Analisis Teknoekonomi Penerapan Enhanced Oil Recovery Xanthan Gum Biopolymer Flooding Metode Injeksi Kontinu Pada Partially Depleted Reservoir Sandstone = Technoeconomic Analysis for the Implementation of Enhanced Oil Recovery Xanthan Gum Biopolymer Flooding with Continuous Injection Method at Partially Depleted Sandstone Reservoir

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Abstrak

Peningkatan produksi minyak bumi di Indonesia menjadi hal mendesak mengingat target produksi 1 juta barrel perhari pada tahun 2030 di tengah penurunan produksi. Permasalahan tersebut memberikan insentif untuk menelusuri metode EOR non-konvensional, biopolymer flooding. Xanthan Gum merupakan biopolimer dengan ketahanan salting effect yang sangat baik sehingga memberikan potensi digunakan bersama air laut sebagai campuran driving fluid dalam metode injeksi kontinuous. Selain itu, HCPV injeksi meningkatkan performa pemulihan jika flooding berhasil . Maka dari itu, penelitian ini menganalisis pengaruh penggunaan air laut sebagai fluida pendorong dan HCPV injeksi terhadap displacement sweep efficiency, recovery factor, serta harga minyak dan gas untuk IRR 15% mengikuti skema bisnis gross split. Penelitian dengan permodelan reservoir sintetik sandstone heterogen, dilanjutkan dengan permodelan EOR dengan membandingkan berbagai strategi injeksi EOR biopolymer flooding terhadap waterflooding, dan analisis ekonomi cashflow mengikuti skema bisnis gross split. Peningkatan HCPV injeksi dapat meningkatkan recovery factor hingga 22.26% dan displacement sweep efficiency 21.27%. Penggunaaan air laut sebagai campuran fluida pendorong mengurangi recovery factor hingga 0.55% dan displacement sweep efficiency 0.54%. Harga minyak minimum proyek dapat mencapai 45.75$ per barrel dengan cost of EOR sebesar 4.52$ per barrel.

.....Increasing Indonesian oil production is an urgent issue due fulfilling Indonesian production target of one million barrels per day in 2030 amidst production decline. This problem gives an incentive to explore non-conventional EOR method, biopolymer flooding. Xanthan gum biopolymer is resistant toward salting effect which has the potential to be used alongside brine as driving fluid mixture in a continuous injection. Moreover, HCPV injection increases oil field’s recovery rate only if the flooding succeeds. Therefore, this research’s purpose is to analyze the usage of brine as driving fluid and HCPV Injection toward partially depleted sandstone reservoir’s displacement sweep efficiency, recovery factor and oil and gas price in reaching IRR 15% following Indonesian gross split scheme. Research methodology includes modelling of synthetic partially depleted heterogenous sandstone reservoir, continued with EOR modelling comparing different biopolymer flooding injection strategy with waterflooding, and cashflow economic analysis following gross split scheme. The increase of HCPV injection could increase recovery factor up to 22.26% dan displacement sweep efficiency up to 21.27%. The usage of sea water as mixture in driving fluid could decrease recovery factor up to 0.55% and displacement sweep efficiency 0.54%. The minimum project oil price reaches 45.75$ per barrel with the cost of EOR 4.52$ per barrel.