SPE 136126 Realising Opportunities Using Integrated Production Modelling in Occidental of Sultanate of Oman

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A field in the North Sultanate of Oman was mainly operated using continuous gas lift in a semi closed system. Distributing the gas lift gas was a major challenge in terms of ensuring optimal production and minimising back pressure effects on other wells in the network. A gas lifted network is considered a non-linear and very dynamic system and ensuring optimum well performance and efficient lifting gas distribution among the network requires consistent modification of the surface facilities well as possible additional installation of new downhole hardware.

The project objectives were three-fold:

1. Surveillance
2. Design and Optimisation
3. Prediction and Forecasting

These objectives were achieved with the following steps:

1. *Reservoir pressure analysis*
    - Static reservoir pressure was achieved from: build-up test, Static Pres measurement, RFT/MDT pressure during drilling, initial ESP static intake pressure
2. *Fluid characterisation (PVTP)*
    - There were two groups of PVT data from the field, saturated and unsaturated.
    - The matched EOS compared very well to the lab data.
3. *Material balance (MBAL)*
    - The entire reservoir was modelled in MBAL and matched well to the measured data.
    - MBAL STOIIP matched with the static model
    - Several drive mechanisms were identified in different areas of the field
4. *Well model (PROSPER)*
    - Initial step to optimising the gas well and saving gas lift gas was to model individual wells in PROSPER and troubleshoot and optimise the artificial lift mechanism in each well.
5. *Surface Network Model (GAP)*
    - GAP used to model the total gas lift surface network and optimise the gas lift distribution.

Conclusion

Implementing the surface network opyimisation recommendations from GAP was very efficient in terms of optimum distribution of lifting gas in the network at a minimum cost and resulted in production increasing by 8% as well as more than 25% of the gas lift gas being saved through its optimal distribution.