

Successful Completion of Deep HPHT Horizontal Well to Achieve Sustained Production from Asphaltene Prone Marrat Carbonate Reservoir in Greater Burgan Field of Kuwait

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ABSTRACT

In Great Burgan field of Kuwait Oil Company, Middle Marrat Carbonates reservoir of Lower Jurassic age consists of 430' gross and 190' of net pay thickness of high energy shoal Grainstone to Packstone. This reservoir is restricted to a relatively small part of the Greater Burgan field having depletion drive as well as weak edge water drive. It is producing oil with very low water cut. Asphaltene deposition on the tubing of these wells is a big challenge to continue production from these wells. This problem persists in all the wells drilled in Marrat formation which are either vertical or slightly deviated. Repeated asphaltene cleaning with toluene and diesel is required to maintain production from these wells leading to additional cost as well production loss. On some of the occasions, coil tubing has got stuck while performing cleaning jobs thus requiring expensive workover operations. A detailed analysis of this problem was carried out to understand how to address flow assurance challenges and mitigate the issue of asphaltene deposition. The formation of Asphaltene is associated with AOP (Asphaltene Onset Pressure). Once the FBHP falls below AOP, Asphaltene starts to deposit in the wellbore and on the walls of tubing. Falling reservoir pressure is another big concern to continue production from this reservoir. Methods like changing choke size and cleaning of borehole have been adopted but with short term success. To address the challenge of asphaltene deposition, an innovative well design was conceptualized. Accordingly, a horizontal well was planned and successfully drilled to minimize the drawdown and maintain the flowing bottom hole pressure above AOP and thus minimize the tendency of asphaltene deposition. Exhaustive well planning was carried out. This paper analyzes the outcome of the process adopted to drill the well and the successful results obtained by its implementation. For the last eight years the well is continuously producing oil @ 6500bopd with no water cut and minimum intervention for asphaltene cleaning. The success of the well and technique adopted has been cross checked by PLT and FBHP measurements on regular basis.