Application of Integrated Production and Asset Modeling for Sour Field Development Planning

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This paper describes the structure of modelling; surface components, optimisation strategy, benefits and challenges of IPM deployment to choose an optimum field design. The results from this study highlight the importance and value of field management in addition to the accuracy and speed of the production forecast.

The model which had been created was to create an IPM forecasting workflow and decision making philosophy to develop two complex sour fields made up of three reservoirs. Two of these reservoirs are sour oil with different PVT, H2S concentration and drive mechanisms while the third reservoir is a sour gas condensate reservoir used to complement the associated gas for constant exported gas rate. The main objective for this project was to optimise the development of the system by assessing the best design for the surface network.

The system consists of; 3 reservoirs, 19 oil producing wells, 3 gas producing wells, 12 water injectors, 1 production station, 3 separators (low, medium and high pressure) and several flowlines of different sizes. The scope defined for this system was to design the optimal station capacity to handle the produced fluids, size of gas compressors and to optimise the artificial lift. Integration of various engineering disciplines was achieved by linking MoReS to GAP, allowing the following to be achieved:

- Optimised oil recovery and NPV
- Understanding of individual reservoirs contribution
- Reservoir allocation between different owners
- Optimised gas compression capacity
- Design station capacity
- Phasing of wells to achieve plateau production
- Evaluate the impact of varying the injection rate on reservoir performance
- Optimising water lift

Conclusion:
The integration of GAP with MoReS resulted in effective and reliable tools being used for; decision making, forecasting and economic evaluations which stimulated cross-function and multi-disciplinary discussions.

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Fit for Purpose and cost effective Integrated Operations Implementation for Mature Assets in Maersk Oil North Sea UK Limited

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A common problem in many oil companies is the search for reliable and good quality data which takes time away from the value added activities. An overview of Maersk Oil UK's effectiveness in data handling and business workflows was carried which justified the need to initiate a project to address this. The project was to be approached in phases and was the first of its kind within Maersk Oil UK Ltd. The 4 phases were as follows: Explore, Appraise, Design and Implement.

Key project themes:

- Bring people together with shared information and objectives.
- Stream the right data to the right people at the right time.
- Achieve easy searchable and configurable data.
- Spend more time on analysis and less time on validation.
- Improve automatic data acquisition and reduce manual data entry

Explore	Appraise	Design	Implement
Centrally Managed and Funded		OU Managed and Funded	
Identify where an IO approach is of most values.	Validate requirements with the OU	Design integrated solution based on the agreed recommendations	Implement technical solutions and agreed workflows
Work with the OU (Operating Unit) to indentify main challenges and opportunities	Work with the disciplines/chiefs/OU champions to establish the best work flows	Conduct procurement activity if external products or services where required	Proactively manage risks, budget, schedule and resources
Develop project recommendations	Work with IT to understand the current infrastructure and data	Resources Project delivery team	Manage communities through change. Including coaching of end users and support organisations
Develop high level business case	Explore alternatives for: scope, solutions, resources, cost and timescale	Finalise technology selection	Prepare for operation including hand over to both IT and Business
Define initial project community, sponsors, stakeholders, work team etc.	Recommend project solutions and plan for OU adoption from Phase 3	Refine change and communication plan	Refine and agree responsibility matrix for data, models and tools
Agree governance structure	Refine the specific value proposition for recommended project	Refine budget to +/- 10%	Modify role descriptions and personal objectives if appropriate.
Use lesson learned form previous projects		Establish value metrics for Operate Phase	Measure early success

Having progressed through the first three phases, the implemented solutions were three-fold: Well test validation: Automated well test validation was provided by PETEX in the form of IFM technology allowing automated workflows to be run comparing well tests against previous results and highlighting whether any changes are outside of the predefined range. ModelCatalogue (also from PETEX) is where the IFM models were stored for the production and reservoir engineers in a structured and transparent system.

Well and reservoir monitoring and surveillance: It was important to reduce the time that the engineers spent on finding and validating the available data. The integrated network and nodal analysis models (MBAL, GAP and PROSPER with IFM) were set up in an organised manner with adirect link to well test and real time data (in IFM and ModelCatalogue).

Production Optimisation: Optimisation was achieved through improved daily communication with the use of IFM and real time data. This allowed the integrated models to be connected to real time data systems (IFM) so that optimisation scenarios could be run direct knowledge of availability of the process equipment and wells on a continuous basis. At the project close-out, it was generally accepted that the project had already delivered more than the total investment which had been made.

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