

ABSTRAK

ANALISIS TEKNO-EKONOMI PENERAPAN *HYDRAULIC PUMPING UNIT* DI SUMUR X DENGAN *HIGH WATER CUT* TERHADAP SUMUR Y DI LAPANGAN Z

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Lapangan Z merupakan lapangan minyak yang menggunakan *artificial lift* jenis *Hydraulic Pumping Unit* (HPU) untuk membantu proses produksi fluida ke permukaan. Penelitian ini dilakukan pada sumur X dan sumur Y yang menggunakan jenis HPU yang sama dikeduanya, namun terdapat perbedaan nilai *water cut* dikedua sumur. Dimana sumur X tergolong *high water cut* sedangkan sumur Y tergolong *low water cut*. Perbedaan inilah yang akan mempengaruhi performa produksi dan kinerja HPU. Sehingga penelitian bertujuan untuk menganalisis kelayakan teknis dan ekonomis penggunaan HPU pada kedua sumur.

Metode penelitian yang digunakan adalah analisis tekno-ekonomi. Analisis teknis dilakukan menggunakan metode *Inflow Performance Relationship* (IPR), *Decline curve analysis* (DCA), serta evaluasi kinerja HPU berdasarkan parameter *total load*, PPRL, dan efisiensi volumetris. Analisis ekonomi dilakukan melalui perhitungan CAPEX, OPEX, dan batas produksi ekonomis sumur.

Hasil penelitian menunjukkan bahwa sumur X memiliki *water cut* sebesar 92% sehingga produksi didominasi air, sedangkan sumur Y memiliki *water cut* sebesar 48% sehingga produksi masih didominasi minyak. Sumur X hanya mencapai 45% dari kemampuan produksi maksimum sedangkan sumur Y telah mencapai 72%. Hasil evaluasi HPU menunjukkan efisiensi volumetris sumur X sebesar 98,03% dan sumur Y sebesar 78,94%. Berdasarkan analisis teknis dan ekonomis dengan berbagai parameter, sumur Y dinilai lebih optimal dibandingkan sumur X, parameter *water cut* dinilai sangat berpengaruh terhadap penelitian ini.

Kata kunci: *Decline Curve Analysis, Hydraulic Pumping Unit, Inflow Performance Relationship, Tekno-Ekonomi, Water cut*

ABSTRACT

TECHNO-ECONOMIC ANALYSIS OF HYDRAULIC PUMPING UNIT APPLICATION IN WELL X WITH HIGH WATER CUT COMPARED TO WELL Y IN FIELD Z

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Field Z is an oil field that uses artificial lift, a Hydraulic Pumping Unit (HPU) to assist in the production process of fluids to the surface. This research was conducted on wells X and Y, both of which use the same type of HPU. However, there are differences in water cut values between the two wells. Well X is classified as high water cut, while well Y is classified as low water cut. This difference will affect production performance and HPU performance. Therefore, the study aims to analyze the technical and economic feasibility of using an HPU on both wells.

The research method used was techno-economic analysis. The technical analysis was conducted using the Inflow Performance Relationship (IPR) method, Decline Curve Analysis (DCA), and HPU performance evaluation based on total load, PPRL, and volumetric efficiency parameters. The economic analysis was conducted through calculations of CAPEX, OPEX, and the well's economic production limit.

The results showed that well X had a water cut of 92%, leading to water-dominated production, while well Y had a water cut of 48%, leading to oil-dominated production. Well X only achieved 45% of its maximum production capacity, while well Y had reached 72%. The HPU evaluation results showed that the volumetric efficiency of well X was 98,03% and well Y was 78,94%. Based on technical and economic analysis with various parameters, well Y was considered more optimal than well X, the water cut parameter was considered to have a significant impact on this study.

Keywords: Decline Curve Analysis, Hydraulic Pumping Unit, Inflow Performance Relationship, Tekno-Ekonomi, Water cut