UNIVERSITI TEKNOLOGI MARA

COILED TUBING DEPLOYED ELECTRICAL SUBMERSIBLE PUMP (CT-ESP) DESIGN USING PROSPER FOR WELL A9: A CASE STUDY

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ABSTRACT

Most oil wells in the world in their early lives are capable of producing naturally from the reservoir by the natural energy coming from the compressed oil deep down the reservoir caused by the difference between reservoir and wellbore pressure. After producing for a period of time, the reservoir pressure will decrease which causes the pressure difference to be small and as a result, the well will not be able to lift oil up to surface. At this stage, artificial lift can be utilized to overcome this issue. The most common methods used are gas lift, electrical submersible pump, sucker rod pump, and many more. In this project, a case study was conducted to design an electrical submersible pump (ESP) with coiled tubing (CT) deployment using software called PROSPER for well A9 Brown Field. A sensitivity analyses to gas lift injection has been conducted to determine the flow rate of the well. The study has been initiated to convert the previous gas lift method in well A9 to ESP in order to maximize and accelerate the production by overcoming the unavailability of enough gas lift supply. A new well model equipped with ESP as the artificial lift method was built to design the ESP by using the software PROSPER. The data required are well data, production data, well fluid conditions, and power sources. Once the data are enough, they will be the input in PROSPER and PROSPER will design based on the input data. The expected result would be an ESP design with important parameters calculated and simulated by PROSPER.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

Artificial lift is considered as a vital technology used to ensure wells producing when they are having insufficient energy in the form of pressure to produce liquids up to the surface at economic rates (Noonan & Beckwith, 2014). In general, oil reservoirs depend on natural drive mechanisms and pressure maintenance mechanisms in order to maintain reservoir energy before the wells are incapable of producing fluids at economical rates. Therefore, high production rate of a well can be achieved when the pressure drawdown of the production is increased and the bottom-hole pressure is decreased by using artificial lift methods. Figure 1.1 shows mainly used artificial lift methods including sucker rod pump, gas lift, electrical submersible pump, hydraulic piston pump, hydraulic jet pump, plunger lift and progressing cavity pump (Guo et al, 2007).

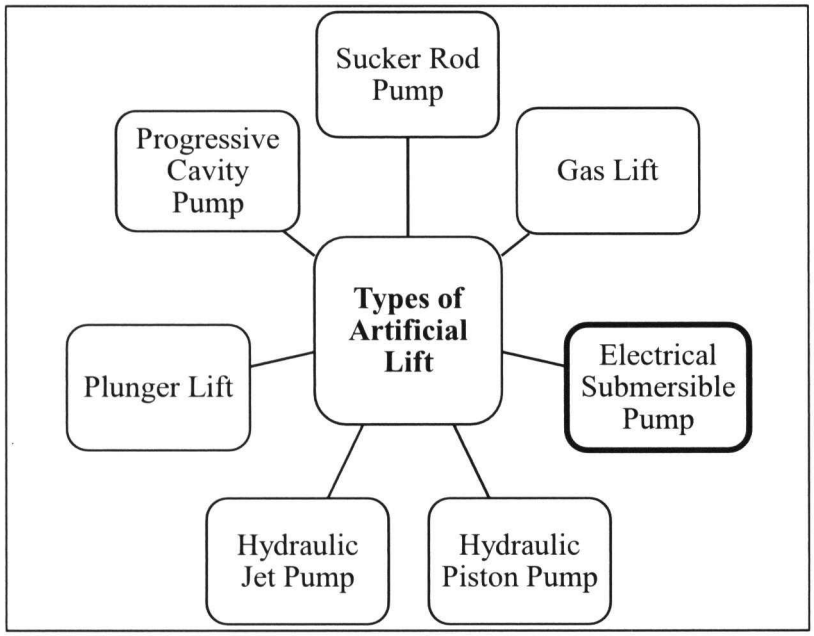

Figure 1.1: Types of Artificial Lift