PALYNOLOGICAL ANALYSIS OF BLENNY-1 GIPPSLAND BASIN

by

A.D. PARTRIDGE
BIOSTRATA PTY LTD
A.C.N. 053 800 945

BIOSTRATA REPORT 1992/3 SEPTEMBER 1992

INTERPRETED DATA

INTRODUCTION

SUMMARY OF RESULTS

GEOLOGICAL COMMENTS

BIOSTRATIGRAPHY

REFERENCES

TABLE-1: INTERPRETED DATA

CONFIDENCE RATINGS

INTRODUCTION

Twenty-six sidewall cores in Blenny-1 were examined, cleaned and split by author and then forwarded to Laola Pty Ltd in Perth for processing to extract organic microfossils (palynomorphs). All samples were examined by author for their contained spores, pollen and microplankton to derive the data and interpretations in this report.

Between 8 to 19 grams (average 12.2g) of each sidewall core was processed for palynological analysis. Residue yields were high in the Latrobe Group coarse clastic section, moderate in the overlying Gurnard Formation and low in basal Lakes Entrance Formation. Palynomorph concentration overall was high and preservation generally fair to good. As a consequence overall spore-pollen diversity was high averaging 28+ species per sample. Microplankton were generally of low abundance and limited diversity (1-7 species) in the Latrobe coarse clastic section but noticeably increase in abundance up-section through the Gurnard Formation from 2% to a maximum of 59%, and through the basal Lakes Entrance Formation from 42% to 85%. Microplankton diversity in these latter two units averaged 8+ species. Some samples were poorly preserved due to over-oxidation (see Table-3) and for all samples some degrading of preservation was caused by the use of polyvinyl alcohol (PVA) and EUKITT mounting medium.

Lithological units and palynological zones from the base of the Lakes Entrance Formation to Total Depth are given in the following summary. The interpretative data with zone identification and Old and New Confidence Ratings are recorded in Table-1 and basic data on residue yields, preservation and diversity are recorded on Tables-2 and 3. Twenty-two of the samples were counted, and percentage data for these counts are recorded in Tables 4 and 5. All species which have been identified with binomial names are tabulated on the accompanying range charts for spore-pollen and microplankton. Relinquishment lists for palynological slides and residues from samples analysed in Blenny-1 are provided at the end of the report.

PALYNOLOGICAL SUMMARY OF BLENNY-1

AGE	UNIT/FACIES		SPORE-POLLEN ZONES (DINOFLAGELLATE ZONES)	DEPTHS (mKB)
OLIGOCENE	Lakes Entrance Formation		*P. tuberculatus* Upper *N. asperus* *(P. comatum)*	1205.0-1214.5 1218.7-1227.6 (1227.6)
LATE EOCENE	LATROBE GROUP	Gurnard Formation	Upper *N. asperus* *(P. comatum)* Middle *N. asperus* *(C. incompositum)*	1230.5-1234.0 (1230.5-1234.0) 1236.7-1256.0 (1239.5-1249.5)
MIDDLE EOCENE	LATROBE GROUP	Undifferentiated coastal plain sands, shales & coals	Middle *N. asperus* Lower *N. asperus* *(D. heterophlycta)*	1259.5-1262.0 1276.7-1339.0 (1298.5)

GEOLOGICAL COMMENTS

1. In Blenny-1 the palynological analysis was conducted over the basal 25 metres of the Lakes Entrance Formation (4 samples), through the 26.5 metres thick Gurnard Formation (9 samples) and from only the upper 82.5 metres (15 samples) of the 166.5 metres of undifferentiated, coarse clastic facies of the Latrobe Group penetrated in the well. In the total of 134 metres of section analysed four spore-pollen and four dinoflagellate zones were identified. The time interval sampled is from late Middle Eocene to probably no younger than Early Oligocene (approx. 30-42 Ma on the Haq *et al.*, 1987 time scale). No major time breaks are considered to be present over the section analysed to account for the low average depositional rate of <12 metres/million years (m/my). Instead both the Gurnard and the basal part of the Lakes Entrance Formation are considered to be condensed sections with depositional rates of <9 m/my and <5 m/my respectively. In contrast the depositional rate in the Latrobe coarse clastic facies is considered likely to be >40 m/my.

2. The record of the *D. heterophlycta* dinoflagellate Zone at 1298.5m combined with the above depositional rate makes it likely that at T.D. Blenny-1 is till in the upper part of the Lower *N. asperus* Zone.

3. The Lakes Entrance Formation is typically a marl or calcareous claystone (as described from the sidewall cores) and its base is placed above the shallowest sidewall core which contains significant glauconite. In Blenny-1 its boundary with the underlying Gurnard Formation is best placed at 1230m at the top of a sharp spike shaped increase on the Bulk Density log, as this is the most obvious change immediately above the first sidewall core to contain glauconite at 1230.5m. This pick for the top of the Gurnard Formation displays only a minor change on the gamma ray log. The fact that both the Upper *N. asperus* and *P. comatum* Zones straddle this boundary suggests that an environmental change rather than a significant age break is the reason for the disappearance of visible glauconite in the sidewall cores.

4. The Gurnard Formation is recognised over a 26.5 metre interval from 1230m to 1256.5m. Its base is placed at the gamma log break below the deepest sidewall core with any trace of glauconite. An "upper" and "lower" subdivision can be recognised over this 26.5 metre interval. Over the "upper" unit between 1230-1247m the hole is significantly out of gauge and this has affected the readings on the Bulk Density log. Over the "lower" unit between 1247-1256.5m the hole is in gauge and the Bulk Density log shows consistently higher readings relative to the overlying Lakes Entrance or underlying Latrobe Group undifferentiated coarse clastics. The "lower" unit is further subdivided by presence of a basal medium grained sandstone between 1251.5-1256.5m which is retained as part of the Gurnard Formation because of the presence of glauconite and relatively high bulk density. Although there is no age difference across the boundary between these units there may be a facies change as there is an increase in the abundance and overall diversity of dinoflagellates in the "upper" unit (see Tables 3 & 4). Similarly there is no apparent age difference between the Gurnard Formation and immediately underlying coarse clastics assigned to Middle *N. asperus* Zone.

5. Twenty-two of the 26 samples analysed in Blenny-1 were extensively counted. An average of 237 palynomorphs were counted per sample and results of these counts are presented on Tables 4 & 5. The spore-pollen and dinoflagellate zonations in the Gippsland Basin are principally based on species ranges and their first and last appearances with generally only a subordinate role given to the abundance of species when choosing zone boundaries. The well preserved assemblages from Blenny-1 where counted to attempt to find additional criteria to identify and perhaps further subdivide the zones.

Unfortunately the most obvious changes in the counts are more related to the increasing marine influence going up section and are likely to be of more environmental rather than age significance.

Abundance and diversity of angiosperm pollen type appearing in the counts are highest in the Latrobe coarse clastic facies and decrease slightly in the overlying marine Gurnard and Lakes Entrance Formations. Both gymnosperm pollen as spores increase in these unit. Most noticeable is increase in pollen of the *Araucariacites/ Dilwynites* complex (whose affinities lie within the extant *Araucaria* and *Agathis*) and the *Podocarpidites* spp. pollen. The dominance of these types is interpreted to be a manifestation of the "Neves effect", which is the tendency, for bisaccate pollen, certain buoyant spores, and other pollen with "comparatively great transportability" to have greater relative abundance the further offshore you go in any depositional basin (Traverse, 1988; p.413).

