

RINGKASAN

ANALISA *LIQUID LOADING* DAN PERENCANAAN METODE *WATER SHUT-OFF* SEBAGAI UPAYA OPTIMASI PRODUKSI SUMUR GAS “SPA-01” LAPANGAN “SAR”

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Lapangan “SAR” merupakan salah satu lapangan milik PT. Pertamina EP Asset 4 Zona 11 Cepu *Field*. Sumur “SPA-01” merupakan sumur gas yang diproduksi pada Lapisan F, Formasi Wonocolo sejak 19 Oktober 2021. Hasil analisa *production performance* dan *history pressure* menunjukkan penurunan produksi gas dan kenaikan produksi air yang diiringi dengan penurunan tekanan. Hal tersebut mengindikasikan bahwa terjadi *problem liquid loading*.

Metodologi dalam penelitian yang dilakukan adalah menganalisa data produksi menggunakan *Chan’s Diagnostic Plot*, analisa secara kualitatif dan kuantitatif dari data CBL/VDL, dan simulasi serta perhitungan untuk memperkirakan kedalaman GWC pada akhir produksi. Setelah diketahui kondisi sumur yang mengalami *liquid loading*, dilakukan perencanaan *water shut-off* dengan *balance plug method* oleh Carter et al., (2015). Dilakukan juga simulasi untuk memperkirakan *performance* sumur setelah dilakukan *water shut-off*.

Hasil analisa *Chan’s Diagnostic Plot* diperoleh hasil adanya *near wellbore water channeling*. Hasil analisa secara kualitatif pada CBL, diperoleh hasil kondisi penyemenan didominasi oleh adanya *channeling*, sedangkan hasil analisa kualitatif pada VDL, diperoleh hasil interpretasi *casing arrival* dan *formation arrival* buruk. Hasil dari analisa kuantitatif nilai BI, diperoleh hasil kualitas penyemenan yang rendah. Dengan simulasi, estimasi GWC berada pada 4487 ft. Dilakukan *balanced plug cementing* dengan volume semen sebesar 4.414 ft³ (4 sack), volume *spacer* sebesar 0.027 bbl, dan *displacement fluid* sebanyak 17.328 bbl. Setelah dilakukan *water shut-off* dan optimasi produksi kondisi sumur berubah dengan AOFD sebesar 16 MMSCFD dan laju alir gas sebesar 1.96 MMSCFD.

Kata Kunci : *Liquid Loading, Plug Cementing, Water Shut-Off.*

ABSTRACT

LIQUID LOADING ANALYSIS AND PLANNING OF THE WATER SHUT-OFF METHOD TO OPTIMIZE THE PRODUCTION OF "SPA-01" GAS WELL "SAR" FIELD

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The "SAR" field is one of the fields owned by PT. Pertamina EP Asset 4 Zone 11 Cepu Field. The "SPA-01" well is a gas well produced in Layer F, Wonocolo Formation since October 19, 2021. The results of production performance and history pressure analysis show a decrease in gas production and an increase in water production accompanied by a decrease in pressure. This indicates that there is a liquid loading problem.

The methodology in the research conducted was analyzing production data using Chan's Diagnostic Plot, qualitative and quantitative analysis of CBL/VDL data, and simulations and calculations to estimate the depth of GWC at the end of production. After knowing the condition of the well that experienced liquid loading, a water shut-off plan was carried out with a balance plug method by Carter et al., (2015). Simulations were also carried out to estimate well performance after water shut-off.

The results of Chan's Diagnostic Plot analysis obtained the results of near wellbore water channeling. The results of qualitative analysis on CBL, obtained the results of cementing conditions dominated by channeling, while the results of qualitative analysis on VDL, obtained poor interpretation of casing arrival and formation arrival. The results of quantitative analysis of BI values obtained low cementing quality results. By simulation, the GWC estimate was at 4487 ft. Balanced plug cementing was carried out with a cement volume of 4,414 ft³ (4 sacks), a spacer volume of 0.027 bbl, and a displacement fluid of 17,328 bbl. After the water shut-off and optimize production, the condition of the well changed with an AOF of 16 MMSCFD and a gas flow rate of 1,96 MMSCFD.

Keywords : *Liquid Loading, Plug Cementing, Water Shut-Off.*