PALYNOLOGICAL ANALYSIS

SUNFISH-2, GIPPSLAND BASIN

by

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INTERPRETATIVE DATA

GEOLOGICAL COMMENTS

1. Although Lower and Upper M. diversus Zone age sediments were not recorded, the interval between 1634.0 and 1721.2m was poorly sampled and it is likely that deposition at the Sunfish-2 well was continuous from the Late Cretaceous Tricolporites apoxyexinus Zone to the Early/Middle Eocene Proteacidites asperopolus Zone. Sediments of T. apoxyexinus (= T. pachyexinus) Zone age have not been previously recorded in the Gippsland Basin.

2. The base of the Lakes Entrance Formation is picked on lithological characteristics and electric logs as occurring at 1615.5m. The spore-pollen data support foraminiferal evidence (Hannah 1984) for a major unconformity at the top of Latrobe. This represents all or part of Late Eocene, Oligocene and possibly early Early Miocene time. It is possible that the sandstones between 1634.6 and 1615.7m, dated as P. asperopolus Zone in age, includes a condensed sequence of lowermost Lower N. asperus Zone sediments. Absence of (i) greensands referable to the Gurnard Formation and (ii) calcareous sediments of Oligocene and Early Miocene (Zone H_1) age suggests substantial erosion has taken place (see Rexilius, 1984).

3. Dinoflagellates occur in low numbers in the top 3m of the Latrobe Group coarse clastics but the first unequivocal evidence of a marine environment within this Group is at 1683.8m. This sample contains Apectodinium hyperacantha and is likely to represent a M. diversus Zone marine transgression. Unlike in Sunfish-1 (5580 ft, Stover 1974) there is no evidence for a Lower M. diversus Zone marine transgression equivalent to that recorded in the Rivernook Bed, Princetown Section, Otway Basin (Cookson & Eisenack 1967)

4. Earlier marine or marginal marine environments are recorded between 1838.4 to 1943.3m (Upper L. balmei Zone) and at 2089.0m (Upper T. longus Zone). The latter can almost certainly be correlated with the Isabelidium (Deflandrea) druggii marine transgression defined by Partridge (1976).

5. Because of relatively poor sample control in Sunfish-1, it is difficult to compare this well with Sunfish-2. Nevertheless several major inconsistencies appear to exist:

(a) In Sunfish-2, the Upper L. balmei Zone sediments are thick (ca 210m) relative to the Lower L. balmei section (ca 74m) with the total possible

thickness of L. balmei sediments being about 390m. The "T. longus seismic horizon" appears to occur within the Upper L. balmei Zone. In Sunfish-1 one sample only (5790') has been dated as Upper L. balmei Zone in age and the total possible thickness of L. balmei sediments is ca. 280m. The "T. longus seismic horizon" occurs within an undated interval below some 60m of Lower L. balmei sediments.

(b) Marine sediments of Isabelidinium druggii Zone age occur in both wells: at 6510' (1984m) in Sunfish-1 and 2089m in Sunfish-2. The former depth is considerably higher than would be anticipated given the structural relationship between the two wells.

(c) The Sunfish-1 well bottomed in sediments identified as Early Cretaceous (Coptospora paradoxa Zone) in age. Conversely Sunfish-2 bottomed in sediments no older than the Late Cretaceous Clavifera triplex Zone in age. It is noted that virtually all of the spores used by Stover (1974) to assign a C. paradoxa Zone age to the interval between 8000' and 8152' in Sunfish-1 are found reworked into Late Cretaceous sediments.

BIOSTRATIGRAPHY

The zone boundaries have been established using the criteria of Stover & Evans (1973), Stover & Partridge (1973), subsequent proprietary revisions including Macphail (1983), and palynological range data for Morum-1 well, Otway Basin.

