APPENDIX 3.

PALYNOLOGICAL ANALYSIS OF KINGFISH-8 GIPPSLAND BASIN

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INTRODUCTION

Thirty-one sidewall cores in Kingfish-8 were examined, cleaned and split by author and then forwarded to Laola Pty Ltd in Perth for processing to extract organic microfossils (palynomorphs). All samples were examined by author for their contained spores, pollen and microplankton to derive the data and interpretations in this report.

Between 5 to 12g (8.5g average) of each sidewall core was processed for palynological analysis and low to high residue yields were recovered from the Latrobe Group coarse clastic section and overall low to very low yields from the overlying condensed greensand interval and basal Lakes Entrance Formation. Only moderate spore-pollen and microplankton diversities were recorded from the samples as a consequence of the low yields. Spore-pollen diversity averaged 18+ species per sample. Microplankton diversity was very low in the Latrobe coarse clastics section and low to moderate in marine greensand section and above where it averaged 8+ species per sample. Preservation varied from poor to good but overall was fair. Some degrading of the preservation was caused by the use of polyvinyl alcohol (PVA) and EUKITT mounting medium.

It was noticeable that the yield of palynomorphs from the sidewall cores and their preservation and presentation (for identification) was poorer than the results obtained from the adjacent Kingfish-7 which was processed in Esso's former Sydney Palynological laboratory in 1977 (Partridge, 1977). The reasons for this can be attributed to the limited experience of Laola Pty Ltd in processing Gippsland Basin samples, and the location of their laboratory in Perth which limited supervision by the palynologist of the quality of the processing. The poorer preparations resulted in lower diversity assemblages, difficulty in finding index species and lower confidence in zone identifications. Overall the results obtained from Kingfish-8 are not as precise as those obtained from Kingfish-7. The worst affected portion of the well is the lower portion of the condensed greensand interval samples between 2299.5 to 2324m. It also should be noted that aside from typical Gippsland Basin palynomorphs most palynological slides (and especially the low yield slides) contained laboratory contamination from *modern* pollen and/or Mesozoic spore, pollen and dinoflagellates typical of the Northwest Shelf sequences. These contaminants have not been recorded on the range charts to prevent confusion.

Lithological units and palynological zones from the base of the Lakes Entrance Formation to Total Depth are given in the following summary. The interpretative data with zone identification and Old and New Confidence

PALYNOLOGICAL SUMMARY OF KINGFISH-8

AGE	UNIT/FACIES		SPORE-POLLEN ZONES	DEPTHS(mKB)	DINOFLAGELLATE ZONES	DEPTHS (mKB)
OLIGOCENE	Lakes Entrance Formation		*P. tuberculatus*	2268.0		
LATE EOCENE	LATROBE GROUP	Gurnard Formation	Upper *N. asperus*	2277.0	*P. comatum*	2277.0
			Middle *N. asperus*	2280.0	*C. incompositum*	2280.0
			Lower *N. asperus*	2286.0-2297.0	*D. heterophlycta* *A. australicum*	2286.0-2290.0 2293.5-2297.0
MIDDLE EOCENE			*P. asperopolus*	2299.5		
		Unnamed Greensand	*P. asperopolus*	2305.5-2306.0	*K. thompsonae*	2305.5-2306.0
			P. asperopolus to Upper *M. diversus*	2308.0-2314.0		
EARLY EOCENE		Undiff. marine sands & shales	Middle *M. diversus*	2325.5-2345.0		
		Coastal plain sands, shales & coals	Lower *M. diversus*	2369.5-2410.0		

Ratings are recorded in Table-1 and basic data on residue yields, preservation and diversity are recorded on Tables-2 and 3. Nine samples between 2325.5m to 2410m contained sufficiently good assemblages that their palynomorphs were counted. Percentage data from these counts are recorded in Table-4. All species which have been identified with binomial names are tabulated on the accompanying range charts.

GEOLOGICAL COMMENTS:

1. Kingfish-8 has intersected the same interval of "greensand" facies as Kingfish-7. There is an Early Eocene portion (samples between 2305.5m to 2314m) equivalent in age to the Flounder Formation and a Middle to Late Eocene portion (samples between 2277m to 2299.5m) which is age equivalent to the Gurnard Formation. Within the Gippsland Basin it has been traditional to restrict the use of the term Gurnard Formation for those "greensands" which lie stratigraphically above the unconformity surface and its lateral extensions produced by the cutting of the Marlin Channel. The wells Kingfish-7 and 8 are the best wells currently drilled in the basin where sampling density and detailed palynology is available to demonstrate that in parts of the Gippsland Basin marine environments existed seemingly without interruption through the submarine channelling event that cut the Marlin Channel. Because of the importance of this event to regional stratigraphy in the summary the "greensand" facies in Kingfish-8 is split between the Gurnard Formation and a lower "Unnamed Greensand". The boundary between these units is placed at 2302.5m for the reasons outlined below.

