

RINGKASAN

PERBANDINGAN PELAKSANAAN *HYDRAULIC FRACTURING* MENGUNAKAN *ROD-SHAPE PROPPANT* DAN KONVENSIONAL *PROPPANT* PADA FORMASI T2 SUMUR FA-91 LAPANGAN KB

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Sumur FA-91 lapangan Kota Batak merupakan sumur *directional* yang berproduksi pada lapisan T-2 didominasi oleh *sandstone* dengan nilai permeabilitas sebesar kecil dari 6.6 mD yang tergolong rendah dan porositas sebesar 20%. Kecilnya permeabilitas ini yang melatar belakangi pelaksanaan *hydraulic fracturing* menggunakan bentuk pasir berupa *rod-shaped proppant* dengan tujuan dapat meningkatkan permeabilitas dan produktivitas sumur FA-91.

Pada analisa hasil *hydraulic fracturing* yang dilakukan pada Sumur FA-91 ini dimulai dengan mengumpulkan berupa data *reservoir*, data kompleksi sumur, data perforasi dan data mekanika batuan. Fluida perekah yang digunakan adalah YF140HTD dan jenis *proppant* yang digunakan adalah S810 *rod-shaped ceramic*. Analisa pelaksanaan *hydraulic fracturing* dianalisa dari pembacaan *breakdown test*, *step rate test*, *re-design simulation*, dan *main frac*. Perhitungan geometri rekahan menggunakan metode PKN 2D untuk mengetahui panjang, lebar, tinggi, dan konduktivitas rekahan. Dan perhitungan permeabilitas formasi rata-rata dengan metode *Howard And Fast*, *index productivity (J/Jo)* dengan metode *Cinco-Ley Samaniego* dan *Dominique*, serta penentuan grafik *Inflow Performance Relationship (IPR)* setelah perekahan dengan metode Pudjo Sukarno. Dan melakukan analisa keekonomian berupa perhitungan *pay out time*.

Berdasarkan hasil perhitungan manual untuk stimulasi *hydraulic fracturing* dengan *rod-shaped proppant* pada geometri rekahan dengan menggunakan metode PKN 2D didapatkan nilai panjang rekahan 257.03 ft, tinggi rekahan 12 ft, lebar rekahan 3.49 inch, dan konduktivitas rekahan 33730 mD ft. Sedangkan untuk konvensional *proppant* didapatkan nilai panjang rekahan panjang rekahan 214.5 ft, tinggi rekahan 10 ft, lebar rekahan 0.137 inch, dan konduktivitas rekahan 13399 mD ft. Sedangkan hasil perhitungan permeabilitas rata-rata formasi dengan menggunakan metode *Howard And Fast* sebesar 72.16 atau mengalami kenaikan 10.9 kali dari kondisi awal, perhitungan *productivity index* dengan metode *Cinco-Ley Samaniego* dan *Dominique* didapati kenaikan PI sebesar 5.40 kali untuk *rod-shaped proppant* dan 4.84 kali untuk konvensional *proppant*. Serta penentuan kurva IPR dengan metode Pudjo Sukarno didapati peningkatan laju produksi mengalami peningkatan menjadi 230 BOPD jika menggunakan *rod-shaped proppant* dan 193 BOPD jika menggunakan konvensional *proppant*. Dilihat dari peningkatan laju produksi, pelaksanaan *hydraulic fracturing* dengan *rod-shaped proppant* dapat dikatakan berhasil. Selain itu juga didapatkan nilai POT pada pengerjaan sumur FA-91 selama 56.3 hari.

Kata kunci: *hydraulic Fracturing*, *rod-shaped proppant*, laju produksi

ABSTRACT

COMPARATIVE IMPLEMENTATION OF HYDRAULIC FRACTURING USING ROD-SHAPE PROPPANT AND CONVENTIONAL PROPPANT IN THE T2 FORMATION OF THE FA-91 WELL IN THE KB FIELD

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The FA-91 well in the Batak City field is a directional well that produces in the T-2 layer dominated by sandstone with a permeability value of less than 6.6 mD which is relatively low and a porosity of 20%. This small permeability is the background for implementing hydraulic fracturing using sand in the form of rod-shaped proppant with the aim of increasing the permeability and productivity of the FA-91 well..

The analysis of the hydraulic fracturing results carried out on the FA-91 Well began by collecting reservoir data, well completion data, perforation data and rock mechanics data. The fracturing fluid used is YF140HTD and the type of proppant used is S810 rod-shaped ceramic. Analysis of the implementation of hydraulic fracturing is analyzed from reading breakdown tests, step rate tests, re-design simulations, and main frac. Fracture geometry calculations use the 2D PKN method to determine the length, width, height and conductivity of the fracture. And calculating the average formation permeability using the Howard And Fast method, productivity index (J/Jo) using the Cinco-Ley Samaniego and Dominique method, and determining the Inflow Performance Relationship (IPR) graph after fracturing using the Pudjo Sukarno method. And carry out economic analysis in the form of pay out time calculations. .

Based on the results of manual calculations for hydraulic fracturing stimulation with rod-shaped proppant on fracture geometry using the PKN 2D method, the fracture length value was 257.03 ft, fracture height 12 ft, fracture width 3.49 inch, and fracture conductivity 33730 mD ft. Meanwhile, for conventional proppant, the fracture length value was 214.5 ft, fracture height 10 ft, fracture width 0.137 inch, and fracture conductivity 13399 mD ft. Meanwhile, the results of calculating the average permeability of the formation using the Howard and Fast method were 72.16 or an increase of 10.9 times from the initial conditions. Calculation of the productivity index using the Cinco-Ley Samaniego and Dominique method showed an increase in PI of 5.40 times for rod-shaped proppant and 4.84 times. for conventional proppant. As well as determining the IPR curve using the Pudjo Sukarno method, it was found that the production rate increased to 230 BOPD if using rod-shaped proppant and 193 BOPD if using conventional proppant. Judging from the increase in production rates, the implementation of hydraulic fracturing with rod-shaped proppant can be said to be successful. Apart from that, the POT value was also obtained for working on the FA-91 well for 56.3 days.

Keywords: hydraulic Fracturing, rod-shaped proppant, production rate,