PALYNOLOGICAL ANALYSIS OF SAMPLES FROM NERITA-1A, TORQUAY SUB-BASIN

by

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Palaeontological report prepared 1 September 1989 for The Shell Company of Australia Ltd.

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PREAMBLE

Spore-pollen and dinoflagellates are amongst the most valuable tools available to the petroleum explorationist for dating and correlating rock units and interpreting the environment of deposition. However a number of important limitations exist. These are chiefly related to sample quality and differences in the time ranges of some species between sedimentary basins:

(A) DATING

Palynological zones are usually defined by overlaps in the vertical [= time] range of several to many spore-pollen or dinoflagellate species. Zone boundaries are mostly defined by first appearances, less often by extinctions. A few rare species are confined to one zone only.

It is important to remember that the times of first appearance and extinction of a species may differ over the geographical range of that species and zonation criteria developed for one basin may not be reliable in adjoining basins.

Nevertheless the zonation scheme developed by Esso Australia Ltd. for the Gippsland Basin has been found to provide reliable dates for conventional cores and, unless gross mud cake contamination has occurred, for sidewall cores in the adjoining basins along the southern margin of Australia. Age-determinations based on cuttings are usually unreliable because of difficulties in distinguishing between *in situ*, caved and [less frequent] recycled species. The reliability can only be improved by analysing a suite of closely spaced cuttings. Other criteria that are useful include relative abundance, differences in preservation and kerogen type [palynofacies] .

(B) PALAEOENVIRONMENT

The abundance and diversity of dinoflagellates provide a reliable indication of open and restricted marine environments, e.g. shoreface, tidal flat and lagoonal conditions. Several types of algal cysts are good evidence for freshwater lacustrine environments. The absence of dinoflagellates is assumed to indicate the absence of a marine influence

The great majority of spores and pollen recovered in both on- and offshore wells have been transported by wind and/or water from dryland plants, some growing at considerable distance. A variety of plant communities will be represented but because of uncertainties in the ecology of mostly extinct species, spore-pollen can only provide a general indication of the palaeoenvironment, e.g. coastal plain, and climate, e.g. warm humid, if coastal tropical rainforest species are present. The most common terrestrial sediments preserving spore-pollen are fluvial and lacustrine silts and clays.

Some indication of relative abundance is necessary. As with dating, cuttings do not provide a reliable indication of palaeoenvironment.

INTRODUCTION

Revised age-determinations presented in this report are mostly based upon palynological slides prepared from fourteen sidewall samples for Dr. M.E. Dettman in 1967. The majority of these preparations contain very low numbers of palynomorphs, many of which are obscured by plant macerals due to inadequate processing, and all mounts have become wholly or partially dried out. Most preparations contain contaminants derived from drilling mud.

When possible the 1967 preparations were examined then reprocessed prior to a second analysis of the spore-pollen and dinoflagellate content. Where this was not feasible, coal fragments recovered from cuttings samples representing the same or adjacent intervals were processed and analysed [8 samples].

Lithological units and palynological determinations for the interval reviewed [2160-6456ft.] are summarized below. Zonal determinations are based on the detailed palynological zonation scheme established for the Bass Strait basins by Esso Australia Ltd. rather than Harris' (1965, 1971) Otway Basin zonation used in Dettman's (1967) report.

Interpretative and basic data are given in Tables 1 and 2 respectively. Check lists of all species recorded are attached. Lithological and electric log data were not available.

SUMMARY

AGE	UNIT	ZONE	DEPTH RANGE (ft.)	ENVIRONMENT
Late Eocene	DEMONS BLUFF FORMATION	Middle N. asperus	2160-2170	Marginal marine
- - - - -	- - - - -	unconformity?	- - - - -	- - - - -
Early Eocene	EASTERN VIEW FORMATION	Lower M. diversus	2510-2682	Coastal plain
Paleocene	"	Upper L. balmei	2846-3253 (867 - 991m)	"
"	"	Lower L. balmei	3531-3867 (1076 -	"
Maastrichtian	[SHERBROOK GP EQUIVALENT]	Upper T. longus	4065	Intra rift valley
"	"	Lower T. longus	4372	"
Campanian	"	T. lilliei	4460	"
- - - - -	- - - - -	unconformity	- - - - -	- - - - -
Lower Albian	OTWAY GROUP	C. striatus	4944-6240	"

TD 2043m

GEOLOGICAL COMMENTS

1. Spore-pollen recovered from cuttings at 2160-70ft. indicate that Nerita-1A intersected the Demons Bluff Formation and that marine-influenced facies are present at or above this depth interval.

