APPENDIX 2

PALYNOLOGICAL ANALYSIS WHITING-1, GIPPSLAND BASIN

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INTRODUCTION

Sixty eight (68) sidewall cores, two conventional core and three cuttings samples were processed and examined for spore-pollen and dinoflagellates. Recovery was mostly low to fair but, with the exception of the Paleocene section, preservation and diversity of the palynofloras were adequate to obtain reliable age-determinations.

Palynological zones and lithological facies divisions from the base of the Lakes Entrance Formation to the total depth of the well are given below. Occurrences of spore-pollen and dinoflagellate species are tabulated in the accompanying range chart. Anomalous and unusual occurrences of taxa are listed at the end of the Biostratigraphy Section (see Table 2).

SUMMARY

UNIT/FACIES	ZONE	DEPTH (m)
Lakes Entrance Formation	*P. tuberculatus*	1276.6
	log break at 1277.5m	
Gurnard Formation	Indeterminate (mixed *P. tuberculatus* and Upper-Middle *N. asperus* Zone palynofloras).	1280.4 - 1284.0
	log break at 1287m	
Latrobe Group Coarse Clastics	Middle *N. asperus*	1301.2
	Lower *N. asperus*	1317.8 - 1437.0
	P. asperopolus	1456.0 - 1542.0
	Upper *M. diversus*	1577.5 - 1676.3
	Middle *M. diversus*	1715.8
	Lower *M. diversus*	1734.0 - 1859.1
	Upper *L. balmei*	1889.5 - 2358.5
	Lower *L. balmei*	2402.8 - 2738.5
	Upper *T. longus*	2767.0 - 2993.5
		3011 T.D.

GEOLOGICAL COMMENTS

1. The Whiting-1 well contains a continuous sequence of sediments from the Late Cretaceous Upper T. longus Zone to at least the Middle Eocene uppermost Lower N. asperus Zone.

2. The recrystallised limestone, at 1276.6m and close to the picked base of the Lakes Entrance Formation (1277.5m; Rexilius 1983), is Oligocene-Early Miocene in age, probably the latter based on foraminiferal data from 1272.0m (Rexilius ibid). Elements of an Early Eocene palynoflora have been reworked into this stratum.

3. Spore-pollen recovered from the Gurnard Formation, picked on lithological and log characteristics as occurring between 1277.5 to 1287.0m (Rexilius ibid), are mostly P. tuberculatus Zone species. This is inconsistent with the age of the formation in the Barracouta-4 and 1 wells (Middle N. asperus) and Snapper-3 well (Lower N. asperus). Moreover species which range no higher than the Upper N. asperus Zone also occur within the Gurnard Formation in Whiting-1, suggesting that mixing by bioturbation of P. tuberculatus, Upper N. asperus and Middle N. asperus Zone floras has occurred. In this context it is noted that traces of glauconite extend from 1287 to 1292m. Although the Gurnard Formation cannot therefore be assigned to a particular zone, its age is likely to be Late Eocene/Early Oligocene.

4. Whilst it is not clear whether there is an age break between the greensands and the top of the underlying coarse clastics at about 1288m, the latter are unlikely to be younger than Middle N. asperus Zone in age. Below 1317.8m, the sediments are certainly Lower N. asperus Zone or older in age.

5. Unlike in the Gurnard Formation, dinoflagellates are rare or absent in the top 73m Latrobe Group coarse clastics (1287-1359.5m) but become common to abundant at 1374.0m and 1415.2m. The highest coal occurs at 1349.0m and the highest major thickness of coal at approximately 1370m. Because preservation of the palynofloras varies across this interval, it is not clear from the data at what depth the transition from a marine to a terrestrial environment occurs, but because of low dinoflagellate species diversity it is likely that the samples at 1374.0m and 1415.2m record marginal marine environments rather than marine transgressions per se.

6. Two marine transgressions are recorded: 1) within the P. asperopolus Zone ~~section~~ at 1527.5m; and 2) at the base of the Lower M. diversus Zone at 1859.0m. The former is represented by abundant Homotryblium tasmanensis and is likely to correlate with the P. asperopolus Zone marine transgression recorded by Partridge (1974) for the Barracouta-4 well. The presence of Sapotaceoidaepollenites rotundus at 1527.5m in Whiting-1 indicates the marine transgression is Middle rather than Early Eocene in age and therefore more likely to correspond to the second (Wetzeliella edwardsii Zone) of the two P. asperopolus Zone transgressions recognised by Partridge (1976). The second (Lower M. diversus Zone) marine transgression is recorded by a spore-pollen and dinoflagellate assemblage virtually identical to that recorded from the Rivernook Bed of the onshore Princetown Section, Otway Basin (Cookson & Eisenack 1967) and is likely to represent the same (Apectodinium hyperacantha Zone) event. Paleocene spore-pollen have been reworked by the transgression into the siltstone at 1859.0m in Whiting-1.

