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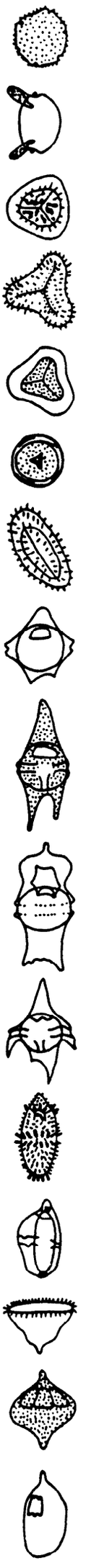
PALYNOLOGY OF BHPP CHAMPION-1

OFFSHORE OTWAY BASIN, VICTORIA, AUSTRALIA

BY

ROGER MORGAN



for **BHP PETROLEUM**

October 1995

REF:OTW.RPCHAMPN

PALYNOLOGY OF CHAMPION-1

OFFSHORE OTWAY BASIN, VICTORIA, AUSTRALIA

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I SUMMARY

1255.0m(swc) - 1277.0m(swc) : *longus* Zone (*druggii* Dino Zone) : Maastrichtian : nearshore marine : immature : usually topmost Sherbrook Group

1313.0m(swc) : lean and zonally indeterminate but clearly Late Cretaceous : marine : immature : usually Sherbrook Group

1428.0m(swc) : *lillei* Zone (no Dino Zone) : Campanian : very nearshore marine : immature : usually Sherbrook Group

1460.0m(swcs) - 1482.0m(swc) : upper *senectus* Zone (1460.0-1480m lower *australis* Dino Zone, 1482.0m upper *aceras* Dino Zone) : early Campanian : nearshore marine : immature : usually Belfast Mudstone

1504.0m(swc) - 1547.0m(swc) : middle *senectus* Zone (upper *aceras* Dino Zone) : early Campanian : very nearshore marine : immature : usually Belfast Mudstone, here partly sandy

1572.0m(swc) - 1673.0m(swc) : lower *senectus* to upper *apoxyexinus* Zones (1572.0-1620.0m middle to lower *aceras* Dino Zone, 1654.0m upper *cretacea* Dino Zone, 1673.0m lower *cretacea* Dino Zone) : early Campanian to late Santonian : nearshore to very nearshore marine : immature : usually Belfast Mudstone, here partly sandy

1686.0m(swc) : *distocarinatus* Zone (*infusorioides* Dino Zone) : Cenomanian : very nearshore marine : marginally mature : usually La Bella Formation

1700m(cutts) - 1812.0m(swc) : *pannosus* Zone : late Albian : non-marine to slightly brackish : marginally mature : usually Eumeralla Formation

1820m(cutts) - 1882m(cutts) : *paradoxa* Zone : late to mid Albian : non-marine : marginally mature : usually Eumeralla Formation.

Depth (m)	Sample Type	Spore-Pollen Zone	Dinoflagellate Zone	Dino %	Environment
1255.0	swc	apparently balmei presumed longus	druggii	17	nearshore
1277.0	swc	longus	druggii	10	nearshore
1313.0	swc	indeterminate	indeterminate	-	marine
1428.0	swc	lillei	indeterminate	5	very nearshore
1460.0	swc	upper senectus	lower australis	1	very nearshore
1480	cutts	upper senectus	lower australis	(20)	nearshore
1482.0	swc	upper senectus	upper aceras	19	nearshore
1504.0	swc	middle senectus	upper aceras	13	nearshore
1518.0	swc	middle senectus	upper aceras	<1	brackish
1525	cutts	middle senectus	upper aceras		
1527.0	swc	middle senectus	upper aceras	6	nearshore
1545	cutts	middle senectus	upper aceras		
1547.0	swc	middle senectus	upper aceras	8	nearshore
1572.0	swc	lower senectus	mid-low aceras	6	nearshore
1592.0	swc	lower senectus	mid-low aceras	12	nearshore
1610	cutts	upper apoxyexinus	mid-low aceras	(20)	nearshore
1612.0	swc	upper apoxyexinus	mid-low aceras	9	nearshore
1620.0	swc	upper apoxyexinus	mid-low aceras	6	nearshore
1654.0	swc	upper apoxyexinus	upper cretacea	21	nearshore
1673.0	swc	upper apoxyexinus	lower cretacea	10	nearshore
1686.0	swc	distocarinatus	infusorioides	2	very nearshore
1700	cutts	pannosus	-	caved	?non-marine
1712.0	swc	pannosus	-	0	non-marine
1751.0	swc	pannosus	-	0	non-marine
1812.0	swc	pannosus	-	2	brackish
1820	cutts	paradoxa	-	0	non-marine
1850	cutts	paradoxa	-	caved	?non-marine
1882	cutts	paradoxa	-	caved	?non-marine

TABLE 1 : INDIVIDUAL SAMPLE SUMMARY : CHAMPION-1

II INTRODUCTION

Eight cuttings samples were studied during drilling on an urgent basis, and reported by fax, at the request of Jim Preston. After well completion, two batches of sidewall cores (fifteen and five) were submitted for detailed study. All these results are summarised herein.

Palynomorph occurrence data are shown as Appendix I and form the basis for the assignment of the samples to eight spore-pollen units and seven dinoflagellate units of Maastrichtian to Albian age.

Specimen counts were made on all assemblages and expressed in the raw data as percentages. In the summary table, percentages from cuttings are bracketed (5%) to show that they may be inaccurate due to caving.

The Cretaceous spore-pollen zonation is essentially that of Dettmann and Playford (1969), but has been significantly modified and improved by various authors since, and most recently discussed in Helby et al (1987), as shown on Figure 1. The Late Cretaceous zonation has been modified by Morgan (1992) in project work for BHPP (Figure 2).

Maturity data was generated in the form of Spore Colour Index, and is plotted on Figure 3 Maturity Profile of Champion-1. The oil and gas windows on Figure 3 follow the general consensus of geochemical literature. The oil window corresponds to spore colours of light-mid brown (Staplin Spore Colour Index of 2.7) to dark brown (3.6). These correspond to vitrinite reflectance values of 0.6% to 1.3%. Geochemists argue variations on kerogen type, basin type and basin history. The maturity interpretation is thus open to reinterpretation using the basic colour observations as raw data. However, the range of interpretation philosophies is not great, and probably would not move the oil window by more than 200 metres.

