PALYNOLOGICAL ANALYSIS OF TURRUM-4
GIPPSLAND BASIN

by

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INTERPRETED DATA

INTRODUCTION

Thirty-six samples comprising 32 sidewall cores and 4 cuttings samples were analysed in Turrum-4. Although 60 sidewall cores were shot and 52 recovered, at 18 locations duplicate samples were taken reducing the sample coverage in the well. The author examined all the sidewall cores, and after choosing the most suitable of the duplicate samples and rejecting unsuitable lithologies 32 samples (including 5 coal samples) were selected, cleaned, split and forwarded to Laola Pty Ltd in Perth for processing to prepare the palynological slides. The four cuttings were selected and sent directly to Laola Pty Ltd by personnel at Esso's core store.

An average of 16 grams of cuttings, 9 grams of the clastic sidewall cores and 3 grams of the coals were processed for palynological analysis. Residue yields overall were high in the Latrobe Group and low in the Seaspray Group. Palynomorph concentration on the slides was mostly moderate to high above 2400m but mostly low below this depth. Preservation of palynomorphs was generally poor to fair but deteriorated below about 2500m. Spore-pollen diversity is moderate, averaging 25+ species per sample in the clastic lithologies but low, averaging 10+ species in the coals samples. Microplankton diversity is very low (1-5 species) in the Latrobe Group but moderate (average 12 species) in the overlying Seaspray Group.

Lithological units and palynological zones from the base of the Seaspray Group 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-three 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 palynomorph range charts which present the species on separate charts in order of highest and lowest appearances. Relinquishment list for palynological slides and residues from samples analysed in Turrum-4 are provided at the end of the report.

PALYNOLOGICAL SUMMARY OF TURRUM-4

AGE	UNIT/FACIES		SPORE-POLLEN ZONES (DINOFLAGELLATE ZONES)	DEPTHS (mKB)
MIOCENE TO LATE OLIGOCENE	SEASPRAY GROUP		*P. tuberculatus*	1902.0-1913.0
EARLY EOCENE	LATROBE GROUP	Flounder Formation	*P. asperopolus*	1923.0-1970.0
PALEOCENE		Undifferentiated coastal plain facies of shale, coals and sands.	Upper *L. balmei* *(A. homomorphum)* Lower *L. balmei* *(E. crassitabulata)*	1982.5-2187.0 *(1982.5-2109.5)* 2290.0-2716.0 *(2390.0)*

GEOLOGICAL COMMENTS

1. The presence of *Foveotriletes lacunosus* diagnostic of the Middle subdivision of the *P. tuberculatus* Zone from both samples near the base of the Seaspray Group suggest the basal Oligocene part of the Lakes Entrance Formation is missing in Turrum-4.

2. The unconformity at 1919m separating the Seaspray Group from the underlying Flounder Formation represents a time break of approximately 20 million years. The interval not represented by sediment is considered to extend from the 30 Ma sequence boundary to the 49.5 Ma sequence boundary as represented on the cycle charts of Haq *et al.* (1987, 1988).

3. There is no evidence in Turrum-4 to indicate that either the Turrum Formation or Gurnard Formation were ever present at this location in the Gippsland Basin. They may never have been deposited at this location due to sediment starvation on the eastern flank of the Marlin Channel.

4. The Flounder Formation consists of a shale/claystone unit between 1919-1963m, which is well defined by the gamma log, underlain by a 15.5 metre thick sand between 1963-1978.5m. Cuttings at 1970m near

the top of this sand gave a *P. asperopolus* Zone age which confirms it is depositionally related to the overlying shale/claystone. The sand can also be distinguished from all sands in the underlying Upper *L. balmei* Zone by being thicker and cleaner according to the gamma log. No equivalent sand was penetrated until below 2300m, and these lie in the Lower *L. balmei* Zone.

5. The palynomorph assemblages from the three sidewall cores and four cuttings analysed from the Flounder Formation are all fairly homogeneous containing assemblages dominated by spore-pollen with dinoflagellates rare to very rare. The deepest sidewall core (at 1962m) and two deepest cuttings (1965m & 1970m) differ slightly in containing a high proportion (est. 20%-50% by volume) of large pieces of structured terrestrial kerogen.

   The three cuttings samples were analysed in an attempt to find the index dinoflagellates *Kisselovia edwardsii* and *K. thompsonae* ms which are used to subdivide the *P. asperopolus* Zone. It was anticipated that the broader sampling interval, with the possibility of some cavings, in the cuttings sample would give a more diverse sampling of the Flounder Formation than obtained from the sidewall cores. The index species were not found, and in fact no clear differences were observed in any of the assemblages. Further, negligible caved palynomorphs were observed from the overlying *P. tuberculatus* Zone and no reworked palynomorphs were recorded from the underlying eroded Upper *L. balmei* Zone.

   The extreme rarity of dinoflagellate in all the samples is unusual for the Flounder Formation. Because of this, and the overall homogeneity of the assemblages, it is suggested the Flounder Formation in Turrum-4 was deposited over only a short time interval, essentially representing one depositional event. Dinoflagellates are rare because they have been diluted by an influx of terrestrial kerogen. This feature has been observed in other sections in the Latrobe Group where depositional rates are high.

6. The unconformity at 1978.5m separating the Flounder Formation from the eroded undifferentiated Latrobe Group represents a time break of at least 3 million years. The erosive event within the Tuna-Flounder Channel system which effected the Turrum-4 site was either the 50.5 Ma or slightly younger 50 Ma sequence boundary, whilst the underlying Upper *L. balmei* Zone is no younger than the 53.5 Ma downlap surface on the cycle charts of Haq *et al.* (1987, 1988).

7. The undifferentiated portion of the Latrobe Group can be subdivided into two on the abundance and thickness of the coals and sands. A third unit of predominantly sand may be present below 2728.5m but as

no suitable samples were available for palynological analysis from this unit it will not be discussed further. The boundary between the two upper units is placed at 2298.5m which is close to the boundary between the Upper and Lower *L. balmei* Zones.

The upper unit from 1978.5-2298.5m is 320 metres thick and is comprised of 83% shale to siltstone, 15% sand and 3% coal. The sands are on average 2 metres thick, but range between 0.6-4.0 metres. The coals are on average 0.5 metres thick but range between 0.3-1.7 metres.

The lower unit from 2298.5-2728.5m is 430 metres thick and is composed of 63% shale to siltstone, 25% sands and 12% coal. The sands are on average 4.2 metres thick but range between 0.4-15.0 metres thick. The coals are on average 1.7 metres thick and range between 0.3 to 8.0 metres thick.

8. The observed dinoflagellate occurrences and their abundance suggest there is more marine influence through the lower unit or in the Lower *L. balmei* Zone than in the upper unit and Upper *L. balmei* Zone.

   Examining the sidewall core lithologies there is no obvious characteristic to distinguish those samples containing significant occurrences of dinoflagellates. An equivalent inspection of the gamma, bulk density and neutron porosity electric logs reveal no characteristic that can distinguish between those samples containing dinoflagellates in abundance or of high diversity from samples lacking dinoflagellates.

   The lack of any apparent correlation of dinoflagellate bearing palynological assemblage to the lithologies determined from the electric logs highlights an ongoing problem. To apply dinoflagellates successfully to the recognition of further subdivision of the *L. balmei* Zone requires increased sampling density.

9. The five coal samples analysed overall gave poor results principally because it was difficult to concentrate the spore-pollen sufficiently for routine microscope searching. Three samples were indeterminate, one was assigned to the *L. balmei* Zone whist the best sample at 2528m gave a moderate diversity assemblage which was confidently assigned to the Lower *L. balmei* Zone. Because of the uncertainty of obtaining good assemblages from the coals they are not recommended as targets for sidewall cores for palynological analysis.

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 (1975, 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 the indexes of Lentin & Williams (1985, 1989) in the paper by Wilson (1988), or other references cited herein. Species names followed by "ms" are unpublished manuscript names.

Proteacidites tuberculatus Zone: 1902.0-1913.0 metres Late Oligocene-Early Miocene.

The two sidewall cores analysed from the Seaspray Group gave meagre yields from which were recorded moderate diversity spore-pollen and microplankton assemblages which were well preserved. The samples can be confidently assigned to the Middle subdivision of the *P. tuberculatus* Zone on the frequent presence of the spores *Cyatheacidites annulatus* and *Foveotriletes lacunosus*. The remainder of the spore-pollen assemblage consists of long ranging species except for the rare occurrence of *Foraminisporis ozotus* ms and *Monoporites media* Cookson 1947 which are not known to range below the *P. tuberculatus* Zone.

The microplankton assemblage can be assigned to the informal *Operculodinium* spp. Association of Partridge 1976 on the frequent occurrence of the long ranging *Operculodinium centrocarpum* associated with the Oligocene or young index species *Protoellipsodinium simplex* ms, *Pyxidinopsis pontus* ms and *Tectactodinium scabroellipticus* ms.

Rare reworked Permian spores were recorded from both samples.

Proteacidites asperopolus Zone: 1923.0-1970.0 metres Early Eocene.

Three sidewall cores and four cuttings were analysed from the Flounder Formation. The lithology of the sidewall cores consisted of black-brown claystone with silty laminations. All samples gave high yields of moderately concentrated spore-pollen assemblages of high diversity. Average diversity was 32+ species but composite diversity for the zone was a very high 75+ species.

The samples were confidently assigned to the *P. asperopolus* Zone on consistent presence of *Conbaculites apiculatus* ms, *Proteacidites pachypolus* and *Myrtaceidites tenuis* and the inconsistent presence of *Intratriporopollenites notabilis*, *Proteacidites ornatus*, *Santalumidites cainozoicus* and *Sapotaceoidaepollenites rotundus*. The eponymous species *Proteacidites asperopolus* was only recorded from the cuttings sample at 1965m. This species together with *C. apiculatus* ms and *S. rotundus* indicate an age no older while *M. tenuis, P. ornatus* and *I. notabilis* are key species confirming an age no younger than the *P. asperopolus* Zone. *Proteacidites alveolatus* which is essentially restricted to this zone was also recorded as rare specimens in two of the sidewall cores. This species has only been infrequently reported in the basin since originally described by Stover & Partridge (1973) and may be locally restricted.

The three sidewall cores, which were counted, and the four cuttings all contain very similar assemblages dominated by spore-pollen (71%-86% of total count) and fungal spores and hyphae (14%-29%) with dinoflagellates rare to very rare (<1%). The two deepest cuttings and the sidewall core at 1962m are further characterised by a high proportion (est. 20%-50% by volume) of very large pieces of structured terrestrial kerogen. The cuttings contain negligible caved fossils from the overlying *P. tuberculatus* Zone and no reworked fossils from the underlying *L. balmei* Zone were recorded.

Angiosperm pollen, particularly *Proteacidites* spp. 22-24% and *Haloragacidites harrisii* (= *Casuarina* pollen) at 19-23% dominate the spore-pollen assemblages. Spores at 11-16% and gymnosperm pollen at 6-9% are minor components. Of age significance are the abundances of *Conbaculites apiculatus* ms (6.4% at 1954m); *Malvacipollis* spp. (2%-6%); *Myrtaceidites tenuis* (3.6% at 1962m) and *Proteacidites pachypolus* (0.8%-2.7%). *Casuarina* pollen is always more abundant than *Nothofagidites* spp. (6%-16%) and the *Nothofagidites* spp. to *H. harrisii* ratio, which is 0.3 at 1962m and 0.7 at 1954m and 1923m, is clear evidence that the abundance data favours a *P. asperopolus* Zone age.

The commonest *insitu* dinoflagellates were mostly fragmented specimens of *Deflandrea* spp. a few of which could be identified as *D. flounderensis* and one specimen was identified as *D. dartmooria*. Following the discovery of these species in the sidewall cores, the four cuttings samples were processed in the hope that with their broader sampling interval the *Kisselovia* index species could be found. Unfortunately in the cuttings like the sidewall cores the assemblages were overwhelmed by terrestrially derived palynomorphs and detritus.

Upper *Lygistepollenites balmei* Zone: 1982.5-2187.0 metres
and
Apectodinium homomorphum Zone: 1982.5-2109.5 metres Late Paleocene.

All six samples over this zone interval clearly belong to the broader *L. balmei* Zone base on the consistent and frequent to abundant occurrence of *Lygistepollenites balmei*. Associated indicator species which range no young than this zone are *Australopollis obscurus, Gambierina rudata, Polycolpites langstonii* and *Integricorpus antipodus* ms all of which are less consistent. An age no older than the Upper *L. balmei* Zone is based principally on the occurrence of *Proteacidites annularis* in four of the samples together with *Verrucosisporites kopukuensis* (at 2111.5m and 2187m) and *Anacolosidites acutullus* (at 2187m). Each of these species normally do not range older than the Upper *L. balmei* Zone although poorly preserved specimens compared to *P. annularis* were recorded from the coal samples at 2373.5m and 2524m. Other species in the assemblages which support the zone assignment are the consistent and frequent occurrence of *Haloragacidites harrisii* and *Nothofagidites emarcidus/heterus* and the rare but fairly consistent occurrences of *Malvacipollis subtilis* and *Proteacidites adenanthoides*. These latter species first appear in the Lower *L. balmei* Zone but are generally not consistent until within the Upper *L. balmei* Zone. Overall the assemblages have an average spore-pollen diversity of 34+ species while the composite diversity for the zone is 64+ species.