7. The Lower N. asperus Zone and Upper M. diversus Zone seismic markers lie within sections dated as Lower N. asperus and Upper M. diversus Zone in age respectively. The P. asperopolus Zone seismic marker lies approximately 13m within the Lower N. asperus Zone section.

8. Because of poor sample control in the adjacent Barracouta and Snapper wells, it is difficult to ascertain whether the relatively thick (approximately 469m) Upper L. balmei Zone section in Whiting-1 is a feature of the Gippsland Basin in this general area.

9. The well bottomed in Maastrichtian Upper T. longus Zone sediments. This is consistent with Barracouta-1. The Barracouta-3 and Snapper-3 wells appear to have bottomed in Lower T. longus or T. lilliei Zone sediments (see attached revised palynology data sheets).

BIOSTRATIGRAPHY

The zone boundaries have been established using the criteria of Stover & Evans (1973), Stover & Partridge (1973) and subsequent proprietary revisions.

Upper Tricolpites longus Zone : 2993.5 - 2767.0m.
Samples within this section contain diverse but poorly to very poorly preserved palynofloras. The lowest sample able to be age-determined is at 2993.5m and is no older than Upper T. longus Zone in age if the specimens of

Tetracolporites verrucosus and Stereisporites punctatus are in situ. This is uncertain since 1) the sample lacks species restricted to the Late Cretaceous and 2) contains an unusually high number of Lystiepollenites balmei pollen for a Late Cretaceous sample. Although the base of the zone has been provisionally placed at 2993.5m, a more reliable base is at 2958.0m, defined by the simultaneous occurrence of T. verrucosus and S. punctatus with Tricolpites longus, Proteacidites gemmatus, P. otwayensis and P. reticuloconcavus in a Gambierina rudata - dominated assemblage. These taxa and Tricolpites waiparensis, Proteacidites clinei and Tricolporites lilliei occur infrequently up to 2767.0m. The top of the zone, at 2767.0m is defined by the highest occurrence of Proteacidites reticuloconcavus.

Lower Lygistepollenites balmei Zone : 2738.5 - 2402.8m.
Most of the samples from this and the overlying Upper L. balmei Zone contained palynofloras dominated by gymnosperms (including the nominate species) and Proteacidites spp. Other general L. balmei Zone marker species, eg. Polycolpites langstonii and frequent to abundant Australopollis obscurus were uncommon. The base of the zone is picked at 2738.5m. This sample contains Tetracolporites multistrixus, a species which ranges no lower than the Lower L. balmei Zone in the Bass Basin, in an assemblage lacking taxa which range no higher than the T. longus Zone. Tetracolporites verrucosus, which ranges no higher than the Lower L. balmei Zone, occurs in cuttings at 2680-85m and 2635-40m but not in the sidewall core samples until 2585.5m. The top of the zone is placed at 2402.8m, based in the highest occurrence of T. verrucosus.

Upper Lygistepollenites balmei Zone : 2358.5 - 1889.5m.
The zone is defined by the constant occurrence of Verrucosisporites kopukuensis in association with (usually) frequent to abundant Lygistepollenites balmei and (less frequently) other species which range no higher than the Upper L. balmei Zone, eg. Australopollis obscurus and Nothofagidites endurus. As noted in Table 2, much of the section contains apparently anomalous occurrences of Late Cretaceous, Early Paleocene or, at 1889.5m, Eocene species. The top of the zone is provisionally picked at 1889.5m, based on the highest occurrence of frequent Lygistepollenites balmei. Verrucosisporites kopukuensis, which first appears in thie Zone, does not occur in the Upper L. balmei Zone sediments above 2141.2m. The presence of abundant Australopollis obscurus at 2010.5m demonstrates this sample is certainly no younger than Upper L. balmei Zone in age. Surprisingly, Haloragacidites harrisii which first appears in the Lower L. balmei Zone was not recorded below this depth in the Whiting-1 well.

Lower Malvacipollis diversus Zone : 1859.1 - 1734.0m.
This zone is represented by three sidewall cores separated by barren intervals. The lowermost, at 1859.1m contains a diverse spore-pollen assemblage in which Spinizonocolpites prominatus and Malvacipollis diversus are common to abundant and Crassiretitriletes venraadschoovenii, Polypodiaceoisporites varus and Proteacidites pachypolus are present. Dinoflagellates are frequent but very poorly preserved and only Cordosphaeridium bipolare could be identified with confidence. Reworked specimens of the Late Cretaceous-Paleocene species Lygistepollenites balmei and Gambierina rudata are present. The upper two samples, at 1780.5m and 1734.0m, contain species which first appear in this zone, eg. Cupanieidites orthoteichus, Ilexpollenites anguloclavatus, Ischyosporites irregularis, Proteacidites biornatus and Schizocolpus marlinensis. The top of the zone, at 1734.0m, is defined by Cyathidites gigantis, a species which ranges no higher than the Lower M. diversus Zone.

