

Multi-Discipline, Multi-Scale Data Integration Unlocks the Horizontal Buda/Georgetown Tight Oil Play

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ABSTRACT

Four unsuccessful vertical wells were drilled using “closeology” in an effort to offset an existing Buda-Glen Rose development in East Texas that was initially thought to be a resource play. To move forward from such a start, in an area with sparse modern well control, all available measurements were leveraged to unlock potential, including the shooting of a new seismic survey specifically designed for ongoing plays. Ultimately, only the integration of several disciplines (production analysis, petrophysical reevaluation, hydraulic fracture modeling, reservoir simulation, and seismic mapping) were able to create a story of potential success moving forward.

Once an optimized target stratigraphic interval was selected from production analysis, the integration of petrophysical re-evaluation with reservoir engineering suggested both unexpected subtle trapping and the surprisingly strong role played by natural fractures. Natural fractures were expected to play a role, so azimuthal analysis of the seismic data were already under way and contributed to the final learnings. By using seismic representations of the production drivers, it was revealed that fracture density, structure, and rock mechanics are the three most significant production drivers for the selected horizontal Buda/Georgetown play. These learnings were used to compile an inventory of prospects. Hydraulic fracture stimulation modeling revealed that dramatic variations from prior practices could reduce interference between wells and prevent connecting to wet reservoir, particularly in the lower Georgetown.

Despite a challenging start to the exploration program (with at least three uneconomic wells), the final analysis held that 40% of the acreage remained prospective.