

Bayu-Undan – from Stratigraphy to Dynamic Simulation

Krieger, Frank W., and David R. Mabee, (1) ConocoPhillips Australia Pty Ltd, West Perth WA, Australia

The Bayu-Undan Field lies in the Timor Sea to the NW of Australia and is a world scale retrograde gas-condensate accumulation. The hydrocarbon bearing reservoir section comprises the Bajocian to mid Callovian Plover Fm deposited in a tidally influenced, fluviially dominated delta system. Overlying this is the mid-Callovian to Oxfordian Elang Fm which is made up of five progradational pulses within an overall transgressive system culminating in the drowning of the delta system.

Critical to understanding both GIIP and the dynamic behaviour of the field is the distribution and connectivity of the reservoir and the interplay between erosion and structural position. Fieldwide correlation in the Elang Fm is relatively straightforward with large shale breaks between progradational pulses when good quality sands were deposited. The Plover Fm is more problematic due to the absence of detailed biostratigraphic markers in a relatively barren fluvial section.

The desire to produce a realistic, flow unit based simulation model for the Plover, where >70% of recoverable resources lie, has resulted in the use of detailed ichnofacies and chemostratigraphy to help constrain a carefully considered sequence stratigraphic approach. The new stratigraphic framework for the Plover Fm coupled with an accurate erosional model for the Elang Fm allows robust characterization of GIIP. However, more importantly, it allows an assessment of the impact on ultimate recoverable resources, of reinjection of lean gas, and of water production; especially when considered in conjunction with rigorous fault modelling.