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Palynological Age Dating of the Latrobe Group in Avon-1, Burong-1, Comley-1, South West Bairnsdale-1, West Seacombe-1 and Wonga Binda-1 from Onshore Gippsland Basin.

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Summary

Results of palynological analysis or review of 36 samples from six wells in the onshore Gippsland Basin are presented. The key findings of this study are:

- A relatively thick (>300 metres) sequence of late Maastrichtian to Paleocene (Upper *T. longus* to *L. balmei* Zones) sediments was found to occur in the Seaspray Depression. No correlative sequence has been found in wells north of the Rosedale Monocline in the onshore Gippsland Basin.
- These Upper *T. longus* to *L. balmei* Zone units are separated from younger intervals within the Latrobe Group by one or more sequence boundary-type unconformities of Early to Middle Eocene age.
- Zone index species caved into older sediments demonstrate that late Early Eocene (Upper *M. diversus* to *P. asperopolus* Zones) age sediments are present in wells in the Seaspray Depression. Unfortunately, because they are not represented by any of the sidewall cores analysed their precise stratigraphic position and thicknesses are uncertain. No sediments of Early Eocene age have been recorded in onshore wells north of the Rosedale Monocline.
- The oldest Latrobe sediments recorded north of the Rosedale Monocline are Middle Eocene (Lower *N. asperus* Zone). The base of the Latrobe becomes progressively younger to the north until it has an Early Oligocene age (Lower *P. tuberculatus* Zone) over parts of the Lakes Entrance Platform.
- The Late Eocene interval includes widespread marginal marine facies deposited during the *G. extensa* microplankton Zone, which is the oldest marine incursion found in the onshore sector of the Gippsland Basin.
- Outside of the Latrobe Valley and Alberton–Gelliondale coalfields, the predominant thick coal seams in the onshore basin are Middle Eocene to basal Oligocene in age. The development of thick coal seams in the Middle and Upper *N. asperus* Zones in the onshore basin contrasts markedly with the immediate offshore areas (eg. Barracouta field) where these zones are found in Gurnard formation and basal few metres of Seaspray Group (Upper *N. asperus* Zone only). This lateral change in facies implies the presence of barrier sand complexes lying between the wells studied and those offshore. as mapped offshore by Blake (1986). The lower *P. tuberculatus* Zone age of Latrobe facies in wells on the Lakes Entrance Platform confirms the presence of even younger (Oligocene) barrier sands.

Introduction

This study is one of two reports aiming to improve the age dating of the Latrobe and Golden Beach Groups in the onshore portion of the Gippsland Basin as a precursor to a regional sequence stratigraphic analysis of the well logs and seismic data. The choice of wells studied in this report was decided by geographic location, with preference given to the more recently drilled wells because of the their modern logs and ties to recent seismic data.

This study is based on 16 cuttings samples, 2 core and 18 sidewall core samples from six wells in the onshore Gippsland Basin. The samples were collected from the Energy and Minerals Victoria core store on the 29 May 1996 and forwarded to Laola Pty Ltd in Perth for palynological processing. Initial results of the study were provided in a provisional report issued on the 18th June 1996.

Avon–1 (spudded 1990) was selected because of its central location in the Lake Wellington Depression north of the Rosedale Monocline, lack of previous palynological dating and presence of interpreted barrier sand at top of Latrobe Group.

Burong–1 (spudded 1985) was selected because of its central location within the Seaspray Depression and relatively good sidewall core coverage.

Wonga Binda–1 (spudded 1988), located in the southern part of the Seaspray Depression, was also selected for its good sidewall coverage. Unfortunately, the sidewall cores were not available for this report and thus the initial palynological datings are based on eight cuttings samples.

West Seacombe–1 (spudded 1971) was selected because of its eastern location in the Lake Wellington Depression and availability of good sidewall core coverage in the Latrobe Group. Unfortunately, the sidewall cores were all found to be sandstones considered unsuitable for palynology. The finest grained lithology when collected and processed gave a very low yield and an imprecise age.

South West Bairnsdale–1 (spudded 1963) is the most northerly petroleum well in the central part of the basin and was included to determine the age of the thin Latrobe Group facies between the base of the Seaspray Group and top of the Devonian Avon River Group.

Comley–1 (spudded 1985) is located on the Lakes Entrance Platform along the northern margin of the basin. The well was sampled to determine the age of a thin sandy section correlated with the Latrobe Group.

The palynological zonation, ages of the samples and comparison between the wells are summarised on Table–1. Interpretative data on individual samples examined including key species and Confidence Ratings are recorded in Tables–2 to 5. Basic data on residue yields, palynomorph concentration on the slides, preservation and species diversity are recorded on Tables–6 to 13. Results of the assemblage counts and other selected species recorded are provided on Tables–14 to 21.

