

## SARI

Analisis *overpressure* dapat memberikan rekomendasi berat lumpur pengeboran dan penentuan kedalaman *casing shoe* yang aman agar terhindar dari masalah-masalah pengeboran seperti *kick*, *blowout*, *stuck pipe*, *lost circulation*, serta *collapse*. Penelitian ini bertujuan untuk menganalisis *overpressure* di Blok Pandawalima, Cekungan Kutai Bawah yang meliputi penentuan kedalaman *top overpressure*, mekanisme pembentukan *overpressure*, dan perbandingan karakteristik *overpressure* di daerah laut dangkal dan di daerah laut dalam. Pada daerah penelitian dilakukan analisis 5 sumur eksplorasi, yaitu 1 sumur (Yudistira) berada di daerah laut dalam dan 4 sumur (Bima, Arjuna, Sadewa, dan Nakula) di laut dangkal. *Overpressure* dianalisis berdasarkan data log sumur dan data tes tekanan menggunakan Metode Eaton (1975) didukung oleh data lain seperti data LOT, *drilling report*, *mudlog*, dan geokimia. Kedalaman *top overpressure* pada daerah penelitian mulai pada kedalaman saat litologi *shale* dominan. *Top overpressure* pada masing masing sumur memiliki kedalaman yang berbeda-beda, pada daerah laut dalam yaitu  $\pm 3555$  kaki TVDBML untuk Sumur Yudistira, pada daerah laut dangkal yaitu  $\pm 5475$  kaki TVDBML untuk Sumur Bima,  $\pm 7640$  kaki TVDBML untuk Sumur Sadewa,  $\pm 8913$  kaki TVDBML untuk Sumur Nakula, dan  $\pm 7650$  kaki TVDBML untuk Sumur Arjuna. Mekanisme *overpressure* pada daerah penelitian diakibatkan oleh mekanisme *loading* (terutama *disequilibrium compaction*) pada zona *overpressure* rendah sebagai mekanisme utama disertai dengan kontribusi sekunder mekanisme *non-loading* yang disebabkan oleh diagenesis mineral lempung (Smektit-Illit) dan generasi hidrokarbon pada zona *overpressure* tinggi. Karakteristik *overpressure* di daerah laut dalam memiliki kedalaman *top overpressure* yang lebih dangkal karena litologi *shale* dominan, dengan kenaikan *overpressure* secara gradual. Pada daerah laut dangkal memiliki kedalaman *top overpressure* yang lebih dalam saat litologi *shale* dominan, dengan kenaikan *overpressure* yang signifikan dan pada kedalaman tertentu dapat menghasilkan besar tekanan yang hampir setara dengan daerah laut dalam. Pada 10500 kaki TVDBML, *overpressure* laut dangkal berkisar 5700-9600 psi dan laut dalam 9800 psi. Mekanisme pembentukan *overpressure* di daerah laut dalam dan laut dangkal adalah mekanisme *loading* dengan kontribusi sekunder mekanisme *non-loading*.

Kata kunci : TVDBML, *overpressure*, *top overpressure*, *loading*, *non-loading*, laut dalam, laut dangkal, Smektit, Illit

## ABSTRACT

*Overpressure analysis can provide recommendations for drilling mud weight and secure casing shoe depth to avoid drilling problems such as kick, blowout, stuck pipe, lost circulation and collapse. This aims study to analyze the overpressure in the Pandawalima Block, Lower Kutai Basin which includes the determination of the top overpressure depth, the mechanism of overpressure, and the comparison of the overpressure characteristics in the shallow water and deep water. In the study area an analysis of 5 exploration wells, namely 1 well (Yudistira) was located in the deep water and 4 wells (Bima, Arjuna, Sadewa, and Nakula) in the shallow water. Overpressure was analyzed based on well log data and pressure test data using the Eaton Method (1975) supported by others data such as LOT data, drilling report, mudlog, and geochemistry. The top overpressure depth in the study area began at depth when shale lithology was dominant. The top overpressure in each well has different depths, in the deep water,  $\pm 3555$  feet TVDBML for Yudistira Well, in shallow water  $\pm 5475$  feet TVDBML for Bima Well,  $\pm 7640$  feet TVDBML for Sadewa Well,  $\pm 8913$  feet TVDBML for Nakula Well, and  $\pm 7650$  feet TVDBML for Arjuna Well. The mechanism of overpressure in the study area is caused (especially disequilibrium compaction) by a loading mechanism in low overpressure as the main mechanism accompanied by a secondary contribution of non-loading mechanisms caused by clay mineral diagenesis (Smectite-Illite) and generation of hydrocarbons in hidh overpressure. The overpressure characteristics in the deep water has a shallower top overpressure depth because shale lithology was dominant, with gradual overpressure increases. In shallow water, it has a deeper depth of top overpressure when shale lithology was dominant, with a significant increase in overpressure and at certain depths it can produce a pressure that is almost equivalent to the deep water. At 10500 feet of TVDBML, shallow water overpressure ranges from 5700 to 9600 psi and the deep water is 9800 psi. The overpressure mechanism in the deep water and shallow water is a loading mechanism with a secondary contribution to the non-loading mechanisms.*

*Keywords: TVDBML, overpressure, top overpressure, loading, non-loading, deep water, shallow water, Smectite, Illite*