Review of Flowback Practices in Unconventional Shale Wells: A Saudi Arabia Field Case Study

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ABSTRACT

Abstract Flowback operational practices in unconventional fractured shale wells are usually undermined and they need to be carefully examined to understand their impact in short- and long-term well deliverability. Some of the potential reasons for losing fracture conductivity and connectivity to the reservoir are the operational practices such as uncontrolled milling operations of frac plugs, aggressive ramp-up of the choke size leading to excessive drawdown, shut-ins, cyclic stress loading, etc. To evaluate the impact of these potential issues on well production; first, a comprehensive literature review was undertaken to compile best practices in unconventional production reservoirs. Secondly, a thorough analysis of high resolution production data from an unconventional field in Saudi Arabia has been carried out, assessing well productivity using specialized plots in wells with aggressive choke openings and cycling, and wells where a choke management strategy was established. A correlation of changes in well productivity trends and operational practices was achieved, helping to define recommended practices to manage hydraulic fracture cleanup and early well testing to ensure durable frac conductivity and sustainable production, and to maximize frac fluid recovery that may jeopardize well productivity; understanding that there are other factors beyond a well's performance that influence an operator's decision on flowback procedures to follow.