Table–1: Palynological Summary

Spore-Pollen Zone (Microplankton Zone) and Age	Wonga Binda–1	Burong–1	Avon–1	SW Bairnsdale–1	Comley–1
Top of Latrobe facies	605	654	735	375	476
P. tuberculatus Oligocene	590m	635.8–647.1m	725–740m	387–390m	478.6–482
Upper *N. asperus* basal Oligocene	590–672m	687.3m	785–810m	?	
Middle *N. asperus* (*G. extensa*) Late Eocene	786 (786)	713.2–887m (713.2–867m)	850–900m (850–900m)	417.6–420.6m	
Lower *N. asperus* Middle Eocene	927m	935.1m			Not present
P. asperopolus to *M. diversus* Early Eocene	Present in cuttings.	Present as contaminants.	Not present	Not present	
L. balmei Paleocene	1071–1263	998–1222m			
Upper *T. longus* Maastrichtian	1332m	?			
Top Strzelecki Group or Basement	1344	1260+	904	430m	497m
Latrobe thickness	739m	606+	169m	55m	23m

~~~~~~ Unconformity

Geological Comments

Stratigraphic Nomenclature. In the following discussion the term Latrobe Group or Latrobe facies is applied to all fluviatile to coastal plain sands and coal measures facies underlying the open marine facies of the Seaspray Group. Sediments of the two groups can be readily distinguished by the fact that sediments from the Seaspray Group are calcareous and consistently contain foraminifera while sediments from the Latrobe Group are non-calcareous and lack foraminifera. Nevertheless, the latter shows evidence of close proximity to, or intercalation of, marine environments by bioturbation and other typical marine
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sedimentary structures as well as the presence of rare to abundant organic walled marine microplankton (mostly dinoflagellate cysts) particularly in the upper part of the section.

Although the terms Latrobe Valley Group and Latrobe Valley Coal Measures (Hocking, 1976; Abele *et al.*, 1988) have legitimate priority over Latrobe Group the latter term is so entrenched in the petroleum industry literature it is unrealistic to expect the former names to gain ascendancy. Instead it is recommended that the term Latrobe Valley Group be restricted to the coal measures facies developed within the Latrobe Valley where the bulk of the sediments are a lateral facies equivalents to the Seaspray Group. These are younger than the sediments assigned to the Latrobe Group in the rest of the basin.

A similar conflict between priority and usage applies to the use of the terms Traralgon Seam and Traralgon Formation. The name was first applied to the Traralgon Seam found in the core of the Loy Yang Dome by Gloe (1960; p.67, fig.3). Recent palynological dating of the top of the seam and overlying interseam clays indicate in its type locality the seam is Early Oligocene in age (Partridge, 1994). Subsequently the name has been extended to include an underlying Traralgon No. 2 seam and expanded in concept as the Traralgon Formation to include all applied onshore sediments lying between either the Strzelecki or Golden Beach Groups to the Seaspray Group (Abele *et al.*, 1988; figs 8.21,8.24). This last broad concept is not sustainable based on the current palynological study which indicates there is a need to subdivide the onshore Latrobe Group section based on lithology and presence of sequence boundary type unconformities. Therefore, it is recommended that the use of the name Traralgon be restricted to the coal seams where the usage is both entrenched and has legitimate priority.

Avon–1 penetrates approximately 169 metres of Latrobe facies between the top of an interpreted shoreline barrier sand at 735m and top of Strzelecki Group picked at 904m (Well completion report). The Latrobe sequence starts within the Late Eocene (high within the Middle *N. asperus* Zone, based on the consistent presence of *Proteacidites stipplatus*), and ranges into the basal Early Oligocene, based on the presence of good Upper *N. asperus* Zone assemblages. The 40 metres of interpreted shoreline barrier sand (735–785m) which overlie the latter zone is therefore clearly Early Oligocene on stratigraphic position although it has not been independently dated. The palynomorph assemblage from 740m at the top of the sand body is so masked by cavings that it cannot be considered to provide a reliable age for the sand. Similar results to Avon–1 were obtained from cores in Wurruk Wurruk–1 (12kms to the SW) where the upper part of the type section of the Upper *N. asperus* Zone is sandy and lacks coals (Partridge, 1971). An approximate thickness for the sand of 34 metres is calculate from the abbreviated lithological descriptions in the original Boring Records for the interval between the oldest occurrence of zonule J foraminifera in a glauconitic and carbonaceous sand at 739m (2424ft) and the top of the first thick brown coal seam at 773m (2536ft) (see Partridge, 1971; and Boring Records for 1941 *in* Victorian Department of Mines Annual Report 1941).

Burong-1 currently has 18 sidewall core samples analysed for palynology. These comprise 8 samples examined in the original palynological study by ECL now available on open file and 10 new samples. Additional data on five of the original samples are provided in this report. The well provides the best age control for the Latrobe Group in the Seaspray Depression. The well penetrated over 606 metres of Latrobe Group (654–1260mT.D.). The deepest sidewall core at 1235.4m although lithologically similar to sediments from the Strzelecki Group yielded an Eocene *N. asperus* Zone assemblage. This is interpreted to be contaminated. Currently there is no evidence from either the palynology or electric log character to confirm that the well penetrated the Strzelecki Group.

The palynology instead revealed the presence of over 224 metres of Paleocene section (997.9–1221.9 m). Within this interval the section below 1044m contains only rare thin coal seams (<1m thick) and is equivalent to the middle part of the *L. balmei* Zone. The overlying section, from 1044m up to 997.9m, contains two coal seams which are respectively 3 metres (1041–44m) and 8 metres (1006–14m) thick. These almost certainly belong to the Upper *L. balmei* Zone based on the good assemblage recorded from SWC-11 at 997.9m. No microplankton were recorded in the assemblages confirming that the Paleocene marine incursions did not reach this far into the basin.

Rare caved species with known stratigraphic ranges restricted to the *M. diversus* and *P. asperopolus* Zones were recorded as contaminants in the sidewall cores. These are interpreted to indicate that the Paleocene interval is overlain by Early Eocene sediments. These can be no thicker than 60 metres based on current sampling but are probably no more than 35 metres thick if the 13 metre thick coal between 949–62m turns out to have the Lower *N. asperus* Zone age, indicated by regional correlations. To resolve this speculation it is recommended that additional palynological analysis be undertaken on SWC-12 at 985.7m, SWC-13 at 962.9m and cuttings from the overlying coal between 949–62m.

The composite *N. asperus* Zone is over 300 metres thick (~654m to ~962m) and can be characterised by six to eight major coal seams each between 4 to 14 metres thick. The coals are picked on the sonic and bulk density/neutron porosity logs. On the basis of the coals, the interval can be divided into a lower member between 810–962m which contains >25% coal, most of which is distributed in only six thick seams, a middle sandy member between 693–810m, and an upper coaly member between 654–693m which is comprised of 50% coal in just two thick seams. The boundary between the Lower and Middle *N. asperus* Zones occurs within the lower member whilst the boundary between the Middle and Upper *N. asperus* Zones approximates the boundary between the middle and upper lithological members. Microplankton incursions occur sporadically within the coal measures over the whole interval and indicate proximity to or fluctuations of the palaeoshoreline. The two highest microplankton abundances recorded in the Latrobe Group occur in the lower member at 866.5m (4%) and 935.1m (7%).

Comley–1 contains 21 metres of Latrobe facies overlying Ordovician meta-sediments on the Lakes Entrance Platform. Two samples analysed from conventional core–1 both gave good *P. tuberculatus* Zone ages. The presence of *Granodiporites nebulosus* indicates assignment to the lower subzone and confirms an Early Oligocene age.

South West Bairnsdale–1 intersects a 55 metre thick section of Latrobe Group coarse clastics intercalated between a white marl (base at ~375m) and the characteristic red claystone of the Devonian Avon River Group at ~430m. The Latrobe facies comprises coarse quartz gravels (often stained reddish-brown) interbedded with carbonaceous claystone and possible coals. The shallower cuttings sample at 387–390m which is mainly brown claystone with some caved marl fragments, is assigned a *P. tuberculatus* Zone age and cannot be older than the Upper *N. asperus* Zone. The frequent occurrence of the bull-rush pollen type *Aglaoreidia qualumis* (2%) in the sample suggests the depositional environment was a freshwater swamp or sluggish-flowing river. The deeper cuttings sample at 417.6–420.6m which is comprised of coaly to carbonaceous claystone fragments (<5%) mixed with quartz sand and gravel provides a reliable Late Eocene age for the base of the interval. Both samples lacked in situ microplankton.

