

An Improved Pulsed-Neutron Driven Optimized Stage and Perforation Placement Design using Projected Vertical Well Petrophysics for Calibration

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Abstract

Evidence mounts that engineered completions optimize cost/BOE by placing stages and perforations in rock with similar petrophysical and mechanical properties. To do this, operators need an acquisition and interpretation method that is safe, low-cost, and accurate. However, many current methods for acquiring those petrophysical and mechanical properties along the lateral have been cost prohibitive, difficult to interpret, or prone to bias and human error. This leads many to avoid acquiring lateral petrophysical data, continuing in suboptimal geometric completions design, not fully understanding individual well performance, and ultimately higher Cost/BOE.

This presentation provides a case history example showing an optimal method for stage and perforation cluster placement. This method involves a low-risk cased-hole pulsed-neutron log calibrated to projected geologic parameters from the vertical well and then run through an automated staging and perforation placement software. This solution has been proven to reduce cost while maximizing BOE in a difficult area of an unconventional resource. Unlike alternatives such as open-hole wireline data acquisition combined with completion-by-committee design, this solution provides a rigorous repeatable petrophysical method that yields unbiased and consistently derived results at a reduced cost and risk.