



WELL COMPLETION REPORT

FLOUNDER-6

APPENDIX 4

PALYNOLOGICAL ANALYSIS OF
FLOUNDER-6, GIPPSLAND BASIN

by

A.D. Partridge

PALYNOLOGICAL ANALYSIS
OF
FLOUNDER-6 AND FLOUNDER-6 (SIDETRACK)
GIPPSLAND BASIN

by
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INTRODUCTION

Forty-one sidewall core and seven core samples were examined in Flounder-6 and Flounder-6A. The zones recognised in the well are summarised below. Details of all samples examined are given on Table-1 while the confidence ratings for the zone intervals are given on the accompanying Data Sheet.

SUMMARY

<u>UNIT</u>	<u>SPORE-POLLEN ZONES</u>	<u>DINOFLAGELLATE ZONES</u>
Lakes Entrance Formation	<u>P. tuberculatus</u> 6340 feet	
----- UNCONFORMITY AT 6341 FEET -----		
Flounder Formation	<u>P. asperopolus</u> 6354 to 7091 feet	<u>W. edwardsii</u> 6475 to 6546 feet
6341 - 7424 feet		<u>W. thompsonae</u> 6876 to 7091 feet
	Upper <u>M. diversus</u> 7142 to 7413 feet	<u>W. ornata</u> 7288 feet
----- UNCONFORMITY AT 7424 FEET -----		
Latrobe Coarse Clastics	Upper <u>L. balmei</u> 7426 feet	
7424 - 7878 feet	Lower <u>L. balmei</u> 7600 to 7845 feet	

Upper Flounder Field Seal	Lower <u>L. balmei</u> 7907 to 8065 feet	<u>T. evittii</u> 8033 to 8065 feet
7878 - 8082 feet		

Lower Flounder Field Seal	<u>T. longus</u> 8095 to 8145 feet	<u>D. druggii</u> 8095 feet
8082 - 8145 feet		

Latrobe Coarse Clastics	<u>T. longus</u> 8145 to 8584 feet	<u>D. druggii</u> 8175 to 8444 feet
8145 - 8601 feet		

Flounder-6, T.D. = 8214 feet		
Flounder-6A, T.D. = 8601 feet		

GEOLOGICAL COMMENTS

1. Flounder Formation

The top of the Flounder Formation can be picked from the electric logs at 6341 feet. This is directly below the sidewall core at 6340 feet containing a good P. tuberculatus Zone assemblage with both spore-pollen and dinoflagellate zone species.

The base of the Flounder Formation lies between sidewall cores at 7413 and 7426 feet, which is not reflected by any marked log break.

The Flounder Formation itself is 1083 feet thick and can be subdivided into two spore-pollen zones and three dinoflagellate zones. Subtle lithological and electric log character changes can be related to the threefold dinoflagellate subdivision of the section.

The most apparent subdivision is the calcareous mudstone and siltstone unit between 6340 and 6800 feet which may be referred entirely to the W. edwardsii Zone even though the nominated species only occurs in the two samples at the top of this interval. The underlying unit would correspond to the interval of the W. thompsonae Zone between 6800 and 7100 feet. This corresponds to the highest occurrence of sands, interbedded with mudstone and siltstone in the Flounder Formation. The break at 6800 feet between the above two units may have some regional importance. It corresponds for example to the time of deep water sand emplacement in the Gurnard Formation in Kingfish-7 (see Partridge 1977).

The lowest unit between 7100 and 7426 feet corresponds to the Upper M. diversus. It contains dinoflagellates throughout but only the sample at 7288 feet can be referred to a specific dinoflagellate zone. This is the W. ornata Zone. There is not much apparent lithological distinction between the middle and lower units except for an increase in the percentage of sand in the lower unit.

2. L. balmei Zone Coal Measures

The division of the L. balmei Zone into Upper and Lower subzones is not clearly defined in Flounder-6. Considering the most recent revision of Stonefish-1 (Partridge 1976) it is probable that in the Flounder Field area the Flounder-Tuna Channel has cut down into the Lower L. balmei Zone. The records of the Upper L. balmei Zone given on data sheets for the other Flounder wells are undoubtedly wrong. Unfortunately revision of these wells is beyond the scope of this report. The source of error is that the base of the Upper L. balmei Zone is recognised on two different parameters. One is the first appearances of spore-pollen such as Cyathidites gigantis and Banksiaeidites elongatus. The alternative is the first appearance of the dinoflagellate Wetzeliella homomorpha. The difficulty lies in that the first occurrences of these forms is not always concurrent, and secondly in the Flounder wells there is difficulty in distinguishing W. homomorpha from various undescribed species of Spinidinium. These two dinoflagellate types seem to represent an evolving plexus in which speciation is difficult.