2. Based on the occurrences and ranges of species of the acritarch *Tritonites*, Marshall & Partridge (1988) advanced the hypothesis that the most likely time of initiation of cutting of the Marlin Channel was the 49.5 Ma Sequence Boundary in the late Early Eocene. This

There is an anomaly with the earlier work as the FAD of *Tritonites pandus* at 2297m before the FAD of *T. tricornus* at 2295m conflicts with known stratigraphic ranges. This most likely reflects the low yields and therefore limited assemblages recorded from all samples from the Gurnard Formation, rather than a reversal of first appearances or an extension of the range of *T. pandus*. However, the absence of an interval in Kingfish-8 containing *T. tricornus* before the FAD of *T. pandus* suggests that part of the early Middle Eocene (approx. 44-48 Ma) is either missing or very condensed in Kingfish-8 (see fig.5 *in* Marshall & Partridge 1988). This particular part of the Middle Eocene is poorly documented or dated in nearly all wells in the Gippsland Basin.

6. The top of the Latrobe coarse clastics in Kingfish-8 is confidently assigned to the Middle *M. diversus* Zone. This contrasts with the results from Kingfish-7 where only the Lower *M. diversus* Zone has been recorded below the condensed greensand section. Because of this apparent extra section in Kingfish-8 the recorded assemblage lists in Kingfish-7 have been reviewed. Although no spore-pollen considered definitive of the Middle *M. diversus* Zone were identified two samples from core-3 at 7580ft and 7591ft (adjusted to electric logs as 7575ft and 7586ft; see table-1 in Partridge, 1977) contained very low diversity dinoflagellate assemblages similar to those found in the Middle *M. diversus* Zone samples in Kingfish-8. This similarity is reinforced by the general lack of dinoflagellates in the underlying Lower *M. diversus* Zone samples in Kingfish-7 as is the case with this latter zone in Kingfish-8.

In summary, there may be a short interval of Middle *M. diversus* Zone section in Kingfish-7 at the top of the Latrobe coarse clastics but re-examination of Kingfish-7 would be necessary to confirm this.

BIOSTRATIGRAPHY

Zone and age determinations are based on the spore-pollen zonation scheme proposed by Stover & Partridge (1973), partially modified by Stover & Partridge (1982) and Helby, Morgan & Partridge (1987), and a dinoflagellate zonation scheme which has only been published in outline by Partridge (1976). Other modifications and embellishments to both zonation schemes can be found in the many palynological reports on the Gippsland Basin wells drilled by Esso Australia Ltd. Unfortunately this work is not collated or summarised in a single report.

Author citations for most spore-pollen species can be sourced from Stover & Partridge (1973, 1982), Helby, Morgan & Partridge (1987) or other references cited herein. Author citations for dinoflagellates can be found in Lentin & Williams (1985, 1989). Species names followed by "ms" are unpublished manuscript names.

Lower *Malvacipollis diversus* Zone: 2369.5-2410.0 metres Early Eocene.

Seven of the deepest nine sidewall cores in Kingfish-8 were confidently assigned to this zone based principally on assemblage counts. These are dominated by angiosperm pollen (37-55%) or occasionally fungal spores and hyphae (up to 42%) expressed as a percentage of the total count. The key species (or species groups) amongst the angiosperms are *Casuarina* pollen (fossil species *Haloragacidites harrisii* and *H. trioratus*) with abundances of 5-17%; *Malvacipollis* spp. (modern affinity is with Euphorbiaceae) with range 1-12% and *Proteacidites grandis* (modern affinity suggested to coastal Proteaceae heath) with abundance range of 2-6%. The combined abundances of these three species groups clearly distinguish the assemblages from those in the underlying *L. balmei* Zone which was clearly not reached in Kingfish-8. Representative counts of palynomorph assemblages from the *L. balmei* Zone for comparison can be found in the palynological reports from Roundhead-1 (Partridge, 1989) and Sweetlips-1 (Partridge, 1990).

Although the majority of samples from the zone display moderate to high spore-pollen species diversity distinctive zone species are rare and most of species are long ranging forms which range beyond the zone. Aside from species mentioned above and counted the only other zone species recorded are *Tetracolporites multistrixus* ms (at 2376m, 2384m and 2410m) and *T. textus* ms (at 2382 and 2410m) which are typically not considered to range above the Lower *M. diversus* Zone. Single specimens of *Lygistepollenites balmei* were recorded at 2410m and 2413m. This species has been recorded very rarely in other wells in this zone.

Dinoflagellates recorded from three samples in this zone are all considered to be contaminants from the Lakes Entrance Formation and are indicative of

Proteacidites asperopolus Zone: 2299.5-2306.0 metres
Early-basal Middle Eocene.

and

Kisselovia thompsonae Zone: 2305.5-2306.0 metres Early Eocene.

