

ABSTRAK

ESTIMASI VOLUME HIDROKARBON PADA LAPISAN “F”, FORMASI TALANGAKAR, LAPANGAN ORCHID, CEKUNGAN JAWA BARAT UTARA

Oleh
Nabila Zafira Damayanti
NIM: 111220169
(Program Studi Sarjana Teknik Geologi)

Penelitian dilakukan di Lapangan Orchid, Cekungan Jawa Barat Utara. Tujuan penelitian ini untuk mengestimasi volume hidrokarbon pada lapisan “F” Formasi Talangakar menggunakan pemodelan statik. Formasi Talangakar merupakan salah satu reservoir hidrokarbon produktif di Indonesia karena distribusi reservoirnya bersifat heterogen akibat variasi fasies. Pemodelan statik diperlukan untuk mengetahui kondisi geologi bawah permukaan pada kegiatan penentuan estimasi volume hidrokarbon.

Analisis dilakukan menggunakan data *wireline log*, *mudlog*, FMI, *checkshot*, dan seismik. Tahapan analisis meliputi identifikasi litologi, fasies, *marker* stratigrafi, korelasi sumur, pembuatan peta struktur waktu dan kedalaman, pemodelan fasies dengan metode *truncated gaussian simulation*, serta pemodelan properti petrofisika menggunakan metode *sequential gaussian simulation*. Litologi Formasi Talangakar terdiri atas batupasir, batulempung, batugamping, dan batubara. Lapisan “F” terdiri atas fasies *sand bar* dengan elektrofasis *cylindrical*, *sand flat* berbentuk *bell*, dan *mixed flat* berbentuk *funnel serrated*. Formasi ini diinterpretasikan sebagai *transgressive system tract*. Pada interval SL teridentifikasi ada empat *marker* sikuen, yaitu *flooding surface* 1, *flooding surface* 2, *flooding surface* 3, dan *transgressive surface*.

Fasies *sand bar* memiliki porositas efektif 0,1–0,15 m³/m³, *sand flat* 0,05–0,07 m³/m³, dan *mixed flat* 0,02–0,04 m³/m³. Berdasarkan nilai porositas tersebut, fasies *sand bar* memiliki potensi hidrokarbon cukup baik. Perhitungan volumetrik pada fasies *sand bar* menunjukkan volume bulk sebesar 52,47×10⁶ m³, *net volume* sebesar 31,66×10⁶ m³, *pore volume* sebesar 3,72×10⁶ m³, *hydrocarbon pore volume* minyak sebesar 920 ribu m³, dan nilai STOIIP sebesar 2,34×10⁶ STB.

Kata kunci: *Formasi Talangakar, Pemodelan statik, Reservoir, Silisiklastik.*

ABSTRACT

HYDROCARBON VOLUME ESTIMATION IN THE “F” LAYER OF THE TALANGAKAR FORMATION, ORCHID FIELD, NORTH WEST JAVA BASIN

By

Nabila Zafira Damayanti

NIM: 111220169

(Geological Engineering Undergraduated Program)

This study was conducted in the Orchid Field, North West Java Basin, to estimate hydrocarbon volume in the “F” layer of the Talang Akar Formation using static modeling. The Talang Akar Formation is one of Indonesia’s productive hydrocarbon reservoirs, characterized by heterogeneous reservoir distribution due to facies variations. Static modeling is required to understand subsurface geological conditions for hydrocarbon volume estimation.

The study utilized wireline log, mud log, FMI, checkshot, and seismic data. The workflow included lithology and facies analysis, stratigraphic marker identification, well correlation, time and depth structure mapping, facies modeling using Truncated Gaussian Simulation (TGS), and petrophysical property modeling using Sequential Gaussian Simulation (SGS). The Talang Akar Formation consists of sandstone, shale, limestone, and coal. The “F” layer comprises sand bar facies with a cylindrical electrofacies pattern, sand flat facies with a bell-shaped motif, and mixed flat facies with a serrated funnel-shaped motif. The depositional environment is interpreted as a Transgressive Systems Tract (TST). Four sequence stratigraphic markers were identified: Flooding Surface 1, Flooding Surface 2, Flooding Surface 3, and a Transgressive Surface.

Effective porosity ranges from 0.10–0.15 m³/m³ in sand bar facies, 0.05–0.07 m³/m³ in sand flat facies, and 0.02–0.04 m³/m³ in mixed flat facies, indicating that sand bar facies has the best reservoir quality. Volumetric calculations for the sand bar facies yielded a bulk volume of $52.47 \times 10^6 \text{ m}^3$, a net volume of $31.66 \times 10^6 \text{ m}^3$, a pore volume of $3.72 \times 10^6 \text{ m}^3$, an oil hydrocarbon pore volume of $920 \times 10^3 \text{ m}^3$, and a STOIP of $2.34 \times 10^6 \text{ STB}$.

Keywords: *Talangakar Formation, Static modelling, Reservoir, Siliciclastic*