3. Flounder Field Seal

The shale-siltstone seal to the Flounder T.1 reservoir sands can be divided into two units based on palynology, as follows:

Unit A: 7878 to 8082 feet Lower L. balmei Zone
Unit B: 8082 to 8145 feet T. longus Zone

Although there is as yet no clearly defined lithological distinction between these units this subdivision is important as it corresponds to the Cretaceous-Tertiary boundary (as well as a major palynological zone boundary) and is elsewhere in the basin recognised as a major seismic sequence boundary.

Dinoflagellates occur throughout both units attesting to their deposition in an open marine environment. The good sidewall core sampling in Flounder-6A compared to the earlier Flounder wells has for the first time allowed the documentation of the occurrence of the Trithyrodinium evittii Dinoflagellate Zone within the Flounder Field Seal. That this zone should occur in the shale seal has been suspected for some time. The occurrence of the Deflandrea druggii Dinoflagellate Zone within the basal part of the shale seal has been documented previously from other Flounder wells.

DISCUSSION OF ZONES

Species identified from the samples examined are given on the eight attached distribution sheets. The basis for choosing the zone intervals is discussed in the following:

Tricolpites longus Zone 8095 to 8584 feet

Flounder-6 and -6A reached total depths while still within the T. longus Zone. This is based on the presence of the spore Stereisporites (Tripunctisporis) punctatus at 8584 feet in the deepest sidewall core and the dinoflagellate Deflandrea druggii at 8444 feet. Other species identified characteristic of the T. longus Zone included Quadruplanus brossus, Proteacidites gemmatus, P. otwayensis, P. palisadus, P. reticuloconcavus and the dinoflagellate Deflandrea coronata.

The diversity within the zone is quite high. This is not apparent from the distribution charts however, as the samples were not studied in detail.

The top of the T. longus Zone is identified as lying within the lower part of the Flounder Field seal.

Lygistepollenites balmei Zone 7426 to 8065 feet

The base of the L. balmei Zone is recognised by the extinction of the characteristic spore and pollen species of the underlying T. longus Zone, and the incoming of the characteristic species of the Trithyrodinium evittii Dinoflagellate Zone.

The top of the L. balmei Zone is identified on the highest mutual occurrence of Lygistepollenites balmei, Australopollis obscurus, Latrobosporites amplus and L. ohaiensis, all in the sample at 7426 feet. This sample is the only one that can possibly be referred to the Upper L. balmei subzone based on the abundant occurrence of a species of Spinidinium transitional to Wetzeliella homomorpha.

Three samples at the base of the L. balmei Zone (from 8033, 8050 and 8065 feet) can be referred to the Trithyrodinium evittii Dinoflagellate Zone based on common occurrence of the nominated species. Important accessory species are Deflandrea speciosus, Areoligera senonensis and common Hystrichosphaeridium tubiferum.

Other dinoflagellates occur in samples throughout the L. balmei Zone (see distribution charts) but are not diagnostic on any particular zone.

Upper Malvacepollis diversus Zone 7142 to 7413 feet

As is usual, the finer grained lithologies sampled in the Flounder Formation gave rich yields of diverse assemblages. The sandstone lithologies gave generally poor assemblages and sometimes could only be defined as indeterminate. In the sidewall core at 7413 feet, no species that would restrict the sample to the Upper M. diversus Zone were identified. However, there is a marked change in preservation of the fossils compared to the underlying L. balmei Zone, and the dominance of the pollen H. harrisii precludes an age older than Lower M. diversus Zone. An Upper M. diversus age for the basal sediment in the channel is preferred from comparison with Flounder-1 and -2, the closest adjacent wells.

The other samples clearly belong to the Upper M. diversus Zone because of common occurrence of Proteacidites pachypolus and Myrtaceidites tenuis. This is further supported by the dinoflagellates, especially the occurrence of Wetzeliella ornata at 7288 feet.