All 6 samples in this zone were counted with a detailed analysis presented on Tables-4 and 5. In the following discussion average percentages for species discussed are used unless otherwise stated. The spore-pollen assemblages are dominated by spores 38%, with fairly equal amounts of angiosperm pollen 33% and gymnosperm pollen 30%. Spores which exceed 10% in some samples are *Gleicheniidites circinidites* (>15%), *Laevigatosporites* spp. (7.4%), and *Cyathidites* spp. (5.9%). *Proteacidites* spp. (15.4%) is the commonest angiosperm category and *Dilwynites* spp. (9.5%) the commonest gymnosperm. Other species show a high abundance in an occasional sample, such as *L. balmei* (19.5% at 2187m) and *Podocarpidites* spp. (18.6%) and *Australopollis obscurus* (17.3%) both at 2109.5m. *Phyllocladidites mawsonii* (5.3%) is noticeably less abundant than in underlying Lower *L. balmei* Zone, whilst *Nothofagidites* spp. (3.7%) and *H. harrisii* (1.9%) are consistent minor components in counts of the Upper *L. balmei* Zone but are irregular in occurrence in the Lower *L. balmei* Zone.

The only dinoflagellate recorded over the interval was the short spined variety of *Apectodinium homomorphum* whose occurrence confirms presence of the *A. homomorphum* Dinoflagellate Zone. A single specimen was recorded at 2109.5m, a few specimens at 2002m, but the species was abundant at 1982.5m where it comprised nearly 60% of total count.

Lower *Lygistepollenites balmei* Zone: 2290.0-2216.0 metres
and
Eisenackia crassitabulata Dinoflagellate Zone: 2390.0 metres
Early Paleocene.

Twelve of the 21 samples from 2290m to T.D. can be confidently assigned to the Lower *L. balmei* Zone. Most of the remainder contain only the broader *L. balmei* Zone assemblage or are indeterminate. The most important indicator is *Proteacidites angulatus* in eleven samples whilst the occurrence of *Juxtacolpus pieratus* ms at 2327.5m confirms an age no younger than the Lower *L. balmei* Zone for this sample. The total range of *P. angulatus* s.s. is now considered to lie within this zone and it is no longer believed to range into the *T. longus* Zone as stated in Stover & Partridge (1973, p.264). Other features of the assemblages in Turrum-4 considered characteristic of the zone are the consistent occurrence of *L. balmei*, and less consistent but still regular occurrences of the species *Australopollis obscurus, Gambierina rudata* and *Peninsulapollis gillii*. The sporadic occurrence of *Tetracolporites verrucosus* also confirm an age no younger than this zone. Average spore-pollen diversity was 21+ species in samples assigned to Lower subdivision but only 11+ species in samples assigned to broader *L. balmei* Zone or given as indeterminate. Composite recorded diversity of all samples in zone is 60+ species.

Counts of 14 of the 21 samples in the zone are given on Tables-4 and 5. in the following discussion of the spore-pollen abundances the two coal samples (at 2373.5m & 2528m) and the very low count of spore-pollen from 2585m are excluded when calculating average percentages quoted. In the remaining 11 samples which are mostly claystones, gymnosperms dominate (49%) followed by angiosperm pollen (28%) and spores (23%). The dominant gymnosperm is *Phyllocladidites mawsonii* 19% (range 9%-27%) with *Podocarpidites* spp. 11% (3%-30%) and *Dilwynites* spp. 8% (0%-22%) the next most common. The eponymous species *L. balmei* is consistently frequent at 5% with a range of abundances from 1% to 10%. Amongst the angiosperms *Proteacidites* spp. 18% is the only consistently abundant type. The three commonest spore types are *Gleicheniidites* spp. 7%; *Laevigatosporites* spp. 6%, and *Stereisporites* spp. 5%. The counts of the coals are similar to the average abundances in the clastic sediments <u>except</u> that *Dilwynites* spp. is rare <1% and the coals often contain unique abundances of spore species such as *Latrobosporites crassus* 21% at 2373.5m and *Stereisporites* n.sp. at 2726m.

The occurrence of microplankton within the Lower *L. balmei* Zone is best described as sporadic even though a moderate 18+ species diversity is recorded for the whole zone. Of most significance is the total range and abundance of *Glaphyrocysta retiintexta* which occurs in 4 of the 6 sidewall cores of clastic lithology between 2327.5m-2503.5m. Samples in this latter interval contain the highest diversity and the occurrence of *Eisenackia* *crassitabulata* at 2390m confirms the presence of the *E. crassitabulata* Zone. There is little doubt that all the dinoflagellates recorded are displaying only partial ranges reflecting intermittent incursions of marine influence into a predominantly coastal plain environment. Characteristic of these incursions is that most samples containing microplankton are dominated by a single species.

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TABLE-1: INTERPRETATIVE PALYNOLOGICAL DATA FOR TURRUM-4, GIPPSLAND BASIN.

SHEET 1 OF 2

SAMPLE TYPE	DEPTH (m)	SPORE-POLLEN ZONES	*CR OLD	*CR NEW	MICROPLANKTON ZONES (OR ASSOCIATIONS)	*CR OLD	*CR NEW	COMMENTS
SWC 60	1902.0	Middle *P. tuberculatus*	0	B2	(*Operculodinium* spp.)	0	B3	*Monoporites media* present.
SWC 59	1913.0	Middle *P. tuberculatus*	0	B2	(*Operculodinium* spp.)	0	B3	FAD *Foveotriletes lacunosus*.
SWC 58	1923.0	*P. asperopolus*	1	B1				LAD *Myrtaceidites tenuis*.
CUTTINGS	1930	*P. asperopolus*	3	D2				
CUTTINGS	1940	*P. asperopolus*	3	D2				
SWC 56	1954.0	*P. asperopolus*	1	B1				*Conbaculites apiculatus* 6%.
SWC 55	1962.0	*P. asperopolus*	1	B1				FAD *Sapotaceoidaepollenites rotundus*.
CUTTINGS	1965	*P. asperopolus*	3	D1				*Proteacidites asperopolus* present.
CUTTINGS	1970	*P. asperopolus*	3	D1				FAD *Conbaculites apiculatus* ms.
SWC 54	1982.5	Upper *L. balmei*	2	B4	*A. homomorphum*	2	B3	LAD *Lygistepollenites balmei*. Microplankton 59%.
SWC 53	2002.0	Upper *L. balmei*	0	B1	*A. homomorphum*	2	B3	*Proteacidites annularis* present.
SWC 52	2076.0	Upper *L. balmei*	1	B4				Poor *P. annularis* only.
SWC 51	2109.5	*L. balmei*	1	B1	*A. homomorphum*	2	B3	*Australopollis obscurus* 17%.
SWC 50	2111.5	Upper *L. balmei*	4	B4				*Verrucosisporites kopukuensis* present.
SWC 49	2187.0	Upper *L. balmei*	1	B1				FAD *Proteacidites annularis*.
SWC 46	2290.0	Lower *L. balmei*	1	B2				LAD *Proteacidites angulatus*.
SWC 45	2302.5	Lower *L. balmei*	1	B1				LAD *Tetracolporites verrucosus*.
SWC 43	2308.0	Lower *L. balmei*	1	B2				
SWC 40	2323.0	*L. balmei*	2	B3				Sandstone=very low yield.
SWC 38	2327.5	Lower *L. balmei*	2	B3	(*G. retiintexta*)	1	B3	*Juxtacolpus pieratus* present. Microplankton 34%.

TABLE-1: INTERPRETATIVE PALYNOLOGICAL DATA FOR TURRUM-4, GIPPSLAND BASIN.

SHEET 2 OF 2

SAMPLE TYPE	DEPTH (m)	SPORE-POLLEN ZONES	*CR OLD	*CR NEW	MICROPLANKTON ZONES (OR ASSOCIATIONS)	*CR OLD	*CR NEW	COMMENTS
SWC 35	2365.0	*L. balmei*	1	B1				Few diagnostic species
SWC 34	2373.5	*L. balmei*	1	B2				Coal with *Latrobosporites crassus* dominant = 21%.
SWC 33	2390.0	Lower *L. balmei*	0	B2	*E. crassitabulata*	0	B3	Microplankton 15%, with *G. retiintexta* dominant species.
SWC 29	2441.5	Lower *L. balmei*	1	B2	(*G. retiintexta*)	1	B3	Microplankton <3%.
SWC 28	2488.0	*L. balmei*	2	B3				Sandstone = low yield.
SWC 26	2503.5	Lower *L. balmei*	1	B2	(*G. retiintexta*)	1	B3	Microplankton 8%.
SWC 24	2528.0	Lower *L. balmei*	1	B2				Coal with *Juxtacolpus pieratus*.
SWC 23	2541.0	Lower *L. balmei*	1	B2				*Apectodinium* sp. = 30%.
SWC 21	2585.0	*L. balmei*	2	B3				*Vozzhennikovia angulatus* Wilson 74%.
SWC 19	2591.5	Indeterminate						Coal with low diversity. Non-diagnostic assemblage.
SWC 17	2623.0	*L. balmei*	1	B2				Low diversity due to poor preservation.
SWC 13	2657.0	Lower *L. balmei*	1	B2				*Proteacidites angulatus* 5%.
SWC 8	2696.0	Lower *L. balmei*	2	B3				
SWC 7	2703.0	Indeterminate						Coal with low diversity. Non-diagnostic assemblage.
SWC 6	2716.0	Lower *L. balmei*	1	B2				FAD *Proteacidites angulatus*.
SWC 4	2726.0	Indeterminate						Coal with monospecific spore assemblage.

*CR = Confidence Ratings OLD & NEW
FAD = First Appearance Datum
LAD = Last Appearance Datum

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, <u>Excellent Confidence</u>, assemblage with zone species of spore, pollen <u>and</u> microplankton.

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

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

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

4 CUTTINGS, <u>No Confidence</u>, 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

RELINQUISHMENT LISTS OF PALYNOLOGICAL SLIDES & RESIDUES

PALYNOMORPH RANGE CHARTS

TABLE-2: BASIC SAMPLE DATA FOR TURRUM-4, GIPPSLAND BASIN.

SAMPLE TYPE	DEPTH (m)	LITHOLOGY	SAMPLE WT (g.)	RESIDUE YIELD
SWC 60	1902.0	Calcisiltite, tr. glauc. in burrows	10.7	Low
SWC 59	1913.0	Cal. claystone 5-10% glauconite	9.4	Very low
SWC 58	1923.0	Calc. claystone minor sst. laminations	9.1	High
CUTTINGS	1930		16.8	High
CUTTINGS	1940		15.6	High
SWC 56	1954.0	Claystone with silty laminations	9.4	High
SWC 55	1962.0	Laminated claystone/siltstone	9.8	High
CUTTINGS	1965		15.5	High
CUTTINGS	1970		15.9	High
SWC 54	1982.5	Claystone/conchoidal fracture	8.9	High
SWC 53	2002.0	Claystone with silty laminae	9.3	High
SWC 52	2076.0	Claystone/subconchoidal fracture	9.7	High
SWC 51	2109.5	Claystone with carbonaceous laminae	6.9	High
SWC 50	2111.5	Claystone/massive/subconchoidal fract.	8.4	High
SWC 49	2187.0	Laminated claystone/siltstone	6.5	High
SWC 46	2290.0	Massive claystone/siltstone	10.6	High
SWC 45	2302.5	Massive claystone	8.1	High
SWC 43	2308.0	Claystone with faint laminations	9.5	High
SWC 40	2323.0	Lt. grey sandstone/clayey matrix	6.6	Very low
SWC 38	2327.5	Mottled clayey sandstone	11.1	High
SWC 35	2365.0	Mottled sandstone/minor clay laminae	10.0	Moderate
SWC 34	2373.5	Coal/brittle	2.2	High
SWC 33	2390.0	Dk gry claystone	9.5	High
SWC 29	2441.5	Dk gry claystone/faint laminae	10.3	High
SWC 28	2488.0	Med. gry v.f. sandstone	8.0	Low
SWC 26	2503.5	Laminated claystone/siltstone	9.4	High
SWC 24	2528.0	Coal/brittle	4.7	Moderate
SWC 23	2541.0	Massive dk gry claystone	10.3	High
SWC 21	2585.0	Dk gry firm claystone	10.3	High
SWC 19	2591.5	Coal/brittle	3.9	High
SWC 17	2623.0	Brn gry silty claystone	10.4	Moderate
SWC 13	2657.0	Claystone with siltstone laminae	10.2	High
SWC 8	2696.0	Lt gry sandstone/clay matrix	8.1	High
SWC 7	2703.0	Coal/brittle	2.7	High
SWC 6	2716.0	Claystone/rare sandy laminations	7.4	High
SWC 4	2726.0	Coal/brittle	2.2	High

TABLE-3: BASIC PALYNOMORPH DATA FOR TURRUM-4, GIPPSLAND BASIN.

