

RINGKASAN

EVALUASI DAN OPTIMASI *ELECTRICAL SUBMERSIBLE PUMP (ESP)* BERDASARKAN LAJU PRODUKSI DAN SIFAT AIR FORMASI PADASUMUR “AFW-642” DI LAPANGAN “HRZ”

Oleh
Akmal Faris Wiryasa
NIM: 113190124
(Program Studi Sarjana Teknik Perminyakan)

Sumur AFW-642 di Lapangan HRZ mengalami penurunan produksi akibat endapan scale yang merusak pompa Electric Submersible Pump (ESP). Penanganan dilakukan melalui well service berupa penggantian pompa TD-750 ke TD-460 dan acid washing. Penelitian ini bertujuan mengevaluasi efektivitas tindakan tersebut serta mengoptimalkan kinerja ESP berdasarkan data produksi dan karakteristik air formasi.

Metode mencakup analisis data reservoir dan produksi, evaluasi performa menggunakan kurva Inflow Performance Relationship (IPR) metode Vogel dan kurva performa pompa, serta optimasi produksi melalui sensitivitas frekuensi. Setelah acid washing, produksi minyak meningkat dari 28,2 menjadi 242,76 BOPD, dengan water cut turun menjadi 32%. Namun, berdasarkan riwayat produksi, ditetapkan target optimasi sebesar 212 BFPD untuk menghindari risiko penurunan produksi lanjutan.

Optimasi dilakukan dengan analisis sensitivitas frekuensi terhadap pompa TD-460. Hasil menunjukkan frekuensi optimal untuk mencapai laju produksi 212 BFPD adalah 36 Hz, berada di antara Best Efficiency Point (BEP) frekuensi 35–40 Hz. Pompa tetap bekerja dalam recommended operating range (ROR) dengan efisiensi tinggi dan risiko minimal. Perhitungan Total Dynamic Head (TDH) sebesar 2182,63 ft mendukung penyesuaian desain dan jumlah stage pompa.

Kata Kunci: *Electric Submersible Pump, acid washing, optimasi frekuensi, scale, TDH, Sumur AFW-642.*

ABSTRACT

EVALUATION AND OPTIMIZATION OF ELECTRICAL SUBMERSIBLE PUMP (ESP) BASED ON PRODUCTION RATE AND FORMATION WATER CHARACTERISTICS IN WELL "AFW-642" AT THE "HRZ" FIELD

By

Akmal Faris Wiryasa

NIM: 113190124

(Petroleum Engineering Undergraduated Program)

Well AFW-642 in the HRZ Field experienced a production decline due to scale deposits that damaged the Electric Submersible Pump (ESP). Remedial actions were taken through well service, including replacing the TD-750 pump with a TD-460 and performing acid washing. This study aims to evaluate the effectiveness of these actions and optimize ESP performance based on production data and formation water characteristics.

The method involved analyzing reservoir and production data, evaluating performance using the Inflow Performance Relationship (IPR) curve with the Vogel method and the pump performance curve, and optimizing production through frequency sensitivity analysis. After acid washing, oil production increased from 28.2 to 242.76 BOPD, with water cut reduced to 32%. However, due to previous production trends, the optimization target was set at 212 BFPD to reduce the risk of further production decline.

Optimization was carried out by analyzing frequency sensitivity of the TD-460 pump. Results indicated that the optimal frequency to achieve 212 BFPD lies at 36 Hz, between the Best Efficiency Point (BEP) of 35–40 Hz. The pump operates within the recommended operating range (ROR) with high efficiency and minimal risk. A Total Dynamic Head (TDH) of 2182.63 ft supports proper adjustment of pump design and number of stages.

This optimization strategy is proven effective in maintaining stable production and is applicable to wells with similar scale-related issues.

Keywords: Electric Submersible Pump, acid washing, frequency optimization, scale, TDH, Well AFW-642.