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EOR Development Screening, Strategy and Technology to Optimize Rokan Block Oil Production

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ABSTRACT

Objective:

Rokan Block, with an oil reserve amount of 1.5 billion barrels and an average production capacity of 207,000 BOPD, is one of the backbones of oil production in Indonesia, and it also becomes the future of the country's oil and gas industry. The Rokan Block has nearly 100 other smaller oil fields besides its giant fields known as Duri and Minas Fields. Unfortunately, even with its immense oil production potential, Rokan Block have been experiencing a decline in production. And for that cause, will be the main objective of this paper to overcome the challenges and optimize the Rokan Block oil production, as ongoing development of EOR and EOR technologies is essential for optimizing these mature fields, presenting a critical challenge for Pertamina even if the company retains talent from Chevron's departure.

Methodology:

We have conducted a literature study of various papers and journals that discussing drilling operations using various EOR techniques and the results. After exploring and understanding the various existing EOR techniques, we compare them by looking at several parameters such as lithology, oil properties, effectiveness, and availability. After comparing these parameters and matching them with conditions in Rokan, we can choose the EOR technique that best suits Rokan.

Result & Discussions:

For Duri Field, we recommend In Situ Combustion EOR. Thermal methods such as steam flooding have been primarily used in the Duri Field since 1985 because of their heavy crude oil in shallow reservoirs. However, these methods have specific parameters to be performed with maximum efficiency. The Cyclic Steam Injection is not feasible due to the Duri Field being too shallow for the EOR method to work, while the Steam Assisted Gravity Drainage can be used but sub-optimally as the Duri Field does not fit in the temperature requirement. Hence the In-Situ Combustion EOR method is chosen because its parameter requirements are perfect for Duri Field properties. In this method, the air is injected into the crude oil reservoir. After ignition, the generated heat by combustion keeps the combustion front moving toward the producer well. Combustion front burns all the fuel in its way. Usually, 5 to 10 percent of the crude oil is used as a fuel, and the rest will be produced in the production well. The heat of

the reaction vaporizes initial water and the oil's light components in front of the combustion front. The steam is condensed while distancing from the hot region.

For Minas Field we chose Water Injection EOR. Enhanced Oil Recovery in the Minas Field is severely hampered by its properties, as it renders many processes unsuitable to be used. Carbon dioxide and hydrocarbon flooding has been deemed unusable as it its negatively affected by the field's low reservoir pressure and high reservoir temperature. Chemical flooding methods using surfactant-polymers and polymers are technically feasible, but economically more expensive compared to water or steam injection EOR methods. We chose water injection EOR because the oil's API degree in the field is more suitable to be injected with water EOR.

Novelty:
A new EOR technique to improve efficiency and production of current wells in the Rokan Block.

Keyword: *Enhanced Oil Recovery, Thermal Injection, Chemical Injection, Gas Injection, Lithology.*