Proteacidites asperopolus Zone 6354 to 7091 feet

The base of the P. asperopolus Zone is normally taken at the first appearances of such species as Santalumidites cainozoicus, Conbaculites apiculatus and Proteacidites asperopolus. In this well there is a little scatter in the first appearance of these species which is reflecting the detail in which the individual samples have been worked. For convenience therefore the base of the zone is placed at the sample containing the first appearance of the dinoflagellate Wetzeliella thompsonae. Other features characteristic of the P. asperopolus Zone are common occurrence of Proteacidites pachypolus and Myrtaceidites tenuis and consistent presence of Triporopollenites helosus. The top of this zone and top of Flounder Formation is readily recognised by marked change in style of preservation and diversity of samples across the unconformity with the overlying Lakes Entrance Formation. That the top of the Flounder Formation is still within the P. asperopolus Zone is confirmed by occurrence in the highest sample, at 6354 feet, of the species Myrtaceidites tenuis, Conbaculites apiculatus and the common occurrence of the dinoflagellate Deflandrea flouderensis.

Proteacidites tuberculatus Zone 6340 feet

This zone is recognised by the occurrence of three key spores species Cyatheidites annulatus, Foveotriletes crater and F. lucunosus in the sample at 6340 feet.

The sidewall core at 6356 feet also obviously belongs to the P. tuberculatus Zone even though it was not documented in detail. It must either be misshot or mislabelled as it is obviously below the E-log pick for the top of the Flounder Formation.

REFERENCES

- PARTRIDGE, A.D., 1976, Palynology of cuttings from Stonefish-1, Gippsland Basin.
Esso Australia Ltd. Palaeo. Rept. 1976/1.
- PARTRIDGE, A.D., 1977, Palynological analysis Kingfish-7, Gippsland Basin.
Esso Australia Ltd., Palaeo. Rept. 1977/25.

SAMPLE and DEPTH (in feet)	ZONE	AGE	CONFIDENCE RATING	YIELD	DIVERSITY	COMMENTS	
SWC 34	6340	<u>P. tuberculatus</u>	Miocene	0	Moderate	Moderate	Reworked Early Eocene present
SWC 32	6354	<u>P. asperopolus</u>	Early Eocene	0	High	High	Top of Flounder Formation
SWC 31	6356	<u>P. tuberculatus</u>	Miocene	1	Moderate	Moderate	SWC miss-shot or miss-labelled
SWC 72	6475	<u>P. asperopolus</u>	Early Eocene	0	High	High	Top occurrence <u>W. edwardsii</u>
SWC 71	6546	"	"	0	High	Moderate	<u>W. edwardsii</u> present
SWC 70	6625	"	"	0	High	High	
SWC 69	6690	"	"	0	High	Moderate	
SWC 68	6750	"	"	0	High	High	
SWC 67	6805	Barren of palynomorphs		-	-	-	Coarse sandstone lithology
SWC 66	6876	<u>P. asperopolus</u>	Early Eocene	0	High	High	Top occurrence <u>W. thompsonae</u>
SWC 65	6937	"	"	0	High	High	<u>W. thompsonae</u> present
SWC 64	6949	"	"	0	Moderate	Moderate	<u>W. thompsonae</u> present
SWC 63	7029	"	"	0	High	High	<u>W. thompsonae</u> present
SWC 62	7091	"	"	0	High	High	Lowest occurrence <u>W. thompsonae</u>
SWC 102	7142	Upper <u>M. diversus</u>	Early Eocene	2	Moderate	Moderate	
SWC 60	7186	"	"	2	Low	Low	Fine sandstone lithology
SWC 59	7261	Indeterminant	"	-	Very low	Very low	Sandstone lithology
SWC 101	7288	Upper <u>M. diversus</u>	Early Eocene	0	High	High	Occurrence of <u>W. ornata</u>
SWC 56	7402	"	"	1	High	High	
SWC 55	7413	"	"	2	Very low	Very low	Base of Flounder Formation
SWC 54	7426	Upper <u>L. balmei</u>	Paleocene	1	High	Moderate	
SWC 53	7457	<u>L. balmei</u>	"	1	Moderate	Moderate	
SWC 51	7600	Lower <u>L. balmei</u>	"	1	High	Moderate	Presence <u>Palaeoperidinium</u> <u>pyrophorum</u>
SWC 50	7666	Lower <u>L. balmei</u>	"	1	Moderate	Low	
SWC 49	7707	"	"	1	Moderate	Moderate	
SWC 46	7845	"	"	1	Low	Moderate	
SWC 45	7907	"	"	1	Moderate	Low	
SWC 100	7930	"	"	1	Moderate	Moderate	
SWC 99	7945	"	"	1	Moderate	Moderate	
SWC 98	7960	"	"	1	Moderate	Moderate	
SWC 97	7975	"	"	1	Moderate	Moderate	
SWC 96	7990	"	"	1	Moderate	Low	
SWC 94	8020	"	"	1	Moderate	Moderate	
SWC 93	8033	"	"	0	High	Moderate	Top occurrence <u>T. evittii</u>
SWC 92	8050	"	"	0	Moderate	Moderate	<u>T. evittii</u> present
SWC 91	8065	"	"	0	Moderate	Moderate	Lowest occurrence <u>T. evittii</u>
SWC 90	8080	Indeterminant	-	-	Moderate	Low	
SWC 89	8095	<u>T. longus</u>	Maestrichtian	1	Moderate	Low	Top occurrence <u>D. druggii</u>
Core - 2	8164	"	"	1	Moderate	Moderate	
Core - 3	8175	"	"	1	Low	Low	<u>D. druggii</u> present
Core - 3	8199	"	"	1	Moderate	Moderate	
Core - 4	8141	"	"	2	Very Low	Very Low	
Core - 4	8144	"	"	1	Moderate	Low	
Core - 4	8152	"	"	1	Low	Low	
Core - 4	8157	"	"	1	Moderate	Moderate	
SWC 77	8444	"	"	0	Moderate	Moderate	<u>D. druggii</u> present
SWC 75	8546	"	"	1	Low	Moderate	
SWC 74	8584	"	"	2	Low	Low	

