ABSTRAK

PARTITIONING INTERWELL TRACER TEST SCENARIO PADA POLA *INVERTED FOUR-SPOT* MENGGUNAKAN SIMULASI RESERVOIR

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Lapangan AQL merupakan lapangan yang terletak di Cekungan Sumatera Selatan yang telah berproduksi sejak tahun 1955 dan akan memasuki tahapan EOR. Lapangan yang telah berproduksi dalam jangka panjang umumnya menghadapi tantangan berupa turunnya efisiensi penyapuan akibat terbentuknya jalur aliran dominan. Kondisi ini menyebabkan banyak minyak tertinggal dalam reservoir sebagai *residual oil*. *Partitioning Interwell Tracer Test* (PITT) merupakan metode yang mampu mengevaluasi distribusi saturasi minyak residu (ROS) dan konektivitas antar sumur secara tidak invasif. Untuk mengatasi keterbatasan teknis dan biaya uji *tracer* di lapangan, simulasi reservoir menjadi solusi strategis dalam memodelkan skenario *tracer test* sebelum implementasi aktual.

Penelitian ini menggunakan metode simulasi reservoir untuk memodelkan dan menganalisis skenario *Partitioning Interwell Tracer Test* (PITT) pada pola injeksi *Inverted Four-Spot*. Data hasil simulasi digunakan untuk menghitung nilai ROS dengan metode *Mean Residence Time* (MRT), serta menganalisis *interwell connectivity* berdasarkan *cumulative tracer production*, *streamline*, dan *flow allocation*.

Hasil simulasi menunjukkan bahwa Sumur SF-297 memiliki nilai ROS terendah sebesar 0.266 dan konektivitas tertinggi terhadap sumur injeksi, diikuti SF-295 (0.271) dan SF-294 (0.286). Korelasi antara konektivitas antar sumur dan nilai ROS menunjukkan bahwa semakin tinggi konektivitas, semakin rendah nilai ROS. Simulasi PITT terbukti efektif dalam mengevaluasi distribusi minyak tersisa dan hubungan antar sumur, serta dapat dijadikan acuan perencanaan *tracer test* yang efisien di lapangan.

Kata kunci: *interwell* connectivity, *inverted four-spot*, PITT, *residual oil*, simulasi reservoir.

ABSTRACT

PARTITIONING INTERWELL TRACER TEST SCENARIO ON INVERTED FOUR-SPOT PATTERN USING RESERVOIR SIMULATION

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The AQL Field is located in the South Sumatra Basin and has been producing since 1955, currently approaching the Enhanced Oil Recovery (EOR) stage. Oil fields that have been producing for an extended period generally face challenges such as a decline in sweep efficiency due to the formation of preferential flow paths. This condition results in a considerable amount of residual oil remaining in the reservoir. The Partitioning Interwell Tracer Test (PITT) is a method capable of evaluating the distribution of residual oil saturation (ROS) and interwell connectivity in a non-invasive manner. To address the technical and cost limitations of conducting tracer tests in the field, reservoir simulation serves as a strategic solution for modeling tracer test scenarios prior to actual implementation.

This study employs reservoir simulation to model and analyze Partitioning Interwell Tracer Test (PITT) scenarios under an Inverted Four-Spot injection pattern. The simulation results were then used to calculate the Residual Oil Saturation (ROS) using the Mean Residence Time (MRT) method, as well as to analyze interwell connectivity based on cumulative tracer production, streamlines, and flow allocation.

The results show that Well SF-297 had the lowest ROS value at 0.266 and the highest connectivity to the injection well, followed by SF-295 (0.271) and SF-294 (0.286). The correlation between interwell connectivity and ROS indicates that higher connectivity results in lower ROS. The PITT simulation has proven effective in assessing residual oil distribution and well-to-well communication, offering valuable insights for planning efficient field tracer tests.

Keywords: interwell connectivity, inverted four-spot, PITT , reservoir simulation, residual oil