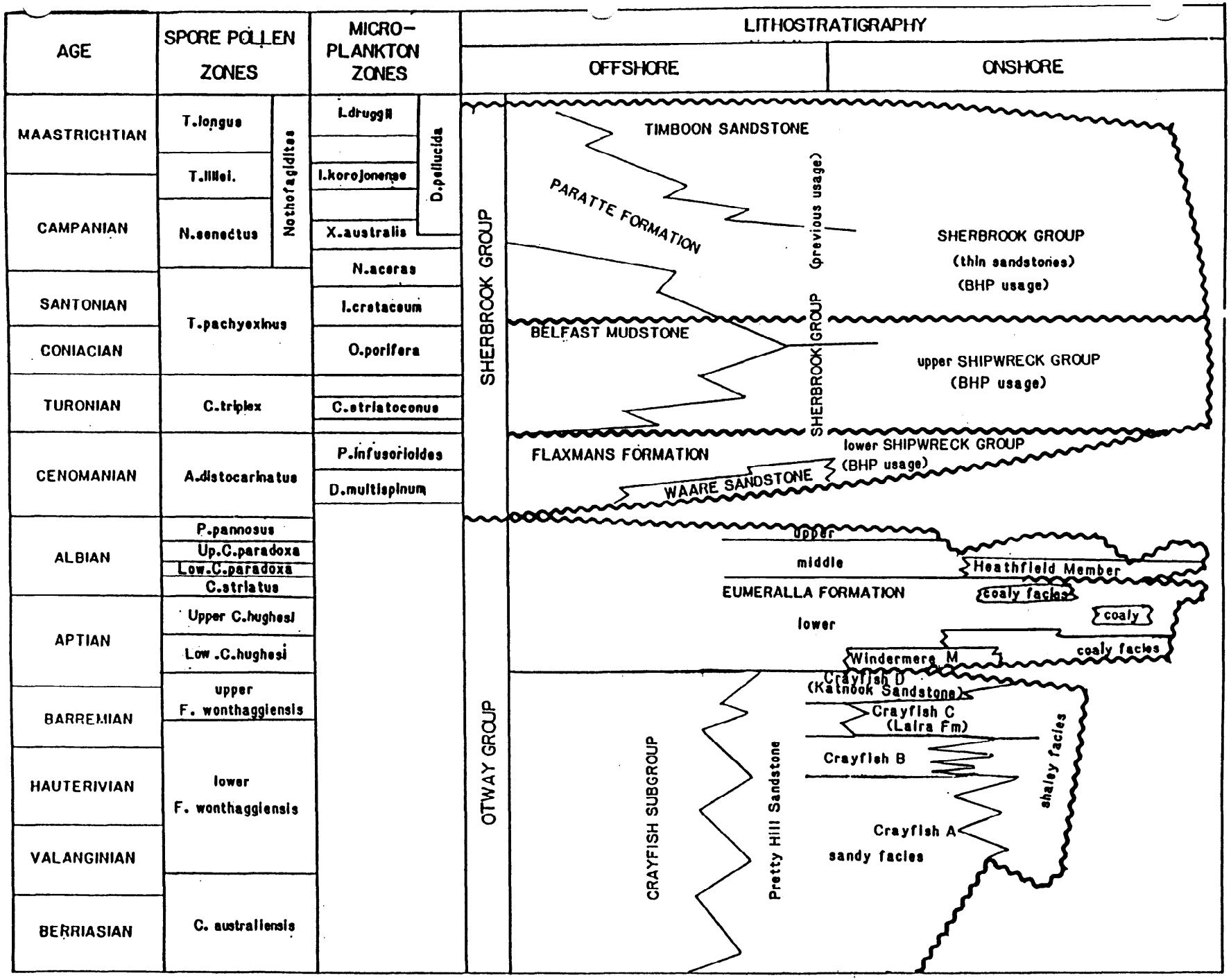

FIGURE 1. CRETACEOUS REGIONAL FRAMEWORK, OTWAY BASIN

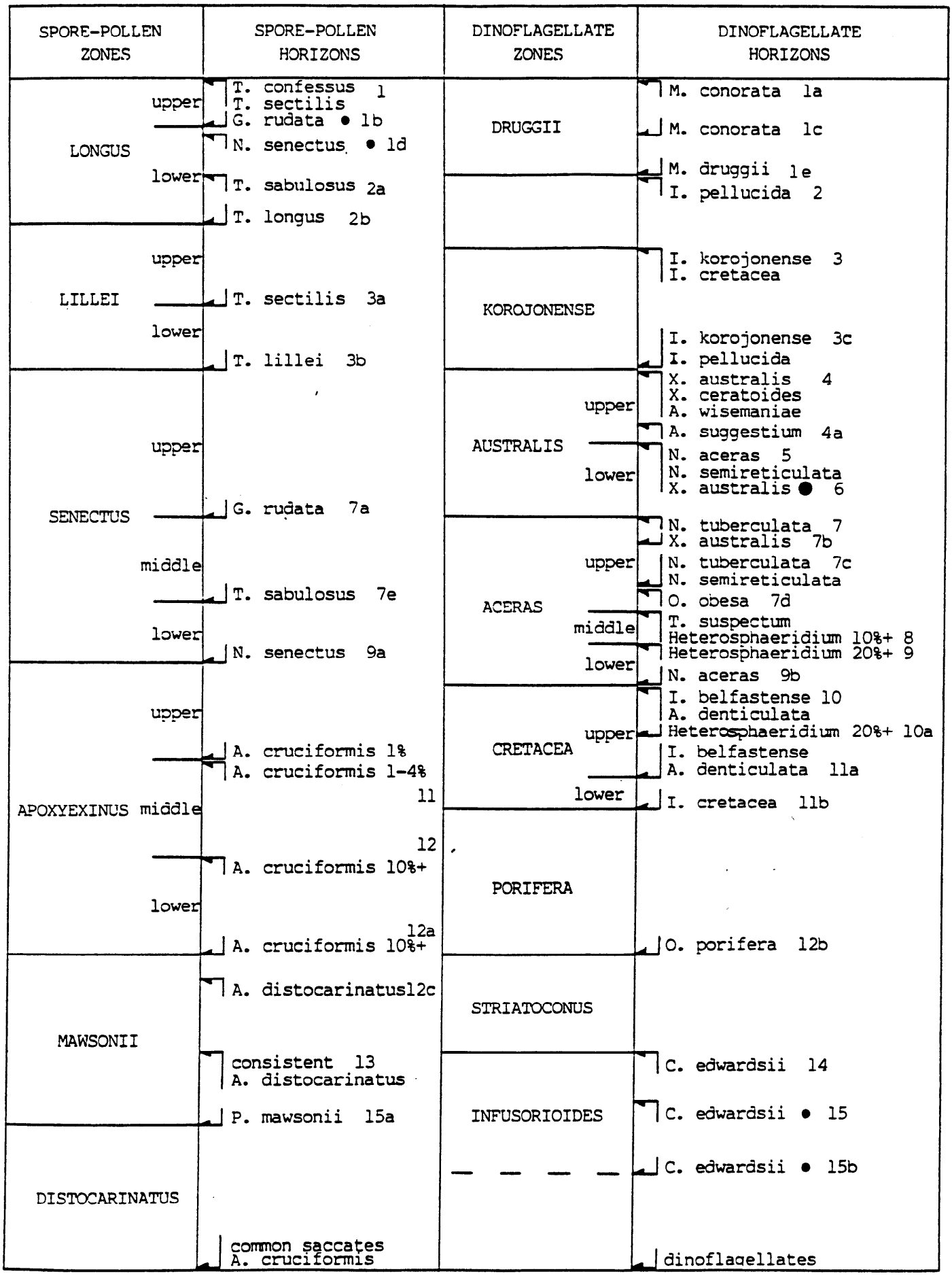

FIGURE 2 ZONATION USED HEREIN SHOWING THE NUMBERED HORIZONS AGAINST THE EXISTING FORMAL ZONATION.

• = frequent (4-10%) ● = common (11-30%)

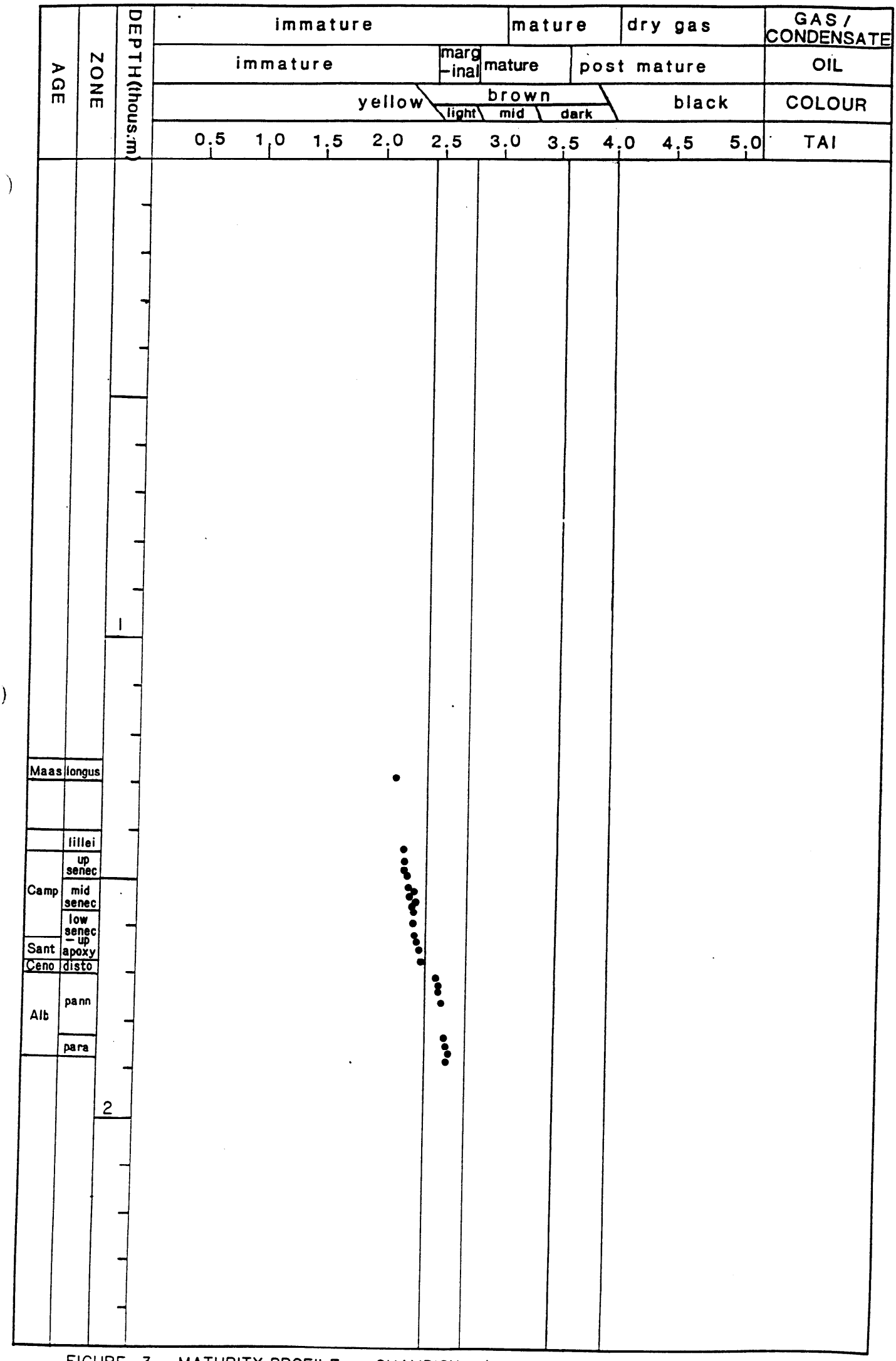

FIGURE 3 MATURITY PROFILE : CHAMPION – 1

III PALYNOSTRATIGRAPHY

A 1255.0m(swc) - 1277.0m(swc) : *longus* Zone (*druggii* Dino Zone)