2. Cuttings at 2510-20ft. and the highest SWC [2570ft.] are more likely to have been shot in the Eastern View Formation. It is probable that sediments at 2682ft. were deposited during the earliest Eocene, A. hyperacantha marine transgression [cycle ET 1.4?], i.e. are a correlative of the Rivernook Member of the Dilwyn Formation in the Otway Basin. Otherwise the only palynological evidence in this review of marginal marine conditions in the Eastern View Formation is at 3704ft. [Lower L. balmei Zone].

3. As in Anglesea-1, Late Cretaceous [Sherbrook Group Equivalent] sediments occurs near the base of the Eastern View Formation [4065-4660ft.]. Both Maastrichtian and Campanian non-marine units are present but the sampling interval is too coarse to determine whether sedimentation was relatively continuous over this period of time.

4. The unconformity between the Eastern View Formation and Otway Group occurs between 4660 and 4944ft. It is unclear what length of time is represented by this unconformity but moderately certain that rocks between 4944-6240ft. are C. striatus Zone. The lowest SWC analysed, 6456ft. [ca. 256ft above TD] is no older than C. australiensis Zone but low yields do not permit any definite conclusions to be made regarding the presence or not of Neocomian strata in Nerita-1A below 6240ft.

5. TAI values within the Early Cretaceous interval are sub-mature.

PALAEOENVIRONMENTS

Consistent with its present-day nearshore location, the Nerita-1A wellsite site was not affected by encroachment of the Southern Ocean until the Paleocene. By this time the local environment was a coastal plain complex. Based on the relative abundance of spore-pollen and dinoflagellates, the marine-influence was greatest during the earliest Eocene A. hyperacantha marine transgression, with the marine influence being slight thereafter until the Late Eocene. Cretaceous sediments appear to have accumulated under fluvial and lacustrine depositional conditions within a rift valley setting.

BIOSTRATIGRAPHY

Zone and age-determinations have been made using criteria proposed by Stover & Partridge (1973), Partridge (1976) and Helby et al. (1987), augmented where necessary by time-range data presented in Dettman (1963), Harris (1965, 1971), Burger (1980), Morgan (1980) and Backhouse (1988) and unpublished observations made on Bass Strait wells drilled by Esso Australia Ltd. The informal subdivision of the T. longus Zone proposed by Macphail (1983: see Helby et al., ibid p.58) is followed here. Zone names have not been altered irrespective of nomenclatural changes to nominate species such as Tricolpites longus [now Forcipites longus: see Dettman & Jarzen, 1988].

Unlike onshore wells in the Torquay Sub-basin, the Early Cretaceous palynomorphs in Nerita-1A are not thermally mature, and preservation was adequate to allow reliable identification of most types. Nevertheless it is possible that the more delicate types, including the zone index species Coptospora paradoxa?, have not always been preserved. Not infrequently, the confidence of age-determinations has been reduced by the poor quality of the processing. Recycled Paleozoic and Early Mesozoic spores are present in many samples.

Crybelosporites striatus Zone 4944-6240ft. Lower Albian

The interval is defined by the consistent presence [in both the SWC and cuttings samples] of Crybelosporites striatus, usually in association with frequent-abundant Cicatricosisporites australiensis and psilate , trilete spores of the Cyathidites-Biretisporites complex. Dictyotosporites speciosus and Foraminisporis spp. occur irregularly throughout the interval and Crybelosporites punctatus at 5670-80ft.

A feature of the interval are multiple occurrences of some usually rare Early Cretaceous species in the cuttings samples, e.g. Balmeisporites holodictyus [5670-80ft.], B. tridictyus [5980-90ft.] and Pyrobolospora reticulata [6230-40ft.]. The acritarchs Leiosphaeridia and Micrastrydium in the same cuttings indicate that lacustrine facies occur at or above the intervals sampled.

Although the base of the zone is placed provisionally at 6230-40ft., it is noted that essentially the same palynoflora occurs in the SWC sample at 6456ft., except that

Crybelosporites striatus is absent. The cuttings sample at 6450-60ft. contained only caved Paleocene spore-pollen.

The upper boundary of the zone [4944ft.] is placed at highest sample dominated by Early Cretaceous spp.

