ABSTRAK

KARAKTERISASI RESERVOIR DAN PERHITUNGAN VOLUMETRIK CADANGAN MINYAK MENGGUNAKAN ANALISIS PETROFISIKA DAN INTERPRETASI SEISMIK PADA FORMASI *TENSLEEP* DI LAPANGAN *TEAPOT DOME*, CEKUNGAN *POWDER RIVER*, WYOMING

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Perhitungan *stock tank original oil in place* (STOOIP) dapat diketahui melalui analisa petrofisika dan interpretasi seismik. Melalui analisis petrofisika diperoleh nilai properti petrofisika berupa kandungan serpih, porositas batuan, saturasi air, permeabilitas dan ketebalan reservoir berupa *gross, net sand, net pay* dan *net to gross* sedangkan melalui interpretasi seismik diperoleh luas area hidrokarbon. Selanjutnya dilakukan pemetaan distribusi properti petrofisika dan ketebalan reservoir. Semua parameter tersebut digunakan untuk menghitung besar cadangan hidrokarbon pada lapangan *Teapot Dome*, formasi batupasir *Tensleep*, cekungan *Powder River*.

Metode yang digunakan dalam penelitian kali ini adalah metode deterministik menggunakan perangkat lunak *Geolog 7.0.* Volume *shale* ditentukan dari metode perhitungan log sinar gamma, porositas efektif dihitung dengan metode neutron-densitas, saturasi air ditentukan berdasarkan persamaan Archie, permeabilitas dihitung dengan persamaan Wyllie dan Rose sedangkan *gross, net sand, net pay* dan *net to gross* ditentukan dari hasil *lumping.*

Hasil penelitian dari tujuh sumur menunjukkan bahwa formasi *Tensleep* mempunyai nilai rata-rata volume *shale* 36,69 %, porositas efektif 7,4 %, saturasi air efektif 53,37 % dan permeabilitas 79,57 mD. Formasi *Tensleep* juga mempunyai ketebalan reservoir rata-rata *gross* 27,65 kaki, *net sand* 14,53 kaki, *net pay* 8,49 kaki dan *net to gross* 0,39. Dari peta distribusi nilai properti petrofisika reservoir diperoleh zona dengan kualitas reservoir baik berada di tenggara. Dari hasil perhitungan volumetrik diperoleh cadangan minyak ditempat sebesar 77,24 MMBO.

Kata Kunci : analisa petrofisika, evaluasi reservoir, volumetrik, STOOIP, formasi *Tensleep*, *Teapot Dome*

ABSTRACT

RESERVOIR CHARACTERIZATION AND VOLUMETRIC OIL CALCULATION USING PETROPHYSICS ANALYSIS AND SEISMIC INTERPRETATION AT TENSLEEP FORMATION IN TEAPOT DOME FIELD, POWDER RIVER BASIN, WYOMING

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Stock tank original oil in place (STOOIP) calculations can be obtained by doing petrophysics analysis and seismic interpretation. By petrophysics analysis obtained petrophysics properties such as volume shale, porosity, water saturation, permeability, and reservoir thickness such as gross, net sand, net pay and net to gross, whereas by seismic interpretation obtained wide area of hydrocarbon zone. Then performed mapping distribution of those petrophysics properties and reservoir thickness. That parameters was used to calculate hydrocarbon reserve in Teapot Dome field, Tensleep sandstone formation, Powder River Basin.

This research used deterministic method in Geolog 7.0 software. Shale volume was determined from gamma ray log calculation method, effective porosity was calculated by neutron-density method, water saturation was determined based on Archie's equation, permeability was calculated by Wyllie and Rose equation whereas gross, net sand, net pay and net to gross was determined from lumping.

The Research result of seven drilling wells shows that Tensleep formation had average value of shale volume about 36.69 %, effective porosity about 7.4 %, effective water saturation about 53.37 % and permeability about 79.57 mD. Tensleep formation also had average reservoir thickness of gross about 27.65 feet, net sand about 14.53 feet, net pay about 8.49 feet and net to gross about 0.39. From the map of petrophysical properties distribution can be obtained a good quality zone reside at the south-eastern. From the result of volumetric calculation obtained oil reserve in place as big as 77.24 MMBO.

Keywords : Petrophysics analysis, reservoir evaluation, volumetric, STOOIP, Tensleep formation, Teapot Dome