West Seacombe–1 was chosen for analysis for its position north of the Rosedale Monocline and close to the coast in a part of the basin which lacks palynological control. Unfortunately, although a good suite of sidewall cores was recovered in the well they were all sandy lithologies unsuitable for palynological analysis. The single sample analysed to confirm this gave only a broad *N. asperus* Zone age. The results from Avon–1, Wurruk Wurruk–1 (Partridge, 1971) and unpublished data from Hollands Landing–1 suggest the base of the Latrobe Group north of the Rosedale Monocline is significantly younger than found south of the monocline.

This hypothesis still need to be tested in the area between Lake Wellington and the coast where the section is thickest. Currently none of the wells is in this area have any palynology from the Latrobe section. Either other wells need to be investigated to see if they contain suitable sidewall cores or a suite of cuttings needs to be analysed

Wonga Binda-1 produced a surprise in that it contains the most westerly confirmed occurrence of Late Cretaceous sediments recorded in the Gippsland Basin. The Late Maastrichtian Upper *T. longus* Zone occurs in cuttings at 1332m from interpreted Yarram Formation intercalated between Older Volcanics identified from the electric logs from 1264–1330m and the top of the Strzelecki Group identified at 1344m.

Above the volcanics the Paleocene *L. balmei* Zone is over 200 metres thick, similar to that found in Burong-1. The presence of the short ranging pollen *Myrtaceidites tenuis* diagnostic of the Upper *M. diversus* to *P. asperopolus* Zones in the cutting at 1071m is reliable evidence for the presence of Early Eocene facies above this depth. The electric logs indicate the most likely location is between the lowest relatively thick coal at 942–945m and top Paleocene coal at either 1040m or 1070m.

Compared to Burong-1, this well contains less coal although most of the thicker seams are again characteristic of the broad *N. asperus* Zone. As the three *N. asperus* subzones are each only represented by one sample it is not possible to comment on the distribution of these zone. Total thickness is over 350 metres (604–95m). Only the sample at 786m assigned to the *G. extensa* microplankton Zone contains proven in situ marine dinoflagellates.

The lithologies of adjacent sidewall cores demonstrates that the shallowest cuttings came from the base of the Seaspray Group. This is confirmed by the high dinoflagellate abundance.

Biostratigraphy

Zone and age determinations are based on the spore-pollen zonation scheme proposed by Stover & Partridge (1973), subsequently modified by Stover & Partridge (1982) and Helby, Morgan & Partridge (1987). The microplankton zonation scheme referred to has only been published in outline by Partridge (1975, 1976). Other modifications and embellishments to both zonation schemes can be found in the many palynological reports on wells drilled in the Gippsland Basin and analysed by the authors. Unfortunately this work has not yet been collated or summarised in a single report.

Author citations for most spore-pollen species can be sourced from Dettmann (1963), Helby, Morgan & Partridge (1987), Stover & Partridge (1973, 1982), or other references cited herein. Author citations for dinoflagellates can be found in the indexes of Lentin & Williams (1993). Species names followed by "ms" are unpublished manuscript names.

***Proteacidites tuberculatus* spore-pollen Zone**
Age: Early Oligocene to Early Miocene
In Avon-1, cuttings sample at 725m and 740m are assigned to the *P. tuberculatus* Zone. Both are dominated (> 60%) by marine dinoflagellates of the *Operculodinium* Superzone, including *Protoellipsodinium simplex* ms. These assemblages are typical of the Lakes Entrance Formation and a significant component of the assemblages are undoubtedly caved. The spore-pollen component is dominated by *Nothofagidites* spp. (36%–62%), *Araucariacites australis* (12%–18%), and *Casuarina* (= *Haloragacidites harrisii*) pollen (7%–12%) and includes index species of the base of the Lower *P. tuberculatus* Zone (*Cyatheacidites annulatus*) as well as the species *Cyathidites subtilis* and *Acaciapollenites myriosporites* which are indicative of the Middle and Upper subzones. The latter species were both found in the lower sample and are considered to be caved. The shallowest sample also contains conspicuous reworking, including *Triorites magnificus* (the index species for the Middle *Nothofagidites asperus* Zone), *Lygistepollenites balmei* from the Paleocene and *Cicatricosisporites australiensis* characteristic of Strzelecki Group sediments.

In Burong-1, the sidewall cores between 635.8– 647.1m are assigned to the *P. tuberculatus* Zone on the presence of the index species *Cyatheacidites annulatus*. The presence of possible specimen of *Foveotriletes lacunosus* in the lower sample suggests the Middle subzone and a possible Late Oligocene age. A similar age was found in cuttings at the base of the Seaspray Group in Longford LWB-6 bore (Partridge, 1995).

In Comley-1, both samples yielded high diversity spore pollen species with *Cyatheacidites annulatus* recorded from both samples. The presence of *Granodiporites nebulosus* in the deeper sample restricts the age to the Lower *P. tuberculatus* Zone. Surprisingly microplankton were neither abundant or diverse.

In SW Bairnsdale-1, cuttings at 387.1–390.1 m yielded abundant spore-pollen with extremely rare dinoflagellates. It is uncertain whether the latter are in situ or derived from the overlying marls. The palynoflora is wholly dominated by *Nothofagidites* spp. (86%) but includes significant (2%) amounts of *Aglaoreidia qualumis*. The sample is provisionally assigned to the *P. tuberculatus* Zone, based on a single corroded specimen of the zone index species *Cyatheacidites annulatus*. If this specimens has been caved, then the sample will be Upper *N. asperus* Zone. Support for an Upper *N. asperus* to (Lower) *P. tuberculatus* Zone age is provided by occurrences of rare species not known to range into the Middle *N. asperus* Zone in the Gippsland Basin: *Diporites aspis* Pocknall & Mildenhall 1984, *Palaeocoprosmadites zelandiae* Pocknall 1982, and *Tetrapollis campbellbrownii* Macphail & Truswell 1993.

In Wonga Binda-1, the SWC at 590m is assigned to the *P. tuberculatus* Zone with low confidence since the spore-pollen yield was very low and age-diagnostic species are absent. The abundance of marine dinoflagellates, including species typical of the Lakes Entrance Formation such as *Protoellipsodinium simplex* ms and the lithological description of the adjacent sidewall cores suggest the sample is from the base of the Seaspray Group.

Upper *Nothofagidites asperus* spore-pollen Zone
Age: basal Early Oligocene
In Avon-1, two cuttings samples at 785m and 810m are assigned to this zone. They are distinguished from those in the overlying *P. tuberculatus* Zone by the paucity of marine dinoflagellates (< 2%) and higher relative abundance of *Phyllocladidites mawsonii* (9%–35%). Although species ranging no higher than the Upper *N. asperus* Zone were not recorded, the age determinations are supported by the persistence presence of *Aglaoreidia qualumis* and occurrences of species which first appear in the upper Middle *N. asperus* Zone, e.g. *Granodiporites nebulosus*, *Proteacidites stipplatus* and *P. tuberculatus*. The Middle *N. asperus* Zone index species *Triorites magnificus* is absent.

In Burong-1, the carbonaceous claystone sidewall core at 687.3 m is assigned an Upper *Nothofagidites asperus* Zone age based on the high relative abundance of *Nothofagidites* spp. and absence of index species of younger or older zones.

In Wonga Binda-1 cuttings at 672m yielded abundant spore-pollen, dominated by *Nothofagidites* spp. (51%) and *Phyllocladidites mawsonii* (21%). Marine dinoflagellates were rare (<1%) and almost certainly caved. The age determination is based on the absence of index species of younger and older zones. Support for the date is provided by rare occurrences of species which first appear within the Middle *N. asperus* Zone, e.g., *Aglaoreidia qualumis*, *Dryadopollis retequetrus*, *Granodiporites nebulosus* and *Verrucosisporites cristatus*. Minor reworking is indicated by species more typical of Early Palaeogene sediments within the basin: *Proteacidites recavus*, *Tetracolporites multistrixus* ms and a strongly verrucate subspecies of *Tricolpites phillipsii*.

Middle *Nothofagidites asperus* spore-pollen Zone
and
***Gippslandica extensa* microplankton Zone**
Age: Late Eocene