Tricolporites lilliei Zone 4660ft. Campanian

One sample is assigned to this zone, based on poorly preserved specimens of Triporopollenites sectilis and Tricolpites waiparensis. The palynoflora is dominated by Late Cretaceous Nothofagidites spp. and Forcipites stipulatus. Gambierina rudata and F. sabulosus demonstrate that the palynoflora is no older than uppermost N. senectus Zone.

Lower Tricolpites longus Zone 4372ft. Maastrichtian

The SWC sample at 4372ft. contains Triporopollenites sectilis Tricolporites lilliei and frequent-abundant Nothofagidites kaitangata and N. senectus. These indicate a maximum age of 'middle' T. lilliei Zone. The Lower T. longus Zone age-determination is provisional, based on an obscured and therefore equivocal specimen of Forcipites longus.

Upper Tricolpites longus Zone 4065ft. Maastrichtian

The SWC sample at 4065ft. contains a sparse palynoflora 'dominated' by Gambierina rudata and small undescribed species of Proteacidites. The occurrence of multiple specimens of Stereisporites punctatus in association with Tricolporites lilliei provides a confident Upper T. longus Zone age for this depth interval.

Lower Lygistepollenites balmei Zone 3531-3867ft. Paleocene

Palynofloras within this and the Upper L. balmei Zone interval are dominated by one or more of gymnosperm taxa such as Dilwynites and Podocarpidites], Nothofagidites kaitangata, Proteacidites and Gleicheniidites. In situ dinoflagellates are present in only one sample, the SWC at 3704ft.

The interval is provisionally dated as Lower L. balmei Zone based on the absence of species which first appear in the Upper L. balmei Zone. Occurrences of the nominate species and Gambierina rudata demonstrate that the SWC sample at 3867ft. is no younger than Upper L. balmei Zone.

Upper Lygistepollenites balmei Zone 2846-3253ft. Paleocene

The lower boundary of this zone is picked at 3253ft., a contaminated SWC sample containing the nominate species, Gambierina rudata, Ischyosporites irregularis and Proteacidites grandis. Camarozonosporites bullatus demonstrates that the minimum age is Upper L. balmei zone. Tetracolporites verrucosus, a species which seldom ranges above the Lower L. balmei Zone occurs along with frequent recycled Early Cretaceous spores in coals floated from cuttings at 2950-60ft.

The SWC picked as the upper boundary contains Lygistepollenites balmei, Camarozonosporites bullatus, Proteacidites grandis and Malvacipollis subtilis. Gambierina rudata, Proteacidites incurvatus and Cyathidites gigantis occur in the coal float at 3100-3110ft. and Lygistepollenites balmei and Malvacipollis subtilis at 2950-60ft. Proteacidites ornatus, cited by Dettman at 2846ft., is considered to be a contaminant given that the Middle-Late Eocene pollen Tricolporites leuros occurs in the reprocessed mount.

Lower Malvacipollis diversus Zone 2510-2682ft. Early Eocene

Two samples are assigned to this zone with moderate degrees of confidence:

(a) The SWC sample at 2682ft. contains Spinizonocolpites prominatus and a diverse dinoflagellate component including Apectodinium hyperacantha, Fibrocysta bipolare(?) and Kenleyia spp. This association is diagnostic of the earliest Eocene A. hyperacantha marine transgression (Partridge 1976) recorded in the Rivernook Member of the onshore Princetown Section, Otway Basin.

(b) Coals floated from cuttings at 2510-20ft. contain Malvacipollis subtilis and frequent Cyathidites gigantis in an assemblage wholly dominated by Proteacidites and Gleicheniidites. Species ranging no higher than the Upper L. balmei Zone are absent.

No age-determination is possible for the contaminated SWC sample at 2570ft. because of the conflicting composition of the palynoflora although it is noted that quantitative dominance of the sample by Malvacipollis, Haloragacidites harrisii and Proteacidites spp. is typical of the Early Eocene, M. diversus Zone.

Conversely - if in situ - the presence of P. leightonii and P. rectomarginis [recorded by Dettman] indicates that the sample is Middle N. asperus Zone despite the virtual absence of Nothofagidites spp.

Middle Nothofagidites asperus Zone 2160-2170ft. Late Eocene

The highest sample analysed for Nerita-1A, cuttings at 2160-70ft. yielded a Nothofagidites-dominated palynoflora in which dinoflagellates were common and zone index species such as Triorites magnificus and Tricolpites thomasii present. The former include Rhombodinium glabrum, Cordosphaeridium inodes, Homotryblium tasmaniense and [frequent] Thalassophora spp. Phthanoperidium comatum indicates some contamination by caved Oligocene-Early Miocene sediments. Proteacidites rugulatus is against the sample being younger than 'middle' Middle N. asperus Zone.

