

ABSTRAK

ANALISIS DISTRIBUSI FASIES LINGKUNGAN PENGENDAPAN BERDASARKAN ATRIBUT SEISMİK DAN INVERSI SEISMİK IMPEDANSI AKUSTIK PADA AREA “ASKIA” CEKUNGAN KUTAI, KALIMANTAN TIMUR

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Cekungan Kutai merupakan salah satu cekungan hidrokarbon terbesar dan paling produktif di Indonesia dengan sistem pengendapan kompleks yang berkembang pada lingkungan fluvio-deltaik. Area ASKIA pada Formasi Kelompok Balikpapan dan Formasi Kelompok Bebulu memiliki potensi reservoir hidrokarbon yang memerlukan analisis terpadu untuk memahami distribusi fasies dan zona prospek. Penelitian ini bertujuan menentukan fasies dan lingkungan pengendapan, memperoleh distribusi impedansi akustik, serta mengidentifikasi persebaran lateral reservoir dan potensi hidrokarbon melalui integrasi data log sumur dan seismik. Data yang digunakan berupa seismik 3D *Post-Stack Time Migration* dan empat sumur, yaitu AS-1, AS-2, KIA-1, dan KIA-2. Metode yang diterapkan meliputi analisis elektrofases, interpretasi sikuen stratigrafi, interpretasi atribut seismik, dan inversi seismik impedansi akustik *model-based*. Target penelitian difokuskan pada interval reservoir klastik MFS-I2 dan MFS-J pada Formasi Kelompok Balikpapan serta interval karbonat CBT pada Formasi Kelompok Bebulu. Hasil penelitian menunjukkan bahwa interval MFS-I2 hingga MFS-J diendapkan pada lingkungan *upper delta plain* hingga *lower delta plain* yang dicirikan oleh *coal*, *organic shale*, *distributary channel*, dan *mouth bar*. Interval CBT berkembang pada lingkungan laut dangkal karbonat dengan perkembangan *patch reef*. Hasil inversi menunjukkan nilai impedansi akustik berkisar 6.000–11.000 m/s.g/cc dengan nilai *cut-off* reservoir 4.000–9.300 m/s.g/cc. *Time Structure Map* menunjukkan tinggian struktur yang berpotensi menjadi zona migrasi dan akumulasi hidrokarbon. Integrasi elektrofases, atribut seismik, dan inversi impedansi akustik efektif untuk karakterisasi reservoir dan identifikasi zona prospek hidrokarbon di Area ASKIA.

Kata kunci: Cekungan Kutai, Fasies Lingkungan Pengendapan, Hidrokarbon, Inversi *Model Based*, Sekuen Stratigrafi

ABSTRACT

ANALYSIS OF THE DISTRIBUTION OF SEDIMENTARY FACIES BASED ON SEISMIC ATTRIBUTES AND SEISMIC ACOUSTIC IMPEDANCE INVERSE MODELING IN THE “ASKIA” AREA OF THE KUTAI BASIN, EAST KALIMANTAN

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The Kutai Basin is one of the largest and most productive hydrocarbon basins in Indonesia, featuring a complex sedimentary system that developed in a fluvial-deltaic environment. The ASKIA area within the Balikpapan Group and Bebulu Group formations holds hydrocarbon reservoir potential that requires integrated analysis to understand facies distribution and prospect zones. This study aims to determine facies and depositional environments, obtain acoustic impedance distributions, and identify the lateral distribution of reservoirs and hydrocarbon potential through the integration of well log and seismic data. The data used consist of 3D Post-Stack Time Migration seismic data and four wells, namely AS-1, AS-2, KIA-1, and KIA-2. The methods applied include electrofacies analysis, stratigraphic sequence interpretation, seismic attribute interpretation, and model-based acoustic impedance seismic inversion. The research focuses on the clastic reservoir intervals MFS-I2 and MFS-J in the Balikpapan Group Formation and the carbonate interval CBT in the Bebulu Group Formation. The results indicate that the MFS-I2 to MFS-J intervals were deposited in an upper to lower delta plain environment characterized by coal, organic shale, distributary channels, and mouth bars. The CBT interval developed in a shallow carbonate marine environment with patch reef development. Inversion results show acoustic impedance values ranging from 6,000–11,000 m/s.g/cc with reservoir cut-off values of 4,000–9,300 m/s.g/cc. The Time Structure Map indicates structural highs that have the potential to serve as hydrocarbon migration and accumulation zones. The integration of electrofacies, seismic attributes, and acoustic impedance inversion is effective for reservoir characterization and the identification of hydrocarbon prospect zones in the ASKIA Area.

Keywords: Depositional Facies, Hydrocarbons, Kutai Basin, Model-Based Inversion, Stratigraphic Sequence