

**BASIC DATA**  
**Palynological analysis of sidewall core and cuttings samples**  
**between 2280 and 3288 metres in Normanby-1,**  
**offshore Otway Basin.**

by

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## BASIC DATA

### Palynological analysis of sidewall core and cuttings samples between 2280 and 3288 metres in Normanby-1, offshore Otway Basin Otway Basin.

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#### Introduction

This new palynological study of the offshore Normanby-1 well was undertaken for Essential Petroleum Resources Limited at the request of Gordon Waklin-King with the objective of revising the age dating and stratigraphic assignment of the section encountered over the bottom 1000 metres penetrated in the well. In terms of the stratigraphic terminology used in the Well Completion Report by Templeton & Peattie (1986), the suite of samples investigated cover the bottom 120 metres of the Paaratte Formation (from 2280 to 2400m), the 684 metre thick Belfast Mudstone (from 2400 to 3084m) and the 224 metres thick Waarre Formation (from 3084 to 3308mTD).

The initial palynological study of the well was performed by Morgan (1986) based on 67 sidewall cores and 36 cuttings samples between 710 and 3300 metres. Unfortunately, that original set of palynological slides were never relinquished by the operator and after several unsuccessful attempts to locate the slides for re-examination it has regretfully been concluded that they have been lost. The same fate was assumed to have applied to the sidewall cores upon which Morgan's original palynological study had been largely based. Recently however, what remains of the sidewall cores were located at the Werribee Core Library after being lost or misplaced for the better part of two decades. As a consequence of this fortuitous discovery, and because there has been considerable uncertainty concerning how the bottom 1000 metres penetrated in the well should be interpreted in terms of the revised stratigraphic terminology for the Sherbrook Group advocated by Partridge (2001), it was decided to re-sample and re-process the remaining available sidewall cores for a new palynological study.

#### Materials and Methods

For this latest study 30 samples, comprising 28 sidewall cores and 2 cuttings samples have been analysed from the Normanby-1 between 2280 and 3288m. The well was drilled by BP Petroleum Development Ltd to a TD of 3308m, and is located in permit VIC/P42, offshore Otway Basin. The samples were collected by the author from the Werribee Core Library on Friday 5<sup>th</sup> July and sent to the Santos Ltd palynological laboratory for processing. Palynological slides from the most critical samples were returned between 14<sup>th</sup> July and 2<sup>nd</sup> August and the initial results of the microscope analysis was provided in three Provisional Reports issued between 18<sup>th</sup> July and 3<sup>rd</sup> August 2005.

Basic sample data comprising the lithologies and weights of the samples processed are given on Table 1, while the basic assemblage data comprising the visual organic residues yields, the concentration and preservation of the palynomorphs observed on the slides, and the number of species of spore-pollen (SP) and microplankton (MP) recorded from individual samples are provided in Table 2. In summary, an average of 8 grams of each sample was processed to give mainly moderate residue yields containing low to high concentration of palynomorphs, whose preservation is mostly poor to fair. Spore-pollen diversity was moderate to high averaging 27+ species per sample while microplankton diversity ranged from low to moderate with a maximum diversity of 17+ species per sample.

## Description of Range Chart

The distribution of the palynomorphs identified in the samples are presented on the accompanying StrataBugs™ range chart, which displays the palynomorph species recorded in the individual samples proportional to their depth in the well and in terms of their absolute abundance (= number of specimens counted). The palynomorphs are also split between different categories. The terrestrial spore and pollen are divided between spores, gymnosperm pollen and angiosperm pollen, which are plotted in separate panels. This is followed by a panel displaying the total percentage (relative to combined microplankton and spore-pollen count) of marine and non-marine microplankton, and a separate category for the colonial algae *Amosopollis cruciformis*. The absolute abundance of the microplankton species in the counts are next displayed in the panel labelled Microplankton. All Other Palynomorphs are plotted in the far right panel. Because the majority of samples are sidewall cores the species are plotted within the panels according to their deepest or oldest occurrences or alternatively in alphabetical order.

The following codes or abbreviations apply to the individual species occurrences and abundances on the range chart:

Numbers	=	Absolute abundance or number of specimens counted
+	=	Species outside of count
C	=	Caved species
R	=	Reworked species
?	=	Questionable identification of species.

Author citations for the recorded spore-pollen species can be sourced from papers by Dettmann (1963), Dettmann & Playford (1968), Helby *et al.* (1987) and Stover & Partridge (1973), while the author citations for the microplankton species can be sourced from the indexes for dinocysts and other organic-walled microplankton prepared by Fensome *et al.* (1990) and Williams *et al.* (1998). Manuscript species names and combinations are indicated by “sp. nov.” or “comb. nov.” on the range chart, and “ms” after their binomials names in the text and tables.

