

## **Quantifying Landing Zone & Subsurface Properties**

**Jonathan Fry**

Asset Development Geologist

Chevron Mid-Continent Business Unit

In unconventional development, delivering predictable well results at the lowest possible cost is vital to an economic development program. In the subsurface realm this translates to minimizing spend on data collection without compromising the ability of earth scientists and engineers to identify and quantify key drivers of well performance. Well performance, measured as EUR or cumulative production through time, is a function of numerous, independent variables. Pre-drill predictions of production using machine learning or any type of multi-variate regression, are dependent on the completeness and accuracy of the input variables. Many of the variables, including well design and completion parameters, are known, but subsurface variables are frequently unknown and the costs to measure them are typically prohibitively expensive. In such an environment, sparse data, and data proxies for unknown variables, can be used to generate a data set of subsurface properties at the individual well or stimulated rock volume (SRV) scale which can be used in the absence of direct measurements. This work presents methods for using MWD data, geosteering data, sparse log data, seismic data, and regional geologic data to quantify subsurface features including mineralogy, rock properties, stratigraphic position, and interference at the individual well and SRV scale for use in predictive models.