

New Stratigraphic Drilling in the Southern Amadeus Basin and a Review of Hydrocarbon Potential

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The Proterozoic-Palaeozoic Amadeus Basin in central Australia is a very large (170,000 km²) producing basin with only 33 exploration wells drilled, yielding 2 commercial and 5 non-commercial discoveries. A basement cored central ridge divides the basin into northern and southern components. In the north, an Ordovician petroleum system is responsible for commercial oil and gas production, but this is inactive to the south where exploration is sparse; only six petroleum exploration wells and 1250 km of seismic occur in an area of 90,000 km². Four Neoproterozoic petroleum systems transgress the Central Ridge and are attractive targets in the southern Amadeus Basin; these are largely gas prone with potential for Helium deposits.

On the southwestern basin margin intense compression in the Musgrave Block (Petermann Ranges Orogeny) formed thick (up to 4000 m), northward prograding alluvial sheets of Late Neoproterozoic / Early Cambrian age. Basinward, stratigraphic drilling intersected Cryogenic sequences which are currently in the gas window, suggesting the basin has been unroofed and drill targets could occur at shallow depths. Extensive structuring/thrusting and salt halotectonics, variably influenced by the Petermann and Alice Springs Orogenies, provide a plethora of structural traps and related sub-salt plays.

Excellent lead-in aeromagnetics (400 m spacing) has identified numerous undrilled antiformal structures in the southern Amadeus Basin, some of which have TCF gas-inplace potential, however reservoir quality will be largely controlled by fracture porosity. These target structures are highly prospective for gas but should be constrained by 1-2 km seismic grids with subsequent 3-D seismic, to facilitate major increments in gas reserves. Pipeline facilities occur 100-200 km from existing leads and burgeoning resource projects will provide future gas markets.