval restricts positive identification of species, particularly species of the genus Globigerina.

Zone CN1a-CN1b: 2440.01-2475.03m

The absence of Zygrhablithus bijugatus and Discoaster druggii in high yielding calcareous nannoplankton assemblages indicate that the interval equates with Zones CN1a and CN1b of Bukry (1981). The extinction of Zygrhablithus bijugatus approximates the top of Zone CP19 (see comments on Zone CP19 on previous page) while the appearance of Discoaster druggii defines the base of Zone CN1c. Siesser (1979) recorded the same biostratigraphic interval in the Nerita-1 and Birdrock sections in the Torquay Basin, and assigned his interval to the NN1 Zone of Martini, 1971 (= CN1a and CN1b Zones of Bukry, 1981). An increase in numbers and diversity of the genus Helicosphaera was noted to occur within Zone CN1a-CN1b in East Kingfish-1. This group needs to be studied thoroughly because Haq (1973) has noted rapid evolution within Helicosphaera elsewhere.

Zone H2 or younger: 2445.09m

Rare specimens of Globigerina woodi were noted in the sidewall core sample at 2445.09m associated with Globoquadrina dehiscens. Globigerina woodi connecta was not recorded at 2445.09m however because of the poor preservational state of the planktonic foraminifera in the sample, its absence may be misleading. For this reason, the sample is not given a definitive zonal assignment.

Zone G: 2440.01 m

The entry of rare specimens of Globigerinoides trilobus at 2440.01 m defines the base of Zone G in East Kingfish-1.



## REFERENCES

- BUKRY, D., 1981. Cenozoic coccoliths from the Deep Sea Drilling Project. In: WARME, J.E., DOUGLAS, R.G., & WINTERER, E. L. (Editors). The Deep Sea Drilling project: a decade of progress. SEPM Special Publ. No. 32: 335-354.
- EDWARDS, A. R., 1971. A calcareous nanoplankton zonation of the New Zealand Paleogene. In: FARINACII, A. (Editor). 2nd Plank Conf., Roma, 1970. Proceedings 1: 381-419.
- EDWARDS, A. R., & PERCH-NIELSEN, K., 1975. Calcareous nannofossils from the Southwest Pacific., Deep Sea Drilling Project, Leg 29. In: KENNETT, J. P., HOUTZ, R. E., et al., Initial Reports of the Deep Sea Drilling Project, Vol. 29, Washington (U.S. Government Printing Office): 469-539.
- HAQ, B. U., 1973. Evolutionary trends in the Cenozoic coccolithophore genus Helicopontosphaera. Micropalaeontology, 19: 32-52.
- MARTINI, E., 1971. Standard Tertiary and Quaternary calcareous nanoplankton zonation. In: FARINACII, A., (Editor). 2nd Plank. Conf., Roma, 1970. Proceedings 1: 739-785.
- SIESSER, W. G., 1979. Oligocene-Miocene calcareous nannofossils from the Torquay Basin, Victoria, Australia. Alcheringa, 3: 159-170.
- TAYLOR, D. J., (in prep.) Observed Gippsland biostratigraphic sequences of planktonic foraminiferal assemblages.
- VAIL, P. R., MITCHUM, R. M., & THOMPSON, S., 1977. Global cycles of relative changes of sea level. In: PAYTON, C.E. (Editor), Seismic Stratigraphy - Applications to Hydrocarbon Exploration. Am. Assoc. Pet. Geol., Mem., 26: 83-97.

