Field Trial of Unique Enhanced Conductivity Fracturing Technique Shows Initial Productivity Increase for Middle East Unconventional Well

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ABSTRACT

Objectives/Scope: Results from a field trial of a new enhanced conductivity fracturing technique are discussed and evaluated. This technique was used in three fracture stages of 20 total in an unconventional well in the Middle East. To assess the effectiveness of the technique, oil, gas and water chemical tracers were used to quantify relative volumes of oil, gas and water being produced from each stage. Methods, Procedures, Process: Enhanced Conductivity (EC) fracturing was designed to create larger, more conductive flowpaths to maximize hydrocarbon recovery from hydraulically stimulated wells. Through a unique combination of fluid dynamics modelling, ultra-lightweight proppant technology and innovative pumping techniques the technique improves shot- and long-term production. Additionally, this fracturing technique can be customized to a formation's unique requirements and requires lower volumes of proppant/water. A form of "pillar fracturing," the EC technique uses proppant pulsing and hindered settling techniques to create proppant "pillars" capable of holding a fracture open allowing maximum hydrocarbon flow. A decision was taken to run a field trial using three stages of EC fracturing on a 20-stage well. Oil, gas and water chemical tracers were all used based on anticipation of a gas condensate producing well. Production flow testing was conducted and monitored. Production performance was compared on a relative basis using analyses of tracer results. Results, Observations, Conclusions: Operationally, the hydraulic fracturing of the well was executed flawlessly; and the three EC stages were implemented as planned. At the completion of flow testing, total producing rates compared to the nearest, comparable offset well, were 79% higher for condensate and 27% higher for gas. It should be noted than neither of the two wells had totally "cleaned up." Information obtained from the analysis of the tracers run in the well were somewhat inconclusive. To completely determine effectiveness, it is recommended that the EC fracturing technique be further tested on a complete well. Novel/Additive Information: In contrast to traditional pillar/channel fracturing, EC fracturing design and technique leverages advanced fluid dynamic modelling to match the design to the formation's specific rock properties. Since current industry pillar fracturing solutions are not matched to formation properties, they often yield inconsistent results.