Assignment to the *Tricolpites longus* Zone of Maastrichtian age is indicated at the top by the dinoflagellates, with the spore pollen assemblage suggesting the *Lygistepollenites balmei* Zone of Paleocene age (*L. balmei*, *G. rudata* without older spore-pollen markers). At 1277.0m(swc), definitive *T. longus* Zone is indicated by *T. longus*, *Tricolpites waipawaensis*, *Tetracolporites verrucosus* and *Triporopollenites sectilis*. In both samples, *Proteacidites* spp are very common with *Gambierina rudata* common, and *Cyathidites minor*, *Falcisporites similis* and *Stereisporites antiquasporites* frequent. Rare Permian reworking was seen.

Amongst the minor dinoflagellates, *Manumiella coronata* indicates the *Manumiella druggii* Dino Zone, with *Canninginopsis bretonica* at 1277.0m.

Nearshore marine environments are indicated by low dinoflagellate content and diversity amongst the dominant and diverse spores and pollen. Freshwater algae (*Botryococcus* and *Paralecaniella indentata*) are frequent.

Yellow spore colours indicate immaturity for hydrocarbons.

These features are normally seen in the topmost Sherbrook Group.

B 1313.0m(swc) : indeterminate

This sample was extremely lean with inertinite dominant. Too few palynomorphs were seen for zonal assignment. *F. similis* and *C. minor* were the most frequent, with *Australopollis obscurus*, *Nothofagidites endurus* and *Tricolpites sabulosus* rare.

Dinoflagellates were extremely rare and not age diagnostic, but their presence indicates marine environments, probably very nearshore.

Yellow spore colours indicate immaturity for hydrocarbons.

The Late Cretaceous age suggests the Sherbrook Group.

C 1428.0m(swc) : *lillei* Zone

Assignment to the *Tricolporites lillei* Zone of Campanian age is indicated at the top by the lack of younger markers and at the base by oldest *Triporopollenites sectilis*. *F. similis* and *Proteacidites* spp are common, with *C. minor*, *M. antarcticus*, *Podosporites microsaccatus* and *Microcachryidites antarcticus* frequent. Minor Permian reworking was seen.

Rare dinoflagellates are not age diagnostic and so no Dino Zone assignment is possible. Very nearshore marine environments are indicated by the rare low diversity dinoflagellates amongst dominant and diverse spores and pollen.

Yellow spore colours indicate immaturity for hydrocarbons.

These features are usually seen in the Sherbrook Group.

D 1460.0m(swc) - 1482.0m(swc) : upper *senectus* Zone (1460.0-1480m lower *australis* Dino Zone, 1482.0m upper *aceras* Dino Zone)

Assignment to the upper *Nothofagidites senectus* Zone of early Campanian age is indicated by the absence of younger markers at the top, and oldest *Gambierina rudata* and frequent *N. endurus* at the interval base. Common are *Falcisporites similis*, *Cyathidites* spp and *Proteacidites* spp, with frequent *N. senectus*. *Tricolpites sabulosus*, *T. gillii* and *Tricolporites apoxyexinus* are rare components. *Tricolpites confessus* occurs to 1480m(cutts). Rare Permian reworking was seen.

Amongst the dinoflagellates, *Nelsoniella semireticulata* at 1460.0m without older markers, indicates the lower *Xenikoon australis* Dino Zone. *X. australis* is common at 1480m and 1482m, with rare *Areosphaeridium suggestium* and *Odontochitina porifera*. At 1482.0m(swc), the presence of *Nelsoniella tuberculata* indicates the upper *Nelsoniella aceras* Dino Zone. *X. australis* is again common with *Maduradinium pentagonum* and *O. porifera* rare.

Nearshore marine environments are indicated by the low dinoflagellate content (17-20%) and diversity, and the dominant and diverse spores and pollen.

Yellow spore colours indicate immaturity for hydrocarbons.

These features are normally seen in the Belfast Mudstone.

E 1504.0m(swc) - 1547.0m(swc) : middle *senectus* Zone (upper *aceras* Dino Zone)

Assignment to the middle *N. senectus* Zone is indicated at the top by the absence of younger markers, and at the base by oldest *T. sabulosus*. Other confirming markers include oldest frequent *Australopollis obscurus* and oldest consistent *N. endurus*. Overall, *F. similis*, *Cyathidites* spp and *Proteacidites* spp are common, with *Microcachryidites* and *Podosporites microsaccatus* frequent to common. Cuticle is common at 1518m and below. Very minor Permian reworking was seen at the base.

Amongst the dinoflagellates, *N. tuberculata* in all samples indicates the upper *N. aceras* Zone. *Heterosphaeridium* spp are the most frequent dinoflagellate, especially *H. solida*. Other age significant taxa include rare *N. aceras* seen throughout, and *X. australis* (frequent at 1504m, rare down to 1527m in swcs and to 1545m in cuttings). *O. porifera* occurs only at 1504m while *Maduradinium pentagonum* is rare throughout.

Very nearshore marine environments are indicated by the low to very low dinoflagellate content (<1-13%) and diversity, the dominant and diverse spores and pollen, and the frequent to common freshwater algae (*Botryococcus*).

Yellow spore colours indicate immaturity for hydrocarbons.

These features are normally seen in the Belfast Formation, but here include significant sands below 1530m.

F 1572.0m(swc) - 1673.0m(swc) : lower *senectus* to upper *apoxyexinus* Zones (1572.0-1620.0m middle to lower *aceras* Dino Zone, 1654.0m upper *cretacea* Dino Zone, 1673.0m lower *cretacea* Dino Zone)

Assignment to this Spore-Pollen Zone interval of Campanian to Santonian age is based on the absence of younger and older markers. Dinoflagellate data suggest that 1572-1620m is probably lower *senectus* Zone, and 1654-1673m upper *apoxyexinus* Zone, but *N. senectus* is always rare and was not seen below 1592.0m(swc). Common are *F. similis*, *Cyathidites* spp and

Proteacidites spp with frequent *Dilwynites granulatus*, *M. antarcticus* and *P. microsaccatus*. *Proteacidites* are common to 1612m, but only frequent below. Large *Proteacidites* does not occur below 1612m. *Camarozonosporites ohaiensis* does not occur below 1620m. *D. granulatus* is more common at 1654.0m and below. Rare elements include *A. obscurus* (consistent throughout), *Ornamentifera sentosa*, *Tricolpites twisted* and *T. apoxyexinus* (intermittently present). *Amosopollis cruciformis* occurs at 1673.0m only. Consistent minor Permian and occasional minor Triassic reworking was seen.

Amongst the dinoflagellates the absence of younger markers at the top, and consistent *N. aceras* to the base, indicate assignment of 1572.0m(swc)-1620.0m(swc) to the middle to lower *N. aceras* Dino Zone. *Heterosphaeridium* spp are frequent to common, with other elements rare. Rare but significant are *Heterosphaeridium* aff *laterobrachius*, *Isabelidinium cretacea*, *Nelsoniella aceras* and *Trithyrodinium* spp. Rare reworking was seen at 1592.0m(swc) (*Isabelidinium belfastense*) and 1572.0m(swc) (*Pseudoceratium turneri*). *Senoniasphaera* sp occurs at 1612.0 and 1620m only.

At 1654.0m(swc), the presence of *Amphidiadema denticulata*, *I. belfastense* and *I. belfastense rotundata* indicate the upper *I. cretacea* Zone. *Heterosphaeridium solida* is common with other elements rare, including *H. hidesi*, *H.* aff *laterobrachius*, *I. cretacea*, *Odontochitina hornless*, *O. porifera* and *Senoniasphaera* sp.