SHEET 1 OF 2

SAMPLE TYPE	DEPTH (m)	PALYNOMORPH CONCENTRATION	PRESERVATION	No. S-P Species*	MICROPLANKTON ABUNDANCE	No. of Species*
SWC 60	1902.0	High	Good	22	Abundant	12
SWC 59	1913.0	Moderate	Good	21	Abundant	12
SWC 58	1923.0	High	Good	49	Very Rare	3
CUTTINGS	1930	Moderate	Fair	19	Very Rare	2
CUTTINGS	1940	Moderate	Fair	19	Very Rare	2
SWC 56	1954.0	High	Good	51	Very Rare	1
SWC 55	1962.0	Moderate	Fair	33	Very Rare	1
CUTTINGS	1965	Moderate	Fair-good	29		
CUTTINGS	1970	High	Fair-good	29	Very Rare	2
SWC 54	1982.5	Low	Poor-fair	24	Abundant	1
SWC 53	2002.0	Moderate	Poor	36	Rare	1
SWC 52	2076.0	High	Good	41		
SWC 51	2109.5	Moderate	Poor-fair	30	Very rare	1
SWC 50	2111.5	High	Fair-good	38		
SWC 49	2187.0	High	Fair	39		
SWC 46	2290.0	Moderate	Poor	18	Rare	1
SWC 45	2302.5	High	Fair	26	Frequent	2
SWC 43	2308.0	High	Fair	22		
SWC 40	2323.0	Low	Poor-fair	7		
SWC 38	2327.5	Low	Poor	22	Abundant	4
SWC 35	2365.0	Moderate	Fair-good	33	Rare	1
SWC 34	2373.5	Moderate	Poor-fair	16		
SWC 33	2390.0	High	Poor-fair	25	Common	5
SWC 29	2441.5	Low	Poor	27	Rare	3
SWC 28	2488.0	Low	Fair	8		
SWC 26	2503.5	Moderate	Poor	25	Frequent	4
SWC 24	2528.0	Moderate	Poor	24		
SWC 23	2541.0	Moderate	Fair	20	Abundant	1
SWC 21	2585.0	Low	Very poor	11	Abundant	3
SWC 19	2591.5	Very low	Poor	6		
SWC 17	2623.0	Low	Poor	14		
SWC 13	2657.0	Low	Poor	16	Rare	1
SWC 8	2696.0	Low	Poor	15		

TABLE-3: BASIC PALYNOMORPH DATA FOR TURRUM-4, GIPPSLAND BASIN.

SHEET 2 OF 2

SAMPLE TYPE	DEPTH (m)	PALYNOMORPH CONCENTRATION	PRESERVATION	No. S-P Species*	MICROPLANKTON ABUNDANCE	No. of Species*
SWC 7	2703.0	Low	Poor-fair	5		
SWC 6	2716.0	Moderate	Poor	20		
SWC 4	2726.0	Very low	Fair	2		

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

TABLE-4: PALYNOMORPHS PERCENTAGES FOR TURRUM-4 PAGE 1 OF 4						
	1923.0	1954.0	1962.0	1982.5	2002.0	2076.0
	SWC-58	SWC-56	SWC-55	SWC-54	SWC 53	SWC 52
MAJOR CATEGORIES %						
Spores %	10.3%	11.4%	9.2%	16.8%	23.1%	43.9%
Gymnosperm Pollen %	6.5%	4.6%	7.6%	7.2%	11.2%	21.2%
Angiosperm Pollen %	67.7%	55.4%	70.2%	13.2%	34.9%	31.2%
TOTAL SPORE-POLLEN %	84.5%	71.4%	87.0%	37.1%	69.2%	96.3%
Fungal Spores and Hyphae %	14.8%	28.6%	22.9%	3.0%	30.8%	3.7%
Dinoflagellate %	0.6%		0.8%	59.9%		
DINOFLAGELLATES						
Dinoflagellates Undiff.	100.0%		100.0%			
Apectodinium homomorphum				100.0%		
Apectodinium spp.						
Cyclopsiella sp.						
Deflandrea spp.						
Eisenackia crassitabulata						
Glaphrocysta retiintexta						
Glaphrocysta spp.						
Paralecaniella indentata						
Spinidinium spp.						
Vozzhennikovia angulata						
DINOFLAGELLATE COUNT	1		1	100		
TOTAL COUNT	155	175	145	167	169	189

TABLE-4: PALYNOMORPHS PERCENTAGES FOR TURRUM-4				PAGE 3 OF 4		
	2365.0	2373.5	2390.0	2441.5	2503.5	2528.0
	SWC 35	SWC 34	SWC 33	SWC 29	SWC 26	SWC 24
		COAL				COAL
MAJOR CATEGORIES %						
Spores %	13.3%	33.9%	19.7%	22.6%	12.1%	25.0%
Gymnosperm Pollen %	57.0%	36.5%	42.9%	45.2%	47.1%	42.2%
Angiosperm Pollen %	16.4%	19.1%	14.3%	19.1%	17.1%	31.0%
TOTAL SPORE-POLLEN %	86.7%	89.6%	76.9%	87.0%	76.4%	98.3%
Fungal Spores and Hyphae %	9.4%	10.4%	9.5%	10.4%	15.7%	1.7%
Dinoflagellate %	3.9%		13.6%	2.6%	7.9%	
DINOFLAGELLATES						
Dinoflagellates Undiff.	20.0%		10.0%	33.3%	54.5%	
Apectodinium homomorphum						
Apectodinium spp.						
Cyclopsiella sp.	80.0%					
Deflandrea spp.						
Eisenackia crassitabulata			5.0%			
Glaphrocysta retiintexta			85.0%	66.7%	45.5%	
Glaphrocysta spp.						
Paralecaniella indentata						
Spinidinium spp.						
Vozzhennikovia angulata						
DINOFLAGELLATE COUNT	5		20	3	11	
TOTAL COUNT	128	115	147	115	140	116

TABLE-4: PALYNOMORPHS PERCENTAGES FOR TURRUM-4				PAGE 4 OF 4		
	2541.0	2585.0	2623.0	2657.0	2761.0	
	SWC 23	SWC 21	SWC 17	SWC 13	SWC 6	
MAJOR CATEGORIES %						
Spores %	21.2%	5.9%	10.2%	13.9%	30.6%	
Gymnosperm Pollen %	16.2%	4.4%	49.1%	29.9%	29.4%	
Angiosperm Pollen %	17.2%	1.5%	35.2%	27.8%	29.4%	
TOTAL SPORE-POLLEN %	54.5%	11.8%	94.4%	71.5%	89.4%	
Fungal Spores and Hyphae %	15.7%	2.9%	5.6%	27.8%	10.6%	
Dinoflagellate %	29.8%	85.3%		0.7%		
DINOFLAGELLATES						
Dinoflagellates Undiff.		1.7%				
Apectodinium homomorphum						
Apectodinium spp.	100.0%					
Cyclopsiella sp.						
Deflandrea spp.		1.7%				
Eisenackia crassitabulata						
Glaphrocysta retiintexta						
Glaphrocysta spp.						
Paralecaniella indentata						
Spinidinium spp.		10.3%		100.0%		
Vozzhennikovia angulata		86.2%				
DINOFLAGELLATE COUNT	59	58		1		
TOTAL COUNT	198	68	108	144	85	

TABLE-5: SPORE-POLLEN PERCENTAGES FOR TURRUM-4 PAGE 1 OF 4						
	1923.0	1954.0	1962.0	1982.5	2002.0	2076.0
	SWC-58	SWC-56	SWC-55	SWC-54	SWC 53	SWC 52
TRILETE SPORES undiff.	3.1%	1.6%	4.5%		1.7%	1.6%
Baculatisporites spp.				1.6%	1.7%	1.1%
Conbaculites apiculatus ms		6.4%				
Cyathidites spp.	3.8%	2.4%	2.7%		5.1%	3.3%
Gleicheniidites/Clavifera spp.	0.8%	4.8%	1.8%	33.9%	16.2%	16.5%
Herkosporites elliottii						
Latrobosporites crassus						
Stereisporites spp.	2.3%			6.5%	4.3%	5.5%
Trilites tuberculiformis						
MONOLETE SPORES undiff.					0.9%	
Laevigatosporites spp.	2.3%	0.8%	1.8%	3.2%	2.6%	16.5%
Peromonolites spp.					0.9%	1.1%
TOTAL SPORES	12.2%	16.0%	10.7%	45.2%	33.3%	45.6%
GYMNOSPERM POLLEN						
Araucariacites australis			0.9%			0.5%
Dilwynites spp.		2.4%	1.8%	11.3%	2.6%	4.4%
Lygistepollenites balmei				1.6%	4.3%	3.8%
Lygistepollenites florinii	3.1%	1.6%	4.5%	1.6%		2.2%
Microcachryidites antarticus					0.9%	
Phyllocladidites mawsonii	3.1%	2.4%			4.3%	6.0%
Phyllocladidites ovalis	0.8%					
Podocarpidites spp.	0.8%		1.8%	3.2%	3.4%	2.7%
Podosporites microsaccatus				1.6%	0.9%	2.2%
TOTAL GYMNOSPERM POLLEN	7.6%	6.4%	8.9%	19.4%	16.2%	22.0%
ANGIOSPERM POLLEN undiff.	1.5%	1.6%	0.9%		0.9%	1.1%
Australopollis obscurus					2.6%	
Casuarina (H. harrisii)	22.1%	19.2%	23.2%	1.6%	1.7%	2.2%
Cupanieidites orthoteichus	0.8%	1.6%	0.9%			
Dicotetradites clavatus	3.8%		1.8%			
Gambierina rudata						
Ilexpollenites sp.	1.5%	0.8%				
Malvacipollis spp.	2.3%	3.2%	6.3%	1.6%	0.9%	
Myrtaceidites spp.		1.6%				
Myrtaceidites tenuis		0.8%	3.6%			
Nothofagidites "brassi" types A/B	11.5%	6.4%	3.6%	3.2%	4.3%	1.1%
Nothofagidites "brassi" type C		4.8%				
Nothofagidites "fusca" type A/B	3.8%	2.4%	2.7%		0.9%	0.5%
Peninsulapollis gillii						
Periporopollenites spp.		0.8%				1.1%
Proteacidites angulatus						
Proteacidites annularis			0.9%			0.5%
Proteacidites pachypolus	0.8%	1.6%	2.7%			
Proteacidites spp.	21.4%	20.0%	20.5%	17.7%	29.1%	19.2%
Tetracolporites spp.						2.7%
Tricolp(or)ates undiff.	10.7%	12.8%	15.2%	8.1%	5.1%	3.3%
Triporopollenites spp. (small)				3.2%	5.1%	0.5%
TOTAL ANGIOSPERM POLLEN	80.2%	77.6%	82.1%	35.5%	50.4%	32.4%
TOTAL SPORES-POLLEN COUNT	131	125	112	62	117	182

TABLE-5: SPORE-POLLEN PERCENTAGES FOR TURRUM-4 PAGE 2 OF 4						
	2109.5	2111.5	2187.0	2302.5	2308.0	2327.5
	SWC 51	SWC 50	SWC 49	SWC 45	SWC 43	SWC 38
TRILETE SPORES undiff.		1.5%	3.1%			
Baculatisporites spp.	0.6%	2.6%	0.9%	0.5%	1.2%	
Conbaculites apiculatus ms						
Cyathidites spp.	5.1%	19.9%	1.8%	0.5%	1.2%	1.0%
Gleicheniidites/Clavifera spp.	7.7%	11.7%	7.1%	14.4%	3.1%	3.8%
Herkosporites elliottii		0.5%		0.5%	0.6%	1.0%
Latrobosporites crassus						
Stereisporites spp.	3.2%	1.5%	0.9%	6.2%	2.5%	2.9%
Trilites tuberculiformis	1.9%	6.1%	1.3%			
MONOLETE SPORES undiff.			0.4%			
Laevigatosporites spp.	7.7%	10.2%	4.9%	11.3%	7.5%	4.8%
Peromonolites spp.	1.3%	0.5%		1.0%	0.6%	
TOTAL SPORES	27.6%	54.6%	20.4%	34.4%	16.8%	13.3%
GYMNOSPERM POLLEN						
Araucariacites australis		1.0%	0.9%	1.0%	1.2%	1.0%
Dilwynites spp.	5.8%	10.7%	22.1%	7.2%	22.4%	7.6%
Lygistepollenites balmei	0.6%	2.0%	19.5%	2.6%	5.0%	9.5%
Lygistepollenites florinii	3.2%	3.6%	2.2%		1.2%	
Microcachryidites antarticus			0.4%			
Phyllocladidites mawsonii	6.4%	5.1%	10.2%	25.6%	17.4%	15.2%
Phyllocladidites ovalis						1.0%
Podocarpidites spp.	18.6%	3.6%	2.7%	6.2%	6.8%	3.8%
Podosporites microsaccatus	1.9%		0.9%	1.0%	4.3%	5.7%
TOTAL GYMNOSPERM POLLEN	36.5%	26.0%	58.8%	43.6%	58.4%	43.8%
ANGIOSPERM POLLEN undiff.	0.6%		0.4%			
Australopollis obscurus	17.3%	3.6%				4.8%
Casuarina (H. harrisii)	3.8%	1.0%	1.3%	0.5%		
Cupanieidites orthoteichus						
Dicotetradites clavatus	0.6%					
Gambierina rudata					0.6%	
Ilexpollenites sp.						
Malvacipollis spp.		0.5%	0.4%			
Myrtaceidites spp.						
Myrtaceidites tenuis						
Nothofagidites "brassi" types A/B	1.9%	2.6%	2.2%	4.6%	6.8%	7.6%
Nothofagidites "brassi" type C						
Nothofagidites "fusca" type A/B	1.9%	0.5%	3.1%			1.9%
Peninsulapollis gillii						
Periporopollenites spp.						
Proteacidites angulatus				0.5%	0.6%	
Proteacidites annularis			0.4%			
Proteacidites pachypolus						
Proteacidites spp.	7.7%	7.7%	10.2%	14.4%	13.0%	21.0%
Tetracolporites spp.	0.6%		0.4%	1.5%	3.1%	1.0%
Tricolp(or)ates undiff.		1.0%	2.7%		0.6%	6.7%
Triporopollenites spp. (small)	1.3%	2.6%	0.4%	0.5%		
TOTAL ANGIOSPERM POLLEN	35.9%	19.4%	21.7%	22.1%	24.8%	42.9%
TOTAL SPORES-POLLEN COUNT	156	196	228	195	161	105