Middle Malvacipollis diversus Zone : 1715.8m.
The Middle M. diversus Zone is represented by one sample only. The age determination is based on the occurrence of species which first appear in this zone, eg. Anacolosidites acutullus and Proteacidites tuberculiformis, in an assemblage lacking Upper M. diversus Zone indicator species.

Upper Malvacipollis diversus Zone : 1676.3 - 1577.5m.
Samples within this interval contain diverse palynofloras dominated by Malvacipollis spp. including M. diversus, Haloragacidites harrisii, Gleicheniidites circinidites and Proteacidites including species such as P. ornatus, P. tuberculiformis and P. kopiensis which typically range no lower than the Middle M. diversus Zone. The base of the zone, at 1657.5m is defined by the first appearance of Bysmapollis emaciatus. The presence of Crassiretitriletes vanraadshoovenii demonstrates this sample is no younger than Upper M. diversus Zone in age. The top of the zone at 1577.5m is defined by Myrtaceidites tenuis, Proteacidites pachypolus and Kuylisporites waterbolkii in an assemblage containing Malvacipollis diversus but lacking Proteacidites asperopolus.

Proteacidites asperopolus Zone : 1542.0 - 1456.0m.
Samples within this interval are dominated by Haloragacidites harrisii and Proteacidites spp. The base of the zone is defined by the first occurrence of Proteacidites asperopolus in association with Myrtaceidites tenuis at 1542.0m. This sample contains the only frequent occurrence of Proteacidites pachypolus in the well. The sidewall core sample at 1527.5m contains numerous

dinoflagellates including Apectodinium hyperacantha and (common) Homotryblium tasmanensis in addition to P. pachypolus, P. asperopolus and M. tenuis. The top of the zone is picked at 1456m, the highest sample containing Proteacidites asperopolus in a Proteacidites-dominated assemblage (30 %). Occurrences of Milfordia hypolaenoides and Sapotaceoidaepollenites rotundus indicate this sample is close to P. asperopolus/Lower N. asperus Zone boundary.

Lower Nothofagidites asperus Zone : 1437.0 - 1317.8m.
The zone is characterised by samples containing Proteacidites asperopolus with common to abundant Nothofagidites pollen separated by intervals of low spore-pollen recovery in which swollen palynomorphs suggest prolonged saturation with liquid hydrocarbons. The base of the zone, at 1437.0m, is defined by the presence of Periporopollenites vesicus, a species which first appears in this zone and a marked increase in abundance of Nothofagidites (to 39%). Tricolporites simatus occurs at 1417.0m, Proteacidites asperopolus, P. pachypolus and Periporopollenites vesicus occur at 1415.2m in an assemblage containing the dinoflagellate species Deflandrea flounderensis and (caved) Vozzhenikovia extensa. The top of the zone is defined by the last appearance of Proteacidites asperopolus. The presence of Nothofagidites falcatus and Verrucatosporites attinatus indicate that this sample is close to the Lower/Middle N. asperus Zone boundary.

Middle Nothofagidites asperus Zone : 1301.2m.
The interval between 1317.8 and 1288.0m is characterised by very low to negligible spore-pollen and dinoflagellate recovery. One sample only, at 1301.2m, is provisionally assigned a Middle N. asperus Zone age on the basis of very rare Vozzhenikovia extensa in a sparse Nothofagidites spp. - dominated palynoflora.

Proteacidites tuberculatus Zone : 1276.6m.
The occurrence of Cyatheacidites annulatus and Foveotriletes lacunosus confirm a P. tuberculatus Zone age for the glauconite-free calcareous sample at 1276.6m. C. annulatus also occurs in samples at 1280.4m and 1284.0m, since the latter sample contains a single well preserved grain of Proteacidites crassus which is not known to range above the Lower N. asperus Zone and the former Ischyosporites gremius, which ranges no higher than the Upper N. asperus Zone, the interval from 1280.4 to 1284.0 cannot be reliably dated. A corroded specimen of the Middle to late Eocene species P. tuberculiformis occurs at 1276.6m. The occurrence of Beaupreadites elegansiformis is consistent with this sample being no younger then Early Miocene in age.

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TABLE I : SUMMARY OF PALYNOLOGICAL ANALYSIS WHITING-1, GIPPSLAND BASIN.