At 1673.0m(swc), the absence of younger markers at the top, and oldest *I. cretacea* and *Isabelidinium rectangulare* at the base, indicate the lower *I. cretacea* Zone. All dinoflagellates are rare and include *I. cretacea elongata*, *Odontochitina cribropoda* and *Trithyrodinium marshalli*.

Nearshore to very nearshore marine environments are indicated by the low to very low dinoflagellate contents (mostly 6-12% with 20% at 1610m possibly caved and 21% at 1654m swc), low to moderate dinoflagellate diversity, abundant and diverse spores and pollen, rare to frequent freshwater algae (*Botryococcus*) and common cuticle, especially at 1673m.

These features are normally seen in the Belfast Mudstone, but here include significant sands above 1620m.

G 1686.0m(swc) : *distocarinatus* Zone (*infusorioides* Dino Zone)

Assignment to the *Appendicisporites distocarinatus* Zone of Cenomanian age is indicated at the top by youngest *A. distocarinatus* without *Phyllocladidites mawsonii*, and at the base by oldest *A. distocarinatus* without older markers. The upper part of the Zone is indicated by the dinoflagellates. Amongst the spore-pollen, *Cyathidites* spp are common, with *D. granulatus*, *Falcisporites grandis*, *F. similis* and *Gleicheniidites* frequent. Rare elements include *Appendicisporites tricornutatus*, *Balmeisporites holodictyus*, *Phyllocladidites eunuchus* and *Trilobosporites trioreticulatus*. Rare Early Cretaceous reworking includes *Foraminisporis asymmetricus* and *Pilosisporites notensis*.

Dinoflagellates are very rare but include *Cribroperidinium edwardsii* indicating the *Palaeohystrichophora infusorioides* Dino Zone. Other rare elements include *Callaoisphaeridium asymmetricum*, *Cyclonephelium compactum* and *Odontochitina operculata*.

Very nearshore marine environments are indicated by the very rare dinoflagellates (2%) of low diversity, the dominant and diverse spores and pollen, and the common freshwater algae (16%, mostly *Botryococcus*).

These features are normally seen in the La Bella Formation.

H 1700m(cutts) - 1812.0m(swc) : *pannosus* Zone

Assignment to the *Phimopollenites pannosus* Zone of late Albian age is indicated by youngest *Coptospora paradoxa* at the top, and oldest *P. pannosus* at the base. Other extinctions at 1700m include *Crybelosporites striatus*, *Foraminisporis asymmetricus*, *Triporoletes bireticulatus* and frequent *Cicatricosporites australiensis*. Other rare elements include *P. pannosus* and *Clavatipollenites hughesi*. Rare Permian and Triassic reworking are present. Late Cretaceous caving is frequent at 1700m (cuttings).

No dinoflagellates are considered in place, but extremely rare spiny acritarchs occur in some samples.

Environments are non-marine to slightly brackish, with the only saline markers being extremely rare spiny acritarchs at 1812.0m only. Spores and pollen are dominant and diverse with cuticle and tracheid being frequent to common.

These features are normally seen in the topmost Eumeralla Formation.

I 1820m(cutts) - 1882m(cutts) : *paradoxa* Zone

Assignment to the *Coptospora paradoxa* Zone of late to mid Albian is indicated by the absence of younger markers at the top, and oldest *C. paradoxa* at the base. Common are *Araucariacites australis*, *Cyathidites* spp, *F. similis* and *Osmundacidites wellmanii*, with frequent *C. australiensis*. Rare elements include *C. striatus*, *Perotriletes majus*, *F. asymmetricus* and *Triporoletes* spp. Rare Permian and Triassic reworking as seen.

Rare dinoflagellates were seen but are considered caved in these cuttings samples.

Non-marine environments are indicated by the dominant and diverse spores and pollen, absence of "in place" saline markers, and abundant plant debris.

These features are normally seen in the upper Eumeralla Formation.

IV CONCLUSIONS

The section appears to be grossly incomplete.

At the base, a normal topmost Eumeralla Formation was encountered, with non-marine to brackish environments in the Albian *paradoxa* and *pannosus* Zones. Log top may be near 1701m.

Above this, a thin La Bella Formation comprising only the more marine upper part is present with very nearshore marine environments in the Cenomanian *distocarinatus* Zone. Log top may be near 1677m.

Above this, a normal age of Belfast Mudstone occurs in nearshore to very nearshore marine environments in the upper *apoxyexinus* to *longus* Zones. Lithologies are not normal however, and include significant sands which may produce a new reservoir play upstructure from the Minerva Formation ones.

V REFERENCES

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E CHAMPION #1 PALYNOLOGICAL DATA

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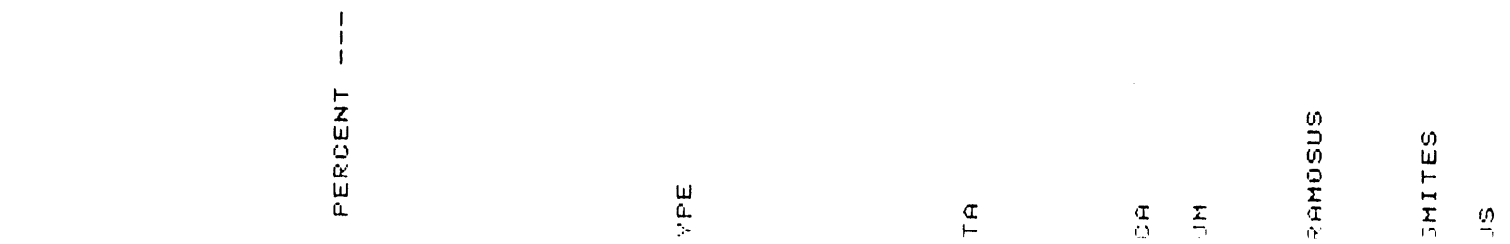
C L I E N T: BHP PETROLEUM
W E L L: CHAMPION #1
F I E L D / A R E A: OFFSHORE OTWAY BASIN, VICTORIA
A N A L Y S T: Roger Morgan D A T E: September 1995
N O T E S: All depths are in metres
All figures are percentages of 100 specimen count
"X" indicates rare occurence outside the count
In lean samples "A" = ABUNDANT "C" = COMMON "F" = FREQUENT
"R" = RARE "X" = VERY RARE

