ABSTRAK

KARAKTERISASI RESERVOIR KARBONAT *GLOBIGERINA LIMESTONE* PADA FORMASI MUNDU BERDASARKAN *ACOUSTIC IMPEDANCE* (AI) MENGGUNAKAN INVERSI SEISMIK DI LAPANGAN 'M', CEKUNGAN JAWA TIMUR UTARA

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Reservoir karbonat *globigerina limestone* pada Formasi Mundu dikenal memiliki heterogenitas tinggi yang dipengaruhi oleh variasi fasies pengendapan dan proses diagenesa, sehingga memerlukan pendekatan geofisika yang mampu menggambarkan variasi sifat fisis batuan secara lateral dan vertikal. Penelitian ini bertujuan untuk mengkarakterisasi reservoir karbonat *globigerina limestone* di Cekungan Jawa Timur Utara berdasarkan parameter *Acoustic Impedance* (AI) menggunakan inversi seismik 3D. Data yang digunakan meliputi satu sumur referensi dan data seismik *Post-Stack Time Migration* (PSTM). Hasil inversi seismik 3D kemudian dianalisis melalui peta persebaran berbasis pendekatan *arithmetic* untuk mengevaluasi distribusi lateral parameter fisis dan petrofisika batuan. Zona prospek reservoir diidentifikasi pada puncak struktur antiklin dan dicirikan oleh nilai AI menengah–rendah pada kisaran sekitar 3.500–4.000 (g/cc) (m/s), densitas relatif rendah sekitar 1,50–1,80 (g/cc), porositas efektif (PHIE) sekitar 30–40%, porositas total (PHIT) sekitar 45–55%, serta nilai *vclay* yang relatif lebih rendah dibandingkan area sekitarnya. Konsistensi respon parameter tersebut pada peta dan penampang menunjukkan keterkaitan yang kuat dengan kontrol struktur bawah permukaan. Berdasarkan integrasi seluruh parameter, zona tersebut diinterpretasikan sebagai zona prospek reservoir karbonat *globigerina limestone* yang berpotensi untuk pengembangan lebih lanjut.

Kata Kunci: *Acoustic Impedance*, Cekungan Jawa Timur Utara, Formasi Mundu, *Globigerina Limestone*, Inversi Seismik

ABSTRACT

CHARACTERIZATION OF GLOBIGERINA LIMESTONE CARBONATE RESERVOIR IN THE MUNDU FORMATION BASED ON ACOUSTIC IMPEDANCE (AI) USING SEISMIC INVERSION IN 'M' FIELD, NORTH EAST JAVA BASIN

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The globigerina limestone carbonate reservoir of the Mundu Formation is known to exhibit high heterogeneity, which is influenced by variations in depositional facies and diagenetic processes. This condition requires a geophysical approach capable of delineating lateral and vertical variations in rock physical properties. This study aims to characterize the globigerina limestone carbonate reservoir in the North East Java Basin based on Acoustic Impedance (AI) using 3D seismic inversion. The data used consist of one reference well and Post-Stack Time Migration (PSTM) seismic data. The results of the 3D seismic inversion were analyzed using arithmetic-based distribution maps to evaluate the lateral distribution of rock physical and petrophysical parameters. Reservoir prospect zones are identified at the crest of anticline structures and are characterized by moderate to low AI values of approximately 3,500–4,000 (g/cc) (m/s), relatively low density values of about 1.50–1.80 (g/cc), effective porosity (PHIE) ranging from 30–40%, total porosity (PHIT) ranging from 45–55%, and relatively lower vclay values compared to the surrounding areas. The consistency of these parameter responses observed on maps and cross-sections indicates a strong relationship with subsurface structural control. Based on the integration of all parameters, the identified zone is interpreted as a prospective globigerina limestone carbonate reservoir with potential for further development.

Keywords: Acoustic Impedance, Globigerina Limestone, Mundu Formation, North East Java Basin, Seismic Inversion.