Downhole Pressure and Temperature Survey Analysis for Intermittent Gas Lift Wells: A Case Study in Assam Arakan Basin

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Abstract:

Gas lift is the major artificial lift method for the wells of brownfields in the Assam Arakan Basin. It is the best suited method for maintaining and extending the current production rate of the fields. In this gas lift optimization endeavor, we have selected Hapjan field, one of the brownfields of the Assam Arakan Basin. This study comprises problem troubleshooting and optimization of 20 intermittent gas lift wells.

In the Hapjan field, intermittent gas lift wells operate with surface intermitters, as well as choke control intermittent lift in a closed rotative gas lift system. During the course of this project, all surface and subsurface diagnostic tools suitable for intermittent gas lift well optimization are utilized with special emphasis on pressure and temperature surveys. The tools and methodologies used are as follows:

a) Surface recordings of tubing and casing pressures.

b) Acoustic well sounding devices.

c) Determination of optimal gas-lift gas injection rate.

d) Gas lift surveillance software.

e) Downhole pressure and temperature surveys.

Downhole pressure and temperature surveys allow pinpointing of many malfunctions and provide a complete evaluation of how the well performs. A 10% increase in production was obtained by implementing the survey results in 20 wells in the Hapjan gas lift field.

This paper presents an exceptionally detailed procedure for performing and analyzing a downhole pressure and temperature survey in intermittent gas lift wells. In this type of subsurface survey, tandem electronic memory gauges (EMG) are run in the well under flowing conditions while the well is being tested. In addition, static measurements are conducted where, once the EMG is run to depth, it remains there until the bottom hole pressure approaches the static value. When dynamic and static downhole surveys are correctly performed and analyzed, the following engineering considerations about gas lift wells can be gathered:

a) Point of operation.

b) Multi-point injection.

c) Operating valve performance.

d) Optimum cycle time.

e) Productivity index.

f) True fluid gradient in the production tubing.

g) Dynamic fallback.

h) Static Fluid Level.

i) Static reservoir pressure and other reservoir properties.

The paper emphasizes the results of the surveys and the detailed adjustments to the wells operating mode based on well performance analysis.

A great potential for low investment and rapidly increasing production and development of the reserve lies in the optimization of gas lift wells. As a result of this project, we have gathered valuable engineering experience that shows gas lift well optimization can substantially increase production in brownfields in the Assam Arakan Basin and other exploration and production (E&P) companies throughout the world.