

Recent Advances and Practical Applications of Integrated Production Modeling at Jack Asset in Deepwater Gulf of Mexico

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An IPM model (GAP and PROSPER) was built for the Jack Asset in deepwater Gulf of Mexico which has a water depth of 7000ft and a reservoir depth of 27000ft. With these depths to deal with, the drilling, completion and intervention costs are much higher than for shallow water developments so the reservoir deliverability plays a key role for the project economics. This means that an understanding of how the wellbore and surface facility impact on the well performance is crucial.

The objective of the IPM model was to predict the reservoir performance while observing the mechanical design constraints of the surface network. The approach taken to building a reliable model with which reliable forecasting can be carried out was split into 5 steps:

1. Framing
2. Modeling
3. Static quality check
4. Initialisation
5. Dynamic quality check

The model was used to address 3 design options:

1. Artificial lift alternatives (gas lift, sea floor boosting and ESPs)
2. Identifying key artificial lift design parameters using experimental design
3. Supporting the injection facility design

The learnings and conclusion from using IPM and following the above modelling steps were:

- IPM adds value to the project by promoting integration, communication and engagement across the disciplines.
- Following a structured model building approach resulted in greater confidence and accuracy in the production forecasts and minimises the number of iterations required to achieve the optimal design.
- IPM can be used for a variety of deepwater field development decisions such as; artificial lift evaluation, design optimisation and water injection facility design.