



MINES ADMINISTRATION PTY. LIMITED

PALYNOLOGICAL LABORATORY

REPORT NO. 272/1

Client: GAS AND FUEL EXPLORATION N/L

Study: OLANGOLAH NO. 1

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I. SUMMARY

See Palynological Data Table appended to report.

II. INTRODUCTION

This report contains the results of a palynological investigation of nine sidewall core samples taken from between 83.5 metres and 1959 metres in Olangolah No. 1 well, Victoria.

The samples yielded extremely low to high volumes of organic material, consisting chiefly of opaque detritus with minor representation of severely to + totally degraded spore/pollen fragments.

Spore-pollen taxa identified and their biostratigraphic implications are discussed in Section III. Section IV includes an account of the kerogen content of the sample as deduced from transmitted light microscope observations. A chart with a summary of the results is appended to the report.

III. BIOSTRATIGRAPHY

1. 83.5 metres to 290 metres.

Cretaceous; no older than *D. speciosus* Zone

Spore-pollen material extracted from samples at SWC 14/83.5m, swc 13/233m, and SWC 12/290m is meagre, mostly fragmented, and very poorly preserved. Forms identified in the residues are as follows:-

- (a) 83.5 metres

Lycopodiumsporites spp. indet.

Stereisporites antiquasporites

Cicatricosisporites australiensis

- (b) 235 metres

bisaccate grains indet.

- (c) 290 metres

Cyathidites australis/minor

Lycopodiumsporites austroclavatidites

Foraminisporis wonthaggiensis

Cicatricosisporites australiensis

Osmundacidites spp.

Stereisporites antiquasporites.

saccate grains indet.

Cicatricosisporites, which occurs at 83.5m and 290m, ranges from the latest Jurassic or earliest Cretaceous to the Turonian in the Otway Basin (see Dettmann and Playford 1969).

Foraminisporis wonthaggiensis at 290 m supports a Cretaceous age, since in the Otway Basin the species first appears within the Early Cretaceous *D. speciosus* Zone and ranges into the Turonian *C. triplex* Zone (Dettmann 1963, Dettmann and Playford 1969). Thus the sediments between 83.5 m and 290 m are considered to be of Cretaceous (Neocomian to Turonian) age and no older than the *D. speciosus* Zone. The microfloral data is insufficient for more precise biostratigraphic allocation in terms of the schemes that Dettmann and Playford (1969) and Dettmann and Douglas (1976) defined for the Otway Basin sequence. In terms of the basins lithostratigraphy, the microfloral evidence indicates that the sampled section is no lower in the Mesozoic sequence than the Otway Group.

2. 467 metres to 658.6 metres

Unassigned Interval

Spore-pollen recovery from the samples between 467m and 658.6m was extremely meagre, with representation of occasional generically identifiable, but extremely poorly preserved and fragmented specimens. Forms identified in the residues include *Osmundacidites*, *Lycopodiumsporites* and *Stereisporites*, all of which are long-ranging within the Mesozoic and Cainozoic sequences of the Otway Basin. Thus on the basis of the recovered plant material the age can not be more precisely stated than Mesozoic or Cainozoic.

3. 924.6 metres to 1959 metres.

Unassigned Interval.

The uppermost sample (SWC 28/924.6m) yielded extremely degraded spores

and pollen grains that could not be identified at generic level.

The lower samples, from 1422.2m (SWC 18) and 1959m (SWC 8), provided residues in which almost totally degraded spore-pollen fragments occur rarely. None of these could be identified and thus no opinion can be given as to the age of the sediments.

IV. KEROGEN ANALYSIS

1. The samples from between 83.5m and 924.6m yielded spores with a dark brown to black colour which suggests that the section has been altered to a level more or less equivalent to that of vitrinite with a reflectance of 2.0%. On this basis the section is considered to be within the high temperature dry gas zone.

The kerogen types represented in the residues are dominantly hydrogen lean (opaque detritus) indicating that the sediments are likely to be gas prone. The sample from 924.6m yielded a high volume of organic material and could thus be considered to be a potential hydrocarbon source rock. However, the samples between 83.5m and 658.6m provided low to extremely low volumes of plant material, indicating that these sediments have no or only very limited potential to source hydrocarbons.

2. 1422.2 metres to 1959 metres

The samples from 1422.2m and 1959m provided residues in which spore-pollen material is almost totally degraded, indicating that the section has been altered to a level equivalent to or greater than that of vitrinite with a reflectance of 3.0%. The presence of low to moderate volumes of predominantly hydrogen lean kerogens indicates that the sediments may have a limited potential to source gas.

V. REFERENCES

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Sample	Depth (feet / metres)	Lithology	Biostratigraphic Unit	Inferred Stratigraphic Unit	Polymorph preservation	Microplankton / Microspore ratio	Organic Residue Yield	Composition of Organic Residue (as a percentage)							Particulate Size (% > 20µ)		Spore Colour (Estimate of Vitrinite Reflectance)	Remarks	
								Dense Sapropelic Detritus	Diffuse Sapropelic Detritus	Fine Sapropelic Detritus	Microspore & Cuticle	Wood Tissue	Opaque Detritus			Structured Tissue			Opaque Detritus
													Humic Detritus	Vitrinite	Inertinite				
SWC 14	83.5	SILTSTONE; med. grey with SANDSTONE lamination	Cretaceous	-	Very poor	-	Ex. Low	-	5	10	5	-	25	5	50	10	30	ca. 2.0 (dark brown-black)	Very low yield of fragmented spores and pollen grains. Presence of <i>Cicatricosisporites</i> .
SWC 13	235	SILTSTONE; med. dark grey	-	-	Very poor	-	Ex Low	-	+	15	+	-	25	5	55	10	35	ca. 2.0 (dark brown-black)	Meagre representation of unidentifiable spore-pollen remnants.
SWC 12	290	SILTSTONE; med. dark grey	Cretaceous; no older than <i>D. speciosus</i> Zone.	No lower than Otway Group.	Very Poor	-	Low	-	-	5	15	-	10	50	20	20	40	ca. 2.0 (dark brown black)	A few identifiable spore fragments recovered. <i>Cicatricosisporites australiensis</i> and <i>Foraminisporis wonthaggiensis</i> represented.
SWC 6	467	SHALE; dark grey carbonaceous	-	-	ex Poor	-	Low	-	-	20	25	-	10	30	15	20	50	2.0-3.0 (black)	Small residue of mostly indeterminate spore/pollen fragments.
SWC 4	490	SANDSTONE; fine grained, light grey	-	-	ex Poor	-	Very Low	-	5	15	10	-	20	30	20	20	30	2.0-3.0 (black)	A few generically identifiable spore/pollen fragments.
SWC 30	658.6	SHALE; med. grey friable	-	-	ex Poor	-	Low	-	-	15	30	-	30	20	15	20	30	2.0-3.0 (black)	Small residue of spore/pollen fragments that are mostly unidentifiable at generic level.
SWC 28	924.6	SHALE; med. grey friable	-	-	ex Poor	-	High	-	10	20	+	-	10	30	30	10	20	2.0-3.0 (black)	Spore-pollen fragments rare almost totally degraded; none identifiable.
SWC 18	1422.2	SHALE; friable med. grey	-	-	-	-	Low	-	-	15	+	-	10	35	40	5	10	-	Rare ± totally degraded spore/pollen fragments
SWC 8	1959	SILTSTONE; med grey	-	-	-	-	Mod.	-	-	20	+	-	+	40	40	5	10	-	As Above