

**KARAKTERISASI RESERVOIR HIDROKARBON
DAN ANALISIS SEKTORISASI MODEL GEOLOGI
UNTUK PENENTUAN LOKASI PENGEMBANGAN FORMASI LAMA,
BLOK “S”, LAPANGAN “A”, CEKUNGAN NATUNA BARAT**

RINGKASAN

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Blok “S” Lapangan “A” terletak di lepas pantai Laut Natuna Utara, Provinsi Kepulauan Riau, yang berjarak sekitar 486 km di Timur Laut Singapura. Pada Blok “S” Lapangan “A” baru terdapat 3 sumur produksi yang memproduksi minyak dan gas dari reservoir Formasi Lama sejak Maret 2006. Hakim, dkk (2008) menyatakan bahwa Formasi Lama merupakan *reservoir play* yang cukup potensial untuk dieksplorasi dan dikembangkan. Oleh karena itu, penelitian ini bertujuan untuk menentukan lokasi sumur pengembangan untuk meningkatkan produksi minyak di Blok “S” Lapangan “A”. Tantangan dari pengembangan lapangan adalah kesulitan dalam menentukan daerah potensial lokasi sumur. Terdapat banyak jenis data yang harus dipertimbangkan, baik dari aspek geologi, geofisika, maupun reservoir.

Reservoir hidrokarbon pada Formasi Lama, Blok “S”, Lapangan “A” diinterpretasikan berumur Eosen Akhir-Oligosen. Hasil interpretasi data petrografi menunjukkan litologi yang berkembang pada Formasi Lama dicirikan oleh perselingan batupasir, *shale* dan batulanau. Formasi Lama terendapkan secara tidak selaras di atas *basement* pada lingkungan *supratidal fresh water fluvio lacustrine*. Struktur geologi yang dominan di Lapangan “A” adalah sesar geser turun berarah relatif Baratlaut-Tenggara (NW-SE) dan sesar-sesar turun berarah Baratlaut-Tenggara (NW-SE), yang merupakan produk dari proses tektonik pada periode *syn-rift* bersamaan dengan pengendapan Formasi Lama. Arah pengendapan Formasi Lama didominasi dari arah Tenggara-Baratlaut (SE-NW).

Penentuan lokasi potensi sumur pengembangan pada penelitian ini menggunakan metode sektorisasi model geologi reservoir berdasarkan parameter indeks potensi reservoir. Indeks potensi reservoir dihasilkan dari perkalian nilai *reservoir quality index* (RQI), *net to gross ratio* (NTG), dan *movable oil saturation* (S_{om}). Indeks potensi reservoir yang semakin besar menggambarkan potensi minyak yang semakin besar. Sektorisasi model geologi mengelompokkan indeks potensi reservoir menjadi kategori *low*, *medium* dan *high*. Pada Formasi Lama, Blok “S”, Lapangan “A”, ditentukan 7 sumur pengembangan pada lokasi berkategori *high* yang menargetkan zona minyak, dengan nilai indeks potensi reservoir berkisar antara 0.45 – 1.31. Berdasarkan hasil pemodelan reservoir dinamik atau simulasi reservoir, produksi 7 sumur pengembangan mampu menambah perolehan minyak di Blok “S” Lapangan “A” sebesar 7.89 MMSTB.

Kata kunci: sumur pengembangan, indeks potensi reservoir, sektorisasi model geologi.

**HYDROCARBON RESERVOIR CHARACTERIZATION
AND ANALYSIS OF GEOLOGICAL MODEL SECTORIZATION
FOR DETERMINATION OF DEVELOPMENT LOCATION IN
LAMA FORMATION, “S” BLOCK, “A” FIELD”, WEST NATUNA BASIN**

ABSTRACT

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Block “S” Field “A” is located at the offshore of North Natuna Sea, Riau Islands Province, about 486 kilometres at the Northeast of Singapore Sea. In the “S” Block, there are only 3 oil and gas producer wells, producing reservoir of Lama Formation since March 2006. According to Hakim, et.al (2008), Lama Formation is a potential reservoir play to be explored and developed. Therefore, this study aims to determine the location of development wells and increase the oil production in “S” Block, “A” Field. The challenge of field development is the difficulty in determining the potential area for the well location. There are many types of data that must be considered, both from the geological, geophysical, and reservoir aspects.

Hydrocarbon reservoir of Lama Formation, “S” Block, “A” Field is interpreted to be Late Eocene-Oligocene age, along with the syn-rift period. The developed lithology in Lama Formation is characterized by the alternation of sandstone, shale and siltstone. Lama Formation was unconformably deposited above the *basement* in supratidal fresh water fluvio lacustrine environment. Dominant geological structures in “A” Field” are relative Northwest-Southeast normal-strike slip fault and relative Northwest-Southeast normal faults, as products of syn-rift tectonic period along with the deposition of Lama Formation. The depositional direction of Lama Formation is Southeast-Northwest.

Determination of the development well locations using the reservoir geological model sectorization method based on the reservoir potential index parameter, generated by multiplying the value of reservoir quality index (RQI), net to gross ratio (NTG), and movable oil saturation (Som). The higher reservoir potential index represents the greater oil potential. Geological model sectorizes the reservoir potential index to three categories: low, medium, and high. Based on the sectorization result, 7 development wells are determined in the high-categorized location (the reservoir potential index ranged from 0.45 to 1.31), targeting the oil zone of Lama Formation, “S” Block, “A” Field. Dynamic reservoir modeling shows 7.89 Million Stock Tank Barrels (MMSTB) gain of oil recovery in “S” Block, “A” Field.

Keywords: development well, reservoir potential index, geological model sectorization.