RINGKASAN

EVALUASI *HYDRAULIC FRACTURING* UNTUK PENINGKATAN PRODUKTIVITAS SUMUR "SRN-05" DAN "SRN-12" LAPANGAN "SEPT"

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Sumur "SRN-05" dan "SRN-12" merupakan sumur baru di Lapangan "Sept" dengan formasi produktif pada lapisan *Gumai Sand* tepatnya di bagian *upper* dari Formasi Gumai dengan lithologi batuan yang didominasi oleh *sandstone*. Formasi produktif kedua sumur tersebut tergolong *tight zone*, karena harga permeabilitas formasi yang tergolong ketat (*tight*) kurang dari 5 mD. Hal tersebut menjadi penyebab *hydraulic fracturing* dilakukan setelah tahap pemboran. Evaluasi dilakukan guna mengetahui keberhasilan serta perbandingan hasil *hydraulic fracturing* dua sumur tersebut.

Evaluasi dimulai dengan pengumpulan data yang dilanjutkan dengan analisis perencanaan serta pelaksanaan stimulasi. Evaluasi geometri rekahan dilakukan secara komparatif antara hasil aktual dengan perhitungan manual menggunakan metode PKN 2D. Metode PKN 2D digunakan karena lapisan produktif kedua sumur tergolong *tight zone* sehingga dibutuhkan panjang rekahan lebih besar daripada tinggi rekahan. Evaluasi produktivitas sumur setelah stimulasi meliputi peningkatan permeabilitas rata-rata formasi (persamaan Howard & Fast), peningkatan *productivity index* (metode Cinco-Ley Samaniego dan Dominique) , dan perbandingan IPR sebelum stimulasi (metode Darcy dengan *software pipesim*) dan setelah stimulasi (metode Vogel dengan *software pipesim*).

Persentase perbedaan geometri rekahan terutama pada panjang rekahan dan lebar rekahan antara hasil aktual dan perhitungan manual pada Sumur "SRN-05" tergolong rendah di bawah 10%, sedangkan pada "SRN-12" terutama pada panjang rekahan begitu signifikan dengan persentase sebesar 41%. Persentase peningkatan permeabilitas rata-rata formasi pada Sumur "SRN-05" sebesar 635%, sedangkan pada "SRN-12" sebesar 346%. FOI pada Sumur "SRN-05" dan "SRN-12" sebesar 4,35 kali dan 3,32 kali. Berdasarkan perbandingan kurva IPR, persentase peningkatan laju produksi minyak pada Sumur "SRN-05" sebesar 1710%, sedangkan pada "SRN-12" sebesar 387%. *Hydraulic fracturing* pada Sumur "SRN-05" dapat dikatakan berhasil secara pelaksanaan dan dalam hal peningkatan produksi setelah stimulasi, sedangkan pada "SRN-12" kurang berhasil secara pelaksanaan karena *screen out* yang menyebabkan geometri rekahan tidak optimal, tetapi masih berhasil dalam hal peningkatan produksi setelah stimulasi.

Kata kunci: *hydraulic fracturing*, evaluasi, permeabilitas rendah, batupasir

ABSTRACT

EVALUATION OF HYDRAULIC FRACTURING FOR INCREASING THE PRODUCTIVITY OF THE "SRN-05" AND "SRN-12" WELLS IN THE "SEPT" FIELD

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The "SRN-05" and "SRN-12" wells are new wells in the "Sept" Field, with productive formations in the Gumai Sand layer, specifically in the upper part of the Gumai Formation where the rock lithology is predominantly sandstone. The productive formations in these wells are classified as tight zones due to their low permeability (less than 5 mD). This necessitated hydraulic fracturing after the drilling phase. An evaluation was conducted to determine the success and compare the hydraulic fracturing results of these two wells.

The evaluation began with data collection, followed by an analysis of the planning and execution of the stimulation. A comparative fracture geometry evaluation was carried out by comparing actual results with manual calculations using the PKN 2D method. The PKN 2D method was chosen because the productive layers of both wells are categorized as tight zones, requiring greater fracture length than fracture height. Post-stimulation well productivity evaluation included assessing the increase in average formation permeability (Howard & Fast equation), productivity index improvement (Cinco-Ley Samaniego and Dominique methods), and comparing the IPR before stimulation (using Darcy's method with Pipesim software) and after stimulation (using Vogel's method with Pipesim software).

The percentage difference in fracture geometry, particularly in fracture length and width, between the actual results and manual calculations for Well "SRN-05" was relatively low, below 10%. However, for "SRN-12," the fracture length difference was significant, with a percentage of 41%. The percentage increase in average formation permeability for Well "SRN-05" was 635%, whereas for "SRN-12," it was 346%. The FOI for Wells "SRN-05" and "SRN-12" was 4.35 and 3.32 times, respectively. Based on the IPR curve comparison, the percentage increase in oil production rate for Well "SRN-05" was 1710%, while for "SRN-12," it was 387%. The hydraulic fracturing process for Well "SRN-05" was considered successful in terms of execution and post-stimulation production improvement. However, for Well "SRN-12", the execution was less successful due to screen-out, which resulted in suboptimal fracture geometry. Nevertheless, it still achieved production improvement after stimulation.

Keywords: hydraulic fracturing, evaluation, low permeability, sandstone.