

ANALISIS PETROFISIKA, KARAKTERISASI RESERVOIR, DAN ESTIMASI CADANGAN HIDROKARBON PADA FORMASI TAWUN, LAPANGAN SUKOREJO, CEKUNGAN JAWA TIMUR UTARA

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SARI

Lapangan Sukorejo merupakan salah satu lapangan minyak bumi yang berada di Kecamatan Cepu, Kabupaten Blora, Cekungan Jawa Timur Utara. Lapangan ini berada pada tahap pengembangan dengan luas 12 km². Fokus penelitian pada Lapangan Sukorejo adalah Formasi Tawun pada interval lapisan V dan lapisan VIII.

Penelitian ini bertujuan untuk memahami kondisi geologi Lapangan Sukorejo dan menentukan karakteristik reservoir Formasi Tawun berupa fasies pengendapan, distribusi properti reservoir, serta estimasi cadangan hidrokarbon di tempat (OOIP) pada Formasi Tawun. Data yang digunakan pada penelitian ini terdiri dari data deskripsi batuan inti dan *cutting*, laporan petrografi, laporan biostratigrafi, seismik 3D, data *checkshot*, dan 30 data log sumur. Metode yang digunakan pada penelitian ini adalah analisis litofasies, elektrofases, biostratigrafi, asosiasi fasies dan lingkungan pengendapan, stratigrafi sikuen, analisis petrofisika, pemodelan reservoir 3D statik, serta estimasi cadangan hidrokarbon.

Hasil analisis batuan inti menunjukkan bahwa litofasies penyusun Formasi Tawun memiliki tujuh litofasies batupasir yaitu Slvf, Ssf, Ssvf, Smf, Sfmf, Spcvf, dan Swvf serta satu litofasies batulempung yaitu Cm. Berdasarkan analisis biostratigrafi, batuan inti, dan elektrofases, interval penelitian berumur Miosen Tengah dan berada pada lingkungan pengendapan laut dangkal dari Neritik Tepi – Neritik Tengah (0 – 100 m) dengan asosiasi fasies berupa *upper shoreface*, *lower shoreface*, dan *offshore*. Distribusi properti petrofisika berupa volume serpih, porositas, dan saturasi air secara kualitatif dikontrol oleh persebaran fasies dan arah pengendapan dari Barat Laut ke Tenggara. Hasil estimasi cadangan menunjukkan volume dari interval reservoir Formasi Tawun lapisan V sebesar 1,679 MMSTB dan lapisan VIII sebesar 0,652 MMSTB. Estimasi total volumetrik hidrokarbon pada Lapangan Sukorejo sebesar 2,331 MMSTB.

Kata kunci: Lapangan Sukorejo, Formasi Tawun, Cekungan Jawa Timur Utara, karakterisasi reservoir, fasies, petrofisika, pemodelan reservoir, estimasi cadangan.

PETROPHYSICAL ANALYSIS, RESERVOIR CHARACTERIZATION, AND VOLUMETRIC HIDROKARBON ESTIMATION OF TAWUN FORMATION, SUKOREJO FIELD, EAST JAVA BASIN

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ABSTRACT

Sukorejo field is one of the oil fields located in Cepu, Blora Regency, North East Java Basin. This field is currently considered as a development field within coverage area approximately 12 km². The focus of the research on Sukorejo field is Tawun Formation at layer V and layer VIII.

The main purposes of this study are to know the geological setting of Sukorejo field, determine reservoir characterization of Tawun formation such as depositional facies, distribution of reservoir properties, and volumetric estimation of Original Oil In Place (OOIP) prospect. The data used in this research consists of core and cutting descriptions, petrographic reports, biostratigraphy reports, 3D seismic, checkshot, and electric log from 30 wells. Several methods have been performed in order to achieve those main purposes which are lithofacies analysis, electrofacies analysis, biostratigraphy analysis, facies association and environmental deposition, sequence stratigraphy analysis, petrophysical analysis, 3D static reservoir modelling, and estimation of hydrocarbon volume.

The result of core analysis presents in target intervals are consist of seven sandstone lithofacies which are Slvf, Ssf, Ssvf, Smf, Sfmf, Spcvf, and Swvf, and also one claystone lithofacies which are Cm. Based on biostratigraphy analysis, core analysis, and electrofacies interpretation, the research area depositional environment of research area is shallow marine from inner neritic to middle neritic (0 - 100 m) in the age of Middle Miocene with facies association consists of upper shoreface, lower shoreface, and offshore. The distribution of petrophysical properties of volume of shale, porosity, and water saturation is qualitatively controlled by the distribution of facies and the direction of deposition from the Northwest to the Southeast. The results of volumetric estimation show the volume from the reservoir interval of Tawun Formation of layer V equal to 1,679 MMSTB and layer VIII equal to 0,652 MMSTB. The total hydrocarbon volumetric estimation on Sukorejo field is 2,331 MMSTB.

Keywords: Sukorejo Field, Tawun Formation, North East Java Basin, reservoir characterization, facies analysis, reservoir modelling, volumetric estimation.