A New Approach to Reservoir Prediction in Mature Basins: An Example from the Central Fields, Cooper Basin, Southwest Queensland, Australia

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The fluvial deposits of the Permian Patchawarra Formation are a major gas reservoir in the Cooper Basin. The formation has produced over 200 Bcf of gas in the Central Fields, with the majority of this gas reservoired in anticlines and three-way fault-dependent traps. Intersection of good quality reservoirs within these closures has been highly variable. Poor results can be attributed to neglecting the importance of under-standing the depositional architecture of the Patchawarra; amending this is the key approach to future success.

Throughout the Permian a number of mildly compressional tectonic events modified existing structural elements resulting in differences in accommodation style basin-wide. This paper concludes how deciphering such sequential structural movements, and how they shaped the pattern of deposition through time, can be used to devise a predictive tool for reservoir distribution.

The magnitude and timing of fault movement was interpreted from seismic data and included syndepositional faults and faults with minor displacement that are often omit-ted from the geophysicists' map, but their relevance to the geological model can be significant. Correlation of log signatures with timing of structural movement enabled an analysis of fault control on depositional patterns. A series of palaeogeographic maps were subsequently produced for each sequence stratigraphic interval and employed to create a reservoir risk and uncertainty map for the Patchawarra Formation. From this, the resource distribution for each of the drilling opportunities in the region was recon-sidered and resulted in a revised ranking. The outcome of recent drilling in the study area supports this approach.