RANGE CHART OF OCCURRENCES BY % & HIGEST APPEARANCE: grouped



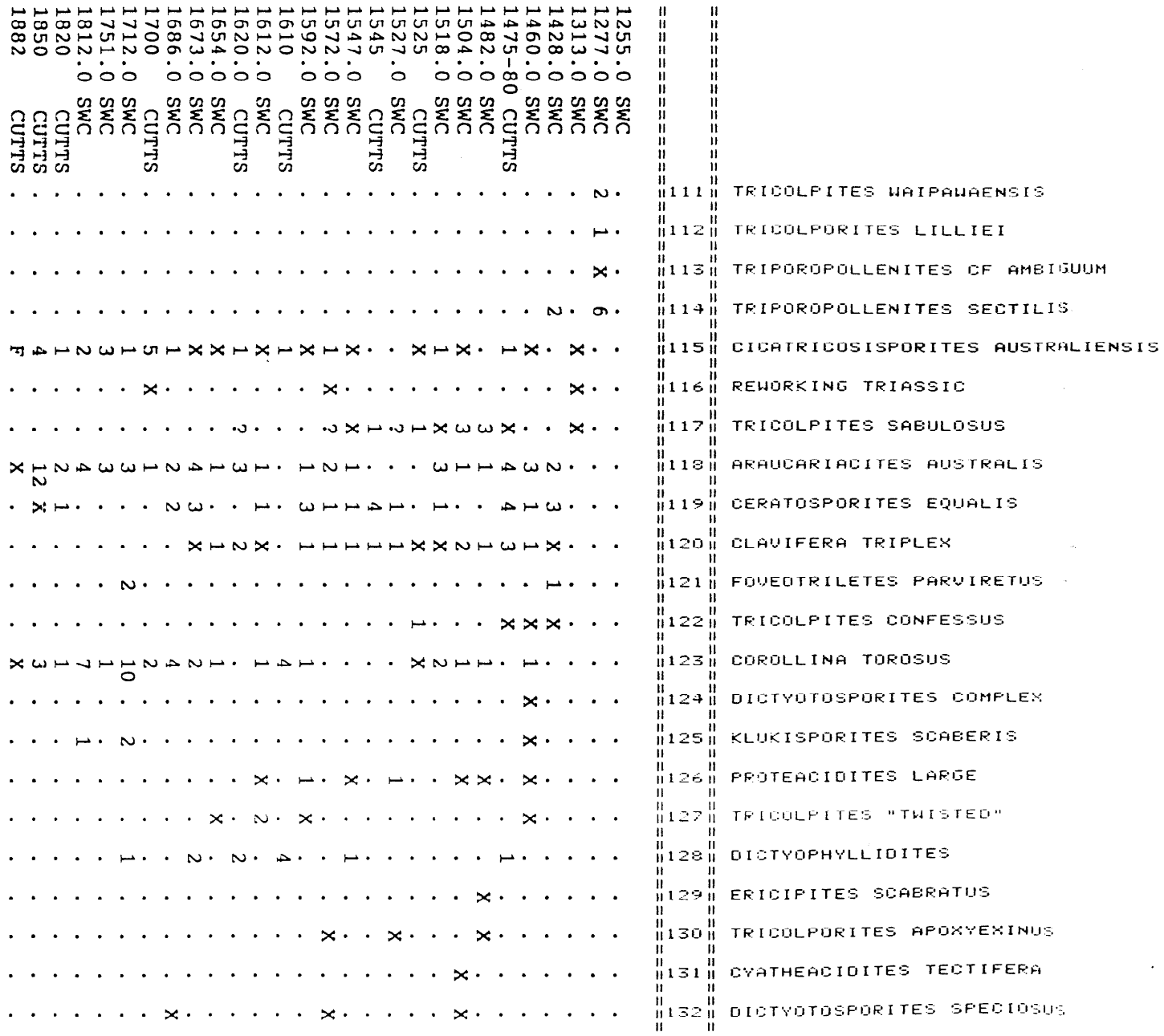
Sample	1 --- MICROPLANKKTON (%) PER	2 BOTRYOCOCCUS SPP	3 SCHIZOSPORIS PSILATA	4 MICRHYSTRIDIUM	5 VERYHACHIUM	6 NUMMUS SP	7 ISABELIDINIUM BAKERI TYPE	8 KIOKANSIUM POLYPES	9 MANUMIELLA CORONATA	10 MANUMIELLA DRUGGII	11 NUMMUS MONOCULATUS	12 PARALECANIELLA INDENTATA	13 THALASSIPHORA PELAGICA	14 AREOLIGERA SENONENSIS	15 CANNINGINOPSIS BRETONICA	16 ISABELIDINIUM PELLUCIDUM	17 PALAEOCYSTIDINIUM SP	18 SPINIFERITES FURCATUS/RAM	19 CRIBROPERIDINIUM SP	20 EXOCHOSPHAERIDIUM PHRAGMI	21 SCHIZOSPORIS RETICULATUS	22 SUBTILISPHAERA
1255.0 SWC	15	6	.	.	.	.	2	1	9	1	1	2	1	.	.	.	.	.	.	.	.	.
1277.0 SWC	10	3	.	.	.	.	.	.	1	.	X	1	.	5	2	X	X	1	.	.	.	.
1313.0 SWC	<1	X	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	F	.	.	.
1428.0 SWC	5	6	.	.	.	.	.	.	.	.	X	3	.	.	.	.	.	1	.	1	X	X
1460.0 SWC	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.
1475-80 CUTTS	20	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
1482.0 SWC	19	5	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1504.0 SWC	13	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.
1518.0 SWC	<1	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1525 CUTTS	5	6	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.	12	.	.	.	.
1527.0 SWC	6	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1545 CUTTS	14	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1547.0 SWC	8	5	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
1572.0 SWC	6	5	1	.	X	.	.	.	.	.	.	.	.	.	.	.	.	X	.	X	.	.
1592.0 SWC	12	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1
1610 CUTTS	20	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.
1612.0 SWC	9	2	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	X	.
1620.0 CUTTS	6	4	.	X	X	X	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.
1654.0 SWC	21	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.
1673.0 SWC	10	3	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	1	.	.	.	1
1686.0 SWC	3	17	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	X	1	.	.	.
1700 CUTTS	<1	.	X	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
1712.0 SWC	<1	2	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1751.0 SWC	<1	1	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1812.0 SWC	2	3	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1820 CUTTS	<1	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1850 CUTTS	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1882 CUTTS	<1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

No.	Species	1255.0 SWC	1277.0 SWC	1313.0 SWC	1428.0 SWC	1460.0 SWC	1475-80 CUTTS	1482.0 SWC	1504.0 SWC	1518.0 SWC	1525 CUTTS	1527.0 SWC	1545 CUTTS	1547.0 SWC	1572.0 SWC	1592.0 SWC	1610 CUTTS	1612.0 SWC	1620.0 CUTTS	1654.0 SWC	1673.0 SWC	1686.0 SWC	1700 CUTTS	1712.0 SWC	1751.0 SWC	1812.0 SWC	1820 CUTTS	1850 CUTTS	1882 CUTTS
23	NELSONIELLA SEMIRETICULATA	.	.	.	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
24	OLIGOSPHAERIDIUM PULCHERRIMUM	.	.	.	.	1	.	X	X	.	.	.	.	.	.	.	.	X	X	.	X	.	.	.	.	.	.	.	.
25	XENIKOON AUSTRALIS	.	.	.	.	X	12	10	6	.	X	X	4	?	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
26	AREOSPHAERIDIUM SUGGESTIUM	.	.	.	.	.	3	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
27	HETEROSPHAERIDIUM HETEROCANTHUM	.	.	.	.	.	X	3	.	.	3	.	1	.	2	2	17	1	2	1	X	.	.	.	.	.	.	1	.
28	ODONTOCHITINA PORIFERA	.	.	.	.	.	1	X	X	.	.	.	.	.	.	.	1	.	.	1	.	.	.	.	.	.	.	X	.
29	OLIGOSPHAERIDIUM COMPLEX	.	.	.	.	.	1	2	1	.	.	.	.	.	X	X	.	.	X	.	.	X	.	.	.	.	.	.	.
30	PALAEOHYSTRICHOPHORA INFUSORIOIDE	.	.	.	.	.	1	2	.	.	.	.	1	.	.	.	.	X	X	X	.	.	.	.	.	.	.	.	.
31	CANNINGIA SP	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
32	EUCLADINIUM MADURENSE	.	.	.	.	.	.	X	.	.	1	.	1	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.
33	FROMEA CHYTRA	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
34	MADURADINIUM PENTAGONUM	.	.	.	.	.	.	X	X	.	.	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
35	NELSONIELLA TUBERCULATA	.	.	.	.	.	.	X	X	.	X	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
36	TRICHODINIUM	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.
37	CANNINGIA GIANT	.	.	.	.	.	.	.	X	.	X	.	.	1	X	X	.	.	X	.	.	.	.	.	.	.	.	.	.
38	HETEROSPHAERIDIUM SOLIDA	.	.	.	.	.	.	.	5	X	.	5	5	6	3	6	.	5	1	14	1	.	.	.	.	.	.	.	.
39	NELSONIELLA ACERAS	.	.	.	.	.	.	.	X	.	.	X	.	X	X	X	.	X	X	.	.	.	.	.	.	.	.	.	.
40	PALAMBAGES	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
41	SPINIDINIUM SP	.	.	.	.	.	.	.	.	X	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
42	CRIBROPERIDINIUM EDWARDSII	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.
43	HETEROSPHAERIDIUM CONJUCTUM	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
44	TRITHYRODINIUM SUSPECTUM	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

No.	Species	1255.0 SWC	1277.0 SWC	1313.0 SWC	1428.0 SWC	1460.0 SWC	1475-80 CUTTS	1482.0 SWC	1504.0 SWC	1518.0 SWC	1525 CUTTS	1527.0 SWC	1545 CUTTS	1547.0 SWC	1572.0 SWC	1592.0 SWC	1610 CUTTS	1612.0 SWC	1620.0 CUTTS	1654.0 SWC	1673.0 SWC	1686.0 SWC	1700 CUTTS	1712.0 SWC	1751.0 SWC	1812.0 SWC	1820 CUTTS	1850 CUTTS	1882 CUTTS
45	CIRCULODINIUM SOLIDA	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	X	.	X	.	.	.	.	.	.	.	.
46	ISABELIDINIUM NUCULA	.	.	.	.	.	.	.	.	.	.	?	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
47	ISABELIDINIUM CRETACEA	.	.	.	.	.	.	.	.	.	.	.	1	X	.	.	.	.	X	1	X	.	.	.	.	.	.	.	.
48	ISABELIDINIUM SP	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
49	ODONTOCHITINA COSTATA	.	.	.	.	.	.	.	.	.	.	.	.	X	.	X	.	X	X	1	2	.	.	.	.	.	.	.	.
50	ISABELIDINIUM BALMEI	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
51	PSEUDOCERATIUM TURNERI	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
52	TRITHYRODINIUM THICK PUNCTATE	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
53	XIPHOPHORIDIUM ALATUM	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	1	.	.	.	.	.	.	.	.	.	.	.	.
54	CHATANGIELLA VICTORIENSIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	?	.	.	.	.	.	.	.	.	.	.	.	.	.
55	EURYDINIUM INGRAMII	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
56	HETEROSPHAERIDIUM AFF LATEROBRACHI	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	X	X	.	.	.	.	.	.	.	.	.
57	ISABELIDINIUM BELFASTENSE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	X	.	.	.	.	.	.	.	.	.
58	ISABELIDINIUM BELFASTENSE ROTUNDAT	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	1	.	.	.	.	.	.	.	.	.
59	ISABELIDINIUM CRETACEA ELONGATA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	X	.	.	.	.	.	.	.	.
60	ODONTOCHITINA TRIANGULARIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
61	TANYOSPHAERIDIUM SALPINX	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
62	TRITHYRODINIUM THICK PSILATE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
63	TRITHYRODINIUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	?	.	.	.	.	.	.	.	.	.	.	.	.
64	CORONIFERA OCEANICA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
65	DICONODINIUM PUSILLUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
66	SENONIASPHAERA SP	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X	.	.	.	.	.	.	.	.	.