In the Latrobe coarse clastic facies a different effect is observed. In a costal plain setting environments are shifting more rapidly, exemplified by the near juxtaposition of coals and shaly beds containing abundant dinoflagellates. The latter are interpreted to signify local or regional marine incursions. The samples from the coarse clastic facies show characteristic "one off" abundances of species, as would be expected of the variable vegetational mosaic growing on the shifting micro-environments of a coastal plain. Some of the most conspicuous abundance peaks are *Phyllocladidites mawsonii* (22% at 1274.8m and 21% at 1289m), *Haloragacidites harrisii* (19% at 1298.5m and 1315m) and *Malvacipollis* spp. (4% at 1276.7m). Fungal spores and hyphae also show abundance peaks of 14% at 1249.5m and 12% at 1274.8m (as a percentage of total count, see Table-4).

The counts on dinoflagellate species show an increasing abundance going up section as the regional marine transgression floods the Blenny-1 location. Individual species abundances are highly variable but at this time no age significant patterns are recognised.

6. The *D. heterophlycta* Zone was identified at 1298.5m from a mottled (probably burrowed) sandstone recovered in a sidewall core shot near the bottom of a thin shaly bed identified on the gamma log between 1297.3-1299m. This shaly bed is probably the best candidate within the Latrobe coarse clastics in Blenny-1 for a condensed section. It would correlate with condensed sections centred at either 40 Ma or 41.2 Ma on the Haq *et al.* (1987, 1988) cycle charts. The zone is recognised by its diversity of dinoflagellates and not by dinoflagellate abundance. The dinoflagellates in the count on the sample represent <1% of the total palynomorph assemblage. This can be

contrasted with other assemblages within the Latrobe coarse clastics which may have significantly higher abundance but have very low or monospecific diversity (see counts on samples at 1262m, 1267m and 1276.7m). An implication of these observations is that it may be difficult to trace these condensed sections in other wells based on cuttings samples because of the likely rarity of the key species.

BIOSTRATIGRAPHY

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

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

Lower *Nothofagidites asperus* Zone: 1276.7-1339.0 metres **Middle Eocene.**

The eight deepest samples analysed in Blenny-1 are confidently assigned to the Lower *N. asperus* Zone on the dominance of *Nothofagidites* spp. in all samples (31%-59%) and the occurrence of several important index species for this assemblage zone. The most important and frequent of these are *Nothofagidites falcatus*, *Proteacidites recavus* and *Tricolpites simatus* which occur in most samples.

The assemblages are difficult to distinguish from those recovered from the overlying Middle *N. asperus* Zone because species that are restricted or range no younger than this zone are very rare. The only notable exceptions are *Anacolosidites luteoides* at 1289m, *Proteacidites kopiensis* at 1315m and *P. tuberculiformis* at 1339m. Instead the top of the Lower *N. asperus* Zone is placed at the shallowest consistent presence of *Proteacidites pacypolus*. Anomalous ranges of species in this zone are the occurrence of *Verrucosisporites cristatus* at 1339m and *Tricolporites* sp. cf. *T. retequetrus* at 1324m.

Deflandrea heterophlycta Dinoflagellate Zone: 1298.5 metres Middle Eocene.

The co-occurrence of *Deflandrea heterophlycta* with the acritarch *Tritonites inaequalis* Marshall & Partridge 1988 from a mottled sandstone at 1298.5m confirm the occurrence of this zone. Other associate dinoflagellates have longer ranges and whilst not diagnostic of any particular age they do mean that this sample has the highest recorded microplankton diversity of all samples below the Gurnard Formation.

Middle *Nothofagidites asperus* Zone: 1236.7-1262.0 metres Late Eocene.

The spore-pollen assemblages from the twelve sidewall cores analysed over the interval 1236.7-1274.8m are all dominated by *Nothofagidites* pollen (47%-78%) and thus clearly assignable to the broad *N. asperus* Zone. Six of the sidewall cores could be more precisely defined as belonging to the Middle *N. asperus* Zone on the presence of the index species *Triorites magnificus* (in 4 samples), *Aglaoreidia qualumis* (at 1244m) and *Anacolosidites sectus* (at 1236.7m). In all of these latter samples the index species were represented by single recorded specimens and in the case of *T. magnificus* specimens of this distinctive pollen were generally poorly preserved or stripped of their sexine.

Other important species in this zone whose Last Appearance Datums (LADs) confirm an age no younger than the Middle *N. asperus* Zone are *Proteacidites adenanthoides* (LAD at 1239.5m), *P. pachypolus* (LAD at 1250.5m), and *P. crassus*, *P. recavus* and *Santalumidites cainozoicus* (the last three with LADs at 1257.8m).

Gippslandia extensa Dinoflagellate Zone: 1236.7-1262.0 metres Late Eocene.
Corrudinium incompositum Dinoflagellate Zone: 1239.5-1249.5 metres Late Eocene.

The observations in Blenny-1 confirm that the *G. extensa* and *C. incompositum* dinoflagellate Zones are time equivalents but preferentially are found in different but contiguous facies. The *Gippslandia extensa* Zone was originally informally proposed (as the *Deflandrea extensa* Zone) by Partridge (1975, 1976) as a total range zone for the eponymous species. In exploration wells drilled in later years, as the Gurnard Formation in the central part of the basin was better sampled with sidewall cores, the occurrence of *G. extensa* was found to be sporadic and the zone was renamed after the more cosmopolitan *Corrudinium incompositum*. Most recently Partridge (1990) in the Sawbelly-1 report speculated that the "typical" development of the *G. extensa* Zone occurred stratigraphically above the *C. incompositum* Zone. This is clearly refuted by the observations in Blenny-1. Here *G. extensa* occurs in 9 out of 10 samples over the zone interval from the "Latrobe coarse clastic facies" and

"Gurnard facies", while *C. incompositum* occurs in only three samples within the "Gurnard facies".

Both zones are identified on the total range of their nominated species. Accessory species which are also considered characteristic of the zones are mainly found in the "upper" more open marine part of the Gurnard Formation. The most important species are the dinoflagellates *Deflandrea leptodermata* at 1244m and 1249.5m, *Rhombodinium glabrum* at 1239.5m and the acritarch *Tritonites spinosus* at 1239.5m and 1244m. The shallowest sample over this interval at 1236.7m contains the common occurrence (8.2%) of a species very similar to *Stoveracysts kakanuiensis* Clowes 1985. The discussion in Clowes & Morgans (1984) suggests this assemblage would lie close to the Eocene/Oligocene boundary.

Upper *Nothofagidites asperus* Zone: 1218.7-1234.0 metres
Late Eocene - basal Oligocene.

Although moderate diversity spore-pollen assemblages were recorded from the four samples assigned to this zone few index species were recorded and the zone is identified as the stratigraphic interval above the last Middle *N. asperus* Zone indicator, in this case *Anacolosidites sectus* at 1236.7m and below the FAD for *Cyatheacidites annulatus*.

