

# **A Petrophysical Model Based on Core Calibration for the Wolfcamp Formation, Midland Basin**

**Ray Wydrinski, Valery Shchelokov and  
Quoc Nguyen**

*Pioneer Natural Resources USA, Inc.*

Pioneer Natural Resources has been very active drilling the Wolfcamp Formation in the Midland Basin. This hybrid formation can be over 2500 feet in thickness and has several oil-mature organic rich layers interbedded with carbonates and silty layers. The basin has a long history of production and there are many wells with open-hole Triple Combo logging suites.

To understand the production sweet spots in the basin and the landing intervals for the placement of the horizontal wells, a petrophysical model was developed from the limited log data available. The foundation of this model was based on industry Petrophysical equations with improvements as core data was integrated into the analysis. The input to this model is a Triple Combo to determine Lithology, Porosity, Water Saturation, TOC, and if a Dipole Sonic is available then geomechanical attributes are calculated. Based on the core data a correlation has been determined to calculate TOC, Water Saturation and an estimate of Permeability. This paper will go through the methodology of the Petrophysical Analysis and show how the core was used to improve the equations.