

ABSTRAK

IDENTIFIKASI ZONA PROSPEK HIDROKARON BERDASARKAN ANALISIS PETROFISIKA PADA LAPANGAN “VAL”, FORMASI BALIKPAPAN, CEKUNGAN KUTAI

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Target peningkatan produksi minyak dan gas bumi nasional menuntut optimalisasi, khususnya pada lapangan mature. Cekungan Kutai sebagai salah satu cekungan produktif di Indonesia memiliki potensi hidrokarbon yang signifikan, terutama pada Formasi Balikpapan yang diendapkan dalam sistem deltaik. Namun, perubahan kondisi saturasi fluida akibat produksi menyebabkan ketidakpastian dalam identifikasi zona hidrokarbon yang masih tersisa. Oleh karena itu, diperlukan pendekatan dalam mengevaluasi karakteristik reservoir melalui integrasi data log sumur untuk mengidentifikasi zona prospek hidrokarbon pada Lapangan “VAL”. Metode penelitian meliputi analisis kualitatif dan kuantitatif terhadap data log sumur (*gamma ray*, resistivitas, densitas, neutron, dan *sonic*) sebagai data *open hole* serta data *Reservoir Saturation Tool* (RST) log sebagai data *closed hole*. Analisis dilakukan untuk menentukan parameter petrofisika seperti *volume shale* (Vsh), porositas efektif (PHIE), dan saturasi air (Sw), serta interpretasi litologi, fasies, dan lingkungan pengendapan. Selain itu, dilakukan korelasi sumur untuk memahami distribusi lateral dan vertikal reservoir. Integrasi data *open hole* dan *closed hole* digunakan untuk mengevaluasi kondisi reservoir pasca produksi serta mengidentifikasi zona yang masih mengandung hidrokarbon.

Hasil penelitian menunjukkan Formasi Balikpapan pada Lapangan “VAL” tersusun oleh perselingan batupasir, batulempung, dan batubara yang diendapkan pada lingkungan delta plain. Nilai parameter petrofisika menunjukkan bahwa reservoir memiliki kualitas yang bervariasi dengan porositas sedang hingga Istimewa serta kandungan shale yang mempengaruhi distribusi fluida. Berdasarkan analisis *cut-off* dan integrasi data log, diperoleh zona prospek yang masih berpotensi mengandung hidrokarbon.

Kata kunci: Cekungan Kutai, Formasi Balikpapan, petrofisika, reservoir hidrokarbon, zona prospek

ABSTRACT

IDENTIFIKASI OF HYDROCARBON PROSPECT ZONES BASED ON PETROPHYSICAL ANALYSIS IN THE “VAL” FIELD, BALIKPAPAN FORMATION, KUTAI BASIN

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The national target to increase oil and gas production requires optimization, particularly in mature fields. The Kutai Basin, as one of the most productive basins in Indonesia, holds significant hydrocarbon potential, especially within the Balikpapan Formation which was deposited in a deltaic system. However, changes in fluid saturation conditions due to production activities lead to uncertainties in identifying remaining hydrocarbon zones. Therefore, an integrated approach is required to evaluate reservoir characteristics through well log data in order to identify prospective hydrocarbon zones in the “VAL” Field.

The methods applied in this study include qualitative and quantitative analyses of well log data (gamma ray, resistivity, density, neutron, and sonic logs) as open-hole data, as well as Reservoir Saturation Tool (RST) log data as closed-hole measurements. The analysis aims to determine petrophysical parameters such as shale volume (V_{sh}), effective porosity (PHIE), and water saturation (S_w), along with the interpretation of lithology, facies, and depositional environment. In addition, well correlation is conducted to understand the lateral and vertical distribution of the reservoir. The integration of open-hole and closed-hole data is used to evaluate post-production reservoir conditions and to identify zones that still contain hydrocarbons.

The results indicate that the Balikpapan Formation in the “VAL” Field consists of interbedded sandstone, shale, and coal deposited in a delta plain environment. Petrophysical parameters show that the reservoir quality varies, ranging from moderate to excellent porosity, with shale content influencing fluid distribution. Based on cut-off analysis and integrated log data, prospective zones with remaining hydrocarbon potential have been identified.

Keywords: Balikpapan Formation, hydrocarbon reservoir, Kutai Basin, petrophysics, prospect zone