TABLE-5: SPORE-POLLEN PERCENTAGES FOR TURRUM-4 PAGE 3 OF 4

	2365.0	2373.5	2390.0	2441.5	2503.5	2528.0
	SWC 35	SWC 34	SWC 33	SWC 29	SWC 26	SWC 24
		COAL				COAL
TRILETE SPORES undiff.				2.0%	0.9%	3.5%
Baculatisporites spp.	0.9%			1.0%	0.9%	
Conbaculites apiculatus ms						
Cyathidites spp.	0.9%	1.0%			0.9%	7.9%
Gleicheniidites/Clavifera spp.	5.4%	9.7%	9.7%	6.0%	7.5%	5.3%
Herkosporites elliottii	0.9%					
Latrobosporites crassus		21.4%				
Stereisporites spp.	1.8%	1.9%	8.0%	6.0%	0.9%	3.5%
Trilites tuberculiformis					1.9%	
MONOLETE SPORES undiff.				1.0%		
Laevigatosporites spp.	3.6%	3.9%	7.1%	9.0%	2.8%	2.6%
Peromonolites spp.	1.8%		0.9%	1.0%		2.6%
TOTAL SPORES	15.3%	37.9%	25.7%	26.0%	15.9%	25.4%
GYMNOSPERM POLLEN	0.9%					
Araucariacites australis			0.9%	1.0%	1.9%	
Dilwynites spp.	14.4%	1.0%	11.5%	12.0%	5.6%	0.9%
Lygistepollenites balmei	9.0%	7.8%	0.9%	8.0%	10.3%	6.1%
Lygistepollenites florinii	1.8%	3.9%	1.8%		1.9%	3.5%
Microcachryidites antarticus	1.8%	1.0%	1.8%	1.0%	1.9%	
Phyllocladidites mawsonii	23.4%	18.4%	18.6%	17.0%	27.1%	20.2%
Phyllocladidites ovalis			0.9%			
Podocarpidites spp.	12.6%	8.7%	17.7%	4.0%	12.1%	7.9%
Podosporites microsaccatus	1.8%		1.8%	9.0%	0.9%	4.4%
TOTAL GYMNOSPERM POLLEN	65.8%	40.8%	55.8%	52.0%	61.7%	43.0%
ANGIOSPERM POLLEN undiff.	0.9%	1.0%				1.8%
Australopollis obscurus	1.8%		2.7%		3.7%	8.8%
Casuarina (H. harrisii)		1.9%			0.9%	
Cupanieidites orthoteichus						
Dicotetradites clavatus						
Gambierina rudata		1.0%			0.9%	
Ilexpollenites sp.						
Malvacipollis spp.						
Myrtaceidites spp.						
Myrtaceidites tenuis						
Nothofagidites "brassi" types A/B	3.6%		0.9%	8.0%	0.9%	
Nothofagidites "brassi" type C						
Nothofagidites "fusca" type A/B	0.9%					0.9%
Peninsulapollis gillii						0.9%
Periporopollenites spp.	0.9%					
Proteacidites angulatus			4.4%	2.0%		0.9%
Proteacidites annularis		4.9%				
Proteacidites pachypolus						
Proteacidites spp.	5.4%	10.7%	8.8%	12.0%	15.0%	14.0%
Tetracolporites spp.	0.9%					1.8%
Tricolp(or)ates undiff.	3.6%	1.0%	1.8%		0.9%	1.8%
Triporopollenites spp. (small)	0.9%	1.0%				0.9%
TOTAL ANGIOSPERM POLLEN	18.9%	21.4%	18.6%	22.0%	22.4%	31.6%
TOTAL SPORES-POLLEN COUNT	111	103	113	100	107	114

TABLE-5: SPORE-POLLEN PERCENTAGES FOR TURRUM-4 PAGE 4 OF 4

	2541.0	2585.0	2623.0	2657.0	2761.0	
	SWC 23	SWC 21	SWC 17	SWC 13	SWC 6	
TRILETE SPORES undiff.	2.8%			1.0%	3.9%	
Baculatisporites spp.	1.9%					
Conbaculites apiculatus ms						
Cyathidites spp.	1.9%		1.0%		2.6%	
Gleicheniidites/Clavifera spp.	8.3%		3.9%	2.9%	10.5%	
Herkosporites elliottii	0.9%				2.6%	
Latrobosporites crassus						
Stereisporites spp.	12.0%		5.9%	6.8%	10.5%	
Trilites tuberculiformis						
MONOLETE SPORES undiff.						
Laevigatosporites spp.	11.1%			7.8%	3.9%	
Peromonolites spp.				1.0%		
TOTAL SPORES	38.9%		10.8%	19.4%	34.2%	
GYMNOSPERM POLLEN						
Araucariacites australis				2.9%		
Dilwynites spp.	3.7%		2.9%	3.9%		
Lygistepollenites balmei	2.8%		1.0%	3.9%	1.3%	
Lygistepollenites florinii			1.0%			
Microcachryidites antarticus	0.9%		1.0%			
Phyllocladidites mawsonii	9.3%		15.7%	9.7%	26.3%	
Phyllocladidites ovalis	1.9%					
Podocarpidites spp.	9.3%		30.4%	20.4%	2.6%	
Podosporites microsaccatus	1.9%			1.0%	2.6%	
TOTAL GYMNOSPERM POLLEN	29.6%		52.0%	41.7%	32.9%	
ANGIOSPERM POLLEN undiff.					1.3%	
Australopollis obscurus	5.6%		4.9%	1.9%		
Casuarina (H. harrisii)						
Cupanieidites orthoteichus						
Dicotetradites clavatus						
Gambierina rudata	0.9%		1.0%			
Ilexpollenites sp.						
Malvacipollis spp.						
Myrtaceidites spp.						
Myrtaceidites tenuis						
Nothofagidites "brassi" types A/B			1.0%	1.0%		
Nothofagidites "brassi" type C						
Nothofagidites "fusca" type A/B						
Peninsulapollis gillii	0.9%		2.0%	1.9%		
Periporopollenites spp.						
Proteacidites angulatus	3.7%			4.9%		
Proteacidites annularis						
Proteacidites pachypolus						
Proteacidites spp.	18.5%		26.5%	24.3%	25.0%	
Tetracolporites spp.					1.3%	
Tricolp(or)ates undiff.	1.9%		2.0%	2.9%	1.3%	
Triporopollenites spp. (small)				1.9%	3.9%	
TOTAL ANGIOSPERM POLLEN	31.5%		37.3%	38.8%	32.9%	
TOTAL SPORES-POLLEN COUNT	108	8	102	103	76	

RELINQUISHMENT LIST - PALYNOLOGY SLIDES

WELL NAME & NO: TURRUM-4

PREPARED BY: A.D. PARTRIDGE

DATE: 14 JANUARY 1993

SHEET 1 OF 3

SAMPLE TYPE	DEPTH (M)	CATALOGUE NUMBER	DESCRIPTION
SWC 60	1902.0	P196342	Kerogen slide sieved/unsieved fractions
SWC 60	1902.0	P196343	Oxidized slide 2
SWC 59	1913.0	P196344	Kerogen slide sieved/unsieved fractions
SWC 59	1913.0	P196345	Oxidized slide 2 (1/2 cover slip)
SWC 58	1923.0	P196346	Kerogen slide sieved/unsieved fractions
SWC 58	1923.0	P196347	Oxidized slide 2
SWC 58	1923.0	P196348	Oxidized slide 3
SWC 58	1923.0	P196349	Oxidized slide 4
CUTTINGS	1930	P196350	Kerogen slide sieved/unsieved fractions
CUTTINGS	1930	P196351	Oxidized slide 2
CUTTINGS	1930	P196352	Oxidized slide 3
CUTTINGS	1930	P196353	Oxidized slide 4
SWC 56	1954.0	P196354	Kerogen slide sieved/unsieved fractions
SWC 56	1954.0	P196355	Oxidized slide 2
SWC 56	1954.0	P196356	Oxidized slide 3
SWC 56	1954.0	P196357	Oxidized slide 4
CUTTINGS	1940	P196358	Kerogen slide sieved/unsieved fractions
CUTTINGS	1940	P196359	Oxidized slide 2
CUTTINGS	1940	P196360	Oxidized slide 3
CUTTINGS	1940	P196361	Oxidized slide 4
SWC 55	1962.0	P196362	Kerogen slide sieved/unsieved fractions
SWC 55	1962.0	P196363	Oxidized slide 2
SWC 55	1962.0	P196364	Oxidized slide 3
SWC 55	1962.0	P196365	Oxidized slide 4
CUTTINGS	1965	P196366	Kerogen slide sieved/unsieved fractions
CUTTINGS	1965	P196367	Oxidized slide 2
CUTTINGS	1965	P196368	Oxidized slide 3
CUTTINGS	1965	P196369	Oxidized slide 4
CUTTINGS	1970	P196370	Kerogen slide sieved/unsieved fractions
CUTTINGS	1970	P196371	Oxidized slide 2
CUTTINGS	1970	P196372	Oxidized slide 3
CUTTINGS	1970	P196373	Oxidized slide 4
SWC 54	1982.5	P196374	Kerogen slide sieved/unsieved fractions
SWC 54	1982.5	P196375	Oxidized slide 2
SWC 54	1982.5	P196376	Oxidized slide 3
SWC 54	1982.5	P196377	Oxidized slide 4 (2nd filter)
SWC 53	2002.0	P196378	Kerogen slide sieved/unsieved fractions
SWC 53	2002.0	P196379	Oxidized slide 2
SWC 53	2002.0	P196380	Oxidized slide 3
SWC 53	2002.0	P196381	Oxidized slide 4 (2nd filter)
SWC 53	2002.0	P196382	Oxidized slide 5 (2nd filter)
SWC 52	2076.0	P196383	Kerogen slide sieved/unsieved fractions
SWC 52	2076.0	P196384	Oxidized slide 2
SWC 52	2076.0	P196385	Oxidized slide 3
SWC 52	2076.0	P196386	Oxidized slide 4

RELINQUISHMENT LIST - PALYNOLOGY SLIDES

WELL NAME & NO: TURRUM-4

PREPARED BY: A.D. PARTRIDGE

DATE: 14 JANUARY 1993

SHEET 2 OF 3

SAMPLE TYPE	DEPTH (M)	CATALOGUE NUMBER	DESCRIPTION
SWC 51	2109.5	P196387	Kerogen slide sieved/unsieved fractions
SWC 51	2109.5	P196388	Oxidized slide 2
SWC 51	2109.5	P196389	Oxidized slide 3
SWC 51	2109.5	P196390	Oxidized slide 4
SWC 50	2111.5	P196391	Kerogen slide sieved/unsieved fractions
SWC 50	2111.5	P196392	Oxidized slide 2
SWC 50	2111.5	P196393	Oxidized slide 3
SWC 50	2111.5	P196394	Oxidized slide 4
SWC 49	2187.0	P196395	Kerogen slide sieved/unsieved fractions
SWC 49	2187.0	P196396	Oxidized slide 2
SWC 49	2187.0	P196397	Oxidized slide 3
SWC 49	2187.0	P196398	Oxidized slide 4
SWC 46	2290.0	P196399	Kerogen slide sieved/unsieved fractions
SWC 46	2290.0	P196400	Oxidized slide 2
SWC 46	2290.0	P196401	Oxidized slide 3
SWC 46	2290.0	P196402	Oxidized slide 4 (2nd ox.)
SWC 46	2290.0	P196403	Oxidized slide 5 (2nd ox.)
SWC 45	2302.5	P196404	Kerogen slide sieved/unsieved fractions
SWC 45	2302.5	P196405	Oxidized slide 2
SWC 45	2302.5	P196406	Oxidized slide 3
SWC 45	2302.5	P196407	Oxidized slide 4
SWC 43	2308.0	P196408	Kerogen slide sieved/unsieved fractions
SWC 43	2308.0	P196409	Oxidized slide 2
SWC 43	2308.0	P196410	Oxidized slide 3
SWC 43	2308.0	P196411	Oxidized slide 4
SWC 40	2323.0	P196412	Kerogen slide sieved/unsieved fractions
SWC 38	2327.5	P196413	Kerogen slide sieved/unsieved fractions
SWC 38	2327.5	P196414	Oxidized slide 2
SWC 38	2327.5	P196415	Oxidized slide 3
SWC 38	2327.5	P196416	Oxidized slide 4 (2nd ox.)
SWC 38	2327.5	P196417	Oxidized slide 5 (2nd ox.)
SWC 35	2365.0	P196418	Kerogen slide sieved/unsieved fractions
SWC 35	2365.0	P196419	Oxidized slide 2
SWC 35	2365.0	P196420	Oxidized slide 3
SWC 35	2365.0	P196421	Oxidized slide 4
SWC 34	2373.5	P196422	Oxidized slide 2 Coal 30 min ox.
SWC 34	2373.5	P196423	Oxidized slide 3 Coal 30 min ox.
SWC 34	2373.5	P196424	Oxidized slide 4 Coal 5 min ox.
SWC 33	2390.0	P196425	Kerogen slide sieved/unsieved fractions
SWC 33	2390.0	P196426	Oxidized slide 2
SWC 33	2390.0	P196427	Oxidized slide 3
SWC 33	2390.0	P196428	Oxidized slide 4
SWC 29	2441.5	P196429	Kerogen slide sieved/unsieved fractions
SWC 29	2441.5	P196430	Oxidized slide 2
SWC 29	2441.5	P196431	Oxidized slide 3
SWC 29	2441.5	P196432	Oxidized slide 4 (2nd ox.)
SWC 29	2441.5	P196433	Oxidized slide 5 (2nd ox.)