The two deepest cuttings in Avon–1 between 850–900m interval can be assigned to both zones on the presence of the index species *Triorites magnificus* and *Gippslandica extensa*. In situ microplankton are rare in the samples probably <1%. The higher microplankton percentage (6%) in the deeper sample is considered to reflect substantial cavings from the Lakes Entrance Formation. The spore-pollen assemblages are dominated by *Nothofagidites* spp. (48%–52%), while *Phyllocladidites mawsonii* (12%–20%) is still common to abundant. Other spore-pollen index species recorded include *Proteacidites reticulatus*, *P. stipplatus* and *Tricolpites thomasii*.

In Burong–1 sidewall core samples from this interval yielded diverse, *Nothofagidites* dominated (33%–50%), spore-pollen assemblages with rare to frequent occurrences of the Late Eocene marine dinoflagellate *Gippslandica extensa*. The upper zone boundary, picked at 713.2m, is defined by the highest record of the accessory index species *Tricolpites thomasii*. The same sample includes species which range no higher than the Middle *N. asperus* Zone, e.g. *Proteacidites adenanthoides* and *Santalumidites cainozoicus*. The highest occurrence of the zone index species *Triorites magnificus* recorded in this study is at 760.8m. Additional occurrences down section are 794.3m (in association with the accessory zone species *Anacolosidites sectus*, *Tricolpites thomasii*) and at 850.7m (in association with *Proteacidites adenanthoides* and *Santalumidites cainozoicus*). The open file ECL range chart has recorded *T. magnificus* in association with *Aglaoreidia qualumis*, *Dryadopollis retequetrus*, *Proteacidites adenanthoides* and *Santalumidites cainozoicus* at 859.5 m.

The lowest record of in situ *Gippslandica extensa* is at 866.5m where the dinoflagellate comprises 4% of the palynoflora. The base of the zone is placed at 887.0m, the lowest record of *Triorites magnificus*, and the zone accessory species *Anacolosidites sectus* and *Proteacidites reticulatus*.

In SW Bairnsdale–1 cuttings at 417.6–420.6m yielded a *Nothofagidites* dominated (58%) palynoflora which included the Middle *N.* asperus Zone accessory index species *Tricolpites thomasii* and species which range no higher than this zone, e.g. *Beaupreaidites verrucosus* and *Santalumidites cainozoicus*.

In Wonga Binda–1 the age determination of the cuttings at 786m is based on frequent *Gippslandica extensa* (3%) and the highest occurrence of the zone index species *Triorites magnificus* in a *Nothofagidites* spp. dominated (52%) palynoflora.

Lower *Nothofagidites asperus* spore-pollen Zone
Age: Middle Eocene
In Burong-1 the SWC at 935.1m is provisionally assigned to the Lower *N. asperus* Zone, based on the absence of Middle *N. asperus* Zone indicators in a *Nothofagidites* dominated palynoflora. Multiple specimens of *Nothofagidites falcatus*, *Tricolpites simatus* and *Tricolporites leuros* confirm the maximum age is Middle Eocene. Marine dinoflagellates are common (8%) in the assemblage, with the most abundant type being an unidentified species resembling *Areosphaeridium capricornum* (4%). The sample is unusual in that it yielded a fossil Droseraceae pollen, a taxon which in the Gippsland Basin is seldom if ever recorded outside the Early Eocene *Malvacipollis diversus* Zone

In Wonga Binda-1 the cuttings at 927 m yield a *Phyllocladidites mawsonii* dominated palynoflora with relatively low (11%-17%) amounts of *Nothofagidites* spp., *Proteacidites* spp. and *Haloragacidites harrisii*. The provisional age determination of Lower *N. asperus* Zone is based on rare specimens of *Conbaculites apiculatus* ms and *Tricolporites leuros*.

***Lygistepollenites balmei* Zone**
Age: Paleocene
In Burong-1 the top of the *L. balmei* Zone at 997.9m is characterised by an assemblage dominated by spores (51%) and gymnosperm pollen (30%), in particular *Gleicheniidites* and *Podocarpidites*. Angiosperm pollen comprises less than 20% of the assemblage, with only *Proteacidites* spp. and *Periporopollenites* spp. being frequent (4%-7%). The sample is confidently assigned to the Upper *L. balmei* Zone age, based on multiple specimens of the index species *Lygistepollenites balmei* and *Cyathidites gigantis* associated with species which range no higher than this zone, e.g. *Gambierina rudata* and *Latrobosporites amplus*. The next SWC at 1135.1m may be part of the same biostratigraphic unit, based on an equivocal specimen of *Nothofagidites endurus* in a mud-contaminated palynoflora dominated by Lower *N. asperus* Zone species. The deeper samples between 1151.2m to 1221.9m are provisionally assigned to an informal middle *L. balmei* Subzone based on the absence of Upper *L. balmei* Zone indicators such as *Cyathidites gigantis* and *Proteacidites incurvatus* in an assemblage containing common *Lygistepollenites balmei* and *Polycolpites langstonii* at 1151.2m. The age determination is supported by common to abundant *Periporopollenites polyoratus* and infrequent *Gambierina rudata*, *Haloragacidites harrisii* and *Tetracolporites multistrixus*.

The deepest sidewall core analysed in Burong-1 at 1235.4m yielded mostly *N. asperus* Zone mud contaminants. Species recorded from this sample in the original palynological report include the Middle *N. asperus* Zone accessory index species *Anacolosidites sectus*, and an unexplained specimen of *Spinizonocolpites prominatus*, a species restricted to the Early Eocene *Malvacipollis diversus* Superzone.

In Wonga Binda-1 the cuttings from the *L. balmei* Zone between 1071-1263m interval yielded mostly caved *Nothofagidites* dominated palynofloras which include (at 1071m) zone index species for the Middle and Lower *N. asperus* Zones including *Triorites magnificus* and *Proteacidites asperopolus*. However, the section can be confidently dated as Paleocene, based on low numbers of species which range no higher than the *L. balmei* Zone (*Gambierina rudata, Lygistepollenites balmei, Nothofagidites endurus*). It is not possible to recognise the subzones as the majority of species which first appear in the Upper *L. balmei* Zone range into the *N. asperus* Superzone. Amongst the caved component are index species which are restricted to the Early Eocene *M. diversus* and *P. asperopolus* Zones, e.g. *Myrtaceidites tenuis* at 1071m and *Proteacidites tuberculiformis* at 1263m.

Upper *Tricolpites longus* Zone
Age: Late Maastrichtian
In Wonga Binda-1 the cuttings at 1332 m are confidently assigned to the Upper *Tricolpites longus* Zone, based on frequent *Gambierina rudata* (> 1%) and multiple specimens of *Battenipollis sectilis*, *Tricolpites waiparaensis* and *Tricolporites lilliei* in a largely caved Middle *N. asperus* Zone palynoflora. The age determination is supported by rare grains of *Tetracolporites verrucosus* not recorded higher in the well.

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Table-2: Interpretative Palynological Data for Avon-1

Sample Type	Depth Metres	Depth Feet	Spore-Pollen Zone (Microplankton Zones)	*CR	Comments and Key Species Present
Cuttings	725	2379	*P. tuberculatus*	D2	Microplankton 66% *Cyatheacidites annulatus*. *Triorites magnificus* present but interpreted as reworked.
Cuttings	740	2428	*P. tuberculatus*	D1	Microplankton 61%. *Cyatheacidites annulatus, Cyathidites subtilis* and *Acaciapollenites myriosporites*.
Cuttings	785	2575	Upper *N. asperus*	D1	Microplankton 2%. *Nothofagidites* spp. abundant. *Aglaoreidia qualumis* frequent.
Cuttings	810	2657	Upper *N. asperus*	D1	Microplankton <<1%. *P. mawsonii* abundant. *Granodiporites nebulosus* and *Proteacidites tuberculatus* present.
Cuttings	850	2789	Middle *N. asperus* (*G. extensa*)	D1 D3	Microplankton <<1%. LADs *Triorites magnificus, Tricolpites thomasii* and dinoflagellate *Gippslandica extensa*.
Cuttings	900	2953	Middle *N. asperus* (*G. extensa*)	D1 D3	Microplankton 6%. *Triorites magnificus* and *Gippslandica extensa* present.

*CR = Confidence Ratings

Table–3: Interpretative Palynological Data for Burong–1.

Sample Type	Depth Metres	Depth Feet	Spore-Pollen Zone (Microplankton Zones)	*CR	Comments and Key Species Present
SWC 30	635.8	2086	Middle *P. tuberculatus*	B1	*Cyatheacidites annulatus* present.
SWC 29	647.1	2123	Middle *P. tuberculatus*	B1	FADs for *Cyatheacidites annulatus* and *Foveotriletes lacunosus*.
SWC 26	687.3	2255	Upper *N. asperus*	B4	*Nothofagidites* spp. dominant without younger or older indicator species.
SWC 25	713.2	2340	Middle *N. asperus* (*G. extensa*)	B2 B3	LADs for *Proteacidites adenanthoides*, *Santalumidites cainozoicus* and *Tricolpites thomasii*.
SWC 23	760.8	2496	Middle *N. asperus*	B1	LAD for *Triorites magnificus*. *Aglaoreidia qualumis* and *Tricolpites thomasii* present.
SWC 21	794.3	2606	Middle *N. asperus* (*G. extensa*)	B1 B3	Microplankton 3%. *Anacolosidites sectus*, *T. magnificus* and *Tricolpites thomasii* present.
SWC 19	850.7	2791	Middle *N. asperus* (*G. extensa*)	B1 B3	*Triorites magnificus* frequent. *Proteacidites rectomarginis* present.
SWC 18	859.5	2820	Middle *N. asperus* (*G. extensa*)	B1 B3	*Triorites magnificus* present.
SWC 17	866.5	2843	Middle *N. asperus* (*G. extensa*)	B1 B3	Microplankton 4%. *Proteacidites leightonii* present. FAD *Gippslandica extensa*.
SWC 16	887.0	2910	Middle *N. asperus*	B1	FADs *T. magnificus* and *A. sectus* with *Proteacidites reticulatus* present.
