

PALYNOLOGY OF TASMANIAN MINES DEPARTMENT SUB-BASALT

DRILLING PROGRAMME HOLE-2

BY

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INTRODUCTION

Ten samples were submitted for palynological analysis by Peter Baillie. All were from sediment horizons interbedded with basalts and all yielded palynomorphs, although some were very lean. The zonation used is summarised on Figure 1 and basically that of Stover and Evans (1973) and Stover and Partridge (1973) as modified by Partridge (1976). Raw data is given in an Appendix.

PALYNOSTRATIGRAPHY

: 129.0 (CORE)-184.0m (CORE) : lower P. tuberculatus Zone : early Oligocene : non-marine : immature

These samples are totally dominated by Nothofagidites spp. in a relatively low diversity assemblage. The co-occurrence of Beaupreadites verrucosus and Cyatheacidites annulatus indicates assignment to the lower Proteacidites tuberculatus Zone of early Oligocene age. The presence of Periporopollenites vesicus and absence of younger indicators confirm the assignment. The underlying sample at 187.3m is very lean, and may belong to this zone, or the one beneath.

Non-marine environments are indicated by the absence of marine

MM YEARS	EPOCH	SERIES	PLANKTONIC FORAMINIFERAL ZONATIONS			PALYNOLOGICAL ZONATIONS			
			CENOZOIC AFTER STAINFORTH et.al. 1975		BLOW, 1969 BERGGREN, 1971	J.1	DINOFLAGELLATE ASSEMBLAGE ZONES	SPORE - POLLEN ASSEMBLAGE ZONES	
			CRETACEOUS AFTER VAN HINTE 1972						BASS STRAIT TAYLOR 1966
35	OLIGOCENE	EARLY	<i>Cassigerinella chipolensis</i>	P.19	J.1	Operculodinium spp.	PROTEACIDITES TUBERCULATUS		
			<i>Pseudohastigerina mica</i>	P.18			J.2		
40	EOCENE	LATE	<i>Globorotalia cerroazulensis</i> (sensu lato)	P.17	K	Phthanoperidinium coreoides	UPPER NOTHOFAGIDITES ASPERUS		
				<i>Globigerinatheka seminvoluta</i>			P.16	Deflandrea extensa	MIDDLE NOTHOFAGIDITES ASPERUS
45		MIDDLE	<i>Truncorotaloides rohi</i>	P.14	NOTHOFAGIDITES GONIATUS	Deflandrea heterophylcta	LOWER NOTHOFAGIDITES ASPERUS		
				<i>Orbulinoides beckmanni</i>				P.13	
				<i>Globorotalia lehneri</i>				P.12	
				<i>Globigerinatheka subcoglobata</i>				P.11	
			<i>Hantkenina aragonensis</i>	P.10		( <i>Wetzelialla echinosuturata</i> )			
50		EARLY	<i>Globorotalia pentacamerata</i>	P.9	<i>Wetzelialla edwardsii</i>	PROTEACIDITES ASPEROPOLUS			
				<i>Globorotalia aragonensis</i>	P.8	<i>Wetzelialla thompsonae</i>	UPPER MALVACIPOLLIS DIVERSUS		
				<i>Globorotalia formosa formosa</i>	P.7	<i>Wetzelialla ornata</i>			
			<i>Globorotalia subbotinae</i>	b.	<i>Wetzelialla waipawaensis</i>	Middle M. Diversus			
55	PALEOCENE	LATE	<i>Globorotalia velascoensis</i>	P.6	a.	<i>Wetzelialla hyperacantha</i>	Lower Malvacipollis Diversus		
				<i>Globorotalia pseudomenardii</i>	P.5		<i>Wetzelialla homomorpha</i>	UPPER LYGISTEPOLLENITES BALMEI	
60		MIDDLE	<i>Globorotalia pusilla pusilla</i>	P.3	NOTHOFAGIDITES GONIATUS	Eisonackia crassitabulata	LOWER LYGISTEPOLLENITES BALMEI		
				<i>Globorotalia angulata</i>				P.2	
				<i>Globorotalia uncinata</i>					
65		LATE CRETACEOUS	EARLY	<i>Globorotalia trinidadensis</i>	P.1	c.	Trithyrodinium evittii	TRICOLPITES LONGUS	
				<i>Globorotalia pseudobulloides</i>					h.
				<i>Globigerina eugubina</i>					
	MAASTRICHTIAN		LATE	<i>Globotruncanella mayaroensis</i>	BASE OF DINOFLAGELLATE SEQUENCE	Deflandrea druggii	TRICOLPITES LONGUS		
				<i>Globotruncana contusa</i>					
				<i>Globotruncana stuarti</i>					
			EARLY	<i>Globotruncana gansseri</i>					
				<i>Globotruncana scutilla</i>					
70	CAMPANIAN		LATE	<i>Globotruncana calcarata</i>	TRICOLPORITES LILLIEI				
				<i>Globotruncana subspinosa</i>					
	EARLY	<i>Globotruncana stuartiformis</i>			Section without diagnostic dinoflagellates				

