ABSTRAK

PERSIAPAN PENGEMBANGAN LAPANGAN F MENUJU TAHAPAN EOR *FULL-SCALE* DENGAN ANALISA TERINTEGRASI PT PERTAMINA HULU ROKAN

Oleh
Farizah Istifatkhul Nadhifa
NIM: 113210163
(Program Studi Sarjana Teknik Perminyakan)

Section Z merupakan salah satu dari tiga kompartemen utama dalam Struktur FIN yang telah lebih dahulu dikembangkan melalui penerapan pola injeksi-produksi (*pattern*) dalam kegiatan *waterflooding.* Dalam rangka melanjutkan optimasi perolehan minyak, penyusunan *pattern* pada *Section* X dan *Section* Y menjadi langkah strategis dalam persiapan perencanaan lapangan menuju implementasi *Enhanced Oil Recovery* (EOR) *full-scale, melalui* perencanaan yang matang serta evaluasi pelaksanaan monitoring dan *surveillance* kegiatan *waterflooding* pada ketiga *section* tersebut.

Hasil evaluasi menjadi dasar perencanaan pengembangan lanjutan menuju tahap *Enhanced Oil Recovery (EOR) full-scale* melalui penentuan pola sumur injeksi-produksi (*pattern*) yang optimal berdasarkan respons reservoir. Evaluasi dilakukan dengan menganalisis Indeks Heterogenitas, *Chan's Diagnostic*, Hall Plot, *Voidage Replacement Ratio(VRR)*, serta konektivitas antar sumur. Penelitian difokuskan pada tiga lapisan dengan nilai *remaining in place* tertinggi dari masing-masing *section*.

Berdasarkan hasil *monitoring* dan *surveillance waterflooding*, diperoleh rekomendasi kandidat pola injeksi-produksi (*pattern)* sebagai usulan *pilot project* EOR yang akan dilanjutkan ke tahap pengembangan skala penuh (*full-scale*). Adapun pola yang direkomendasikan adalah: *Section* X menggunakan Pola *Irregular Inverted Five-Spot Pattern* menunjukan kenaikan *oil rate* sebesar 92 bbl/day, *Section* Y menggunakan Pola *Irregular Four-Spot Pattern* menunjukan kenaikan *oil rate* sebesar 38 bbl/day, dan *Section* Z juga menggunakan Pola *Irregular Five-Spot Pattern* menunjukan kenaikan *oil rate* sebesar 47 bbl/day. Selanjutnya, hasil *screening* metode EOR menurut Al-Adasani & Bai, 2010 dan menggunakan *Software* EORgui menunjukkan bahwa metode *Surfactant Polymer* (SP) dan *Alkaline Surfactant Polymer* (ASP) merupakan metode EOR yang paling direkomendasikan untuk Struktur FIN, berdasarkan karakteristik batuan dan fluida reservoir yang dianalisis.

Kata kunci*: Chan's Diagnostic Plot,* Hall Plot*, EOR, Pattern, Waterflooding, EOR full-scale*

ABSTRACT

PREPARATION FOR FIELD F DEVELOPMENT FOR FULL-SCALE EOR IMPLEMENTATION USING AN INTEGRATED ANALYSIS APPROACH PT PERTAMINA HULU ROKAN

By
Farizah Istifatkhul Nadhifa
NIM: 113210163
(*Petroleum Engineering Undergraduated Program*)

Section Z is one of the three main compartments within the FIN Structure that has been previously developed through the application of an injection-production pattern in waterflooding operations. To enhance oil recovery, the establishment of optimized patterns in Section X and Section Y becomes a strategic step in field development planning toward the full-scale implementation of Enhanced Oil Recovery (EOR). This planning is supported by a comprehensive evaluation, including monitoring and surveillance of waterflooding performance across all three sections.

The evaluation results serve as the basis for planning further development toward full-scale Enhanced Oil Recovery (EOR) by determining the optimal injection-production well pattern based on reservoir response. The evaluation includes analysis of heterogeneity index, Chan's Diagnostic Plot, Hall Plot, Voidage Replacement Ratio (VRR), and injection-production well connectivity. The study focuses on three reservoir layers, with the top three sections having the highest remaining oil in place in each section.

Based on the results of waterflooding monitoring and surveillance, recommended injection-production patterns were identified as candidates for an EOR pilot project, which will be further developed into a full-scale implementation. The recommended patterns are as follows: Section X uses an Irregular Inverted Five-Spot Pattern, showing an increase in oil rate of 92 bbl/day; Section Y applies an Irregular Four-Spot Pattern, with an oil rate increase of 38 bbl/day; and Section Z adopts an Irregular Five-Spot Pattern, resulting in an oil rate increase of 47 bbl/day. Furthermore, EOR method screening based on Al-Adasani & Bai (2010) and the use of EORgui software indicates that Surfactant Polymer (SP) and Alkaline-Surfactant Polymer (ASP) are the most recommended EOR methods for the FIN Structure, based on the analyzed rock and fluid properties of the reservoir.

Keywords: Chan's Diagnostic Plot, Hall Plot, EOR, Pattern, Waterflooding, EOR full-scale