Increasing Confidence in Reservoir Management with Merak Software for Kuwait Oil Company

Integrated approach to economic evaluation, reserve management, and portfolio analysis helps KOC identify optimal reservoir development options, Kuwait

CHALLENGE
Develop a hydrocarbon reserves and production inventory management system for the Kuwait Oil Company (KOC) to prioritize development strategies for its reservoirs, including unconventional reservoirs and residual oil zones.

SOLUTION
- Implement the Peep module in Merak* planning, risk, and reserves software, Merak VOLTS, Merak Capital Planning, and Tableau to deliver an efficient integrated software solution for economic evaluation, reserve management, and portfolio analysis.
- Create a custom application leveraging the Peep module in Merak software and Merak VOLTS for hydrocarbon reserves and profile alignment.

RESULTS
- Provided a structured and integrated economic evaluation and portfolio optimization process.
- Facilitated the visualization of key reservoir parameters and economic metrics.
- Performed portfolio optimization based on technical and commercial criteria.
- Delivered a full understanding of the forecasted reserves, production, and economic potential.
- Identified gaps in KOC’s reserves horizon with detailed development plans.
- Streamlined analysis methodology through automation.

Develop a digital system to prioritize reservoir development
To remain competitive in a volatile and uncertain business environment, Kuwait Oil Company recognized a need to prioritize its future development based on key economic indicators, while maintaining the long-term health of their reserves based on sound reservoir principles.

With some of KOC’s future production slated to come from undocumented unconventional and offshore reservoirs, and residual oil zones that are difficult to exploit with conventional technology, it was determined a full assessment and exploitation strategy would be needed across the company’s entire asset portfolio. To help achieve this goal, KOC selected Schlumberger to develop a reserves and production inventory management system to prioritize their development strategy.

The key objectives of the project were to
- meet KOC’s long-term requirement of increasing their reserves replacement ratio (RRR)
- develop options for increasing the total remaining reserves of KOC using different criteria
- link the company’s stage-gate cycle with approved reserves categorization system for reserves movement
- identify gaps in the company’s reserves horizon by creating detailed development plans
- develop a more structured, efficient methodology for reservoir analysis.

Integrate economic evaluation, reserve management, and portfolio analysis capabilities
Working closely with KOC, Schlumberger implemented an integrated reserves management, economic evaluation, and portfolio analysis methodology, using the Peep module in Merak software, Merak VOLTS, and Merak Capital Planning, as well as Tableau, which was used to enhance reporting and visual analytics. This integrated software solution automated certain processes for KOC— replacing the manual inefficiencies encountered by the KOC team with their previous method, which relied on users accessing multiple Excel spreadsheets from disparate sources. The result was a more structured, efficient process for reservoir analysis that enabled the KOC team to model complex scenarios and quickly evaluate a wide range of different development strategies.

"The integrated approach to economics, reserves, and portfolio management using the Peep module in Merak software, Merak VOLTS, and Merak Capital Planning allowed us to view and analyze various development options for our operations in Kuwait. We can now plan development of our resources more effectively. We couldn’t have done this manually with spreadsheets."

Mohammad Al-Bahar, Reservoir Management Team Leader, Kuwait Oil Company
CASE STUDY: Integrated solution using Merak software improves reservoir management for KOC

Encompassing the scope of the project,
- asset action plans (AAPs) were brought in from Excel for each asset down to the reservoir level utilizing an automated data loader
- automated cost estimation algorithms were built into the Peep module in Merak software to support the long-term nature of the development plans
- AAPs were compared against reserves management forecasts for accuracy and completeness and differences visualized using a custom application, leveraging Merak VOLTS and Merak VOLTS and the Peep module in Merak software
- economics and reserves results for each reservoir were brought into Merak Capital Planning as the basis for optimization
- multiple strategies under different prices were generated that met all business rules; constraints, including minimum production of different streams, minimum reserves replacement ratio, and maximum production in different areas to model gathering system constraints; and strategic production plateau goals
- optimization was done primarily using the linear program: for each strategy, multiple options were generated including sensitivities on project delay, acceleration, and cost overruns.

Optimized reservoir development planning
The Peep module in Merak software and Merak Capital Planning provided a structured and integrated economic evaluation and portfolio optimization process that facilitated the visualization of key reservoir parameters and economic metrics.

Additional development scenarios were created within the custom application, leveraging Merak VOLTS and the Peep module in Merak software, and together with the automated cost estimation algorithms a complete KOC depletion plan, including economic results, was constructed.

Once uncertainty was reduced and reserves estimates were more accurately defined by this project, KOC was able to confidently move forward with their overall reservoir development planning and decision-making at a portfolio level.

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