The shallowest sample at 2299.5m can confidently be assigned to *P. asperopolus* Zone on the LAD (Last Appearance Datum) for *Myrtaceidites tenuis* in association with the index species *Proteacidites asperopolus* (single specimen) and *Conbaculites apiculatus* ms (several specimens) which do not range below this zone. The record of *Proteacidites ornatus* is a fragment of a specimen and may not be reliable. The microplankton in the sample was dominated by *Systematophora tarphosus* ms which is also common in the shallowest *P. asperopolus* Zone sample in Kingfish-7 at 7480ft (2279.9m). Overall the Kingfish-8 assemblage was reminiscent of samples containing the index acritarch *Tritonites asteris* (Marshall & Partridge, 1988) but although the available sides were searched twice under the microscope this latter species could not be found. It would still be worthwhile to reprocess the remaining samples from this sidewall core in an attempt to find *T. asteris* in Kingfish-8.

The two deeper samples at 2305.5m and 2306m are assigned to the *P. asperopolus* Zone principally because the samples contain the index species for the associated *K. thompsonae* dinoflagellate Zone. Significant spore-pollen are the presence of *M. tenuis* in both samples, the common occurrence of *Proteacidites pachypolus* at 2305.5m and presence of *Santalumidites cainozoicus* at 2306m.

Kisselovia thompsonae ms was identified from a single specimen in the sample at 2305.5m and from three specimens at 2306m. The other stratigraphically significant dinoflagellate is the presence of *Wetzeliella articulata* at 2305.5m.

The sidewall at 2303.5m within this zone interval gave only a very low yield which could not be assigned to either a spore-pollen or dinoflagellate zone.

Lower *Nothofagidites asperus* Zone: 2286.0-2297.0 metres Middle Eocene.

Five samples over 11 metres are confidently assigned to the Lower *N. asperus* Zone. Although key spore-pollen are sparsely identified over this interval the age dating is amply supported by moderate diversity microplankton assemblages with key zone species. The most significantly spore-pollen identified are: *Tricolporities leuros* at (2297.0m); *Nothofagidites falcatus* at 2286m, and *Tricolpites simatus* at 2286m, whose occurrence justify higher confidence ratings for those samples. Overall the spore-pollen assemblages are characterised by high *Nothofagidites* spp. to *Haloragacidites harrisii* ratios.

Proteacidites tuberculatus Zone: 2268.0 metres Oligocene.

Assigned to the *P. tuberculatus* Zone on associated microplankton assemblages which contains the Lakes Entrance Formation index dinoflagellate species *Protoellipsodinium simplex* ms and *Tectactodinium scabroellipticus* ms. Overall the sample is dominated by the dinoflagellate *Operculodinium centrocarpum* which also dominates the underlying sample at 2271m. Even though this latter sample lacks key species its assemblage has the overall character of samples from the Lakes Entrance Formation. The fact that the sample is significantly more calcareous than the underlying sidewall cores would support this interpretation.

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TABLE 1: Interpretative Palynological Data Kingfish-8, Gippsland Basin

SAMPLE TYPE	DEPTH (M)	SPORE-POLLEN ZONES	*CR OLD	*CR NEW	DINOFLAGELLATE ZONE (OR ASSOCIATION)	*CR OLD	*CR NEW	COMMENTS
SWC 32	2268.0	*P. tuberculatus*	2	B5	*(Operculodinium* spp.)			Dinoflagellates dominate.
SWC 31	2271.0	Indeterminate			*(Operculodinium* spp.)			Similar to SWC-32.
SWC 29	2277.0	Upper *N. asperus*	2	B5	*P. comatum*	0	B2	*P. comatum* Acme
SWC 28	2280.0	Middle *N. asperus*	2	B4	*C. incompositum*	0	B2	FAD *Tritonites spinosus*
SWC 27	2286.0	Lower *N. asperus*	1	B2	*D. heterophlycta*	0	B2	FAD *Tritonites inaequalis*
SWC 26	2290.0	Lower *N. asperus*	2	B4	*D. heterophlycta*	1	B3	
SWC 25	2293.5	Lower *N. asperus*	2	B4	*A. australicum*	0	B2	LAD *Tritonites tricornus*
SWC 24	2295.0	Lower *N. asperus*	2	B4	*A. australicum*	0	B3	FAD *T. tricornus*
SWC 23	2297.0	Lower *N. asperus*	1	B2	*A. australicum*	1	B2	FAD *Tritonites pandus*
SWC 22	2299.5	*P. asperopolus*	1	B2	Indeterminate			LAD *Myrtaceidites tenuis*
SWC 21	2303.5	Indeterminate			Indeterminate			
SWC 20	2305.5	*P. asperopolus*	2	B4	*K. thompsonae*	1	B2	
SWC 19	2306.0	*P. asperopolus*	2	B4	*K. thompsonae*	1	B3	
SWC 18	2308.0	*P. asperopolus* to Upper *M. diversus*			Indeterminate			
SWC 17	2311.5	*P. asperopolus* to Upper *M. diversus*			Indeterminate	1		
SWC 16	2314.0	*P. asperopolus* to Upper *M. diversus*			*(H. tasmaniense)*	1		*H. tasmaniense* acme
SWC 15	2322.0	Indeterminate						Virtually barren.
SWC 14	2324.0	Indeterminate						Virtually barren.
SWC 13	2325.5	Middle *M. diversus*	2	B4				*Polycolpites esobalteus* present.
SWC 12	2341.5	Middle *M. diversus*	1	B2				*Proteacidites tuberculiformis* present.
SWC 11	2345.0	Middle *M. diversus*	2	B4				*P. esobalteus* present.

