

Late Devonian and Earliest Carboniferous Shallow Water Carbonates and Associated Basinal Shales of the Southeastern Bonaparte Basin – Petroleum Potential

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Klemme and Ulmishek (1991) estimated that 8% of the world's original petroleum reserves was generated from Late Devonian-Tournaisian black shale facies source rocks, primarily deposited on platforms and, to a lesser extent, in intracratonic sags. 80% of the reserve is oil. Late Devonian shaly sources are known in Australia from the Canning Basin, and possibly the Carnarvon Basin. In the Southeastern Bonaparte marine shales of this age have been loosely described as the Bonaparte Formation in wells, but locally other terminology has been used. Palaeogeographic reconstructions of the Late Devonian indicate the Bonaparte Basin lay in the arid belt about 10° S of the palaeoequator, and suggest that carbonate-rich sedimentation was likely.

During the Late Frasnian the northern part of the onshore basin contained intertidal to marine environments associated with reefs. Interbedded with the carbonates are shaly facies, such as the Kamilili Formation, and unassigned strata intersected by petroleum wells.

Of interest to the petroleum exploration of the area is the transgressive/regressive shales of the Kamilili Formation. From isolated outcrop and stratigraphic relationships, mostly from mineral exploration bore holes, the Kamilili Formation is estimated to attain about 750 m in the basinal areas off the mapped reef edge.

Of added exploration interest is the occurrence of earliest Carboniferous carbonate platforms fringing eroded Devonian topography. Two wells have produced hydrocarbons from this facies. Similar facies may be present in the offshore southeastern Bonaparte Basin west of the Turtle High.