

SARI

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Penelitian ini dilakukan pada Lapangan “DEA” yang terletak di Cekungan Kutai Bawah, Kalimantan Timur. Stratigrafi Lapangan “DEA” tersusun oleh Kelompok Balikpapan yang berumur Miosen Tengah. Tujuan penelitian ini adalah untuk mengetahui kondisi geologi, mengestimasi tekanan pori dan tegasan minimum horizontal, distribusi zona *overpressure*, mekanisme pembentuk *overpressure* pada daerah penelitian, hubungan geologi daerah penelitian terhadap *overpressure*, dan memberikan rekomendasi *casing point* & *mudweight* untuk sumur *pre-drill*. Pengolahan data dilakukan pada tujuh sumur (DEA-269, DEA-270, DEA-251, DEA-044, DEA-237, DEA-249, dan DEA-261) dengan menggunakan data berupa data *wireline log*, *interval velocity*, LOT (*Leak-Off Test*), laporan pengeboran, *mudlog*, data temperatur, data *mudweight*, data *marker*, dan data reflektansi vitrinit (%Ro). Hasil analisis data sumur menunjukkan bahwa tekanan pori di Lapangan “DEA” terdiri dari tiga kondisi, yaitu kondisi tekanan hidrostatik, *low overpressure*, dan *high overpressure*. Berdasarkan analisis *overpressure* menggunakan data *wireline log*, *top low overpressure* terdapat pada kedalaman bervariasi dari 9448 – 10571 TVDSS, temperature 130 – 140°C dan %Ro 0,7. Zona *low overpressure* memiliki magnitude 8.345 – 10.3. *Top hard overpressure* memiliki magnitude 9.83 – 10.3 ppg pada kedalaman >11812 TVDSS, temperature 140 - 175°C, dan %Ro 0,8. Zona *high overpressure* memiliki magnitude 9.83 – 16.5 ppg. Mekanisme pembentukan *overpressure* di lapangan “DEA” adalah mekanisme *loading* yang disebabkan oleh *disequilibrium compaction* dan *unloading* yang disebabkan oleh diagenesis mineral lempung dan pembentukan hidrokarbon. *Overpressure* menyebar ke seluruh lapangan, dengan *top hard overpressure* yang paling dangkal terdapat di bagian tengah daerah penelitian sesuai dengan struktur tertinggi lapangan “DEA” dan tidak parallel dengan fasies tertentu. Zona *hard overpressure* terdapat pada fasies *pro-delta* yang didominasi *shale*/batulempung. Penelitian ini menghasilkan rekomendasi kisaran *mudweight* dan *casing point* berdasarkan nilai tekanan pori di zona *overpressure* dan tegasan minimum horizontal zona deplesi yang aman untuk pengeboran untuk mengurangi masalah pengeboran di masa mendatang.

Kata kunci: *overpressure*, mekanisme *overpressure*, lapangan “DEA”, Cekungan Kutai Bawah

ABSTRACT

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This research was conducted in the "DEA" Field which is located in the Lower Kutai Basin, East Kalimantan. "DEA" Field is composed by the Balikpapan Formation, which is from the Middle Miocene. The purpose of this study is to determine the geological conditions, estimate the pore pressure and minimum horizontal stress, distribution of overpressure zones, overpressure generating mechanism in the study area, the relationship of the geological conditions to overpressure, and provide recommendations for casing point & mudweight for pre-drill wells. Data processing was carried out on seven wells (DEA-269, DEA-270, DEA-251, DEA-044, DEA-237, DEA-249, and DEA-261) using wireline log data, interval velocity data, LOT (Leak-Off Test) data, drilling reports, mudlog data, temperature data, mudweight data, marker data, and vitrinite reflectance data (%Ro). The results shows that the pore pressure in the "DEA" Field consists of three conditions, hydrostatic pressure, low overpressure, and high overpressure. Based on overpressure analysis using wireline log data, top low overpressure occurs at varying depths from 9448 – 10571 TVDSS, temperatures 130 – 140°C and %Ro 0.7. The low overpressure zone has a magnitude of 8.345 – 10.3. Top hard overpressure has a magnitude of 9.83 – 10.3 ppg at depth >11812 TVDSS, temperature 140 - 175°C, and %Ro 0.8. The high overpressure zone has a magnitude of 9.83 – 16.5 ppg. The overpressure generating mechanism in the "DEA" Field is loading mechanism caused by disequilibrium compaction and unloading mechanism caused by clay mineral diagenesis and hydrocarbon generation. Overpressure spreads throughout the field, with the shallowest top hard overpressure occurring in the middle of the study area according to the highest structure of the "DEA" Field and not parallel to certain facies. The hard overpressure zone is found in the pro-delta facies which is dominated by shale/claystone. This study produces recommendations on the range of mudweight and casing point based on the pore pressure especially in the overpressure zone and minimum horizontal stress of depletion zone for drilling to reduce future drilling problems.

Keyword: *overpressure, overpressure generating mechanism, "DEA" Field, Lower Kutai Basin*