

Energy Efficiency Analysis of Electrical Submersible Pump on Mature Oil Field Offshore Java Sea

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Abstract : Electrical Submersible Pump (ESP) is an artificial lift of choice to produce oil on Offshore Java Sea. It is selected based on the production rate capacity and running life expectation. ESP performance in a mature field is highly affected by oil well conditions. The presence of sand, scale, gas, and low influx will create unstable ESP operation hence lowering the run life expectation and system efficiency. This paper reviews the current energy usage and efficiency on every part of the ESP system. The hydraulic and electrical losses, as well as system efficiency for each well, are calculated to identify energy losses and the possibility for improvement. It is shown that high back pressure on the system and low-efficiency pump are the major contributors to energy losses. It was found that optimized production rate and the use of advanced technology on pump and motor unit could improve energy efficiency.

Keywords : advance technology, energy efficiency, ESP, mature field, production rate

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