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TABLE I: SUMMARY OF INTERPRETATIVE PALYNOLOGICAL DATA

NERITA-1A

SAMPLE NO.	DEPTH (ft.)	SPORE-POLLEN ZONE	DINOFLAGELLATE ZONE	AGE	CONFIDENCE RATING	COMMENTS
ctg	2160-70	Middle N. asperus	-	Late Eocene	1	T. magnificus, T. thomasii
ctg	2510-20	Lower M. diversus	-	Early Eocene	3	C. gigantis, freq. Malvacipollis
SWC	2570	Indeterminate	-	Early Eocene	-	contaminated sample
SWC	2682	Lower M. diversus	A. hyperacantha	Early Eocene	1	S. prominatus, A. hyperacantha
SWC	2846	Upper L. balmei	-	Paleocene	2	contaminated sample
ctg	2950-60	Upper L. balmei	-	Paleocene	3	L. balmei, G. rudata, P. annularis, P. grandis, M. subtilis, A. obscurus
ctg	3100-3110	Upper L. balmei	-	Paleocene	3	G. rudata, P. annularis, P. grandis P. incurvatus, C. gigantis
SWC	3253	Upper L. balmei	-	Paleocene	2	G. rudata, C. bullatus, P. grandis
SWC	3531	Lower L. balmei	-	Paleocene	2	L. balmei, A. obscurus
SWC	3704	Lower L. balmei	-	Paleocene	2	freq. N. kaitangata, Spinidium spp.
SWC	3867	Lower L. balmei	-	Paleocene	2	L. balmei, P. angulatus, T. confessus
SWC	4065	Upper T. longus	-	Maastrichtian	1	T. lilliei, S. punctatus
SWC	4372	Lower T. longus	-	Maastrichtian	2	F. longus
SWC	4660	T. lilliei	-	Campanian	1	T. sectilis, T. waiparensis
SWC	4944	C. striatus	-	Lower Albian	2	
SWC	5287	C. striatus	-	C. striatus	2	D. speciosus, ? C. striatus
ctg	5670-80ft.	C. striatus	-	C. striatus	3	C. striatus, C. punctatus

TABLE I: SUMMARY OF INTERPRETATIVE PALYNOLOGICAL DATA

NERITA-1A

SAMPLE NO.	DEPTH (ft.)	SPORE-POLLEN ZONE	DINOFLAGELLATE ZONE	AGE	CONFIDENCE RATING	COMMENTS
ctg	5980-5990	C. striatus	-	Lower Albian	3	C. striatus
SWC	6068	C. striatus	-	Lower Albian	1	C. striatus
ctg	6230-6240	C. striatus	--	Lower Albian	3	C. striatus
ctg	6450-6460	Indeterminate	-	Early Cretaceous	-	Caved Paleocene spp.
SWC	6456	No older than C. australiensis Zone		latest Jurassic-Early Cretaceous		C. australiensis

TABLE 2 : SUMMARY OF BASIC PALYNOLOGICAL DA

NERITA-1A

DIVERSITY -	low	medium	high
S & P	less than 10	10-30	greater than 30
D	1-3	3-10	10

SAMPLE NO.	DEPTH (ft.)	YIELD SPORE-POLLEN	YIELD DINOS	DIVERSITY SPORE-POLLEN	DIVERSITY DINOS	PRESERVATION	LITHOLOGY	PYRIZATION	COMMENTS
ctg	2160-70	high	medium	medium	low	good	-	-	
ctg	2510-20	high	-	medium	-	good	-	-	
SWC	2570	low	-	medium	-	moderate	-	-	contaminated
SWC	2682	v. low	low	low	medium	good	-	-	Poor processing
SWC	2846	medium	-	high	-	good	-	-	reprocessed
ctg	2950-60	high	v. low	medium	low	good	-	-	dinos caved
ctg	3100-110	medium	v. low	medium	low	good	-	-	dinos caved
SWC	3253	high	-	high	-	good	-	-	poor processing
SWC	3531	v. low	-	low	-	good	-	-	reprocessed
SWC	3704	medium	medium	medium	low	good	-	-	reprocessed
SWC	3867	low	-	high	-	good	-	-	poor processing
SWC	4065	low	-	medium	-	moderate	-	-	reprocessed
SWC	4372	high	-	high	-	good	-	-	
SWC	4660	low	-	medium	-	moderate	-	-	poor processing
SWC	4944	low	-	medium	-	good but fragmented	-	-	

