PALYNOLOGY AND KEROGEN ANALYSIS OF FIVE SAMPLES FROM BALLANGEICH NO. 1 WELL

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SUMMARY

Sample Depth (m)	Zone	Age
810	Crybelosporites striatus	Aptian-Albian
860	Cyclosporites hughesi	Aptian
865	Foraminisporis wonthaggiensis	Valanginian-Aptian
1200	Retitriletes watherooensis	Tithonian
1240	-	Indeterminate

CONTENTS

INTRODUCTION

Five cuttings samples from Ballangeich No. 1 well were received from the Phoenix Oil and Gas N.L. for palynological analyses and visual kerogen assessment. The samples were from these depths : 800-810 m, 860 m, 860-865 m, 1190-1200 m and 1230-1240 m (hereinafter only last depths of the sample intervals are mentioned).

All samples except the lowest one at 1240 m were rich in sporomorph yields. Caving has been appreciable in all samples and mostly took place from immediately overlying sections. Obvious cavings from higher sections were minimal which were easily distinguished and ignored (such as much younger dinoflagellate cysts).

Due to caving from immediately overlying sections, only top occurrences of significant sporomorph species have been taken into account for zonal correlation. Generally, most species occur rarely and sporadically in the upper (and lower) parts of their respective stratigraphic ranges. Yet greater emphasis have been placed on such rare occurrences rather than on the whole assemblages which have been masked by caving. That explains why, except these significant species, the sporomorph assemblages in all samples look identical.

PALYNOSTRATIGRAPHY

The following zonal correlations are based on top occurrences of significant species and remain subject to confirmation by core sample analyses. The distribution of species is presented in Table 1.

810 m

Crybelosporites striatus Interval Zone

Aptian-Albian

Top occurrence of Biretisporites eneabbaensis together with abundant Microcachryidites antarcticus suggest that the sample is not younger than the Crybelosporites striatus Interval Zone as modified by Helby et al. (1987). Other species supportive to this correlation are the nominate species, Cyclosporites hughesi, common Pilosisporites notensis and abundant Foraminisporis asymmetricus. The age of the zone is latest Aptian to early Albian.

860 m

Cyclosporites hughesi Interval Zone

Aptian

Top occurrence of Callialasporites turbatus suggests that the sample is not younger than the Aptian Cyclosporites hughesi Interval Zone as modified by Helby et al. (op. cit.). Other species supporting this correlation are the nominate species, Foraminisporis asymmetricus, F. wonthaggiensis, Microcachryidites antarcticus and common Pilosisporites notensis.

865 m

Foraminisporis wonthaggiensis Interval Zone

Valanginian-Aptian

Top occurrence of Aratrisporites sp. indicate that the sample is not younger than the Foraminisporis wonthaggiensis Interval Zone as modified by Helby et al. (op. cit.). F. wonthaggiensis Interval is a broad zone ranging from Valanginian to basal Aptian. Other notable species are the nominate species, Contignisporites cooksoniae and Microcachryidites antarcticus.

1200 m

Retitriletes watherooensis Oppel Zone

Tithonian

The sample is considered to be not younger than the Tithonian Retitriletes watherooensis Oppel Zone as modified by Helby et al. (op. cit.) from the top occurrence of Araucariacites fissus. Abundant Microcachryidites antarcticus, and rare Callialasporites dampieri and C. turbatus are important accessory species.

1240 m

Indeterminate

Although some distinction in kerogen properties is observed, the sample yielded almost identical sporomorph assemblage which is considered to be almost entirely caving. The sample is, therefore, thought to be almost barren of palynomorphs. Possible sampling error is also not entirely ruled out. The only significant species, Duplexisporites problematicus, is very weathered and is probably not indigenous.

PALYNOFACIES

All samples examined contain abundant terrestrial sporomorphs and a few dinoflagellate cysts noticed are obvious caving from much younger strata. Rare fungal palynomorphs are present. The samples are, therefore, considered non-marine. There were no evidence to indicate otherwise. The lowest sample at 1240 m is considered nearly barren of palynomorphs and is probably non-marine.

MATURITY AND SOURCE-ROCK POTENTIAL

Visual assessment of kerogen components is presented in Table 2. Due to caving, the results remain tentative and subject to confirmation by core sample analyses.

