

ABSTRAK
KARAKTERISASI RESERVOAR MENGGUNAKAN INVERSI
MODEL BASED DAN ANALISIS PETROFISIKA PADA LAPANGAN
“LEMON” FORMASI BATURAJA SUMATERA SELATAN
INDONESIA

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Geofisika Eksplorasi berdasarkan karakterisasi potensi reservoir masih menjadi hal yang penting dalam industri minyak dan gas bumi. Formasi baturaja adalah salah satu daerah di Indonesia yang memiliki potensi hidrokarbon cukup baik dengan litologi dominan berupa batugamping. Distribusi facies formasi Baturaja memiliki kecenderungan heterogenitas yang signifikan baik vertikal maupun horizontal dalam jarak dekat. Dalam penelitian ini data 3D digunakan untuk menentukan struktur dan peta horizon, kemudian digunakan untuk menganalisis data seismik dan data sumur yang telah dilakukan inversi berbasis model dan analisis petrofisika dari data sumur. Metode Inversi model based dan sparse spike dipilih untuk mendeskripsikan sifat fisik internal batuan/ lapisan dan kemenerusan secara lateral, sedangkan petrofisika digunakan untuk analisis distribusi porositas batuan. Model hasil inversi berdasarkan distribusi akustik impedansi batuan memiliki range nilai sebesar 11.000-13.000 (m/s)(g/cc) yang diinterpretasikan sebagai daerah potensial hidrokarbon pada formasi Baturaja.

Hasil analisis petrofisika adalah peta persebaran densitas (RHOB), porositas total (PHIT) dan porositas efektif (PHIE) dari daerah penelitian yang diperoleh dari hasil *trace math* berdasarkan persamaan regresi linier AI dengan RHOB, AI dengan PHIT, dan AI dengan PHIE. Berdasarkan proses inversi dan petrofisika diketahui bahwa probabilitas lokasi reservoir daerah penelitian berada pada kedalaman 1597 m sampai 1615 m, dengan nilai porositas total 15% -22%, porositas efektif 11% -17%, densitas 2,2-2,4 g/cc. Reservoir daerah penelitian diperkirakan berada pada daerah *isolated platform* sehingga menghasilkan persebaran porositas yang tidak merata. Hasil analisis log PEF diperoleh *Top* reservoir berupa kalsit dan diperkirakan sebagai lingkungan *vadose zone*, dan pada kedalaman di bawah 1620 ms dalam bentuk dolomit yang diperkirakan berada pada lingkungan diagenesa *mixing zone*.

Keywords: Impedansi akustik, *Mixing zone*, *Model based*, Porositas, *Vadose zone*.

ABSTRACT

**RESERVOIR CHARACTERIZATION USING MODEL BASED
INVERSION AND PETROPHYSICS ANALYSIS “LEMON” FIELD
BATURAJA FORMATION SOUTH SUMATRA BASIN INDONESIA**

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Exploration Geophysics based on reservoir potential characterization still become an important thing in oil and gas industry. Baturaja formation, for example is one of the area in Indonesia that has a good hydrocarbon potential. It's Lithology is dominated by Limestone. The original distribution of Baturaja formation has the tendency for significant heterogeneity both vertical and horizontal over short distance. In this research 3D data is used to determine fault map and map horizons. Then it is used to analyzed seismic and well data which has been carried out by model based inversion and petrophysical analysis from well data. Model based and sparse spike inversion is chosen as the method to describe internal physical properties of rocks and lateral continuity, meanwhile petrophysical analysis is used to determine the distribution of rocks porosity. Inversion result model of rock acoustic impedance distribution value with approximately 11.000-13.000 (m/s)(g/cc) that interpreted as hydrocarbon potential area of Baturaja formation.

While, the result of petrophysical analysis is distribution of porosity map from research area that obtained from trace math result based on AI linear regression equation with PHIE (effective porosity). From the inversion and petrophysical analysis process it is known that the probability of reservoir location of the study area is at a depth of 1597 m to 1618 m, with total porosity value of 15%-22%, effective porosity value of 11% -16%, and density value of 2,2-2,4 g/cc. The reservoir is interpreted as an isolated platform limestone so that the high porosity distribution is uneven. Based on PEF analysis lithology dominance was obtained in top reservoir in the form of calcite and is estimated to be environment vadoze zone at a depth below 1620 in the form of a dolomite suspected to be a mixing zone environment.

Keywords: *Acoustic impedance, Mixing zone, Model based, Porosity, Vadoze zone.*