INTERPRETATIVE DATA

SAMPLE NO.	DEPTH (m)	YIELD	DIVERSITY SPORE POLLEN	LITHOLOGY	ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 82	1276.6	Good	Fair	Calci. stst.	P.tuberculatus		0	C.annulatus
SWC 81	1280.4	Good	Low	Calci.stst,glau.	Indeterminate		2	C.annulatus, I.gremius
SWC 80	1284.0	Low	Fair	Calci.stst.glau?	Indeterminate		2	C.annulatus, P.crassus
SWC 79	1288.0	Barren	-	Ss., glau	-		-	
SWC 78	1292.0	V. low	Low	Ss.	Indeterminate		-	Nothofagidites common
SWC 77	1301.2	V. low	Fair	Ss.	Middle N.asperus		2	V.extensa
SWC 76	1304.9	Varren	-	-			-	
SWC 75	1317.8	Good	High	Ss.	Uppermost Lower N.asperus	Middle Eocene	0	P.vesicus, T.simatus, P.asperopolus, V.attinatus
SWC 74	1322.5	Low	Low	Ss.	Uppermost Lower N.asperus	Middle Eocene	1	V.attinatus, P.asperopolus, T.simatus
SWC 72	1332.0	V. low	V. low	Ss.	Indeterminate		-	
SWC 70	1341.5	Barren	-	Ss.	-		-	
SWC 69	1342.5	Low	V. low	Ss.	Lower N.asperus	Middle Eocene	1	N.falcatus
SWC 67	1359.5	Moderate	Fair	Calci.slt.	Lower N.asperus	Middle Eocene	1	Nothofagidites common, P.asperopolus
SWC129	1374.0	Moderate	High	Slst.,carb.	Lower N.asperus	Middle Eocene	2	Senegalium asymmetricum, Deflandrea obliquipes, D.oebisfeldensis.
SWC 65	1382.5	V. low	Low	Ss.	Lower N.asperus	Middle Eocene	2	Frequent Nothofagidites, T.cf.simatus
SWC 63	1415.2	Good	High	Clyst.	Lower N.asperus	Middle Eocene	0	Abundant Nothofagidites, P.vesicus, P.asperopolus, P.pachypolus, D.flounderensis.
SWC 62	1417.0	Moderate	High	Ss.	Lower N.asperus	Middle Eocene	1	T.simatus, Nothofagidites common.
SWC 61	1437.0	V. good	V. high	Slst.	Lower N.asperus	Middle Eocene	0	Nothofagidites abundant (39%), P.vesicus
SWC 60	1456.0	Good	Fair	Slst.	P.asperopolus	Middle Eocene	1	P.asperopolus, Proteacidites, common (30%) Nothofagidites,uncommon (13%) M.hypolaenoides, S.rotundus.
SWC 59	1461.0	Moderate	Fair	Ss.	P.asperopolus	Middle Eocene	2	
SWC 58	1478.5	Barren	-	Coal	-	-	-	H.harrisii
SWC 51	1492.0	Barren	-	Ss.	-	-	-	
SWC 56	1525.0	Moderate	High	Ss.	P.asperopolus	Middle Eocene	0	P.asperopolus, frequent M.tenuis, abundant Proteacidites.

TABLE I : SUMMARY OF PALYNOLOGICAL ANALYSIS WHITING-1, GIPPSLAND BASIN.

