INTISARI

ANALISIS PETROFISIKA DENGAN METODE DETERMINISTIK DAN MULTIMINERAL PADA RESERVOIR *LOW RESISTIVITY LOW CONTRAST* FORMASI AIR BENAKAT, LAPANGAN "TESLA", CEKUNGAN SUMATRA SELATAN

Wandia Mellani Trihapsari
18/427566/PA/18526

Lapangan Tesla berada pada Cekungan Sumatra Selatan dimana dalam cekungan tersebut terdapat Formasi Air Benakat dengan batuan penyusun didominasi oleh perselingan batupasir dan batulempung sehingga berpotensi menjadi *low-resistivity hydrocarbon reservoir*. Reservoir hidrokarbon pada umumnya memiliki nilai log resistivitas lebih dari 10 Ωm, ketika suatu reservoir hidrokarbon memiliki nilai resistivitas yang rendah interval antara 0,5-5 Ωm maka disebut sebagai *low-resistivity hydrocarbon reservoir.* Analisis petrofisika tahap demi tahap (deterministik) dan analisa petrofisika dengan pendekatan pada peluang (multimineral) kemudian dilakukan agar dapat dihitung parameter petrofisika reservoir sehingga dapat ditentukan zona-zona yang berpotensi menjadi kandidat *low-resistivity hydrocarbon reservoir* serta diketahui penyebab *low-resistivity hydrocarbon reservoir* tersebut. Penelitian diawali dengan menganalisis 2 data log sumur, *mud log*, dan laporan sumur TSL-2B dan TSL-4. Data log sumur dan data *mud log* digunakan dalam perhitungan properti fisika batuan seperti kandungan serpih, porositas efektif, permeabilitas, dan saturasi air serta analisis penyebab *low-resistivity hydrocarbon reservoir*. Berdasarkan analisis tersebut diketahui kandidat reservoir *low-resistivity* yang didapatkan pada sumur TSL-2B berjumlah 10 reservoir dan pada sumur TSL-4 berjumlah 6 reservoir dengan ketebalan bervariasi. Kandidat reservoir tersebut memiliki nilai parameter petrofisika yang berbeda-beda, namun dapat digolongkan bahwa porositas efektif pada *low-resistivity hydrocarbon reservoir* tergolong cukup hingga istimewa, nilai volume serpih kurang dari 46%, saturasi air kurang dari 60%, dan permeabilitas tergolong ketat (*tight*) hingga baik sekali. Berdasarkan analisis tersebut diketahui bahwa reservoir *low-resistivity* pada Lapangan Tesla disebabkan oleh ukuran butir batupasir yang sangat halus sehingga mampu mengikat air secara signifikan (*irreducible water*), kandungan serpih yang melimpah dan terdistribusi secara *laminated shale*, *dispersed shale* dan *structural shale* sehingga menyebabkan terjadinya *clay bound water*, dan terdapat kemunculan mineral konduktif berupa glaukonit. Serta diketahui bahwa metode multimineral dianggap lebih representatif dalam menggambarkan kondisi bawah permukaan dibandingkan dengan metode deterministik

Kata kunci: *low-resistivity hydrocarbon reservoir*, metode deterministik dan multimineral, parameter petrofisika.

ABSTRACT

PETROPHYSICAL ANALYSIS WITH DETERMINISTIK AND MULTIMINERALS METHODS IN THE LOW RESISTIVITY LOW CONTRAST RESERVOIR AIR BENAKAT FORMATION, "TESLA" FIELD, SOUTH SUMATRA BASIN

Wandia Mellani Trihapsari
18/427566/PA/18526

Tesla Field is located in the South Sumatra Basin where in the basin there is the Air Benakat Formation with the constituent rocks dominated by alternating sandstones and claystones so that it has the potential to become a low-resistivity hydrocarbon reservoir. Hydrocarbon reservoirs generally have a resistivity log value above 10 m, when a hydrocarbon reservoir has a low resistivity value, the interval between 0.5-5 m is called a low-resistivity hydrocarbon reservoir. A step-by-step (deterministic) petrophysical analysis and a petrophysical analysis with an opportunity (multimineral) approach are then carried out in order to calculate the petrophysical parameters of the reservoir so that zones that have the potential to become candidates for low-resistivity hydrocarbon reservoirs can be determined and the cause of the low-resistivity hydrocarbon reservoir is known. The study begins by analyzing 2 well log data, mud log, and well reports TSL-2B and TSL-4. Well log data and mud log data are used in the calculation of rock physical properties such as shale content, effective porosity, permeability, and water saturation as well as analysis of the causes of low-resistivity hydrocarbon reservoirs. Based on this analysis, it is known that there are 10 low-resistivity reservoir candidates in the TSL-2B and 6 reservoirs in the TSL-4 with varying thicknesses. These reservoir candidates have different petrophysical parameter values, but it can be classified that the effective porosity in low-resistivity hydrocarbon reservoirs is moderate to excellent, shale volume value is less than 46%, water saturation is less than 60%, and permeability is tight to very good. Based on this analysis, it is known that the low-resistivity reservoir in the Tesla Field is caused by the very fine grain size of the sandstone so that it can bind water significantly (irreducible water), the abundant shale content and the distribution of laminated shale, dispersed shale and structural shale, causing clay to occur bound water, and there is the appearance of conductive minerals in the form of glauconite as well as. It is known that the multimineral method is considered more representative in describing subsurface conditions compared to the deterministic method.

Keywords: *low-resistivity hydrocarbon reservoir, deterministic and multimineral methods, petrophysical parameters.*