



REF ID: 11898

R7424

PETROLEUM DIVISION

22 AUG 1991



PALYNOLOGICAL ANALYSIS OF SAMPLES FROM  
HINDHAUGH CREEK-1, TORQUAY SUB-BASIN

by

M.K. MACPHAIL

Palaeontological report prepared 27 August 1989 for  
The Shell Company of Australia Ltd.

Consultant Palynologist, 20 Abbey St., Gladesville, NSW 2111

INTRODUCTION

SUMMARY OF RESULTS

GEOLOGICAL COMMENTS

BIOSTRATIGRAPHY

INTERPRETATIVE DATA

BASIC DATA

SPECIES CHECK LIST

## INTRODUCTION

Three conventional core and two cuttings samples, representing the interval 910-7776.0ft. in Hindhaugh Creek-1 were processed and analysed for spore-pollen and dinoflagellates.

Yields were adequate to good although preservation was mostly poor due to thermal alteration and fragmentation. As with other carbonized palynofloras of Early Cretaceous age in the Torquay Sub-basin, it is possible that the more delicate zone index species have not been preserved and, consequently, most age-determinations and zone boundary picks are of low confidence.

Lithological units and palynological determinations are summarized below. Interpretative and basic data are given in Tables 1 and 2 respectively. Check lists of all species recorded are attached.

## SUMMARY

AGE	UNIT*	ZONE	DEPTH RANGE (ft.)	ENVIRONMENT
Lower Albian	EUMERELLA FORMATION	C. striatus	910 - 1257.0	Fluvio-lacustrine
Aptian	"	C. hughesii	3665.5- 7776.0	"

Mid Eum -  
Heathfield  
Lower Eum -  
Windermere M.

TD 2372m

\* Lithological and electric log data not available

## GEOLOGICAL COMMENTS

1. Despite the high degree of thermal alteration, palynomorphs are preserved in the Hindhaugh Creek-1 core samples. The negligible or zero recovery reported in previous analyses (Douglas/Burger) is likely to reflect poor processing techniques.
2. TAI values range from estimated 3+ [mature] at 910-20ft. to 5 [dry gas] at 7340-7776.0ft.
3. Based on the palynofloras recovered in this review, the interval 910-7776ft. is Eumeralla Formation. It is probable that the well bottomed [TD 7782ft.] in this unit of the Otway Group.

### BIOSTRATIGRAPHY

Zone and age-determinations have been made using criteria proposed by Helby et al. (1987), augmented where necessary by time-range data presented in Dettman (1963), Burger (1980), Morgan (1980) and Backhouse (1988).

In spite of carbonization and fragmentation of the palynomorphs, sufficient fine sculptural detail was preserved to allow reliable identification of most spore-pollen. Nevertheless it is possible that the more delicate types, including the zone index species Crybelosporites striatus, may not have been preserved.

Cyclosporites hughesii Zone 3665.5-7776.0ft. Aptian

Three samples are provisionally assigned to this zone, based on fragmented specimens of the nominate species in Core 3 [7776.0ft.] and cuttings from 7340-50ft. The uppermost sample, Core 2 [3665.5ft.] lacks Cyclosporites hughesii but is unlikely to be older than C. hughesii Zone given the occurrence of a poorly-preserved (probable) specimen of Filosporites notensis. Crybelosporites striatus was not recorded.

Crybelosporites striatus Zone 910-1257.0ft. Lower Albian

Two samples are provisionally assigned to this zone, based on a fragmented (probable) specimen of the nominate species in Core 1 [1257.0ft.]. Filosporites notensis indicates that the cuttings at 910-20ft. are no older than C. hughesii Zone.

### BIBLIOGRAPHY

- BACKHOUSE, J. (1988). Late Jurassic and Early Cretaceous palynology of the Perth Basin, Western Australia. Geological Survey of Western Australia Bulletin 135.
- BURGER, D. (1980). Palynological studies of the Lower Cretaceous of the Surat Basin, Australia. Bureau of Mineral Resources Bulletin 189.
- MORGAN, R. (1980). Palynostratigraphy of the Australian Early and Middle Cretaceous. Memiors of the Geological Survey of New South Wales, Palaeontology 18: 1-153.

