

## RINGKASAN

### EVALUASI *ACID FRACTURING* UNTUK PENINGKATAN KAPASITAS INJEKSI PADA SUMUR "IRC-13" LAPANGAN "HAM"

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Sumur "IRC-13" merupakan sumur produksi yang dikonversi menjadi sumur injeksi. Setelah 2 tahun beroperasi terjadi penurunan kapasitas injeksi sehingga Sumur "IRC-13" hanya mampu menginjeksikan air 237.172 STB/d. Maka dari itu, dilakukan peningkatan laju injeksi pada Sumur "IRC-13" dengan cara stimulasi *acid fracturing*. Stimulasi ini dipilih karena dianggap paling sesuai dengan kondisi lapangan.

Pelaksanaan operasi *acid fracturing* dilakukan dengan mengumpulkan data *reservoir*, mekanika batuan, data sumur, dan data injeksi. Kemudian dilakukan evaluasi yang meliputi evaluasi perencanaan, evaluasi pelaksanaan, dan evaluasi hasil. Evaluasi perencanaan meliputi penentuan komposisi fluida *treatment*, desain rekahan, penentuan volume *pad*, asam, dan *displacement*, dan penentuan desain injeksi. Selanjutnya, dalam evaluasi pelaksanaan dilakukan *pickling stage*, *step rate test*, *main fracturing stage*, dan *displacement stage*. Setelah evaluasi pelaksanaan maka selanjutnya dilakukan evaluasi hasil dengan membandingkan hasil geometri rekahan yang terbentuk, tingkat penembusan asam, volume fluida *treatment*, dan konduktivitas rekahan, peningkatan laju injeksi, permeabilitas dan *Fracture dimensionless conductivity* dengan nilai yang terdapat pada *post job*.

Berdasarkan evaluasi hasil pelaksanaan *acid fracturing* diperoleh geometri rekahan dengan panjang rekahan ( $xf$ ) sebesar 164.13 ft, lebar rekahan ( $wf$ ) sebesar 0.24 inch, tinggi rekahan ( $hf$ ) sebesar 32.55 ft, dan jarak penembusan asam ( $L_a$ ) sebesar 148.43 ft. Tekanan injeksi permukaan *pad* sebesar 2072.02 psi dan asam sebesar 1368.42 psi. Volume fluida *pad* yang digunakan sebesar 96.85 bbl, volume asam sebesar 113.7 bbl, volume *displacement* sebesar 60.729 bbl. Setelah dilakukan *acid fracturing* didapatkan konduktivitas rekahan sebesar 10601.5 md-ft, FCD sebesar 1.605, permeabilitas sebesar 40.4 md, dan peningkatan kapasitas injeksi menjadi 2542 STB/d. Berdasarkan hasil tersebut, operasi *acid fracturing* berhasil dilakukan pada Sumur "IRC-13"

Kata Kunci : *Acid Fracturing*, Sumur Injeksi, Laju Injeksi

## ABSTRACT

### EVALUATION OF ACID FRACTURING TO INCREASE INJECTION CAPACITY IN THE “IRC-13” WELL OF “HAM” FIELD

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*The “IRC-13” Well is a production well that was converted into an injection well. After 2 years of operation, there was a decrease in injection capacity hence the “IRC-13” Well was only able to inject 273.172 STB/d. Therefore, it is necessary to increase the injection rate at the “IRC-13” Well by performing acid fracturing stimulation. This stimulation was chosen because it was considered as the most suitable stimulation along with the field condition.*

*The implementation of acid fracturing operations is carried out by collecting reservoir data, rock mechanics, well data, and injection data. Then an evaluation is carried out which includes planning evaluation, implementation evaluation, and result evaluation. Planning evaluation includes determining the composition of the treatment fluid, fracture design, determining the volume of pad, acid, and displacement, and determining the injection design. Further, the implementation evaluation includes pickling stage, step rate test, main fracturing stage, and displacement stage. Following the implementation evaluation, the results were evaluated by comparing the results of the fracture geometry formed, acid penetration rate, treatment fluid volume, and fracture conductivity, increased injection rate, permeability and fracture dimensionless conductivity with the values found in the post job.*

*Based on the evaluation of the results of acid fracturing operation, a fracture geometry with a fracture length ( $x_f$ ) of 164.13 ft, fracture width ( $w_f$ ) of 0.24 inch, fracture height ( $h_f$ ) of 32.55 ft, and acid penetration distance ( $L_a$ ) of 148.43 ft was obtained. The pad surface injection pressure was 2072.02 psi and the acid was 1368.42 psi. The pad fluid volume used was 96.85 bbl, acid volume was 113.7 bbl, displacement volume was 60.729 bbl. After acid fracturing, fracture conductivity of 10601.5 md-ft, FCD of 439.68, permeability of 40.4 md, and increased injection capacity to 2542 STB/d were obtained. Based on these results, the acid fracturing operation was successfully conducted at “IRC-13” Well.*

*Keyword : Acid Fracturing, Well Injection, Injection Rate*