With Thermal Alteration Indices (TAI) ranging from 2.75 to 3.0, the upper 4 samples are considered mature to generate liquid hydrocarbon. Moderate yield of organic residue (VOM = volume of organic matter) together with moderate sporinite component indicate good source-rock potential but this is downgraded in terms of oil potential by low cuticle yields, moderate woody substances and high sapropelic components. These samples are, therefore, more potent to generate gas and condensate than oil.

The lowest sample at 1240 m with high VOM is a very good source-rock but for low sporinite and cuticle, moderate woody material and high sapropel is potent to generate gas and condensate with little oil.

REFERENCE

HELBY, R., MORGAN, R. and PARTRIDGE, A.D., 1987.
A palynological zonation of the Australian Mesozoic.
Association of Australasian Palaeontologists, Memoir No. 4,
pp. 1-94.

TABLE 1. DISTRIBUTION OF SPECIES

	Sample depth (m)				
	810	860	865	1200	1240
Aequitriradites spinulosus	X	X	X	X	
Araucariacites australis	X	X	X	X	X
Biretisporites eneabbaensis	X			X	X
Camarozonosporites clivosus	X	X	X	X	X
Ceratosporites equalis	X	X	X	X	X
Cibotiumspora juriensis	X	X	X		X
Cicatricosisporites australiensis	X	X	X	X	X
Classopollis torosus	X	X	X	X	X
Clavatipollenites hughesi	X	X	X	X	X
Crybelosporites striatus	X	X	X	X	
Cyathidites asper	X		X	X	X
Cyathidites australis	X	X	X	X	X
Cyathidites minor	X	X	X	X	X
Cycadopites follicularis	X	X	X	X	X
Cycadopites nitidus	X	X	X	X	X
Cyclosporites hughesi	X	X	X	X	X
Dictyophyllidites equiexinus	X		X		X
Dictyophyllidites harrisii	X	X	X	X	X
Dictyophyllidites mortonii	X	X	X	X	X
Dictyotosporites complex	X	X	X	X	X
Dictyotosporites speciosus	X	X	X	X	
Foraminisporis asymmetricus	X	X		X	
Foraminisporis daylii	X		X	X	
Foraminisporis wonthaggiensis	X	X	X	X	X
Gleicheniidites senonicus	X		X		X
Klukisporites lacunus	X	X	X	X	X
Leptolepidites major	X	X	X		
Matonisporites cooksoniae	X	X	X	X	X
Microcachrydites antarcticus	X	X	X	X	X
Neoraistrickia truncata	X	X	X	X	X
Osmundacidites wellmanii	X	X	X	X	X
Pilosisporites grandis	X	X			

...cont'd

TABLE 1 (cont'd)

	Sample depth (m)				
	810	860	865	1200	1240
Pilosisporites notensis	X	X	X	X	X
Pilosisporites parvispinosus	X	X	X	X	X
Pinuspollenites globosaccatus	X		X		X
Pinuspollenites parvisaccatus	X	X	X	X	X
Podocarpidites ellipticus	X	X	X	X	X
Retitriletes austroclavatidites	X	X	X	X	X
Retitriletes circolumenus	X	X	X	X	X
Retitriletes facetus	X	X	X	X	X
Retitriletes reticulumsporites	X	X	X		X
Retitriletes rosewoodensis	X	X	X	X	X
Retitriletes semimuris	X	X	X	X	
Rogalskaisporites cicatricosus	X	X	X	X	X
Stereisporites antiquasporites	X	X	X	X	X
Trilobosporites trioreticulosus	X		X		
Triporoletes reticulatus	X	X	X	X	
Trisaccites variabilis	X		X	X	X
Vitreisporites pallidus	X	X		X	X
Alisporites grandis		X		X	X
Alisporites similis		X	X	X	X
Aequitriradites verrucosus		X			X
Callialasporites dampieri		X		X	X
Callialasporites turbatus		X		X	X
Camarozonosporites ramosus		X	X	X	X
Cicatricosisporites hughesi		X	X		
Crybelosporites stylosus		X			X
Foveosporites canalis		X	X	X	X
Leptolepidites verrucatus		X	X	X	
Aratrisporites sp.			X		X
Contignisporites cooksoniae			X		
Araucariacites fissus				X	X
Callialasporites segmentatus				X	X
Retitriletes watherooensis				X	X
Staplinisporifes caminus				X	X
Callialasporites trilobatus					X
Coronatispora perforata					X
Duplexisporites problematicus					X