Species considered diagnostic but not restricted to the zone are *Proteacidites rectomarginis* at 1218.7m and 1230.5m and *P. stipplatus* also at 1230.5m. Other notable species present are *Nothofagidites longispina* (Couper) and *Kuylisporites waterbolki* at 1230.5m.

All samples are dominated by *Nothofagus* pollen (41-69%). The next most dominant types are the combined *Araucariacites australis, Dilwynites granulatus* and *D. tuberculatus* (6-28%), and *Casuarina (Haloragacidites harrisii)* pollen (2.5-9%). Notable by its absence is any significant abundance of the gymnosperm pollen *Phyllocladidites mawsonii*. Abundances of the last species are typical of this zone as developed in the onshore parts of the Gippsland Basin (Stover & Partridge, 1973, p.243) and this feature has been used as a secondary criteria for the zone by other workers. The availability of more numerous assemblage counts from all zones in the Gippsland Basin over the past decade has shown that abundances of *P. mawsonii* and related species can occur in the non-marine portions of the coastal plain facies in most Tertiary spore-pollen zone in the Gippsland Basin, and thus their usefulness for age dating and correlation must be treated cautiously.

Phthanoperidinium comatum Dinoflagellate Zone: 1227.6-1234.0 metres Late Eocene-basal Oligocene.

The section in Blenny-1 is amongst the best examples of the *Phthanoperidinium comatum* Zone in the Gippsland Basin. The zone is defined by the abundance of the eponymous species and in Blenny-1 the two deepest samples are dominated by *P. comatum* which has abundances of 53-56% of the dinoflagellate count or 23-33% of the total assemblage count. Both these samples are from the Gurnard Formation and there may be an environment factor in the high abundances. In the shallowest sample from the basal Lakes Entrance at 1227.6m the abundance of *P. comatum* drops back to 21% of the dinoflagellate count and less than 10% of the total count. The next sample above at 1218.7m which is assignable to the Upper *N. asperus* Zone lacks *P. comatum* and the dinoflagellate assemblage is overall more similar to those from the overlying *P. tuberculatus* Zone. Whilst it is considered that the *P. comatum* Zone is an exact marine correlative of the non-marine or continentally derived Upper *N. asperus* Zone this may be more of a reflection of the availability of samples in this very thin and irregularly distributed zone in the offshore portion of the basin. In most wells only one or at best two samples can be assigned to this zone. The abundance and species range data in Blenny-1 suggests there may be more complexity to the zone, but this will only be resolvable with much more detailed sampling.

Other dinoflagellates abundant in the zone in order of dominance are *Spiniferites* spp., *Achomosphaera* spp. especially *A. ramulifera*, and *Operculodinium centrocarpum*. Species whose local ranges extend no younger than this zone are *Deflandrea* spp., *Distatodinium* sp., *Phthanoperidinium eocenicum* and the undescribed form called *Kapetocysta cuneatus* ms. All specimens of *Deflandrea* recorded were so fragmented that species identification was not possible but most where thought to be *D. phosphoritica* or an undescribed closely related species or subspecies with a sparsely verrucate endophragm which is recorded as *Deflandrea* sp. cf. *heterophlycta*.

Proteacidites tuberculatus Zone: 1205.0-1214.5 metres Oligocene.

Two sidewall core samples both of which gave meagre yields are assigned to the *P. tuberculatus* Zone on the occurrence of the key spore *Cyatheacidites annulatus* which is present in both samples. No other indicator spore-pollen species are present in these samples. The samples are dominated by microplankton (85% at 1214.5m, see Table-4) and the assemblages contain the typical Lakes Entrance Formation index dinoflagellate species *Protoellipsodinium simplex* ms and *Tectactodinium scabroellipticus* ms at 1214.5m. Overall the samples are dominated by the dinoflagellates *Spiniferites ramosus* s.l., *Operculodinium centrocarpum*, *Dapsilidinium pseudocolligerum* and *Lingulodinium machaerophorum*. Both samples also contain microforaminiferal liners.

REFERENCES

CLOWES, C.D., 1985. *Stoveracysta*, a new gonyaulacacean dinoflagellate genus from the Upper Eocene and Lower Oligocene of New Zealand. *Palynology 9*, 27-35.

CLOWES, C.D., & MORGANS, H.E.G., 1984. Micropalaeontology of the Runangan-Whaingaroan (Eocene-Oligocene) Totara Limestone, Kakanui River, New Zealand. *New Zealand Geological Survey record 3*, 30-40.

HAQ, B.U., HARDENBOL, J. & VAIL, P., 1987. Chronology of fluctuating sea levels since Triassic. *Science 235*, 1156-1167.

HAQ, B.U., HARDENBOL, J. & VAIL, P., 1988. Mesozoic and Cenozoic chronostratigraphy and cycles of sea-level change. *SEPM Special Publication No. 42*, 71-108.

HELBY, R., MORGAN, R. & PARTRIDGE, A.D., 1987. A palynological zonation of the Australian Mesozoic. *Mem. Ass. Australas. Palaeontols 4*, 1-94.

LENTIN, J.K. & WILLIAMS, G.L., 1985. Fossil Dinoflagellates: Index to genera and species, 1985 Edition. *Canadian Tech. Rep. Hydrog. Ocean Sci. 60*, 1-451.

LENTIN, J.K. & WILLIAMS, G.L., 1989. Fossil Dinoflagellates: Index to genera and species, 1989 Edition. *AASP Contribution Series No. 20*, 1-473.

MARSHALL, N.G. & PARTRIDGE, A.D., 1988. The Eocene acritarch *Tritonites* gen. nov. and the age of the Marlin Channel, Gippsland Basin, southeastern Australia. *Mem. Ass. Australas. Palaeontols 5*, 239-257.

PARTRIDGE, A.D., 1975. Palynological zonal scheme for the Tertiary of the Bass Strait Basin (Introducing Paleogene Dinoflagellate Zones and Late Neogene Spore-Pollen Zones). *Geol. Soc. Aust. Symposium on the Geology of Bass Strait and Environs, Melbourne*, November, 1975. *Esso Aust. Ltd. Palaeo. Rept. 1975/17* (unpubl.).

PARTRIDGE, A.D., 1976. The geological expression of eustacy in the early Tertiary of the Gippsland Basin. *APEA J. 16* (1), 73-79.

PARTRIDGE, A.D., 1990. Palynological analysis of Sawbelly-1, Gippsland Basin. *Esso Aust. Ltd. Palaeo. Rept. 1990/11*, 16p. (unpubl.).

STOVER, L.E. & PARTRIDGE, A.D., 1973. Tertiary and late Cretaceous spores and pollen from the Gippsland Basin, southeastern Australia. *Proc. R. Soc. Vict. 85*, 237-286.

STOVER, L.E. & PARTRIDGE, A.D., 1982. Eocene spore-pollen from the Werillup Formation, Western Australia. *Palynology 6,* 69-95.

TRAVERSE, A., 1988. *Paleopalynology*. Unwin Hyman Ltd, Boston, 1-600.

TABLE 1: INTERPRETATIVE PALYNOLOGICAL DATA FOR BLENNY-1, GIPPSLAND BASIN.

