

ABSTRAK

Lapangan “Aphrodite” yang merupakan bagian dari Cekungan Kutai di Kalimantan Timur adalah salah satu lapangan penghasil minyak dan gas bumi. Dari sisi geologi, lapangan ini tersusun atas Formasi Maruat hingga Kelompok Balikpapan berumur Miosen Awal hingga Miosen Akhir. Penelitian ini bertujuan untuk menganalisis kondisi tekanan pori dan tegasan minimum horizontal yang berpengaruh terhadap perkembangan zona *overpressure*. Selain itu, juga dilakukan analisis terhadap mekanisme pembentukan zona *overpressure* serta kontrol geologi terhadap pembentukannya. Pengolahan data dilakukan pada empat sumur yang meliputi Sumur Aphrodite-1, Sumur Aphrodite-2, Sumur Aphrodite-3, dan Sumur Aphrodite-4 dengan data *wireline log*, *mudlog*, LOT (*leak-off test*), RFT (*repeat formation tester*), *mudweight*, dan *marker*. Hasil analisis data menunjukkan bahwa terdapat tiga sumur di Lapangan “Aphrodite” dengan kondisi *overpressure*. Persebaran zona *overpressure* pada Lapangan “Aphrodite” yaitu *top overpressure* di Sumur Aphrodite-1 pada 5.705 ftTVDSS dengan kondisi *pore pressure* 3.945 psi dan *fracture pressure* 5.040 psi, Sumur Aphrodite-2 pada 7.265 ftTVDSS dengan kondisi *pore pressure* 3.261 psi *fracture pressure* 4.642 psi, dan Sumur Aphrodite-3 pada 10.300 ftTVDSS dengan kondisi *pore pressure* 4.868 psi dan *fracture pressure* 8.546 psi. Pada hasil analisis kecepatan sedimentasi menunjukkan bahwa interval pada sumur yang terdampak *overpressure* memiliki kecepatan sedimentasi hingga 426 meter/juta tahun yang direpresentasikan dengan data Sumur Aphrodite-3. Kondisi geologi yang mempengaruhi persebaran zona *overpressure* yaitu lithologi hasil sedimentasi yang sangat cepat dan keberadaan Sesar Sepinggian yang memiliki pergerakan mendatar kanan di blok selatan Cekungan Kutai.

Kata kunci: Cekungan Kutai, *overpressure*, mekanisme *overpressure*, dan *pore pressure*

ABSTRACT

The "Aphrodite" field, part of the Kutai Basin in East Kalimantan, is one of the oil and gas producing fields. Geologically, this field is composed of the Maruat Formation to the Balikpapan Group, ranging in age from Early Miocene to Late Miocene. This study aims to analyze the conditions of pore pressure and minimum horizontal stress that influence the overpressure zones. Additionally, the study also analyzes the mechanism of overpressure zone formation and the geological controls over its formation. Data processing was carried out on four wells, there are Aphrodite-1, Aphrodite-2, Aphrodite-3, and Aphrodite-4, using wireline log data, mudlog, LOT (leak-off test), RFT (repeat formation tester), mudweight, and markers. The data analysis results indicate that there are three wells in the "Aphrodite" field with overpressure conditions. The distribution of overpressure zones in the "Aphrodite" Field shows the top of overpressure in Aphrodite-1 Well at 5,705 ft TVDSS with a pore pressure of 3,945 psi and fracture pressure of 5,040 psi, Aphrodite-2 Well at 7,265 ft TVDSS with a pore pressure of 3,261 psi and fracture pore pressure of 4,642 psi, and Aphrodite-3 Well at 10,300 ft TVDSS with a pore pressure of 4,868 psi and fracture pressure of 8,546 psi. The sedimentation rate analysis results indicate that the interval in the wells affected by overpressure has a sedimentation rate to 426 meters/million years, as represented by data from Well Aphrodite-3. The geological conditions affecting the distribution of overpressure zone include the lithology results from rapid sedimentation also the Sepinggan Fault, which has a right-lateral movement in the southern block of the Kutai Basin.

Keywords: *Kutai Basin, overpressure, overpressure mechanism, and pore pressure*