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PALYNOLOGICAL ANALYSIS OF YELLOWTAIL-1

GIPPSLAND BASIN

by

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PART I

INTERPRETATIVE DATA

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INTRODUCTION.

Twenty five (25) sidewall cores were processed and examined for palynomorphs. The recovery of microfossils was poor to fair from most samples, however, all but two yielded enough palynomorphs so that an age determination could be made.

Palynological zones and lithological facies subdivisions, from the base of the Lakes Entrance Formation to the total depth of the well, is given below. Table 1 presents a summary of the palynological analysis for each sample and the occurrence of each species is tabulated in the accompanying check-charts.

<u>SUMMARY</u>		
<u>UNIT/FACIES</u>	<u>ZONE</u>	<u>DEPTH KB</u> <u>(metres)</u>
Lakes Entrance Formation (base)	<u>P. tuberculatus</u>	2402
----- UNCONFORMITY -----		
Gurnard Formation	Middle <u>N. asperus</u>	2406-2410
----- UNCONFORMITY -----		
Latrobe Group "Coarse Clastics"	Upper <u>L. balmei</u>	2415-2438
	Lower <u>L. balmei</u>	2470-2570
		----- T.D. 2571

GEOLOGICAL COMMENTS:

- 1) Two major periods of non-deposition and/or unconformities are evident in the well section examined. One is located between 2402 and 2406 metres, between the base of the Lakes Entrance Formation (Oligocene, P. tuberculatus Zone) and the top of the Gurnard Formation (Late Eocene, Middle N. asperus Zone). Foraminiferal studies of this section will probably offer more accurate estimates of the amount

of time missing, but it appears, from this study to be in excess of 4 million years.

The second time gap is much larger. At least 13 million years appear to be missing from the stratigraphic record between 2410 and 2415 metres. The flora changes from one of the Middle N. asperus Zone at 2410 metres to an Upper L. balmei Zone assemblage in the sidewall core from 2415 metres. The 5 metre sand in between was barren of fossils.

- 2) Foraminiferal examination of the basal Lakes Entrance sediments revealed that uppermost Eocene (Zone K) was present in the Opah-1 section. A similar occurrence is possible in this well.
- 3) The Gurnard Formation (Middle N. asperus Zone) which extends from 2406 to 2410 metres is almost pure quartz sand in this well. The lithological evidence for equating this to the Gurnard Formation is the presence of glauconite in most of the samples. The 5 metres of sand between the last N. asperus Zone sample (2410 metres) and the highest L. balmei Zone record at 2415 metres was barren of palynomorphs.
- 4) The section between the base of P. tuberculatus Zone at 2402 metres and top of L. balmei Zone at 2415 metres is similar in thickness and sandiness in both Opah-1 (14 metres) and Yellowtail-1 (13 metres). In Yellowtail-1, the upper 8 metres to 2410 metres includes a well-defined Middle N. asperus Zone fora. The bottom 5 metres of this section is barren of fossils. The reverse situation is true in Opah-1, where the upper 11 metres of the section

is barren of significant fossils and a poorly developed assemblage of probable P. asperopolus Zone age was identified from the sidewall cores taken from the lower 3 metres.

- 5) Samples in Yellowtail-1 from the upper part of the L. balmei section, from 2415 to 2421 metres, were badly contaminated by drilling mud and originally were considered to be a mixed flora of N. asperus Zone with L. balmei Zone reworking. Because additional study shows that the younger element of the flora is a mixture of P. tuberculatus and N. asperus Zone species, rather than just an N. asperus Zone Assemblage, it is believed that the post L. balmei Zone fossils were introduced by drilling mud infiltration of this sandy section.

- 6) This well bottomed in the Lower L. balmei Zone of the Paleocene age. The bottom sample (2570 metres) contained not only a well developed spore-pollen flora, but also included a fairly diverse dinoflagellate assemblage that included both Palaeoperidinium pyrophorum and Deflandrea speciosus, dinoflagellate marker species for the Lower L. balmei Zone.