RELINQUISHMENT LIST - PALYNOLOGY SLIDES

WELL NAME & NO: TURRUM-4

PREPARED BY: A.D. PARTRIDGE

DATE: 14 JANUARY 1993

SHEET 3 OF 3

SAMPLE TYPE	DEPTH (M)	CATALOGUE NUMBER	DESCRIPTION
SWC 28	2488.0	P196434	Kerogen slide sieved/unsieved fractions
SWC 28	2488.0	P196435	Oxidized slide 2 (1/2 slip cover)
SWC 26	2503.5	P196436	Kerogen slide sieved/unsieved fractions
SWC 26	2503.5	P196437	Oxidized slide 2
SWC 26	2503.5	P196438	Oxidized slide 3
SWC 26	2503.5	P196439	Oxidized slide 4
SWC 24	2528.0	P196440	Oxidized slide 2 Coal 30 min ox.
SWC 24	2528.0	P196441	Oxidized slide 3 Coal 30 min ox.
SWC 24	2528.0	P196442	Oxidized slide 4 Coal 5 min ox.
SWC 23	2541.0	P196443	Kerogen slide sieved/unsieved fractions
SWC 23	2541.0	P196444	Oxidized slide 2
SWC 23	2541.0	P196445	Oxidized slide 3
SWC 23	2541.0	P196446	Oxidized slide 4
SWC 21	2585.0	P196447	Kerogen slide sieved/unsieved fractions
SWC 21	2585.0	P196448	Oxidized slide 2
SWC 21	2585.0	P196449	Oxidized slide 3
SWC 21	2585.0	P196450	Oxidized slide 4 (2nd ox.)
SWC 21	2585.0	P196451	Oxidized slide 5 (2nd ox.)
SWC 19	2591.5	P196452	Oxidized slide 2 Coal 30 min ox.
SWC 19	2591.5	P196453	Oxidized slide 3 Coal 30 min ox.
SWC 19	2591.5	P196454	Oxidized slide 4 Coal 5 min ox.
SWC 17	2623.0	P196455	Kerogen slide sieved/unsieved fractions
SWC 17	2623.0	P196456	Oxidized slide 2
SWC 17	2623.0	P196457	Oxidized slide 3
SWC 17	2623.0	P196458	Oxidized slide 4
SWC 13	2657.0	P196459	Kerogen slide sieved/unsieved fractions
SWC 13	2657.0	P196460	Oxidized slide 2
SWC 13	2657.0	P196461	Oxidized slide 3
SWC 13	2657.0	P196462	Oxidized slide 4
SWC 8	2696.0	P196463	Kerogen slide sieved/unsieved fractions
SWC 8	2696.0	P196464	Oxidized slide 2
SWC 8	2696.0	P196465	Oxidized slide 3
SWC 8	2696.0	P196466	Oxidized slide 4
SWC 8	2696.0	P196467	Oxidized slide 5
SWC 7	2703.0	P196468	Oxidized slide 2 Coal 30 min ox.
SWC 7	2703.0	P196469	Oxidized slide 3 Coal 30 min ox.
SWC 7	2703.0	P196470	Oxidized slide 4 Coal 5 min ox.
SWC 6	2716.0	P196471	Kerogen slide sieved/unsieved fractions
SWC 6	2716.0	P196472	Oxidized slide 2
SWC 6	2716.0	P196473	Oxidized slide 3
SWC 6	2716.0	P196474	Oxidized slide 4
SWC 4	2726.0	P196475	Oxidized slide 2 Coal 30 min ox.
SWC 4	2726.0	P196476	Oxidized slide 3 Coal 30 min ox.
SWC 4	2726.0	P196477	Oxidized slide 4 Coal 5 min ox.

RELINQUISHMENT LIST - PALYNOLOGY RESIDUES

WELL NAME & NO: TURRUM-4

PREPARED BY: A.D. PARTRIDGE

DATE: 14 JANUARY 1993

SHEET 1 OF 2

SAMPLE TYPE	DEPTH (M)	DESCRIPTION
SWC 58 SWC 58	1923.0 1923.0	Kerogen residue Oxidized residue
CUTTINGS	1940.0	Oxidized residue
CUTTINGS	1930.0	Oxidized residue
SWC 56 SWC 56	1954.0 1954.0	Kerogen residue Oxidized residue
SWC 55 SWC 55	1962.0 1962.0	Kerogen residue Oxidized residue
CUTTINGS	1940.0	Oxidized residue
CUTTINGS	1970.0	Oxidized residue
SWC 54 SWC 54	1982.5 1982.5	Kerogen residue Oxidized residue
SWC 53 SWC 53	2002.0 2002.0	Kerogen residue Oxidized residue
SWC 52 SWC 52	2076.0 2076.0	Kerogen residue Oxidized residue
SWC 51 SWC 51	2109.5 2109.5	Kerogen residue Oxidized residue
SWC 50 SWC 50	2111.5 2111.5	Kerogen residue Oxidized residue
SWC 49	2187.0	Oxidized residue
SWC 46 SWC 46	2290.0 2290.0	Kerogen residue Oxidized residue
SWC 45 SWC 45	2302.5 2302.5	Kerogen residue Oxidized residue
SWC 43 SWC 43	2308.0 2308.0	Kerogen residue Oxidized residue
SWC 38	2327.5	Oxidized residue
SWC 35 SWC 35	2365.0 2365.0	Kerogen residue Oxidized residue
SWC 33 SWC 33	2390.0 2390.0	Kerogen residue Oxidized residue
SWC 29 SWC 29	2441.5 2441.5	Kerogen residue Oxidized residue
SWC 26 SWC 26	2503.5 2503.5	Kerogen residue Oxidized residue
SWC 24	2528.0	Oxidized residue

RELINQUISHMENT LIST - PALYNOLOGY RESIDUES

WELL NAME & NO:	TURRUM-4
PREPARED BY:	A.D. PARTRIDGE
DATE:	14 JANUARY 1993

SHEET 2 OF 2

SAMPLE TYPE	DEPTH (M)	DESCRIPTION
SWC 23 SWC 23	2541.0 2541.0	Kerogen residue Oxidized residue
SWC 21 SWC 21	2585.0 2585.0	Kerogen residue Oxidized residue
SWC 19	2591.5	Oxidized residue
SWC 17 SWC 17	2623.0 2623.0	Kerogen residue Oxidized residue
SWC 13 SWC 13	2657.0 2657.0	Kerogen residue Oxidized residue
SWC 8 SWC 8	2696.0 2696.0	Kerogen residue Oxidized residue
SWC 7	2703.0	Oxidized residue
SWC 6 SWC 6	2716.0 2716.0	Kerogen residue Oxidized residue
SWC 4	2726.0	Oxidized residue

TURRUM-4 PALYNOMORPH RANGE CHART FOR INTERVAL 1902-1970 M.

CHART 1 OF 4

Format: Relative Abundance By Highest Appearance

Microplankton species 1 - 24

Spore-pollen species 25 - 113

ANALYSIS BY: Alan D. PARTRIDGE

December 1992

Key to Symbols

W = REWORKED SPECIMENS
Z = CAVED SPECIMENS
X = PRESENT
R = RARE
F = FREQUENT
C = COMMON
A = ABUNDANT
? = Questionably Present
. = Not Present

1 ACHOMOSPHAERA RAMULIFERA
2 DAPSILIDINIUM PSEUDOCOLLIGERUM
3 IMPAGIDINIUM SPP.
4 LINGULODINIUM MACHAEROPHORUM
5 NEMATOSPHAEROPSIS RHIZOMA MS
6 OPERCULODINIUM CENTROCARPUM
7 PENTADINIUM LATICINCTUM
8 PROTOELLIPSODINIUM SIMPLEX MS
9 PYXIDINOPSIS PONTUS MS
10 SPINIFERITES RAMOSA S.L.
11 TASMANITES SPP.
12 TECTATODINIUM SCABROELLIPTICUS MS
13 botryococcus
14 microforaminiferal liner
15 scolecodont
16 ACHOMOSPHAERA ALCICORNU
17 CRASSOSPHAERA CONCINNIA
18 PSALIGONYAULAX SIMPLICIA
19 SCHEMATOPHORA SP. CF. SPECIOSUS
20 DEFLANDREA FLOUNDERENSIS
21 DEFLANDREA SPP.
22 HYSTRICHOSPHAERIDIUM TUBIFERUM
23 PSEUDOSCHIZAEA CIRCULA
24 DEFLANDREA DARTMOORIA
25 ARAUCARIACITES AUSTRALIS
26 BACULATISPORITES SPP.
27 CYATHEA PALEOSPORA
28 CYATHEACIDITES ANNULATUS
29 DACRYCARPITES AUSTRALIENSIS
30 DILWYNITES GRANULATUS
31 FOVEOTRILETES LACUNOSUS
32 GRANULATISPORITES TRISINUS
33 HALORAGACIDITES HARRISII
34 HERKOSPORITES ELLIOTTII
35 KUYLISPORITES WATERBOLKII
36 LAEVIGATOSPORITES OVATUS
37 LYGISTEPOLLENITES FLORINII
38 MONOPORITES MEDIA
39 NOTHOFAGIDITES DEMINUTUS
40 NOTHOFAGIDITES EMARCIDUS/HETERUS
41 PHYLLOCLADIDITES MAWSONII
42 PHYLLOCLADIDITES OVALIS
43 POLYPODIIDITES PERVERRUCATUS
44 PROTEACIDITES SPP.
45 STEREISPORITES ANTIQUISPORITES
46 VERRUCOSISPORITES CRISTATUS
47 DIDECITRILETES ERICIANUS
48 FORAMINISPORIS OZOTUS MS
49 ISCHYOSPORITES GREMIUS
50 ISCHYOSPORITES IRREGULARIS MS
51 LYMINGTONIA N.SP. (6 COLPI)
52 MALVACIPOLLIS SUBTILIS
53 MATONISPORITES ORNAMENTALIS
54 NOTHOFAGIDITES FALCATUS
55 VERRUCOSISPORITES KOPUKUENSIS
56 BEAUPREAIDITES TRIGONALIS MS
57 CICATRICOSISPORITES AUSTRALIENSIS
58 CONBACULITES APICULATUS MS
59 CUPANIENIDITES ORTHOTEICHUS
60 CYATHIDITES SPLENDENS
61 DICOTETRADITES CLAVATUS
62 DILWYNITES TUBERCULATUS
63 FOVEOTRILETES BALTEUS
64 ILEXPOLLENITES SPP.
65 INTRATRIPOROPOLLENITES NOTABILIS
66 MALVACIPOLLIS DIVERSUS
67 MALVACIPOLLIS ROBUSTUS MS
68 MYRTACEIDITES PARVUS/MESONESUS
69 MYRTACEIDITES TENUIS
70 NOTHOFAGIDITES BRACHYSPINULOSUS
71 NOTHOFAGIDITES FLEMINGII
72 PODOCARPIDITES SPP.
73 POLYCOLPOROPOLLENITES ESOBALTEUS
74 PROTEACIDITES ADENANTHOIDES
75 PROTEACIDITES ALVEOLATUS
76 PROTEACIDITES ANNULARIS
77 PROTEACIDITES CRASSUS
78 PROTEACIDITES DIFFERENTIPOLUS
79 PROTEACIDITES GRANDIS
80 PROTEACIDITES LATROBENSIS
81 PROTEACIDITES OBSCURUS
82 PROTEACIDITES PACHYPOLUS
83 PROTEACIDITES PSEUDOMOIDES
84 PROTEACIDITES RETICULOSCABRATUS
85 RUGULATISPORITES MALLATUS
86 SANTALUMIDITES CAINOZOICUS
87 SAPOTACEOIDAEPOLLENITES ROTUNDUS
88 STEREISPORITES (TRIPUNCTISPORIS) SP.
89 TRICOLPORITES ADELAIDENSIS
90 TRICOLPORITES PAENESTRIATUS
91 TRICOLPORITES SPHAERICA
92 TRILITES TUBERCULIFORMIS
93 TRIPOROPOLLENITES AMBIGUUS
94 BEAUPREAIDITES ELEGANSIFORMIS
95 CAMAROZONOSPORITES HESKERMENSIS
96 GLEICHENIIDITES CIRCINIDITES
97 PROTEACIDITES ORNATUS
98 TRIPOROPOLLENITES HELOSUS MS
99 BANKSIEAEIDITES ARCUATUS
100 CLAVIFERA TRIPLEX
101 HALORAGACIDITES TRIORATUS
102 NOTHOFAGIDITES VANSTEENISII
103 PERIPOROPOLLENITES DEMARCATUS
104 PODOSPORITES MICROSACCATUS
105 POLYORIFICITES OBLATUS
106 PROTEACIDITES LEIGHTONII
107 PROTEACIDITES TUBERCULIFORMIS
108 TRICOLPORITES SCABRATUS
109 PROTEACIDITES ASPEROPOLUS
110 PROTEACIDITES KOPIENSIS
111 PROTEACIDITES NASUS
112 ROTVERRUSPORITES STELLATUS MS
113 BEAUPREAIDITES VERRUCOSUS

