

INTISARI

Evaluasi Petrofisika dalam Penentuan Zona Potensi Hidrokarbon dan Analisis Atribut Seismik untuk Pemetaan Persebaran Area Prospek Hidrokarbon di Lapangan El-Shallom Cekungan Jawa Timur Utara

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Lapangan El-Shallom merupakan salah satu lapangan yang dikelola oleh PT. Pertamina EP Cepu sebagai operator lapangan dalam KKS (Kontraktor Kerja Sama) yang berada di blok Cepu. Penelitian ini dilakukan sepanjang *carbonate build-up* yang terbentuk pada Formasi Kujung yang berumur Oligosen hingga Miosen awal.

Evaluasi petrofisika dan analisa atribut seismik telah dilakukan untuk menentukan zona potensi hidrokarbon dan memetakan persebaran area prospek hidrokarbon. Evaluasi petrofisika dilakukan terhadap lima sumur yang berada sepanjang *carbonate build-up*. Berdasarkan persamaan Bateman-Konen, nilai rata-rata porositas pada lima sumur tersebut berada di *range* 17 hingga 23 persen. Pada properti saturasi air menggunakan metode Archie terdapat perbedaan nilai saturasi air sumur yang berada di bagian timur laut *carbonate build-up* dengan *range* nilai 14 hingga 16 persen, sedangkan pada sumur yang terletak di barat daya *carbonate build-up* memiliki *range* nilai 24 hingga 36 persen. Berdasarkan analisa gradien log resistivitas, *crossover* log densitas-neutron, perhitungan saturasi air dan kontrol pengukuran tekanan fluida pada salah satu sumur maka ditentukan *Gas Oil Contact* (GOC) berada di kedalaman 6546 ft'ss dan *Oil Water Contact* (OWC) pada kedalaman 6692 ft'ss.

Atribut amplitudo *RMS* melalui *crossplot* terhadap hasil perhitungan porositas menunjukkan bahwa karbonat yang memiliki porositas baik memiliki amplitudo yang lebih rendah dibandingkan pada zona *tight*. Melalui atribut *half-time energy* menunjukkan distribusi energi konsentrasi amplitudo yang tinggi pada sepanjang *carbonate build-up* yang mengindikasikan distribusi gas. Atribut *number of zero crossings* diaplikasikan untuk mengkalibrasi indikasi persebaran hidrokarbon gas pada atribut *half-time energy*. Melalui analisa atribut yang telah digunakan menghasilkan peta area prospek hidrokarbon di Lapangan El-Shallom dengan luas area sebesar 6395,18 acre.

Kata kunci: *Carbonate build-up*, amplitudo *RMS*, evaluasi petrofisika, atribut *half-time energy*, atribut *number of zero crossings*

ABSTRACT

Petrophysical Evaluation to Determine Hydrocarbon Potential Zone and Seismic Attribute Analysis to Hydrocarbon Prospect Area Distribution Mapping in El-Shallom Field, East Java North East Java Basin

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El-Shallom Field is one of the fields managed by PT. Pertamina EP Cepu as the field operator in the KKS (Kontraktor Kerja Sama) located in Cepu block. This research was carried out along the carbonate build-up formed in the Kujung Formation which was Oligocene to the early Miocene.

Petrophysical evaluation and seismic attribute analysis have been carried out to determine the hydrocarbon potential zone and map the distribution of the hydrocarbon prospect area. Petrophysical evaluation was conducted on five wells along the carbonate build-up. Based on the Bateman-Konen equation, the average porosity value of the five wells is in the range of 17 up to 23 percent. Archie method has been used in water saturation property have differences in the saturation values of the northeast carbonate build-up wells with a value range of 14 up to 16 percent, whereas in the southwest carbonate build-up wells have a value range of 24 up to 36 percent. Based on the resistivity log gradient analysis, neutron-density log crossover, water saturation calculation and fluid pressure measurement control at the HS-1 well, the Gas Oil Contact (GOC) is determined at a depth of 6546 ft'ss and Oil Water Contact (OWC) at 6692 ft'ss depth.

The attribute of RMS amplitude through crossplot to porosity calculation results shows that good porosity carbonates will have a lower amplitude than the tight zone. Through the half-time energy attribute shows a high amplitude concentration energy distribution throughout the carbonate build-up which indicates gas distribution. The attribute number of zero crossings is applied to calibrate the indication of the gas hydrocarbon distribution in the half-time energy attribute. Through attribute analysis that has been used, it produces a map of the hydrocarbon prospect area at El-Shallom Field with an area of 6395.18 acres.

Keywords: Carbonate build-up, amplitude RMS, petrophysical evaluation, half-time energy attribute, number of zero crossings attribute