PALYNOLOGICAL DETERMINATIONS FOR KINGFISH-4, GIPPSLAND BASIN, AUSTRALIA

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SUMMARY

7408'-7413'	Upper *M. diversus*	Early Eocene
7424'-7616'	Lower *M. diversus*	Early Eocene
7630'-8198'	*L. balmei*	Paleocene

Spore-pollen zone determinations for the Kingfish-4 well are based on palynomorph assemblages from six conventional and 18 sidewall cores. In general, the preservation of the spore-pollen and dinoflagellates is fair to poor although occasional well preserved specimens are present in some samples. Dinoflagellates occur consistently in assemblages from 7408 to 7796 feet and also at 8107 and 8184 feet. Recycled pre-Tertiary palynomorphs were not observed in Kingfish-4 assemblages.

DISCUSSION

Upper *Malvacipollis diversus* Zone

Assemblages from SWC 18 at 7408 feet and SWC 7413 feet are assigned to this zone with low confidence ratings mainly because of the very sparse and rather poorly preserved assemblages recovered from these samples. The shallower sidewall core has mostly incomplete dinoflagellate specimens and rare spore-pollen; the deeper core has rare spore-pollen and even rarer dinoflagellates.

Among the spore-pollen the presence of *Nothofagidites deminutus*, *Myrtaceidites tenuis* and *Proteacidites pachypolus* indicate the samples are no older than Upper *M. diversus*, but they could be younger. The dinoflagellates, particularly the types of *Wetzeliella (W. homomorpha, W. hyperacantha, W. articulata)* in association with *Homotryblium tasmaniense* support the Upper *M. diversus* assignment, especially since the types of *Wetzeliella (W. thompsonae, W. edwardsii)* known to occur in the *P. asperopolus* zone were not seen in the Kingfish-4 samples.

Species identified from sidewall cores 17 and 18 are:

Spore-Pollen

Dilwynites granulatus
Haloragacidites harrisii
Helcisporites astrus
Lygistepollenites florinii
Nothofagidites emarcidus
N. deminutus
N. brachyspinulosus
Malvacipollis subtilis
Myrtaceidites parvus
M. tenuis
Proteacidites annularis
P. pachypolus
Simplicepollis meridianus
Tricolporites paenestriatus

Microplankton

Achomosphaera sp.
Cleistosphaeridium sp.
Cordosphaeridium sp.
Deflandrea sp.
Epicephalopyxis indentata
Exochosphaeridium sp.
Homotryblium tasmaniense
Hystrichokolpoma eisenackii
Operculodinium centrocarpum
Spinidinium sp.
Spiniferites sp.
Wetzeliella articulata
W. homomorpha
W. hyperacantha

Lower *Malvacipollis diversus* Zone

Samples from conventional cores 2, 3, 4, 5, 6, 8 and 9 between 7424 and 7616 feet are placed in the Lower *M. diversus* zone. Within this interval spore-pollen are consistently more abundant than dinoflagellates. Fairly well preserved and rather diverse spore-pollen assemblages were recovered from cores 2 and 4 at 7424 and 7478 feet, and assemblages with low species diversity were obtained from cores 5 to 9 between 7521.5 and 7616 feet. In the deeper cores the most conspicuous species is *Proteacidites grandis* and although other Proteaceous pollen are sparse to common, poor preservation precludes identification at the species level for a majority of specimens. Dinoflagellates, which occur throughout the Lower *M. diversus* zone, are for the most part rare, poorly preserved and poorly represented in terms of the number of species present.

Assignment of samples from cores 2 through 9 to the Lower *M. diversus* zone is based on spore-pollen of which the following species were identified.

Anacolosidites sp.
Banksieaeidites arcuatus
Bysmapollis emaciatus?
Cupanieidites orthoteichus
Dilwynites granulatus
Haloragacidites harrisii
Ilexpollenites anguloclavatus
Ischyosporites gremius
I. irregularis
Polycolpites esobalteus
Proteacidites adenanthoides
P. annularis
P. grandis
P. incurvatus
P. leightonii
P. ornatus
P. reticuloscabratus
P. tuberculiformis?

Lygistepollenites florinii
Nothofagidites emarcidus/heterus
N. flemingii
Malvacipollis diversus
M. sublilis
Myrtaceidites parvus
Periporopollenites demarcetus
P. polyoratus
Phyllocladidites mawsonii
Rugulatisporites mallatus
Schizocolpus marlinensis
Schizocolpus sp.
Simplicepollis meridianus
Stereisporites punctatus
Tricolpites gillii
T. phillipsii
Tricolporites moultonii
Verrucosisporites kopukuensis

Microplankton from the Lower *M. diversus* zone are:

Cyclonephelium sp.
Deflandrea pachyceros?
Deflandrea sp.
Epicephalopyxis indentata
Spinidinium sp.
Wetzeliella homomorpha

Lygistepollenites balmei Zone

Palynomorph assemblages from sidewall cores 16 to 3 covering the interval from 7630 to 8189 feet are assigned to the *L. balmei* zone. Spore-pollen from nearly all of the samples are poorly preserved, especially those from cores below 8000 feet, in which the surface features of many specimens have been destroyed because of imbedment by minute pyrite crystals. Consequently, specific and in some examples, even generic identifications are uncertain. The identification of the key species such as *Lygistepollenites balmei, Polycolpites longstonii* and *Tetracolporites textus,* however, are firm and reliable.