SAMPLE TYPE	DEPTH (M)	SPORE-POLLEN ZONES	*CR OLD	*CR NEW	DINOFLAGELLATE ZONE OR ASSOCIATION	*CR OLD	*CR NEW
SWC 30	1205.0	*P. tuberculatus*	0	B3	(*Operculodinium* spp.)	1	B2
SWC 29	1214.5	*P. tuberculatus*	0	B2	(*Operculodinium* spp.)	1	B2
SWC 28	1218.7	Upper *N. asperus*	2	B2			
SWC 26	1227.6	Upper *N. asperus*	2	B2	*P. comatum*	0	B1
SWC 25	1230.5	Upper *N. asperus*	0	B1	*P. comatum*	0	B1
SWC 24	1234.0	Upper *N. asperus*	2	B1	*P. comatum*	1	B2
SWC 23	1236.7	Middle *N. asperus*	2	B4	*G. extensa*	2	B3
SWC 22	1239.5	Middle *N. asperus*	1	B1	*C. incompositum*	0	B2
SWC 21	1244.0	Middle *N. asperus*	1	B2	*C. incompositum*	0	B2
SWC 20	1249.5	*N. asperus*	1	B2	*C. incompositum*	0	B2
SWC 19	1250.5	*N. asperus*	1	B2	*G. extensa*	1	B3
SWC 18	1252.5	*N. asperus*	1	B2	*G. extensa*	1	B3
SWC 17	1256.0	Middle *N. asperus*	1	B1	*G. extensa*	1	B3
SWC 16	1257.8	*N. asperus*	1	B2			
SWC 15	1259.5	Middle *N. asperus*	1	B1	*G. extensa*	1	B3
SWC 14	1262.0	Middle *N. asperus*	1	B2	*G. extensa*	1	B3
SWC 12	1267.0	*N. asperus*	1	B2			
SWC 11	1274.8	*N. asperus*	1	B3			
SWC 10	1276.7	Lower *N. asperus*	2	B2			

TABLE 1: INTERPRETATIVE PALYNOLOGICAL DATA FOR BLENNY-1, GIPPSLAND BASIN.

SAMPLE TYPE	DEPTH (M)	SPORE-POLLEN ZONES	*CR OLD	*CR NEW	DINOFLAGELLATE ZONE OR ASSOCIATION	*CR OLD	*CR NEW
SWC 8	1285.0	Lower *N. asperus*	2	B4			
SWC 7	1289.0	Lower *N. asperus*	1	B1			
SWC 6	1293.7	Lower *N. asperus*	0	B1			
SWC 5	1298.5	Lower *N. asperus*	0	B1	*D. heterophlycta*	1	B3
SWC 4	1315.0	Lower *N. asperus*	1	B1			
SWC 3	1324.0	Lower *N. asperus*	1	B1			
SWC 2	1339.0	Lower *N. asperus*	1	B1			

*CR = Confidence Ratings OLD & NEW

CONFIDENCE RATINGS

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

OLD CONFIDENCE RATINGS

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

1 SWC or CORE, Good Confidence, assemblage with zone species of spores and pollen or microplankton.

2 SWC or CORE, Poor Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.

3 CUTTINGS, Fair Confidence, assemblage with zone species of either spore and pollen or microplankton, or both.

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

NEW CONFIDENCE RATINGS

Alpha codes: Linked to sample type

A Core

B Sidewall core

C Coal cuttings

D Ditch cuttings

E Junk basket

F Miscellaneous/unknown

G Outcrop

Numeric codes: Linked to fossil assemblage

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

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

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

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

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

BASIC DATA

TABLE 2: BASIC SAMPLE DATA

TABLE 3: BASIC PALYNOMORPH DATA

TABLE 4: PALYNOMORPH PERCENTAGES

TABLE 5: SPORE-POLLEN PERCENTAGES

RELINQUISHMENT LISTS

SPORE- POLLEN RANGE CHART
(ATTACHMENT)

MICROPLANKTON RANGE CHART
(ATTACHMENT)

TABLE 2: BASIC SAMPLE DATA FOR BLENNY-1, GIPPSLAND BASIN.

SAMPLE TYPE	DEPTH (M)	LITHOLOGY	SAMPLE WT (g)	RESIDUE YIELD
SWC 30	1205.0	Calcareous claystone	9.3	Very low
SWC 29	1214.5	Calcareous claystone	11.7	Low
SWC 28	1218.7	Calcareous claystone	10.3	Moderate
SWC 26	1227.6	Calcareous claystone	9.9	High
SWC 25	1230.5	Glauconitic siltstone	14.0	Low
SWC 24	1234.0	Glauconitic claystone	12.8	Moderate
SWC 23	1236.7	Calcareous/glauc. claystone	15.5	High
SWC 22	1239.5	Glauconitic claystone	16.6	High
SWC 21	1244.0	Glauconitic claystone	14.3	Moderate
SWC 20	1249.5	Glauconitic claystone	15.9	Moderate
SWC 19	1250.5	Glauconitic sandy claystone	15.8	Moderate
SWC 18	1252.5	Med. sandstone/glauc./pyrite	14.8	Moderate
SWC 17	1256.0	Med. sandstone/tr. glauconite	19.0	Moderate
SWC 16	1257.8	Clayey sandstone/laminated	13.5	High
SWC 15	1259.5	Dk brn sandstone	10.8	High
SWC 14	1262.0	Laminated sandstone/claystone	11.4	High
SWC 12	1267.0	Laminated claystone/siltstone	10.4	High
SWC 11	1274.8	Laminated shale/siltstone	9.7	High
SWC 10	1276.7	Burrowed blk/brn shale	8.6	High
SWC 8	1285.0	Blk/brn claystone	9.6	High
SWC 7	1289.0	Blk/brn claystone	9.6	High
SWC 6	1293.7	Laminated sandstone/claystone	10.5	High
SWC 5	1298.5	Mottled sandstone med. grey	10.6	Moderate
SWC 4	1315.0	Burrowed sandstone	12.6	High
SWC 3	1324.0	Dk brn claystone	9.8	High
SWC 2	1339.0	Claystone/siltstone finely laminated	10.4	High

TABLE 3: BASIC PALYNOMORPH DATA FOR BLENNY-1, GIPPSLAND BASIN.

