

BASIC DATA
Reconnaissance palynological analysis of
interval 3008 to 4440m in Breaksea Reef-1,
offshore Otway Basin, South Australia.

by

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Introduction

This new palynological study of the offshore Breaksea Reef-1 well was undertaken for Essential Petroleum Resources Limited with the objective of improving the age dating and correlation of the bottom ~1500 metres penetrated in the well by the analysis of new samples and the examination of new palynological slides prepared from old palynological residues.

The Breaksea Reef-1 well was drilled between 22 December 1983 and 28 May 1984 by Ultramar Australia Inc to a TD of 4468m, in the South Australian portion of the Otway Basin. In the Well Completion Report by Ultramar Australia (1984) the well is interpreted to have drilled through a 1360 metre thick interval of the Belfast Mudstone between 3002 and 4362m, before penetrating a 142 metre thick “sandy” interval assigned to a composite Flaxman/Waarre Formation between 4326 and 4468mTD. Age dating and confirmation of the stratigraphic assignment of the latter interval has proved problematic as even though the section was penetrated in all three Sidetrack holes no electric logs were obtained deeper than 4289m, while the deepest sidewall core recovered and analysed was at 4178.2m some 148 metres shallower than the picked top of the Waarre Formation.

Relevant previous palynological work from the bottom half of Breaksea Reef-1 consists solely of the original study by Morgan (1984) who analysed 40 sidewall cores and 8 cuttings samples over the interval of interest. The palynological slides from this study were submitted to the operator, but subsequently were never relinquished and are now missing or lost and therefore not available for restudy. Fortunately however, some of the original palynological residues have been located and from these residues new palynological slides been prepared by the Palynology Facility at Santos Ltd. From this new set of slides 18 sidewall cores and one cuttings sample between 3008 and 4178.2m have been examined for this study. As there were no slides or residues available from the bottom 290 metres penetrated in the well an additional seven (7) new cuttings samples were collected and processed between 4026 and 4440m. In total 26 samples are examined for this study.

Because this new study of Breaksea Reef-1 has been commissioned at a specified budget the approach taken has been to examine and report on the samples at a qualitative reconnaissance level. The assemblages have only been counted to a level necessary to determine the abundances of marine microplankton and the common colonial algae *Amosopollis cruciformis* relative to the abundance of terrestrial spore-pollen in the assemblages.

The new cuttings samples were collected from the PIRSA Core Store in Adelaide by Dr Sally Phillips and the laboratory processing undertaken by Core Laboratories Pty Ltd in Perth. Basic assemblage data consisting of the visual organic residues yields, the concentration and preservation of the palynomorphs observed on the slides, and the number of species of spore-pollen and microplankton recorded from the new slides analysed are provided in Table 1, while the basic species distribution data is provided on the accompanying StrataBugs™ range chart. This chart displays the presence of the palynomorph species recorded in the samples according to the different categories of palynomorphs recorded. 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 showing the total count of marine microplankton and the colonial algae *Amosopollis cruciformis* displayed as a graph of percentages relative to the combined spore-pollen and

microplankton count. The next three panels record the occurrence of the individual species of Microplankton, various Other palynomorphs, and Reworked (RW) palynomorphs. The species are plotted within the panels according to their deepest or oldest occurrences, or in alphabetical order. The following codes or abbreviations apply to the individual species occurrences and abundances on the range chart:

Numbers	=	Abundance expressed as percentage
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 palynological sample and assemblage data for Breaksea Reef-1.

Depth metres	Sample Type	Visual Yield	Palynomorph Concentration	Palynomorph Preservation	No. SP Species	No. MP Species
3008.0	SWC 5	Low	Low	Poor-Fair	34	10
3145.0	Cuttings	Moderate	Moderate	Poor-Fair	38	3
3216.1	SWC 50	Moderate	Moderate	Fair	34	2
3310.0	SWC 47	Moderate	Moderate	Poor-Fair	42	6
3543.1	SWC 39	Moderate	Low	Poor-Fair	30	4
3589.0	SWC 37	Moderate	Moderate	Poor	35	9
3613.1	SWC 36	Moderate	High	Poor-Fair	41	6
3630.0	SWC 35	Moderate	Low	Poor-Fair	29	9
3641.1	SWC 32	Low	Very Low	Very Poor	25	2
3677.0	SWC 26	Low	Low	Poor	16	1
3775.0	SWC 21	Moderate	Moderate	Poor	31	9
3829.0	†SWC 19	Moderate	Moderate	Poor	29	6
3868.0	†SWC 17	Low	Low	Very Poor	28	4
3886.0	†SWC 16	Low	Low	Poor	31	3
3987.0	†SWC 11	Moderate	Moderate	Poor	32	4
4026.0	NEW Cuttings	Moderate	Moderate	Very Poor	25	7
4027.1	SWC 9	Moderate	Moderate	Poor	32	7
4070.5	SWC 7	Moderate	Low	Poor	25	7
4173.0	SWC 3	Moderate	Low	Poor	19	6
4178.2	SWC 2	Low	Low	Poor	24	9
4179.0	NEW Cuttings	Moderate	Low	Poor	20	6
4311.0	NEW Cuttings	Moderate	Very Low	Very Poor	7	NR
4323.0	NEW Cuttings	Moderate	Very Low	Very Poor	8	2
4395.0	NEW Cuttings	Low	Very Low	Very Poor	5	1
4413.0	NEW Cuttings	Moderate	Very Low	Very Poor	9	2
4440.0	NEW Cuttings	High	Low	Very Poor	24	13

†SWC = NOT recorded in SWC descriptions

Well Name : Breaksea Reef-1

Operator : Ultramar Spudded : 22 December 1983
 Well Code : BREAKSEAREEF-1 Completed : 28 May 1984
 Lat/Long : 38° 9' 0.00"S 140°36' 0.00"E
 Interval : 3000m - 4500m BASIC Distribution Chart
 Scale : 1:6000 Sample interval 3308 to 4440m
 Chart date: 28 February 2006 Microscope analysis by Alan D. Partridge

**Biostrata Pty Ltd
 AUSTRALIA**

Breaksea Reef-1

Attachment to Biostrata Report 2006/02B