Dinoflagellate specimens are fairly common at 7630 and 7796 feet, and in each sample a single species is represented. At 7796 feet, the specimens are of the short spined variety of *Wetzeliella homomorpha,* whereas at 7630 feet they are of the same as the *Deflandrea sp.* in the Lower *M. diversus* zone. Rare microplankton are also present in assemblages from 8107 and 8184 feet.

Spore-pollen identified from the *L. balmei* zone are:

Dilwynites granulatus
Haloragacidites harrisii
Lygistepollenites balmei
Malvacipollis diversus
Nothofagidites emarcidus
N. flemingii
Periporopollenites polyoratus
Phyllocladidites mawsonii
P. reticulosaccatus
Polycolpites langstonii
Proteacidites adenanthoides
P. annularis
P. grandis
P. parvus
Simplicepollis meridianus
Tetracolporites textus
Tricolpites gillii
T. phillipsii

Misplaced Samples

Sidewall core 22: This sample is reportedly from a depth of 6956 feet which on log character places it in the post-Latrobe part of the section (Oligocene Lakes Entrance Formation). However, a more or less typical Latrobe Lower *M. diversus* (Early Eocene) spore-pollen assemblage was obtained rom the core. Additionally, the associated microplankton indicate an Early Eocene age for the assemblage. Based on palynological evidence, the sample is definitely out-of-place.

Sidewall core 20: The residue from this core supposedly from 7340 feet consists of carbonized debris and abundant plant tissue with the latter represented principally by cuticular material. Palynomorphs are very rare and not well preserved so that specific attribution is impossible for most of the Proteaceous pollen. Nearly all of the dinoflagellate specimens are incomplete. Comparison of the general nature and preservational condition of the residue with others from Kingfish-4 samples indicates that sidewall 20 is from the *L. balmei* interval. Single specimen occurrence of *Polycolpites langstonii* and *Lygistepollenites balmei* reinforce this interpretation.

CONCLUSIONS

The Latrobe section between 7408 and 8198 feet in Kingfish-4 contains palynomorph assemblages indicative of the Early Eocene Upper and Lower *M. diversus* zones and the Paleocene *L. balmei* zone. Dinoflagellates are much less numerous than spore-pollen and occur throughout the *M. diversus* zones and sporadically in the *L. balmei* zone. Spore-pollen diversity is relatively low, which in all probability reflects the generally fair to poor preservation of most assemblages. However, the overall character of the palynomorphs is not dissimilar from other assemblages recovered from the Kingfish area.

SAMPLES STUDIED

Sample and Depth		Zone	Comment
SWC 22	6956'	Lower *M. diversus*	Misplaced
SWC 20	7340'	*L. balmei*	Misplaced
SWC 18	7408'	Upper *M. diversus*	Mainly dinoflagellates
SWC 17	7413'	Upper *M. diversus*	Very sparse assemblage
Core 2	7424'	Lower *M. diversus*	Sparse dinoflagellates
Core 3	7459'	Indeterminate	
Core 4	7478'	Lower *M. diversus*	Rare dinoflagellates
Core 5	7521.5'	Lower *M. diversus*	Rare dinoflagellates
Core 6	7545.5'	Lower *M. diversus*	Rare dinoflagellates
Core 8	7602.5'	Lower *M. diversus*	Rare dinoflagellates
Core 9	7616'	Lower *M. diversus*	Rare dinoflagellates
SWC 16	7630'	*L. balmei*	Frequent dinoflagellates
SWC 14	7796'	*L. balmei*	Frequent dinoflagellates
SWC 13	7810'	Indeterminate	Barren
SWC 12	7840'	*L. balmei*	
SWC 11	7870'	Indeterminate	No zone species
SWC 10	7880'	*L. balmei*	
SWC 9	7928'	Indeterminate	No zone species
SWC 8	7965'	*L. balmei*	
SWC 6	8107'	*L. balmei*	Rare dinoflagellates
SWC 4	8184'	*L. balmei*	Rare dinoflagellates
SWC 3	8198'	*L. balmei*	
SWC 2	8217'	Indeterminate	No zone species

BASIN Gippsland DATE January 1974

WELL NAME Kingfish-4 ELEVATION +32'(KB), +31'(DF)

AGE	PALYNOLOGIC ZONES	HIGHEST DATA					LOWEST DATA				
		Preferred Depth	Rtg	Alternate Depth	Rtg	2 way time	Preferred Depth	Rtg.	Alternate Depth	Rtg.	2 way time
OLIGO-MIOC.	T. bellus										
	P. tuberculatus										
EOCENE	U. N. asperus										
	L. N. asperus										
	P. asperopolus										
	U. M. diversus	7408	2				7413	2			
	L. M. diversus	7421	1				7616	1			
PALEO-CENE	L. balmei	7630	1				8198	1			
	T. longus										
LATE CRETACEOUS	T. lilliei										
	N. senectus										
	C. trip./T.pach.										
	C. distocarin.										
	T. pannosus										
EARLY CRETACEOUS	C. paradoxa										
	C. striatus										
	U. C. hughesii										
	L. C. hughesii										
	C. stylosus										
Pre-Cretaceous											

COMMENTS: *L. balmei* assemblages below 8000' very poorly preserved; those from 7800' to 8000' with low species diversity.

RATINGS:
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 a sample cannot be assigned to one particular zone, then no entry should be made. Also, if an entry is given a 3 or 4 confidence rating, an alternate depth with a better confidence rating should be entered, if possible.

DATE RECORDED BY: L. E. Stover DATE January 1974

DATA REVISED BY: _____ DATE _____