SWC 14	935.1	3068	Lower *N. asperus*	B1	Microplankton 7%. FADs *Nothofagidites falcatus*, *Tricolpites simatus*, *Proteacidites recavus* and *Tricolporites leuros*.
SWC 11	997.9	3274	Upper *L. balmei*	B1	LAD for *Lygistepollenites balmei* with *Camarozonosporites bullatus*, *Cyathidites gigantis* and *Gambierina rudata* present.
SWC 07	1135.1	3724	Lower *N. asperus*	B1	Sample out of place. Common *Nothofagidites* spp. with *Proteacidites asperopolus*, *Tricolporites moultoni* ms and *Tricolpites simatus*.
SWC 06	1151.2	3777	*L. balmei*	B1	*Lygistepollenites balmei*, *Gambierina rudata* and *Polycolpites langstonii* recorded.
SWC 05	1167.1	3829	Indeterminate		Lower diversity assemblage recorded in original palynological report.
SWC 03	1205.8	3956	*L. balmei*	B1	FAD for *Lygistepollenites balmei* with *Gambierina rudata* present.
SWC 02	1221.9	4009	*L. balmei*	B3	FAD for *Gambierina rudata*.
SWC 01	1235.4	4053	*N. asperus*	B2	Sample out of place: SWC suspected to include contamination from cutting or drilling mud.

Table-4: Interpretative Palynological Data

Sample Type	Depth Metres	Depth Feet	Spore-Pollen Zone (Microplankton Zones)	*CR	Comments and Key Species Present
Comley-1					
Core-1	478.6–478.8	1570.2–1570.9	*P. tuberculatus*	A2	Very low yield, but index species *Cyatheacidites annulatus* recorded.
Core-1	481.8–482.0	1580.7–1581.4	Lower *P. tuberculatus*	A1	Microplankton 4%. *Nothofagidites* spp. 62%. *C. annulatus* and *Granodiporites nebulosus* present
South West Bairnsdale-1					
Cuttings	387.1-390.1	1270–80	*P. tuberculatus*	D1	*Nothofagidites* spp. 86%. *Cyatheacidites annulatus* present and common *Aglaoreidia qualumis*. No microplankton recorded.
Cuttings	417.6–420.6	1370–80	Middle *N. asperus*	D4	*Nothofagidites* spp. 67%. *Proteacidites rectomarginis*, *Santalumidites cainozoicus* and *Tricolpites thomasii* key species recorded. Rare microplankton are all caved.
West Seacombe-1					
SWC 17	905.3	2970.0	*N. asperus*	B5	Very low yield gave only a few palynomorphs which indicate only broad Middle Eocene to Early Oligocene age.

Table-5: Interpretative Palynological Data for Wonga Binda-1

Sample Type	Depth Metres	Depth Feet	Spore-Pollen Zone (Microplankton Zone)	*CR	Comments and Key Species Present
Cuttings	590	1936	*P. tuberculatus*	D5	Dominated by microplankton consistent with marly lithology.
Cuttings	672	2205	Upper *N. asperus*	D1	Microplankton <1%. *Granodiporites nebulosus* and *Aglaoreidia qualumis* key species present.
Cuttings	786	2579	Middle *N. asperus* (*G. extensa*)	D1 D3	Microplankton ~3%. LADs for *Triorites magnificus* and *Gippslandica extensa*.
Cuttings	927	3041	Lower *N. asperus*	D4	Microplankton <<1%. *Phyllocladidites mawsonii* 50% *Nothofagidites* spp. 17%. *Tricolporites leuros* present without younger index species.
Cuttings	1071	3514	*L. balmei*	D3	Microplankton ~2%. LAD of *Lygistepollenites balmei* in largely caved assemblage including index species *T. magnificus*, *Proteacidites asperopolus* and *Myrtaceidites tenuis*.
Cuttings	1185	3888	*L. balmei*	D3	Microplankton <<1%. *Lygistepollenites balmei* (4 specimens) and *Nothofagidites endurus* present in largely caved assemblage.
Cuttings	1263	4144	*L. balmei*	D3	Microplankton ~1%. *Lygistepollenites balmei*, with caved *Proteacidites asperopolus* and *P. tuberculiformis* present.
Cuttings	1332	4370	Upper *T. longus*	D2	Microplankton ~2%. Frequent *Gambierina rudata* with *Battenipollis sectilis*, *Tricolporites lilliei*, *Tricolpites waiparaensis*, *Tetracolporites verrucosus* and *Tetradopollis securus*.

Confidence Ratings

The Confidence Ratings assigned to the zone identifications on Tables–2 to 5 are quality codes used in the STRATDAT relational database developed by the Australian Geological Survey Organisation (AGSO) as a National Database for interpretive biostratigraphic data. Their purpose is to provide a simple relative comparison of the quality of the zone assignments. The alpha and numeric components of the codes have been assigned the following meanings:

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–6: Basic Sample Data for Avon–1

Sample Type	Depth Metres	Depth Feet	Lithology	Sample Wt (g)	Residue Yield
Cuttings	725	2379	Marl.	10.4	Low
Cuttings	740	2428	Quartz sand and marl.	10.2	Low
Cuttings	785	2575	90% carbonaceous claystone to coal; 10% quartz sand.	9.5	Moderate
Cuttings	810	2657	95% brown coal to carbonaceous claystone; 5% sand.	10.0	High
Cuttings	850	2789	95% medium grey carbonaceous claystone; 5% sand and coal.	10.0	High
Cuttings	900	2953	95% dark grey–black carbonaceous claystone to siltstone; 5% sand and coal.	10.0	High
			AVERAGE:	**10.0**	

Table–7: Basic Palynomorph Data for Avon–1

Sample Type	Depth Metres	Depth Feet	Palynomorph Concentration	Palynomorph Preservation	Number S-P spp*	Microplankton Abundance	MP %	Number MP spp*
Cuttings	725	2379	High	Moderate	20+	Abundant		6+
Cuttings	740	2428	High	Good	40+	Abundant	61%	8+
Cuttings	785	2575	Moderate	Good	50+	Low	2%	2+
Cuttings	810	2657	Moderate	Good	45+	Very low	<<1%	1+
Cuttings	850	2789	High	Good	70+	Very low	<<1%	1+
Cuttings	900	2953	Moderate	Fair–good	60+	Low–common	6%	7+
				Average Diversity:	**47+**			**4+**

***Diversity:**
Very low = 1–5 species
Low = 6–10 species
Moderate = 11–25 species
High = 26–74 species
Very high = 75+ species

Note: Spore-pollen and microplankton diversity excludes reworked Permian species and some of the caved species

Table-8: Basic Sample Data for Burong-1

Sample Type	Depth Metres	Depth Feet	Lithology	Sample Wt (g)	Residue Yield
SWC 30	635.8	2086	Claystone – grey–green, calcareous massive.	NA	
SWC 29	647.1	2123	Claystone – grey–green, calcareous massive.	NA	
SWC 26	687.3	2255	Claystone – dark brown, carbonaceous, slightly calcareous, sub–fissile with minor silt laminae.	NA	
SWC 25	713.2	2340	Dark grey claystone with fine light grey sandstone laminae up to 4mm.	10.5	High
SWC 23	760.8	2496	Med grey–brown hard claystone with light grey sandstone laminae <2mm.	10.0	High
SWC 21	794.3	2606	Light brown–grey siltstone to fine sandstone with minor (<10%) wavy carbonaceous laminar.	11.0	Moderate
SWC 19	850.7	2791	Light grey–brown fine grained sandstone with wavy carbonaceous siltstone laminae <1–2.5mm.	10.5	High
SWC 18	859.5	2820	Claystone – medium grey, silty, massive, sub-fissile, carbonaceous.	NA	
SWC 17	866.5	2843	Dark brown–grey carbonaceous claystone.	7.5	High
SWC 16	887.0	2910	Medium brown claystone with irregular carbonaceous layers.	10.1	High
SWC 14	935.1	3068	Medium brown grey hard siltstone with trace carbonaceous flecks.	10.2	High
SWC 11	997.9	3274	Medium light brown–grey claystone with minor carbonaceous material.	10.9	High
SWC 07	1135.1	3724	Medium brown grey claystone with fine wavy laminae.	9.7	High
SWC 06	1151.2	3777	Medium grey claystone with carbonaceous fragments and flecks.	10.1	High
SWC 05	1167.1	3829	Siltstone – light grey.	NA	
SWC 03	1205.8	3956	Claystone – medium grey, carbonaceous calcareous.	NA	
SWC 01	1235.4	4053	Siltstone – green with fine to medium greenish–black (chlorite?) grains embedded.	NA	
			AVERAGE:	**10.1**	

Table–9: Basic Palynomorph Data for Burong–1

Sample Type	Depth Metres	Depth Feet	Palynomorph Concentration	Palynomorph Preservation	Number S-P spp*	Microplankton Abundance	MP %	Number MP spp*
SWC 30	635.8	2086	NR	NR	30+	Abundant	NA	10+
SWC 29	647.1	2123	Moderate	Fair	36+	Abundant	NA	10+
SWC 26	687.3	2255	Moderate	Fair	38+	NR		
SWC 25	713.2	2340	Moderate	Poor–fair	60+	Very rare	<<1%	1+
SWC 23	760.8	2496	High	Fair	75+	Very rare		1
SWC 21	794.3	2606	High	Good	45+	Rare	3%	6+
SWC 19	850.7	2791	High	Fair–good	70+	Rare	<<1%	3+
SWC 18	859.5	2820	Moderate	Good	50+	Rare	NA	1+
SWC 17	866.5	2843	Low	Poor	40+	Common	4%	2+
SWC 16	887.0	2910	Moderate	Poor–fair	40+	NR		
SWC 14	935.1	3068	Moderate	Poor–fair	45+	Common	7%	5+
SWC 11	997.9	3274	High	Good	45+	NR		
SWC 07	1135.1	3724	Low	Poor–fair	45+	NR		
SWC 06	1151.2	3777	Moderate	Poor–fair	50+	NR		
SWC 05	1167.1	3829	NR	NR	9+	NR		
SWC 03	1205.8	3956	Moderate	Poor–fair	28+	NR		
SWC 02	1221.9	4009	NA	NA	35+	NR		
SWC 01	1235.4	4053	Low	Fair–good	29+	NR		
				AVERAGE:	**43+**			

***Diversity:**
Very low = 1–5 species
Low = 6–10 species
Moderate = 11–25 species
High = 26–74 species
Very high = 75+ species

Note: Spore-pollen and microplankton diversity excludes reworked Permian species and some of the caved species

Table–10: Basic Sample Data

Sample Type	Depth Metres	Depth Feet	Lithology	Sample Wt (g)	Residue Yield
Comley–1					
Core–1	481.8–482.0	1580.7–1581.4	Medium grey mottled sandstone (bioturbated).	NA	Very low
Core–1	478.6–478.8	1570.2–1570.9	Medium grey green hard sandstone (core now oxidised with salt efflorescence making lithology difficult to interpret).	10.3	Low
South West Bairnsdale–1					
Cuttings	387.1	1270–80	Brown claystone with quartz sandstone minor caved marl.	10.1	High
Cuttings	417.6	1370–80	90% quartz sand and gravel; 5% grey claystone.	2.8	High
West Seacombe–1					
SWC 17	905.3	2970.0	Brown grey (glauconitic?) sandstone.	12.3	Very low

Table–11: Basic Palynomorph Data

Sample Type	Depth Metres	Depth Feet	Palynomorph Concentration	Palynomorph Preservation	Number S-P spp*	Microplankton Abundance	MP %	Number MP spp*
Comley–1								