INTERPRETATIVE DATA

SAMPLE NO.	DEPTH (m)	YIELD	DIVERSITY SPORE POLLEN	LITHOLOGY	ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 50	1527.5	Moderate	High	Slst.,carb.	P.asperopolus	Middle Eocene	0	P.asperopolus, M.tenuis, S.rotundus, P.rugulatus, Apectodinium hyperacantha, Homotriblium tasmaniensis common.
SWC 49	1542.0	Good	High	Ss.	P.asperopolus	Early/Middle Eocene	0	P.asperopolus, M.tenuis, B.verrucosus.
SWC 48	1577.5	Low	Fair	Clyst.	Upper M.diversus	Early Eocene	1	M.tenuis, M.diversus, P.pachypolus, K.waterbolkii.
SWC 47	1590.3	V. good	V. high	Ss.	Upper M.diversus	Early Eocene	0	Frequent M.tenuis & M.diversus, P.pachypolus, K.waterbolkii.
SWC 46	1604.5	Barren	-	Ss.	-	-	-	
SWC 45	1640.7	Low	Fair	Ss.	Upper M.diversus	Early Eocene	2	M.diversus common.
SWC 44	1657.5	Low	High	Slst.	Upper M.diversus	Early Eocene	2	B.emaciatus, G.divaricatus, P.leightonii, P.ornatus.
SWC 54	1665.5	Moderate	High	Slst.	No older than Middle M.diversus	Early Eocene	-	I.gremius, P.ornatus, P.tuberculiformis
SWC 53	1668.0	V. low	V. low	Slst.	No older than Middle M.diversus	Early Eocene	-	T.paenestriatus
SWC 43	1676.3	Good	High	Slst.	Upper M.diversus	Early Eocene	2	B.emaciatus, A.acutullus, D.delicatus, P.tuberculiformis
SWC 42	1715.8	Good	V. high	Slst.	Middle M.diversus	Early Eocene	1	A.acutullus, P.tuberculiformis, T.moultonii
SWC 41	1734.0	Good	Fair	Clyst.	Lower M.diversus	Early Eocene	0	C.gigantis, I.irregularis, P.biornatus
SWC 52	1739.0	Barren	-	Ss.	-	-	-	-
SWC 40	1756.0	Barren	-	Slst.	-	-	-	-
SWC 39	1780.5	Good	High	Slst.,carb.	Lower M.diversus	Early Eocene	1	C.orthotelchus, I.anguloclavatus, I.irregularis, S.marlinensis.
SWC 38	1802.5	Barren	-	Slst.	-	-	-	
SWC 36	1859.1	Good	Fair	Clyst.	Lower M.diversus (A.hyperacantha)	Early Eocene	0	C.vanraadshoovenii, P.varus, P.pachypolus, abundant S.prominatus, A.hyperacantha, C.bipolare

TABLE I : SUMMARY OF PALYNOLOGICAL ANALYSIS WHITING-1, GIPPSLAND BASIN.

INTERPRETATIVE DATA

SAMPLE NO.	DEPTH (m)	YIELD	DIVERSITY SPORE POLLEN	LITHOLOGY	ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 35	1889.5	V. low	Fair	Slst.	Upper L.balmei	Paleocene	1	L.balmei, V.kopukuensis
SWC 34	1925.0	Low	V. low	Ss., carb.	L.balmei	Paleocene	-	L.balmei
SWC 33	1950.5	V. low	V. low	Slst.	L.balmei	Paleocene	-	L.balmei, T.tuberculiformis
SWC 32	1980.5	V. low	V. low	Slst.	L.balmei	Paleocene	-	A.obscurus, P.angulatus
SWC 31	2010.5	Low	Fair	Slst.	Upper L.balmei	Paleocene	2	L.balmei, A.obscurus, P.prodigus
SWC127	2042.0	Barren	-	Slst.	-	-	-	
SWC124	2141.2	Moderate	Fair	Slst.,carb.	Upper L.balmei	Paleocene	1	L.balmei, V.kopukuensis
SWC120	2233.0	Good	Fair	Slst.	L.balmei	Paleocene	-	T.cf.verrucosus, frequent N.endurus
SWC 20	2358.5	Good	High	Slst. carb.	Upper L.balmei	Paleocene	1	L.balmei, V.kopukuensis
SWC116	2402.8	Good	High	Clyst.	Lower L.balmei	Paleocene	1	Frequent T.verrucosus, L.balmei
SWC 18	2457.0	V. low	V. low	Clyst.	L.balmei	Paleocene	-	L.balmei
SWC 17	2486.5	Good	Fair	Sl. carb.	Lower L.balmei	Paleocene	1	T.verrucosus, B.mutabilis
SWC 15	2551.0	Good	High	Ss.	Lower L.balmei	Paleocene	1	Frequent T.verrucosus, & L.balmei
CTS	2545-50	Low	Fair	-	Lower L.balmei	Paleocene	3	
SWC 14	2585.5	Good	Fair	Slst.	Lower L.balmei	Paleocene	2	T.verrucosus, common A.obscurus
CTS	2585-90	Low	Fair	-	Lower L.balmei	Paleocene	3	
CTS	2635-40	Low	Fair	-	Lower L.balmei	Paleocene	3	T.verrucosus, P.catastus
SWC 11	2678.0	Low	V.low	Slst.	Indeterminate	-	-	L.balmei, T.confessus
CTS	2680-85	Low	Low	-	Lower L.balmei	Paleocene	3	T.verrucosus, caved Eocene species
Core	2687.87	V. low	Low	-	Indeterminate	-	-	P.angulatus common, L.balmei
Core	2689.04	V. low	Low	-	Indeterminate	-	-	L.balmei, Stereisporites sp. common
SWC111	2717.0	Negligible	V. low	Slst.	Indeterminate	-	-	
SWC 9	2738.5	Low	Low	Coal	Lower L.balmei	Paleocene	2	L.balmei, T.multistrixus
SWC110	2749.0	Barren	-	Ss.	-	-	-	
SWC 8	2767.0	Good	Fair	Clyst. carb.	Upper T.longus	Maastrichtian	1	P.reticuloconcavus, common T.verrucosus, T.cf.lilliei
SWC108	2793.0	Low	Low	Clyst. carb.	Upper T.longus	Maastrichtian	1	T.lilliei, S.punctatus
SWC107	2801.5	Barren	-	Ss.	-	-	-	

TABLE 1 : SUMMARY OF PALYNOLOGICAL ANALYSIS WHITING-1, GIPPSLAND BASIN.