TABLE 2

## SUMMARY OF PALAEOLOGICAL ANALYSIS, EAST KINGFISH-1, GIPPSLAND BASIN

## INTERPRETATIVE DATA

NATURE OF SAMPLE	DEPTH (mKB)	YIELD		PRESERVATION		DIVERSITY		ZONE		AGE	COMMENTS
		PLANK FORAMS	NANNOS	PLANK FORAMS	NANNOS	PLANK FORAMS	PLANK NANNOS	FORAMS	NANNOS		
SWC13	2497.1	Very low	Very low	Poor	Poor	Very low	Very low	Indeterm.	Indeterm.	Indeterm.	Contaminated with
SWC14	2496.02	Barren	Barren	-	-	-	-	-	-	-	calcareous microfossils
SWC15	2495.08	Low	Very low	Poor	Poor	Very low	Very low	Indeterm.	Indeterm.	Indeterm.	from the Lakes Entrance
SWC16	2493.91	Very low	Very low	Poor	Poor	Very low	Very low	Indeterm.	Indeterm.	Indeterm.	Formation. Rare fish teeth at 2495.08m.
SWC19	2491.06	Barren	Barren	-	-	-	-	-	-	-	Severe recrystallisation.
SWC24	2480.08	High	High	Poor	Moderate/poor	Low	Low	III or younger	CP19	Late Oligocene	
SWC25	2475.03	High	High	Poor	Moderate	Low	Low	III or younger	CN1a-CN1b	Early Miocene	
SWC28	2450.05	Moderate	High	Poor	Moderate/poor	Very low	Low/moderate	III or younger	CN1a-CN1b	Early Miocene	
SWC29	2445.09	High	High	Poor	Moderate/poor	Low	Low/moderate	H2 or younger	CN1a-CN1b	Early Miocene	
SWC30	2440.01	High	High	Poor	Moderate	Low	Low/moderate	G	CN1a-CN1b	Early Miocene	

