

First Digital Intelligent Artificial Lift Production Optimization Technology in UAE Dual-String Gas Lift Well – Completion and Installation Considerations

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Abstract

Objectives/Scope: This paper details the implementation plan of the first Digital Intelligent Artificial Lift (DIAL) gas lift production optimization technology in a dual string well in the UAE, with a specific focus on completion and installation considerations.

Optimizing gas lift systems with existing technology is typically time consuming, costly and risky. Frequent well interventions are required with associated lost and/or deferred production. Traditionally it was not possible to make on-demand in-well adjustments to gas lift injection depth and rate to address these challenges. Compounding this, it was not possible to easily make data-driven decisions about these adjustments to assure continuously maximized and stable production. These challenges are further amplified with dual completion strings: fluctuating casing pressure; unpredictable temperatures due to the proximity of the two strings; and inability to individually control the injection rates to each string. String dedicated to the formation with lower productivity and reservoir pressure tends to "rob" gas from other string. Operating philosophy in such cases end up producing from one string. Production optimization in such cases requires frequent intervention with attendant costs and risks thus presents an opportunity to re- imagine gas lift well design.

Methods, Procedures, Process: ADNOC in collaboration with Silverwell developed a Digital Intelligent Artificial Lift (DIAL) system, which consists of multiple port mandrels to be placed at GLV depths. These mandrels are connected to the surface operating system with a single electrical cable. The

ports can be selectively opened or closed by sending an electric signal from the surface unit. In addition, pressure and temperature sensors are also placed which help record these parameters in real time. Such a system enables the choice of depth, injection rate, loading and unloading sequence controlled from the surface. Real time optimization is possible as pressure/temperature data helps draw accurate gradient curves. This system makes gas lift optimization possible in dual gas lift wells.

Results, Observations, Conclusions: It has been estimated that this technology delivers a production increase approaching 20% for single completion wells, and exceeding 40% for dual-string gas lifted wells.

Recognizing this opportunity, a business case and implementation plan were developed to pilot a dual-string digitally controlled gas lift optimization system.

Novel/Additive Information: This paper will describe, the screening phase, business case preparation, risk assessment and validation process, leading to this 1st worldwide implementation of a fully optimized dual completion gas lifted well. Implementation plan of novel digital gas lift production optimization technology in an onshore dual completion well. The completely original approach increases safety, efficiency, operability and surveillance. The paper reintroduces work presented in paper SPE-196146-MS at the SPE Annual Technical Conference and Exhibition in Calgary, with updates on the candidate well selected and further information given on the completion details and installation preparations.