SAMPLE TYPE	DEPTH (M)	PALYNOMORPH CONCENTRATION	FOSSIL PRESERVATION and No. Spore-Pollen Species*		MICROPLANKTON Abundance & No. of Species*	
SWC 30	1205.0	High	Fair-good	6+	Abundant	6+
SWC 29	1214.5	High	Poor	16+	Very abundant	12+
SWC 28	1218.7	High	Poor	14+	Abundant	8+
SWC 26	1227.6	High	Poor-fair	25+	Abundant	8+
SWC 25	1230.5	High	Good	32+	Abundant	7+
SWC 24	1234.0	High	Poor	26+	Abundant	6+
SWC 23	1236.7	Moderate	Poor-fair	27+	Abundant	10+
SWC 22	1239.5	High	Fair-good	28+	Abundant	17+
SWC 21	1244.0	High	Poor-fair	24+	Abundant	14+
SWC 20	1249.5	Moderate	Fair	21+	Common	14+
SWC 19	1250.5	Moderate	Poor-good	24+	Frequent	5+
SWC 18	1252.5	Moderate	Poor-good	24+	Rare	2+
SWC 17	1256.0	High	Excellent	44+	Rare	3+
SWC 16	1257.8	High	Fair-good	25+	Very rare	2+
SWC 15	1259.5	High	Fair-good	42+	Rare	1+
SWC 14	1262.0	High	Poor	22+	Common	3+
SWC 12	1267.0	High	Poor (over oxid.)	22+	Frequent	1+
SWC 11	1274.8	Moderate	Poor (over oxid.)	12+		
SWC 10	1276.7	High	Poor (over oxid.)	23+	Common	3+
SWC 8	1285.0	High	Fair (over oxid.)	35+		
SWC 7	1289.0	High	Fair	35+	Very rare	1+
SWC 6	1293.7	High	Good	41+	Very rare	2+
SWC 5	1298.5	High	Good	51+	Rare	7+
SWC 4	1315.0	High	Good	58+	Very rare	2+
SWC 3	1324.0	High	Fair (over oxid.)	29+		
SWC 2	1339.0	High	Good	45+	Very rare	1+

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

TABLE-4: PALYNOMORPH PERCENTAGES FOR BLENNY-1 PAGE 1 OF 4						
	1214.5	1218.7	1227.6	1230.5	1234.0	1236.7
	SWC-29	SWC-28	SWC-26	SWC-25	SWC-24	SWC-23
MAJOR CATEGORIES %						
Spores %	2.6%	1.5%	3.8%	4.1%	4.9%	7.5%
Gymnosperm Pollen %	5.6%	8.1%	11.9%	13.2%	9.8%	18.9%
Angiosperm Pollen %	3.0%	12.1%	36.8%	21.9%	40.4%	40.1%
TOTAL SPORE-POLLEN %	11.1%	21.7%	52.5%	39.2%	55.1%	66.5%
Fungal Spores and Hyphae %		0.5%	1.9%	1.6%	1.7%	2.8%
Microforaminiferal liners%	3.8%	3.5%	3.1%		0.7%	0.6%
Dinoflagellates %	85.0%	74.2%	42.5%	59.2%	42.5%	30.1%
TOTAL COUNT	234	198	261	319	287	322
DINOFLAGELLATES						
Dinoflagellates Undiff.	4.0%	10.2%	7.2%	4.8%	9.0%	45.4%
Achomosphaera spp.			2.7%	21.2%	3.3%	11.3%
Corrudinium incompositum						
Dapsilidinium pseudocolligerum	3.0%					
Deflandrea spp.		X	0.9%			
Gippslandia extensa						X
Impagidinium spp.		2.0%			X	X
Lingulodinium macharophorum	1.5%	4.8%				
Operculodinium centrocarpum	62.8%	34.0%	23.4%	1.6%	X	7.2%
Phthanoperidinium comatum			20.7%	52.9%	55.7%	
Phthanoperidinium spp.				2.1%	9.8%	17.5%
Spindinium spp.						
Spiniferities spp.	28.6%	49.0%	45.0%	17.5%	22.1%	10.3%
Stoveracysta sp.						8.2%
Systematophora placacantha			X			
Tectatodinium marlum ms						
DINOFLAGELLATE COUNT	199	147	111	189	122	97
X = Present in assemblage but not in count.						

TABLE-4: PALYNOMORPH PERCENTAGES FOR BLENNY-1 PAGE 2 OF 4						
	1239.5	1244.0	1249.5	1250.5	1252.5	1256.0
	SWC-22	SWC-21	SWC-20	SWC-19	SWC-18	SWC-17
MAJOR CATEGORIES %						
Spores %	2.9%	4.3%	3.7%	1.6%	2.8%	1.7%
Gymnosperm Pollen %	11.8%	2.5%	5.9%	6.8%	9.1%	15.2%
Angiosperm Pollen %	52.2%	34.5%	54.3%	80.8%	84.6%	79.2%
TOTAL SPORE-POLLEN %	66.9%	41.2%	63.8%	89.2%	96.5%	96.1%
Fungal Spores and Hyphae %	3.7%	6.8%	13.8%	2.0%	0.8%	1.7%
Microforaminiferal liners%		0.3%	0.5%			
Dinoflagellates %	29.4%	51.7%	21.8%	8.8%	2.8%	2.2%
TOTAL COUNT	272	325	188	250	254	178
DINOFLAGELLATES						
Dinoflagellates Undiff.	28.8%	24.4%	26.8%	27.3%	57.1%	75.0%
Achomosphaera spp.						
Corrudinium incompositum	6.3%	X	X	?		
Dapsilidinium pseudocolligerum						
Deflandrea spp.	X	0.6%	4.9%			
Gippslandia extensa	1.3%	11.3%	7.3%	13.6%	42.9%	25.0%
Impagidinium spp.	X		X			
Lingulodinium macharophorum		14.3%				
Operculodinium centrocarpum	1.3%	6.5%	X	9.1%		X
Phthanoperidinium comatum		8.3%				
Phthanoperidinium spp.			X			
Spindinium spp.						
Spiniferities spp.	51.3%	32.7%	41.5%	50.0%		X
Stoveracysta sp.						
Systematophora placacantha		0.6%	19.5%			
Tectatodinium marlum ms	11.3%	1.2%				
DINOFLAGELLATE COUNT	80	168	41	22	7	4
X = Present in assemblage but not in count.						

TABLE-4: PALYNOMORPH PERCENTAGES FOR BLENNY-1 PAGE 3 OF 4						
	1259.5	1262.0	1267.0	1274.8	1276.7	1289.0
	SWC-15	SWC-14	SWC-12	SWC-11	SWC-10	SWC- 7
MAJOR CATEGORIES %						
Spores %	0.6%		0.9%	0.7%	2.6%	3.2%
Gymnosperm Pollen %	11.9%	6.7%	8.8%	20.3%	11.0%	22.1%
Angiosperm Pollen %	84.7%	54.3%	82.4%	66.7%	75.7%	74.3%
TOTAL SPORE-POLLEN %	97.2%	61.0%	92.1%	87.7%	89.3%	99.5%
Fungal Spores and Hyphae %	1.7%	5.8%	4.2%	12.3%	3.7%	
Microforaminiferal liners%						
Dinoflagellates %	1.1%	33.2%	3.7%		7.0%	0.5%
TOTAL COUNT	176	328	216	138	272	222
DINOFLAGELLATES						
Dinoflagellates Undiff.		8.3%	12.5%		15.8%	100.0%
Achomosphaera spp.						
Corrudinium incompositum						
Dapsilidinium pseudocolligerum						
Deflandrea spp.						
Gippslandia extensa	100.0%	91.7%				
Impagidinium spp.						
Lingulodinium macharophorum						
Operculodinium centrocarpum						
Phthanoperidinium comatum						
Phthanoperidinium spp.						
Spindinium spp.			87.5%		84.2%	
Spiniferities spp.						
Stoveracysta sp.						
Systematophora placacantha						
Tectatodinium marlum ms						
DINOFLAGELLATE COUNT	2	109	8		19	1