TABLE 1: Interpretative Palynological Data Kingfish-8, Gippsland Basin

SAMPLE TYPE	DEPTH (M)	SPORE-POLLEN ZONES	*CR OLD	*CR NEW	DINOFLAGELLATE ZONE (OR ASSOCIATION)	*CR OLD	*CR NEW	COMMENTS
SWC 10	2356.0	Indeterminate						
SWC 9	2369.5	Lower *M. diversus*	1	B2				*Proteacidites grandis* 3%
SWC 8	2376.0	Lower *M. diversus*	1	B2				*P. grandis* 6%
SWC 7	2382.0	Lower *M. diversus*	1	B2				*P. grandis* 2%
SWC 6	2384.0	Lower *M. diversus*	1	B2				Some contamination
SWC 5	2387.0	Lower *M. diversus*	1	B2				*P. grandis* 6%
SWC 4	2400.0	Indeterminate						Virtually barren
SWC 3	2404.0	Lower *M. diversus*	2	B3				
SWC 2	2410.0	Lower *M. diversus*	2	B3				Fungal spores & hyphae 42%
SWC 1	2413.0	Indeterminate						Virtually barren

*CR = Confidence Ratings OLD & NEW

CONFIDENCE RATINGS

The concept of Confidence Ratings applied to palaeontological zone picks was originally proposed by Dr. L.E. Stover in 1971 to aid the compilation of micropalaeontological and palynological data and to expedite the revision of the then rapidly evolving zonation concepts in the Gippsland Basin. The original or OLD scheme which mixes confidence in fossil species assemblage with confidence due to sample type has gradually proved to be rather limiting as additional refinements to existing zonations have been made. With the development of the STRATDAT computer database as a replacement for the increasingly unwieldy paper based Palaeontological Data Sheet files a NEW set of Confidence Ratings have been proposed. Both OLD and NEW Confidence Ratings for zone picks are given on Table 1, and their meanings are summarised below:

OLD CONFIDENCE RATINGS

0 SWC or CORE, Excellent Confidence, assemblage with zone species of spore, 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 spore and pollen or microplankton, or both.

4 CUTTINGS, No Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.

NEW CONFIDENCE RATINGS

Alpha codes: Linked to sample type

A Core

B Sidewall core

C Coal cuttings

D Ditch cuttings

E Junk basket

F Miscellaneous/unknown

G Outcrop

Numeric codes: Linked to fossil assemblage

1 **Excellent confidence:** High diversity assemblage recorded with key zone species.

2 **Good confidence:** Moderately diverse assemblage recorded with key zone species.

3 **Fair confidence:** Low diversity assemblage recorded with key zone species.

4 **Poor confidence:** Moderate to high diversity assemblage recorded without key zone species.

5 **Very low confidence:** Low diversity assemblage recorded without key zone species.

BASIC DATA

TABLE 2: Basic Sample Data

TABLE 3: Basic Palynomorph Data

TABLE 4: Palynomorph Percentages for samples counted

RANGE CHARTS

RELINQUISHMENT LISTS

TABLE 2: Basic Sample Data Kingfish-8, Gippsland Basin.

SAMPLE TYPE	DEPTH (M)	LITHOLOGY	SAMPLE WT(g)	RESIDUE YIELD
SWC 32	2268.0	Calcisiltite	8.3	Very low
SWC 31	2271.0	Cal. glauc. siltst.	7.5	Very low
SWC 29	2277.0	Glauconitic siltst.	8.4	Moderate
SWC 28	2280.0	Glauconitic sst.	10.2	Low
SWC 27	2286.0	Glauconitic siltst.	10.4	Low
SWC 26	2290.0	Glauconitic siltst.	8.8	Low
SWC 25	2293.5	Glauconitic siltst.	11.2	Moderate
SWC 24	2295.0	Glauconitic siltst.	8.7	Low
SWC 23	2297.0	Glauconitic sst.	8.7	Moderate
SWC 22	2299.5	Glauconitic sst.	9.8	Low
SWC 21	2303.5	Glauconitic sst.	11.8	Very low
SWC 20	2305.5	Sandstone vf-f.	8.4	Very low
SWC 19	2306.0	Pyritic sst.	10.3	Low
SWC 18	2308.0	Glauconitic sst.	11.5	Moderate
SWC 17	2311.5	Glauconitic sst.	11.4	Low
SWC 16	2314.0	Glauconitic sst.	9.9	Low
SWC 15	2322.0	Sandstone f-vf.	7.4	Very low
SWC 14	2324.0	Sandstone f.	7.4	Very low
SWC 13	2325.5	Sst/clay partings	7.0	Low
SWC 12	2341.5	Sandstone f-med.	9.1	High
SWC 11	2345.0	Sandstone f-crs.	7.0	Low
SWC 10	2356.0	Sandstone f-vf.	6.6	Low
SWC 9	2369.5	Siltstone/claystone	6.9	High
SWC 8	2376.0	Sandstone/siltst.	5.2	High
SWC 7	2382.0	Mudstone	8.0	High
SWC 6	2384.0	Sst f-vf/Siltst.	8.6	High
SWC 5	2387.0	Siltstone	6.5	High
SWC 4	2400.0	Sandstone vf-f.	4.8	Very low
SWC 3	2404.0	Sandstone f.	8.6	Low
SWC 2	2410.0	Siltstone	7.0	High
SWC 1	2413.0	Sandstone vf-f.	8.1	Very low