TABLE 2: SUMMARY OF BASIC PALYNOLOGICAL DA

NERITA-1A

DIVERSITY -	low	medium	high
S & P	less than 10	10-30	greater than 30
D	1-3	3-10	10

SAMPLE NO.	DEPTH (ft.)	YIELD		DIVERSITY		PRESERVATION	LITHOLOGY	PYRIZATION	COMMENTS
		SPORE-POLLEN	DINOS	SPORE-POLLEN	DINOS				
SWC	5287	medium	-	medium	-	moderate	-	-	
ctg	5670-80	high	-	high	-	moderate	-	-	Tertiary contams.
ctg	5980-90	high	-	high	-	good	-	-	"
SWC	6068	high	-	medium	-	moderate	-	-	"
ctg	6230-40	high	-	high	-	good	-	-	"
ctg	6450-60	low	-	low	-	good	-	-	Paleocene spp.
SWC	6456	low	-	medium	-	moderate	-	-	"

TABLE NO.

Well Name NERITA-1A Basin TORQUAY SUB-BASIN Sheet No. 5 of 6

SAMPLE TYPE OR NO. *	T	T	S	S	S	T	T	S	S	S	S	S	S	S	S	S	T	T	S	T	T	S				
FOSSIL NAMES / DEPTHS (ft.)	2160-70	2510-20	2570	2682	2846	2950-60	3100-10	3253	3531	3704	3867	4065	4372	4660	4944	5287	5670-80	5980-90	6068	6230-40	6450-60	6456				
Striatopodocarpidites spp. R																										
Tetracolporites multistrixus ms		•			•	•	•																			
T. palynius	•																									
T. textus ms							•																			
T. verrucosus							•																			
Tetradopollis securus																										
Tricolpites confessus											•	•	•	•												
T. gigantis ms					•																					
T. phillipsii					•																					
T. reticulatus					•																					
T. simatus	•																									
T. thomasii	•																									
T. waiparensis													•	•												
Tricolpites spp. undescribed	•		•	•	•	•					•	•	•	•												
Tricolporites adelaidensis	•																									
T. cf adelaidensis [longicolpate]	•	•																								
T. angurium																										
T. circumlumensus ms																										
T. halis ms	•			•																						
T. leuros					•																					
T. lilliei												•														
T. moultonii ms																										
T. paenestriatus																										
T. retequetrus [sensu Stover & Partridge]	•																									
T. scabratus complex				•																						
T. sphaerica complex	•																									
Tricolporites spp. undescribed	•	•	•	•	•	•	•			•	•	•	•	•				•								
Triletes tuberculiformis					•										•	•										
trilete spores indeterminate/undescribed											•	•	•	•	•	•	•	•								
Trilobosporites tribotrys																		•		•						
T. trioreticulatus																		•		•						
Triorites magnificus	•																									
Triporopollenites ambiguus							•																			
T. crocodilus ms													•													
T. delicatus																										
T. helosus																										
T. scabratus						•																				
T. sectilis complex													•	•												
Triporopollenites spp. undescribed	•	•				•							•	•												
Trisaccites spp.															•	•										
Tsugaepollenites spp.																			•							
Velosporites triquetrus																•				•						
Verrucatosporites alienus																										
V. attinatus ms																										
Verrucosisporites kopukuensis complex	•						•																			
Dictyotosporites speciosus															•	•	•		•							

* C=CORE S=SIDEWALL CORE
T=CUTTINGS J=JUNK BASKET

R - REWORKED SP.
C - CONTAMINANT

TABLE NO.:

