



The geology of the Brecknock, Calliance and Torosa gas fields, Browse Basin, Western Australia

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SUMMARY

The Brecknock, Calliance and Torosa (BCT) gas fields are located offshore approximately 425 km north of Broome, Western Australia. The fields have undergone an extensive appraisal drilling and seismic acquisition campaign between 2005-2012, with the main reservoirs intersected between 3600-4400 mTVDss in water depths of less than 700 mMSL. The integration of the associated subsurface studies has underpinned reservoir modelling for field development planning.

The gas is primarily hosted in a sequence of fluvial and coastal/deltaic siliciclastic sediments from the Early to Middle Jurassic Plover Formation. These sediments onlap and thin onto eroded Triassic structural highs along the outboard side of the Caswell Sub-basin, and are overlain by more strongly marine Late Jurassic and Early Cretaceous sequences. A thick interval of Late Cretaceous to Tertiary carbonates blankets the region.

Extensive seismic and well-based studies were undertaken to better understand the spatial distribution and properties of the reservoirs and seals, which vary considerably between the fields. Some key controls include pre- and syn-Jurassic tectonics and possibly by syn and post-depositional volcanism/igneous activity. More than 1000 metres of conventional coring in the appraisal drilling campaign have underpinned these interpretations along with many of the other studies described here. High resolution palynology was critical for defining the chronostratigraphic framework and relating the sequences to key regional sequence stratigraphic surfaces that can be recognised between the basins of the North West Shelf. Sedimentology and petrology studies, and the evaluation of potential modern and ancient analogues provided insights into the spatial arrangement of depositional systems and the present controls on reservoir quality. Findings from this regional to reservoir scale work have been integrated with the analysis of geochemical and pressure data to better understand reservoir connectivity, all of which are integral for supporting the path to development.

Key words: Plover Formation, Brecknock, Calliance, Torosa, stratigraphy, petrology, geochemistry, hydrodynamics