

Planform Morphology, Sedimentology and Stratal Architecture of the Modern Kalaweerina Terminal Splay Complex, Lake Eyre, Central Australia
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Numerous significant hydrocarbons provinces have been interpreted as dryland systems, yet many potential dryland reservoirs remain poorly understood. Terminal splay complexes (TSCs) form around the margins of Lake Eyre, central Australia, when a drylands ephemeral fluvial system terminates sub-aerially onto a horizontally unconstrained playa surface. TSCs represent a potential drylands sink for the deposition of reservoir quality siliciclastic sands. At present, there is no established facies model for TSCs. The Kalaweerina TSC is 80km² and is located at the mouth of the Kalaweerina Creek, along the northeastern margin of Lake Eyre. The Kalaweerina Creek and Warburton River fluvial system drains a catchment 361,000km². Satellite image analysis was used to characterise the planform morphology of the Kalaweerina TSC and surrounds. A map of depositional sub-environments and a database of geometries were generated in order to investigate processes and identify spatial relationships. The sedimentology and stratal architecture of the Kalaweerina TSC was described using stratigraphic logs recorded from pits and trenches. A synthetic stratigraphic log or 'type section' and a correlation panel were generated for each depositional sub-environment in order to investigate reservoir connectivity and identify architectural elements, through integration with the planform morphology. Laboratory analysis, including grain size analysis, sequential loss on ignition and QEMSCAN[®] analysis, of a representative suite of surficial sediment samples enabled a more detailed investigation of the sedimentology of the Kalaweerina TSC. Of particular interest was the nature of the muds and mud-rich facies, which represent potential seals and intra-formational baffles. Developing an understanding of the nature of the finer-grained facies is fundamental to constraining reservoir connectivity. In addition, the muds and mud-rich facies proved important in distinguishing the different depositional sub-environments. The results have been compared with similar investigations of three other TSCs in order to better understand the processes and deposits.