Well Name NERITA-1A Basin TORQUAY SUB-BASIN Sheet No. 1 of 6

SAMPLE TYPE OR NO. *	T	T	S	S	S	T	T	S	S	S	S	S	S	S	S	S	T	T	S	T	T	S
FOSSIL NAMES / DEPTHS (ft.)	2160-70	2510-20	2570	2682	2846	2950-60	3100-10	3253	3531	3704	3867	4065	4372	4660	4944	5287	5670-80	5980-90	6068	6230-40	6450-60	6456
Acanthotriletes spp. R																						
Aequitriradites spinulosus								C					•						•	•		
A. verrucosus																		•		•		
Alangiopollis sp. of Foster 1982																						
Alisporites grandis														•	•	•	•	•	•			
A. similis		•																				
Amosopollis cruciformis								•			•	•		•								
Anacolosidites acutullus																						
A. luteoides																						
A. sectus																						
Araucariacites australis	•		•	•	•		•	•	•		•			•	•	•	•		•			
A. sp. cf A. fissis																						
Australopollis obscurus			•	•	•	•	•	•	•	•	•										C	C
Baculatisporites comaumensis														•	•	•	•	•				•
B. disconformis	•						•	•														
Balmeisporites holodictyus																	•	•				
B. tridictyus																		•				
Banksieaeidites arcuatus	•				•	•															C	
B. elongatus		•																				
B. lunatus ms		•																				
Basopollis mutabilis ms								•					•									
B. otwayensis ms				•					•		•		•									
Beaupreacidites elegansiformis		•																				
B. orbiculatus						•																
B. trigonalis ms																						
B. verrucosus		•																				
Biretisporites spectabilis s.l.																			•	•		
Bysmapollis emaciatus					•																	
Camarozonosporites australiensis s.l.	•			R			•					•	•					•				
C. bullatus					•			•				•										
C. dumus ms																						
C. spp. indeterminate																				•		
Canthiumidites oblatus																						
Ceratosporites equalis															•	•	•					•
Cicatricosisporites australiensis											R				•		•		•	•		•
C. sp cf C. australiensis																	•		•	•		
C. hughesii																				•		
C. ludbrookii						R																
Clavifera triplex complex		•			•	•					•		•									
Clavatisporites glarius																						
Conbaculites apiculatus ms																						
Concavissimisporites penolaensis																						
Contignisporites cooksoniae																		•				
C. fornicatus																						
Coptospora paradoxa																						
Corollinia spp.								R						•		•		•	•			
Crassiretitriletes vanraadshoovenii								•														
Crybelosporites punctatus																	•					
C. striatus											R				•	?	•	•	?	•		
C. sp. cf C. striatus of Burger 1980																						
Cunoniaceae-type					•																	
Cupanieidites orthoteichus	•		•		•		•															
Cyathidites australis														•	•	•	•	•	•	•		•
C. gigantis		•					•															
C. minor	•	•	•		•	•					•		•	•	•	•	•	•	•	•		•
C. paleospora	•																					

* C=CORE S=SIDEWALL CORE
T=CUTTINGS J=JUNK BASKET

R - REWORKED SP.
C - CONTAMINANT

TABLE NO.:

Well Name NERITA-1A Basin TORQUAT SUB-BASIN Sheet No. 2 of 6

SAMPLE TYPE OR NO. *	T	T	S	S	S	S	T	S	S	S	S	S	S	S	S	S	T	T	S	T	T	S
FOSSIL NAMES / DEPTHS (ft.)	2160-70	2510-20	2570	2682	2846	2950-60	3100-10	3253	3531	3704	3867	4065	4372	4660	4944	5287	5670-80	5980-90	6068	6230-40	6450-60	6456
Cyathidites splendens	•	•		•		•					•	•	•									
Cyclosporites hughesii																						
Dacrycarpites australiensis					•								•									
Deltoidospora spp.																						
Densoisporites velatus																						
Dicotetradites clavatus	•	•	•		•	•				•	•		•									
Dictyophyllidites cf arcuatus				•								•	•									
D. crenatus	•																					
Didecitriletes spp. R																						
Dilwynites granulatus	•		•	•	•			•		•	•											
D. tuberculatus	•		•	•				•		•	•											
Dryptopollenites semilunatus			•		•																	
Elaeocarpaceae-type			•																			
cf Elphredripites notensis [65y]					•																	
Ericipites scabratus	•				•	•						•										
Foraminisporis asymmetricus																•	•	•	•	•		•
F. dailyii																						
F. wonthaggiensis															•			•	•	•		
Forcipites longus													•									
F. renmarkensis ms												•	•									
F. sabulosus													•	•								
F. stipulatus														•								
F. spp. indeterminate												•	•									
Foveosporites canalis																						
Foveotriletes balteus					•																	
F. parviretus								R										•		•		
Gambierina edwardsii												•	•									
G. rudata					•	•	•	•	•		•	•	•	•								
G. tenuis ms																						
G. verrucatus ms												•										
Gleicheniidites spp.	•	•	•	•	•	•		•	•		•	•	•		•		•	•	•	•	C	
Granodiporites nebulosus																						
Haloragacidites harrisii	•	•	•	•		•	•	•					•									
Herkosporites elliotii											•		•									
Ilexpollenites anguloclavatus complex	•	•			•						•		•									
Integricorpus antipodus ms						•																
Intratriporopollenites notabilis						•																
Ischyosporites gremius	•				•																	
I. irregularis ms				•				•	•		•											
I. punctatus																	•			•		
Jaxtacolpus pieratus ms [12u]																						
Klukisporites scaberis															•	•						•
Kraeuselisporites spp.													•				•					
Kulyisporites waterbolkii																						
Laevigatosporites spp.	•	•		•		•		•	•	•	•	•	•					•				
Latrobosporites amplus									•		•	•	•									
L. crassus		•			•	•	•	•	•				•									
Leptolepidites major																				•		
L. verrucatus															•			•		•		•
Liliacidites bainii																						
L. lanceolatus																						
L. sernatus ms						•																
L. spp. indeterminate											•	•	•									
Lycopodiumsporites spp.	•	•	•		•			•					•	•	•	•	•	•	•	•		
Lygistepollenites balmei					•	•		•	•		•		•									
L. florinii	•	•	•	•	•	•	•	•	•	•	•	•										

