

Producing Intervals of the Wolfberry Trend in Eastern Reagan County, Texas

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The Wolfberry trend has been producing Oil and Natural Gas for 60 years from Permian age shale, sand, limestone and dolomite. Both conventional and unconventional production is from the Wolfcamp, Dean and Spraberry formations thus the name "Wolfberry," which has become the common industry name for this interval.

Located in the Midland Basin, the Wolfberry low-permeability oil play spreads across Martin, Dawson, Borden, Ector, Midland, Upton, Glasscock and Reagan counties. Reservoirs are slope and basin systems, including debris flows, grain flows and salinity current turbidites composed of carbonate detritus in the Wolfcamp and dolomitic and siliceous sand and silt in the Spraberry and Dean. In Eastern Reagan County the Wolfberry interval is 2800 feet thick and is found at depths of 5,500 to 8,500 feet. These fine grained mixed lithology low permeability rocks exhibit heterogeneity both vertically and horizontally at a micro scale, but homogeneity at the macro scale.

The process of planning an exploitation completion strategy across 55,000 acres led to the need to understand past practices of other operators. Historical completion strategies average one to two stage fracs that target a wide variety of zones throughout the Wolfberry interval. Pay identification of extremely thin bedded mixed lithologies using logging methods is problematic. Producing intervals as reported by commercial data bases are unreliable.

In order to identify commercially productive intervals and to optimize completions Broad Oak Energy embarked on a project to subdivide the Wolfberry into intervals approximately equivalent in thickness to a frac stimulation interval, or 200-250 ft. using regionally correlative sequence boundary shale markers that could be reliably picked on the predominant neutron-density log control. The zonation was applied to 3,034 area Spraberry Trend wells over 900 sq. miles. This resulted in a framework comprised of 15 separate intervals. Analysis of completions within this framework shows the most commonly completed intervals are the uppermost Spraberry sand, the lower Spraberry sand, the Dean sand, and fractured organic shale in the upper Wolfcamp.

This work has resulted in a modern 8 stage frac design that stimulates all proven productive Wolfberry zones and is providing an average IP of 75-80 BOEPD, a lower variance per-well EUR distribution, and fewer sub commercial wells compared to historical surrounding area wells.