ABSTRAK

PERENCANAAN DAN OPTIMASI DESAIN ESP UNTUK PENINGKATAN PRODUKTIVITAS SUMUR DALAM DAN BERARAH DENGAN KANDUNGAN GLR TINGGI “ASM-01”

Oleh
Aynun Septina Meliyani
NIM: 113220234
(Program Studi Sarjana Teknik Perminyakan)

Perencanaan produksi pada sumur baru ASM-01 di Lapangan "ASM" dihadapkan pada kompleksitas teknis yang tinggi. Sumur ini memiliki karakteristik *deep directional well* dengan inklinasi 30°, *Bottom Hole Temperature* ekstrem mencapai 270 °F, serta *Gas Liquid Ratio* yang tinggi. Selain itu, kondisi fluida dengan *water cut* sebesar 65% diproyeksikan akan meningkatkan beban hidrostatis fluida yang berpotensi memicu penurunan laju produksi.

Analisis kinerja sumur dilakukan melalui pengolahan data untuk menghitung *Productivity Index* (PI) dan pemetaan kurva *Inflow Performance Relationship* (IPR) metode Pudjo Sukarno. Laju produksi target ditetapkan pada batas optimum 80% dari laju produksi maksimum untuk memitigasi terjadinya *excessive drawdown*. Selanjutnya, perancangan sistem ESP diselesaikan melalui pemilihan tipe pompa serta serangkaian perhitungan komprehensif, mencakup penentuan *Pump Setting Depth* (PSD), evaluasi tekanan *intake*, penanganan gas bebas, hingga perhitungan *Total Dynamic Head* (TDH) dan kebutuhan *Horse Power* (HP).

Hasil perhitungan menunjukkan bahwa kebutuhan *Total Dynamic Head* sebesar 8101.37 ft paling efektif dipenuhi oleh konfigurasi ESP tipe REDA D1050N. Untuk menjaga integritas peralatan pada lingkungan bersuhu tinggi dan fluida yang menantang, desain ini menggunakan komponen khusus berupa *protector* dengan material Aflas dan motor seri 456. Desain ESP yang komprehensif ini diharapkan dapat mengoptimalkan performa produksi awal serta menjamin keandalan masa pakai pompa pada Sumur ASM-01.

Kata kunci: *Artificial Lift, Deep Well, Directional Well, Design Optimization, Electric Submersible Pump, High Gas Liquid Ratio*

ABSTRACT

PLANNING AND OPTIMIZATION OF ESP FOR PRODUCTION ENHANCEMENT IN A DEEP DIRECTIONAL WELL WITH HIGH GAS-LIQUID RATIO "ASM-01"

By
Aynun Septina Meliyani
NIM: 113220234
(*Petroleum Engineering Undergraduated Program*)

Production planning for the newly drilled ASM-01 well in the "ASM" Field is challenged by significant technical complexity. This well is characterized as a deep directional well with a 30° inclination, an extreme Bottom Hole Temperature of up to 270 °F, and a high Gas-Liquid Ratio. In addition, the fluid condition with a projected water cut of 65% is expected to increase the hydrostatic fluid load, which may potentially lead to a decline in production rate.

Well performance analysis was conducted through data processing to calculate the Productivity Index (PI) and to generate the Inflow Performance Relationship (IPR) curve using the Pudjo Sukarno method. The target production rate was established at the optimum limit of 80% of the maximum production rate in order to mitigate excessive drawdown. Subsequently, the ESP system design was completed through pump type selection and a series of comprehensive calculations, including the determination of Pump Setting Depth (PSD), intake pressure evaluation, free gas handling, as well as the calculation of Total Dynamic Head (TDH) and required Horsepower (HP).

The calculation results indicate that the Total Dynamic Head requirement of 8101.37 ft is most effectively fulfilled by the REDA D1050N ESP configuration. To maintain equipment integrity under high-temperature conditions and challenging fluid characteristics, the design incorporates a protector made of Aflas material and a Series 456 motor. This comprehensive ESP design is expected to optimize initial production performance and ensure long-term pump reliability in the ASM-01 well.

Keywords: Artificial Lift, Deep Well, Directional Well, Design Optimization, Electric Submersible Pump, High GLR.