

# **The Geology and Petroleum Potential of the Bremer Sub-Basin – a Potential Deepwater Petroleum Province on Australia’s Southwest Margin**

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The Bremer Sub-basin is a Middle Jurassic – Late Cretaceous half-graben complex that forms the western-most depocentre of the Bight Basin. It is located across the continental slope off the southern coast of Western Australia in water depths of 100 – 4000 m. The sub-basin is a rank frontier area for petroleum exploration with no wells previously drilled. Through integrating dredge sample data with regional seismic interpretations, it has been possible to develop a structural and stratigraphic framework for the sub-basin, and assess the petroleum exploration potential using conventional basin analysis techniques.

Structurally, the sub-basin comprises a series of en-echelon SW-NE trending fault-bounded half graben, and a significant intra-basin fault system that developed during rifting between Australia and Antarctica. Of particular importance to petroleum exploration are three major cycles of lacustrine and fluvial sedimentation in Late Jurassic – Early Cretaceous strata, which provide key petroleum system elements of both organic-rich source rocks to generate hydrocarbons, and sandstones overlain by thick mudstones that could potentially reservoir hydrocarbons. Exploration opportunities and play types vary across the sub-basin. A large potential source kitchen area occurs in the central part of the sub-basin, where sediments are 4 to 9.5 km thick. Here, the main exploration play is fault block traps in water depths of 1000 – >2500 m. Smaller depocentres with up to 5 km of sediment fill occur in the western and eastern parts of the basin and host large anticlinal structures in water depths of 500 – 800 m.