Core–1	478.6–478.8	1570.2–1570.9	Low	Poor	31+	Frequent	5%	4+
Core–1	481.8–482.0	1580.7–1581.4	High	Very good	45+	Frequent	4%	3+
South West Bairnsdale–1								
Cuttings	387.1	1270–80	Very high	Fair	3+	NR		
Cuttings	417.6	1370–80	Very low	Fair–good	27+	Very rare	<1%	1
West Seacombe–1								
SWC 17	905.3	2970.0	Low	Poor–fair	14	Rare	~1%	1

***Diversity:** Very low = 1–5 species
Low = 6–10 species
Moderate = 11–25 species
High = 26–74 species
Very high = 75+ species

Note: Spore-pollen and microplankton diversity excludes reworked Permian species and some of the caved species

Table–12: Basic Sample Data for Wonga Binda–1

Sample Type	Depth Metres	Depth Feet	Lithology	Sample Wt (g)	Residue Yield
Cuttings	590	1936	Light grey green marl.	10.6	Low
Cuttings	672	2205	Medium grey claystone/sandstone.	11.6	Moderate
Cuttings	786	2579	Dark grey carbonaceous claystone.	10.1	High
Cuttings	927	3041	Dark grey–black carbonaceous claystone–coal 80%; Quartz sandstone 20%.	10.3	High
Cuttings	1071	3514	Black claystone to coal 75%; Quartz sandstone 25%.	10.4	High
Cuttings	1185	3888	Coarse white quartz sand 80%; Dark grey carbonaceous claystone 20%.	14.0	Moderate
Cuttings	1263	4144	Medium–dark brown claystone 90%; Quartz sandstone 10%.	10.9	Low
Cuttings	1332	4370	Dark grey–brown claystone to siltstone 90%; Quartz sandstone 10%.	13.8	Low
			AVERAGE:	**11.5**	

Table–13: Basic Palynomorph Data for Wonga Binda–1

Sample Type	Depth Metres	Depth Feet	Palynomorph Concentration	Palynomorph Preservation	Number S-P spp*	Microplankton Abundance	MP %	Number MP spp*
Cuttings	590	179.8	High	Poor–fair	15+	Abundant		6+
Cuttings	672	204.8	High	Good	50+	Very low	<1%	2+
Cuttings	786	239.6	Moderate	Poor–fair	45+	Low	3%	2+
Cuttings	927	282.6	Low	Good	35+	Very low	<<1%	2
Cuttings	1071	326.4	Low	Good	45+	Low	2%	4+
Cuttings	1185	361.2	Low	Good	50+	Very low	<<1%	3+
Cuttings	1263	384.9	Low	Good	50+	Low	1%	3
Cuttings	1332	405.9	Moderate	Fair–good	60+	Low	2%	2
				Average:	**43+**			**3+**

***Diversity:**
Very low = 1–5 species
Low = 6–10 species
Moderate = 11–25 species
High = 26–74 species
Very high = 75+ species

Note: Spore-pollen and microplankton diversity excludes reworked Permian species and some of the caved species

Table–14: Selected Palynomorph Abundance Data for Avon-1						
Sample Type:	CTS	CTS	CTS	CTS	CTS	CTS
Depth in metres:	725	740	785	810	850	900
Depth in feet:	2379	2428	2575	2657	2789	2953
TRILETE SPORES undiff.				0.7%		
Baculatisporites spp.		1.7%			0.5%	
Cyathidites spp. large >40μm		0.9%				
Cyathidites spp. small <40μm	5.0%	2.6%				
Gleicheniidites/Clavifera spp.	X	0.9%	2.2%	1.4%	1.5%	1.9%
MONOLETES SPORES undiff:						
Laevigatosporites spp.	1.7%				X	
Total Spores:	**7%**	**6%**	**2%**	**2%**	**2%**	**2%**
GYMNOSPERMS		0.9%				
Araucariacites australis	18.3%	12.2%	1.4%		0.5%	0.6%
Dacrrycarpites australiensis			X	X		0.6%
Dilwynites spp.		0.9%			1.0%	
Lygistepollenites florinii	5.0%	X	2.9%	4.9%	3.0%	5.8%
Microcachyridites antarticus			0.7%	2.1%	0.5%	
Phyllocladidites mawsonii	1.7%	1.7%	9.4%	35.0%	12.5%	20.1%
Podocarpidites spp.	6.7%	4.3%	2.9%	4.9%	9.5%	7.1%
Trichotomosulcites subgranulatus	1.7%	1.7%	2.2%	0.7%	3.5%	3.9%
Total Gymnosperms:	**33%**	**22%**	**19%**	**48%**	**31%**	**38%**
ANGIOSPERM POLLEN	3.3%	0.9%	0.7%		6.0%	0.6%
Aglaoreidia qualumis			X	2.1%		
Casuarina (H. harrisii)	11.7%	7.0%	6.5%	5.6%	2.5%	5.2%
Dicotetradites clavatus						0.6%
Ericipites spp.	3.3%	0.9%	0.7%	0.7%	0.5%	0.6%
Ilexpollenites spp.	X		X	X	X	0.6%
Liliacidites spp.		X	X		2.0%	
Malvacipollis spp.	X	X	X		1.0%	0.6%
Myrtaceidites spp.	1.7%	0.9%	X		0.5%	
Nothofagidites asperus/goniatus	3%	3%	2%		2%	1%
N. brachyspinulosus/flemingii	2%	3%	4%	2%	8%	5%
N. deminutus/vansteenisii	3%	4%	11%	11%	7%	10%
N. emarcidus/heterus/falcatus	28%	52%	50%	27%	35%	32%
Periporopollenites spp.					0.5%	0.6%
Proteacidites spp.	X	X	1.4%	X	1.5%	1.3%
Tricolp(or)ates spp.	3.3%	X	2.2%	2.1%	2.0%	0.6%
Total Angiosperms:	**60%**	**72%**	**78%**	**50%**	**68%**	**60%**
Total Spore-Pollen Count	60	115	139	143	200	154
MICROPLANKTON						
Dinoflagellates undiff:	11%	9%				
Achomosphaera spp.		15%				
Cyclopsiella vieta	3%					
Dapsilidinium pseudocolligerum	1%					
Lingulodinium machaerophorum		1%				14%
Operculodinium centrocarpum	6%	27%				14%
Protoellipsodinium spp.	3%	4%				
Spiniferites spp.	77%	43%	100%	X		71%
Microplankton % of total count:	66%	39%	2%			4%
TOTAL COUNT SP + MP	177	189	142	143	200	161

Table–15: Selected Species Distribution for Avon-1						
Sample Type:	CTS	CTS	CTS	CTS	CTS	CTS
Depth in metres:	725	740	785	810	850	900
Depth in feet:	2379	2428	2575	2657	2789	2953
SPORE-POLLEN						
Acaciapollenites myriosporites		CV				
Aglaoreidia qualumis			X	X		X
Banksieacidites arcuatus			X	X		
Banksieacidites elongatus	X	X			X	
Beaupreaidites elegansiformis	X					X
Beaupreaidites trigonalis ms					X	X
Beaupreaidites verrucosus				cf	X	
Bluffopollis scabratus		X	X			
Cicatricosisporites australiensis	RW					
Concolpites leptos					X	
Cupanieidites orthoteichus		X			X	
Cyatheacidites annulatus	**X**	**X**				
Cyathidites subtilis		CV				
Cyperaceaepollis neogenicus			X			
Foveotriletes balteus				X	X	X
Foveotriletes palaequetrus		X				
Geuttardidites sp.	X					
Granodiporites nebulosus				X		
Herkosporites elliottii	X	X				
Latrobosporites crassus				X	X	
Latrobosporites marginatus	X	X	X	X		X
Lygistepollenites balmei	RW					
Malvacipollis subtilis	X	X	X		X	X
Matonisporites ornamentalis		X				
Milfordia incerta				X	X	
Nothofagidites asperus	**X**	**X**	**X**	**X**	**X**	**X**
Nothofagidites flemingii	X	X	X	X	X	X
Nothofagidites falcatus	X	X	X	X	X	X
Nothofagidites goniatus	X			X	X	X
Periporopollenites demarcatus	X		X	X	X	X
Periporopollenites vesicus			X	X	X	
Peromonolites vellosus					X	
Polycolpites esobalteus	X	X				
Proteacidites adenanthoides	RW				**X**	**X**
Proteacidites annularis	X	X	X	X	X	X
Proteacidites crassus					X	X
Proteacidites latrobensis	X				X	
Proteacidites obscurus	cf		X	X	X	X
Proteacidites pachypolus						**X**

Table–15: Selected Species Distribution for Avon–1						
Sample Type:	CTS	CTS	CTS	CTS	CTS	CTS
Depth in metres:	725	740	785	810	850	900
Depth in feet:	2379	2428	2575	2657	2789	2953
Proteacidites reticulatus						X
Proteacidites rugulatus					X	
Proteacidites stipplatus			X		X	X
Proteacidites truncatus	X					
Proteacidites tuberculatus				cf	X	
Sapotaceoidaepollenites rotundus			X			
Stereisporites australis	X	X			X	X
Tricolpites thomasii					X	
Tricolporites adelaidensis			X	X	X	X
Tricolporites leuros	X		X	X	X	X
Tricolpites paenestriatus					X	X
Tricolporites sphaerica	X				X	X
Triorites magnificus	RW				X	X
Triporopollenites ambiguus						X
Verrucosisporties cristatus	X					
Verrucosisporties kopukuensis	X	X			X	X
MICROPLANKTON						
Achomosphaera ramulifera	X					X
Apteodinium australiense	cf					
Cyclopsiella vieta	X	X				X
Diphyes ariensis ms		X				
Gippslandica extensa					X	X
Impagidinium spp.	X	X				X
Lingulodinium machaerophorum	cf					
Nematosphaeropsis spp.	X					
Operculodinium centrocarpum	X	X	X		X	X
Paralecaniella indentata		X				
Protoellipsodinium simplex ms	X	X	X			CV
Pyxidinopsis pontus ms	X					
Spinidinum spp.	X					
Systematophora placacanthum	cf	cf				
Tectatodinium spp.	X					
X = Present						
RW = Reworked species						
CV = Caved species						
cf = Compare with						

Table-16: Selected Palynomorph Abundance Data for Burong-1

Sample Type:	SWC 25	SWC 23	SWC 21	SWC 19	SWC 17	SWC 16	SWC 14	SWC 11	SWC 07	SWC 06
Depth in metres:	713.2	760.8	794.3	850.7	866.5	887.0	935.1	997.9	1135.1	1151.2
Depth in feet:	2340	2496	2606	2791	2843	2910	3068	3274	3724	3777
TRILETE SPORES undiff.					1%		2%	1%	1%	1%
Baculatisporites spp.	1%						1%		1%	1%
Cyathidites spp. large >40μm										
Cyathidites spp. small <40μm				1%	1%		1%	6%	4%	2%
Gleicheniidites/Clavifera spp.		1%						31%		3%
Herkosporites elliottii										1%
Stereisporites spp.								1%	1%	
Verrucosisporites kopukuensis				1%	1%	1%			1%	
MONOLETES SPORES undiff:								4%		
Laevigatosporites spp.		3%		1%				2%	7%	1%
Polypodiisporites spp.					1%			5%		
Total Spores:	1%	4%		3%	4%	1%	3%	50%	15%	9%
GYMNOSPERMS										1%
Araucariacites australis	2%	2%	1%	1%	4%		2%	1%		3%
Dilwynites spp.				1%	1%		1%			1%
Lygistepollenites balmei								X		5%
Lygistepollenites florinii	3%	2%	7%	9%	2%	2%	7%	4%	5%	2%
Microcachyridites antarticus		1%				1%	1%		1%	
Phyllocladidites mawsonii	22%	6%	7%	7%	13%	4%	13%	6%	5%	16%
Podocarpidites spp.	7%	1%	7%	11%	7%	7%	5%	21%	9%	34%
Trichotomosulcites subgranulatus	6%	1%		2%	2%	1%		3%	1%	2%
Total Gymnosperms:	40%	14%	22%	31%	29%	16%	29%	34%	21%	63%
ANGIOSPERM POLLEN			4%	1%	4%	4%	3%	1%	8%	
Casuarina (H. harrisii)	8%	9%	20%	6%	9%	6%	30%		5%	1%
Dicotetradites clavatus				1%			1%	1%		
Ericipites spp.	1%	1%	1%	1%		2%			1%	1%
Gambierina rudata										1%
Ilexpollenites spp.	1%			1%	1%	1%	1%			
Liliacidites spp.			1%	1%	1%				1%	
Malvacipollis spp.	2%	1%			1%		1%			1%
Myrtaceidites spp.		1%							1%	
N. asperus/goniatus		1%	1%	1%	1%	1%			1%	
N. brachyspinulosus/flemingii	1%	4%	2%	7%	1%	6%	6%		3%	
N. deminutus/vansteenisii	3%	6%	4%	9%	5%	3%	2%		1%	
N. emarcidus/heterus/falcatus	36%	51%	36%	35%	41%	46%	14%		25%	9%
Periporopollenites spp.	2%	2%		1%		3%	1%	4%	1%	13%