Tricolporites apoxyexinus Zone 2639.0m

One sidewall core sample has been assigned to this age on the basis of (i) Tricolpites vergillus, a species which in Morum-1 first appears in this zone and (ii) the absence of Nothofagidites, a taxon which first appears in the overlying N. senectus Zone. The occurrence of Phyllocladidites mawsonii and undescribed Tricolpites and Proteacidites spp. (abundant) demonstrate the sample is no older than C. triplex Zone in age.

Nothofagidites senectus Zone 2534.8 - 2630.5m

Seven samples have been assigned to this zone. The lowermost three, at 2630.5, 2621.1 and 2599.6m lack Nothofagidites but contain either Tricolpites sabulosus or Proteacidites otwayensis, species which in Morum-1 first appear in the N. senectus Zone. The first appearance of Nothofagidites, including the nominate species N. senectus, is at 2564.0m. The upper boundary is picked at 2534.8m, the highest sample containing Nothofagidites, Tricolpites sabulosus and T. vergillus but lacking species first appearing in the overlying T. lilliei Zone. A feature of this latter zone and the N. senectus Zone is the presence (due to reworking ?) of spores which are usually indicative of an Early Cretaceous age.

Tricolporites lilliei Zone 2437.0-2530.8m

The base of the T. lilliei Zone is defined by the first appearance of Gambierina rudata at 2530.8m. Although G. rudata is present throughout, it is always much less common than Nothofagidites. The first appearance of the nominate species, Tricolporites lilliei, is at 2477.7m.

Lower Tricolpites longus Zone 2421.2-2284.9m

The base of the Lower T. longus Zone is defined by the first appearance of the nominate species Tricolpites longus. This sample contains relatively frequent Nothofagidites and occasional occurrences of species which become frequent

within the Upper T. longus Zone, e.g. Proteacidites clinei, P. palisadus and P. reticuloconcavus, but lacks Tetracolporites verrucosus and Stereisporites punctatus. Gambierina rudata and Triporopollenites sectilis become uncommon upwards through the zone. The upper boundary of the Zone is defined by the occurrence of Quadraplanus brossus in a Gambierina rudata-dominated assemblage which lacks species first appearing in the Upper T. longus Zone.

Upper Tricolpites longus Zone 2269.5-2089.0m

Palynofloras within this interval are dominated by Gambierina rudata and include at least several Proteacidites clinei, P. gemmatus, P. otwayensis, P. palisadus, P. reticuloconcavus, P. wahooensis, Quadraplanus brossus, Tricolporites lillei, Tricolpites longus, T. waiparensis, Tetracolporites verrucosus, Stereisporites punctatus and S. regium. The base of the zone is defined by the first appearance of Proteacidites gemmatus and Stereisporites punctatus, at 2269.5m. Dilwynites granulatus first occurs at 2268.1m. The upper boundary is picked at 2089.0m, based on occurrences of the Late Cretaceous dinoflagellate species Isabelidinium druggii and the very rare spore Ornamentifera sentosa. Neither species is known to range above the Upper T. longus Zone. The sample also contains frequent occurrences of Stereisporites punctatus and Tetracolporites verrucosus but is unusual in that Lygistepollenites balmei is frequent. This suggests the sample lies closer to the L. balmei/T. longus Zone boundary than is usually the case with T. longus Zone age sidewall core samples taken in the Gippsland Basin.

Lower Lygistepollenites balmei Zone 1999.1-2073.0m

Samples within this interval are dominated by Proteacidites and gymnosperm pollen but the nominate species, Lygistepollenites balmei, does not become frequent until 1999.1m. The first occurrence of species which first appear in the L. balmei Zone is considerably higher up the section again: six grains of Polycolpites langstonii at 1915.0m. The lower boundary is placed at 2073.0m, a sample containing Tetracolporites verrucosus and Proteacidites angulatus. These species typically range no higher than the Lower L. balmei Zone and species restricted to the Late Cretaceous are absent. The upper boundary is provisionally picked at 1999.1m, the highest L. balmei Zone sample lacking zone indicator species of Upper L. balmei Zone. The common occurrence of Herkosporites elliottii in this sample supports the age-determination.