* C=CORE S=SIDEWALL CORE
T=CUTTINGS J=JUNK BASKET

R - REWORKED SP.
C - CONTAMINANT

TABLE NO.:

Well Name NERITA-1A Basin TORQUAY SUB-BASIN Sheet No. 3 of 6

FOSSIL NAMES \ DEPTHS	2160-70	2510-20	2570	2682	2846	2950-60	3100-10	3253	3531	3704	3867	4065	4372	4660	4944	5287	5670-80	5980-90	6068	6230-40	6450-60	6456
SAMPLE TYPE OR NO. *	T	T	S	S	S	T	T	S	S	S	S	S	S	S	S	S	T	T	S	T	T	S
Malvacipollis diversus	•		•	•	•																	
M. duratus ms	•		•																			
M. robustus ms		•																				
M. subtilis	•	•	•	•	•	•	•														C	
Matonisporites ornamentalis																						
M. sp. cf M. cooksonii																						
Micrantheum spinyspora																						
Microcachrydites antarcticus				•	•			•		•	•		•	•	•	•	•	•	•	•		•
Milfordia homeopunctatus	•																					
M. hypolaenoides																						
Monolites alveolatus			•																			
Myrtaceidites tenuis						•																
M. parvus-mesonesus				•	•																	
Myrtaceoipollenites australis				•																		
Neoraistrickia truncata																•				•		
Nothofagidites asperus					•						•											
N. brachyspinulosus	•							•					•	•								
N. deminutus-vansteenii	•																					
N. emarcidus-heterus	•	•	•	•	•		•	•		•												
N. falcatus	•					•																
N. flemingii	•	•	•		•	•	•				•											
N. kaitangata					•	•		•		•	•		•	•								
N. senectus s.l.													•	•								
N. cf waipawaensis [Late Cretaceous]														•								
Osmundacites wellmanii																						
Parvisaccites catastus																						
Peninsulapollis askinae													•									
P. gillii	•											•	•									
Periporopollenites demarcatus	•	•	•	•	•	•					•											
P. polyoratus		•	•		•	•	•			•			•									
P. vesicus	•																					
Peromonolites bacculatus ms																						
P. densus								•														
Phyllocladidites mawsonii	•	•		•	•	•	•	•	•	•	•	•	•	•							C	
P. reticulosaccatus [var. enuch]						•	•						•									
P. verrucosus																						
Phyllocladus palaeogenicus																						
Pilosisporites notensis																				•		
P. parvispinosus																						
Plicatipollenites spp. R								R														
Podocarpidites spp.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	
Podosporites microsaccatus	•		•	•	•	•		•		•	•		•	•			•	•			•	
Polycingulatisporites clavus															•		•					
P. spp. indeterminate																•			•			
Polyorificites oblatus																						
Polypodiaceoisporites cf tumulatus																						
Polypodiisporites spp.	•	•				•					•											
Polycolpites langstonii								•														
P. cf P. simplex ms																						
Polycolporopollenites esobalteus	•																					
Proteacidites adenanthoides			•		•	•		•														
P. ademonosus ms													•									
P. amolosexinus																						
P. angulatus											•		•									
P. annularis	•	•				•	•			•												
P. asperopolus							•															

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R = REWORKED SP.
C = CONTAMINANT

TABLE NO. :

