

Innovative Retrofit Straddle Deep Gas-Lift Technology for Activating and Enhancing Oil Production

Author

Himanshu Tyagi, Weatherford

Abstract:

Objective/ Scope:

This paper outlines an approach to activate and enhance production from a deep, moderate bottomhole-pressure (BHP) reservoir in a mature offshore oilfield by using deep gas-lift technology. Enhanced software-based analysis, design and optimization has proved to be effective in enhancing the production rate from an existing gas-lifted well.

Methods, Procedures, Process:

A conventional gas-lift installation cannot reach any deeper than the production packer and, in most cases, a significant depth above the lowest perforation remains sheltered. A distinctive retrofit straddle-deep gas-lift system (DGLS) was designed for a major operator to enable lift gas to reach the lowest perforations. It provides an efficient means of lowering the flowing bottomhole pressure beyond the capability of a standard gas-lift system.

The DGLS incorporates tubing directly above the packer and straddles the lowest gas-lift mandrel, using thru-tubing packers, with a two-piece straddle/crossover assembly and a dip tube extending to the desired depth. This system directs lift gas from the casing-tubing annulus via a special crossover assembly to the desired depth, with the resultant production returning via the dip tube annulus through the crossover to the tubing above. This assembly facilitates the deepest point of gas injection without applying additional backpressure on the formation.

Results, Observations, Conclusions:

A pilot project on four wells demonstrated a significant improvement in well performance with an incremental gain of 3,000 bpd. This system was installed in a well with 5.0 in. tubing to provide lift gas 2,800 ft. below the production packer and resulted in 700 bpd augmentation of production from the well.

Novel/ Additive Information:

This paper considers multiple scenarios that help revive and elevate a potential hydrocarbon source and recommends suitable actions that allow production engineers to analyze performance of an oil well. With the increased complexity of mature fields, each next step to improve recovery comes with increased cost. Therefore, novel horizons of affordable technology will play a pivotal role in maximizing economic recovery and meet rising demand in the current business environment.