N.B. Samples underlined are from Flounder 6A (sidetrack)

TABLE - 1: SUMMARY OF PALYNOLOGICAL ANALYSES,
FLOUNDER - 6 AND FLOUNDER - 6A, GIPPSLAND BASIN

BASIN GIPPSLAND

DATE March 17, 1978.

WELL NAME FLOUNDER-6 AND -6A

ELEVATION K.B. +83 feet

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
OLIG-MIO.	<u>P. tuberculatus</u>	6340	0				6340	0			
	<u>U. N. asperus</u>										
EOCENE	<u>M. N. asperus</u>										
	<u>L. N. asperus</u>										
	<u>P. asperopolus</u>	6354	0				7091	0			
	<u>U. M. diversus</u>	7142	2	7288	0		7413	2	7402	1	
	<u>M. M. diversus</u>										
	<u>L. M. diversus</u>										
PALEOCENE	<u>U. L. balmei</u>	7426	1				7426	1			
	<u>L. L. balmei</u>	7600	1				8065*	0			
	<u>T. longus</u>	8095*	1				8584*	2	8546*	1	
LATE CRETACEOUS	<u>T. lilliei</u>										
	<u>N. senectus</u>										
	<u>C. trip./T. pach.</u>										
	<u>C. distocarin.</u>										
	<u>T. pannosus</u>										
EARLY CRETACEOUS											
PRE-CRETACEOUS											

COMMENTS:

*These depths are for Flounder-6A.

W. edwardsii Zone 6475 to 6546 ft; W. thompsonae Zone 6876 to 7091 ft.

W. ornata Zone 7288 ft.

T. evittii Zone 8033 to 8065 ft; D. druggii Zone 8095 to 8444 ft.

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 spore 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.

DATA RECORDED BY: A.D. Partridge DATE March 17, 1978.

