7. PERMO-CARBONIFEROUS MILLIGANS-KURIYIPPI/MILLIGANS (!) PETROLEUM SYSTEM (Southern Petrel Sub-basin)

The Carboniferous Milligans-Kuriyippi/Milligans (!) petroleum system is located in the Southern Petrel Sub-basin of the Bonaparte Basin.

The Petrel Sub-basin is an asymmetric northwest-trending rift of Late Devonian-Carboniferous age, containing up to 15 km of Palaeozoic and Mesozoic sediments. In the Southern Petrel Sub-basin the most significant source rock is the oil and gas prone Middle Paleozoic Milligans Formation. Modelled expulsion from the formations reached its peak in the Early Permian and is responsible for the bulk of exploration activity in the area, peaking in the Early Permian. Minor expulsion continued through the Permian and Early-Middle Triassic.

The primary reservoirs in the region are the Milligans and Kuriyippi formations. The Temsura Formation and Point Sound Sandstones also have some reservoir potential. These reservoirs are eroded or truncated at the top by the Treachery Shale regional seal. The traps include faulted and flanking anticlines, horsts, stratigraphic onlap and downlap, bounded by barrier fans, carbonate mounds and associated plays.

The petroleum system has well established hydrocarbon potential with 11 discoveries: Barnett, Turtle (offshore), Bonaparte, Garimala, Kulshill, Ningbing, Pelican Island, Spirit Hill, Variga, Waggon Creek and Vienta (onshore). Recent work by Gorter et al., 2004 has indicated that the Early Carboniferous Langfield Formation of the Bonaparte Group is the more likely source for hydrocarbons in this region. This is based on a re-assessment of the stratigraphic ages of samples in well NBF-1002.

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