

A Sequence Stratigraphic Approach to Eumeralla Formation Seal Evaluation in the Otway Basin, South Australia and Victoria

Lotte Svendsen
Australian School of Petroleum
(formerly National Centre for Petroleum Geology & Geophysics)
University of Adelaide
Adelaide, South Australia
lsvendsen@ncpgg.adelaide.edu.au

The Early Cretaceous Eumeralla Formation has a poor record as a regional top seal in the Australian Otway Basin, largely due to sand interbeds providing preferential hydrocarbon migration pathways. A distal, lacustrine unit has been identified near the base of the formation. This interval has better sealing properties than the coal swamp and fluvial deposits characteristic of the overlying Eumeralla Formation intervals. The coal measures are recognisable on seismic and logs, and were used to define the transition between the intervals.

The gamma ray log is unable to identify the commonly occurring sandstone interbeds due to the sand's high volcanogenic content. A distinct log-response (sonic, density, neutron, resistivity and gamma ray log) occurs at numerous intervals in many of the Otway Basin wells. XRD-analyses suggest that this is associated with zones cemented by calcite. Bands of carbonate concretions occur in southwest Victoria outcrops of the Eumeralla Formation. An integration of the log data with seismic data, palynology, conventional core, and sidewall core and cuttings descriptions has enabled the seal geometry of the Eumeralla Formation to be determined. Mercury injection capillary pressure analyses suggest that the basal Eumeralla Formation has a higher seal capacity centrally in the Early Cretaceous troughs than on the flanks of the troughs.

A sequence stratigraphic framework helps explain the variations seen within the Eumeralla Formation and the underlying reservoir sandstones. The sandstones have excellent reservoir properties, and new plays could potentially open in the Otway Basin if the Eumeralla Formation proves to be a viable seal.