TABLE 3: Basic Palynomorph Data Kingfish-8, Gippsland Basin

SAMPLE TYPE	DEPTH (M)	PALYNOMORPH CONCENTRATION	PALYNOMORPH PRESERVATION	NUMBERS S-P SPECIES*	MICROPLANKTON ABUNDANCE & NO. OF SPECIES*	
SWC 32	2268.0	Moderate	Poor-fair	14+	Abundant	8+
SWC 31	2271.0	Moderate	Poor	9+	Common	6+
SWC 29	2277.0	High	Fair	19+	Abundant	5+
SWC 28	2280.0	High	Good	35+	Abundant	17+
SWC 27	2286.0	Moderate	Poor-good	38+	Common	15+
SWC 26	2290.0	Low	Poor	16+	Common	11+
SWC 25	2293.5	Moderate	Poor-fair	23+	Abundant	9+
SWC 24	2295.0	Moderate	Fair	18+	Abundant	7+
SWC 23	2297.0	Moderate	Fair	25+	Common	12+
SWC 22	2299.5	Moderate	Poor	28+	Common	6+
SWC 21	2303.5	Very low	Poor	11+	Frequent	6+
SWC 20	2305.5	High	Fair	26+	Common	9+
SWC 19	2306.0	Low	Fair-good	19+	Low	6+
SWC 18	2308.0	Very low	Fair-good	14+	Common	3+
SWC 17	2311.5	Very low	Fair-good	10+	Common	8+
SWC 16	2314.0	Low	Fair	7+	Common	3+
SWC 15	2322.0	Very low	Poor	2+		NR
SWC 14	2324.0	Very low	Poor	5+	Rare	1
SWC 13	2325.5	High	Good	34+	Rare	4+
SWC 12	2341.5	Low	Poor-fair	16+	Rare	2+
SWC 11	2345.0	Moderate	Fair	31+	Rare	5+
SWC 10	2356.0	Very low	Fair	11+		
SWC 9	2369.5	High	Poor	18+	(Very rare)	(1)
SWC 8	2376.0	Moderate	Poor	23+		
SWC 7	2382.0	High	Good	29+		
SWC 6	2384.0	Moderate	Poor-fair	33+	(Rare)	(2+)
SWC 5	2387.0	Moderate	Poor	20+		
SWC 4	2400.0	Very low	Poor	4+		
SWC 3	2404.0	Low	Poor-fair	11+		
SWC 2	2410.0	Low	Poor	18+		
SWC 1	2413.0	Very low	Poor	7+	(Rare)	(1+)

Microplankton shown in (brackets) = contamination.

*Diversity: Very Low = 1- 5 species.
Low = 6-10 species.
Moderate = 11-25 species.
High = 26-74 species.
Very High = 75+ species.