DATA REVISED BY: _____ DATE _____

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S			
DEPTHS	6340	6354	6356	6475	6546	6625	6690	6750	6805	6876	6937	6949	7029	7091	7142	7186	7261	7288	7402	7413	7426	7457	7600	7666	7707	7845	7907	7950									
PALYNOMORPHS																																					
<i>A. qualumis</i>																																					
<i>A. acutullus</i>																																					
<i>A. luteoides</i>																																					
<i>A. oculatus</i>																																					
<i>A. sectus</i>																																					
<i>A. triplaxis</i>																																					
<i>A. obscurus</i>																																					
<i>B. discoformis</i>																																					
<i>B. arcuatus</i>																																					
<i>B. elongatus</i>																																					
<i>B. mutabilis</i>																																					
<i>B. otwayensis</i>																																					
<i>B. elegansiformis</i>																																					
<i>B. trigonalis</i>																																					
<i>B. verrucosus</i>																																					
<i>B. bombaxoides</i>																																					
<i>B. emaciatus</i>																																					
<i>C. bulliatus</i>																																					
<i>C. heskermensis</i>																																					
<i>C. horrendus</i>																																					
<i>C. meleosus</i>																																					
<i>C. apiculatus</i>				A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
<i>C. leptos</i>																																					
<i>C. striatus</i>																																					
<i>C. vanraadshoovenii</i>																																					
<i>C. orthoteichus/major</i>																																					
<i>C. annulatus</i>																																					
<i>C. gigantis</i>																																					
<i>C. splendens</i>	RW?																																				
<i>D. australiensis</i>																																					
<i>D. granulatus</i>																																					
<i>D. tuberculatus</i>																																					
<i>D. delicatus</i>																																					
<i>D. semilunatus</i>																																					
<i>E. notensis</i>																																					
<i>E. crassiexinus</i>																																					
<i>F. balteus</i>																																					
<i>F. crater</i>																																					
<i>F. lucinosus</i>																																					
<i>F. palaequetrus</i>																																					
<i>G. edwardsii</i>																																					
<i>G. ruclata</i>																																					
<i>G. divaricatus</i>																																					
<i>G. gestus</i>																																					
<i>G. catathus</i>																																					
<i>G. cranwellae</i>																																					
<i>G. wahoensis</i>																																					
<i>G. bassensis</i>																																					
<i>G. nebulosus</i>																																					
<i>H. harrisii</i>																																					
<i>H. astrus</i>																																					
<i>H. elliotii</i>																																					
<i>I. anguloclavatus</i>																																					
<i>I. antipodus</i>																																					
<i>I. notabilis</i>																																					
<i>I. gremius</i>																																					
<i>I. irregularis</i>																																					
<i>J. peiratus</i>																																					
<i>K. waterbolkii</i>																																					
<i>L. ampilus</i>																																					
<i>L. crassus</i>																																					
<i>L. ohaensis</i>																																					
<i>L. bairii</i>																																					
<i>L. lanceolatus</i>																																					
<i>L. halmi</i>																																					
<i>L. florinii</i>																																					
<i>M. diversus</i>																																					
<i>M. duratus</i>																																					
<i>M. grandis</i>																																					
<i>M. perimagnus</i>																																					

*C=core; S=side wall core; T=cuttings.

