

SARI

Cekungan Sumatra Utara *offshore* merupakan salah satu cekungan penghasil minyak dan gas bumi di Indonesia. Formasi Malacca berperan sebagai batuan reservoir dalam cekungan ini. Pada formasi tersebut, terdapat masalah pemboran yang disebabkan oleh tekanan pori yang abnormal. Analisis *overpressure* dilakukan untuk menghindari masalah-masalah pemboran seperti *kick*, *blow-out*, *stuck pipe*, *loss circulation*, serta *collapse*. Penelitian ini bertujuan untuk menganalisis *overpressure* di Blok “APR”, Cekungan Sumatra Utara *offshore* yang meliputi penentuan kedalaman *top overpressure* dan mekanisme pembentukan *overpressure*. Pada daerah penelitian dilakukan analisis 3 sumur eksplorasi, yaitu Sumur-A, P, dan R serta pada data *velocity model* dari seismik 3D. *Overpressure* dianalisis berdasarkan data log sumur, data tes tekanan, dan data *velocity* seismik menggunakan Metode Eaton (1975) didukung oleh data lain seperti data LOT (*Leak-Off Test*), *drilling report*, *mudlog*. Pada Sumur-A, kedalaman *top overpressure* adalah ± 3235 ft TVDSS. Pada Sumur-P, kedalaman *top overpressure* adalah ± 3065 ft TVDSS (*true vertical depth sub sea*), dan pada Sumur-R kedalaman *top overpressure* adalah ± 2901 ft TVDML (*true vertical depth mud line*). Pada penampang vertikal *velocity model*, *top overpressure* berada pada horizon *Seabed* yang mencakup Formasi Seurula dan Formasi Keutapang, dengan nilai kedalaman ± 2400 ft TVDSS. Mekanisme pembentukan *overpressure* pada daerah penelitian diakibatkan oleh mekanisme *loading* yakni *disequilibrium compaction* dan mekanisme *nonloading* yakni *bouyancy* hidrokarbon.

Kata kunci : *overpressure*, *top overpressure*, Formasi Malacca, mekanisme *overpressure*, *velocity model*

ABSTRACT

The offshore North Sumatra Basin is one of the oil and gas producing basins in Indonesia. The Malacca Formation acts as a reservoir rock in this basin. In these formations, there are drilling problems caused by abnormal pore pressures. Overpressure analysis is carried out so that drilling activities are avoided from drilling problems such as kicks, blowouts, stuck pipes, loss circulation, and collapse. This study aims to analyze the overpressure in the “APR” block, offshore North Sumatra Basin, which includes determine the depth of the top overpressure and the mechanism of overpressure formation. In the research area, analysis of 3 exploration wells was carried out, namely wells A, P, and R as well as on the velocity data of the 3D seismic model. Overpressure is analyzed based on well log data, pressure test data, and seismic velocity data using the Eaton method (1975) supported by other data such as LOT (Leak-Off Test) data, drilling reports, mudlogs. At Well A, the top overpressure depth is ± 3235 ft TVDSS (true vertical depth sub sea). At Well P, the top overpressure depth is ± 3065 ft TVDSS, and at Well R the top overpressure depth is ± 2901 ft TVDML (true vertical depth mud line). In the vertical section of the velocity model, the top overpressure is on the Seabed horizon which includes the Seurula Formation and the Keutapang Formation, with a depth value of ± 2400 ft TVDSS. The overpressure generating mechanism in the study area is caused by the loading mechanism, namely disequilibrium compaction and caused by the nonloading mechanism, namely the bouyancy of hydrocarbons.

Keywords: overpressure, top overpressure, Malacca Formation, overpressure mechanism, velocity model