TABLE-4: PALYNOMORPHS PERCENTAGES FOR KINGFISH-8 Page 1 of 2

	2325.5 m SWC-13	2341.5m SWC -12	2345.0m SWC-11	2369.5m SWC-9	2376.0m SWC-8
TRILETE SPORES undiff.	0.5%	2.4%	1.8%	1.4%	1.0%
Baculatisporites spp.				2.1%	2.7%
Cyathidites spp.	6.7%	7.1%	8.3%	8.6%	2.7%
Gleicheniidites/Clavifera spp.	8.1%	4.8%	13.7%	8.6%	14.1%
Stereisporites spp.	1.9%	2.4%	0.6%	1.4%	2.0%
MONOLETE SPORES					
Laevigatosporites spp.	5.2%	4.8%	4.8%	0.7%	1.0%
TOTAL SPORES	22.4%	21.5%	29.2%	22.8%	23.5%
GYMNOSPERM POLLEN				1.4%	
Araucariacites australis	0.5%		2.4%	1.4%	2.0%
Dilwynites spp.	4.3%	2.4%	2.4%	9.2%	10.1%
Lygistepollenites balmei					
Lygistepollenites florinii	0.5%	2.4%	1.2%		1.0%
Phyllocladidites mawsonii (s.l.)			5.9%	0.7%	
Phyllocladus palaeogenicus					
Podocarpidites spp.	1.9%	2.4%	0.6%	0.7%	3.4%
Podosporites microsaccatus	2.4%	2.4%	1.8%	0.7%	0.7%
TOTAL GYMNOSPERM POLLEN	9.6%	9.6%	14.3%	14.1%	17.2%
ANGIOSPERM POLLEN undiff.	0.9%		1.2%	0.7%	0.7%
Basopollis spp.					
Casuarina (H. harrisii)	27.6%	14.3%	15.5%	14.3%	12.8%
Cupanieidites orthoteichus				0.7%	
Dicotetradites clavatus	3.8%		0.6%		
Ilexpollenites sp.	1.4%	2.4%	0.6%	1.4%	
Malvacipollis spp.	8.1%	4.8%	2.4%	12.1%	12.1%
Myrtaceidites spp.			0.6%	1.4%	
Nothofagidites "brassi"	2.4%		0.6%	0.7%	0.7%
Nothofagidites "fusca"	0.9%		1.8%	0.7%	
Proteacidites grandis	4.3%	4.8%	11.9%	5.0%	6.0%
Proteacidites spp.	12.9%	38.1%	18.5%	20.0%	20.1%
Tetracolporites spp.					1.0%
Tricolp(or)ates undiff.	4.8%	4.8%	3.0%	6.4%	4.7%
Triporopollenites spp. (small)					
TOTAL ANGIOSPERM POLLEN	67.1%	69.2%	56.7%	63.4%	58.1%
TOTAL SPORES-POLLEN COUNT	210	42	168	140	149
MAJOR CATEGORIES %					
Spores %	19.6%	16.7%	22.8%	13.3%	21.2%
Gymnosperm Pollen %	8.3%	7.4%	11.2%	7.9%	15.3%
Angiosperm Pollen %	59.6%	53.7%	44.2%	37.1%	51.2%
TOTAL SPORE-POLLEN %	87.5%	77.8%	78.2%	58.3%	87.7%
Fungal Spores and Hyphae %	9.6%	13.0%	14.9%	41.7%	12.4%
Microplankton %	2.9%	9.3%	7.0%		
TOTAL COUNT	240	54	215	240	170

TABLE-4: PALYNOMORPHS PERCENTAGES FOR KINGFISH-8 Page 2 of 2

	2382.0m SWC-7	2384.0m SWC-6	2387.5m SWC-5	2410.0m SWC-2
TRILETE SPORES undiff.	2.7%	1.9%	2.1%	2.3%
Baculatisporites spp.	1.3%		2.8%	1.6%
Cyathidites spp.	2.2%	1.9%		3.9%
Gleicheniidites/Clavifera spp.	18.8%	14.9%	19.7%	17.2%
Stereisporites spp.	3.5%	2.8%	6.3%	5.5%
MONOLETE SPORES				
Laevigatosporites spp.	0.9%	2.3%	4.9%	1.6%
TOTAL SPORES	29.4%	23.8%	35.8%	32.1%
GYMNOSPERM POLLEN				
Araucariacites australis	0.4%	1.9%	1.4%	0.8%
Dilwynites spp.	3.1%	6.0%	6.3%	3.9%
Lygistepollenites balmei				0.8%
Lygistepollenites florinii		0.9%		
Phyllocladidites mawsonii (s.l.)	3.5%	2.3%	2.1%	2.3%
Phyllocladus palaeogenicus		0.9%		
Podocarpidites spp.	2.2%	3.3%	7.0%	4.7%
Podosporites microsaccatus	2.7%	1.9%	0.7%	0.8%
TOTAL GYMNOSPERM POLLEN	11.9%	17.2%	17.5%	13.3%
ANGIOSPERM POLLEN undiff.				0.8%
Basopollis spp.	0.4%	3.3%		0.8%
Casuarina (H. harrisii)	16.5%	5.1%	8.5%	4.7%
Cupanieidites orthoteichus		0.5%		
Dicotetradites clavatus		0.9%		
Ilexpollenites sp.	0.4%	1.9%		
Malvacipollis spp.	0.9%	2.8%		0.8%
Myrtaceidites spp.	0.4%			0.8%
Nothofagidites "brassi"	2.7%	1.4%	3.5%	
Nothofagidites "fusca"	1.8%	1.9%	2.8%	
Penninsulapollis gillii				
Periporopollenites spp.				
Proteacidites grandis	1.8%	1.9%	6.3%	2.3%
Proteacidites spp.	29.9%	34.4%	21.1%	39.1%
Tetracolporites spp.	0.5%	0.5%		1.6%
Tricolp(or)ates undiff.	3.1%	4.6%	4.2%	3.1%
Triporopollenites spp. (small)				
TOTAL ANGIOSPERM POLLEN	58.4%	59.2%	46.4%	54.0%
TOTAL SPORES-POLLEN COUNT	224	215	142	128
MAJOR CATEGORIES %				
Spores %	26.4%	21.3%	33.8%	19.2%
Gymnosperm Pollen %	10.8%	15.4%	16.6%	7.8%
Angiosperm Pollen %	52.4%	52.9%	43.7%	31.5%
TOTAL SPORE-POLLEN %	89.6%	89.6%	94.1%	58.5%
Fungal Spores and Hyphae %	10.4%	10.4%	6.0%	41.5%
Microplankton %				
TOTAL COUNT	250	240	151	219