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	C	C	C	C	C	C	C	S	S	S	
DEPTHS	7945	7960	7975	7990	8020	8035	8050	8065	8080	8095	8141	8144	8152	8157	8164	8175	8199	8444	8546	8584	
PALYNOMORPHS																					
<i>A. qualumis</i>																					
<i>A. acutullus</i>																					
<i>A. luteoides</i>																					
<i>A. oculatus</i>																					
<i>A. sectus</i>																					
<i>A. triplaxis</i>																					
<i>A. obscurus</i>																					
<i>B. disciformis</i>																					
<i>B. arcuatus</i>																					
<i>B. elongatus</i>																					
<i>B. mutabilis</i>																					
<i>B. otwayensis</i>																					
<i>B. elegansiformis</i>																					
<i>B. trigonalis</i>																					
<i>B. verrucosus</i>																					
<i>B. bombaxoides</i>																					
<i>B. emaciatus</i>																					
<i>C. bullatus</i>																					
<i>C. heskermensis</i>																					
<i>C. horrendus</i>																					
<i>C. meleosus</i>																					
<i>C. apiculatus</i>																					
<i>C. leptos</i>																					
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<i>C. vanraadshoovenii</i>																					
<i>C. orthoteichus/major</i>																					
<i>C. annulatus</i>																					
<i>C. gigantis</i>																					
<i>C. splendens</i>																					
<i>D. australiensis</i>																					
<i>D. granulatus</i>																					
<i>D. tuberculatus</i>																					
<i>D. delicatus</i>																					
<i>D. semilunatus</i>																					
<i>E. notensis</i>																					
<i>E. crassixinus</i>																					
<i>F. bolteus</i>																					
<i>F. crater</i>																					
<i>F. lucinosus</i>																					
<i>F. palaequetrus</i>																					
<i>G. edwardsii</i>																					
<i>G. rufdata</i>														A	A		A				
<i>G. divaricatus</i>																					
<i>G. gestus</i>																					
<i>G. catathus</i>																					
<i>G. cranwellae</i>																					
<i>G. wahooensis</i>																					
<i>G. bassensis</i>																					
<i>G. nebulosus</i>																					
<i>H. harrisii</i>																					
<i>H. astrus</i>																					
<i>H. elliotii</i>	A																				
<i>I. angulo clavatus</i>																					
<i>I. antipodus</i>																					
<i>I. notabilis</i>																					
<i>I. gremius</i>																					
<i>I. irregularis</i>																					
<i>J. peiratus</i>																					
<i>K. waterbolkii</i>																					
<i>L. amplus</i>																					
<i>L. crassus</i>																					
<i>L. ohaiensis</i>																					A
<i>L. bainii</i>																					
<i>L. lanceolatus</i>																					
<i>L. balnei</i>	A			A	A	A	A	A													
<i>L. florinii</i>																					
<i>M. diversus</i>																					
<i>M. duratus</i>																					
<i>M. grandis</i>																					
<i>M. perimagnus</i>																					

*C=core; S=sidewall core; T=cuttings.

A = Common or Abundant
C = Caved
RW = Reworked species

SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	S	C	C	C	C	C	C	S	S	S
DEPTHS	7945	7960	7975	7990	8020	8035	8050	8065	8080	8095	8141	8144	8152	8157	8164	8175	8199	8444	8546	8584
PALYNOMORPHS																				
<i>M. subtilis</i>																				
<i>M. ornamentalis</i>																				
<i>M. hypolaenoides</i>																				
<i>M. homeopunctatus</i>																				
<i>M. parvus/mesonesus</i>																				
<i>M. tenuis</i>																				
<i>M. verrucosus</i>																				
<i>M. australis</i>																				
<i>N. asperus</i>																				
<i>N. asperoides</i>																				
<i>N. brachyspinulosus</i>																				
<i>N. deminutus</i>																				
<i>N. emarcidus/heterus</i>																				
<i>N. endurus</i>																				
<i>N. falcatus</i>																				
<i>N. flenningii</i>																				
<i>N. goniatus</i>																				
<i>N. senectus</i>																				
<i>N. vansteenisii</i>																				
<i>O. seriosa</i>																				
<i>P. ochesis</i>																				
<i>P. castus</i>																				
<i>P. demarcatus</i>																				
<i>P. magnus</i>																				
<i>P. polyoratus</i>																				
<i>P. vesicus</i>																				
<i>P. densus</i>																				
<i>P. velosus</i>																				
<i>P. morganiifubatus</i>																				
<i>P. mawsonii</i>	A	A	A																	
<i>P. reticulosaccatus</i>																				
<i>P. verrucosus</i>																				
<i>P. crescentis</i>																				
<i>P. esobalteus</i>																				
<i>P. langstonii</i>																				
<i>P. reticulatus</i>																				
<i>P. simplex</i>																				
<i>P. varus</i>																				
<i>P. acanthoides (Prot.)</i>																				
<i>P. alveolatus</i>																				
<i>P. amolosexinus</i>																				
<i>P. angulatus</i>																				
<i>P. annularis</i>																				
<i>P. asperopolus</i>																				
<i>P. biornatus</i>																				
<i>P. clarus</i>																				
<i>P. cleinei</i>																				
<i>P. confragosus</i>																				
<i>P. crassis</i>																				
<i>P. delicatus</i>																				
<i>P. formosus</i>																				
<i>P. grandis</i>																				
<i>P. grevillaensis</i>																				
<i>P. incurvatus</i>																				
<i>P. intricatus</i>																				
<i>P. kopiensis</i>																				
<i>P. lapis</i>																				
<i>P. latrobensis</i>																				
<i>P. leightonii</i>																				
<i>P. obesofabrus</i>																				
<i>P. obscurus</i>																				
<i>P. ornatus</i>																				
<i>P. otwayensis</i>																				
<i>P. pachypolus</i>																				
<i>P. palisadus</i>																				
<i>P. parvus</i>																				
<i>P. plennelius</i>																				
<i>P. prodigus</i>																				
<i>P. pseudonoides</i>																				
<i>P. recavus</i>																				