Well Name NERITA-1A　　Basin TORQUAY SUB-BASIN　　Sheet No. 4 of 6

FOSSIL NAMES / DEPTHS (ft.)	2160-70	2510-20	2570	2682	2846	2950-60	3100-10	3253	3531	3704	3867	4065	4372	4660	4944	5287	5670-80	5980-90	6068	6230-40	6450-60	6456
SAMPLE TYPE OR NO. *	T	T	S	S	S	T	T	S	S	S	S	S	S	S	S	S	T	T	S	T	T	S
Proteacidites biporus																						
P. callosus		•																				
P. crassus	•		•																			
P. differentipollis																						
P. dierama ms																						
P. dilwynensis-grandis complex	•	•	•			•	•	•														
P. incurvatus	•	•	•	•	•	•	•															
P. kopiensis	•																					
P. latrobensis	•																					
P. leightonii	•		•																			
P. nasus																						
P. obscurus	•	•				•	•															
P. ornatus					•	•																
P. otwayensis ms													•									
P. pachypolus	•					•																
P. pseudomoides	•			•																		
P. recavus																						
P. rectomarginis			•																			
P. rectus	•				•																	
P. reticulatus																						
P. reticuloconcavus ms												•										
P. reticuloscabratus			•		•	•																
P. retiformis												•										
P. rugulatus	•						•															
P. scitus																						
P. tenuiexinus																						
P. tuberculatus							•															
P. tuberculiformis																						
P. tuberculotumulatus ms																						
P. spp. undescribed	•	•	•	•	•	•	•	•	•	•		•	•	•								
Protohaploxypinus spp. R																						
Pseudowinterapollis calathus																						
P. cranwellae													•									
P. wahooensis													•									
Pyrolobospora reticulata																		•		•		
Reticulatisporites pudens																•						
Retistephanocolpites nixonii ms			•		•																	
Riccia boxatus ms																						
Rogalskaisporites cf canalis																						
Rotverrusporites stellatus ms																						
Rouseisporites reticulatus					•								•		•		?	•	•	•		
R. simplex																						
Rugulatisporites mallatus complex	•				•																	
Santalumidites cainozoicus	•																					
Sapotaceoidaepollenites rotundus	•																					
Schizaea digitatoides																						
Schizocolpus marlinensis						•						•										
S. rarus ms		•																				
Selagosporis sp.												•										
Spinizonocolpites prominatus				•																		
Stereisporites antiquisporites	•			•								•	•	•	•	•	•	•	•	•		•
S. australis f. crassa		•																		•		
S. cf pocockii																						
S. punctatus ms						•						•										
S regium ms													•									
S. spp. indeterminate						•	•			•		•	•		•	•		•	•			

* C=CORE　S=SIDEWALL CORE
T=CUTTINGS　J=JUNK BASKET

R - REWORKED SP.
C - CONTAMINANT

TABLE NO.:

Well Name NERITA-1A   Basin TORQUAY SUB-BASIN   Sheet No. 6 of 6

SAMPLE TYPE OR NO. *	T	T	S	S	S	T	T	S	S	S	S	S	S	S	S	S	T	T	S	T	T	S
FOSSIL NAMES / (ft.) DEPTHS	2160-70	2510-20	2570	2682	2846	2950-60	3100-10	3253	3531	3704	3867	4065	4372	4660	4944	5287	5670-80	5980-90	6068	6230-40	6450-60	6456
DINOFLAGELLATES																						
cf Achomosphaera alcicornu	•																					
Apectodinium homomorpha																						
A. hyperacantha				•																		
Areosphaeridium capricornum																						
A. diktyoplokus																						
Chordosphaeridium inodes																						
Deflandrea phosphoritica																						
Glaphyracysta retiintexta																						
Homotryblium tasmaniense	•																					
Hystiocysta variata																						
Hystrichosphaeridium rigaude																						
Impagidinium spp.																						
Nematosphaeropsis balcombiana																						
Operculodinium centrocarpum	•																					
Rhombodinium glabrum	•																					
Schematophora speciosa																						
Spinidium spp.				•						•												
Spiniferites spp.	•			•																		
Thalassiphora spp.	•																					
indeterminate/undescribed dinoflagelates	•			•		C	C															
Senagalium dilwynense										•												
ACRITARCHS																						
Leiosphaeridia spp.															•	•	•	•		•		
Micrhystridium spp.															•			•				

* C=CORE S=SIDEWALL CORE

R - REWORKED SP.