ABSTRACT

Hydraulic fracturing is one of the stimulation efforts with the aim of increasing production. Hydraulic fracturing operations often have problems caused by several factors such as the selection of proppant, error in calculating the number of pad volumes, inability of gel to carry proppant, high concentration of proppant, problems with mechanical damage to the pump, human error and design errors, etc. These conditions result in low fracture conductivity and even operational failures can occur, causing the loss of wells due to screen out events. The HI-68 well has been subjected to hydraulic fracturing in a multilayer reservoir and with different rock characteristics so that the fracture distribution is uneven in all layers and each layer can result in different production performance. Evaluation and follow-up are the main parts in the process of improving future plans.

The methodology in this study goes through the stages of data collection and data analysis, namely geological data, reservoirs, wells and hydraulic fracturing treatment parameters. The data is then evaluated for each stage in determining the fracture geometry and the resulting fracture conductivity, such as the step rate test analysis which is divided into two stages, namely: step up test and step down test. The stage begins with determining the location of the perforation to see how far the fracture geometry is formed and does not create a communication line between the water or gas zone and the oil zone. The next step is to evaluate and analyze the mainfract performance seen from the fracture conductivity dimensionless (FCD) value greater than 1. Sensitivity is carried out on the pumping rate and the size and type of proppant to obtain optimum geometry and high fracture conductivity so that it will provide a productivity index (PI). optimum with the economics of a good or positive project.

The implementation of hydraulic fracturing in the HI-68 well is influenced by the use of a small proppant mesh size, which is the size of a water-based fracturing fluid that is able to place proppant in the fracture at a temperature of 190 °F with a low density ceramic type and a size of 20/40 mesh, by producing permeability retained of $1.02x10^6$ mD, fracture conductivity of 7,095 mD-ft and FCD of 4.78. The extension pressure of the a1 layer is 2,483.19 psi at a minimum rate of 2 bpm with a closure pressure of 2,287.3 psi. Based on the closure stress value of 2,287.3 psi, the 16/20 mesh Carbolite proppant can produce a permeability retained of $1.20x10^6$ mD greater than the other proppant. The results of the sensitivity to 4 pumping rates, the rate at 15 bpm gives the lowest horse power price and the highest FCD rating is 10.2 and the productivity index value is 2.17 compared to the rate of 16, 17 & 18 bpm. Carbolite 16/20 mesh provides the best economic value at the price of NPV USD 800,000, IRR 1.326 %, POT 0.07 /years and PI 14.26.

Keywords: *hydraulic fracturing, fracturing initiation, productivity index*