

# **The Angel Formation: A Classic Example of a Sheet Turbidite Reservoir from the North West Shelf, Australia**

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Deepwater sheet sandstones, deposited from decelerating turbidity currents, are considered to be excellent hydrocarbon reservoir systems due to their geometry, lateral continuity, sorting and internal high net-to-gross (NTG) ratios. The Late Jurassic Angel Formation of the Dampier Sub-Basin on the NW Shelf of Australia contains classic examples of sheet turbidite sandstone bodies, which are reservoirs for the oil and gas fields in this area.

Sandstone sheets in the Angel Formation can be subdivided into two distinct groups based upon their internal architecture: (1) layered sheets and, (2) amalgamated sheets. Sheets exhibit a decrease in thickness and NTG and are transitional from an amalgamated to a layered form in a down dip direction. Examination of wireline logs and cores between the Wanaea Field and Madeleine-1 well, reveals layered sheets within a low NTG (i.e approx 0.25) setting that contains interbedded heterolithic/clay and sandstone beds, which occasionally showing upper classic Bouma turbidite sequence. Amalgamated sheets are recognised in the Angel and Cossack fields, which are characterized by higher NTG values (i.e approx 0.9) and contain stacked event beds commonly form flat-based sandbodies with fewer interbedded heterolithic/clay layers.

This change in sandbody architectures has a significant control on reservoir heterogeneity. Additional heterogeneity is created by stratigraphic pinch-out and sandstone injection features, as well as localised dolomite cementation, which appears to be at least partially structurally controlled. The Angel Formation is also a regional aquifer and field development strategies are thus impacted by the various reservoir heterogeneities encountered in different fan settings. Heterolithic/clays are also very laterally extensive and field scale pressure barriers.