No.	Species	1255.0 SWC	1277.0 SWC	1313.0 SWC	1428.0 SWC	1460.0 SWC	1475-80 CUTTS	1482.0 SWC	1504.0 SWC	1518.0 SWC	1525 CUTTS	1527.0 SWC	1545 CUTTS	1547.0 SWC	1572.0 SWC	1592.0 SWC	1610 CUTTS	1612.0 SWC	1620.0 CUTTS	1654.0 SWC	1673.0 SWC	1686.0 SWC	1700 CUTTS	1712.0 SWC	1751.0 SWC	1812.0 SWC	1820 CUTTS	1850 CUTTS	1882 CUTTS
67	TRITHYRODINIUM MARSHALLI	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.	X	.	.	.	.	.	.	.	.
68	TRITHYRODINIUM THICK RETICULATE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	X	.	.	.	.	.	.	.	.	.
69	APTEODINIUM GRANULATUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.
70	ODONTOCHITINA OPERCULATA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.	X	X	.	.	.	.	.	.
71	AMPHIDIADEMA DENTICULATA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.
72	HETEROSPHAERIDIUM HIDESI	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.
73	ODONTOCHITINA HORNLESS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.
74	CIRCULODINIUM DEFLANDREI	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.	.	.	.	.	1	.
75	ISABELIDINIUM RECTANGULARE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.
76	ODONTOCHITINA CRIBROPODA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
77	ODONTOCHITINA OBESOPORIFERA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
78	CALLAOISPHAERIDIUM ASYMMETRICUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.
79	CYCLONEPHELIUM COMPACTUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.
80	SCHIZOSPORIS PARVUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	X	.	.	.	.
81	CAMEROZONOSPORITES OHAIENSIS	1	.	.	1	2	.	1	1	.	1	.	.	1	.	.	.	X	X	.	.	.	.	.	.	.	.	.	.
82	CYATHIDITES AUSTRALIS	2	2	F	4	7	18	3	7	1	7	2	4	3	6	3	25	5	6	2	2	5	5	4	4	7	2	20	X
83	CYATHIDITES MINOR	11	2	C	10	5	.	7	7	7	4	7	1	7	9	3	.	6	13	11	8	9	21	23	31	21	11	.	C
84	FALCISPORITES SIMILIS	5	8	C	18	16	24	17	13	16	13	20	24	16	12	16	17	18	11	12	16	8	10	10	14	15	16	25	C
85	GAMBIERINA RUDATA	11	9	.	?	X	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
86	GLEICHENIIDITES	X	.	X	2	1	1	3	4	3	1	.	2	4	1	4	.	2	2	2	.	5	1	1	.	.	1	.	.
87	HERKOSPORITES ELLIOTTII	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
88	LAEVIGATOSPORITES OVATUS	5	4	.	1	2	.	1	1	1	1	4	.	X	.	X	.	2	2	.	.	2	1	X	.	.	1	.	.

No.	Species	1255.0 SWC	1277.0 SWC	1313.0 SWC	1428.0 SWC	1460.0 SWC	1475-80 CUTTS	1482.0 SWC	1504.0 SWC	1518.0 SWC	1525 CUTTS	1527.0 SWC	1545 CUTTS	1547.0 SWC	1572.0 SWC	1592.0 SWC	1610 CUTTS	1612.0 SWC	1620.0 CUTTS	1654.0 SWC	1673.0 SWC	1686.0 SWC	1700 CUTTS	1712.0 SWC	1751.0 SWC	1812.0 SWC	1820 CUTTS	1850 CUTTS	1882 CUTTS
89	LYGISTIPOLLENITES BALMEI	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
90	NOTHOFAGIDITES ENDURUS	1	2	F	4	8	X	7	2	.	3	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
91	OSMUNDACIDITES WELLMANII	1	2	.	2	.	1	1	2	2	1	1	1	3	.	2	1	3	3	7	1	2	5	4	3	10	12	16	C
92	PERIPOROPOLLENITES POLYORATUS	1	X	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
93	PEROTRILETES MAJUS	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	X	1	.	X
94	PHYLLOCLADIDITES MAWSONII	1	1	F	3	.	1	1	.	1	4	2	5	1	X	1	2	2	5	1	1	.	.	.	.	.	1	.	.
95	PODOSPORITES MICROSACCATUS	2	6	X	7	8	.	3	2	4	2	10	1	4	8	3	.	4	5	7	9	4	1	2	.	1	5	.	X
96	PROTEACIDITES	24	17	F	10	13	11	13	7	18	12	6	7	5	16	12	.	15	8	7	.	.	.	.	.	.	3	X	.
97	REWORKING PERMIAN	1	1	X	1	X	3	X	.	.	.	.	2	X	1	2	.	.	X	.	1	.	.	X	.	1	.	.	X
98	STEREISPORITES ANTIQUASPORITES	7	6	C	1	1	X	1	1	3	1	2	1	X	4	4	1	2	7	1	1	3	2	1	2	3	2	.	.
99	TRICOLPITES	1	.	.	.	.	.	.	.	1	.	2	.	.	2	1	.	.	.	X	1	.	.	.	.	.	.	.	.
100	VITREISPORITES PALLIDUS	1	3	X	5	5	.	.	1	1	5	5	3	5	5	4	.	6	2	5	3	4	.	.	.	.	7	.	.
101	AUSTRALOPOLLIS OBSCURIS	.	1	X	X	1	X	4	5	4	2	4	3	3	X	2	.	X	X	1	1	.	.	.	.	.	.	.	.
102	DILWYNITES GRANULATUS	.	5	F	2	6	.	4	9	11	6	6	6	10	3	9	.	5	5	8	16	9	1	.	.	.	5	.	.
103	FALCISPORITES GRANDIS	.	1	X	1	3	.	.	3	6	3	4	2	6	4	3	.	3	3	2	2	8	3	1	4	7	4	.	X
104	MICROCACHRYIDITES ANTARCTICUS	.	X	X	6	9	2	2	2	1	5	5	6	10	9	5	3	7	9	5	7	3	15	8	7	1	5	3	X
105	NOTHOFAGIDITES SENECTUS	.	X	.	2	1	3	X	.	.	1	.	.	.	.	?	.	.	.	.	.	.	.	.	.	.	1	.	.
106	RETITRILETES AUSTROCLAVATIDITES	.	1	.	1	2	2	1	2	1	.	2	1	2	2	1	5	3	1	.	1	1	7	5	1	8	2	4	X
107	STEREISPORITES REGIUM	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
108	TETRACOLPORITES VERRUCOSUS	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
109	TRICOLPITES GILLII	.	2	.	X	X	.	1	.	.	.	1	.	X	1	1	.	.	X	.	.	.	.	.	.	.	.	.	.
110	TRICOLPITES LONGUS	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.


