

Will Stratigraphic Traps Rejuvenate an Aging Cooper Basin in Central Australia?

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Gas was first discovered in the Cooper Basin in 1963. Over the next 30 years, drilling structural traps mapped on 2-D seismic, the rate and size of gas discoveries defined a classic creaming curve. Initial discoveries were large and frequent with 5 Tcf booked in the first 14 years (Youth). Discovery rate and size then fell with only 1.5 Tcf booked during the following 6 years (Adolescence), then a mere 0.5 Tcf in 5 years (Early Maturity) before discoveries virtually dried up and the basin profile flattened for the 5 years to end 1992 (Late Maturity).

Two events then changed the impetus of gas exploration within the basin. Firstly, PASA secured all uncontracted gas reserves in southwest Queensland, thereby stimulating an aggressive new exploration phase in the border region and, secondly, 3-D seismic was introduced. Although 3-Ds improved coverage and quality were ideally suited to define stratigraphic traps, it was initially applied to oil exploration while gas exploration remained focussed on the hitherto successful structural play. Thus, despite the aggressive exploration effort, the basin's gas discovery gradient achieved only a moderate upturn. Only 1 Tcf was booked over 8 years before the gradient once again flattened to where it has remained for the last 4 years.

Recent applications of AVO, seismic inversion and pattern recognition on 3-D seismic are being applied, with limited success, to bring stratigraphic traps to light, but a predictive tool has yet to emerge. Principal challenges are the depth and thin nature of the reservoir sands coupled with a lack of contrast in seismic velocity/impedance between reservoir and seal facies plus the number and proximity of intervening coal beds within the swampy fluvial deposits that constitute the Cooper Basin succession.