

Karakterisasi Reservoir Menggunakan Metode Inversi Seismik dan Multiatribut Seismik Berbasis Probabilistic Neural Network (PNN) pada Lapangan "ZENA", Cekungan Banggai, Sulawesi Tengah = Reservoir Characterization Using Seismic Inversion and Seismic Multiattribute Methods Based on Probabilistic Neural Network (PNN) in the "ZENA" Field, Banggai Basin, Central Sulawesi

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Abstrak

Cekungan Banggai memiliki potensi hidrokarbon yang terakumulasi pada reservoir karbonat dengan porositas ganda – porositas primer dan sekunder akibat diagenesis. Hal tersebut menyebabkan variasi nilai porositas secara vertikal maupun lateral sehingga menyulitkan identifikasi zona hidrokarbon yang potensial. Untuk mengidentifikasi zona reservoir karbonat dengan porositas ganda, penelitian ini mengintegrasikan metode inversi seismik, multiatribut seismik, dan Probabilistic Neural Network (PNN), yang bertujuan untuk meningkatkan akurasi dalam pemodelan karakteristik reservoir. Hasil penelitian menunjukkan bahwa karbonat build-up Formasi Mantawa memiliki impedansi akustik rendah (6200–10000 m/s*g/cc), porositas tinggi (21%–28%), dan saturasi air rendah (30%–47%), yang mengindikasikan adanya batuan berpori yang mengandung hidrokarbon. Diharapkan dengan penerapan integrasi metode tersebut, distribusi reservoir, porositas, dan saturasi air dapat dipetakan dengan lebih akurat berdasarkan hasil dari prediksi Probabilistic Neural Network (PNN) dan membuka peluang eksplorasi lebih lanjut di zona prospektif Lapangan ZENA.

.....The Banggai Basin has hydrocarbon potential accumulated in carbonate reservoirs with dual porosity – primary and secondary porosity due to diagenesis. This causes variations in porosity values both vertically and laterally, making it difficult to identify potential hydrocarbon zones. To identify carbonate reservoir zones with dual porosity, this study integrates seismic inversion methods, multi-attribute seismic analysis, and Probabilistic Neural Network (PNN), aimed at improving the accuracy of reservoir characteristic modeling. The results show that the carbonate build-up of the Mantawa Formation has low acoustic impedance (6200–10000 m/s*g/cc), high porosity (21%–28%), and low water saturation (30%–47%), indicating the presence of porous rocks containing hydrocarbons. It is expected that with the application of the integration of these methods, the distribution of the reservoir, porosity, and water saturation can be mapped more accurately based on the results from the predictions of the Probabilistic Neural Network (PNN), thus opening up further exploration opportunities in the prospective zones of the ZENA Field.