

# Prediksi tekanan pori batuan dari seismik 2-D dan hubungannya terhadap kecepatan seismik untuk mitigasi drilling hazard di lapangan 'B', cekungan Sumatera Tengah = Pore pressure prediction from 2-D seismic in relation to seismic velocity for drilling hazard mitigation in 'B' field, Central Sumatera basin

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## Abstrak

Prediksi tekanan pori merupakan hal yang penting dalam persiapan program pemboran, khususnya jika diprediksi menembus zona gas dangkal. Program pemboran akan mempengaruhi saat penentuan desain selubung pemboran, berat lumpur dan mitigasi tekanan abnormal sebagai bahaya pemboran. Di lapangan 'B', Cekungan Sumatera Tengah beberapa sumur mengalami tendangan lumpur (kick). Kejadian tersebut yang melatar belakangi studi tekanan pori untuk pemboran selanjutnya. Studi ini ditekankan pada teknik integrasi prediksi tekanan pori dari data sumur, yaitu data pemboran, wireline log, data tekanan formasi dan data seismik 2-D. Saat ini, teknologi seismik dengan dasar teknik geopressure dapat memberikan estimasi tekanan dari data kecepatan seismik dikombinasikan dengan data sumur memiliki tren yang sama. Studi ini menggunakan hasil analisa kecepatan seismik untuk mendapatkan resolusi tinggi kecepatan dalam tiga dimensi. Tahap kalibrasi dilakukan berdasarkan hasil perhitungan tekanan pori dari data sumur dan well log. Metoda Eaton merupakan metoda empiris untuk mengestimasi tekanan pori data log sonik, resistivitas, dan densitas yang dikalibrasi dengan pengukuran tekanan formasi dari data RFT dan DST. Prediksi tekanan pori di Lapangan 'B' dilakukan dapat membuat prediksi di seluruh area lapangan dan berguna dalam desain selubung pemboran, berat lumpur, dan pencegahan untuk drilling hazard.

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Pore Pressure Prediction is crucial to prepare a safe drilling program especially if there the well will potentially intersect shallow gas zones. It influences casing design, drilling mud weight and mitigation of overpressure as a drilling hazard. In the "B" Block, Central Sumatra Basin several wells have experienced kicks. These kicks led me to conduct a pore pressure study ahead of future drilling. The work more emphasize the technique integrated pore pressure prediction (PPP) brings together well and 2-D seismic data. The study used as input data from drilling data, wireline logs, pressure tests, and 2D Seismic. Nowadays, seismic technology-based geopressure techniques provide an estimation of pore pressure from seismic velocity combine with well data has a relation in trend.

This study uses velocity analysis result to obtain a high-resolution velocity cube. Afterward, calibrated to pore pressure using well log and drilling data. The Eaton method is an empirical method to estimate pore pressures from sonic, resistivity and density logs which are calibrated to measured pore pressures from RFT and DST. In the "B" Block, the resistivity data did not reliably characterize pore pressure, and density data was incomplete, so the sonic log proved to be the most appropriate source data. Reliable pore pressure distribution required an empirical relationship between pore pressure and velocity. The Bentu Block pore pressure model created in this study allowed us to predict pore pressure throughout the block, and was used to design a drilling program especially for propose delineation wells, casing design, drilling mud weight, and overpressure prediction to prevent drilling hazards.