RELINQUISHMENT LIST - PALYNOLOGICAL SLIDES 1

WELL NAME & NO: KINGFISH-8
PREPARED BY: A.D. PARTRIDGE
DATE: May 1992

SAMPLE TYPE	DEPTH (M)	CATALOGUE NUMBER	DESCRIPTION
SWC 32	2268.0	P195874	Kerogen slide sieved/unsieved fractions
SWC 32	2268.0	P195875	Oxidized slide 1
SWC 32	2268.0	P195876	Oxidized slide 2
SWC 31	2271.0	P195877	Kerogen slide sieved/unsieved fractions
SWC 31	2271.0	P195878	Oxidized slide 2
SWC 29	2277.0	P195879	Kerogen slide sieved/unsieved fractions
SWC 29	2277.0	P195880	Kerogen slide unsieved
SWC 29	2277.0	P195881	Oxidized slide 2
SWC 28	2280.0	P195882	Kerogen slide sieved/unsieved fractions
SWC 28	2280.0	P195883	Kerogen slide unsieved
SWC 28	2280.0	P195884	Oxidized slide 2
SWC 27	2286.0	P195885	Kerogen slide sieved/unsieved fractions
SWC 27	2286.0	P195886	Kerogen slide unsieved
SWC 27	2286.0	P195887	Oxidized slide 2
SWC 26	2290.0	P195888	Kerogen slide sieved/unsieved fractions
SWC 26	2290.0	P195889	Kerogen slide unsieved
SWC 26	2290.0	P195890	Oxidized slide 2
SWC 25	2293.5	P195891	Kerogen slide sieved/unsieved fractions
SWC 25	2293.5	P195892	Kerogen slide unsieved
SWC 25	2293.5	P195893	Oxidized slide 2
SWC 25	2293.5	P195894	Oxidized slide 3
SWC 24	2295.0	P195895	Kerogen slide sieved/unsieved fractions
SWC 24	2295.0	P195896	Kerogen slide unsieved
SWC 24	2295.0	P195897	Oxidized slide 2
SWC 23	2297.0	P195898	Kerogen slide sieved/unsieved fractions
SWC 23	2297.0	P195899	Kerogen slide unsieved
SWC 23	2297.0	P195900	Oxidized slide 2
SWC 23	2297.0	P195901	Oxidized slide 3
SWC 22	2299.5	P195902	Kerogen slide sieved/unsieved fractions
SWC 22	2299.5	P195903	Kerogen slide unsieved
SWC 22	2299.5	P195904	Oxidized slide 2
SWC 21	2303.5	P195905	Kerogen slide sieved/unsieved fractions
SWC 21	2303.5	P195906	Oxidized slide 2
SWC 21	2303.5	P195907	Oxidized slide 3
SWC 20	2305.5	P195908	Kerogen slide sieved/unsieved fractions
SWC 20	2305.5	P195909	Kerogen slide unsieved
SWC 20	2305.5	P195910	Oxidized slide 2
SWC 19	2306.0	P195911	Kerogen slide unsieved
SWC 19	2306.0	P195912	Oxidized slide 2
SWC 19	2306.0	P195913	Oxidized slide 3
SWC 18	2308.0	P195914	Kerogen slide unsieved
SWC 18	2308.0	P195915	Oxidized slide 2
SWC 18	2308.0	P195916	Oxidized slide 3
SWC 17	2311.5	P195917	Kerogen slide unsieved
SWC 17	2311.5	P195918	Oxidized slide 2
SWC 17	2311.5	P195919	Oxidized slide 3