TABLE-4: PALYNOMORPH PERCENTAGES FOR BLENNY-1 PAGE 4 OF 4						
	1293.7	1298.5	1315.0	1339.0		
	SWC- 6	SWC- 5	SWC- 4	SWC- 2		
MAJOR CATEGORIES %						
Spores %	3.4%	2.3%	7.5%	7.7%		
Gymnosperm Pollen %	7.2%	12.1%	4.7%	11.2%		
Angiosperm Pollen %	85.6%	82.6%	67.7%	74.2%		
TOTAL SPORE-POLLEN %	96.2%	97.0%	79.9%	93.1%		
Fungal Spores and Hyphae %	3.4%	2.6%	19.7%	6.0%		
Microforaminiferal liners%						
Dinoflagellates %	0.4%	0.4%	0.4%	0.9%		
TOTAL COUNT	236	265	254	233		
DINOFLAGELLATES						
Dinoflagellates Undiff.	100.0%	X	100.0%			
Achomosphaera spp.						
Corrudinium incompositum						
Dapsilidinium pseudocolligerum						
Deflandrea spp.		X				
Gippslandia extensa						
Impagidinium spp.						
Lingulodinium macharophorum						
Operculodinium centrocarpum						
Phthanoperidinium comatum			X			
Phthanoperidinium spp.						
Spindinium spp.	X	100.0%		100.0%		
Spiniferities spp.						
Stoveracysta sp.						
Systematophora placacantha						
Tectatodinium marlum ms						
DINOFLAGELLATE COUNT	1	1	1	2		

TABLE-5: SPORE-POLLEN PERCENTAGES FOR BLENNY-1 PAGE 1 OF 4						
	1214.5	1218.7	1227.6	1230.5	1234.0	1236.7
	SWC-29	SWC-28	SWC-26	SWC-25	SWC-24	SWC-23
TRILETE SPORES undiff.	1.0%	X	2.2%	0.8%	1.9%	4.7%
Baculatisporites spp.			2.2%	0.8%	3.2%	
Cyathidites spp.	3.1%	7.0%	2.9%	5.6%	0.6%	2.8%
Gleicheniidites/Clavifera spp.	3.1%			1.6%	0.6%	0.5%
Stereisporites spp.	3.1%	X		X	X	2.3%
MONOLETE SPORES undiff.	1.0%				0.6%	
Laevigatosporites spp.				1.6%	1.9%	0.9%
TOTAL SPORES	11.3%	7.0%	7.3%	10.4%	8.9%	11.2%
GYMNOSPERM POLLEN						
Araucariacites australis	22.7%	16.3%	12.4%	8.8%	1.9%	5.1%
Dacrycarpidites australiensis				0.8%	0.6%	1.4%
Dilwynites spp.	11.3%	11.6%	2.9%	4.0%	4.4%	9.3%
Lygistepollenites florinii		X	0.7%	1.6%	1.3%	1.4%
Microcachryidites antarcticus					0.6%	0.5%
Phyllocladidites mawsonii	3.1%	4.7%	2.2%	8.0%	4.4%	6.1%
Podocarpidites spp.	10.3%	4.7%	4.4%	10.4%	4.4%	4.2%
Podosporites microsaccatus						0.5%
TOTAL GYMNOSPERM POLLEN	47.4%	37.2%	22.6%	33.6%	17.7%	28.5%
ANGIOSPERM POLLEN undiff.			0.7%	0.8%	0.6%	1.4%
Casuarina (H. harrisii)	2.1%	9.3%	5.1%	8.0%	2.5%	3.3%
Cupanieidites orthoteichus						
Ilexpollenites sp.			X	0.8%		
Malvacipollis spp.		X	0.7%	0.8%		0.9%
Myrtaceidites spp.		X		X	0.6%	
Nothofagidites "brassi" types A/B	30.9%	39.5%	50.4%	35.2%	39.2%	33.6%
Nothofagidites "brassi" type C	2.1%	2.3%	8.8%	4.8%	26.6%	11.7%
Nothofagidites "menziesii"			0.7%	X	0.6%	1.9%
Nothofagidites "fusca" type A/B	4.1%	4.7%	0.7%	0.8%	2.5%	4.2%
Periporopollenites spp.				X		
Proteacidites annularis				1.6%	X	
Proteacidites obscurus			X			
Proteacidites pachypolus						
Proteacidites spp.	1.0%	X	2.2%	0.8%	X	3.3%
Tricolp(or)ates undiff.	1.0%		0.7%	2.4%	0.6%	
TOTAL ANGIOSPERM POLLEN	41.2%	55.8%	70.1%	56.0%	73.4%	60.3%
TOTAL SPORES-POLLEN COUNT	97	43	137	125	158	214
X = Present in assemblage but not in count.						

TABLE-5: SPORE-POLLEN PERCENTAGES FOR BLENNY-1 PAGE 2 OF 4						
	1239.5	1244.0	1249.5	1250.5	1252.5	1256.0
	SWC-22	SWC-21	SWC-20	SWC-19	SWC-18	SWC-17
TRILETE SPORES undiff.	1.6%	3.7%	0.8%	0.9%	0.8%	1.2%
Baculatisporites spp.	X		0.8%	0.4%		0.6%
Cyathidites spp.	0.5%	3.7%	1.7%		0.4%	
Gleicheniidites/Clavifera spp.				X	0.8%	X
Stereisporites spp.	2.2%	1.5%	X	0.4%	0.4%	
MONOLETE SPORES undiff.		0.7%	0.8%		0.4%	
Laevigatosporites spp.		0.7%	1.7%		X	
TOTAL SPORES	4.4%	10.4%	5.8%	1.8%	2.9%	1.8%
GYMNOSPERM POLLEN						
Araucariacites australis	2.7%		0.8%	0.9%		X
Dacrycarpidites australiensis	0.5%		0.8%			0.6%
Dilwynites spp.	2.2%	3.0%		0.9%	1.2%	1.8%
Lygistepollenites florinii	2.7%	0.7%	1.7%	1.8%	0.8%	1.2%
Microcachryidites antarcticus						0.6%
Phyllocladidites mawsonii	4.9%	1.5%	5.8%	3.6%	5.7%	5.8%
Podocarpidites spp.	4.4%	0.7%	X		1.6%	5.8%
Podosporites microsaccatus				0.4%		
TOTAL GYMNOSPERM POLLEN	17.6%	6.0%	9.2%	7.6%	9.4%	15.8%
ANGIOSPERM POLLEN undiff.	1.6%	2.2%	2.5%	1.8%	0.4%	1.2%
Casuarina (H. harrisii)	8.8%	14.9%	5.8%	6.3%	6.5%	8.2%
Cupanieidites orthoteichus		0.7%				
Ilexpollenites sp.				0.9%		X
Malvacipollis spp.	0.5%	0.7%	0.8%	1.8%	0.4%	0.6%
Myrtaceidites spp.	1.1%		1.7%		0.4%	0.6%
Nothofagidites "brassi" types A/B	42.9%	43.3%	42.5%	55.6%	51.0%	40.9%
Nothofagidites "brassi" type C	8.2%	12.7%	14.2%	10.8%	13.5%	16.4%
Nothofagidites "menziesii"	0.5%			0.4%		0.6%
Nothofagidites "fusca" type A/B	4.9%	2.2%	4.2%	4.0%	4.5%	4.1%
Periporopollenites spp.						X
Proteacidites annularis	0.5%	1.5%	1.7%		0.4%	1.2%
Proteacidites obscurus		X				
Proteacidites pachypolus				0.4%		0.6%
Proteacidites spp.	6.6%	3.0%	9.2%	6.3%	6.1%	5.3%
TOTAL ANGIOSPERM POLLEN	78.0%	83.6%	85.0%	90.6%	87.8%	82.5%
TOTAL SPORES-POLLEN COUNT	182	134	120	223	245	171