Upper Lygistepollenites balmei Zone 1768.5-1978m

The lower boundary is picked at 1978.0m, based on the occurrence of Verrucosisporites kopukuensis and frequent Gleicheniidites. As is usually the case in L. balmei Zone sections of Gippsland wells, the first occurrence of V. kopukuensis lies below occurrences of species which are usually reliable indicators of the Lower L. balmei Zone. For example Proteacidites angulatus is common at 1966.0m; Tetracolporites verrucosus and the Late Cretaceous species Tetradopollis securus and Camarozonosporites horrendus occur at 1934.0m; Jaxtacolpus pieratus occurs in a marine sample at 1915m. Occurrences of Verrucosisporites kopukuensis are continuous from 1915.0m up to the upper boundary at 1768.5m, defined by the simultaneous occurrence of V. kopukuensis, Cyathidites gigantis with abundant Lygistepollenites balmei and Gleicheniidites. Preservation and diversity are unusually good over this (largely marine) interval and anomalous occurrences of several Eocene species may represent real extensions of range into the Paleocene e.g. Gemmatricolporites divaricatus and Triporopollenites ambiguus. There is now no doubt that 'Eocene' taxa such as Ilexpollenites anguloclavatus, Matonisporites ornamentalis and Polycolpites esobalteus first appear within the L. balmei Zone. The dinoflagellate species Glaphryacysta retiintextum is frequent at 1934.0m and Apectadinium homomorpha present to frequent in good dinoflagellate assemblages over the interval 1934.0 to 1834.4m.

Lower Malvacipollis diversus Zone 1721.2m

One sample, at 1721.2m, is provisionally assigned to this zone on the basis of a single, poorly preserved specimen of Cyathidites gigantis. This species has not been recorded above the Lower M. diversus Zone but it is noted that the sample also contains Banksieacidites elongatus, a species first appearing in the Middle M. diversus Zone and Tricolporites moultonii, which is rarely recorded below the same zone. The samples at 1699.6 and 1683.8m cannot be precisely dated, but are no older than Lower M. diversus Zone in age.

Proteacidites asperopolus Zone 1615.7-1634.6m

Three samples, including the top sample of the Latrobe Group coarse clastics are assigned to this zone. The lowermost, at 1634.6m, contains Proteacidites asperopolus, P. rugulatus and Sapotaceoidaepollenites rotundus, species which first appear at or within this zone. Myrtaceidites tenuis, a species which ranges no higher than the P. asperopolus Zone is present at 1618.2m and, in association with Proteacidites asperopolus and Tricolpites incisus, at 1615.7m. Although this combination of taxa by definition defines the interval as P. asperopolus Zone in age, Nothofagidites pollen are rather more common (up to 24%) than is usually the case in P. asperopolus Zone palynofloras. This

fact plus isolated occurrences of typically N. asperus Zone taxa, e.g. Proteacidites vesicus and Proteacidites reticulatus at 1618.2m, makes it possible that the section extends into lower Lower N. asperus Zone time. Species whose first appearance defines the Lower N. asperus Zone, e.g. Tricolporites leuros, T. delicatus and Nothofagidites falcatus, are absent.

Proteacidites tuberculatus 1499.7-1613.9m

Occurrences of Cyatheacidites annulatus at 1611.6 and 1499m confirm a P. tuberculatus Zone age for this interval. The sample at 1613.9m lacks C. annulatus but is included in this zone on the basis of (i) the dinoflagellate species Dinosphaera pontus and D. vietus and (ii) a general similarity to the above samples.

