

Application of Integrated Production and Reservoir Modeling to Optimize Deepwater Developments

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A deepwater development in West Africa consisting of 5 fields producing to 2 FPSOs was being studied due to the development of 2 more fields in the vicinity of the existing FPSOs. The objective of the study was to commercialise the 2 fields as economically as possible based on two possible options; install a single line production loop or dual line production loop and a new FPSO. The project schedule was accelerated by conducting engineering studies in parallel with the reservoir simulations by building IPM (MBAL, PROSPER and GAP) models. These models allowed material balance, well, flowline, riser and facility performance to be predicted throughout the project life including aspects such as, flow assurance, project planning, evaluation and optimisation.

The IPM models were used to achieve this by their rapid generation of production forecasts consistent with the available field data while ensuring that hydraulic and capacity constraints are honoured.

Numerous development scenarios were modelled in IPM including a detailed flow assurance evaluation the results of which showed that a single line production loop in the system would achieve the same rate as the dual line and new FPSO. So the production rate from the 2 new fields could be achieved with minimal capital investment.

In conclusion; the application of IPM allows rapid prototyping and analysis of a wide range development architectures in parallel with the reservoir simulations so an extensive investigation into the architectures could be achieved while accelerating the project schedule.