

**RESERVOIR PROPERTY MODELING USING MULTIATTRIBUTE
SEISMIC ANALYSIS WITH A PROBABILISTIC NEURAL NETWORKS
(PNN) APPROACH: CASE STUDY OF THE “ATA” FIELD, NORTH
EAST JAVA BASIN**

By

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ABSTRACT

This research was carried out in an effort to optimize oil and gas production by detecting reservoir locations based on reservoir property distribution modeling using the Probabilistic Neural Networks (PNN) method. The research focus is to identify the best combination of seismic attributes, such as porosity, density, Gamma Ray, and p-wave to improve the accuracy of seismic data interpretation. The research involved 3D PSTM seismic data, well data with well checkshots and well markers, as well as geological information about the research area. The PNN method is used to model the distribution of reservoir properties by connecting seismic data with well data. The results of training data on four types of target logs in the PNN seismic multiattribute process are applied to the overall seismic volume to obtain a pseudo PNN model. The results of the target logs found ranged from 1.9-2.12 g/c³ (density), 0.4-0.48 v/v (porosity), 57-80 API (Gamma Ray), and 147-152 μs/ft (p-wave). Analysis of the time structure map, depth structure map, and multi-attribute slicing shows consistent and mutually supportive responses with the reservoir potential zone thought to be located in the depth range of 140 meters - 400 meters.

Keywords: Reservoir Property Modeling, Seismic Multiattribute Analysis, Probabilistic Neural Networks (PNN).

**PEMODELAN PROPERTI *RESERVOIR* MENGGUNAKAN ANALISIS
MULTIATRIBUT SEISMIK DENGAN PENDEKATAN *PROBABILISTIC
NEURAL NETWORKS (PNN)*: STUDI KASUS LAPANGAN “ATA”,
CEKUNGAN JAWA TIMUR UTARA**

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ABSTRAK

Penelitian ini dilakukan dalam upaya optimalisasi produksi minyak dan gas dengan cara pendeteksian lokasi *reservoir* berdasarkan pemodelan distribusi properti *reservoir* menggunakan metode *Probabilistic Neural Networks (PNN)*. Fokus penelitian adalah mengidentifikasi kombinasi atribut seismik terbaik, seperti *porosity*, *density*, *Gamma Ray*, dan *p-wave* untuk meningkatkan akurasi interpretasi data seismik. Penelitian melibatkan data seismik 3D PSTM, data sumur dengan *well checkshot* dan *well marker*, serta informasi geologi daerah penelitian. Metode PNN digunakan untuk memodelkan distribusi properti *reservoir* dengan menghubungkan data seismik dengan data sumur. Hasil *data training* terhadap empat jenis target *log* pada proses multiatribut seismik PNN diterapkan pada volum seismik secara keseluruhan sehingga diperoleh model *pseudo* PNN. Hasil dari target *log* yang ditemukan berkisar antara 1.9-2.12 g/c³ (densitas), 0.4-0.48 v/v (porositas), 57-80 API (*Gamma Ray*), dan 147-152 μ s/ft (*p-wave*). Analisis terhadap *time structure map*, *depth structure map*, dan *slicing* multiatribut menunjukkan respons yang konsisten dan saling mendukung dengan zona potensial *reservoir* diduga terletak pada kisaran kedalaman 140 meter - 400 meter.

Kata kunci: Pemodelan Properti *Reservoir*, Analisis Multiatribut Seismik, *Probabilistic Neural Networks (PNN)*.