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 C = Caved
 RW = Reworked species

SAMPLE TYPE *	DEPTH(S)																											
	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S										
PALYNOFORMS	6340	6354	6356	6475	6546	6625	6690	6750	6805	6876	6937	6949	7029	7091	7142	7186	7261	7288	7402	7413	7426	7457	7600	7666	7707	7845	7907	7930
<i>P. rectomarginis</i>																												
<i>P. reflexus</i>																												
<i>P. reticulatus</i>																												
<i>P. reticuloconcavus</i>																												
<i>P. reticulosabratus</i>																												
<i>P. rugulatus</i>																												
<i>P. scitus</i>																												
<i>P. stipplatus</i>																												
<i>P. tenuicrinus</i>																												
<i>P. truncatus</i>																												
<i>P. tuberculatus</i>																												
<i>P. tuberculiformis</i>																												
<i>P. tuberculotumulus</i>																												
<i>P. xestiformis (Prot.)</i>																												
<i>O. brassus</i>																												
<i>R. boxatus</i>																												
<i>R. stellatus</i>																												
<i>R. mallatus</i>																												
<i>R. trophus</i>																												
<i>S. cainozoicus</i>																												
<i>S. rotundus</i>																												
<i>S. digitoides</i>																												
<i>S. marlinensis</i>																												
<i>S. rarus</i>																												
<i>S. meridianus</i>																												
<i>S. prominatus</i>																												
<i>S. uvatus</i>																												
<i>S. punctatus</i>																												
<i>S. regium</i>																												
<i>T. multistrixis (CP4)</i>																												
<i>T. textus</i>																												
<i>T. verrucosus</i>																												
<i>T. securus</i>																												
<i>T. confessus (C3)</i>																												
<i>T. gillii</i>																												
<i>T. incisus</i>																												
<i>T. longus</i>																												
<i>T. phillipsii</i>																												
<i>T. ienmarkensis</i>																												
<i>T. sabulosus</i>																												
<i>T. simatus</i>																												
<i>T. thomasi</i>																												
<i>T. waiparaensis</i>																												
<i>T. adalaidensis (CP3)</i>																												
<i>T. angurium</i>																												
<i>T. delicatus</i>																												
<i>T. geraniodes</i>																												
<i>T. leuros</i>																												
<i>T. lilliei</i>																												
<i>T. marginatus</i>																												
<i>T. moultonii</i>																												
<i>T. paenestriatus</i>																												
<i>T. retequetrus</i>																												
<i>T. scabratus</i>																												
<i>T. sphaerica</i>																												
<i>T. magnificus (P3)</i>																												
<i>T. spinosus</i>																												
<i>T. ambiguus</i>																												
<i>T. chnosus</i>																												
<i>T. helosus</i>																												
<i>T. scabratus</i>																												
<i>T. sectilis</i>																												
<i>V. attinatus</i>																												
<i>V. cristatus</i>																												
<i>V. kopukuensis</i>																												

