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Mitigating the Risk of Uneconomic Wells in an Emerging Unconventional Play: Rigorous Technical Analysis and Disciplined Prospect Selection, Devonian Tight Gas, Midland Basin, West Texas

The Devonian play in the Midland Basin, West Texas has yielded over 2 Tcf and 95 MMBO of cumulative production. Production surged from 100 to 200 MMCF/D in the 1990's due to development of bypassed tight gas reserves, and play extension beyond the limits of existing fields through lateral and vertical wells. Production has been established deep into the synclinal lows of the Midland basin, leading to interpretations of basin-centered gas or unconventional trapping in the cherty limestone reservoir rocks.

Initial rates from lateral wells in excess of 10 MMCF/D led to a burst of horizontal drilling activity, both in-field development and play extension down the flanks of structures. The novelty of the unconventional horizontal play imparted considerable risk to economic outcomes due to the lack of production longevity and hence the lack of statistics to differentiate populations of economic and uneconomic wells. With a huge potential fairway to explore, assuring delivery of economic value required effective risk assessment and disciplined investment selection.

Available production histories and well tests were used to identify key productive and wet wells. Petrophysical analysis of modern log suites was combined with conventional and special core analyses to characterize reservoir rocks and correlate rock and log properties. Water saturation versus height profiles, porosity-saturation products (Buckles numbers), and rock-typing of reservoir rocks were used to discriminate wet zones from gas-productive zones. Integrating these data with conventional play and prospect mapping provided a means of focusing activity to areas offering the highest risk-weighted economic value.