

ABSTRAK

OPTIMASI KONVERSI SUCKER ROD PUMP (SRP) KE *ELECTRIC SUBMERSIBLE PUMP (ESP)* PADA SUMUR ST- 010 DI LAPANGAN IFA "

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Sumur ST-010 merupakan sumur produksi pada Lapangan "IFA" yang berlokasi di Provinsi Riau merupakan sumur *mature* yang menggunakan sistem *artificial lift* berupa *Sucker Rod Pump (SRP)*. Penelitian ini bertujuan untuk mengevaluasi kelayakan sumur ST-010 untuk dipasang *Electric Submersible Pump (ESP)* serta merancang desain ESP yang optimal guna meningkatkan laju produksi sumur ST-010 di Lapangan IFA.

Penelitian ini menggunakan pendekatan deskriptif kuantitatif dengan studi kasus pada sumur ST-010 di Lapangan "IFA" untuk mengevaluasi kelayakan penerapan ESP serta merancang desain yang optimal berdasarkan data *reservoir*, produksi, tekanan, fluida, dan kondisi sumur. Analisis dilakukan melalui evaluasi kelayakan dari *history production* dan performa produksi *existing* menggunakan SRP, melihat kurva IPR, serta evaluasi tekanan alir dasar sumur (P_{wf}) untuk memperoleh laju alir optimum. Selanjutnya dilakukan perancangan ESP meliputi pemilihan tipe pompa, jumlah *stages*, daya *motor* dan peralatan pendukung lainnya agar beroperasi pada kondisi optimal.

Hasil evaluasi bahwa ketidakmampuan sistem SRP dalam mengatasi masalah kerusakan mekanis yang sering terjadi dan laju produksi pada sumur ST-010 menjadi indikasi kuat bahwa metode pengangkatan ini belum mampu mengoptimalkan potensi produksi ditandai dengan laju produksi sebesar 471 BFPD dan produksi minyak 5 BOPD, berada di bawah potensi maksimum berdasarkan analisis IPR metode Wiggins yaitu Q_{max} 1251,97 BFPD. Laju alir optimum ditentukan pada kondisi P_{wf} 400 psi dengan laju 923,9 BFPD untuk menjaga kestabilan operasi dan mencegah terbentuknya gas bebas. Perancangan ESP dipilih tipe EJP IND-1000 dengan 95 *stages* dan efisiensi 58,2% mampu meningkatkan produksi menjadi 923,9 BFPD dengan minyak 9,25 BOPD, atau naik sebesar 452,9 BFPD, menunjukkan bahwa sumur masih produktif dan responsif terhadap peningkatan *drawdown*.

Kata kunci: *Sucker Rod Pump (SRP)*, *Electric Submersible Pump (ESP)*, *Inflow Performance Relationship (IPR)*, optimasi produksi, konversi pompa

ABSTRACT

OPTIMIZATION OF CONVERSION FROM SUCKER ROD PUMP (SRP) TO ELECTRIC SUBMERSIBLE PUMP (ESP) IN WELL ST-010 AT THE IFA FIELD

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Well ST-010 is a production well in the “IFA” Field located in Riau Province, categorized as a mature oil well utilizing an artificial lift system in the form of a Sucker Rod Pump (SRP). This study aims to evaluate the feasibility of converting Well ST-010 to an Electric Submersible Pump (ESP) system and to design an optimal ESP configuration to increase the well’s production rate.

This research applies a quantitative descriptive approach with a case study on Well ST-010 in the “IFA” Field, using secondary data including reservoir, production, pressure, fluid, and well condition data. The analysis was conducted through feasibility evaluation based on production history and the performance of the existing Sucker Rod Pump (SRP) system, analysis of the Inflow Performance Relationship (IPR) curve, and evaluation of flowing bottom hole pressure (P_{wf}) to obtain the optimum production rate. Furthermore, the ESP design included the selection of pump type, determination of the number of stages, motor power, and other supporting equipment to ensure optimal operating conditions.

The evaluation results indicate that the inability of the Sucker Rod Pump system to overcome frequent mechanical failures and sustain production rates in well ST-010 strongly suggests that this lifting method has not been able to optimize the well’s production potential, as reflected by the production rate of 471 BFPD and oil production of 5 BOPD, which are below the maximum potential obtained from the IPR analysis using the Wiggins method with a Q_{max} of 1251.97 BFPD. The optimum flow rate was determined at a P_{wf} of 400 psi with a production rate of 923.9 BFPD to maintain operational stability and prevent free gas formation. Based on the design results, the selected Electric Submersible Pump type EJP IND-1000 with 95 stages and an efficiency of 58.2% was capable of increasing production to 923.9 BFPD with an oil rate of 9.25 BOPD, representing an increase of 452.9 BFPD, which indicates that the well remains productive and responsive to increased drawdown.

Keywords: Sucker Rod Pump (SRP), Electric Submersible Pump (ESP), Inflow Performance Relationship (IPR), production optimization, pump conversion.