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TABLE I : SUMMARY OF PALYNOLOGICAL ANALYSIS SUNFISH-2

INTERPRETATIVE DATA

SAMPLE NO.	DEPTH (m)	YIELD	DIVERSITY SPORE POLLEN	LITHOLOGY	ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 101	1499.7	Fair	Low	Sist., calc.	P. tuberculatus	Early-Middle Eocene	0	C. annulata, D. simplex
SWC 89	1611.6	Good	Low	Sist., calc.	P. tuberculatus	"	0	C. annulata, reworked G. rudata
SWC 88	1613.9	Fair	Low	Sist., calc.	P. tuberculatus	"	2	D. pontus, D. vletus
SWC 87	1615.7	Good	High	Ss.	P. asperopolus	"	1	M. tenuis, P. asperopolus
SWC 86	1618.2	Good	High	Ss.	P. asperopolus	"	2	M. tenuis, P. pachypolus
SWC 84	1623.9	Fair	Fair	Ss.	Indeterminate	"	-	
SWC 83	1634.6	Good	High	Ss.	P. asperopolus	"	1	P. asperopolus, P. rugulatus
SWC 82	1659.0	Nil	-	Ss.	Indeterminate			
SWC 117	1683.8	V. Low	Low	Sist. ss.	No older than Lower M. diversus Zone			A. homomorpha
SWC 116	1699.6	V. Low	Low	Sist.	No older than Lower M. diversus Zone			P.latrobensis, reworked Late Cret.spores
SWC 115	1721.2	Good	High	Sist.	Lower M. diversus	Early Eocene	0	C.gigantis, T.moultonii, P.esobalteus
SWC 113	1768.5	V. good	High	Ss.	Upper L. balmei	Paleocene	0	L.balmei common, C.gigantis, L.amplus
SWC 112	1784.2	Good	Low	Ss.	Upper L. balmei	Paleocene	1	L. balmei abundant, V. kopukuensis
SWC 110	1819.5	V. good	Low	Sist.	L. balmei	Paleocene	-	L. balmei common, A. obscurus
SWC 109	1838.4	V. good	High	Sh., carb.	Upper L. balmei	Paleocene	0	L.balmei abund., P.incurvatus, V. kopukuensis, G.Edwardsii, P.langstonii
SWC 108	1853.1	V. good		Sist., carb.	Upper L. balmei	Paleocene	0	as for SWC 109
SWC 107	1867.5	Good	Fair	Sh., carb.	Upper L. balmei	Paleocene	2	L.balmei abund., Gleichenilidites freq.
SWC 106	1882.9	V. good	High	Sist., carb.	Upper L. balmei	Paleocene	0	C.gigantis, V.kopukuensis, P.incurvatus, P.langstonii (freq.), G.rudata, G.edwardsii

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SAMPLE NO.	DEPTH (m)	YIELD	DIVERSITY SPORE POLLEN	LITHOLOGY	ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 105	1898.1	Good	High	Sh., carb	Upper L. balmei	Paleocene	1	Gleichenilidites & L.balmei abundant, V. kopukuensis
SWC 104	1915.0	V. good	High	Sist., carb.	Upper L. balmei	Paleocene	1	L.balmei abudant, V.kopukuensis
SWC 103	1934.0	Good	High	Sist., carb.	Upper L. balmei	Paleocene	2	L.balmei common, P.annulares
SWC 66	1943.3	Fair	Low	Sist., carb.	L. balmei	Paleocene	-	G. rudata
SWC 64	1978.0	Fair	Low	Sh.	Upper L. balmei	Paleocene	1	L. balmei & Gleichenlites frequent, V. kopukuensis
SWC 63	1999.1	Good	Fair	Sist.	Lower L. balmei	Paleocene	2	H. elliottii common
SWC 62	2014.6	Fair	Low	Sist.	Lower L. balmei	Paleocene	2	Proteacidites dominant, P.angulatus abundant
SWC 61	2032.2	Fair	Low	Sist.	Lower L. balmei	Paleocene	2	as above
SWC 60	2045.2	Low	Fair	Sist.	Lower L. balmei	Paleocene	2	L.balmei & B.otwayensis frequent
SWC 59	2057.8	Low	Fair	Ss., carb.	Lower L. balmei	Paleocene	1	T. verrucosus
SWC 57	2073.0	Good	Fair	Sist., carb.	Lower L. balmei	Paleocene	1	Proteacidites abundant, D. granulatus, T. phillipsii & T. verrucosus frequent
SWC 56	2089.0	Good	Fair	Sist., carb.	Upper T. longus	Maastrichtian	0	O. sentosa, I. druggii, S. punctatus, T. verrucosus, P. gemmatus, T. securus, T. walparensis
SWC 55	2102.7	Good	High	Sist., carb.	Upper T. longus	Maastrichtian	0	T. longus, S. punctatus, P. wahooensis, P. otwayensis, P. pallsadus, P. clinei, G. rudata frequent