DISCUSSION OF ZONES:

Lower Lygistepollenites balmei Zone: 2470 to 2570 metres

Samples from this section contained specimens of Tetracolporites verrucosus, a marker of the Lower L. balmei Zone, in addition to the usual general L. balmei markers, such as Lygistepollenites balmei, Australopollis obscurus, Gambierina edwardsii and G. rudata. The bottom sample (2570 metres) is especially notable because of the addition of marine dinoflagellates, which include Palaeoperidinium pyrophorum and Deflandrea speciosus as well as Senegalinium dilwynensis and Gingiodinium palaeocenicum.

Upper Lygistepollenites balmei Zone 2415 to 2438 metres.

Common and consistent occurrence of L. balmei, A. obscurus, G. edwardsii and G. rudata in these samples indicate an age of Paleocene (L. balmei Zone) or lower; and the regular presence of Apectodinium homomorpha demonstrates that they are no older than Upper L. balmei Zone.

Middle Nothofagidites asperus Zone: 2406 to 2410 metres.

Samples from this section contained well-developed floras of both dinoflagellates and spore-pollen that included the following important markers: Triorites magnificus, Eisenackia ornata, Phthanoperidium comatum, Holoroginella spinosa, Systematophora placacantha and Schematophora speciosus.

Proteacidites tuberculatus Zone: 2371 to 2402 metres.

The regular presence of Cyatheacidites annulatus and Protoellipsodinium simplex in these samples are indicative of post-Eocene sediments.

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

SAMPLE	DEPTH METRES	DEPTH FEET	ZONE	AGE	CONFIDENCE RATING	YIELD	SPORE-POLLEN DIVERSITY	DINO. DIVERSITY	COMMENTS
SWC 72	2371	7779	<u>P. tuberculatus</u>	Oligocene	1	Poor	Low	Moderate	
SWC 67	2381	7812	<u>P. tuberculatus</u>	Oligocene	1	Poor	Low	Moderate	
SWC 64	2388	7835	<u>P. tuberculatus</u>	Oligocene	1	Poor	Low	Moderate	
SWC 58	2399	7871	<u>P. tuberculatus</u>	Oligocene	1	Poor	Moderate	Moderate	<u>C. annulatus</u>
SWC 55	2401.9	7880	<u>P. tuberculatus</u>	Oligocene	1	Poor	Low	Moderate	<u>C. annulatus</u>
SWC 52	2405	7890.5	Indeterminate	-	-	Poor	None	Moderate	
SWC 51	2406.1	7894	Middle <u>N. asperus</u>	Late Eocene	1	Poor	Very Low	Low	<u>Eisenackia ornata</u>
SWC 50	2407	7897	Middle <u>N. asperus</u>	Late Eocene	1	Fair	Moderate	Moderate	<u>T. magnificus</u>
SWC 49	2408	7900	<u>N. asperus</u>	Late Eocene	2	Poor	Low	Low	
SWC 47	2409.9	7906.5	Middle <u>N. asperus</u>	Late Eocene	1	Poor	Low	Moderate	
SWC 42	2415	7923	Upper <u>L. balmei</u>	Late Paleocene	2	Good	Moderate	Moderate	Badly mud contaminated
SWC 41	2415.9	7926	Upper <u>L. balmei</u>	Late Paleocene	1	Poor	Moderate	None	
SWC 40	2417	7930	Upper <u>L. balmei</u>	Late Paleocene	1	Fair	Moderate	Very Low	
SWC 39	2418	7933	Upper <u>L. balmei</u>	Late Paleocene	1	Fair	Moderate	Low	
SWC 37	2420.1	7940	Indeterminate	-	-	Poor	Low	Low	
SWC 36	2420.9	7942.5	<u>L. balmei</u>	Paleocene	2	Poor	Low	Low	
SWC 34	2423	7949.5	Upper <u>L. balmei</u>	Late Paleocene	1	Poor	Moderate	Low	
SWC 33	2424	7953	Upper <u>L. balmei</u>	Late Paleocene	1	Fair	Moderate	Low	Mud contamination
SWC 28	2429	7969	Upper <u>L. balmei</u>	Late Paleocene	1	Very Poor	None	Low	<u>W. homomorpha</u>
SWC 21	2438.2	7999	Upper <u>L. balmei</u>	Late Paleocene	1	Fair	Moderate	Low	
SWC 18	2456	8058	<u>L. balmei</u>	Paleocene	2	Fair	Moderate	Low	
SWC 14	2470	8103.5	Lower <u>L. balmei</u>	Paleocene	1	Poor	Moderate	None	
SWC 10	2483.4	8147.5	Lower <u>L. balmei</u>	Paleocene	2	Fair	Moderate	Low	
SWC 7	2519.8	8267	Lower <u>L. balmei</u>	Paleocene	2	Fair	Moderate	Low	
SWC 1	2570	8432	Lower <u>L. balmei</u>	Paleocene	0	Fair	Moderate	Moderate	<u>P. pyrophorum</u> , <u>D. speciosus</u>

