ABSTRAK

PERENCANAAN *HYDRAULIC FRACTURING* BERDASARKAN ANALISIS KARAKTERISTIK RESERVOIR DAN GEOMEKANIKA UNTUK OPTIMASI PRODUKTIVITAS SUMUR "IJ-07" LAPANGAN "TBN"

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Sumur "IJ" Lapangan "TBN" merupakan sumur minyak pada reservoir batupasir Formasi Talang Akar dengan karakteristik permeabilitas rendah sebesar 5,25 mD dan porositas 14,7%, sehingga kemampuan aliran fluida reservoir menuju sumur menjadi terbatas dan menyebabkan produktivitas sumur menurun. Untuk mengatasi permasalahan tersebut dilakukan perencanaan *hydraulic fracturing* guna meningkatkan konduktivitas aliran fluida melalui pembentukan rekahan buatan yang konduktif.

Metode penelitian dilakukan melalui analisis karakteristik reservoir dan geomekanika. Selanjutnya dilakukan sensitivitas terhadap pemilihan fluida perekah *borate crosslinked* YF130.1HTD dan YF135.1HTD, pemilihan *proppant ceramic Carbolite* ukuran mesh 20/40, 16/20, dan 12/18, serta penentuan *pump schedule* menggunakan perangkat lunak simulasi *hydraulic fracturing*. Evaluasi keberhasilan stimulasi dilakukan berdasarkan parameter *fracture conductivity, skin factor, fold of increase* (FOI), permeabilitas rata-rata formasi, dan *inflow performance relationship* (IPR).

Hasil penelitian menunjukkan Sumur "IJ" cocok dilakukan *hydraulic fracturing* berdasarkan analisa geomekanika. Skenario optimum diperoleh pada fluida YF135.1HTD dengan *proppant ceramic Carbolite* mesh 12/18 dan *pump rate* 13 bbl/min. Skenario tersebut meningkatkan permeabilitas reservoir dari 5,25 mD menjadi 48,63 mD dengan nilai FOI sebesar 9,43 serta meningkatkan performa kurva IPR. Berdasarkan hasil evaluasi, perencanan *hydraulic fracturing* berhasil meningkatkan kemampuan aliran fluida dan produktivitas Sumur "IJ" Lapangan "TBN".

Kata kunci: geomekanika, *hydraulic fracturing*, produktivitas sumur, *proppant ceramic*, reservoir batupasir

ABSTRACT

HYDRAULIC FRACTURING DESIGN BASED ON RESERVOIR CHARACTERISTICS AND GEOMECHANICS ANALYSIS FOR OPTIMIZING WELL PRODUCTIVITY "IJ-07" IN "TBN" FIELD

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Well IJ" in the "TBN" Field is an oil well located in the Talang Akar sandstone reservoir with low permeability characteristics of 5.25 mD and porosity of 14.7%, causing limited reservoir fluid flow into the wellbore and resulting in declining well productivity. To overcome this problem, hydraulic fracturing was designed to improve fluid flow conductivity through the creation of conductive artificial fractures.

The research method was conducted through reservoir characterization and geomechanical analysis. Sensitivity analysis was performed on the selection of borate crosslinked fracturing fluids YF130.1HTD and YF135.1HTD, ceramic Carbolite proppant sizes of 20/40, 16/20, and 12/18 mesh, as well as pump schedule determination using hydraulic fracturing simulation software. The stimulation performance was evaluated based on fracture conductivity, skin factor, fold of increase (FOI), average formation permeability, and inflow performance relationship (IPR).

The results showed that Well "IJ" is suitable for hydraulic fracturing based on geomechanical analysis. The optimum scenario was achieved using YF135.1HTD fluid with 12/18 mesh ceramic Carbolite proppant and a pump rate of 13 bbl/min. This scenario increased reservoir permeability from 5.25 mD to 48.63 mD with an FOI value of 9.43 and improved the IPR curve performance. Based on the evaluation results, the hydraulic fracturing design successfully enhanced fluid flow capability and the productivity of Well "IJ" in the "TBN" Field.

Keywords: geomechanics, hydraulic fracturing, well productivity, ceramic proppant, sandstone reservoir