Proteacidites spp.	3%	4%	7%	2%	1%	11%	5%	8%	13%	1%
Tricolp(or)ates spp.	2%	3%	3%	1%	2%	3%	4%	2%	4%	1%
Total Angiosperms:	59%	83%	78%	66%	67%	84%	68%	16%	64%	28%
Total Spore-Pollen Count	**139**	**138**	**138**	**141**	**137**	**153**	**165**	**163**	**152**	**149**
MICROPLANKTON										
Dinoflagellates undiff:							77%			
Gippslandica extensa			50%		100%					
Operculodinium centrocarpum		X	25%				23%			
Spiniferites spp.			25%				X			
Microplankton % of total count:			3%		4%		7%			
TOTAL COUNT SP + MP	**139**	**138**	**142**	**141**	**142**	**153**	**178**	**163**	**152**	**149**

Table-17: Selected Species Distribution for Burong-1																		
Sample Type:	SWC 30	SWC 29	SWC 26	SWC 25	SWC 23	SWC 21	SWC 19	SWC 18	SWC 17	SWC 16	SWC 14	SWC 11	SWC 07	SWC 06	SWC 05	SWC 03	SWC 02	SWC 01
Depth in metres:	635.8	647.1	687.3	713.2	760.8	794.3	850.7	859.5	866.5	887.0	935.1	997.9	1135.1	1151.2	1167.1	1205.8	1221.9	1235.4
Depth in feet:	2086	2123	2255	2340	2496	2606	2791	2820	2843	2910	3068	3274	3724	3777	3829	3956	4009	4053
SPORE-POLLEN																		
Aglaoreidia qualumis					X			E										E
Anacolosidites sectus					X	X				X								E
Araucariacites australis	E	E	E	X	X	X	X	E	X	X	X			X				
Basopollis otwayensis ms														X		X		
Beaupreaidites elegansiformis				X				E										E
Beaupreaidites trigonalis ms						X	X		X	X								E
Beaupreaidites verrucosus							X						CV					
Bysmapollis emarcitus														X				
Camarozonosporites bullatus												X						
Clavifera triplex												X		X				
Cupanieidites orthoteichus		E		X	X	X	X	E	X		X		CV					E
Cyatheacidites annulatus	E	E																
Cyathidites gigantis												X						
Cyathidites paleospora							X		X		X	X		X		X		E
Cyathidites splendens					X		X					X	X			E		
Dacrycarpites australiensis	E		X	X	X		X	E		X							E	
Dicotetradites clavatus					X	X	X		X	X	X	X						
Dilwynites granulatus	E	X	E		X	X	X	E	X		X			X				E
Dilwynites tuberculatus	E	E			X		X	X						X				
Dryadopollis retequetrus				X				E										
Ericipites crassiexinus		E		X	X			E		X								
Foveotriletes balteus				X	X				X		X							
Foveotriletes lacunosus		X																
Gambierina rudata														X		X	E	
Gemmatricolporites gestus								X										
Gleicheniidites circinidites	E	E		X	X		X	E		X	X	X	X	X		X	E	
Haloragacidites harrisii	E	X	X	X	X	X	X	X	X	X	X	X	X	X	E	X	E	X
Herkosporites elliottii														X		E		
Ilexpollenites spp.		E	E	X		X	X	E	X	X	X	X					E	E
Ischyosporites irregularis ms			X	X	X	X	X	X	X									
Kuylisporites waterbolkii		E																
Laevigatosporites major	E	E	E														E	
Laevigatosporites ovatus	E	E	E	X			X	E	X			X	X	X	E	X	E	E
Latrobosporites amplus												X		X		X		
Latrobosporites crassus							X				X					E		E
Latrobosporites marginatus				X						X								
Lygistepollenites balmei												X		X		X		
Lygistepollenites florinii	E	E	X	X	X	X	X	X	X	X	X	X	X	X	E	X	E	
Malvacipollis robustus ms					X		X		X	X	X							

Table–17: Selected Species Distribution for Burong–1

Sample Type:	SWC 30	SWC 29	SWC 26	SWC 25	SWC 23	SWC 21	SWC 19	SWC 18	SWC 17	SWC 16	SWC 14	SWC 11	SWC 07	SWC 06	SWC 05	SWC 03	SWC 02	SWC 01
Depth in metres:	635.8	647.1	687.3	713.2	760.8	794.3	850.7	859.5	866.5	887.0	935.1	997.9	1135.1	1151.2	1167.1	1205.8	1221.9	1235.4
Depth in feet:	2086	2123	2255	2340	2496	2606	2791	2820	2843	2910	3068	3274	3724	3777	3829	3956	4009	4053
Malvacipollis subtilis	E	E	X	X	X	X	X	X	X	X		X	CV	X			E	E
Matonisporites ornamentalis			X		X		X		cf									
Milfordia homeopunctatus							X											E
Milfordia incerta								E	cf									X
Myrtaceidites parvus/mesonesus	E	E	E	X	X			X					CV				E	
Myrtaceidites verrucosus						X	X		X									
Nothofagidites asperus	E		E	X		X	X	X	X		cf						E	
Nothofagidites deminutus	E	X	E					X									E	X
Nothofagidites falcatus		X			X	X	X	X	X	X	X							
Nothofagidites flemingii		E	X	X	X	X	X	X	X	X						X	E	X
Nothofagidites goniatus				X	X	X	X	E	X	X	X		CV				E	
Nothofagidites vansteenisii		E	X	X	X	X	X	X	X	X	X	X						X
Paripollis ochesis							X											E
Peninsulapollis gillii												X				X	E	
Periporopollenites demarcatus	E	E	E	X	X	X	X	X	X	X	X	X	X	X				
Periporopollenites polyoratus								X					X	X		E	E	E
Periporopollenites vesicus	E	E		X		X	X											
Peromonolites densus							X							X				
Peromonolites vellosus			X													E		
Phyllocladiidites mawsonii	E	E	X	X	X	X	X	X	X	X	X	X	X	X	E	X	E	X
Phyllocladiidites reticulosaccatus												X	X	X				
Polycolpites esobalteus				X				X										
Polycolpites langstonii														X				
Pseudowinterapollis cranwellae				X				E										
Proteacidites adenanthoides				X	X	cf	X	X		X	X					E		E
Proteacidites annularis		X	X	X	X	X	X	E	X	X	X	X				E	E	E
Proteacidites asperopolus													CV					
Proteacidites crassus				X	X		X			X	X							
Proteacidites differentipollis				X					cf	X			CV					
Proteacidites kopiensis					X													
Proteacidites latrobensis							X		X	X								
Proteacidites leightonii							X		X									
Proteacidites obscurus	E			X	X	X	X			X								
Proteacidites pachypolus				X						X	X							
Proteacidites pseudomoides			X				X										E	
Proteacidites recavus							X			X	X							
Proteacidites rectomarginis					cf		cf			cf								
Proteacidites reflexus								E										
Proteacidites reticulatus						X		E										
Proteacidites reticuloscabratus				X		X	X					cf						

Table–17: Selected Species Distribution for Burong-1

Sample Type:	SWC 30	SWC 29	SWC 26	SWC 25	SWC 23	SWC 21	SWC 19	SWC 18	SWC 17	SWC 16	SWC 14	SWC 11	SWC 07	SWC 06	SWC 05	SWC 03	SWC 02	SWC 01
Depth in metres:	635.8	647.1	687.3	713.2	760.8	794.3	850.7	859.5	866.5	887.0	935.1	997.9	1135.1	1151.2	1167.1	1205.8	1221.9	1235.4
Depth in feet:	2086	2123	2255	2340	2496	2606	2791	2820	2843	2910	3068	3274	3724	3777	3829	3956	4009	4053
Proteacidites rugulatus					X		X		X	X	cf		CV					
Rugulatispoites mallatus			E													X		
Rugulatispoites trophus			cf															
Santalumidites cainozoicus				X	X	X	X	E		X						E		E
Sapotaceoidaepollenites rotundus								E										
Stereisporites antiquisporites		E						X		X			X	X		E	E	
Stereisporites australis					X		X					X						
Stereisporites regium																E		
Stereisporites (Tripunctisporites) sp.						X	X				X	X	X			X		
Tetracolporites multistrixus														X				
Tricolpites phillipsii													X	X				E
Tricolpites simatus			E				X	E			X		CV					
Tricolpites thomasii				X	cf	X		cf										
Tricolpites waiparaensis														X				
Tricolporites adelaidensis			X		X		X		X	X	cf	X	CV	cf				
Tricolporites leuros				X	X	X	X		X	X	X							
Tricolpites paenestriatus				X														
Tricolporites sphaerica	E	E	E	X				E					X					
Triorites magnificus						X	X	E		X								
Triporopollenites ambiguus					X	X		E										
Verrucosisporties cristatus		E																
Verrucosisporties kopukuensis			X	X	X	X	X		X	X	X	X	X	X				
MICROPLANKTON																		
Achomosphaera spp.						cf					cf							
Areosphaeridium capricornum											cf							
Deflandrea spp.						X												
Gippslandica extensa				X		X	X	X	X									
Lingulodinium solarum		X																
Lingulodinium machaerophorum						X												
Nematosphaeropsis spp.		X																
Operculodinium centrocarpum	E	X			X	X					X							
Paralecaniella indentata						X												
Rhombodinium glabrum						X												
Spinidinum spp.											X							
Systematophora placacanthum						X												

E =	Present / Recorded in ECL report
X =	Present / Recorded in this report
CV =	Caved or Contamination
cf =	Compare with

Table–18: Selected Palynomorph Abundance Data							
A = Comley-1 **B = SW Bairnsdale-1** **C = W Seacombe-1**	**A**	**A**		**B**	**B**		**C**
Sample Type:	C-1	C-1		Cts	Cts		SWC
Depth in metres:	**478.6-478.8**	**481.8-482.0**		**387.1-390.1**	**417.6-420.6**		**905.3**
Depth in feet:	**1570.2-1570.9**	**1580.7-1581.4**		**1270-1280**	**1370-1380**		**2970**
TRILETE SPORES undiff.	3.0%	1.0%			6.8%		6.7%
Cyatheacidites annulatus	0.4%	X		X			
Cyathidites spp. small <40μm	0.9%	0.5%		0.7%			8.3%
Gleicheniidites/Clavifera spp.	0.4%	1.0%					
Stereisporites spp.	0.4%			0.7%	1.1%		
MONOLETES SPORES undiff:	0.4%			0.7%			
Laevigatosporites spp.	1.3%	3.6%			3.4%		
Total Spores:	**7%**	**6%**		**2%**	**11%**		**15%**
GYMNOSPERMS		0.5%					
Araucariacites australis	2.6%	1.0%		1.4%	1.1%		3.3%
Dacrrycarpites australiensis		0.5%					
Dilwynites spp.	3.0%	1.0%					
Lygistepollenites florinii	1.3%	3.1%		0.7%			
Microcachyridites antarticus	0.9%			0.7%			1.7%
Phyllocladidites mawsonii	3.8%	6.2%		0.7%	2.3%		6.7%
Podocarpidites spp.	8.9%	5.2%		2.7%	4.5%		8.3%
Trichotomosulcites subgranulatus	0.4%	0.5%					1.7%
Total Gymnosperms:	**21%**	**18%**		**6%**	**8%**		**22%**
ANGIOSPERM POLLEN	1.3%	1.0%			2.3%		
Aglaoreidia qualumis				2.1%			
Casuarina (H. harrisii)	8.9%	8.2%			4.5%		21.7%
Malvacipollis spp.	0.9%	1.0%					
Myrtaceidites spp.	2.6%						
Nothofagidites asperus/goniatus	2%	3%		5%	1%		2%
N. brachyspinulosus/flemingii	0.4%	1%		5%	5%		
N. deminutus/vansteenisii	8%	7%		10%	3%		3%
N. emarcidus/heterus/falcatus	43%	52%		68%	57%		35%
Periporopollenites spp.	0.4%	1.5%		0.7%	1.1%		
Proteacidites annularis	1.7%	1.0%					
Proteacidites spp.	2.6%	0.5%		0.7%	2.3%		
