

Optimizing Geologic, Drilling, and Completion Variables: A Multivariate Analysis of the Wolfcamp B, Midland Basin, Texas

By: Patrick Rutty, Enverus Technical Sales Director

The Wolfcamp B is the most heavily drilled unconventional target in the Midland Basin, with over three thousand active horizontal wells, mostly located in the central and southern portions of the basin. A map of 12-month cumulative oil production from the zone shows higher production in the northern and central portions of the basin but provides little insight into why that might be the case. Further complicating matters is the fact that Wolfcamp B wells were drilled with wide variations in drilling and completion parameters such as lateral length, proppant per foot, and well spacing. Which of these factors are most important? Is there a “silver bullet”?

Multivariate non-linear analysis allows for a deeper understanding and a quantification of the complicated interrelationships of the geologic, drilling, and completion variables from these wells, revealing that the factors most influencing 12-month cumulative oil in the Wolfcamp B are 1) depth, 2) lateral length, 3) completion fluid volume, and 4) thickness. Proppant loading and well spacing play secondary roles in short-term production. The predictive model resulting from this analysis can be used locally for optimal design of proposed wells, providing estimates of their production and thus financial returns.