# ABSTRAK

# ANALISA MODEL LINGKUNGAN PENGENDAPAN DARI HASIL ANALISIS ELEKTROFASIES FORMASI BELUMAI DAN BAONG CEKUNGAN SUMATRA UTARA BERDASARKAN DATA SUMUR DAN DATA BIOSTRATIGRAFI

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Cekungan Sumatra Utara merupakan salah satu cekungan sedimen utama di Indonesia yang memiliki perkembangan lingkungan pengendapan yang kompleks akibat pengaruh perubahan muka laut relatif, aktivitas tektonik, dan variasi suplai sedimen. Formasi Belumai dan Formasi Baong merupakan satuan stratigrafi penting yang merekam perubahan lingkungan pengendapan dari sistem pesisir, *platform* karbonat, hingga laut dalam. Penelitian ini bertujuan untuk menentukan litologi, elektrofasies, lingkungan pengendapan, serta merekonstruksi model lingkungan pengendapan Formasi Belumai dan Formasi Baong berdasarkan data sumur dan data biostratigrafi pada daerah penelitian di Cekungan Sumatra Utara.

Metode penelitian dilakukan melalui analisis log sumur, deskripsi side wall core, interpretasi elektrofasies berdasarkan klasifikasi Kendall (2003), korelasi stratigrafi, analisis biostratigrafi, serta interpretasi stratigrafi sekuen pada empat sumur penelitian yaitu NSB E-1, NSO 2N, Salem-1, dan Rajamuda-1A. Analisis elektrofasies menghasilkan pola *cylindrical, serrated, bell*, dan *funnel* yang diinterpretasikan sebagai *tidal mud flat, mouth bar, distributary mouth bar, offshore mud, prodelta, distal delta front, inner carbonate platform, outer carbonate platform, submarine channel fringe, basin floor fan,* dan *slope apron*. Integrasi data elektrofasies, litologi, dan biostratigrafi digunakan untuk menentukan perubahan lingkungan pengendapan pada fase *Transgressive Systems Tract* (TST) dan *Highstand Systems Tract* (HST).

Hasil penelitian menunjukkan bahwa Formasi Belumai berkembang pada lingkungan *mud flat, delta front–distributary mouth bar, shallow marine, inner carbonate platform, hingga outer shelf*. Sementara itu, Formasi Baong didominasi oleh lingkungan *outer shelf, upper slope, slope apron, submarine channel fringe, basin floor fan,* dan *outer carbonate platform*. Pada fase TST terjadi kecenderungan pendalaman lingkungan pengendapan akibat kenaikan muka laut relatif, sedangkan fase HST ditandai oleh progradasi sedimen dan perkembangan lingkungan yang lebih proksimal. Model lingkungan pengendapan yang dihasilkan menunjukkan evolusi sistem pengendapan dari lingkungan pesisir dan platform karbonat menuju lingkungan laut dalam yang dikontrol oleh fluktuasi muka laut relatif, suplai sedimen, dan perkembangan tektonik Cekungan Sumatra Utara selama Miosen Tengah.

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Kata kunci: Biostratigrafi, Formasi, Litologi, Lingkungan Pengendapan, Stratigrafi.

# *ABSTRACT*

# *ANALYSIS OF THE DEPOSITIONAL ENVIRONMENT MODEL FROM RESULTS OF ELECTROFACIES ANALYSIS OF THE BELUMAI AND BAONG FORMATIONS OF THE NORTH SUMATRA BASIN BASED ON WELL DATA AND BIOSTRATIGRAPHIC DATA*

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*The North Sumatra Basin is one of the major sedimentary basins in Indonesia, characterized by a complex depositional history influenced by relative sea-level fluctuations, tectonic activity, and variations in sediment supply. The Belumai and Baong Formations represent important stratigraphic units that record depositional environments ranging from coastal systems and carbonate platforms to deep-marine settings. This study aims to determine lithology, electrofacies, depositional environments, and reconstruct the depositional model of the Belumai and Baong Formations based on well log and biostratigraphic data from the North Sumatra Basin.*

*The research methods include well log analysis, sidewall core description, electrofacies interpretation based on Kendall (2003), stratigraphic correlation, biostratigraphic analysis, and sequence stratigraphic interpretation using four wells, namely NSB E-1, NSO 2N, Salem-1, and Rajamuda-1A. Electrofacies analysis identified cylindrical, serrated, bell, and funnel patterns, which were interpreted as tidal mud flat, mouth bar, distributary mouth bar, offshore mud, prodelta, distal delta front, inner carbonate platform, outer carbonate platform, submarine channel fringe, basin floor fan, and slope apron facies associations. The integration of electrofacies, lithological, and biostratigraphic data was used to determine depositional environment changes during the Transgressive Systems Tract (TST) and Highstand Systems Tract (HST).*

*The results indicate that the Belumai Formation was deposited in mud flat, delta front–distributary mouth bar, shallow marine, inner carbonate platform, and outer shelf environments. In contrast, the Baong Formation is dominated by outer shelf, upper slope, slope apron, submarine channel fringe, basin floor fan, and outer carbonate platform environments. During the TST phase, depositional environments show a deepening trend associated with relative sea-level rise, whereas the HST phase is characterized by sediment progradation and the development of more proximal depositional settings. The resulting depositional model demonstrates the evolution of sedimentary systems from coastal and carbonate platform environments to deep-marine settings, controlled by relative sea-level fluctuations, sediment supply, and tectonic development within the North Sumatra Basin during the Middle Miocene.*

*Keywords: Biostratigraphy, Formations, Lithology, Depositional environment, Stratigraphy.*