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SAMPLE TYPE *	DEPTHS																				
	S	S	S	S	S	S	S	S	S	S	C	C	C	C	C	S	S	S			
PALYNOMORPHS	7945	7960	7975	7990	8020	8035	8050	8065	8080	8095	8141	8144	8152	8157	8164	8175	8199	8444	8546	8584	
<i>P. rectomarginis</i>																					
<i>P. reflexus</i>																					
<i>P. reticulatus</i>																					
<i>P. reticuloconcavus</i>																					
<i>P. reticulosabratu</i>																					
<i>P. rugulatus</i>																					
<i>P. scitus</i>																					
<i>P. stipplatus</i>																					
<i>P. tenuixinus</i>																					
<i>P. truncatus</i>																					
<i>P. tuberculatus</i>																					
<i>P. tuberculiformis</i>																					
<i>P. tuberculotumulatus</i>																					
<i>P. xestiformis</i> (Prot.)																					
<i>O. brossus</i>																					
<i>R. boxatus</i>																					
<i>R. stellatus</i>																					
<i>R. mallatus</i>																					
<i>R. trophus</i>																					
<i>S. cainozoicus</i>																					
<i>S. rotundus</i>																					
<i>S. digitatoides</i>																					
<i>S. marlinensis</i>																					
<i>S. rarus</i>																					
<i>S. meridianus</i>																					
<i>S. prominatus</i>																					
<i>S. uvatus</i>																					
<i>S. punctatus</i>																					
<i>S. regium</i>																					
<i>T. multistrius</i> (CP4)																					
<i>T. textus</i>																					
<i>T. verrucosus</i>																					
<i>T. securus</i>																					
<i>T. confessus</i> (C3)																					
<i>T. gillii</i>																					
<i>T. incisus</i>																					
<i>T. longus</i>																					
<i>T. phillipsii</i>																					
<i>T. renmarkensis</i>																					
<i>T. sabulosus</i>																					
<i>T. simatus</i>																					
<i>T. thomasii</i>																					
<i>T. waiparaensis</i>																					
<i>T. adalaidensis</i> (CP3)																					
<i>T. angurium</i>																					
<i>T. delicatus</i>																					
<i>T. geraniodes</i>																					
<i>T. leuros</i>																					
<i>T. lilliei</i>																					
<i>T. marginatus</i>																					
<i>T. moultonii</i>																					
<i>T. paenestriatus</i>																					
<i>T. retequetrus</i>																					
<i>T. scabratus</i>																					
<i>T. sphaerica</i>																					
<i>T. magnificus</i> (P3)																					
<i>T. spinosus</i>																					
<i>T. ambiguus</i>																					
<i>T. chnosus</i>																					
<i>T. helosus</i>																					
<i>T. scabratus</i>																					
<i>T. sectilis</i>																					
<i>V. attinatus</i>																					
<i>V. cristatus</i>																					
<i>V. kopukuensis</i>																					

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SAMPLE TYPE #	DEPTHS																												
	6340	6354	6356	6475	6546	6525	6690	6750	6805	6876	6937	6949	7029	7091	7142	7186	7261	7288	7402	7413	7426	7457	7600	7666	7707	7845	7907	7930	
Dinosph. simplex	/																												
Dinosph. clavatus	/																												
Nemat. balcombiana	/																												
Opirc. centrocarpum	/																												
Reticulodinium spp.	/																												
Dinosph. pontus	/																												
Defl. flouderensis	/	A																		A									
Spinidium spp.	/						A														A								
Kencl. lophophora	/																												
Wetz. edwardsii	/			A																									
Thal. pelagica	/																												
Leptodinium spp.	/																												
Wetz. homomorpha	/																												
Spinif. ramosa	/																												
Defl. macmurdoensis	/																												
Wetz. articulata	/																												
Areoligera sp.	/																												
Homo. tasmanense	/																												
Defl. truncata	/																												
Defl. pachyceros	/																												
Wetz. thompsonae	/																												
H/kolp. varispinosa	/																												
Cordo. inodes	/																												
Prac. indentata	/																												
Lang. machaerophorum	/																												
Hyst. tubiferum	/																												
Defl. longispinata	/																												
Hemicytidium sp.	/																												
Seno. morayensis	/																												
Wetz. ornata	/																												
Acho. crassipellis	/																												
Dyph. colligerum	/																												
Wetz. hyperacantha	/																												
Defl. dilwynensis	/																												
Defl. medcallii	/																												
Palaeo. pyrophorum	/																												

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SAMPLE TYPE *	S	S	S	S	S	S	S	S	S	S	C	C	C	C	C	C	S	S	S	
DEPTHS	7945	7960	7975	7990	8020	8035	8050	8065	8080	8095	8141	8144	8152	8157	8164	8175	8199	8444	8546	8584
PALYNOMORPHS																				
<i>Operc. centrocarpum</i>		/	/	/																
<i>Defl. speciosus</i>		/	/	/		A														
<i>Prae. indentata</i>		/	/	/																
<i>Hyst. tubiferum</i>						A	A	A												
<i>Trifhy. evittii</i>						A	A	A												
<i>Arcol. senonensis</i>																				
<i>Defl. druggii</i>										/						/		/		
<i>Defl. conorata</i>										/						/				

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