INTERPRETATIVE DATA

SAMPLE NO.	DEPTH (m)	YIELD	DIVERSITY SPORE POLLEN	LITHOLOGY	ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 6	2827.1	Barren	-	Slst.	-	-	-	
SWC106	2887.0	Moderate	Fair	Sh.,carb.	Upper T.longus	Maastrichtian	1	T.verrucosus, P.clinei, T.walparensis
SWC 3	2926.5	V. low	Fair	Slst.,carb.	Upper T.longus	Maastrichtian	1	T.verrucosus, P.otwayensis, R.mallatus, abundant G.rudata
SWC 2	2958.0	Moderate	Fair	Slst.,carb.	Upper T.longus	Maastrichtian	0	T.longus, P.gemmatus, P.otwayensis, P.reticuloconcavus, T.verrucosus, S.punctatus, frequent G.rudata
SWC 1	2993.5	V. low	Fair	Slst.	Upper T.longus	Maastrichtian	1	T.verrucosus, S.punctatus, P.angulatus
SWC103	2998.0	Barren	-	Ss.	-	-	-	

TABLE 2.

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN WHITING-1.

SAMPLE NO.	DEPTH(m)	ZONE (CONFIDENCE RATING)	TAXON	COMMENTS
SWC 82	1276.6	P. tuberculatus (0)	Lygistepollenites florinii	Abundant
SWC 82	1276.6	P. tuberculatus (0)	Beaupreadites elegansiformis	Uncommon in Early Miocene
SWC 82	1276.6	P. tuberculatus (0)	Podocarpidites ostentatus	Uncommon in Early Miocene
SWC 80	1284.0	P. tuberculatus (1)	Latrobosporites crassus	= L. cf. crassus (Stover & Partridge 1973)
SWC 80	1284.0	P. tuberculatus (1)	Proteacidites crassus	Not known above Lower N. asperus Zone
SWC 78	1292.0	Indeterminate	T. reticulatus Cookson 1947	Rare species
SWC 77	1301.2	N. asperus	Erdtmanipollis sp.	Rare species
SWC 75	1317.8	Uppermost Lower N. asperus (0)	Dodonaea, tricolporate Cunoniaceae, Umbelliferae	Essentially modern taxa
SWC 75	1317.8	Uppermost Lower N. asperus (0)	Elphredripites notensis	Rare species
SWC 75	1317.8	Uppermost Lower N. aperus	Verrucosisporites cristatus	Not recorded below Uppermost Middle N. asperus Zone
SWC 63	1415.2	Lower N. asperus (0)	Tricolporites gigantis	Ms. species (Macphail)
SWC 63	1415.2	Lower N. asperus (0)	Milfordia hypolaenoides	Rare species
SWC 62	1417.0	Lower N. asperus (1)	Rhamnaceae	Modern taxon
SWC 61	1437.0	Lower N. asperus (0)	Proteacidites callosus	Rare species
SWC 60	1456.0	P. asperopolus (1)	Schizocolpus rarus	Rare species
SWC 56	1525.0	P. asperopolus (0)	Gemmatricolporites divaricatus	Rare species
SWC 56	1525.0	P. asperopolus (0)	Tricolpites reticulatus Cookson	Rare species
SWC 49	1542.0	P. asperopolus (0)	Proteacidites callosus	V. rare species
SWC 49	1542.0	P. asperopolus (0)	Proteacidites alveolatus	V. rare species

TABLE 2.

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN WHITING-1.