1255.0 SWC
1277.0 SWC
1313.0 SWC
1428.0 SWC
1460.0 SWC
1475-80 CUTTS
1482.0 SWC
1504.0 SWC
1518.0 SWC
1525 CUTTS
1527.0 SWC
1545 CUTTS
1547.0 SWC
1572.0 SWC
1592.0 SWC
1610 CUTTS
1612.0 SWC
1620.0 CUTTS
1654.0 SWC
1673.0 SWC
1686.0 SWC
1700 CUTTS
1712.0 SWC
1751.0 SWC
1812.0 SWC
1820 CUTTS
1850 CUTTS
1882 CUTTS
111 TRICOLPITES WAIPAWAENSIS
112 TRICOLPORITES LILLIEI
113 TRIPOROPOLLENITES CF AMBIGUUM
114 TRIPOROPOLLENITES SECTILIS
115 CICATRICOSISPORITES AUSTRALIENSIS
116 REWORKING TRIASSIC
117 TRICOLPITES SABULOSUS
118 ARAUCARIACITES AUSTRALIS
119 CERATOSPORITES EQUALIS
120 CLAVIFERA TRIPLEX
121 FOVEOTRILETES PARVIRETUS
122 TRICOLPITES CONFESSUS
123 COROLLINA TOROSUS
124 DICTYOTOSPORITES COMPLEX
125 KLUKISPORITES SCABERIS
126 PROTEACIDITES LARGE
127 TRICOLPITES "TWISTED"
128 DICTYOPHYLLIDITES
129 ERICIPITES SCABRATUS
130 TRICOLPORITES APOXYEXINUS
131 CYATHEACIDITES TECTIFERA
132 DICTYOTOSPORITES SPECIOSUS

1255.0 SWC	1277.0 SWC	1313.0 SWC	1428.0 SWC	1460.0 SWC	1475-80 CUTTS	1482.0 SWC	1504.0 SWC	1518.0 SWC	1525 CUTTS	1527.0 SWC	1545 CUTTS	1547.0 SWC	1572.0 SWC	1592.0 SWC	1610 CUTTS	1612.0 SWC	1620.0 CUTTS	1654.0 SWC	1673.0 SWC	1686.0 SWC	1700 CUTTS	1712.0 SWC	1751.0 SWC	1812.0 SWC	1820 CUTTS	1850 CUTTS	1882 CUTTS			
.	.	.	.	.	.	.	8	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	133	PHYLLOCLADIDITES EUNUCHUS
.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	134	STEREISPORITES PUNCATUS
X	.	.	.	.	.	.	.	X	1	.	.	X	.	.	.	.	.	.	.	1	2	.	.	2	.	.	.	135	AEQUITRIRADITES SPINULOSUS
X	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	136	CALLIALASPORITES DAMPIERI
.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	137	SESTROSPORITES PSEUDOALVEOLATUS
.	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.	.	X	2	.	.	.	.	.	.	138	AMOSOPOLLIS CRUCIFORMIS
.	.	.	.	.	.	.	.	.	.	.	1	1	2	1	1	.	.	.	.	2	X	.	.	.	X	1	.	139	CYCADOPITES FOLLICULARIS
.	.	.	.	.	.	.	.	.	.	.	1	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	140	FORAMINISPORIS WONTHAGGIENSIS
.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	X	.	.	.	X	.	.	1	.	.	.	.	141	PEROTRILETES JUBATUS/MORGANII
X	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	X	.	1	.	.	.	.	142	CICATRICOSISPORITES LUDBROOKIAE
X	X	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	1	X	.	2	.	143	CRYBELOSPORITES STRIATUS
X	X	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	X	X	.	.	144	FORAMINISPORIS DAILYI
.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	X	.	.	.	.	.	.	4	X	.	.	145	PHIMOPOLLENITES PANNOSUS
.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	146	REWORKING CRETACEOUS
.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	1	.	2	.	.	.	.	147	ANNULISPORITES FOLLICULOSA
.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	1	.	.	.	2	1	.	.	148	CALLIALASPORITES TURBATUS
.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	149	CONTIGNISPORITES GLEBULENTUS
.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	150	CYCLOSPORITES HUGHESI
.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	151	LILIACIDITES SP
.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	152	ORNAMENTIFERA MINIMA
.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	X	.	1	.	.	.	.	.	.	.	.	.	X	153	ORNAMENTIFERA SENTOSA
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	RW	.	.	.	.	.	.	.	.	.	.	.	154	AULISPORITES ASTIGMOSUS

No.	Species	1255.0 SWC	1277.0 SWC	1313.0 SWC	1428.0 SWC	1460.0 SWC	1475-80 CUTTS	1482.0 SWC	1504.0 SWC	1518.0 SWC	1525 CUTTS	1527.0 SWC	1545 CUTTS	1547.0 SWC	1572.0 SWC	1592.0 SWC	1610 CUTTS	1612.0 SWC	1620.0 CUTTS	1654.0 SWC	1673.0 SWC	1686.0 SWC	1700 CUTTS	1712.0 SWC	1751.0 SWC	1812.0 SWC	1820 CUTTS	1850 CUTTS	1882 CUTTS
155	LEPTOLEPIDITES VERRUCATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	2	.	2	.
156	RETITRILETES FACETUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	1	.	.	.	.	.	.	.	.	.
157	BALMEIOPSIS LIMBATA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	X	.	.	.	.	.	.	.
158	PERINOPOLLENITES ELATOIDES	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.
159	APPENDICISPORITES DISTOCARINATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.
160	APPENDICISPORITES TRICORNITATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.
161	BALMEISPORITES HOLODICTYUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	1	.	.	.	.	.
162	CINGUTRILETES CLAVUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.
163	FORAMINISPORIS ASYMMETRICUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	1	.	X	.	.	.	X
164	LYCOPODIACIDITES ASPERATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
165	PILOSISPORITES NOTENSIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.
166	TRILOBOSPORITES TRIORETICULOSUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.
167	AEQUITRIRADITES TILCHAENESIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.
168	COPTOSPORA PARADOXA	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X	1	1	X	X
169	TRIPOROLETES BIRECTICULATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	1	.	.	.	.
170	TRIPOROLETES RADIATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	X	1	.	.	X	X
171	TRIPOROLETES RETICULATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	5	.	1	4	X
172	CLAVATIPOLLENITES HUGHESI	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.
173	ISCHYOSPORITES PUNCTATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.
174	TRIPOROLETES SIMPLEX	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.
175	AEQUITRIRADITES VERRUCOSUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.
176	CONTIGNISPORITES COOKSONIAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.

		LEPTOLEPIDITES MAJOR	RETITRILETES NODOSUS	CICATRICOSISPORITES CUNEIFORMIS	CICATRICOSISPORITES HUGHESI	NEORAISTRICKIA	DENSOISPORITES VELATUS	
		177	178	179	180	181	182	
1255.0	SWC	.	.	.	.	.	.	1255.0 SWC
1277.0	SWC	.	.	.	.	.	.	1277.0 SWC
1313.0	SWC	.	.	.	.	.	.	1313.0 SWC
1428.0	SWC	.	.	.	.	.	.	1428.0 SWC
1460.0	SWC	.	.	.	.	.	.	1460.0 SWC
1475-80	CUTTS	.	.	.	.	.	.	1475-80 CUTTS
1482.0	SWC	.	.	.	.	.	.	1482.0 SWC
1504.0	SWC	.	.	.	.	.	.	1504.0 SWC
1518.0	SWC	.	.	.	.	.	.	1518.0 SWC
1525	CUTTS	.	.	.	.	.	.	1525 CUTTS
1527.0	SWC	.	.	.	.	.	.	1527.0 SWC
1545	CUTTS	.	.	.	.	.	.	1545 CUTTS
1547.0	SWC	.	.	.	.	.	.	1547.0 SWC
1572.0	SWC	.	.	.	.	.	.	1572.0 SWC
1592.0	SWC	.	.	.	.	.	.	1592.0 SWC
1610	CUTTS	.	.	.	.	.	.	1610 CUTTS
1612.0	SWC	.	.	.	.	.	.	1612.0 SWC
1620.0	CUTTS	.	.	.	.	.	.	1620.0 CUTTS
1654.0	SWC	.	.	.	.	.	.	1654.0 SWC
1673.0	SWC	.	.	.	.	.	.	1673.0 SWC
1686.0	SWC	.	.	.	.	.	.	1686.0 SWC
1700	CUTTS	.	.	.	.	.	.	1700 CUTTS
1712.0	SWC	.	.	.	.	.	.	1712.0 SWC
1751.0	SWC	.	.	.	.	.	.	1751.0 SWC
1812.0	SWC	1	1	.	.	.	.	1812.0 SWC
1820	CUTTS	.	.	1	X	1	.	1820 CUTTS
1850	CUTTS	1	.	.	1	1	X	1850 CUTTS
1882	CUTTS	.	.	.	.	.	.	1882 CUTTS

SPECIES LOCATION INDEX

Index numbers are the columns in which species appear.

