

Well Placement in Shale Plays – How Significant Is It?

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Abstract

Unconventional shale gas reservoirs are low porosity, low matrix permeability, large in a regional extent, and in most areas, they have been interpreted to be highly heterogeneous in nature. From best practices it has been established that horizontal completions yield better returns compared to those of vertical or directional wells. To delineate a typical shale reservoir, a vertical or pilot offset well is used to confirm the reservoir thickness, evaluate the rock properties and identify the target zone to position the horizontal production hole. The horizontal well is drilled and stimulated via hydraulic fracturing to maximize reservoir exposure and enhance inflow production performance.

Shale reservoirs contain higher concentrations of organic matter that result in higher gamma ray readings, providing the first indication of presence of organic rich shale. These high gamma ray events are common markers that can be used to correlate subsurface structures across the field. This feature is further exploited in field development, whereby the majority of the horizontal production wells are drilled and steered using an averaged gamma ray measurement and well site cutting analysis. However, oftentimes, varying production results between near-by horizontal wells are observed, and are usually directed towards shale heterogeneity. To understand their reservoir, operators invest in post-drill Wire Line or LWD logging suites, microseismic programs and/or elaborate hydraulic fracturing completion designs.

However, could this problem present itself in a simpler form? This presentation investigates the significance of accurate well placement to provide some possible answers.