SAMPLE NO.	DEPTH(m)	ZONE	(CONFIDENCE RATING)	TAXON	COMMENTS
SWC 49	1542.0	P. asperopolus (0)		Proteacidites xestoformis	Rarely recorded in this zone (also at 1527.5m)
SWC 49	1542.0	P. asperopolus (0)		Tricolporites palisadus	Ms. species (Macphail)
SWC 47	1590.3	Upper M. diversus (0)		Tricolpites inclsus	Not recorded below P. asperopolus Zone
SWC 45	1640.7	Upper M. diversus (2)		Proteacidites sp.	Transitional between P. annularis and P. callosus
SWC 44	1657.5	Upper M. diversus (2)		Matonisporites ornamentalis	Rare below Lower N. asperus Zone
SWC 44	1657.5	Upper M. diversus (2)		Palycolpites aff. P. langstonii	Species resembling P. langstonii but less than 40u length
SWC 44	1657.5	Upper M. diversus (2)		Tricolporites circumlumenus	Ns. species (Macphail)
SWC 44	1657.5	Upper M. diversus (2)		Triporopollenites cf. spinosus	
SWC 43	1673.3	Upper M. diversus (2)		Basopollis mutabilis, B. otwayensis	Not recorded above Lower M. diversus Zone
SWC 43	1673.3	Upper M. diversus (2)		Polycolpites aff. P. langstonii	Not recorded above Lower M. diversus Zone (40u)
SWC 42	1715.8	Middle M. diversus		Basopollis otwayensis	Possibly reworked.
SWC 41	1734	Lower M. diversus (0)		Tricolporites moultonii	Not recorded below Middle M. diversus Zone
SWC 39	1780.5	Lower M. diversus (1)		Basopollis otwayensis	Frequent in assemblage
SWC 39	1780.5	Lower M. diversus (1)		Foveosporites balteus	Not recorded below Upper M. diversus Zone
SWC 39	1780.5	Lower M. diversus (1)		Peromonolites vellosus	Not recorded below Middle M. diversus Zone
SWC 39	1780.5	Lower M. diversus (1)		Tricolpites gigantis	Ms. species (Macphail)
SWC 35	1889.5	Upper L. balmei (1)		Banksieacidites arcuatus	Not recorded below uppermost Lower M. diversus Zone
SWC 35	1889.5	Upper L. balmei (1)		Ischyosporites irregularis	Not recorded below Lower M. diversus Zone
SWC 35	1889.5	Upper L. balmei (1)		Proteacidites amolosexinus	Not recorded above Lowermost Lower L. balmei Zone
SWC 32	1980.5	(Upper) L. balmei		Proteacidites angulatus	Not recorded above Lower L. balmei Zone

TABLE 2.

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN WHITING-1.

SAMPLE NO.	DEPTH(m)	ZONE	(CONFIDENCE RATING)	TAXON	COMMENTS
SWC 31	2010.5	Upper *L. balmei*	(2)	*Tricolpites gigantis*	Ms. species (Macphail)
SWC 124	2141.2	Upper *L. balmei*	(1)	*Proteacidites gemmatus*	Rarely recorded above Lower *L. balmei* Zone
SWC 124	2141.2	Upper *L. balmei*	(1)	*Tubulifloridites truswellii*	Ms. species (Macphail). Not recorded above *T. longus* Zone
SWC 120	2233	Upper *L. balmei*	(2)	*Nothofagidites endurus*	Abundant in sample
SWC 20	2358.5	Upper *L. balmei*	(1)	*Proteacidites angulatus*	Not recorded above Lower *L. balmei* Zone
SWC 116	2402.8	Lower *L. balmei*	(1)	*Tricolporites marginatus*	Ms. species (Stover & Evans 1969)
SWC 15	2551.0	Lower *L. balmei*	(1)	*Uvatisporites*	Rare species
SWC 15	2551.0	Lower *L. balmei*	(1)	*Tricolporites marginatus*	Rare species
Core	2687.9	? Lower *L. balmei*		*Tricolpites gigantis*	Ms. species (Macphail

PALYNOLOGY DATA SHEET

BASIN: GIPPSLAND ELEVATION: KB: 21.0 GL: -53.00

WELL NAME: WHITING-1 TOTAL DEPTH:

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	*T. pleistocenicus*										
	M. lipsis										
	C. bifurcatus										
	T. bellus										
PALEOGENE	*P. tuberculatus*	1276.6	0				1276.6	0			
	Upper *N. asperus*										
	Mid *N. asperus*	1301.2	2				1301.2	2			
	Lower *N. asperus*	1317.8	0				1437.0	0			
	P. asperopolus	1456.0	1				1542.0	0			
	Upper *M. diversus*	1577.5	1				1676.3	2	1590.3	0	
	Mid *M. diversus*	1715.8	1				1715.8	1			
	Lower *M. diversus*	1734.0	0				1859.1	0			
	Upper *L. balmei*	1889.5	2				2358.5	1			
	Lower *L. balmei*	2402.8	1				2738.5	2	2551.0	1	
LATE CRETACEOUS	*T. longus*	2767.0	1				2993.5	1			
	T. lilliei										
	N. senectus										
	U. *T. pachyexinus*										
	L. *T. pachyexinus*										
	C. triplex										
	A. distocarinatus										
EARLY CRET.	*C. paradoxus*										
	C. striatus										
	F. asymmetricus										
	F. wonthaggiensis										
	C. australiensis										
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: M.K. Macphail DATE: June 27, 1983.