INDEX NUMBER	SPECIES
1	--- MICROPLANKKTON (%) PERCENT ---
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167	AEQUITRIRADITES TILCHAENESIS
175	AEQUITRIRADITES VERRUCOSUS
138	AMOSOPOLLIS CRUCIFORMIS
71	AMPHIDIADEMA DENTICULATA
147	ANNULISPORITES FOLLICULOSA
159	APPENDICISPORITES DISTOCARINATUS
160	APPENDICISPORITES TRICORNITATUS
69	APTEODINIUM GRANULATUM
118	ARAUCARIACITES AUSTRALIS
14	AREOLIGERA SENONENSIS
26	AREOSPHAERIDIUM SUGGESTIUM
154	AULISPORITES ASTIGMOSUS
101	AUSTRALOPOLLIS OBSCURIS
157	BALMEIOPSIS LIMBATA
161	BALMEISPORITES HOLODICTYUS
2	BOTRYOCOCCUS SPP
78	CALLAOISPHAERIDIUM ASYMMETRICUM
136	CALLIALASPORITES DAMPIERI
148	CALLIALASPORITES TURBATUS
81	CAMEROZONOSPORITES OHAIENSIS
37	CANNINGIA GIANT
31	CANNINGIA SP
15	CANNINGINOPSIS BRETONICA
119	CERATOSPORITES EQUALIS
54	CHATANGIELLA VICTORIENSIS
115	CICATRICOSISPORITES AUSTRALIENSIS
179	CICATRICOSISPORITES CUNEIFORMIS
180	CICATRICOSISPORITES HUGHESI
142	CICATRICOSISPORITES LUDBROOKIAE
162	CINGUTRILETES CLAVUS
74	CIRCULODINIUM DEFLANDREI
45	CIRCULODINIUM SOLIDA
172	CLAVATIPOLLENITES HUGHESI
120	CLAVIFERA TRIPLEX
176	CONTIGNISPORITES COOKSONIAE
149	CONTIGNISPORITES GLEBULENTUS
168	COPTOSPORA PARADOXA
123	COROLLINA TOROSUS
64	CORONIFERA OCEANICA
42	CRIBROPERIDINIUM EDWARDSII
19	CRIBROPERIDINIUM SP
143	CRYBELOSPORITES STRIATUS
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82	CYATHIDITES AUSTRALIS
83	CYATHIDITES MINOR
139	CYCADOPITES FOLLICULARIS
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150	CYCLOSPORITES HUGHESI
182	DENSOISPORITES VELATUS
65	DICONODINIUM PUSILLUM
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180 CICATRICOSISPORITES HUGHESI
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162 CINGUTRILETES CLAVUS
74 CIRCULODINIUM DEFLANDREI
45 CIRCULODINIUM SOLIDA
172 CLAVATIPOLLENITES HUGHESI
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176 CONTIGNISPORITES COOKSONIAE
149 CONTIGNISPORITES GLEBULENTUS
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64 CORONIFERA OCEANICA
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83 CYATHIDITES MINOR
139 CYCADOPITES FOLLICULARIS
79 CYCLONEPHELIUM COMPACTUM
150 CYCLOSPORITES HUGHESI
182 DENSOISPORITES VELATUS
65 DICONODINIUM PUSILLUM
128 DICTYOPHYLLIDITES
124 DICTYOTOSPORITES COMPLEX
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129 ERICIPITES SCABRATUS
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55 EURYDINIUM INGRAMII
20 EXOCHOSPHAERIDIUM PHRAGMITES
103 FALCISPORITES GRANDIS
84 FALCISPORITES SIMILIS
163 FORAMINISPORIS ASYMMETRICUS
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140 FORAMINISPORIS WONTHAGGIENSIS
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87 HERKOSPORITES ELLIOTTII
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43 HETEROSPHAERIDIUM CONJUCTUM
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57 ISABELIDINIUM BELFASTENSE
58 ISABELIDINIUM BELFASTENSE ROTUNDATA
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46 ISABELIDINIUM NUCULA
16 ISABELIDINIUM PELLUCIDUM
75 ISABELIDINIUM RECTANGULARE
48 ISABELIDINIUM SP
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125 KLUKISPORITES SCABERIS
88 LAEVIGATOSPORITES OVATUS
177 LEPTOLEPIDITES MAJOR
155 LEPTOLEPIDITES VERRUCATUS
151 LILIACIDITES SP
164 LYCOPODIACIDITES ASPERATUS
89 LYGISTIPOLLENITES BALMEI
34 MADURADINIUM PENTAGONUM
9 MANUMIELLA CORONATA
10 MANUMIELLA DRUGGII
4 MICRHYSTRIDIUM
104 MICROCACHRYIDITES ANTARCTICUS
39 NELSONIELLA ACERAS
23 NELSONIELLA SEMIRETICULATA
35 NELSONIELLA TUBERCULATA
181 NEORAISTRICKIA
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105 NOTHOFAGIDITES SENECTUS
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6 NUMMUS SP
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43	HETEROSPHAERIDIUM CONJUCTUM
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125	KLUKISPORITES SCABERIS
88	LAEVIGATOSPORITES OVATUS
177	LEPTOLEPIDITES MAJOR
155	LEPTOLEPIDITES VERRUCATUS
151	LILIACIDITES SP
164	LYCOPODIACIDITES ASPERATUS
89	LYGISTIPOLLENITES BALMEI
34	MADURADINIUM PENTAGONUM
9	MANUMIELLA CORONATA
10	MANUMIELLA DRUGGII
4	MICRHYSTRIDIUM
104	MICROCACHRYIDITES ANTARCTICUS
39	NELSONIELLA ACERAS
23	NELSONIELLA SEMIRETICULATA
35	NELSONIELLA TUBERCULATA
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90	NOTHOFAGIDITES ENDURUS
105	NOTHOFAGIDITES SENECTUS
11	NUMMUS MONOCULATUS
6	NUMMUS SP
49	ODONTOCHITINA COSTATA
76	ODONTOCHITINA CRIBROPODA
73	ODONTOCHITINA HORNLESS
77	ODONTOCHITINA OBESOPORIFERA
70	ODONTOCHITINA OPERCULATA
28	ODONTOCHITINA PORIFERA
60	ODONTOCHITINA TRIANGULARIS
29	OLIGOSPHAERIDIUM COMPLEX
24	OLIGOSPHAERIDIUM PULCHERRIMUM
152	ORNAMENTIFERA MINIMA
153	ORNAMENTIFERA SENTOSA
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17	PALAEOCYSTIDINIUM SP
30	PALAEOHYSTRICHOPHORA INFUSORIOIDES
40	PALAMBAGES
12	PARALECANIELLA INDENTATA
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141	PEROTRILETES JUBATUS/MORGANII
93	PEROTRILETES MAJUS
145	PHIMOPOLLENITES PANNOSUS
133	PHYLLOCLADIDITES EUNUCHUS
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165	PILOSISPORITES NOTENSIS
95	PODOSPORITES MICROSACCATUS
96	PROTEACIDITES
126	PROTEACIDITES LARGE
51	PSEUDOCERATIUM TURNERI
106	RETITRILETES AUSTROCLAVATIDITES
156	RETITRILETES FACETUS
178	RETITRILETES NODOSUS
146	REWORKING CRETACEOUS
97	REWORKING PERMIAN
116	REWORKING TRIASSIC
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21	SCHIZOSPORIS RETICULATUS
66	SENONIASPHAERA SP
137	SESTROSPORITES PSEUDOALVEOLATUS
41	SPINIDINIUM SP

24	OLIGOSPHAERIDIUM PULCHERRIMUM
152	ORNAMENTIFERA MINIMA
153	ORNAMENTIFERA SENTOSA
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3	SCHIZOSPORIS PSILATA
21	SCHIZOSPORIS RETICULATUS
66	SENONIASPHAERA SP
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134	STEREISPORITES PUNCATUS
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22	SUBTILISPHAERA
61	TANYOSPHAERIDIUM SALPINX
108	TETRACOLPORITES VERRUCOSUS
13	THALASSIPHORA PELAGICA
36	TRICHODINIUM
99	TRICOLPITES
127	TRICOLPITES "TWISTED"
122	TRICOLPITES CONFESSUS
109	TRICOLPITES GILLII
110	TRICOLPITES LONGUS
117	TRICOLPITES SABULOSUS
111	TRICOLPITES WAIPAWAENSIS
130	TRICOLPORITES APOXYEXINUS
112	TRICOLPORITES LILLIEI
166	TRILOBOSPORITES TRIORETICULOSUS
169	TRIPOROLETES BIRECTICULATUS
170	TRIPOROLETES RADIATUS
171	TRIPOROLETES RETICULATUS
174	TRIPOROLETES SIMPLEX
113	TRIPOROPOLLENITES CF AMBIGUUM
114	TRIPOROPOLLENITES SECTILIS
63	TRITHYRODINIUM
67	TRITHYRODINIUM MARSHALLI
44	TRITHYRODINIUM SUSPECTUM
62	TRITHYRODINIUM THICK PSILATE
52	TRITHYRODINIUM THICK PUNCTATE
68	TRITHYRODINIUM THICK RETICULATE
5	VERYHACHIUM
100	VITREISPORITES PALLIDUS
25	XENIKOON AUSTRALIS
53	XIPHOPHORIDIUM ALATUM