

RINGKASAN

Lapangan Bentayan merupakan lapangan tua yang ditemukan sejak tahun 1932 dan berproduksi hingga saat ini pada formasi Talang Akar. Lapisan Telisa merupakan lapisan yang belum diproduksi di lapangan Bentayan dan baru terbuka di satu sumur suspended (BN-62). Lapisan Telisa ini terbukti menghasilkan minyak namun belum dapat berproduksi kontinu karena memiliki permeabilitas yang rendah. Referensi lapisan Telisa di lapangan lain sukses diproduksi melalui *hydraulic fracturing*.

Penelitian ini dimaksudkan untuk mengembangkan potensi produksi lapisan Telisa di lapangan Bentayan dengan metode stimulasi *hydraulic fracturing* melalui penentuan besar cadangan, penentuan fluida perekah, penentuan proppant, perencanaan dimensi perekahan, perencanaan jadwal pemompaan, dan evaluasi keekonomian stimulasi *hydraulic fracturing* di sumur BN-62 dan BN-21.

Hasil perhitungan cadangan dengan basis sumuran di sumur BN-62 dan BN-21 masing-masing sebesar 2.555 MSTB dan 1698 MSTB. Fluida perekah yang digunakan adalah Hybor#35 yang merupakan fluida bertaut silang dengan nilai residu yang sangat rendah dan memiliki kemampuan membawa konsentrasi proppant yang tinggi. Selain fluida perekah, direncanakan pula stimulasi solvent untuk mengkondisikan formasi terkait dengan karakteristik minyak di lapisan Telisa ini yang memiliki titik tuang tinggi (40°C). Proppant yang digunakan adalah Bauxlite 20/40 yang merupakan jenis proppant kategori pasir yang relatif murah dan mampu menahan *closure pressure* hingga 6000 psi. Proppant ini berukuran 0,0331 in dan sudah mempertimbangkan *Entry Hole Diameter* pada perforasi sebesar 0,4 in. Berdasarkan simulasi *fracpro 2019* diperoleh dimensi perekahan BN-62 dengan panjang rekahan 72,1 m, tinggi rekahan 27,7 m, lebar rekahan 0,307 in, konduktivitas rekahan 3913,6 md-ft dan FCD 1,39 melalui pemompaan 65 klbs propan dan 858 bbl fluida perekah. Adapun sumur BN-21 diperoleh dimensi perekahan dengan panjang rekahan 59 m, tinggi rekahan 46,1 m, lebar rekahan 0,328 in, konduktivitas rekahan 3913,6 md-ft dan FCD 3,82 melalui pemompaan 69,8 klbs proppant dan 902,2 bbl fluida perekah. Melalui perhitungan IPR, didapatkan estimasi AOFD dari BN-62 dan BN-21 sebesar 127 BFPD dan 90 BFPD dengan target Q_{oi} sebesar 51 BOPD dan 36 BOPD. Berdasarkan analisis keekonomian, stimulasi *hydraulic fracturing* di sumur BN-21 dan BN-62 memiliki potensi keekonomian yang baik dengan nilai NPV USD 184,000 dan USD 313,000 serta nilai IRR masing-masing sebesar 45,8% dan 67,4%.

Kata Kunci: stimulasi sumur, hydraulic fracturing, reservoir permeabilitas rendah, Telisa

ABSTRACT

Bentayan Field is a mature oil field founded in 1932 and have been producing from Talang Akar Formation. Telisa Layer is another layer found in Bentayan Structure that hasn't been produced and this layer is opened at well BN-62. Well log analysis indicated hydrocarbon presence into the layer, but economic production is prevented by its relatively low permeability characteristic. As reference, the same Telisa Layer has been known as a productive layer through hydraulic fracturing

The purpose of this research is to develop the production potential of Telisa Layer in Bentayan Field with hydraulic fracturing stimulation design processes which includes reserve calculation, frac fluid determination, proppant determination, frac dimension calculation, pumping schedule design, and economic evaluation of hydraulic fracturing job at well BN-62 and BN-21.

From the well reserve calculation of Telisa Layer in BN-62 and BN-21, each well has oil reserve of 2.555 MSTB and 1698 MSTB. The fracturing fluid chosen for hydraulic fracturing job of the two wells is Hybor#35 which has high proppant transport capacity. For the hydraulic stimulation of BN-62 and BN-21, solvent also will be added to dissolve deposited paraffin wax that might occur in formation and provide high mobility to the oil which has HPO characteristic. Proppant that will be used for the job is bauxlite 20/40 which has compression strength of 6000 psi which also suitable with the perforation diameter. Based on job simulation with fracpro 2019, after fracturing job, BN-62 will have fracture with 72,1 m half length, height of 27,7 m, width of 0,307 in, frac conductivity of 39313,6 md-ft, and FCD of 1,39 from pumping 65 klbs of proppant and 858 bbl of fracturing fluid. BN-21 will have fracture with 59 m half length, height of 46,1 m, width of 0,328 in, frac conductivity of 39313,6 md-ft, and FCD of 3,82 from pumping 69,8 klbs of proppant and 902,2 bbl of fracturing fluid. With previously described fracture parameter, BN-62 will have AOF of 127 BFPD and targeted oil production rate of 51 BOPD, while BN-21 will have AOF of 90 BFPD and 36 BOPD target oil production rate. Based on feasibility study conducted on each simulated oil production target, the fracturing job will have economic potential with NPV of USD 184.000 and USD 313.0000 and IRR of 45,8% and 67,4% for BN-62 and BN-21 respectively.

Keywords: well stimulation, hydraulic fracturing, low permeability reservoir, Telisa