

INDONESIAN PETROLEUM ASSOCIATION

Proceedings of the International Symposium on Sequence Stratigraphy in SE Asia, May 1995

PUFFIN FORMATION SEQUENCE STRATIGRAPHY IN THE SOUTHERN TIMOR SEA

D. Ormerod*

D. Whittam*

M. Fittall*

ABSTRACT

The Vulcan Graben is a Jurassic rift system located in the Timor Sea, offshore northwest Australia. It trends northeast-southwest and is some 220 km long and 60 km wide, being bound to the northwest and southeast by the Permo-Triassic high blocks of the Ashmore Platform and Londonderry High respectively, to the northeast by the Sahul Syncline and to the southwest by the Browse Basin.

The Upper Cretaceous Puffin Formation sandstones are a primary target within the passive margin sequence of the Vulcan Graben and Browse Basin. The Puffin Formation petroleum system is well defined in the southern Timor Sea with several known accumulations to date. A eustatic sea-level fall in the Late Campanian (75 Ma) resulted in major canyon incision across the shelf and the development of several lowstand submarine fan packages across the central and southwest part of AC/P2 (i.e. Puffin/Skua/Swan).

The Puffin Formation is made up of two major sequences assigned by the C12 and C13 foram zones (Apthorpe, 1979), each being associated with a major coarse-grained clastic submarine fan system. The sequence boundaries have been picked using age

determinations based on a combination of composite calcareous nannofossils (KCCM) zones (Rexillius) and foram zonations, integrated with log, depositional facies analysis and seismic interpretations.

Each of the fan systems has a different orientation of feeder system with the older C12 systems more S-N and the younger C13 more E-W. This reflects the level of tectonic control on the deposition of the earlier C12 which is confined mainly to the Vulcan Graben axis. Feeder systems for both C12 and C13 systems are mappable seismically and provide the mechanism for bypass of the shelf for the coarse clastics. The two fan systems are separated by a major condensed section which is incised by the C13 fan axis. The overall Puffin Formation sequences are overlain by a major flooding surface at the end of the Cretaceous which provides potential seal to migrating hydrocarbons.

The level of detail that is available particularly within the 3D seismic volumes has allowed mapping of individual facies within the overall fan. The interpretation of channels, lobes and levee/overbank facies has helped determine reservoir risk and trap definition. Mapping of the Puffin Formation sequences has provided a clearer understanding of the reservoir distribution in the southern Timor Sea area and has resulted in an upgrading of the prospectivity of this play.

* BHP Petroleum, Melbourne - Australia