

ABSTRAK

ANALISIS DAN OPTIMASI *ELECTRIC SUBMERSIBLE PUMP* (ESP) UNTUK MENINGKATKAN LAJU PRODUKSI PADA SUMUR “WN-03” LAPANGAN “W”

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Sumur “WN-03” Lapangan “W” terletak pada Blok West Madura Offshore merupakan sumur produksi minyak yang telah terpasang pengangkat buatan (*artificial lift*) berupa *Electric Submersible Pump* (ESP). pompa REDA 465 tipe D1050N dengan 252 *stages*, frekuensi 50 Hz, dan *pump setting depth* pada kedalaman 5062 ft. Laju produksi aktual sebesar 509,89 BFPD dengan *efficiency* pompa sebesar 84%. Dari data histori produksi, sumur “WN-03” mengalami penurunan produksi sehingga dilakukan analisis serta optimasi untuk meningkatkan laju produksi sumur.

Penelitian ini dilakukan dengan mengumpulkan data sumur, data reservoir, data produksi, data PVT, dan data pompa yang telah terpasang. Dilakukan analisis produktivitas formasi sumur menggunakan kurva *Inflow Performance Relationship* (IPR) guna menentukan laju produksi maksimal dan optimum. Analisis pompa terpasang untuk mengidentifikasi permasalahan pada pompa. Perencanaan *Electric Submersible Pump* (ESP) pada laju produksi optimum dilakukan sensitivitas frekuensi, penentuan jumlah *stages*, sensitivitas *pump setting depth* dan pemilihan komponen pompa.

Dari hasil *Inflow Performance Relationship* (IPR) menunjukkan nilai laju alir maksimum sebesar 1015,21 BFPD. Dengan nilai laju produksi optimum sebesar 675,99 BFPD. Dengan hasil perencanaan ESP dengan tipe pompa REDA D1050N, frekuensi 50 Hz, dan 252 *stages* yang dipasang pada kedalaman 5062 ft TVD. Dengan efisiensi pompa sebesar 95%.

Kata kunci: Analisis pompa, efisiensi pompa, *electric submersible pump*, laju optimum, optimasi.

ABSTRACT

ANALYSIS AND OPTIMIZATION OF ELECTRIC SUBMERSIBLE PUMP (ESP) TO ENHANCE THE PRODUCTION FLOW RATE IN WELL “WN-03” OF FIELD “W”

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The well "WN-03" in the "W" Field located in the Blok West Madura Offshore is an oil production well equipped with an artificial lift system in the form of an Electric Submersible Pump (ESP). The pump used is the REDA 465 type D1050N with 252 stages, operating at a frequency of 50 Hz, and installed at a pump setting depth of 5062 ft. The actual production rate is 509.89 BFPD with a pump efficiency of 84%. From the production history data, the well "WN-03" has experienced a decline in production, prompting analysis and optimization efforts to increase the production rate.

This study was conducted by collecting well data, reservoir data, production data, PVT data, and installed pump data. An analysis of the well formation productivity was carried out using the Inflow Performance Relationship (IPR) curve to determine the maximum and optimum production rates. Analysis of the installed pump was conducted to identify any pump problems. The planning for the Electric Submersible Pump (ESP) at the optimum production rate included sensitivity analysis of frequency, determination of the number of stages, sensitivity to pump setting depth, and selection of pump components.

The results from the Inflow Performance Relationship (IPR) showed a maximum flow rate value of 1015.21 BFPD and an optimum production rate of 675.99 BFPD. The ESP planning was carried out using the REDA D1050N pump type, with a frequency of 50 Hz, and 252 stages installed at a depth of 5062 ft TVD, achieving a pump efficiency of 95%.

Keywords: Electric submersible pump, optimum rate, pump analysis, pump efficiency, optimazation