

## RINGKASAN

### DESAIN *MATRIX ACIDIZING* DAN PREDIKSI LAJU PRODUKSI BERDASARKAN DATA *PRESSURE BUILD UP TEST* PADA SUMUR “Y-04” LAPANGAN “ILY”

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Sumur “Y-04” adalah sumur minyak dengan kedalaman mencapai 8416,48 ft, zona perforasi pada 6066 – 6072 ft dengan ketebalan zona produktif 16 ft yang mana dalam kedalaman tersebut merupakan Lapisan TAF (Talang Akar) dengan batuan reservoir merupakan dominasi batupasir (*sandstone*). Sumur diproduksi dengan cara *natural flow*. Permeabilitas awal sumur 146 md sehingga tergolong baik, namun, sumur mengalami penurunan produksi yang semula sebesar 367,20 BFPD terus menurun hingga saat ini, menjadi 32 BFPD.

Identifikasi kerusakan formasi menggunakan nilai *skin*, permeabilitas *damage*, PI, dan FE dari analisa data PBU *test*. Identifikasi masalah *scale* dianalisa dari harga SI hasil analisa kimiawi air formasi. Setelah itu, perhitungan desain *matrix acidizing* yang mencakup volume asam, tekanan injeksi, gradien rekah formasi, tekanan hidrostatis asam, tekanan injeksi pompa maksimum di permukaan, dan penentuan laju injeksi asam maksimum. Menentukan volume pada setiap tahap *matrix acidizing*, meliputi tahap *pickling stage*, *preflush*, *main acid treatment (mainflush)*, serta *overflush*. Asam yang digunakan pada tahap *main acid treatment* adalah HCL 12% : HF 3% berdasarkan uji *acid solubility* pada sumur yang berdekatan. Prediksi laju alir fluida setelah dilakukan stimulasi *matrix acidizing* menggunakan analisa IPR tiga fasa Wiggins dengan asumsi permeabilitas kembali kebesaran semula ( $S=0$ ).

Hasil analisa menunjukkan nilai *skin* +3,14, permeabilitas *damage* 16,7 md, FE 0,7, dan PI 0,26. Harga *Stability Index* +0,58 menunjukkan ada kemungkinan masalah *scale*. Perhitungan desain dan perencanaan pelaksanaan stimulasi *matrix acidizing* diperoleh harga gradien rekah formasi sebesar 0,6007 sehingga tekanan rekah formasi sebesar 3646,2 psi dengan diperhitungkan laju injeksi asam maksimum sebesar 0,58 bpm. Volume yang diinjeksikan untuk *main acid treatment* 2809,17 gallon. Jika *matrix acidizing* berhasil, maka hasil prediksi laju produksi *liquid* sebesar 190 BFPD yang semula hanya 75 BFPD.

Kata kunci: *pressure build up*, batupasir, *matrix acidizing*,

## ABSTRACT

### **DESAIN MATRIX ACIDIZING DAN PREDIKSI LAJU PRODUKSI BERDASARKAN DATA *PRESSURE BUILD UP TEST* PADA SUMUR “Y-04” LAPANGAN “ILY”**

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*The “Y-04” well is an oil well with a depth of 8416.48 ft, a perforation zone at 6066 - 6072 ft with a productive zone thickness of 16 ft which at that depth is the TAF (Talang Akar) Layer with reservoir rocks dominated by sandstone. The well is produced by natural flow. The initial well production was 367.20 BFPD, but the well productivity has continued to decline until now, to 32 BFPD. The initial well permeability is 146 md so it is classified as good.*

*Identification of formation damage using skin values, permeability damage, PI, and FE from PBU test data analysis. Identification of scale problems is analyzed from the SI price of the results of the chemical analysis of formation water. After that, the calculation of the matrix acidizing design includes acid volume, injection pressure, formation fracture gradient, acid hydrostatic pressure, maximum pump injection pressure on the surface, and determination of the maximum acid injection rate. Determine the volume at each stage of matrix acidizing, including the pickling stage, preflush, main acid treatment (mainflush), and overflush. The acid used in the main acid treatment stage is HCL 12%: HF 3% based on acid solubility tests in adjacent wells. Prediction of fluid flow rate after matrix acidizing stimulation using Wiggins three-phase IPR analysis assuming permeability returns to its original size ( $S = 0$ ).*

*The analysis results show a skin value of +3.14, damage permeability of 16,7 md, FE 0.7, and PI 0.26. The Stability Index price of +0.58 indicates a possible scale problem. The design calculation and planning of the implementation of matrix acidizing stimulation obtained a formation fracture gradient price of 0.6007 so that the formation fracture pressure was 3646.2 psi with a maximum acid injection rate of 0.58 bpm. The volume injected for the main acid treatment is 2809.17 gallons. If matrix acidizing is successful, the predicted liquid production rate will be 190 BFPD which was originally only 75 BFPD.*

*Keywords: pressure build up, sandstone, matrix acidification.*