

PALYNOLOGY OF TASMANIAN MINES DEPARTMENT SUB-BASALT

DRILLING PROGRAMME HOLE-4

BY

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INTRODUCTION

Five core samples were submitted by Peter Baillie for palynological analysis. All were from sediment horizons interbedded with basalts. All were fairly lean with two (168.2m and 275.0m) extremely lean. Thermal maturity was very variable. The zonation used is summarised on Figure 1 and is 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

171.1m (CORE)-211.4m (CORE) : P. tuberculatus Zone : early Oligocene : non-marine : variable maturity immature to fully mature.

These samples are dominated by Nothofagidites, especially N. emarcidus, in moderately diverse but lean assemblages. The co-occurrence of Periporopollenites vesicus and Cyatheacidites annulatus indicates assignment to the P. tuberculatus Zone of early Oligocene age. Minor Cretaceous reworking was seen at 211.4m.

Non-marine environments are indicated by the absence of

dinoflagellates and the presence of the freshwater alga Botryococcus.

Spore colours are yellow to mid brown at 171.1m (indicating immaturity to maturity for oil, yellow at 168.2m (indicating immaturity) and light to mid brown at 211.4m (indicating marginal maturity to maturity).

275.0m (CORE) : indeterminate : non-marine : post-mature

This assemblage is very lean due to its high maturity, and too few specimens have been seen to confidently assign it to any zone. Nothofagidites spp. and leaf cuticle are the most common components.

Non-marine environments are most likely due to the common cuticle and absence of marine indicators.

Dark brown to black fragmentary palynomorphs are seen and indicate post-maturity for oil and peak maturity for gas condensate. This is presumably due to very local heating.

371.0m (CORE) : upper N. asperus Zone : latest Eocene to earliest Oligocene : non-marine : early mature

This assemblage is dominated by Nothofagidites spp. although Phyllocladidites mawsonii is also common. Diversity is low. Its age is indicated at the top by youngest Grandodiporites nebulosus and the absence of younger indicators, and at the base by the absence of any of the many other older indicators.

Non-marine environments are indicated by the common pollen and spores and absence of marine indicators.

Mid brown spore colours indicate early maturity for oil, and marginal maturity for gas/condensate.

CONCLUSIONS

The studied section is of latest Eocene to early Oligocene age (upper N. asperus and P. tuberculatus Zones), non-marine, and of variable maturity caused by local heating from basalt flows. Radiometric dating of the basalts would provide calibration of the palynological zone boundary, although it cannot be precisely located.

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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168.2 CORE		34	PERIPOROPOLLENITES VESICUS
171.1 CORE		35	PEROMONOLITES WELLOSUS
211.4 CORE		36	VERRUCOSISPORITES SPP.
275.0 CORE		37	HALORAGACIDITES HARRISII
371.0 CORE		38	MALVACIPOLLIS SUBTILIS
		39	TRICOLFITES SPP.

SPECIES LOCATION INDEX

Index numbers are the columns in which species appear.

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NUMBER	SPECIES
19	*BOTRYOCOCCUS*
20	CINGUTRILETES CLAVUS
21	CYATHEACIDITES ANNULATUS
1	CYATHIDITES SPP.
31	DACRYCARPITES AUSTRALIENSIS
2	DILWYNITES GRANULATUS
17	DILWYNITES TUBERCULATUS
3	ERICIPITES SCABRATUS
22	FALCISPORITES SIMILIS
4	GRANODIFORITES NEBULOSUS
37	HALORAGACIDITES HARRISII
23	ILEXPOLLENITES SP.
5	ISCHYOSPORITES GREMIUS
24	LAEVIGATOSPORITES
6	LYGISTEPOLLENITES FLORINII
38	MALVACIFOLLIS SUBTILIS
25	MATONISPORITES ORNAMENTALIS
26	MICROCACHRYIDITES ANTARCTICUS
32	MICROFOVEOSPORITES
7	NOTHOFAGUS ASPERUS
8	NOTHOFAGUS BRACHYSPINULOSUS
27	NOTHOFAGUS DEMINUTUS
9	NOTHOFAGUS EMARCIDUS/HETERUS
10	NOTHOFAGUS FALCATUS
11	NOTHOFAGUS FLEMINGII
33	NOTHOFAGUS VANSTEENISII
34	PERIPOROPOLLENITES VESICUS
35	PEROMONOLITES VELLOSUM
12	PHYLLOCLADIDITES MAWSONII
13	PHYLLOCLADIDITES VERRUCOSUS
14	PODOSPORITES MICROSACCATUS
15	PROTEACIDITES SPP.
18	RETITRILETES AUSTRICLAVATIDITES
16	STEREISPORITES ANTIQUISPORITES
39	TRICOLPITES SPP.
28	VERRUCATOSPORITES ATTENUATUS
29	VERRUCOSISPORITES CF. CRISTATUS
30	VERRUCOSISPORITES KOPUKUENSIS
36	VERRUCOSISPORITES SPP.