

## ABSTRAK

### **PENGARUH LINGKUNGAN PENGENDAPAN TERHADAP KUALITAS BATUBARA BERDASARKAN ANALISIS PROKSIMAT, TOTAL SULFUR, DAN NILAI KALORI PADA PIT TA, KAUBUN, KUTAI TIMUR, KALIMANTAN TIMUR**

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Batubara merupakan komoditas energi strategis yang nilai komersialnya sangat bergantung pada parameter kualitas seperti Nilai Kalori dan Sulfur. Di Pit TA PT Indexim Coalindo, ditemukan permasalahan berupa variasi kualitas yang signifikan antar lapisan batubara dalam Formasi Manumbar, yang ditandai oleh fluktuasi kadar sulfur yang dinamis serta adanya anomali hubungan antar parameter. Fenomena lapangan ini mengindikasikan adanya kontrol genetik yang kuat dari dinamika lingkungan pengendapan purba terhadap kandungan batubara tersebut. Oleh karena itu, penelitian ini dilakukan untuk menganalisis hubungan antara lingkungan pengendapan dengan kualitas batubara melalui parameter proksimat, total sulfur, dan nilai kalori guna memberikan landasan ilmiah bagi optimalisasi perencanaan tambang yang lebih akurat. Penelitian ini menggunakan metode deskriptif-analitik melalui pemetaan geologi lapangan dan pengujian laboratorium. Data stratigrafi terukur digunakan untuk mengidentifikasi asosiasi fasies. Sampel batubara dari *seam* A, L, U-LS, U-HS, dan R diambil menggunakan teknik *channel sampling*, kemudian diuji kualitasnya untuk menentukan peringkat batubara berdasarkan standar klasifikasi ASTM D388. Hasil penelitian menunjukkan stratigrafi daerah telitian tersusun atas Satuan batulempung Manumbar dan Satuan batupasir Manumbar berumur Miosen Tengah yang menunjukkan pola suksesi mengkasar ke atas. Satuan ini terendapkan di lingkungan *transitional lower delta plain* dengan asosiasi fasies berupa rawa, teluk antarcabang sungai, dan *crevasse splay*. Kualitas batubara menunjukkan rata-rata nilai kalori 4.996 – 5.257 Kkal/Kg, kadar abu 4% - 5,9%, dan total sulfur 0,26% - 1,47%, dengan peringkat *Subbituminous* B. Temuan ini membuktikan bahwa persentase sulfur dikontrol secara genetik oleh pengaruh pasang surut air laut (*tidal influence*), sedangkan penurunan nilai kalori disebabkan oleh masuknya material sedimen silisiklastik dari luapan sungai (*crevasse splay*) yang berperan sebagai pengotor anorganik dalam rawa gambut.

Kata kunci: Kualitas Batubara, Lingkungan Pengendapan, Nilai Kalori, Proksimat, Total Sulfur

## **ABSTRACT**

### **DEPOSITIONAL ENVIRONMENT INFLUENCE ON COAL QUALITY BASED ON PROXIMATE ANALYSIS, TOTAL SULFUR, AND CALORIC VALUE IN PIT TA, KAUBUN, EAST KUTAI, EAST KALIMANTAN**

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*Coal is a strategic energy commodity whose commercial value is highly dependent on quality parameters such as Calorific Value and Sulfur content. At Pit TA of PT Indexim Coalindo, significant quality variations were identified among the coal seams within the Manumbar Formation. This issue is characterized by dynamic fluctuations in sulfur content and anomalous relationships between parameters. These field phenomena indicate a strong genetic control of the paleo-depositional environment dynamics on the coal characteristics. Therefore, this research was conducted to analyze the relationship between the depositional environment and coal quality using proximate, total sulfur, and calorific value parameters, aiming to provide a scientific basis for more accurate and measurable optimization in mine planning. This study employed a descriptive-analytical method through field geological mapping and laboratory testing. Measured stratigraphic data were utilized to identify facies associations. Coal samples from seams A, L, U-LS, U-HS, and R were collected using the channel sampling technique and subsequently analyzed to determine the coal rank based on the ASTM D388 classification standard. The results show that the stratigraphy of the study area consists of the Manumbar Claystone Unit and the Manumbar Sandstone Unit of Middle Miocene age, which exhibit a coarsening-upward succession pattern. These units were deposited in a transitional lower delta plain environment with facies associations comprising swamp, interdistributary bay, and crevasse splay. The coal quality analysis indicates an average calorific value of 4,996 – 5,257 Kcal/kg, ash content of 4% – 5.9%, and total sulfur of 0.26% – 1.47%, classifying it as Subbituminous B rank. These findings demonstrate that the sulfur percentage is genetically controlled by tidal influence, whereas the decrease in calorific value is caused by the influx of siliciclastic sedimentary materials from river overflows (crevasse splays) acting as inorganic impurities within the peat swamp.*

**Keywords:** *Calorific Value, Coal Quality, Depositional Environment, Proximate, Total Sulfur*