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SAMPLE NO.	DEPTH (m)	YIELD	DIVERSITY SPORE POLLEN	LITHOLOGY	ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 54	2116.7	Low	Fair	Ss.	Upper T. longus	Maastrichtian	0	Q. brossus, T. longus, S. punctatus, T. verrucosus
SWC 53	2135.1	Good	High	Slst., carb.	Upper T. longus	Maastrichtian	0	as SWC 53 with T. verrucosus & S. punctatus frequent
SWC 52	2150.2	Good	High	Slst.	Upper T. longus	Maastrichtian	0	P.gemmatus, S.punctatus (common), Q. brossus, P.reticuloconcavus, T.sectilis
SWC 51	2165.0	Negligible	SS.	-	Indeterminate			
SWC 47	2224.8	Good	Fair	Slst., coaly	Upper T. longus	Maastrichtian	0	T.verrucosus, S.punctatus, J.pieratus
SWC 46	2241.9	Fair	High	SS., carb.	Upper T. longus	Maastrichtian	0	T.longus, T.verrucosus, P.angulatus
SWC 45	2254.6	Good	Fair	Slst., carb.	Upper T. longus	Maastrichtian	1	G. rudata abundant, P. gemmatus
SWC 44	2268.1	Good	Fair	Slst., coaly	Upper T. longus	Maastrichtian	1	as above plus D. granulatus
SWC 43	2269.5	Good	High	Slst.	Upper T. longus	Maastrichtian	0	as above plus S. punctatus
SWC 42	2284.9	V. good	High	Slst., coaly	Lower T. longus	Late Cretaceous	1	N. endurus & G. rudata abundant, T. sectilis (common), Q. brossus, T. lillielei, T. walparensis, P. polyoratus
SWC 41	2295.1	Low	Fair	Coal	Lower T. longus	Late Cretaceous	2	N. endurus & G. rudata common, T. securus, T. walparensis, N. flemingii, T. sectilis (frequent)
SWC 35	2361.1	Barren	-	Volcanic	-	-		
SWC 33	2393.6	Good	Fair	Ss., carb.	No older than T. lillielei Zone		-	N. endurus frequent, S. regium, T. walparensis
SWC 31	2421.2	Fair	High	Slst.	Lower T. longus	Late Cretaceous	1	T.longus,P.pallsadus,P.reticuloconcavus
SWC 30	2437.0	Fair	Fair	Slst.	T. lillielei	Late Cretaceous	2	G. rudata, T. sabulosus, T. sectilis
SWC 28	2477.7	Good	Fair	Slst., coaly	T. lillielei	Late Cretaceous	1	T.lillielei, G.rudata. N.endurus (freq.)

