

SEDIMENTOLOGY AND DIAGENESIS OF
POTENTIAL PERMIAN RESERVOIR SANDSTONES,
NORTH PERTH BASIN, WESTERN AUSTRALIA.

BY

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ABSTRACT

Permian sediments constitute the beginning of an extensive basin-wide depositional period, and the sediment base of the whole North Perth Basin. Phanerozoic basin-forming tectonic extension has played a role in the distribution of these sediments and post-depositional burial has led to their diagenesis.

The High Cliff Sandstone was deposited at the top of a regressive sequence as the Tethyan Ocean retreated. The well sorted shoreline sands gave way to the fluvial deposition of the Irwin River Coal Measures as waters drained from the Northampton and Yilgarn Blocks. The quartz arenites observed in the Mountain Bridge area have undergone two pronounced stages of diagenesis and a later stage of extensive fracturing. The first stage of diagenesis is characterised by quartz overgrowth cementation and the beginning of feldspar alteration and subsequent illite production. This stage of diagenesis is associated with fluid movement through the rock due to burial. The second stage of diagenesis is characterised by deeper burial effects such as the formation of saddle dolomite and further alteration of feldspars and rock fragments to illite. Three distinct stages of fracturing have been identified as being after the main stages of cementation. The diagenesis of the other Permian units at Mountain Bridge is relatively similar to that of the High Cliff Sandstone given their respective depths of burial.

The suggestion that apparent fault transfer zones in the basin fill are controlled by deep-seated basement fractures is questioned by a series

of experiments which show the "transfer zones" to be a natural consequence of simple extension.

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