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Ensuring Success of Complex Liner Deployment Over Complete Field Development Campaign

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Abstract

This paper describes the innovative engineering workflow which has been used to ensure the safe deployment of deep production liners on long step-out wells of a deep offshore development field.

It highlights the importance of accurate Torque & Drag modelling during planning and operations and provides details on how the use of downhole data assisted in understanding downhole conditions on the first wells, which allowed to optimize the running and setting procedure for the next wells of the field.

For this methodology, a unique Torque & Drag stiff-string model was used to simulate the evolution of side-forces, tension, stretch, torque and twist along the string at every stage of the deployment and setting of the liner. Simulations were performed both during planning phase and operations. Once the well completed, downhole memory data from a logging tool was compared with simulations, which allowed to calibrate the model, better understand downhole conditions, and provide recommendations for the next runs.

Using this methodology, the operator succeeded in deploying the liner to total depth, setting the hanger and packer successfully on all the wells of the field. These operations were performed with only 40 minutes of non-productive time throughout the campaign. The paper shows how correlating downhole data with Torque & Drag simulations highlighted areas of improvement and allowed to optimize the running and setting procedure of the liner. It also led the operator to gain confidence in the feasibility of such critical operations even on the more challenging wells. Detailed engineering and collaboration were key to this success. Such methodology can be applied on every well where weight transfer is a potential issue.

As the industry is heading towards digitalization and automation, this case study is a prime example which demonstrates the added value of combining advanced physics-based simulations with time based downhole data.