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SAMPLE NO.	DEPTH (m)	YIELD	DIVERSITY SPORE POLLEN	LITHOLOGY	ZONE	AGE	CONFIDENCE RATING	COMMENTS
SWC 27	24900.0	Barren	-	Ss.	-	-	-	
SWC 26	2509.0	Barren	-	Volcanic	-	-	-	
SWC 23	2521.7	Fair	Fair	Slst., carb.	T. lillel	Late Cretaceous	2	N. endurus common, T. sabulosus, P. polyoratus
SWC 22	2523.1	Low	Low	Slst.	No older than T. lillel		-	T. sabulosus
SWC 20	2530.8	Low	Low	Slst.	T. lillel	Late Cretaceous	2	G. rudata
SWC 19	2534.8	Low	Low	Ss.	N. senectus	Late Cretaceous	1	Nothofagidites spp., T. sabulosus T. apoxyexinus, P. amolosexinus
SWC 17	2546.1	Low	Low	Ss.	N. senectus	Late Cretaceous	2	Nothofagidites abundant, T. sabulosus common
SWC 16	2547.6	V. Low	Low	Ss.	N. senectus	Late Cretaceous	2	Nothofagidites, T. sabulosus, T. vergillus
SWC 11	2559.4	Barren	-	Ss.	Indeterminate	-	-	
SWC 10	2564.0	Low	Fair	Slst.	N. senectus	Late Cretaceous	2	Nothofagidites, T. sabulosus
SWC 8	2599.6	Fair	Fair	Coal	N. senectus	Late Cretaceous	1	P. otwayensis, B. otwayensis, T. vergillus L. balmei, A. obscurus
SWC 7	2611.0	V. Low	V. low	Slst., carb.	No older than C. triplex Zone		-	P. mawsonii
SWC 6	2617.5	Barren			-	-	-	
SWC 5	2621.1	Low	Fair	Slst./Sh.	N. senectus	Late Cretaceous	2	T. sabulosus
SWC 4	2623.5	Barren	-	Ss.	-	-	-	
SWC 3	2630.5	V. low	Low	Slst.	N. senectus	Late Cretaceous	2	T. sabulosus, Gleichenlidites (common)
SWC 2	2636.0	V. low	Low	Slst.	No older than C. triplex Zone		-	P. mawsonii
SWC 1	2639.0	Good	Fair	Slst., carb.	T. apoxyexinus	Late Cretaceous	2	T. vergillus, abundant Proteacidites

TABLE .

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN SUNFISH-2

SAMPLE NO.	DEPTH(m)	ZONE	TAXON	COMMENTS
SWC 86	1618.2	P. asperopolus (2)	Periporopollenites vesicus	Very rarely recorded below Lower N. asperus Zone
SWC 86	"	"	Proteacidites reticulatus	Rarely recorded below middle of Lower N. asperus Zone
SWC 84	1623.9	P. asperopolus	Periporopollenites vesicus	as above
SWC 84	"	"	Proteacidites reticulatus	as above
SWC 84	"	"	Phyllocladidites paleogenicus	Rare sp.
SWC 83	1634.6	P. asperopolus (1)	P. paleogenicus	as above
SWC 83	"	"	Proteacidites callosus	Rare sp.
SWC 83	"	"	Tricolpites reticulatus Cookson	Rare sp.
SWC 115	1721.2	Lower M. diversus (0)	Banksi eacidites elongatus	Not recorded below Middle M. diversus Zone
SWC 115	"	"	Clavifera Vultuosus	Very rare ms sp. (A. Partridge)
SWC 113	1768.5	Upper L. balmei (0)	Triporopollenites ambiguus	Not recorded below Middle M. diversus Zone
SWC 113	"	"	Matonisporites ornamentalis	Unusual below Lower N. asperus Zone
SWC 109	1838.4	Upper L. balmei (0)	Tricolpites gigantis	Rare ms sp. (Macphail)
SWC 109	"	"	Ilexpollenites anguloclavatus	Early occurrance
SWC 108	1853.1	Upper L. balmei (0)	Amosopollis cruciformis	Rare sp.
SWC 108	"	"	Camarozonosporites dumus	Not previously noted in this zone
SWC 108	"	"	Polycolpites esobalteus	Extends range of species into Upper L. balmei Zone
SWC 108	"	"	Tricolpites gigantis	Rare ms sp. (Macphail)
SWC 106	1882.9	Upper L. balmei (0)	Ilexpollenites anguloclavatus	as above
SWC 106	"	"	Tricolpites gigantis	Rare ms sp. (Macphail)
SWC 106	"	"	Triporopollenites ambiguus	See SWC 113
SWC 105	1898.1	Upper L. balmei (1)	Ilexpollenites anguloclavatus	as above
SWC 104	1915.0	Upper L. balmei (1)	Ilexpollenites anguloclavatus	as above

