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Forecasting Productivity of a Hydraulically Fractured Well using a Detailed Mapping of its Proppant Conductivity Distribution

Wadood El-Rabaa and Nazia Siddiqui

Blade Energy Partners, Frisco, TX, USA

Abstract

The primary purpose of fracture conductivity left after a fracture treatment is to increase the contact area between reservoir rock matrix and wellbore, and hence enhancing the productivity of a hydraulically fractured well. Historically, most developed productivity enhancement relationship of stimulated wells and still used extensively, McGuire & Soukora, Cinco-ley, Prats, the fracture conductivity (FC) appears as a single value. However, most fracture geometry stimulation models show that the fracture conductivity inside the fracture is not even, and its distribution relies greatly on many factors. Hence, the final conductivity distribution is rarely evenly distributed across the entire fracture surface. In hydraulic fracture simulators, the conductivity distribution depends greatly on the proppant settling models which are governed by the proppant type, leak-off, frac fluids type, as well as pumping rate of frac fluid applied in the treatment. In addition, in the unconventional reservoirs, we believe over-displacement practices can also affect greatly the fracture conductivity near the wellbore and would have an adverse effect on well productivity.