Figure 1 Zonation Framework (from Partridge 1976)

indicators and the presence of the freshwater alga Botryococcus.

Pale yellow spore colours indicate immaturity for hydrocarbon generation, despite the proximity of basalt flows.

: 187.3m (CORE)-318.9m (CORE) : upper N. asperus Zone : latest Eocene to earliest Oligocene : non-marine, lacustrine at the base : generally immature with some high maturity horizons.

These assemblages are extremely rich in pollen, totally dominated by Nothofagidites spp. and are of low diversity. The presence of Periporopollenites vesicus without younger or older indicators, along with the dominance of Nothofagidites spp., indicates assignment to the upper Nothofagidites asperus Zone, of latest Eocene to earliest Oligocene age. The topmost sample (187.3m) is very lean and could possibly belong to the overlying zone.

Non-marine environments are indicated by the absence of marine indicators. In the basal sample (318.9m), common non-marine dinoflagellates (Saeptodinium tasmaniense and ?Trithyrodinium sp.) suggest lacustrine environments.

Spore colours are generally pale yellow indicating immaturity for hydrocarbon generation. Several samples however, are rather lean and exhibit higher maturity. At 268.6m (CORE) the spore dominated assemblage is light to mid brown, indicating very early maturity for oil. At 279.0m (CORE), the assemblage is dark brown to black, indicating full maturity for oil and gas/condensate. These anomolous maturities are presumed due to local heating effects of the basalts.

## CONCLUSIONS

The section is of latest Eocene to early Oligocene age (upper N. asperus and lower P. tuberculatus Zones), lacustrine at the base, non-marine above and generally immature, with some higher maturities

caused by local heating from basalt flows. Radiometric dating of the basalts would provide calibration of the palynological boundary.

#### REFERENCES

Partridge, A.D. (1976) The geological expression of eustasy in the early Tertiary of the Gippsland Basin Aust. Pet. Explor. Assoc. J., 16 : 73-79

Stover, L.E. and Evans, P.R. (1973) Upper Cretaceous-Eocene spore-pollen zonation, offshore Gippsland Basin, Australia. Spec. Publ. geol. Soc. Austr. 4 : 55-72

Stover, L.E. and Partridge, A.D. (1973) Tertiary and Late Cretaceous spores and pollen from the Gippsland Basin, south-eastern Australia Proc. R. Soc. Vict., 86 : 237-286

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TASDM SBDF #2

DESCRIPTION:

ALL DEPTHS IN METRES

CHECKLIST OF GRAPHIC ABUNDANCE BY LOWEST APPEARANCE

-  = Abundant
-  = Common
-  = Few
-  = Rare
-  = Very Rare
- ? = Questionably Present
- . = Not Present

Depth (m)	Species	Abundance
129.0 CORE	*SAEPTODINIUM TASMANIENSE*	
184.0 CORE	*TRITHYROIDINIUM SP.*	
187.3 CORE	DADRYCARPITES AUSTRALIENSIS	
197.6 CORE	DILWYNITES GRANULATUS	
220.8 CORE	DILWYNITES TUBERCULATUS	
229.5 CORE	GLEICHENIIDITES CIRCINOIDITES	
268.6 CORE	HALORAGACIIDITES HARRISII	
279.0 CORE	ILEXPOLLENITES SP.	
303.5 CORE	ISCHYOSPORITES GREMIUS	
318.9 CORE	LYGISTEPOLLENITES FLORINII	
	MALVACIPOLLIS SUBTILIS	
	MATONISPORITES ORNAMENTALIS	
	NOTHOFAGUS ASPERUS	
	NOTHOFAGUS BRACHYSPINULOSUS	
	NOTHOFAGUS DEMINUTUS	
	NOTHOFAGUS EMARCIDUS/HETERUS	
	NOTHOFAGUS FALCATUS	
	NOTHOFAGUS FLEMINGII	
	NOTHOFAGUS VANSTEENISII	
	PERIPOROPOLLENITES DEMARCATUS	
	PERIPOROPOLLENITES POLYORATUS	
	PERIPOROPOLLENITES VESICUS	
	PHYLLOCLADIDITES MAWSONII	
	PODOSPORITES MICROSACCATUS	
	PROTEACIIDITES SPP.	
	STEREISPORITES ANTIQUISPORITES	
	TRICOLPITES SPP.	
	VERRUCATOSPORITES ATTENATUS	
	VERRUCATOSPORITES SP.	
	VERRUCOSISPORITES KOPUKUENSIS	
	CLAVIFERA TRIPLEX	
	CYATHIIDITES SPP.	
	DICTYOPHYLLIIDITES SPP.	