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN SUNFISH-2

SAMPLE NO.	DEPTH(m)	ZONE	TAXON	COMMENTS
SWC 104	1915.0	Upper *L. balmei* (1)	*Jaxtacolpus pleratus*	Not previously recorded above Lower *L. balmei* Zone
SWC 103	1934.0	Upper *L. balmei* (2)	*Camorozonosporites horrendus*	Not previously noted in this zone
SWC 103	"	"	*Tetradopollis securus*	Late Cretaceous sp.
SWC 66	1943.3	*L. balmei*	*Deflandrea dartmoorla*	Lower *M. diversus* Zone species
SWC 63	1999.1	Lower *L. balmei* (2)	*Proteacidites amolosexinus*	Late Cretaceous sp. in non marine sediment
SWC 62	2014.6	Lower *L. balmei* (2)	*Schizaea digitatoides*	Rare sp.
SWC 57	2073.0	Lower *L. balmei* (1)	*Proteacidites* cf *vulgaris*	cf rare ms sp. (Harris)
SWC 56	2089.0	Upper *T. longus* (0)	*Lygistepollenites balmei*	Frequent in assemblage
SWC 56	"	"	*Ornamentifera sentosa*	Very rare in Maastrichtian
SWC 56	"	"	*Proteacidites protograndis*	Ms sp. (Macphail)
SWC 53	2135.1	Upper *T. longus* (0)	*Tricolpites vergilius*	Rare ms sp. (Partridge)
SWC 53	"	"	*Grapnellspora evansii*	Rare sp., tips of processes bifurcated
SWC 53	2150.2	Upper *T. longus* (0)	*Tubulifloridites truswellii*	Rare ms sp. (Macphail)
SWC 52	2150.2	Upper *T. longus* (0)	*Grapnellspora evansii*	as for SWC 53
SWC 47	2224.8	Upper *T. longus* (0)	*Jaxtacolpus pleratus*	Rare sp.
SWC 47	"	"	*Grapnellspora* cf *evansii*	Tips of processes simple
SWC 47	"	"	*Foveogleichenlidites* sp.	Rare genus
SWC 42	2284.9	Lower *T. longus* (1)	*Proteacidites vulgaris*	Rare ms sp. (Harris)
SWC 42	"	"	*Grapnellspora* cf *evansii*	as for SWC 47
SWC 41	2295.1	Lower *T. longus* (2)	*Phyllocladidites paleogenicus*	Rare sp.
SWC 31	2421.2	Lower *T. longus* (1)	*Cyclosporites hughesii*	Early Cretaceous sp.

TABLE 1

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN SUNFISH-2

SAMPLE NO.	DEPTH(m)	ZONE	TAXON	COMMENTS
SWC 23	2521.7	T. lilliei(2)	Periporopollenites polyoratus	First appears in this zone?
SWC 22	2523.1	Indet.	Cyclosporites hughesii	as for SWC 31
SWC 19	2534.8	N. senectus (2)	Tricolpites sabulosus	Forms with and without strongly thickened endexine along margins of colpi
SWC 17	2546.1	N. senectus (1)	Tricolpites sabulosus	Population as in SWC 19
SWC 10	2564.0	N. senectus (2)	Foraminisporis asymmetricus	Early Cretaceous sp.
SWC 5	2621.1	N. senectus (2)	Basopollis otwayensis	Early occurrence
SWC 5	"	"	Gephyrapollenites wahooensis	Early occurrence