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1902.0 M  SWC 60    R R F R R F R C C C R R R F R . . . . . . . . . C R C F R C R W C R R R R R R F R R R R R R . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .  1902.0 M  SWC 60
1913.0 M  SWC 59    R . . R R F . R R F R . . C R R R R R . . . . . R . R F . R F . R R . R R . R F R . R . R . W R R R R R F R R . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .  1913.0 M  SWC 59
1923.0 M  SWC 58    . . . . . . . . . R . . . . . . . . . R R R . . . R F . . . . . A . . F F . . C F R . A F . . . . . . F . . R R W F R R F R F F R F R R R F F R R R R R F R R R R F R R R ? R R R R R R R . . . . . . . . . . . . . . . . . . . .  1923.0 M  SWC 58
1930   M  CUTTINGS  . . Z . . Z . . . . . . . . . . . . . . R . . . . . . . . . . . A . . R R . . R R . . C . . . . . . . R . . F . . R R . R . . . . . . . . . R . . . . . R . . . . F . . . . . . . . . . . R R F R . . . . . . . . . . . . . . . .  1930   M  CUTTINGS
1940   M  CUTTINGS  . . . . . . . . . Z . . . . . . . . . R R . . . . . R . . . . . A . . R R . . . R . . C . . . . . . . R . . R . . R . R . . . . . R . . R R . . . . . . . . . . . F . . . . . R . . . . . . . . R R R . . . . . . . . . . . . . . .  1940   M  CUTTINGS
1954.0 M  SWC 56    . . . . . . . . . . . . . . . . . . . . R . R . R R R . . F . . A . R R F . R C F . . A R . . . . R . F . . R . . C R F R R . R R F . R R F F R R R R R R . . . R F . R R R R . . R . . . R . F . R R R R R R R R R R . . . . . .  1954.0 M  SWC 56
1962.0 M  SWC 55    . . . . . . . . . . . . . . . . . . . R . . . . R R F . . F . . A . R F F . . F R . . A . . . . . . . F . . R . . F R F F R . . . . . . F . F F . R . R . . R . R F R R R . R R . R . . . . . F . . . . . . . . . R . R . . . . .  1962.0 M  SWC 55
1965   M  CUTTINGS  . . . . . Z . . . . . . . . . . . . . . . . . . R . R . . F . . . . R . R . . R . . . C R . . . . . . R . . . . . R R . R . . . . . R . R . R . . . . . . . . . R F R R R . . . R . . . . . . R . . . . . . . . . R R . R R R R .  1965   M  CUTTINGS
1970   M  CUTTINGS  . . R . . . . . Z Z . . . . . . . . . . . . . R . . R . . . . . C . . R R . . R . R . C R . . . . . . . . . R . . R R F . . . . R R . . F . . . R R . R . . R . . F R . R R . . . R . . . . . F R . . . . . . . . . . . . . . R . R  1970   M  CUTTINGS
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SPECIES LOCATION INDEX

CHART COLUMN SPECIES

16 ACHOMOSPHAERA ALCICORNU
1 ACHOMOSPHAERA RAMULIFERA
25 ARAUCARIACITES AUSTRALIS
26 BACULATISPORITES SPP.
99 BANKSIEAEIDITES ARCUATUS
94 BEAUPREAIDITES ELEGANSIFORMIS
56 BEAUPREAIDITES TRIGONALIS MS
113 BEAUPREAIDITES VERRUCOSUS
95 CAMAROZONOSPORITES HESKERMENSIS
57 CICATRICOSISPORITES AUSTRALIENSIS
100 CLAVIFERA TRIPLEX
58 CONBACULITES APICULATUS MS
17 CRASSOSPHAERA CONCINNIA
59 CUPANIENIDITES ORTHOTEICHUS
27 CYATHEA PALEOSPORA
28 CYATHEACIDITES ANNULATUS
60 CYATHIDITES SPLENDENS
29 DACRYCARPITES AUSTRALIENSIS
2 DAPSILIDINIUM PSEUDOCOLLIGERUM
24 DEFLANDREA DARTMOORIA
20 DEFLANDREA FLOUNDERENSIS
21 DEFLANDREA SPP.
61 DICOTETRADITES CLAVATUS
47 DIDECITRILETES ERICIANUS
30 DILWYNITES GRANULATUS
62 DILWYNITES TUBERCULATUS
48 FORAMINISPORIS OZOTUS MS
63 FOVEOTRILETES BALTEUS
31 FOVEOTRILETES LACUNOSUS
96 GLEICHENIIDITES CIRCINIDITES
32 GRANULATISPORITES TRISINUS
33 HALORAGACIDITES HARRISII
101 HALORAGACIDITES TRIORATUS
34 HERKOSPORITES ELLIOTTII
22 HYSTRICHOSPHAERIDIUM TUBIFERUM
64 ILEXPOLLENITES SPP.
3 IMPAGIDINIUM SPP.
65 INTRATRIPOROPOLLENITES NOTABILIS
49 ISCHYOSPORITES GREMIUS
50 ISCHYOSPORITES IRREGULARIS MS
35 KUYLISPORITES WATERBOLKII
36 LAEVIGATOSPORITES OVATUS
4 LINGULODINIUM MACHAEROPHORUM
37 LYGISTEPOLLENITES FLORINII
51 LYMINGTONIA N.SP. (6 COLPI)
66 MALVACIPOLLIS DIVERSUS
67 MALVACIPOLLIS ROBUSTUS MS
52 MALVACIPOLLIS SUBTILIS
53 MATONISPORITES ORNAMENTALIS
38 MONOPORITES MEDIA
68 MYRTACEIDITES PARVUS/MESONESUS
69 MYRTACEIDITES TENUIS
5 NEMATOSPHAEROPSIS RHIZOMA MS
70 NOTHOFAGIDITES BRACHYSPINULOSUS
39 NOTHOFAGIDITES DEMINUTUS
40 NOTHOFAGIDITES EMARCIDUS/HETERUS
54 NOTHOFAGIDITES FALCATUS
71 NOTHOFAGIDITES FLEMINGII
102 NOTHOFAGIDITES VANSTEENISII
6 OPERCULODINIUM CENTROCARPUM
7 PENTADINIUM LATICINCTUM
103 PERIPOROPOLLENITES DEMARCATUS
41 PHYLLOCLADIDITES MAWSONII
42 PHYLLOCLADIDITES OVALIS
72 PODOCARPIDITES SPP.
104 PODOSPORITES MICROSACCATUS
73 POLYCOLPOROPOLLENITES ESOBALTEUS
105 POLYORIFICITES OBLATUS
43 POLYPODIIDITES PERVERRUCATUS
74 PROTEACIDITES ADENANTHOIDES
75 PROTEACIDITES ALVEOLATUS
76 PROTEACIDITES ANNULARIS
109 PROTEACIDITES ASPEROPOLUS
77 PROTEACIDITES CRASSUS
78 PROTEACIDITES DIFFERENTIPOLUS
79 PROTEACIDITES GRANDIS
110 PROTEACIDITES KOPIENSIS
80 PROTEACIDITES LATROBENSIS
106 PROTEACIDITES LEIGHTONII
111 PROTEACIDITES NASUS
81 PROTEACIDITES OBSCURUS
97 PROTEACIDITES ORNATUS
82 PROTEACIDITES PACHYPOLUS
83 PROTEACIDITES PSEUDOMOIDES
84 PROTEACIDITES RETICULOSCABRATUS
44 PROTEACIDITES SPP.
107 PROTEACIDITES TUBERCULIFORMIS
8 PROTOELLIPSODINIUM SIMPLEX MS
18 PSALIGONYAULAX SIMPLICIA
23 PSEUDOSCHIZAEA CIRCULA
9 PYXIDINOPSIS PONTUS MS
112 ROTVERRUSPORITES STELLATUS MS
85 RUGULATISPORITES MALLATUS
86 SANTALUMIDITES CAINOZOICUS
87 SAPOTACEOIDAEPOLLENITES ROTUNDUS
19 SCHEMATOPHORA SP. CF. SPECIOSUS
10 SPINIFERITES RAMOSA S.L.
88 STEREISPORITES (TRIPUNCTISPORIS) SP.
45 STEREISPORITES ANTIQUISPORITES
11 TASMANITES SPP.
12 TECTATODINIUM SCABROELLIPTICUS MS
89 TRICOLPORITES ADELAIDENSIS
90 TRICOLPORITES PAENESTRIATUS
108 TRICOLPORITES SCABRATUS
91 TRICOLPORITES SPHAERICA
92 TRILITES TUBERCULIFORMIS
93 TRIPOROPOLLENITES AMBIGUUS
98 TRIPOROPOLLENITES HELOSUS MS
46 VERRUCOSISPORITES CRISTATUS
55 VERRUCOSISPORITES KOPUKUENSIS
13 botryococcus
14 microforaminiferal liner
15 scolecodont

TURRUM-4 PALYNOMORPH RANGE CHART FOR INTERVAL 1902-1970 M.

Format: Relative Abundance By Lowest Appearance

Key to Symbols

W = REWORKED SPECIMENS
Z = CAVED SPECIMENS
X = PRESENT
R = RARE
F = FREQUENT
C = COMMON
A = ABUNDANT
? = Questionably Present
. = Not Present

		DEFLANDREA DARTMOORIA	IMPAGIDINIUM SPP.	PYXIDINOPSIS PONTUS MS	SPINIFERITES RAMOSA S.L.	OPERCULODINIUM CENTROCARPUM	DEFLANDREA FLOUNDERENSIS	DEFLANDREA SPP.	PSEUDOSCHIZAEA CIRCULA	HYSTRICHOSPHAERIDIUM TUBIFERUM	ACHOMOSPHAERA ALCICORNU	ACHOMOSPHAERA RAMULIFERA	CRASSOSPHAERA CONCINNIA	LINGULODINIUM MACHAEROPHORUM	NEMATOSPHAEROPSIS RHIZOMA MS	PROTOELLIPSODINIUM SIMPLEX MS	PSALIGONYAULAX SIMPLICIA	SCHEMATOPHORA SP. CF. SPECIOSUS	TASMANITES SPP.	microforaminiferal liner	scolecodont	DAPSILIDINIUM PSEUDOCOLLIGERUM	PENTADINIUM LATICINCTUM	TECTATODINIUM SCABROELLIPTICUS MS	botryococcus	BEAUPREAIDITES VERRUCOSUS	CONBACULITES APICULATUS MS	CUPANIENIDITES ORTHOTEICHUS	CYATHEA PALEOSPORA	CYATHIDITES SPLENDENS	GLEICHENIIDITES CIRCINIDITES	HALORAGACIDITES HARRISII	INTRATRIPOROPOLLENITES NOTABILIS	LAEVIGATOSPORITES OVATUS	LYGISTEPOLLENITES FLORINII	MALVACIPOLLIS DIVERSUS	MYRTACEIDITES TENUIS	NOTHOFAGIDITES EMARCIDUS/HETERUS	PHYLLOCLADIDITES OVALIS	POLYCOLPOROPOLLENITES ESOBALTEUS	PROTEACIDITES ADENANTHOIDES	PROTEACIDITES ANNULARIS	PROTEACIDITES GRANDIS	PROTEACIDITES NASUS	PROTEACIDITES ORNATUS	PROTEACIDITES PACHYPOLUS	PROTEACIDITES PSEUDOMOIDES	PROTEACIDITES SPP.	RUGULATISPORITES MALLATUS	SANTALUMIDITES CAINOZOICUS	STEREISPORITES ANTIQUISPORITES	TRICOLPORITES PAENESTRIATUS	VERRUCOSISPORITES KOPUKUENSIS	ARAUCARIACITES AUSTRALIS	DICOTETRADITES CLAVATUS	DILWYNITES GRANULATUS	KUYLISPORITES WATERBOLKII	MALVACIPOLLIS ROBUSTUS MS	MALVACIPOLLIS SUBTILIS	NOTHOFAGIDITES FLEMINGII	PROTEACIDITES ASPEROPOLUS	PROTEACIDITES KOPIENSIS	PROTEACIDITES LEIGHTONII	PROTEACIDITES OBSCURUS	PROTEACIDITES TUBERCULIFORMIS	PROTEACIDITES RETICULOSCABRATUS	ROTVERRUSPORITES STELLATUS MS	TRICOLPORITES ADELAIDENSIS	BACULATISPORITES SPP.	DILWYNITES TUBERCULATUS	PHYLLOCLADIDITES MAWSONII	PODOCARPIDITES SPP.	SAPOTACEOIDAEPOLLENITES ROTUNDUS	STEREISPORITES (TRIPUNCTISPORIS) SP.	TRICOLPORITES SCABRATUS	BANKSIEAEIDITES ARCUATUS	BEAUPREAIDITES ELEGANSIFORMIS	CLAVIFERA TRIPLEX	HALORAGACIDITES TRIORATUS	ILEXPOLLENITES SPP.	ISCHYOSPORITES IRREGULARIS MS	MYRTACEIDITES PARVUS/MESONESUS	NOTHOFAGIDITES BRACHYSPINULOSUS	NOTHOFAGIDITES DEMINUTUS	NOTHOFAGIDITES VANSTEENISII
1902.0 M	SWC 60	.	F	C	C	F	.	.	.	.	.	R	.	R	R	C	.	.	R	F	R	R	R	R	R	.	.	.	C	.	.	C	.	R	R	.	.	F	R	.	.	.	.	.	.	.	.	R	.	.	R	.	.	C	.	C	R	.	.	.	.	.	.	.	.	.	.	.	R	.	R	.	.	.	.	.	.	.	.	.	.	.	.	R	.
1913.0 M	SWC 59	.	.	R	F	F	.	.	.	.	R	R	R	R	R	R	R	R	R	C	R	.	.	.	.	.	.	.	R	.	.	R	.	R	R	.	.	F	.	.	.	.	.	.	.	.	.	.	.	.	R	.	R	R	.	R	.	.	R	.	.	.	.	.	.	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	R	.	.	R	.
1923.0 M	SWC 58	.	.	.	R	.	R	R	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	F	R	F	R	.	A	R	F	F	F	R	C	R	R	R	R	R	.	.	F	R	A	R	?	F	R	R	.	F	.	.	R	F	F	.	.	.	R	R	.	.	R	R	R	F	R	R	R	.	.	.	.	.	F	.	R	F	.	.
1930 M	CUTTINGS	.	Z	.	.	Z	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	R	.	.	F	A	.	R	R	.	.	R	.	.	.	.	.	.	R	F	.	C	.	.	.	.	F	.	R	.	.	.	R	R	.	.	.	.	.	.	.	.	.	.	R	.	.	.	.	.	R	.	.	.	.	.	.	.	.
1940 M	CUTTINGS	.	.	.	Z	.	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	R	R	R	A	.	R	R	R	R	.	.	.	.	.	.	.	R	F	.	C	.	.	.	.	R	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	R	.	.	R	.	.	.	.	.	.	.	.	R	.	.
1954.0 M	SWC 56	.	.	.	.	.	.	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C	R	R	F	F	A	R	R	F	F	R	C	.	R	R	R	.	.	.	F	.	A	R	R	R	R	R	R	R	F	R	.	F	F	.	.	R	R	R	R	.	.	R	R	F	R	R	.	.	R	R	R	R	R	R	R	F	R	R
1962.0 M	SWC 55	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	F	R	F	F	F	A	.	F	F	.	F	F	.	.	R	R	R	.	.	F	R	A	R	.	.	R	R	R	F	F	R	.	F	F	.	.	R	R	R	.	.	.	R	R	R	F	R	R	R	.	.	.	.	.	.	.	.	.	.
1965 M	CUTTINGS	.	.	.	.	Z	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	R	R	.	R	.	.	.	R	.	R	R	.	.	.	.	.	R	.	F	R	C	R	.	R	.	.	R	R	F	R	R	R	R	R	R	R	R	R	R	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1970 M	CUTTINGS	R	R	Z	Z	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	R	R	R	F	F	C	R	R	R	R	F	R	R	R	R	R	R	R	R	F	R	C	R	R	R	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

