Horizontal Well Target Identification in the Wolfcamp Oil Resource Play in the Midland Basin

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This study contains a workflow that attempts to high grade horizontal targets within the sub-intervals of the greater Wolfcamp Formation of the Midland Basin of West Texas. The ability to high-grade targets within the stratigraphic column as well as aerially across the basin early in the life of a play is critical for selecting future well locations and defining an optimum development plan for this vast stacked-pay resource play.

The key geologic and petrophysical properties used to high-grade targets are: reservoir pore pressure, thermal maturity, kerogen volume, bulk volume hydrocarbon, and clay volume. Kerogen volume is total organic carbon (usually expressed in weight percent) mathematically transformed to volume percent. Regional maps of these key properties were created from a data set consisting of a whole-core calibrated petrophysical model applied across approximately 1,300 vertical wells, thermal maturity information from hundreds of wells, and pore pressure information from thousands of operated wells. These key properties were also interpolated between wells in cross-section view in order to select horizontal targets within the sub-intervals of the greater Wolfcamp Formation. Based on fracture stimulation modeling, a 300 foot window around each horizontal target was assumed to be the accessible frac interval. Maps were then created for the average (the) key properties across each 300 foot target window. An example of this workflow will be presented on the Wolfcamp B interval, which industry has targeted most aggressively to date. The production responses at different geologic and petrophysical properties observed in the Wolfcamp B will be utilized to further high-grade the other Wolfcamp sub-intervals.

This workflow has been applied to the greater Wolfcamp Formation of the Midland Basin in West Texas. The resulting horizontal targets and accessible target window property maps are currently being utilized to identify the most prospective horizontal Wolfcamp well locations and to define an optimum development plan to efficiently harvest this vast stacked-pay resource play.