

## ABSTRACT

The PB field covers around 25 km<sup>2</sup> of Bintuni Basin's onshore part, which four exploration wells were drilled with mostly had several hole problems such as tight spot, pipe stuck, bit balling, connection gas and trip gas. Those phenomenons indicate the underbalanced condition that classified as low overpressure. Those whole condition led to sidetrack, most of them happened in the last section drilled which covered by wireline log data from Ainim to Daram Formations. Therefore, this study that based on wireline log calculations is focus on these formations.

The subsurface pressure calculated based on Bowers (1995) which using sonic data gave the best result compare to Eaton (1975) which using resistivity and sonic data. Fracture pressure or minimum horizontal stress calculated based on Eaton (1969) which considers the poisson ratio from sonic data and combined with correction based on Marbun *et al.*, 2015. The horizontal stress direction derived from breakout determination of 6-arm caliper log. The overpressure generating mechanism was determined by using some neutron-density crossplots, porosity logs correlation, temperature profile and maturity data.

Geomechanic profile shows the low overpressure with subsurface pressure is located above the normal hydrostatic pressure, still below the mud weight pressure, and far below the vertical stress. The minimum horizontal stress is located below the vertical stress. The maximum horizontal stress is located above the vertical stress. The minimum horizontal stress direction, which derived from breakout determination, indicates the Northwest to Southeast direction.

The overpressure generating mechanism of PB field generally can divide into two (2) mechanisms. The first and main mechanism is unloading mechanism that dominantly covered the whole study area, consist of clay diagenesis, lateral transfer and hydrocarbon generation. The second is loading mechanism or disequilibrium compaction with possible transition to mainly unloading mechanism which only occurred on Daram, Jass and Lower Vorwata Formations of P-1 ST well, also on Daram, Sebyar, Jass and Lower Vorwata Formations of P-4 ST well.

## SARI

Lapangan PB mencakup +/- 25 km<sup>2</sup> dari Cekungan Bintuni, empat sumur eksplorasi telah di bor dan terdapat beberapa masalah seperti *tight spot*, *pipe stuck*, *bit balling*, *connection gas* dan *trip gas*. Fenomena tersebut merupakan indikasi *underbalanced* yang diklasifikasikan sebagai *low overpressure*. Kondisi ini menyebabkan *sidetrack* dan sebagian besar terjadi pada fase akhir pengeboran dimana akuisisi data *wireline* dilakukan pada Formasi Ainim hingga Daram. Studi ini didasari pada perhitungan data *wireline log*, sehingga fokus studi ini ada pada interval tersebut.

*Subsurface pressure* berdasarkan perhitungan Bowers (1995) menggunakan data *sonic* memberikan hasil yang lebih baik dibandingkan dengan Eaton (1975) menggunakan data *resistivity* dan *sonic*. Perhitungan *fracture pressure* atau *minimum horizontal stress* dilakukan berdasarkan Eaton (1969) menggunakan data *sonic* dan digabungkan dengan koreksi berdasarkan Marbun dkk., 2015. Arah *horizontal stress* dihasilkan dari determinasi *breakout* berdasarkan log *caliper 6-arm*. Mekanisme pencetus *overpressure* dideterminasi menggunakan *crossplot* data *neutron-density*, korelasi log porositas, profil temperatur dan data kematangan.

Profil geomekanik menunjukkan *low overpressure* dengan *subsurface pressure* diatas *normal hydrostatic pressure*, dibawah tekanan berat lumpur, dan dibawah *vertical stress*. *Vertical stress* terletak diatas *minimum horizontal stress* dan dibawah *maximum horizontal stress*. Arah *minimum horizontal stress* dari determinasi *breakout* mengindikasikan arah Barat daya hingga Timur laut.

Mekanisme pencetus *overpressure* pada lapangan PB dapat dibagi menjadi dua. Pertama, *unloading mechanism* secara dominan meliputi keseluruhan area studi, terdiri dari *clay diagenesis*, *lateral transfer* dan *hydrocarbon generation*. Kedua, *loading mechanism* atau lebih spesifik lagi yaitu *disequilibrium compaction* yang berkemungkinan transisi ke dominan *unloading mechanism*, hanya terdapat pada sumur P-1 ST Formasi Daram, Jass dan *Lower Vorwata*, serta sumur P-4 ST pada Formasi Daram, Sebyar, Jass dan *Lower Vorwata*.