Conference:

ALRDC – Gas lift 2021

Title: Real time production optimization in conjunction with virtual flowmeter

Author(s): Bob Okhuijsen – Siemens Energy

Abstract:

Objectives/Scope

Digitalization solutions are often implemented and evaluated as stand alone systems. The true value of these type of solutions is however revealed in an integrated ecosystem.

This presentation shows the merits and challenges of one remarkable powerful combination: real time production optimization and a virtual flowmeter.

Methods, Procedures, Process

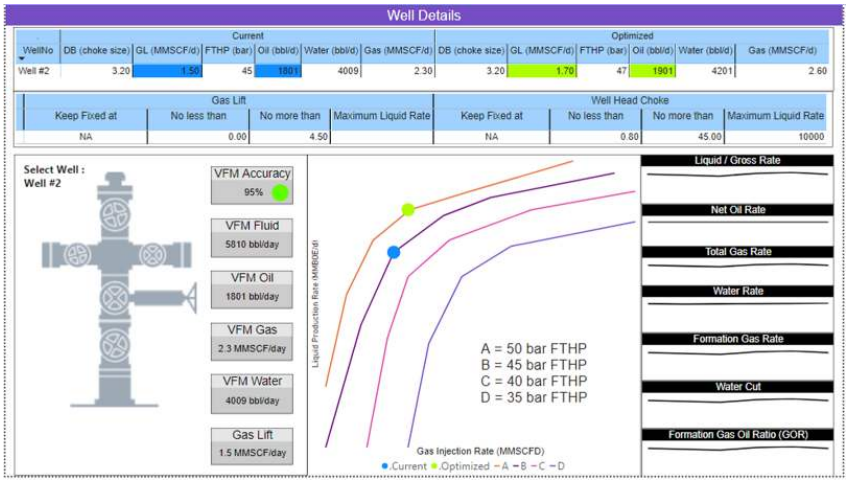
For ongoing, reliable and accurate generation of best operational set points in a simulation-optimization environment there must be "real time" data available. Furthermore the system must create a unified digital twin of an oilfield operation; no separate models to be developed and aggregated for the wells, separator plant, gathering network, gas lift compressors, gas lift system etc.

Wells curves are a essential input for a production optimization solution. That's why optimization accuracy and reliability is jeopardized by any uncertainties in the well curves (IPR/VLP). Transient inflow behavior and the changing fluid composition of wells is challenging here. Especially with outdated well test data.

The developed solution introduces a virtual flow meter (soft sensor) to solve this issue. The flow meter is trained to identify correlations between well test rates and actual measurements. Given sufficient training time (a few days), it can generate production rates for oil-water-gas with ~95% accuracy.

The phased flow insight is processed in the production optimizer. It can generate real time well- and gas lift curves.

The simulation software eagerly uses the real time gas lift curves for optimization of the entire gas lifted oil field.



Results, Observations, Conclusions

The combination of real time production optimization and virtual flowmeter elevates the optimization of an oil field with gas lift to a level never seen before. It enables operators to run complex multi-objective optimizations considering production, economics and sustainable objectives; within the constraints of all the field and facilities involved.

The developed solution included innovations such as real-time data capture and handling and a simulation model that represents the entire oil field operation (including entire gas lift system). It also included a virtual flowmeter giving real time insight in the gas lift curves.
The combination delivers reliable and accurate set points for the gas lift rates at unparalleled level, considering well dynamics, production and gas lift network, gas lift compressor and gas treatment facility.