1455L

TABLE 3

## SUMMARY OF PALAEOONTOLOGICAL ANALYSIS, EAST KINGFISH-1, GIPPSLAND BASIN

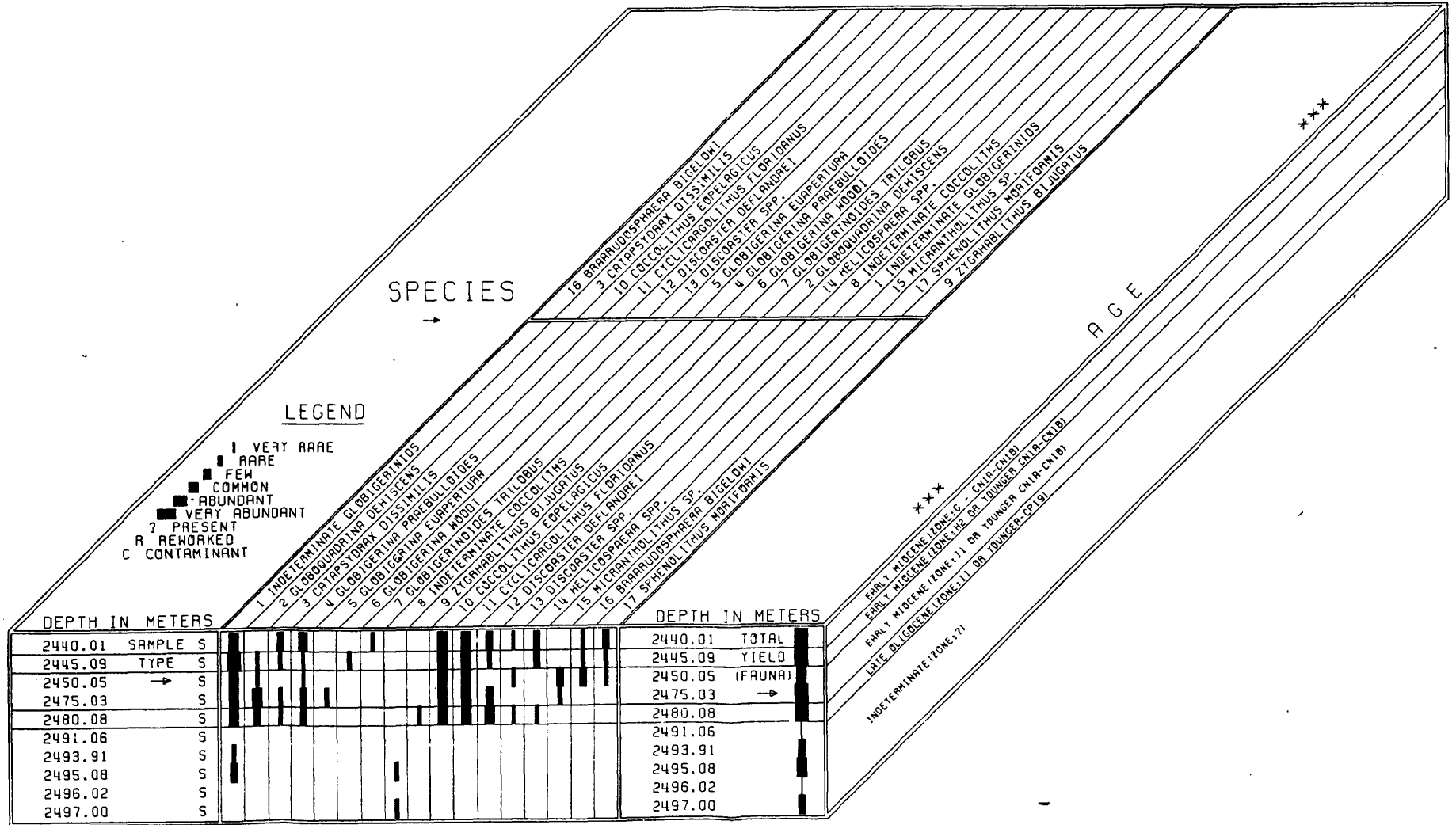
BASIC DATA

NATURE OF SAMPLE	DEPTH (mKB)	YIELD		PRESERVATION		DIVERSITY	
		PLANK FORAMS	NANNOS	PLANK FORAMS	NANNOS	PLANK FORAMS	PLANK NANNOS
SWC13	2497.1	Very low	Very low	Poor	Poor	Very low	Very low
SWC14	2496.02	Barren	Barren	-	-	-	-
SWC15	2495.08	Low	Very low	Poor	Poor	Very low	Very low
SWC16	2493.91	Very low	Very low	Poor	Poor	Very low	Very low
SWC19	2491.06	Barren	Barren	-	-	-	-
SWC24	2480.08	High	High	Poor	Moderate/poor	Low	Low
SWC25	2475.03	High	High	Poor	Moderate	Low	Low
SWC28	2450.05	Moderate	High	Poor	Moderate/poor	Very low	Low/moderate
SWC29	2445.09	High	High	Poor	Moderate/poor	Low	Low/moderate
SWC30	2440.01	High	High	Poor	Moderate	Low	Low/moderate

BASIC DATA

TABLE 3: BASIC DATA, EAST KINGFISH-1  
RANGE CHART: CALCAREOUS MICROFOSSILS

ESSO BHP EAST KINGFISH 1. GIPPSLAND BASIN. MICROPAL.



SPECIES

LEGEND

- VERY RARE
- RARE
- FEW
- COMMON
- ABUNDANT
- VERY ABUNDANT
- ? PRESENT
- R REWORKED
- C CONTAMINANT

DEPTH IN METERS

2440.01	SAMPLE	S
2445.09	TYPE	S
2450.05		S
2475.03		S
2480.08		S
2491.06		S
2493.91		S
2495.08		S
2496.02		S
2497.00		S

DEPTH IN METERS

2440.01	TOTAL
2445.09	YIELD
2450.05	(FAUNA)
2475.03	
2480.08	
2491.06	
2493.91	
2495.08	
2496.02	
2497.00	

\*\*\*

EARLY MIOCENE ZONE 12 - CNIP-CA19

EARLY MIOCENE ZONE 12 OR YOUNGER CNIP-CA19

EARLY MIOCENE ZONE 11

INDETERMINATE (ZONE 11 OR YOUNGER CP 19)

AGE

ESSO BHP EAST KINGFISH 1. GIPPSLAND BASIN. MICROPAL.

