A Novel Approach For Analyzing Long Term Compression Requirements Using Dynamic Integration In An Integrated Asset Framework For A Giant Gas Condensate Field

Author block: A. Alsaeedi, ADNOC Onshore.

Abstract

Objectives/Scope: A producing field encompasses a variety of challenges for production forecasting and long-term field optimization planning, which are a critical part of its business objectives. It demands a thorough evaluation of various associate components in an integrated fashion, such that a reasonable information and insight flow is achieved in an end-to-end workflow process. This paper elaborates on such an initiative achieved by analyzing a long-term compression strategy development using an end-to-end dynamic reservoir integration workflow.

Methods, Procedures, Process: The intended approach used simulation data in an integrated workflow, where an iterative forecast scenario triggered both surface and sub-surface profiles for one each timestep. The key ingredients included physics-based models for wells, networks, and reservoirs. The scenario was setup by implementing a compressor mechanism to assist fluid transfer to the delivery point. The inflow performances from history matched sub-surface simulation model were utilized in surface modeling system, which in turn fed the control parameters back to the sub-surface model on each run iteration. Various field locations such as manifolds and wellheads were analyzed for declining pressure over time.

Results, Observations, Conclusions: This dynamic approach to analyzing long term production strategy for field compression design generated a set of outputs for each what-if scenario, where an accurate pressure profile was being identified at various surface facility locations. The reliability of the output profile was enhanced due to the integration philosophy where various critical inputs such as business plan, field development strategy, and surface and subsurface constraints. The scenario setup provided a seamless and flexible approach to setting rerouting events at multiple timesteps for the forecast profile estimation as well as for mitigating backpressure issues in the network. This dynamic integration approach provides a continuous interaction workflow and a highly reliable forecast production profile generation catering practical field variables such as constraints, capacities, and deliverable priorities. This resulted in efficiency improvements compared to the traditional approach of long-term production forecast analysis, which is only focused on simulation model outputs for capturing pressure decline at the field level in general. This dynamic approach integrated with an automated work process helped in analyzing the scenario at each facility location and at each time step to simulate the real production scenario.
**Novel/Additive Information:** This dynamic integration approach of end-to-end integration empowered the operators to capitalize not only on their business strategy but also to evaluate the future compression requirement optimization to avoid production deferrals and to enhance the sustainability of the field targets for a long-term production strategy.