Real-Time Monitoring and Evaluation of Actual vs. Simulated Torque and Drag in Deviated Long Lateral Openhole Gas Wells

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ABSTRACT

This paper describes the implementation of a system for evaluating actual torque and drag when running multistage fracturing (MSF) completion equipment in long openhole (OH) lateral sections. The process uses an important evaluation tool to compare with results from simulated scenarios, which helps with real-time decision making when actual parameters differ from those simulated. Torque and drag were simulated using different friction coefficients. Actual torque and drag data collected while performing a previous reaming trip were combined with caliper logs to evaluate the running-in-hole of the OH MSF completion equipment. Real-time monitoring of the actual run and continuous evaluation provided important information that helped avoid sticking and the high circulating pressure scenarios that led to loose OH laterals in similar previous wells. Using the evaluation tool significantly increased the success rate of running the OH MSF completion equipment in gas wells. The torque and drag simulations enabled ease of operation when running the OH MSF completion equipment to the target depth. Various techniques are presented that were used in the torque and drag simulations to accurately predict real-time parameters and properly anticipate downhole variables while running in hole. Logging data from a caliper run performed on the OH formation were uploaded into the torque and drag software, which enabled a more realistic simulation. This helped to pass through expected tight spots and washouts in the OH. Additionally, the previous reaming trip provided valuable data concerning friction factor coefficients; a torque and drag simulation of the reaming trip was performed, and the differences in parameters while running in hole were monitored. The friction factors were adjusted to match the actual parameters of the reaming trip, and those same friction factors were then used to simulate the OH MSF completion. This technique provided a more suitable reference in terms of expected parameters. Running OH MSF completion equipment in a long, lateral OH poses significant risks of sticking or decreased circulating capability, particularly in wells drilled in the minimum stress direction. Adding the evaluation process to the existing real-time monitoring system allows predicting adverse scenarios before they become irreversible; thus, the modeling increases the likelihood of successful system deployment, which in turn allows for a quicker turnaround to production.