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 129.0 CORE  
 184.0 CORE  
 187.3 CORE  
 197.6 CORE  
 220.8 CORE  
 229.5 CORE  
 268.6 CORE  
 279.0 CORE  
 303.5 CORE  
 318.9 CORE

34	ERICIPITES SCABRATUS
35	RUGULATISPORITES MALLATUS
36	RUGULATISPORITES SPP.
37	VERRUCOSISPORITES SPP.
38	VERRUCOSISPORITES "BUBBLY"
39	BEAUPREAITES VERRUCOSUS
40	PROTEACIDITES OBSCURUS
41	RETITRILETES
42	VERRUCOSISPORITES CF. CRISTATUS
43	MICROCACHRYDITES ANTARCTICUS
44	PROTEACIDITES INCURVATUS
45	TRICOLPITES WAIPARAENSIS CF.
46	BEAUPREAITES TRIGONALIS
47	LAEVIGATOSPORITES
48	PROTEACIDITES ANNULARIS
49	AGLAOREIDIA QUALUMIS
50	*BOTRYOCOCCUS*
51	CYATHEACIDITES ANNULATUS
52	PEROMONOLITES DENSUS
53	RUGULATISPORITES MALLATUS CF.
54	TRIPOROPOLLENITES CHNOSUS
55	MICROFOVEOSPORITES
56	MILFORDIA HOMEOPUNCTATUS

## SPECIES LOCATION INDEX

Index numbers are the columns in which species appear.

INDEX NUMBER	SPECIES
50	*BOTRYOCOCCUS*
1	*SAEPTODINIUM TASMANIENSE*
2	*TRITHYRODINIUM SP.*
49	AGLAOREIDIA QUALUMIS
39	BEAUPREADITES VERRUCOSUS
46	BEAUPREADITES TRIGONALIS
31	CLAVIFERA TRIPLEX
51	CYATHEACIDITES ANNULATUS
32	CYATHIDITES SPP.
3	DACRYCARPITES AUSTRALIENSIS
33	DICTYOPHYLLIDITES SPP.
4	DILWYNITES GRANULATUS
5	DILWYNITES TUBERCULATUS
34	ERICIPITES SCABRATUS
6	GLEICHENIIDITES CIRCINIDITES
7	HALORAGACIDITES HARRISII
8	ILEXPOLLENITES SP.
9	ISCHYOSPORITES GREMIUS
47	LAEVIGATOSPORITES
10	LYGISTEPOLLENITES FLORINII
11	MALVACIPOLLIS SUBTILIS
12	MATONISPORITES ORNAMENTALIS
43	MICROCACHRYIDITES ANTARCTICUS
55	MICROFOVEOSPORITES
56	MILFORDIA HOMEOPUNCTATUS
13	NOTHOFAGUS ASPERUS
14	NOTHOFAGUS BRACHYSPINULOSUS
15	NOTHOFAGUS DEMINUTUS
16	NOTHOFAGUS EMARCIDUS/HETERUS
17	NOTHOFAGUS FALCATUS
18	NOTHOFAGUS FLEMINGII
19	NOTHOFAGUS VANSTEENISII
20	PERIPOROPOLLENITES DEMARCATUS
21	PERIPOROPOLLENITES POLYORATUS
22	PERIPOROPOLLENITES VESICUS
52	PEROMONOLITES DENSUS
23	PHYLLOCLADIDITES MAWSONII
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25	PROTEACIDITES SPP.
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