B A S I N: GIPPSLAND

ELEVATION: KB: 21 GL: 77

WELL NAME: YELLOWTAIL-1

TOTAL DEPTH: 2571 metres

AGE	PALYNOLOGICAL ZONES	HIGHEST DATA					LOWEST DATA				
		Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time
NEOGENE	<i>T. pleistocenicus</i>										
	<i>M. lipsis</i>										
	<i>C. bifurcatus</i>										
	<i>T. bellus</i>										
PALEOGENE	<i>P. tuberculatus</i>	2371	1				2401.9	1			
	Upper <i>N. asperus</i>										
	Mid <i>N. asperus</i>	2406.1	1				2409.9	1			
	Lower <i>N. asperus</i>										
	<i>P. asperopolus</i>										
	Upper <i>M. diversus</i>										
	Mid <i>M. diversus</i>										
	Lower <i>M. diversus</i>										
	Upper <i>L. balmei</i>	2415	1				2438.2	1			
	Lower <i>L. balmei</i>	2470	1				2570	0			
LATE CRETACEOUS	<i>T. longus</i>										
	<i>T. lilliei</i>										
	<i>N. senectus</i>										
	U. <i>T. pachyexinus</i>										
	L. <i>T. pachyexinus</i>										
	<i>C. triplex</i>										
EARLY CRET.	<i>A. distocarinatus</i>										
	<i>C. paradoxus</i>										
	<i>C. striatus</i>										
	<i>F. asymmetricus</i>										
	<i>F. wonthaggiensis</i>										
	<i>C. australiensis</i>										
	PRE-CRETACEOUS										

COMMENTS:

CONFIDENCE RATING:

- 0: SWC or Core, Excellent Confidence, assemblage with zone species of spores, pollen and microplankton.
- 1: SWC or Core, Good Confidence, assemblage with zone species of spores and pollen or microplankton.
- 2: SWC or Core, Poor Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.
- 3: Cuttings, Fair Confidence, assemblage with zone species of either spores and pollen or microplankton, or both.
- 4: Cuttings, No Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.

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:

HOWARD E. STACY

DATE:

FEBRUARY 25, 1982

DATA REVISED BY:

DATE:

PART II

BASIC DATA

Table-1: Basic Data
Range Charts

TABLE-1

BASIC DATA

SUMMARY OF PALAEOLOGICAL ANALYSIS, YELLOWTAIL-1, GIPPSLAND BASIN

SAMPLE	DEPTH METRES	DEPTH FEET	YIELD	SPORE-POLLEN DIVERSITY	DINO. DIVERSITY
SWC 72	2371	7779	Poor	Low	Moderate
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