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LTRO Workflow for Fast Turnaround Field Optimisation Studies and Efficient Development Decisions

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ABSTRACT

Getting the most out of existing assets and optimizing production can be a time consuming and technically complex exercise when using traditional static and dynamic modelling workflows, which hampers fast and cost effective decision making. This paper presents a case study of an alternative approach using LTRO (Locate-the-Remaining-Oil) technique that identifies potential drilling opportunities in a fraction of the time with the same confidence level as the traditional dynamic modelling approach.

The study, conducted on the Marmul GNR Field located in the South of Oman, used an efficient ROCM (remaining oil compliant mapping) workflow within an advanced LTRO software package. The goal of the study was to perform an evaluation of quantified and risked remaining oil for infill drilling. This assessment was then combined with the forecast for the various infill scenarios using predictive analytics approach driven by neural network engine coupled with ROCM. To benchmark the results of the study against 3D reservoir simulation, a dynamic sector model was created and history matched.

From LTRO perspective Marmul GNR has a number of challenges starting from the fact that for the last 25 years the field has been developed by radial horizontal producers. The geological challenges are related to the high degree of reservoir heterogeneity, which, combined with high oil viscosity, leads to water fingering effects.

In this paper we present an overall workflow to determine risked remaining oil distribution, along with the results of ROCM and a full-field forecast for infill development scenarios by using neural network predictive analytics.

The applied innovative workflow provides a breakthrough in reservoir management. This methodology has a potential to become a reliable alternative approach to be used over the conventional reservoir modelling, providing equivalent results in a fraction of the time and thus allowing for efficient decision making in mature oil field redevelopment.