HELBY, R., MORGAN, R. & PARTRIDGE, A. (1987). A palynological zonation of the Australian Mesozoic. In "Studies in Australian Mesozoic Palynology", Association of Australasian Palaeontologists Memoir 4, pp. 1-94.

TABLE 1: SUMMARY OF BASIC PALYNOLOGICAL DAT

HINDHAUGH CREEK-1

p. 1 of 1

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

SAMPLE NO.	DEPTH (m)	YIELD		DIVERSITY		PRESERVATION	LITHOLOGY	PYRIZATION	COMMENTS
		SPORE-POLLEN	DINOS	SPORE-POLLEN	DINOS				
ctg	910-20ft.	Medium	-	Medium	-	Poor	-	-	TAI est. 3+
Core 1	1257.0ft.	High	-	Medium	-	Poor	-	-	TAI est. 3+
Core 2	3665.5ft.	Low	-	Low	-	Poor	-	-	TAI 3+ to 4+
ctg	7340-50ft.	High	-	Medium	-	Poor	-	-	TAI est. 5
Core 1	7776.0ft.	Low	-	Medium	-	Poor	-	-	TAI est. 5

TABLE 1: SUMMARY OF INTERPRETATIVE PALYNOLOGICAL DATA

HINDHAUGH CREEK-1

SAMPLE NO.	DEPTH (m)	SPORE-POLLEN ZONE	DINOFLAGELLATE ZONE	AGE	CONFIDENCE RATING	COMMENTS
ctg	910-20ft.	No older than <i>C. hughesii</i> Zone		Aptian-Lower Albian	-	<i>P. notensis</i> , caved Eocene spore-pollen
Core 1	1257.0ft.	<i>C. striatus</i>	-	Lower Albian	2	Probable <i>C. striatus</i> ; <i>P. notensis</i>
Core 2	3665.5ft.	<i>C. hughesii</i>	-	Aptian	2	Probable <i>P. notensis</i> ; <i>C. australiensis</i>
ctg	7340-50ft.	<i>C. hughesii</i>	-	Aptian	3	<i>C. hughesii</i> , <i>P. notensis</i>
Core 1	7776.0ft.	<i>C. hughesii</i>	-	Aptian	1	<i>C. hughesii</i> , <i>F. wonthaggiensis</i>



SAMPLE TYPE OR NO. *	DEPTHS																			
	T	C	C	T	C															
FOSSIL NAMES	910-20ft.	1257.0ft.	3665.5ft.	7340-50ft.	7776.0ft.															
Aequitriradites spinulosus		•		•																
A. verrucosus		•																		
A. spp. (indeterminate)		•			•															
Allisporites grandis																				
A. similis				•																
Baculatisporites comaumensis	•			•	•															
Biretisporites sp.	•	•																		
Ceratosporites equalis				•	•															
Cicatricosporites australiensis	•	•	•	•	•															
C. hughesii				•																
C. ludbrookii				•																
Crybelosporites striatus	?	•																		
Cyathidites australis	•	•	•	•	•															
C. minor	•	•		•	•															
Cyclosporites hughesii		?		•	•															
Dictyotosporites complex	?																			
D. speciosus	•	•		•	?															
Foraminisporis wonthaggiensis	•			•	•															
Gleicheniidites spp.	•																			
Ischyosporites/Klukisporites spp.		•	•	•	•															
Lycopodiumsporites spp.	•	•	•	•	•															
Leptolepidites verrucosus				•																
Microacrydites antarcticus				•	•															
Neoraistrickia truncata	•	•		•	•															
Osmundacites wellmanii					•															
Pilosporites notensis	•	•	•	•																
P. parvispinosus	•																			
Podocarpidites spp.	•	•			•															
Polycingulatisporites spp.					•															
Stereisporites spp.		•		•																
Trisaccites		•																		
trilete spores (indeterminate)	•	•	•	•	•															
Cupanioidites orthoteichus	C																			
Haloragacidites harrisii	C																			
Nothofagidites emarcidus-heterus	C																			

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

R = REWORKED SP.  
C = CONTAMINANT