

## **FASIES DAN LINGKUNGAN PENGENDAPAN INTERVAL MFS 4.1-MFS 4.2 MENGGUNAKAN ANALOG STRATIGRAFI PERMUKAAN PADA CEKUNGAN KUTAI**

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### **SARI**

Lapangan Lestari terletak di Blok Mahakam, Cekungan Kutai memiliki enam zona reservoir berdasarkan kedalaman dan umurnya. Penelitian ini berfokus pada interval MFS 4.1-MFS 4.2 yang termasuk dalam zona reservoir dangkal-sangat dangkal berumur Miosen Akhir dengan karakteristik reservoir yang tersingkap dipermukaan dibuktikan oleh injeksi air meteorik. Suksesi sedimen Miosen Akhir tersingkap di dekat Samarinda (Palaran), Kalimantan Timur. Integrasi data singkapan dan interval bawah permukaan dibutuhkan untuk menghasilkan interpretasi geologi bawah permukaan yang lebih baik.

Data yang digunakan berupa 3 hasil pengukuran stratigrafi singkapan permukaan, 4 batuan inti, 22 data log sumur, dan seismik inversi 3D *Cube GI Sand Probability*. Sedimentasi pertama dari endapan Miosen Akhir (10.2 jtyl) tersingkap pada singkapan Perum Palaran berupa endapan *fluvial channel*, sedangkan interval MFS 4.1-MFS 4.2 memiliki kesamaan umur berkisar di kala Miosen Akhir (N15-N17). Suksesi 2/3 bawah dari singkapan Ampera merupakan parasikuen retrogradasi dan progradasi delta sub-lingkungan *delta front-prodelta*. Satu per tiga atas singkapan Ampera dan interval bawah permukaan termasuk dalam progradasi delta lingkungan *delta front-delta plain*. Berdasarkan analisis bawah permukaan terdapat tiga jenis elektrofasis yaitu *shale*, *channel*, dan *bar* yang setelah diintegrasikan dengan asosiasi fasies singkapan termasuk dalam *interdistributary delta front*, *distributary mouth bar*, *tidal distributary channel*, *fluvial distributary channel*, *delta swamp*, *splay bar*, dan *mud flat* yang merepresentasikan sublingkungan *delta front-delta plain* bagian lingkungan delta dominasi sungai dan pasang-surut. Terdapat 14 siklus delta pada singkapan Ampera dan 8 siklus delta pada interval bawah permukaan yang menunjukkan frekuensi tinggi dengan hasil semua endapan berada pada *Highstand System Tract* (HST) dengan pola penumpukan progradasional yang dikontrol oleh suplai sedimen yang besar dan muka air laut relatif yang konstan (kenaikan secara lambat). Arah persebaran batupasir pada Miosen Akhir menunjukkan penipisan kearah Tenggara dengan perubahan lingkungan semakin kearah laut. Tektonik regional menunjukkan pada kala Miosen Akhir Baratlaut cekungan berupa Tinggian Kuching dan area Samarinda tengah mengalami inversi sehingga terjadi penambahan suplai sedimen kearah cekungan yang menghasilkan sedimentasi progradasi delta pada cekungan.

Kata Kunci: Analog Singkapan, Miosen Akhir, Lingkungan Delta, Siklus Delta Progradasi, *Highstand System Tract* (HST)

## ***FACIES AND DEPOSITIONAL ENVIRONMENT INTERVAL MFS 4.1-MFS 4.2 BASED ON OUTCROP ANALOGUE AT KUTAI BASIN***

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### ***ABSTRACT***

*Lestari field, one of the largest fields in the Mahakam Delta and it has six reservoir zones. To maintain the production rate, it is planned to produce the Shallow and Very Shallow Zones from Late Miocene sedimentation include interval MFS 4.1—MFS 4.2. The problem is fresh water injection in this interval that inform the reservoir is outcropping. Moreover, A succession of middle Miocene rocks is exposed near Samarinda (Palaran area), East Kalimantan. So an integrated study of the outcrop analog (surface) and sub-surface was needed to get a better geological interpretation.*

*Measured outcrop stratigraphy were integrated with cores, well correlation and seismic inversion to obtain the depositional environments and overall stratigraphic framework. The late Miocene succession (10.2 Ma) begin with fluvial channel sedimentation that exposed in Perum Palaran outcrop. Interval MFS 4.1 -MFS 4.2 has the same age in Ampere Outcrop on the Late Miocene (N15-N17). The lower two thirds of Ampere section is consisted of bioturbated sand and shale and the upper one third is consisted of thick sand bodies, shale and coal interpreted distributary channel deposits. There are three electrofacies defined by log; (1) Shale, (2) Channel, and (3) Bar that represent seven surface facies associations: (1) interdistributary delta front; (2) distributary mouth bar, (3) tidal distributary channel, (4) fluvial distributary channel, (5) delta swamp, (6) splay bar, dan (7) mud flat shown delta front-delta plain sub-environment of fluvial and tidal delta dominated. Fourteen deltaic cycles in the Ampere outcrop and Eight in the subsurface interval are recognized high-frequency parasequence cycles. Stacking pattern of parasequences sets in the lower Ampere outcrop is retrogradational. The upper and the subsurface interval indicate the progradational parasequences. All of section represents High System Tract controlled by increase of sediment supply in the constant of relative sea level. Sand distribution in the Late Miocene show the thinning up to the South East and deepening environment. Look at the regional tectonic and stratigraphic in the Late Miocene shows the tectonic inversion and compression in the North West, providing a large source of thick sedimentation in the basin. Consequently, the deposit is progradational deltaic sedimentation during Late Miocene.*

*Key words: Outcrop Analogue, Late Miocene, Delta Environment, Progradational Deltaic Cycle, Highstand System Tract (HST)*