TABLE-5: SPORE-POLLEN PERCENTAGES FOR BLENNY-1 PAGE 3 OF 4						
	1259.5	1262.0	1267.0	1274.8	1276.7	1289.0
	SWC-15	SWC-14	SWC-12	SWC-11	SWC-10	SWC- 7
TRILETE SPORES undiff.				0.8%	0.4%	1.4%
Baculatisporites spp.						X
Cyathidites spp.					0.4%	0.5%
Gleicheniidites/Clavifera spp.			0.5%	X		0.9%
Stereisporites spp.					X	
MONOLETE SPORES undiff.						
Laevigatosporites spp.	0.6%		0.5%		2.1%	0.5%
TOTAL SPORES	0.6%		1.0%	0.8%	2.9%	3.2%
GYMNOSPERM POLLEN						
Araucariacites australis	0.6%		0.5%			
Dacrycarpidites australiensis						
Dilwynites spp.					0.4%	
Lygistepollenites florinii	0.6%	1.0%				
Microcachryidites antarcticus		0.5%	0.5%			0.5%
Phyllocladidites mawsonii	9.9%	8.0%	7.5%	22.3%	11.1%	20.8%
Podocarpidites spp.	0.6%	1.0%	1.0%	0.8%	0.4%	0.9%
Podosporites microsaccatus	0.6%	0.5%			0.4%	
TOTAL GYMNOSPERM POLLEN	12.3%	11.0%	9.5%	23.1%	12.3%	22.2%
ANGIOSPERM POLLEN undiff.	2.3%	0.5%			1.6%	1.4%
Casuarina (H. harrisii)	3.5%	6.5%	1.5%	14.0%	8.6%	7.7%
Cupanieidites orthoteichus	X				0.4%	0.5%
Ilexpollenites sp.	X	1.0%			0.8%	X
Malvacipollis spp.	0.6%	0.5%	3.0%	0.8%	4.1%	1.4%
Myrtaceidites spp.						0.9%
Nothofagidites "brassi" types A/B	58.5%	41.0%	50.3%	32.2%	41.2%	45.2%
Nothofagidites "brassi" type C	12.3%	28.0%	27.6%	14.0%	16.0%	10.9%
Nothofagidites "menziesii"	X	0.5%	0.5%		X	
Nothofagidites "fusca" type A/B	3.5%	3.0%		2.5%	2.1%	
Periporopollenites spp.	2.9%	1.0%				X
Proteacidites annularis	X				X	X
Proteacidites obscurus	X	0.5%	X			X
Proteacidites pachypolus					X	X
Proteacidites spp.	2.9%	5.5%	5.0%	9.9%	9.1%	6.3%
Tricolp(or)ates undiff.	0.6%	1.0%	1.5%	2.5%	0.8%	0.5%
TOTAL ANGIOSPERM POLLEN	87.1%	89.0%	89.4%	76.0%	84.8%	74.7%
TOTAL SPORES-POLLEN COUNT	171	200	199	121	243	221

TABLE-5: SPORE-POLLEN PERCENTAGES FOR BLENNY-1 PAGE 4 OF 4						
	1293.7	1298.5	1315.0	1339.0		
	SWC- 6	SWC- 5	SWC- 4	SWC- 2		
TRILETE SPORES undiff.	1.8%	0.4%	2.0%	1.8%		
Baculatisporites spp.			X	1.4%		
Cyathidites spp.	X	1.2%	3.9%	2.8%		
Gleicheniidites/Clavifera spp.	0.4%	X	X	0.9%		
Stereisporites spp.			1.0%	X		
MONOLETE SPORES undiff.		0.8%	1.5%			
Laevigatosporites spp.	1.3%	X	1.0%	1.4%		
TOTAL SPORES	3.5%	2.3%	9.4%	8.3%		
GYMNOSPERM POLLEN						
Araucariacites australis	0.9%	X	X	0.5%		
Dacrycarpidites australiensis			0.5%			
Dilwynites spp.	0.4%	0.8%	X	0.5%		
Lygistepollenites florinii		1.2%	X	0.9%		
Microcachryidites antarcticus		X	0.5%			
Phyllocladidites mawsonii	5.3%	8.6%	3.0%	7.8%		
Podocarpidites spp.	0.9%	1.9%	1.0%	0.9%		
Podosporites microsaccatus			1.0%	1.4%		
TOTAL GYMNOSPERM POLLEN	7.5%	12.5%	5.9%	12.0%		
ANGIOSPERM POLLEN undiff.	1.3%	1.2%	3.0%	2.8%		
Casuarina (H. harrisii)	12.3%	19.5%	19.2%	13.8%		
Cupanieidites orthoteichus	2.2%	0.8%	1.5%	X		
Ilexpollenites sp.		X	0.5%	X		
Malvacipollis spp.	1.3%	1.2%	2.5%	0.9%		
Myrtaceidites spp.	1.8%		0.5%			
Nothofagidites "brassi" types A/B	40.1%	34.6%	23.6%	29.5%		
Nothofagidites "brassi" type C	8.8%	9.7%	4.9%	13.4%		
Nothofagidites "menziesii"			X			
Nothofagidites "fusca" type A/B	0.9%	1.2%	3.0%	4.1%		
Periporopollenites spp.	0.4%	0.4%	2.0%			
Proteacidites annularis	X	X	0.5%	0.5%		
Proteacidites obscurus		1.6%		0.5%		
Proteacidites pachypolus	0.9%	X	1.5%	X		
Proteacidites spp.	13.7%	11.3%	14.8%	8.8%		
Tricolp(or)ates undiff.	5.3%	3.9%	7.4%	5.5%		
TOTAL ANGIOSPERM POLLEN	89.0%	85.2%	84.7%	79.7%		
TOTAL SPORES-POLLEN COUNT	227	257	203	217		