RELINQUISHMENT LIST - PALYNOLOGICAL SLIDES 2

WELL NAME & NO: KINGFISH-8
PREPARED BY: A.D. PARTRIDGE
DATE: May 1992

SAMPLE TYPE	DEPTH (M)	CATALOGUE NUMBER	DESCRIPTION
SWC 16	2314.0	P195920	Kerogen slide unsieved
SWC 16	2314.0	P195921	Oxidized slide 2
SWC 16	2314.0	P195922	Oxidized slide 3
SWC 16	2314.0	P195923	Oxidized slide 4
SWC 15	2322.0	P195924	Kerogen slide sieved/unsieved fractions
SWC 15	2322.0	P195925	Oxidized slide 1
SWC 14	2324.0	P195926	Kerogen slide sieved/unsieved fractions
SWC 14	2324.0	P195927	Oxidized slide 2
SWC 13	2325.5	P195928	Kerogen slide sieved/unsieved fractions
SWC 13	2325.5	P195929	Kerogen slide unsieved
SWC 13	2325.5	P195930	Oxidized slide 2
SWC 12	2341.5	P195931	Kerogen slide sieved/unsieved fractions
SWC 12	2341.5	P195932	Kerogen slide unsieved
SWC 12	2341.5	P195933	Oxidized slide 2
SWC 12	2341.5	P195934	Oxidized slide 3
SWC 12	2341.5	P195935	Oxidized slide 4
SWC 11	2345.0	P195936	Kerogen slide sieved/unsieved fractions
SWC 11	2345.0	P195937	Kerogen slide unsieved
SWC 11	2345.0	P195938	Oxidized slide 2
SWC 11	2345.0	P195939	Oxidized slide 3A
SWC 11	2345.0	P195940	Oxidized slide 3B
SWC 11	2345.0	P195941	Oxidized slide 4
SWC 10	2356.0	P195942	Kerogen slide sieved/unsieved fractions
SWC 10	2356.0	P195943	Oxidized slide 2
SWC 10	2356.0	P195944	Oxidized slide 3
SWC 10	2356.0	P195945	Oxidized slide 4
SWC 9	2369.5	P195946	Kerogen slide sieved/unsieved fractions
SWC 9	2369.5	P195947	Kerogen slide unsieved
SWC 9	2369.5	P195948	Oxidized slide 2
SWC 9	2369.5	P195949	Oxidized slide 3
SWC 9	2369.5	P195950	Oxidized slide 4
SWC 8	2376.0	P195951	Kerogen slide sieved/unsieved fractions
SWC 8	2376.0	P195952	Kerogen slide unsieved
SWC 8	2376.0	P195953	Oxidized slide 2
SWC 8	2376.0	P195954	Oxidized slide 3
SWC 8	2376.0	P195955	Oxidized slide 4
SWC 7	2382.0	P195956	Kerogen slide sieved/unsieved fractions
SWC 7	2382.0	P195957	Kerogen slide unsieved
SWC 7	2382.0	P195958	Oxidized slide 2
SWC 7	2382.0	P195959	Oxidized slide 3
SWC 7	2382.0	P195960	Oxidized slide 4
SWC 6	2384.0	P195961	Kerogen slide sieved/unsieved fractions
SWC 6	2384.0	P195962	Kerogen slide unsieved
SWC 6	2384.0	P195963	Oxidized slide 2
SWC 6	2384.0	P195964	Oxidized slide 3
SWC 6	2384.0	P195965	Oxidized slide 4
SWC 5	2387.0	P195966	Kerogen slide sieved/unsieved fractions
SWC 5	2387.0	P195967	Kerogen slide unsieved
SWC 5	2387.0	P195968	Oxidized slide 2
SWC 5	2387.0	P195969	Oxidized slide 3
SWC 5	2387.0	P195970	Oxidized slide 4

RELINQUISHMENT LIST - PALYNOLOGICAL SLIDES 3

WELL NAME & NO: KINGFISH-8
PREPARED BY: A.D. PARTRIDGE
DATE: May 1992

SAMPLE TYPE	DEPTH (M)	CATALOGUE NUMBER	DESCRIPTION
SWC 4	2400.0	P195971	Kerogen slide sieved/unsieved fractions
SWC 4	2400.0	P195972	Oxidized slide 2
SWC 3	2404.0	P195973	Kerogen slide sieved/unsieved fractions
SWC 3	2404.0	P195974	Oxidized slide 2
SWC 3	2404.0	P195975	Oxidized slide 3
SWC 2	2410.0	P195976	Kerogen slide sieved/unsieved fractions
SWC 2	2410.0	P195977	Kerogen slide unsieved
SWC 2	2410.0	P195978	Oxidized slide 2
SWC 2	2410.0	P195979	Oxidized slide 3
SWC 2	2410.0	P195980	Oxidized slide 4
SWC 1	2413.0	P195981	Kerogen slide sieved/unsieved fractions
SWC 1	2413.0	P195982	Oxidized slide 2
SWC 1	2413.0	P195983	Oxidized slide 3

RELINQUISHMENT LIST - PALYNOLOGICAL RESIDUES

4

WELL NAME & NO: KINGFISH-8
PREPARED BY: A.D. PARTRIDGE
DATE: May 1992

SAMPLE TYPE	DEPTH (M)	DESCRIPTION
SWC 19	2306.0	Oxidized residue
SWC 18	2308.0	Oxidized residue
SWC 17	2311.5	Oxidized residue
SWC 16	2314.0	Oxidized residue
SWC 11	2345.0	Oxidized residue
SWC 9	2369.5	Kerogen residue
SWC 9	2369.5	Oxidized residue
SWC 8	2376.0	Oxidized residue
SWC 7	2382.0	Kerogen residue
SWC 7	2382.0	Oxidized residue
SWC 5	2387.0	Kerogen residue
SWC 5	2387.0	Oxidized residue
SWC 2	2410.0	Kerogen residue
SWC 2	2410.0	Oxidized residue