DATA REVISED BY: DATE:

PALYNOLOGY DATA SHEET

BASIN: GIPPSLAND ELEVATION: KB: _____ GL: _____

WELL NAME: SNAPPER-3 TOTAL DEPTH: _____

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	*T. pleistocenicus*										
	M. lipsis										
	C. bifurcatus										
	T. bellus										
	P. tuberculatus										
PALEOGENE	Upper *N. asperus*										
	Mid *N. asperus*										
	Lower *N. asperus*										
	P. asperopolus										
	Upper *M. diversus*										
	Mid *M. diversus*										
	Lower *M. diversus*										
	Upper *L. balmei*	5970	1				6306	2			
	Lower *L. balmei*	7274	2				8934	2			
LATE CRETACEOUS	*T. longus*	9948	1				9948	1			
	T. lilliei										
	N. senectus										
	U. *T. pachyexinus*										
	L. *T. pachyexinus*										
	C. triplex										
	A. distocarinatus										
EARLY CRET.	*C. paradoxus*										
	C. striatus										
	F. asymmetricus										
	F. wonthaggiensis										
	C. australiensis										
PRE-CRETACEOUS											

COMMENTS: Revision of Paleocene-Late Cretaceous sections only. Depths in feet. Revision based on original data sheets of L.E. Stover & A.D. Partridge 1971. The sample at 9948' is Upper T. longus Zone in age and the interval between 10,102' to 10,253' no older than T. lilliei Zone in age.

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: L.E. Stover/A.D. Partridge DATE: June 1971/December 1971.

DATA REVISED BY: M.K. Macphail. DATE: July 29, 1983.

PALYNOLOGY DATA SHEET

BASIN: GIPPSLAND ELEVATION: KB: +31 ft. GL: _____

WELL NAME: BARRACOUTA-3 TOTAL DEPTH: _____

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	*T. pleistocenicus*										
	M. lipsis										
	C. bifurcatus										
	T. bellus										
	P. tuberculatus										
PALEOGENE	Upper *N. asperus*										
	Mid *N. asperus*										
	Lower *N. asperus*										
	P. asperopolus										
	Upper *M. diversus*										
	Mid *M. diversus*										
	Lower *M. diversus*										
	Upper *L. balmei*										
	Lower *L. balmei*	6300	2								
LATE CRETACEOUS	*T. longus*	7748	1				8414	1			
	T. lilliei	8844	2								
	N. senectus										
	U. *T. pachyexinus*										
	L. *T. pachyexinus*										
	C. triplex										
	A. distocarinatus										
EARLY CRET.	*C. paradoxus*										
	C. striatus										
	F. asymmetricus										
	F. wonthaggiensis										
	C. australiensis										
PRE-CRETACEOUS											

COMMENTS: Revision of Paleocene-Late Cretaceous sections only. Depths in feet. Revision based on original data sheets of P.R. Evans & R.D. Mulholland (1969). The sample at 7748' is Upper T.longus Zone in age and that at 8414' Lower T.longus Zone in age. The sample at 8844' is no older than T.lilliei Zone in age but may be younger.

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: P.R. Evans/R.D. Mulholland. DATE: October 1969.

DATA REVISED BY: M.K. Macphail. DATE: July 29, 1983.

PALYNOLOGY DATA SHEET

BASIN: GIPPSLAND ELEVATION: KB: +31ft. GL: _____

WELL NAME: BARRACOUTA-1 TOTAL DEPTH: _____

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	*T. pleistocenicus*										
	M. lipsis										
	C. bifurcatus										
	T. bellus										
	P. tuberculatus										
PALEOGENE	Upper *N. asperus*										
	Mid *N. asperus*										
	Lower *N. asperus*										
	P. asperopolus										
	Upper *M. diversus*										
	Mid *M. diversus*										
	Lower *M. diversus*										
	Upper *L. balmei*	5653	2				5653	2			
	Lower *L. balmei*	6124	3	6450	1		7251	1			
LATE CRETACEOUS	*T. longus*	7708	3	7722	2		8700	1			
	T. lilliei										
	N. senectus										
	U. *T. pachyexinus*										
	L. *T. pachyexinus*										
	C. triplex										
	A. distocarinatus										
EARLY CRET.	*C. paradoxus*										
	C. striatus										
	F. asymmetricus										
	F. wonthaggiensis										
	C. australiensis										
PRE-CRETACEOUS											

COMMENTS: Depths in feet. Paleocene-Late Cretaceous sections revised using data sheets (L.E. Stover/A.D. Partridge 1971). All T.longus Zone samples are Upper T.longus Zone in age.

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: L.E. Stover/A.D. Partridge DATE: June 1971, December 1971.

DATA REVISED BY: M.K. Macphail. DATE: July 29, 1983.