RELINQUISHMENT LIST - PALYNOLOGICAL SLIDES

WELL NAME & NO: BLENNY-1

PREPARED BY: A.D. PARTRIDGE

DATE: 24 SEPTEMBER 1992

SAMPLE TYPE	DEPTH (M)	CATALOGUE NUMBER	DESCRIPTION
SWC 30	1205.0	P196021	Kerogen slide sieved/unsieved fractions
SWC 30	1205.0	P196022	Kerogen slide unsieved fraction
SWC 30	1205.0	P196023	Oxidized slide 2 (1/4 cover slip)
SWC 29	1214.5	P196024	Kerogen slide sieved/unsieved fractions
SWC 29	1214.5	P196025	Kerogen slide unsieved fraction
SWC 29	1214.5	P196026	Oxidized slide 2 (1/4 cover slip)
SWC 28	1218.7	P196027	Kerogen slide sieved/unsieved fractions
SWC 28	1218.7	P196028	Kerogen slide unsieved fraction
SWC 28	1218.7	P196029	Oxidized slide 2
SWC 26	1227.6	P196030	Kerogen slide sieved/unsieved fractions
SWC 26	1227.6	P196031	Kerogen slide unsieved fraction
SWC 26	1227.6	P196032	Oxidized slide 2
SWC 26	1227.6	P196033	Oxidized slide 3
SWC 25	1230.5	P196034	Oxidized slide 2 (1/2 cover slip)
SWC 24	1234.0	P196035	Oxidized slide 2
SWC 24	1234.0	P196036	Oxidized slide 3
SWC 23	1236.7	P196037	Oxidized slide 2
SWC 23	1236.7	P196038	Oxidized slide 3
SWC 22	1239.5	P196039	Oxidized slide 2
SWC 22	1239.5	P196040	Oxidized slide 3
SWC 21	1244.0	P196041	Oxidized slide 2
SWC 21	1244.0	P196042	Oxidized slide 3
SWC 20	1249.5	P196043	Oxidized slide 2
SWC 20	1249.5	P196044	Oxidized slide 3
SWC 19	1250.5	P196045	Oxidized slide 2
SWC 19	1250.5	P196046	Oxidized slide 3
SWC 18	1252.5	P196047	Oxidized slide 2
SWC 18	1252.5	P196048	Oxidized slide 3
SWC 17	1256.0	P196049	Oxidized slide 2
SWC 17	1256.0	P196050	Oxidized slide 3
SWC 16	1257.8	P196051	Kerogen slide sieved/unsieved fractions
SWC 16	1257.8	P196052	Kerogen slide unsieved fraction
SWC 16	1257.8	P196053	Oxidized slide 2
SWC 16	1257.8	P196054	Oxidized slide 3
SWC 15	1259.5	P196055	Kerogen slide sieved/unsieved fractions
SWC 15	1259.5	P196056	Kerogen slide unsieved fraction
SWC 15	1259.5	P196057	Oxidized slide 2
SWC 15	1259.5	P196058	Oxidized slide 3
SWC 14	1268.0	P196059	Kerogen slide sieved/unsieved fractions
SWC 14	1268.0	P196060	Kerogen slide unsieved fraction
SWC 14	1268.0	P196061	Oxidized slide 2
SWC 14	1268.0	P196062	Oxidized slide 3

RELINQUISHMENT LIST - PALYNOLOGICAL SLIDES

WELL NAME & NO: BLENNY-1

PREPARED BY: A.D. PARTRIDGE

DATE: 24 SEPTEMBER 1992

SAMPLE TYPE	DEPTH (M)	CATALOGUE NUMBER	DESCRIPTION
SWC 12	1267.0	P196063	Kerogen slide sieved/unsieved fractions
SWC 12	1267.0	P196064	Kerogen slide unsieved fraction
SWC 12	1267.0	P196065	Oxidized slide 2
SWC 12	1267.0	P196066	Oxidized slide 3
SWC 11	1274.8	P196067	Kerogen slide sieved/unsieved fractions
SWC 11	1274.8	P196068	Kerogen slide unsieved fraction
SWC 11	1274.8	P196069	Oxidized slide 2
SWC 11	1274.8	P196070	Oxidized slide 3
SWC 10	1276.7	P196071	Kerogen slide sieved/unsieved fractions
SWC 10	1276.7	P196072	Kerogen slide unsieved fraction
SWC 10	1276.7	P196073	Oxidized slide 2
SWC 10	1276.7	P196074	Oxidized slide 3
SWC 8	1285.0	P196075	Kerogen slide sieved/unsieved fractions
SWC 8	1285.0	P196076	Kerogen slide unsieved fraction
SWC 8	1285.0	P196077	Oxidized slide 2
SWC 8	1285.0	P196078	Oxidized slide 3
SWC 7	1289.0	P196079	Kerogen slide sieved/unsieved fractions
SWC 7	1289.0	P196080	Kerogen slide unsieved fraction
SWC 7	1289.0	P196081	Oxidized slide 2
SWC 7	1289.0	P196082	Oxidized slide 3
SWC 6	1293.7	P196083	Kerogen slide sieved/unsieved fractions
SWC 6	1293.7	P196084	Kerogen slide unsieved fraction
SWC 6	1293.7	P196085	Oxidized slide 2
SWC 6	1293.7	P196086	Oxidized slide 3
SWC 5	1298.5	P196087	Kerogen slide sieved/unsieved fractions
SWC 5	1298.5	P196088	Kerogen slide unsieved fraction
SWC 5	1298.5	P196089	Oxidized slide 2
SWC 4	1315.0	P196090	Kerogen slide sieved/unsieved fractions
SWC 4	1315.0	P196091	Kerogen slide unsieved fraction
SWC 4	1315.0	P196092	Oxidized slide 2
SWC 4	1315.0	P196093	Oxidized slide 3
SWC 3	1324.0	P196094	Kerogen slide sieved/unsieved fractions
SWC 3	1324.0	P196095	Kerogen slide unsieved fraction
SWC 3	1324.0	P196096	Oxidized slide 2
SWC 3	1324.0	P196097	Oxidized slide 3
SWC 2	1339.0	P196098	Kerogen slide sieved/unsieved fractions
SWC 2	1339.0	P196099	Kerogen slide unsieved fraction
SWC 2	1339.0	P196100	Oxidized slide 2
SWC 2	1339.0	P196101	Oxidized slide 3

RELINQUISHMENT LIST - PALYNOLOGICAL RESIDUES

WELL NAME & NO: BLENNY-1

PREPARED BY: A.D. PARTRIDGE

DATE: 24 SEPTEMBER 1992

SAMPLE TYPE	DEPTH (M)	DESCRIPTION
SWC 26	1227.6	Kerogen residue
SWC 24	1234.0	Kerogen residue
SWC 23	1236.7	Kerogen residue
SWC 22	1239.5	Kerogen residue
SWC 21	1244.0	Kerogen residue
SWC 20	1249.5	Kerogen residue
SWC 19	1250.5	Kerogen residue
SWC 18	1252.5	Kerogen residue
SWC 17	1256.0	Kerogen residue
SWC 16	1257.8	Oxidized residue
SWC 15	1259.5	Oxidized residue
SWC 14	1268.0	Kerogen residue
SWC 14	1268.0	Oxidized residue
SWC 12	1267.0	Kerogen residue
SWC 12	1267.0	Oxidized residue
SWC 11	1274.8	Kerogen residue
SWC 11	1274.8	Oxidized residue
SWC 10	1276.7	Kerogen residue
SWC 10	1276.7	Oxidized residue
SWC 8	1285.0	Kerogen residue
SWC 8	1285.0	Oxidized residue
SWC 7	1289.0	Kerogen residue
SWC 7	1289.0	Oxidized residue
SWC 6	1293.7	Kerogen residue
SWC 3	1324.0	Kerogen residue
SWC 2	1339.0	Kerogen residue
SWC 2	1339.0	Oxidized residue