SPECIES LOCATION INDEX

CHART COLUMN	SPECIES
10	ACHOMOSPHAERA ALCICORNU
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25	BEAUPREAIDITES VERRUCOSUS
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77	CLAVIFERA TRIPLEX
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82	NOTHOFAGIDITES BRACHYSPINULOSUS
83	NOTHOFAGIDITES DEMINUTUS
37	NOTHOFAGIDITES EMARCIDUS/HETERUS
108	NOTHOFAGIDITES FALCATUS
59	NOTHOFAGIDITES FLEMINGII
84	NOTHOFAGIDITES VANSTEENISII
5	OPERCULODINIUM CENTROCARPUM
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70	PHYLLOCLADIDITES MAWSONII
38	PHYLLOCLADIDITES OVALIS
71	PODOCARPIDITES SPP.
86	PODOSPORITES MICROSACCATUS
39	POLYCOLPOROPOLLENITES ESOBALTEUS
87	POLYORIFICITES OBLATUS
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41	PROTEACIDITES ANNULARIS
60	PROTEACIDITES ASPEROPOLUS
89	PROTEACIDITES CRASSUS
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43	PROTEACIDITES NASUS
63	PROTEACIDITES OBSCURUS
44	PROTEACIDITES ORNATUS
45	PROTEACIDITES PACHYPOLUS
46	PROTEACIDITES PSEUDOMOIDES
64	PROTEACIDITES RETICULOSCABRATUS
47	PROTEACIDITES SPP.
65	PROTEACIDITES TUBERCULIFORMIS
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16	PSALIGONYAULAX SIMPLICIA
8	PSEUDOSCHIZAEA CIRCULA
3	PYXIDINOPSIS PONTUS MS
66	ROTVERRUSPORITES STELLATUS MS
48	RUGULATISPORITES MALLATUS

TURRUM-4 PALYNOMORPH RANGE CHART FOR INTERVAL 1982.5-2726 M.

Format: Relative Abundance By Highest Appearance

Key to Symbols

W = REWORKED SPECIMENS
Z = CAVED SPECIMENS
X = PRESENT
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C = COMMON
A = ABUNDANT
? = Questionably Present
. = Not Present

			APECTODINIUM HOMOMORPHUM (short spines) 1	SENEGALINIUM DILWYNENSE 2	CYCLOPSIELLA N.SP. 3	OPERCULODINIUM CENTROCARPUM 4	ACHOMOSPHAERA SEPTATA 5	GLAPHYROCYSTA RETIINTEXTA 6	GLAPHYROCYSTA SPP. 7	PARALECANIELLA INDENTATA 8	SPINIFERITES RAMOSA S.L. 9	DEFLANDREA SPECIOSUS 10	EISENACKIA CRASSITABULATA 11	PALAEOCYSTODINIUM GOLZOWENSE 12	VERYHACHIUM SP. 13	botryococcus 14	AMOSOPOLLIS CRUCIFORMIS 15	SPINIDINIUM SPP. 16	TUBIOSPHAERA FILOSA 17	VOZZHENNIKOVIA ANGULATA 18	AUSTRALOPOLLIS OBSCURUS 19	BACULATISPORITES SPP. 20	BASOPOLLIS MUTABILIS MS 21	DILWYNITES GRANULATUS 22	FOVEOTRILETES BALTEUS 23	GLEICHENIIDITES CIRCINIDITES 24	HALORAGACIDITES HARRISII 25
1982.5 M	SWC 54		A	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	R	R	C	R	A	F
2002.0 M	SWC 53		F	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	F	F	R	F	R	C	F
2076.0 M	SWC 52		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	R	F	R	A	F
2109.5 M	SWC 51		R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	A	R	.	C	.	C	F
2111.5 M	SWC 50		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	F	F	R	C	.	C	F
2187.0 M	SWC 49		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	A	.	C	F
2290.0 M	SWC 46		.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	F	.	C	.
2302.5 M	SWC 45		.	.	C	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	C	.	C	R
2308.0 M	SWC 43		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	A	.	F	.
2323.0 M	SWC 40		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2327.5 M	SWC 38		.	.	.	.	R	C	C	A	R	.	.	.	.	.	.	.	.	.	F	.	.	C	.	F	R
2365.0 M	SWC 35		.	.	F	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	F	R	.	C	.	C	.
2373.5 M	SWC 34	COAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	C	R
2390.0 M	SWC 33		.	.	.	.	.	A	.	.	.	?	R	R	R	R	.	.	.	.	F	.	.	C	.	C	.
2441.5 M	SWC 29		.	?	.	.	.	F	R	.	.	R	.	.	.	.	R	.	.	.	R	R	.	C	.	C	.
2488.0 M	SWC 28		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	F	R	.	R	.	.	.
2503.5 M	SWC 26		.	.	.	.	.	C	.	.	.	?	.	.	.	.	.	R	R	.	F	R	.	C	.	F	R
2524.0 M	SWC 24	COAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C	.	.	R	.	C	.
2541.0 M	SWC 23		A	?	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C	F	.	F	.	C	.
2585.0 M	SWC 21		.	.	.	.	.	.	.	.	R	.	.	.	.	.	.	F	.	A	R	.	.	C	.	R	.
2591.5 M	SWC 19	COAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.
2623.0 M	SWC 17		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C	.	.	F	.	F	.
2657.0 M	SWC 13		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	F	.	.	F	.	F	.
2696.0 M	SWC 8		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.
2703.0 M	SWC 7	COAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C	.
2716.0 M	SWC 6		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	C	.
2726.0 M	SWC 4	COAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

			LAEVIGATOSPORITES MAJOR 26	LAEVIGATOSPORITES OVATUS 27	LYGISTEPOLLENITES BALMEI 28	LYGISTEPOLLENITES FLORINII 29	MALVACIPOLLIS SUBTILIS 30	NOTHOFAGIDITES EMARCIDUS/HETERUS 31	NOTHOFAGIDITES FLEMINGII 32	PERIPOROPOLLENITES POLYORATUS 33	PEROMONOLITES N.SP. 34	PHYLLOCLADIDITES MAWSONII 35	PODOCARPIDITES SPP. 36	PODOSPORITES MICROSACCATUS 37	PROTEACIDITES ANNULARIS 38	PROTEACIDITES SPP. 39	PROTEACIDITES TENUIEXINUS 40	STEREISPORITES ANTIQUISPORITES 41	TRIPOROPOLLENITES SPP. (small) 42	CLAVIFERA TRIPLEX 43	CYATHIDITES SPLENDENS 44	DILWYNITES TUBERCULATUS 45	ISCHYOSPORITES IRREGULARIS MS 46	MICROCACHRYIDITES ANTARCTICUS 47	NOTHOFAGIDITES BRACHYSPINULOSUS 48	PEROMONOLITES DENSUS 49	PHYLLOCLADIDITES OVALIS 50
1982.5 M	SWC 54		R	F	F	F	R	F	R	R	R	R	F	R	R	A	R	C	F	.	.	.	.	.	.	.	.
2002.0 M	SWC 53		R	F	C	R	R	F	.	R	.	F	F	R	R	A	.	F	C	R	F	R	R	R	R	R	R
2076.0 M	SWC 52		R	A	F	F	R	F	.	R	.	C	F	F	R	A	.	C	R	R	R	R	R	.	R	R	.
2109.5 M	SWC 51		.	R	R	F	.	F	.	.	.	C	A	F	.	A	.	F	F	.	.	.	.	.	F	F	R
2111.5 M	SWC 50		F	C	F	F	F	F	.	.	.	C	F	R	.	C	.	F	F	R	R	R	.	.	R	R	.
2187.0 M	SWC 49		.	C	A	F	R	F	.	.	.	C	F	F	R	C	.	F	R	R	F	.	.	R	F	R	R
2290.0 M	SWC 46		.	R	F	.	.	.	.	.	.	C	F	R	.	F	.	R	.	.	.	.	.	.	.	.	.
2302.5 M	SWC 45		.	C	F	R	.	.	.	.	.	A	.	F	.	C	.	C	R	R	.	.	.	R	.	R	.
2308.0 M	SWC 43		.	C	F	R	.	.	.	R	.	C	C	F	.	C	.	F	.	.	.	R	.	.	.	R	.
2323.0 M	SWC 40		.	.	F	.	.	Z	.	.	.	C	R	.	.	R	.	R	.	.	.	.	.	.	.	.	.
2327.5 M	SWC 38		.	F	C	R	.	F	.	.	.	C	R	R	.	A	.	F	.	.	.	.	.	.	F	R	R
2365.0 M	SWC 35		.	F	C	F	.	F	.	R	.	A	C	.	.	C	.	R	F	.	R	R	.	R	R	R	R
2373.5 M	SWC 34	COAL	.	F	C	F	.	.	.	.	.	A	C	.	?	C	.	R	R	.	.	.	.	R	.	R	.
2390.0 M	SWC 33		F	F	R	F	.	R	.	.	.	A	A	F	.	A	.	C	.	R	.	.	.	F	.	R	R
2441.5 M	SWC 29		.	C	C	R	.	C	.	.	R	C	F	.	.	C	.	F	.	.	R	R	.	C	.	R	.
2488.0 M	SWC 28		.	F	C	.	.	.	.	.	.	C	R	.	.	C	.	.	.	.	.	.	.	.	.	.	.
2503.5 M	SWC 26		.	F	C	F	.	R	.	.	.	A	C	R	.	C	.	R	.	.	R	.	.	F	.	.	.
2524.0 M	SWC 24	COAL	.	F	C	F	.	.	.	.	F	A	C	C	?	C	.	F	R	.	F	.	.	.	R	.	.
2541.0 M	SWC 23		.	C	F	.	.	.	.	.	.	C	C	F	.	A	.	C	.	.	R	.	.	.	.	.	F
2585.0 M	SWC 21		.	R	F	.	.	.	.	.	.	R	.	.	.	C	.	F	.	.	R	.	.	.	.	.	.
2591.5 M	SWC 19	COAL	.	.	.	.	.	.	.	C	.	C	.	.	.	.	.	A	.	.	R	.	.	.	.	.	.
2623.0 M	SWC 17		.	.	R	R	.	.	.	.	.	C	A	.	.	A	.	C	.	.	.	.	.	R	.	.	.
2657.0 M	SWC 13		.	C	F	.	.	.	.	.	.	C	A	R	.	A	.	C	F	.	.	.	.	.	.	.	.
2696.0 M	SWC 8		.	R	R	.	.	.	.	.	.	R	R	R	.	R	.	F	.	.	R	.	.	.	.	R	.
2703.0 M	SWC 7	COAL	.	.	.	.	.	.	.	.	.	C	.	.	.	R	.	C	.	.	R	.	.	.	.	.	.
2716.0 M	SWC 6		R	F	R	R	.	.	.	.	.	A	F	F	.	A	.	C	F	.	F	.	.	.	.	.	.
2726.0 M	SWC 4	COAL	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.

