

**KARAKTERISASI RESERVOAR BATUPASIR TERHADAP APLIKASI
“PETROPHYSICAL ROCK TYPE” PADA SUB FORMASI UPPER ZELDA
ZONA 1 & ZONA 2 FORMASI TALANG AKAR, LAPANGAN LITA
CEKUNGAN SUNDA**

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Profil produksi Zona 1 dan 2 reservoir di Lapangan Lita telah mencapai puncaknya kurang lebih selama enam bulan pada tahap awal produksi. Penelitian terdahulu menunjukkan Anggota *Upper Zelda* diendapkan pada lingkungan fluvial, namun penelitian ini diharapkan akan menghasilkan interpretasi lingkungan pengendapan berbeda. Untuk itulah diperlukan upaya pemetaan heterogenitas dan hubungan reservoir kembali dan menjaga kinerja produksi seperti pengkinian perhitungan cadangan dalam rangka program pengembangan lapangan. Program ini membutuhkan analisis yang mendetail baik dari pemahaman fasies, asosiasi fasies sampai dengan pemodelan reservoir statik dengan pendekatan *rock typing* sehingga distribusi petrofisika reservoir dan karakteristik aliran fluida dapat dipahami dengan lebih baik.

Data batuan inti dari dua sumur dengan total panjang 99 kaki, 103 *core plug* yang diukur porositas dan permeabilitasnya, 22 data sumur dengan log listrik dan data seismik 3D. Tahap pertama adalah mengidentifikasi litofasies dan asosiasi fasies untuk mengetahui model pengendapan. Zona 1 dan 2 Anggota *Upper Zelda* terdiri atas dua asosiasi fasies yaitu; batupasir endapan *distributary channel* dan batupasir endapan *distributary mouth bar* pada lingkungan delta yang didominasi oleh supply sediment dari daratan (*Fluvial dominated delta*). Identifikasi *rock type* (RT) menggunakan metode FZI/RQI yang dibatasi oleh asosiasi fasies dan dikontrol oleh litofasies. Lima (5) RT teridentifikasi yaitu (1) RT1 – batupasir sangat kasar hingga konglomeratan dengan pemilahan buruk sampai sedang, (2) RT2 – Batupasir sedang hingga kasar dengan pemilahan sedang, (3) RT3 – Batupasir halus hingga sedang dengan perlapisan (*laminated sandstone*), (4) RT4 – Batupasir halus dengan pemilahan butir sedang, dan (5) RT5 – Batupasir sangat halus dengan sisipan batulanau pemilahan butir baik. RT-0 telah teridentifikasi sebagai lapisan non reservoir dengan litologi penyusun batuserpih (*shale*) dan batubara (*coal*).

Karakterisasi reservoir secara 3D dilakukan melalui pemodelan fasies, RT, pemodelan porositas (yang dikontrol oleh RT), pemodelan permeabilitas (yang dikontrol oleh RT dan porositas). Batupasir endapan *distributary channel* terdiri dari lima RT yaitu RT1, RT2, RT3, RT4, dan RT5, sedangkan batupasir endapan *distributary mouth bar* terdiri dari empat RT yaitu RT2, RT3, RT4 dan RT5. Perhitungan *original oil in place* (OOIP) didapat dari pemodelan inisial hidrokarbon



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Kata kunci: asosiasi fasies, *rock type*, pemodelan reservoir.

**SANDSTONE RESERVOIR CHARACTERIZATION ZONE 1 & 2 USING
“PETROPHYSICAL ROCK TYPE” AT UPPER ZELDA SUBFORMATION,
TALANG AKAR FORMATION, LITA FIELD, SUNDA**

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Production profile of reservoir Zone 1 & 2 at Lita Field has reached its peak less than six months at first phase production. Previous research from former geologist had interpreted Upper Zelda member deposited at fluvial environment, but this research will be resulted the new interpretation of different depositional environment. Remapping of heterogeneity and connectivity reservoir and keeping production performance have given effect to develop field with recalculating of reserves. Developing field needs several analyses like detailing of description of fasies, modeling reservoir with rock typing that will be ensuring of petrophysical reservoir distribution and flow unit.

The several data which used in this research are core data at two wells with total length of 99 ft, core plug at 103 points, 22 well log data and 3D seismic data. The first step is identification of facies and facies association in order to predict depositional environment. Zone 1 & 2 reservoir interval are consist of two facies association; distributary channel and distributary mouth bar sandstone, which deposited in delta environment with domination of sediment supply from landward (Fluvial dominated delta). Rock type is identified based on FZI/RQI method which constrained by facies association and controlled by lithofacies. Five RT are identified as (1) RT1 – Very coarse-conglomerate through poorly until moderate sorted sandstone, (2) RT2 – Medium-very coarse through moderate sorted sandstone, (3) RT3 – Fine-very fine through laminated sandstone, (4) RT4 – Medium through moderate sorted, (5) RT5 – Very fine though laminated well sorted sandstone. RT-0 was identified as non reservoir layer with shale and coal lithologies.

3D Reservoir characterization is done through moeling of facies, RT, porosity (controlled by RT), and permeability (which controlled by RT and porosity). Distributary channel sandstone deposit is consist of five RT i.e; RT1, RT2, RT3, RT4 and RT 5 meanwhile distributary mouth bar sandstone deposit is consist of four RT i.e; RT2, RT3, RT4, and RT5. Original oil in place calculation was predicted by inisial hydrocarbon modeling that controlled from five MICP (mercury injection of capillary pressure) for representing each reservoir characterization or rock type at 3D modeling reservoir. Comparing material balance data has become a method to validate reserve calculation from reservoir modeling. Saturation modeling result was calculated by the number of original oil in place around 31.0 MMBO (Segment Lita “A” 10.5 MMBO, Segment Lita “B” 3.0 MMBO & Segment Cinta 17 MBBO) for all



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compartments, even though the differentiation of POR result and material balance result with saturation model that was caused by the oldest research did not use of association facies development and reservoir heterogeneity as consider for accumulation hydrocarbon.

Keywords: facies, facies association, rock type, reservoir modeling.