

ABSTRAK

ANALISIS SATURASI AIR (S_w) BERDASARKAN DATA *LOG* DAN *CORE* UNTUK MENGIDENTIFIKASI KANDUNGAN FLUIDA PADA LIMA SUMUR DI-LAPANGAN “L” JAWA TENGAH

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Penurunan cadangan hidrokarbon dan keterbatasan penemuan lapangan baru menuntut evaluasi reservoir yang lebih akurat, khususnya dalam penentuan distribusi fluida. Salah satu parameter penting dalam evaluasi reservoir adalah saturasi air (S_w), yang digunakan untuk mengidentifikasi potensi hidrokarbon. Penelitian ini bertujuan menganalisis saturasi air berdasarkan data *log* dan data *core* untuk mengidentifikasi kandungan fluida pada lima sumur (LA-1 hingga LA-5) di Lapangan “L”, Jawa Tengah.

Metode penelitian meliputi analisis petrofisika menggunakan data *well logging* berupa *log gamma ray*, resistivitas, *neutron*, dan densitas. Parameter yang dianalisis meliputi *shale volume*, porositas efektif, dan saturasi air. Penentuan nilai S_w dilakukan melalui perhitungan manual dan menggunakan perangkat lunak *Interactive Petrophysics* (IP), kemudian dibandingkan dengan data *core* sebagai acuan. Selain itu, dilakukan analisis korelasi antara S_w manual, S_w IP, dan S_w *core* untuk menilai tingkat kesesuaian hasil.

Hasil penelitian menunjukkan adanya variasi nilai *shale volume*, porositas, dan saturasi air pada masing-masing sumur dan zona target reservoir. Perbandingan antara S_w manual, S_w IP, dan S_w *core* menunjukkan tingkat kesesuaian yang cukup hingga baik, sehingga data *log* dapat digunakan dalam evaluasi saturasi air. Berdasarkan hasil tersebut, beberapa zona reservoir diinterpretasikan memiliki potensi hidrokarbon di Lapangan “L”.

Kata kunci: saturasi air, *well logging*, data *core*, data *log*, petrofisika

ABSTRACT

WATER SATURATION (S_w) ANALYSIS BASED ON LOG AND CORE DATA TO IDENTIFY FLUID CONTENT IN FIVE WELLS IN FIELD ‘L’, CENTRAL JAVA

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The decline in hydrocarbon reserves and the limited discovery of new fields require more accurate reservoir evaluation, particularly in determining fluid distribution. One of the key parameters in reservoir evaluation is water saturation (S_w), which is used to identify hydrocarbon potential. This study aims to analyze water saturation based on log and core data to identify fluid content in five wells (LA-1 to LA-5) located in Field “L”, Central Java.

The methodology includes petrophysical analysis using well logging data consisting of gamma ray, resistivity, neutron, and density logs. The analyzed petrophysical parameters include shale volume, effective porosity, and water saturation. Water saturation values were determined through manual calculations and using Interactive Petrophysics (IP) software, then compared with core data as a reference. In addition, correlation analysis was conducted between manual S_w , IP S_w , and core S_w to evaluate the consistency of the results.

The results indicate variations in shale volume, porosity, and water saturation across each well and reservoir target zone. The comparison between manual S_w , IP S_w , and core S_w shows fair to good agreement, indicating that log data can be reliably used for water saturation evaluation with core data as validation. Based on these results, several reservoir zones in Field “L” are interpreted to have hydrocarbon potential.

Keywords: water saturation, well logging, core data, log data, petrophysics