RINGKASAN

PENENTUAN CADANGAN MINYAK SISA UNTUK PERENCANAAN SUMUR *INFILL* PADA LAPISAN "A" LAPANGAN "AWRA" MENGGUNAKAN SIMULASI *RESERVOIR*

Oleh
Aura Alma Nareswari
NIM: 113190134
(Program Studi Sarjana Teknik Perminyakan)

Lapangan "AWRA" merupakan lapangan minyak *onshore* yang terletak di Cekungan Sumatera Tengah dan terletak di kabupaten Rokan Hilir ±130 km ke arah Utara. Reservoir terletak di Formasi Sihapas dengan batuan penyusun berupa batupasir. Lapisan A Lapangan "AWRA", mulai berproduksi sejak April 1972. Hingga akhir produksi pada Juli 2019, terdapat 7 sumur aktif, 12 sumur *shut in*, dan 6 sumur injeksi. *Original oil in place* (OOIP) pada Lapangan "AWRA" sebesar 66 MMSTB. Kumulatif produksi minyak saat akhir produksi di Juli 2019 mencapai 25,51 MMSTB dan *recovery factor s*ebesar 38,66%. Perencanaan pengembangan Lapangan "AWRA" perlu dilakukan karena masih terdapat luasaan area hidrokarbon di Lapisan A yang masih belum terkuras, sehingga produksi kurang optimal. Oleh karenanya, dilakukan studi simulasi reservoir untuk menentukan lokasi serta jumlah sumur pengembangan yang optimum.

Perencanaan pengembangan Lapangan "AWRA" menggunakan simulator. Tahap simulasi diawali dengan persiapan dan pengolahan data, validasi model (inisialisasi, *history matching*, PI *matching),* lalu melakukan prediksi dengan penambahan sumur *infill* dengan mempertimbangkan letak dan jarak antar sumur *infill* berdasarkan peta *oil per unit* (OPU) dan *bubble map*, melakukan analisa dan menentukan jumlah sumur serta skenario optimum yang dapat diterapkan dengan memperhatikan kenaikan *recovery factor*. Dalam penambahan sumur *infill*, *constrain* yang digunakan minimum *bottom hole pressure* (BHP), maksimum *water cut*, dan minimum *surface oil rate* (STO). Prediksi dilakukan dengan membuat 2 skenario. Skenario 1 berupa *basecase* ditambah 10 sumur *infill.* Skenario 2 berupa *basecase* ditambah 5 sumur *infill* optimum yang didapatkan melalui plot kumulatif produksi minyak dengan jumlah sumur.

Skenario optimum yang diterapkan pada Lapisan A Lapangan "AWRA" adalah Skenario 2 dengan 5 sumur *infill* optimum, diperoleh nilai kumulatif produksi minyak sebesar 28,06 MMSTB dan *recovery factor* sebesar 42,53%. Peramalan performa produksi ini dilakukan mulai Juli 2019 sampai *end of production sharing contract*.

Kata kunci: OPU, *bubble map*, *infill*, skenario optimum, *recovery factor*

ABSTRACT

DETERMINATION OF RESIDUAL OIL RESERVES FOR INFILL WELL PLANNING IN LAYER "A" OF THE "AWRA" FIELD USING RESERVOIR SIMULATION

By
Aura Alma Nareswari
NIM: 113190134
(*Petroleum Engineering Undergraduated Program*)

The "AWRA" field is an onshore oil field located in the Central Sumatra Basin and is located in Rokan Hilir district ±130 km to the north. The main reservoir is located in the Sihapas Formation with the constituent rocks being sandstone. Layer A of the "AWRA" Field, started production in April 1972. Until the end of production in July 2019, there were 7 active wells, 12 shut-in wells and 6 injection wells. Original oil in place (OOIP) in the "AWRA" Field is 66 MMSTB. Cumulative oil production at the end of production in July 2019 reached 25.51 MMSTB and the recovery factor was 38.66%. Planning for the development of the "AWRA" Field needs to be carried out because there are still large hydrocarbon areas in Layer A that have not been drained, so production is less than optimal. Therefore, a reservoir simulation study was carried out to determine the optimum location and number of development wells.

"AWRA" Field development planning using a simulator. The simulation stage begins with data preparation and processing, model validation (initialization, history matching, PI matching) to calculate cumulative oil production, then making predictions by adding infill wells by considering the location and distance between infill wells based on the oil per unit map and bubble map, carry out analysis and determine the number of wells and the optimum scenario that can be applied by taking into account the increase in recovery factor. In adding infill wells, the constraints used are minimum bottom hole pressure (BHP), maximum water cut, and minimum surface oil rate (STO). Predictions are made by creating 2 scenarios. Scenario 1 is a base case plus 10 infill wells. Scenario 2 is a base case plus 5 optimum infill wells obtained through a cumulative plot of oil production by number of wells.

Based on the predictions made, the optimum scenario applied to Layer A of the "AWRA" Field is Scenario 2 with 5 optimum infill wells, resulting in a cumulative oil production value of 28.06 MMSTB and a recovery factor of 42.53%. This production performance forecasting is carried out from July 2019 until the end of the production sharing contract.

Keywords: OPU, bubble map, infill, skenario optimum, recovery factor