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1982.5 M	SWC 54		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2002.0 M	SWC 53		R	R	R	R	R	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2076.0 M	SWC 52		.	R	R	.	.	R	R	R	R	R	R	R	R	?	R	F	R	R	R	.	.	.	.	.
2109.5 M	SWC 51		.	.	.	.	.	.	.	.	R	.	.	R	.	.	.	R	.	.	.	F	R	R	R	R
2111.5 M	SWC 50		.	R	R	.	.	R	R	R	.	.	R	F	R	.	R	.	.	.	.	A	R	.	.	R
2187.0 M	SWC 49		.	R	.	.	.	.	R	R	.	.	R	.	R	.	R	R	.	.	.	R	R	R	.	.
2290.0 M	SWC 46		.	R	.	.	.	.	R	R	.	R	.	R	.	.	.	.	.	.	.	.	R	R	.	.
2302.5 M	SWC 45		R	.	.	.	.	.	R	R	.	.	.	F	R	.	.	R	.	R	.	R	.	R	.	.
2308.0 M	SWC 43		.	.	.	.	.	.	R	R	.	.	.	C	.	.	.	F	.	.	.	R	R	R	.	.
2323.0 M	SWC 40		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	.	.
2327.5 M	SWC 38		.	.	.	.	.	.	R	R	.	.	.	F	.	.	.	R	.	.	.	R	.	.	.	.
2365.0 M	SWC 35		.	.	.	.	.	R	.	.	.	.	R	.	R	.	R	R	.	R	.	.	.	R	R	.
2373.5 M	SWC 34	COAL	.	.	.	.	.	.	.	.	.	.	A	.	.	.	.	.	.	.	.	R	R	.	.	.
2390.0 M	SWC 33		.	.	.	.	.	.	R	R	.	.	.	.	.	.	R	.	.	R	.	.	R	R	.	.
2441.5 M	SWC 29		R	.	.	.	.	.	R	.	.	.	R	.	.	.	R	.	.	.	.	.	R	R	.	.
2488.0 M	SWC 28		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2503.5 M	SWC 26		.	.	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	R	R	R	.	.
2524.0 M	SWC 24	COAL	.	.	.	.	.	R	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.
2541.0 M	SWC 23		.	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.	R	R	R	.	.
2585.0 M	SWC 21		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	F	.	.
2591.5 M	SWC 19	COAL	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2623.0 M	SWC 17		.	.	R	.	.	.	.	.	.	.	.	R	.	.	.	.	.	R	.	.	R	.	.	.
2657.0 M	SWC 13		.	.	.	.	.	.	R	F	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.
2696.0 M	SWC 8		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	R	.	.
2703.0 M	SWC 7	COAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2716.0 M	SWC 6		.	.	.	.	.	.	.	.	.	R	.	.	.	.	R	.	.	.	.	.	.	F	.	.
2726.0 M	SWC 4	COAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

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TURRUM-4 PALYNOMORPH RANGE CHART FOR INTERVAL 1982.5-2726 M.

Format: Relative Abundance By Lowest Appearance

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ANALYSIS BY: Alan D. PARTRIDGE

December 1992

Key to Symbols

W = REWORKED SPECIMENS
Z = CAVED SPECIMENS
X = PRESENT
R = RARE
F = FREQUENT
C = COMMON
A = ABUNDANT
? = Questionably Present
. = Not Present

			SPINIDINIUM SPP. 1	SPINIFERITES RAMOSA S.L. 2	VOZZHENNIKOVIA ANGULATA 3	APECTODINIUM HOMOMORPHUM (short spines) 4	SENEGALINIUM DILWYNENSE 5	DEFLANDREA SPECIOSUS 6	GLAPHYROCYSTA RETIINTEXTA 7	TUBIOSPHAERA FILOSA 8	AMOSOPOLLIS CRUCIFORMIS 9	GLAPHYROCYSTA SPP. 10	EISENACKIA CRASSITABULATA 11	PALAEOCYSTODINIUM GOLZOWENSE 12	VERYHACHIUM SP. 13	botryococcus 14	CYCLOPSIELLA N.SP. 15	ACHOMOSPHAERA SEPTATA 16	PARALECANIELLA INDENTATA 17	OPERCULODINIUM CENTROCARPUM 18	PROTEACIDITES SPP. 19	STEREISPORITES N.SP. 20	BASOPOLLIS MUTABILIS MS 21	CYATHIDITES SPLENDENS 22	ELPHEDRIPITES NOTENSIS 23	GLEICHENIIDITES CIRCINIDITES 24	HERKOSPORITES ELLIOTTII 25	LAEVIGATOSPORITES MAJOR 26	LAEVIGATOSPORITES OVATUS 27	LATROBOSPORITES OHAIENSIS 28	LYGISTEPOLLENITES BALMEI 29	LYGISTEPOLLENITES FLORINII 30	PENINSULAPOLLIS GILLII 31	PHYLLOCLADIDITES MAWSONII 32	PODOCARPIDITES SPP. 33
1982.5 M	SWC 54		.	.	.	A	.	.	.	.	.	.	.	.	.	.	.	.	.	.	A	.	R	.	.	A	.	R	F	.	F	F	.	R	F
2002.0 M	SWC 53		.	.	.	F	.	.	.	.	.	.	.	.	.	.	.	.	.	.	A	.	R	F	.	C	.	R	F	.	C	R	.	F	F
2076.0 M	SWC 52		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	A	.	R	R	R	A	.	R	A	.	F	F	.	C	F
2109.5 M	SWC 51		.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	A	.	.	.	.	C	R	.	R	.	R	F	.	C	A
2111.5 M	SWC 50		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C	.	R	R	.	C	.	F	C	.	F	F	.	C	F
2187.0 M	SWC 49		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C	.	.	F	.	C	R	.	C	.	A	F	.	C	F
2290.0 M	SWC 46		.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	F	.	.	.	R	C	R	.	R	R	F	.	.	C	F
2302.5 M	SWC 45		.	.	.	.	.	.	.	.	.	.	.	.	.	.	C	.	.	R	C	.	.	.	.	C	R	.	C	.	F	R	.	A	.
2308.0 M	SWC 43		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C	.	.	.	.	F	R	.	C	.	F	R	.	C	C
2323.0 M	SWC 40		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	F	.	.	C	R
2327.5 M	SWC 38		.	R	.	.	.	.	C	.	.	C	.	.	.	.	.	R	A	.	A	.	.	.	.	F	.	.	F	.	C	R	R	C	R
2365.0 M	SWC 35		.	.	.	.	.	.	.	.	.	.	.	.	.	.	F	.	.	.	C	.	.	R	.	C	R	.	F	.	C	F	.	A	C
2373.5 M	SWC 34	COAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C	.	.	.	.	C	.	.	F	R	C	F	.	A	C
2390.0 M	SWC 33		.	.	.	.	.	?	A	.	.	.	R	R	R	R	.	.	.	.	A	.	.	.	.	C	R	F	F	.	R	F	R	A	A
2441.5 M	SWC 29		.	.	.	.	?	R	F	.	R	R	.	.	.	.	.	.	.	.	C	.	.	R	.	C	R	.	C	.	C	R	R	C	F
2488.0 M	SWC 28		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C	.	.	.	.	.	.	.	F	.	C	.	.	C	R
2503.5 M	SWC 26		R	.	.	.	.	?	C	R	.	.	.	.	.	.	.	.	.	.	C	.	.	R	.	F	R	.	F	.	C	F	R	A	C
2524.0 M	SWC 24	COAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C	.	.	F	.	C	.	.	F	.	C	F	R	A	C
2541.0 M	SWC 23		.	.	.	A	?	.	.	.	.	.	.	.	.	.	.	.	.	.	A	.	.	R	.	C	R	.	C	.	F	.	R	C	C
2585.0 M	SWC 21		F	R	A	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C	.	.	R	.	R	F	.	R	.	F	.	.	R	.
2591.5 M	SWC 19	COAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	R	.	.	.	.	.	.	.	C	.
2623.0 M	SWC 17		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	A	.	.	.	.	F	.	.	.	.	R	R	F	C	A
2657.0 M	SWC 13		R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	A	R	.	.	.	F	.	.	C	.	F	.	R	C	A
2696.0 M	SWC 8		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	R	.	R	R	.	R	.	R	.	.	R	R
2703.0 M	SWC 7	COAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	.	.	R	.	C	.	.	.	.	.	.	.	C	.
2716.0 M	SWC 6		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	A	.	R	F	R	C	F	R	F	R	R	R	R	A	F
2726.0 M	SWC 4	COAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	R	A	.	.	.	.	.	.	.	.	.	.	.	.	.

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1982.5 M	SWC 54		R	.	.	C	.	F	.	.	.	.	R	C	.	.	.	.	.	.	R	.	.	R	.	.	.	.	.	.	R	R	.	.	.
2002.0 M	SWC 53		R	.	.	F	.	C	.	.	R	.	F	F	.	R	.	R	R	.	R	R	.	F	R	.	.	.	.	R	.	R	R	.	.
2076.0 M	SWC 52		F	.	R	C	.	R	.	.	R	R	.	F	R	R	.	.	R	R	R	.	.	R	.	.	.	.	R	R	.	R	R	.	.
2109.5 M	SWC 51		F	.	.	F	.	F	.	F	F	.	A	C	R	.	R	.	.	.	.	.	.	R	R	.	.	.	.	F	.	.	.	F	.
2111.5 M	SWC 50		R	.	R	F	.	F	.	A	R	R	F	C	F	R	R	.	R	.	.	.	.	F	.	R	.	.	R	R	.	.	R	C	.
2187.0 M	SWC 49		F	.	R	F	.	R	.	R	R	R	.	A	.	R	R	R	.	.	.	.	.	R	R	.	R	.	R	F	.	R	.	F	.
2290.0 M	SWC 46		R	R	.	R	.	.	.	.	.	R	.	F	R	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2302.5 M	SWC 45		F	F	.	C	R	R	.	R	R	R	.	C	F	R	.	R	.	R	.	R	.	R	.	.	.	.	.	.	.	.	.	.	.
2308.0 M	SWC 43		F	R	.	F	.	.	.	R	R	R	.	A	C	R	R	.	.	.	R	.	.	R	.	.	.	.	.	.	.	.	.	.	.
2323.0 M	SWC 40		.	.	.	R	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2327.5 M	SWC 38		R	.	.	F	.	.	.	R	R	R	F	C	F	R	.	.	.	.	.	.	.	.	R	.	.	R	.	F	.	.	.	.	.
2365.0 M	SWC 35		.	.	R	R	.	F	.	.	R	.	F	C	.	.	.	R	.	R	R	.	.	R	R	R	.	.	R	R	.	.	R	.	.
2373.5 M	SWC 34	COAL	.	.	.	R	.	R	.	R	R	.	.	R	.	.	R	R	.	.	.	.	.	.	.	.	.	.	A	.	.	?	.	.	.
2390.0 M	SWC 33		F	F	R	C	.	.	.	.	R	R	F	C	.	R	R	F	.	R	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.
2441.5 M	SWC 29		.	R	R	F	.	.	.	.	R	.	R	C	.	R	R	C	.	.	.	R	.	R	.	.	.	.	R	.	R	.	.	.	.
2488.0 M	SWC 28		.	.	.	.	.	.	.	.	.	.	F	R	.	.	.	.	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.
2503.5 M	SWC 26		R	R	.	R	R	.	.	R	.	R	F	C	.	.	R	F	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	F	R
2524.0 M	SWC 24	COAL	C	R	.	F	R	R	.	.	.	.	C	R	.	.	.	.	.	.	.	.	.	.	.	.	R	R	R	R	F	?	R	R	.
2541.0 M	SWC 23		F	F	.	C	.	.	.	R	.	.	C	F	.	R	R	.	.	.	.	.	.	F	F	R	.	.	.	.	.	.	.	.	.
2585.0 M	SWC 21		.	.	.	F	.	.	.	.	.	.	R	C	.	.	.	.	.	.	.	.	F	.	.	.	.	.	.	.	.	.	.	.	.
2591.5 M	SWC 19	COAL	.	.	.	A	.	.	.	.	.	.	.	.	.	.	.	.	.	.	C	R	.	.	.	.	.	.	.	.	.	.	.	.	.
2623.0 M	SWC 17		.	.	.	C	.	.	.	.	.	.	C	F	R	.	R	R	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2657.0 M	SWC 13		R	F	.	C	.	F	.	.	.	F	F	F	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2696.0 M	SWC 8		R	R	.	F	R	.	R	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2703.0 M	SWC 7	COAL	.	.	.	C	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2716.0 M	SWC 6		F	R	R	C	F	F	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2726.0 M	SWC 4	COAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

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2002.0 M	SWC 53		F	F	R	.	R	.	.	.	.	.	.	R	.	R	.	.	.	.	R	R	.	.	.	R	R	.	.	.	.	.	.	2002.0 M	SWC 53	
2076.0 M	SWC 52		F	F	R	.	R	.	.	R	.	F	.	R	.	R	.	.	.	R	R	R	?	R	R	.	.	.	.	.	.	.	.	2076.0 M	SWC 52	
2109.5 M	SWC 51		F	F	.	.	.	R	R	.	.	R	.	.	.	.	.	R	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	2109.5 M	SWC 51	
2111.5 M	SWC 50		F	F	R	.	R	.	.	R	.	.	.	R	.	F	R	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2111.5 M	SWC 50	
2187.0 M	SWC 49		F	F	.	R	R	.	.	R	R	R	.	R	R	R	F	.	.	.	.	.	.	.	.	.	.	.	.	.	W	W	W	2187.0 M	SWC 49	
2290.0 M	SWC 46		.	.	.	.	.	.	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2290.0 M	SWC 46	
2302.5 M	SWC 45		R	.	.	.	R	.	.	R	.	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2302.5 M	SWC 45	
2308.0 M	SWC 43		.	.	R	.	.	.	.	.	.	F	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2308.0 M	SWC 43	
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2327.5 M	SWC 38		R	F	.	.	.	.	.	.	.	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	W	.	.	.	2327.5 M	SWC 38	
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2373.5 M	SWC 34	COAL	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2373.5 M	SWC 34	COAL
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2441.5 M	SWC 29		.	C	R	R	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2441.5 M	SWC 29	
2488.0 M	SWC 28		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2488.0 M	SWC 28	
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2585.0 M	SWC 21		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2585.0 M	SWC 21	
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2716.0 M	SWC 6		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2716.0 M	SWC 6	
2726.0 M	SWC 4	COAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2726.0 M	SWC 4	COAL

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