Tricolp(or)ates spp.	1.3%	0.5%		0.7%	4.5%		1.7%
Total Angiosperms:	**72%**	**76%**		**92%**	**81%**		**63%**
Total Spore-Pollen Count	**235**	**194**		**146**	**88**		**60**
MICROPLANKTON							
Dinoflagellates undiff:	92%	56%					
Lingulodinium machaerophorum	8%						
Operculodinium centrocarpum							100%
Spiniferites spp.		44%					
Microplankton % of total count:	5%	4%					2%
TOTAL COUNT SP + MP	**247**	**203**		**146**	**88**		**61**

Table–19: Selected Species Distribution							
A = Comley-1 **B = SW Bairnsdale-1** **C = W Seacombe-1**	**A**	**A**		**B**	**B**		**C**
Sample Type:	C-1	C-1		Cts	Cts		SWC
Depth in metres:	478.6-478.8	481.8-482.0		387.1-390.1	417.6-420.6		905.3
Depth in feet:	1570.2-1570.9	1580.7-1581.4		1270-1280	1370-1380		2970
SPORE-POLLEN							
Aglaoreidia qualumis		X		X			
Araucariacites australis	X	X		X			X
Beaupreaidites elegansiformis		X					
Beaupreaidites trigonalis ms		X					
Bluffopollis scabratus	X						
Cupanieidites orthoteichus		X					
Cyatheacidites annulatus	X	X		X			
Cyathidites paleospora	X	X		X	X		X
Dacrycarpites australiensis		X		X			
Dicotetradites clavatus				X			
Dilwynites granulatus	X	X					
Dilwynites tuberculatus		X					
Dryadopollis retequetrus					X		
Ericipites crassiexinus		X		X			
Foveotriletes balteus					X		
Foveotriletes crater	X						
Foveotriletes palaequetrus		X					
Gleicheniidites circinidites	X	X					
Granodiporites nebulosus		X					
Haloragacidites harrisii	X	X		X	X		
Herkosporites elliottii		X					X
Ilexpollenites spp.		X					
Ischyosporites irregularis ms		X		X	X		
Laevigatosporites major					X		
Laevigatosporites ovatus	X	X		X	X		
Latrobosporites marginatus	X	X					
Lygistepollenites florinii	X	X		X	X		
Malvacipollis robustus ms		X					
Malvacipollis subtilis	X	X			X		
Matonisporites ornamentalis	X	X		X	X		X
Monoporites media	X	X		X			
Nothofagidites deminutus	X	X		X	X		X
Nothofagidites falcatus	X	X		X			
Nothofagidites flemingii	X	X		X	X		X
Nothofagidites goniatus		X					
Nothofagidites vansteenisii	X	X		X	X		X
Parvisaccites catastus		X					

Table–19: Selected Species Distribution							
A = Comley-1 B = SW Bairnsdale-1 C = W Seacombe-1	A	A		B	B		C
Sample Type:	C-1	C-1		Cts	Cts		SWC
Depth in metres:	478.6-478.8	481.8-482.0		387.1-390.1	417.6-420.6		905.3
Depth in feet:	1570.2-1570.9	1580.7-1581.4		1270-1280	1370-1380		2970
Periporopollenites demarcatus	X	X			X		
Periporopollenites vesicus		X					
Peromonolites vellosus		X					
Phyllocladiidites mawsonii	X	X		X	X		X
Polycolpites simplex ms				X	X		
Pseudowinterapollis couperi					X		
Proteacidites annularis	X	X					
Proteacidites obscurus		X					
Proteacidites rectomarginis		X			X		
Proteacidites stipplatus		X					
Proteacidites truncatus		X					
Santalumidites cainozoicus					X		
Sapotaceoidaepollenites rotundus		X					
Sparganiaceaepollenites barungensis				X			
Stereisporites antiquisporites				X			
Stereisporites australis	X	X		X	X		
Tricolpites thomasii					X		
Tricolporites adelaidensis		X					
Verrucosisporties cristatus				X			
Verrucosisporties kopukuensis		X		X			
MICROPLANKTON							
Apteodinium australiense		X					
Fromea sp. cf. F. chytra	X						
Hologinella incurvata	X						
Lingulodinium machaerophorum	X						
Operculodinium centrocarpum		X					X
Paralecaniella indentata	X						

Table-20: Selected Palynomorph Abundance Data for Wonga Binda-1								
Sample Type:	CTS	CTS	CTS	CTS	CTS	CTS	CTS	CTS
Depth in metres:	590	672	786	927	1071	1185	1263	1332
Depth in feet:	1936	2205	2579	3041	3514	3888	4144	4370
TRILETE SPORES undiff.							0.6%	0.6%
Baculatisporites spp.		0.6%	0.8%			0.6%		
Cyathidites spp. large >40μm		0.6%	0.8%					1.3%
Cyathidites spp. small <40μm			0.8%					
Gleicheniidites/Clavifera spp.		0.6%		1.0%	7.2%			
Ischyosporites spp.		2.4%	0.8%					
Verrucosisporites kopukuensis		0.6%					0.6%	
MONOLETES SPORES undiff:								
Laevigatosporites spp.					0.7%	0.6%		3.1%
Polypodiisporites spp.		0.6%						
Total Spores:		**5%**	**3%**	**1%**	**8%**	**1%**	**1%**	**5%**
GYMNOSPERMS			0.8%					
Araucariacites australis		1.8%	6.4%		0.7%	1.8%	1.9%	1.9%
Dacrrycarpites australiensis		0.6%						
Dilwynites spp.						0.6%		
Lygistepollenites florinii		2.4%	3.2%	3.9%	2.6%	5.5%	9.9%	4.4%
Microcachyridites antarticus						1.2%		
Phyllocladidites mawsonii		21.1%	8.8%	49.5%	21.6%	19.5%	22.4%	11.3%
Podocarpidites spp.		4.8%	4.0%		7.2%	11.0%	6.8%	11.9%
Trichotomosulcites subgranulatus		1.8%			1.3%	1.8%	0.6%	1.3%
Total Gymnosperms:		**33%**	**23%**	**53%**	**33%**	**41%**	**42%**	**31%**
ANGIOSPERM POLLEN			0.8%		2.0%		5.6%	5.0%
Casuarina (H. harrisii)		0.6%	10.4%	11.7%	5.9%	7.9%	11.2%	3.1%
Dicotetradites clavatus								0.6%
Ericipites spp.			0.8%			0.6%	0.6%	
Gambierina rudata								1.3%
Ilexpollenites spp.			0.8%		0.7%	0.6%	0.6%	
Liliacidites spp.		1.8%	1.6%		0.7%			1.9%
Malvacipollis spp.		1.8%		1.9%		0.6%	0.6%	
Nothofagidites asperus/goniatus		2%	2%	1%	1%		2%	3%
N. brachyspinulosus/flemingii		15%	4%	2%	2%	4%	5%	2%
N. deminutus/vansteenisii		9%	6%		7%	10%	7%	6%
N. emarcidus/heterus/falcatus		25%	40%	14%	33%	24%	13%	17%
Periporopollenites spp.		0.6%	1.6%		1.3%	0.6%	1.2%	3.8%
Proteacidites spp.		3.0%	4.8%	11.7%	3.9%	3.0%	6.2%	14.4%
Tricolp(or)ates spp.		3.0%	1.6%	3.9%	2.0%	6.1%	3.7%	6.9%
Total Angiosperms:		**62%**	**74%**	**46%**	**59%**	**57%**	**57%**	**64%**
Total Spore-Pollen Count		**166**	**125**	**103**	**153**	**164**	**161**	**160**
MICROPLANKTON								
Dinoflagellates undiff:		100.0%			33.3%			
Gippslandica extensa			100.0%					
Spiniferites spp.					66.7%		100.0%	100.0%
Microplankton % of total count:		**1%**	**3%**		**2%**		**1%**	**2%**
TOTAL COUNT SP + MP		**167**	**129**	**103**	**156**	**164**	**163**	**163**

Table–21: Selected Species Distribution for Wonga Binda–1								
Sample Type:	CTS	CTS	CTS	CTS	CTS	CTS	CTS	CTS
Depth in metres:	590	672	786	927	1071	1185	1263	1332
Depth in feet:	1936	2205	2579	3041	3514	3888	4144	4370
SPORE-POLLEN								
Aglaoreidia qualumis		X				X		X
Araucariacites australis	X	X	X		X	X	X	X
Battenipollis sectilis								**X**
Beaupreaidites elegansiformis		X						
Beaupreaidites trigonalis ms		X		X				
Beaupreaidites verrucosus						CV		CV
Conbaculites apiculatus ms				X				
Cupanieidites orthoteichus		X	X			X	X	X
Cyathidites paleospora	X	X	X		X			
Cyathidites splendens					X			
Dacrycarpites australiensis		X				X		X
Dicotetradites clavatus						X	X	X
Dilwynites granulatus	X	X			X	X	X	
Dilwynites tuberculatus			X					
Dryadopollis retequetrus		X						
Foveotriletes palaequetrus						X		
Gambierina rudata								**X**
Gleicheniidites circinidites		X		X	X	X	X	
Granodiporites nebulosus		**X**						
Haloragacidites harrisii	X	X	X	X	X	X	X	X
Ilexpollenites spp.			X		X		X	X
Ischyosporites irregularis ms	X	X	X			X	X	X
Laevigatosporites ovatus		X	X		X	X	X	X
Latrobosporites amplus								X
Latrobosporites crassus							X	
Lygistepollenites balmei					**X**	**X**	**X**	
Lygistepollenites florinii	X	X	X	X	X	X	X	X
Malvacipollis diversus					X			
Malvacipollis robustus ms				X			X	
Malvacipollis subtilis		X	X	X	X		X	
Matonisporites ornamentalis		X						
Myrtaceidites tenuis					CV			
Nothofagidites asperus		X	X	X	X			
Nothofagidites endurus						X	X	X
Nothofagidites falcatus	X	X	X		X	X	X	
Nothofagidites flemingii		X	X	X	X	X	X	X
Nothofagidites goniatus	X	X	X	X	X	X	X	
Nothofagidites vansteenisii	X	X	X		X	X	X	X
Periporopollenites demarcatus		X	X		X	X	X	X
Periporopollenites vesicus		X	X	X		X		
Phyllocladidites mawsonii	X	X	X	X	X	X	X	X
Phyllocladidites reticulosaccatus				X	X	X		

Table-21: Selected Species Distribution for Wonga Binda-1

Sample Type:	CTS	CTS	CTS	CTS	CTS	CTS	CTS	CTS
Depth in metres:	590	672	786	927	1071	1185	1263	1332
Depth in feet:	1936	2205	2579	3041	3514	3888	4144	4370
Phyllocladidites verrucosus							X	
Polycolpites esobalteus					X			X
Proteacidites adenanthoides			X		X		X	X
Proteacidites annularis		X		X	X	X	X	
Proteacidites asperopolus					X			
Proteacidites crassus			X	X	X	X	X	X
Proteacidites differentipollis				X	X			
Proteacidites grandis							X	
Proteacidites obscurus		X	X	X		X	cf	X
Proteacidites pachypolus							X	X
Proteacidites rectomarginis	X							
Proteacidites reticuloscabratus				X	X			
Proteacidites rugulatus			X		X			
Proteacidites tuberculiformis							X	
Pseudowinterapollis cranwelliae		X						
Rugulatispoites mallatus	X							
Santalumidites cainozoicus					X	X		X
Sapotaceoidaepollenites rotundus				X	X		X	
Stereisporites australis	X	X				X	X	
Stereisporites (Tripunctisporites) sp.			X					
Tetracolporites verrucosus								**X**
Tetrradopollis securus								**X**
Tricolpites phillipsii								X
Tricolpites thomasii								CV
Tricolpites waiparaensis								**X**
Tricolporites adelaidensis		X	X	X	cf	X	X	X
Tricolporites leuros		X	X	X			X	
Tricolporites lilliei								**X**
Tricolporites sphaerica		X				cf	X	
Triorites magnificus			**X**		X			
Triporopollenites ambiguus				X				
Triporopollenites heiosus ms						X		
Verrucosisporties kopukuensis		X	X	X	X	X		X
MICROPLANKTON								
Gippslandica extensa			**X**		CV	CV		
Lingulodinium machaerophorum					CV	CV		
Nematosphaeropsis spp.	X							CV
Operculodinium centrocarpum	X	X				CV		
Protoellipsodinium simplex ms					CV	CV		CV
X = Present								
CV = Caved species								
cf = Compared with								