Decoding Sisi Nubi: Advancing Field Development Through Strategic Data Analytics

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Abstract

Sisi Nubi field is an offshore mature gas field, part of Mahakam PSC, East Kalimantan Indonesia. The field currently operated by Pertamina Hulu Mahakam, and since 2007 delivering gas of 1.5 Tcf and condensate of 39 MMstb, from 89 development wells. The field has its geologically heterogeneities as divided into 2 structural faulted anticlines and 3 main zones, affected its development strategy, where existing development mainly focusing in central part of Sisi Nubi. This paper aims to show the journey of field comprehension by the aid of technology in order to develop the field.

As the field have evolved into a mature gas field, through field phasing starting by exploration followed by series of development phases, the subsurface data have been growing through times, in order to maximize the effort to unlock any hydrocarbon potentials in the field. This is reflected by substantial growth through increased data acquisition, advanced analytical techniques, and an enhanced understanding of the field dynamics. Across the way, there are significant challenges encountered, involving a compressed timeline for study maturation, a shortage of skilled personnel, subsurface uncertainties up until economic constraints associated with maintaining production levels in the face of field maturity. Therefore, the need to address these challenges is mandatory, using any imperative approach applying cutting-edge technologies.

In the Sisi Nubi subsurface studies, a meticulous data analytics approach is employed, comprising five key steps that collectively contribute to a comprehensive understanding of the field's dynamics. The first step involves Exploratory Data Analysis, where an in-depth examination of the available data is conducted to identify patterns, anomalies, and potential insights. The second step, Feature Engineering is undertaken to enhance the relevance and quality of the data, ensuring that key features are extracted to better inform subsequent analyses. The third step, Modeling Evaluation and Validation, focuses on the development and assessment of models to accurately represent the subsurface conditions. This step ensures that the chosen models are aligned with the observed data and can be relied upon for further insights. The fourth step is applying a Comprehensive Synthesis involves integrating the findings from the previous stages, offering a holistic perspective on the subsurface characteristics. This synthesis is crucial for capturing the complexity and heterogeneities inherent in the field. Lastly, the fifth step is the Development Proposal, involves formulating strategic plans and recommendations based on the synthesized information.

These data analytics approach aims to maximize the core value of the available data while respecting the field's inherent heterogeneities, ultimately guiding the progression of the subsurface studies. These five interconnected steps ensure a systematic and thorough approach, allowing for the extraction of meaningful insights and the development of informed strategies, and deliver hydrocarbon potentials beyond current existing perimeters, maximize potentials within existing development and rejuvenate a deeper production interval, expressed by the deliverability of three Plan of Developments. Moreover, these approach has played a pivotal role in maintaining the production portfolio and current operations, showcasing its immediate impact on sustaining and enhancing the field's overall productivity.