

ABSTRAK

PENENTUAN LOKASI SUMUR *INFILL* BERDASARKAN INTEGRASI DATA GEOLOGI, *RESERVOIR* DAN DATA PRODUKSI PADA LAPANGAN “EF”

Oleh
Erika Febriyanti
NIM: 113220202
(Program Studi Sarjana Teknik Perminyakan)

Lapangan EF merupakan lapangan minyak yang telah berproduksi sejak tahun 1961 dan saat ini tergolong sebagai *mature field*. Seiring lamanya periode produksi, lapangan ini mengalami penurunan laju produksi minyak disertai peningkatan *water cut* secara signifikan. Kondisi ini mengindikasikan bahwa proses pengurasan *reservoir* tidak berlangsung secara merata akibat heterogenitas *reservoir*, sehingga masih terdapat potensi minyak sisa (*remaining oil*) yang belum terdrainase secara optimal. Penelitian ini bertujuan menentukan lokasi sumur *infill* yang optimal pada Zona A Lapangan EF melalui integrasi data geologi *reservoir* dan data produksi.

Metodologi penelitian menggunakan pendekatan kuantitatif dengan menghitung radius pengurasan (*drainage radius, re*) setiap sumur menggunakan metode volumetrik berdasarkan akumulasi produksi minyak (*cumulative oil production, Np*). Nilai radius pengurasan kemudian divisualisasikan secara spasial dalam bentuk *bubble map* yang dioverlay dengan peta *Hydrocarbon Pore Volume* (HCPV) dan peta struktur *reservoir* untuk mengidentifikasi area yang belum terdrainase secara optimal (*underdrained area*). Analisis selanjutnya dilakukan dengan mengintegrasikan parameter petrofisika untuk mengevaluasi potensi hidrokarbon tersisa pada area yang belum terdrainase secara optimal.

Hasil analisis menunjukkan adanya beberapa area *underdrained* pada Zona A yang masih memiliki potensi minyak sisa. Integrasi distribusi radius pengurasan, nilai HCPV, dan kualitas *reservoir* menghasilkan rekomendasi empat titik sumur *infill* pada tiga *main closure*. Area tersebut memiliki kisaran porositas 19-20%, permeabilitas 285-303 mD, NTG 0,8-1,0, dan HCPV 3,35-4,42 m, dengan radius pengurasan (*re*) 5-60 m serta jarak terhadap sumur *existing* 92-212 m. Penempatan sumur *infill* pada zona dengan HCPV tinggi dan di luar jangkauan radius pengurasan diharapkan dapat meningkatkan efektivitas pengurasan *reservoir* serta mengoptimalkan perolehan minyak pada Zona A Lapangan EF.

Kata kunci: *Hydrocarbon pore volume* (HCPV), *mature field*, Radius Pengurasan, *remaining oil*, sumur *infill*

ABSTRACT

DETERMINATION OF INFILL LOCATIONS BASED ON THE INTEGRATION OF GEOLOGICAL, RESERVOIR, AND PRODUCTION DATA IN THE "EF" FIELD

By
Erika Febriyanti
NIM: 113220202
(Petroleum Engineering Undergraduated Program)

EF Field has been producing oil since 1961 and is currently categorized as a mature field. Over time, the field has experienced a decline in oil production rate accompanied by a significant increase in water cut. This condition indicates that the reservoir depletion process is not uniformly distributed due to reservoir heterogeneity, resulting in the presence of remaining oil that has not been optimally drained. One of the development strategies to improve reservoir drainage efficiency and enhance oil recovery is infill well drilling. Therefore, this study aims to determine the optimal infill well locations in Zone A of EF Field through the integration of geological, reservoir, and production data.

The methodology applied in this study uses a quantitative approach by calculating the drainage radius (r_e) of each well using a volumetric method based on cumulative oil production (N_p). The calculated drainage radius is then integrated with the Hydrocarbon Pore Volume (HCPV) map and reservoir structural map to identify under-drained areas. Furthermore, reservoir petrophysical properties are evaluated to assess the remaining oil potential within the identified zones.

The results indicate several underdrained areas in Zone A that still have remaining oil potential. The integration of drainage radius distribution, HCPV, and reservoir quality results in the recommendation of four infill well locations in three main closures. These areas have porosity of around 19–20%, permeability of about 285–303 mD, NTG of 0.8–1.0, and HCPV of around 3.35–4.42, with a drainage radius (r_e) of about 5–60 m and distances to existing wells of around 92–212 m. The placement of infill wells in areas with high HCPV and outside the drainage radius of existing wells is expected to improve Reservoir drainage efficiency and optimize oil recovery in Zone A of the EF Field..

Keywords: *Infill well, drainage radius, hydrocarbon pore volume (HCPV), remaining oil, mature field*