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**Table 1: Basic sample data for Normanby-1, Otway Basin.**

Sample Type	Depth metres	Brief Lithological Description	Approx. Weight †
SWC 15	2280.03	Light grey siltstone	6g
SWC 14	2302.18	Light-medium grey mudstone	7g
SWC 12	2329.01	Medium grey mudstone	7g
SWC 9	2417.51	Reddish-brown siltstone	11g
SWC 8	2476.01	Medium-dark grey mudstone	11g
SWC 7	2524.38	Medium-dark grey mudstone	10g
SWC 6	2561.43	Medium grey mudstone	6g
SWC 5	2580.82	Medium-dark grey mudstone	10g
SWC 89	2756	Dark grey mudstone	6g
SWC 88	2773	Dark grey shale	11g
SWC 86	2833	Light grey siltstone	6g
SWC 85	2847	Dark grey mudstone	12g
SWC 81	2935	Dark grey shale	4g
SWC 79	2975	Medium grey mudstone	10g
SWC 78	2989.5	Medium grey mudstone	13g
SWC 75	3035	Medium grey mudstone	14g
SWC 74	3047	Medium grey mudstone	10g
SWC 72	3075.5	Medium grey mudstone	8g
SWC 71	3084	Brown siltstone	9g
SWC 70	3087	Medium grey silty-shale	3g
Cuttings	3145-50	Mudstone 70%, sand 30%	10g
SWC 58	3157	Medium grey siltstone	5g
Cuttings	3165-70	Mudstone 60%, sand 40%	10g
SWC 55	3176.5	Medium grey shale	2g
SWC 54	3181	Medium grey shale	12g
SWC 47	3220	Medium grey siltstone	4g
SWC 43	3246.5	Medium grey shale	5g
SWC 39	3266	Medium grey shale	8g
SWC 37	3272.5	Light grey shale	4g
SWC 32	3288	Medium grey siltstone	8g

Average: 8 grams

† Sample weight only approximate as it is based on simple spring scale.

**Table 2: Basic assemblage data for Normanby-1, Otway Basin.**

Sample Type	Depth metres	Visual Yield	Palynomorph Concentration	Preservation	No. SP Species	No. MP Species
SWC 15	2280.03	Moderate	Moderate	Poor	31+ (1+)	12+
SWC 14	2302.18	Moderate	Moderate	Poor-fair	35+ (4+)	5+
SWC 12	2329.01	Moderate	Moderate	Poor-fair	36+ (3+)	4+
SWC 9	2417.51	Low	Low	Very poor	19+ (2+)	NR
SWC 8	2476.01	High	Moderate	Poor	35+ (1+)	13+
SWC 7	2524.38	Moderate	Moderate	Poor	29+ (1+)	8+
SWC 6	2561.43	Moderate	Moderate	Poor-fair	32+ (2+)	14+
SWC 5	2580.82	Moderate	High	Very poor	32+	13+
SWC 89	2756	High	Moderate	Poor-fair	27+ (2+)	17+
SWC 88	2773	High	Moderate	Poor-fair	32+ (2+)	14+ (1+)
SWC 86	2833	Low	Low	Poor-fair	20+	2+
SWC 85	2847	Low	Low	Poor	25+	9+
SWC 81	2935	Low	Very low	Poor	28+	11+
SWC 79	2975	Moderate	Moderate	Poor-fair	29+	11+
SWC 78	2989.5	Moderate	Moderate	Poor-fair	29+ (1+)	15+
SWC 75	3035	Moderate	Moderate	Poor-fair	24+ (2+)	10+
SWC 74	3047	Moderate	Low	Poor	20+	14+
SWC 72	3075.5	High	Moderate	Poor-good	26+	15+
SWC 71	3084	Moderate	Very low	Poor	4+	1+
SWC 70	3087	Low	Moderate	Poor	28+	11+
Cuttings	3145-50	Moderate	Moderate	Poor	22+	13+
SWC 58	3157	Moderate	High	Poor	41+ (2+)	7+
Cuttings	3165-70	Moderate	Moderate	Poor	21+ (2+)	12+
SWC 55	3176.5	Moderate	Moderate	Poor	34+ (6+)	8+
SWC 54	3181	Moderate	Moderate	Poor	24+ (1+)	8+
SWC 47	3220	High	Moderate-high	Poor	34+ (6+)	1+ (7+)
SWC 43	3246.5	High	High	Poor-fair	30+ (6+)	1+
SWC 39	3266	High	High	Poor-fair	26+ (3+)	3+
SWC 37	3272.5	Moderate	Low	Poor	19+ (3+)	NR
SWC 32	3288	High	High	Poor-fair	38+ (3+)	6+

Averages: 27+ (1+) 8+ (&lt;1)

Numbers in brackets in two right-hand columns refer to species which are caved or contaminants.

NR = Not Recorded.

