

ABSTRAK

DESAIN ULANG *ELECTRIC SUBMERSIBLE PUMP* (ESP) UNTUK OPTIMASI PRODUKSI PADA SUMUR “MRH” LAPANGAN “AR”

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Di Lapangan "AR", sumur produksi "MRH" beroperasi menggunakan sistem artificial lift berupa *Electric Submersible Pump* (ESP) tipe IND450/39Hz/226 stages yang terpasang pada kedalaman 1836,8 ft MD. Permasalahan yang dihadapi meliputi laju produksi aktual sebesar 224,66 BLPD yang sudah melewati batas bawah *recommended operating range* (230-350 BLPD) sehingga berpotensi menyebabkan downthrust, dapat menurunkan laju alir produksi, dan merusak pompa.

Studi ini menggunakan data sumur, produksi, reservoir, PVT, dan ESP yang terpasang. Analisis produktivitas formasi menggunakan pendekatan Inflow Performance Relationship (IPR) metode *Wiggins*. Evaluasi performa ESP dilakukan untuk mengidentifikasi masalah pada pompa yang beroperasi, diikuti dengan optimasi desain melalui studi sensitivitas parameter frekuensi, kedalaman instalasi, jumlah stage, dan pemilihan motor.

Analisis IPR menghasilkan laju alir maksimum sebesar 477,18 BLPD. Optimasi desain menghasilkan konfigurasi pompa IND440/42Hz/200 stages pada kedalaman 1850 ft MD yang mampu meningkatkan laju produksi hingga 270,48 BLPD dengan produksi minyak 53,55 BOPD. Pompa menghasilkan head 2002 ft yang sesuai dengan kebutuhan TDH 2002 ft, serta efisiensi pompa meningkat menjadi 49%. REDA Maximus 375 Series Motor Type RA 17,8 HP/482 V/49,6 A dapat memenuhi kebutuhan daya operasi.

Kata kunci: *Electric Submersible Pump*, evaluasi pompa, downthrust, perencanaan ulang.

ABSTRACT

REDESIGN OF ELECTRIC SUBMERSIBLE PUMP (ESP) FOR PRODUCTION OPTIMIZATION IN THE “MRH” WELL IN THE “AR” FIELD

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In the "AR" Field, the "MRH" production well operates using an artificial lift system consisting of an IND450/39Hz/226-stage Electric Submersible Pump (ESP) installed at a depth of 1,836.8 ft MD. The problems encountered included an actual production rate of 224.66 BLPD, which exceeded the lower limit of the recommended operating range (230-350), potentially causing downthrust, reducing production flow rates, and damaging the pump.

This study utilized data from the well, production, reservoir, PVT, and the installed ESP. Formation productivity analysis used the Wiggins Inflow Performance Relationship (IPR) approach. ESP performance evaluation was conducted to identify issues with the operating pump, followed by design optimization through sensitivity studies of frequency parameters, installation depth, number of stages, and motor selection.

The IPR analysis resulted in a maximum flow rate of 477.18 BLPD. Design optimization resulted in an IND440/42Hz/200 stages pump configuration at a depth of 1850 ft MD capable of increasing production rates to 270.48 BLPD with oil production of 53.55 BOPD. The pump produces a head of 2002 ft which meets the TDH requirement of 2002 ft, and pump efficiency increases to 49%. The REDA Maximus 375 Series Motor Type RA 17.8 HP/482 V/49.6 A can meet the operating power requirements.

Keywords: Electric Submersible Pump, pump evaluation, downthrust, redesign.