

Karakterisasi reservoir dan kandungan fluida menggunakan extended elastic impedance (EEI) dan analisis Avo: studi kasus reservoir batupasir berumur pliosen formasi Kampung Baru Cekungan Kutai = Reservoir characterization and fluid content using extended elastic impedance eei and avo analysis study case sandstone reservoir Kampung Baru formation Kutei basin

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Abstrak

[ABSTRAK

Lapangan AAA merupakan lapangan gas yang terdapat pada lingkungan Delta Mahakam, Cekungan Kutai, Kalimantan Timur. Lapangan AAA merupakan bagian dari lapangan gas dengan produksi terbesar di Indonesia yang telah dieksplorasi dan diproduksi lebih dari 40 tahun. Salah satu tahapan penting setelah proses eksplorasi adalah mengaplikasikan metode karakterisasi reservoir untuk pengembangan lapangan. Karakterisasi reservoir dalam penentuan distribusi lithologi dan fluida sangat penting dilakukan untuk mengetahui daerah berprospek ekonomis yang belum ditembus oleh sumur produksi.

Pada penelitian ini karakterisasi reservoir yang digunakan adalah metode Analisa AVO dan Extended Elastic Impedance (EEI). Analisis AVO menggunakan data prestack 3D gather dan bantuan velocity cube. Data DTS yang digunakan pada penelitian ini terdapat pada sumur 3A45, 3A50, dan 3A45. Metode Extended Elastic Impedance (EEI) dimulai dengan penentuan sudut Chi (X) pada nilai koefisien korelasi yang maksimum (mendekati nilai 1) dan analisis crossplot untuk menentukan nilai cut-off indikator lithologi dan indikator fluida pada setiap parameter fisika dari data sumur. Hasil analisis menyebutkan bahwa fluida pada daerah penelitian merupakan AVO kelas III. Indikator lithologi (reservoir dan non reservoir) dapat dipisahkan dengan parameter Gamma Ray (reservoir bernilai 20 – 60 GAPI) dan Density (reservoir bernilai 1.75 – 2.17 g/cc). Sedangkan indikator fluida (gas dan water) dapat dipisahkan dengan parameter Lambda-Rho (gas bernilai 1.5 – 9 Gpa*g/cc), Lambda per Mu (gas bernilai 0.5 – 2.5), Vp per Vs (gas bernilai 1.5 – 2.2), dan Poisson Ratio (gas bernilai 0.16 – 0.35). Hasil inversi Extended Elastic Impedance (EEI) pada GTS 3A menyebutkan bahwa inversi Lambda-Rho mempunyai akurasi 78.57% (MFA) dan 85.71% (MFB), inversi Lambda per Mu mempunyai akurasi 50% (MFA) dan 85.71% (MFB), inversi Vp per Vs mempunyai akurasi 71.42% (MFA) dan 71.42% (MFB), Inversi Poisson Ratio mempunyai akurasi sebesar 71.42% (MFA) dan 78.57% (MFB).

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ABSTRACT

AAA field is a gas field that located in Delta Mahakam environment, Kutei Basin, East Kalimantan. AAA field is a part of giant gas field which has biggest production

in Indonesia already explored and produced almost over 40 years. One of important steps after exploration of the field is to conduct a reservoir characterization for field development. Reservoir characterization to determine lithology distribution and fluid content is very important to know the prospect area which has economical values and not penetrated yet by infill wells or production wells.

Reservoir characterization method that has been used in this study are AVO analysis and Extended Elastic Impedance (EEI). Pre-stack 3D gather data and velocity cube used for AVO analysis in this study. DTS logs only available in 3A45, 3A50, and 3A55. Extended Elastic Impedance method started with determination of Chi (X) angle that has maximum correlation coefficient (near to 1 value) and cross-plot analysis to determine cut-off value for lithology indicator and fluid indicator in each well data parameter.

Analysis results show that fluid class in this study is AVO class III. Lithology indicator (reservoir and non reservoir) can be separated by Gamma Ray (value of reservoir between 20 – 60 GAPI) and Density (value of reservoir is between 1.75 – 2.17 g/cc). Fluid indicator (gas and water) can be separated by Lambda-Rho (value of gas is between 1.5 – 9 Gpa*g/cc), Lambda per Mu (value of gas is between 0.5 – 2.5), Vp per Vs (value of gas is between 1.5 – 2.2), and Poisson Ratio (value of gas is between 0.16 – 0.35). Results of Extended Elastic Impedance inversion in GTS 3A show that Lambda-Rho inversion has 78.57% accuracy (in MFA) and 85.71% accuracy (in MFB), Lambda per Mu inversion has 50% accuracy (in MFA) and 85.71% accuracy (in MFB), Vp per Vs inversion has 71.42% accuracy (in MFA) and 71.42% (in MFB), Poisson Ratio has 71.42% accuracy (in MFA) and 78.57% accuracy (in MFB).; AAA field is a gas field that located in Delta Mahakam environment, Kutei Basin, East Kalimantan. AAA field is a part of giant gas field which has biggest production in Indonesia already explored and produced almost over 40 years. One of important steps after exploration of the field is to conduct a reservoir characterization for field development. Reservoir characterization to determine lithology distribution and fluid content is very important to know the prospect area which has economical values and not penetrated yet by infill wells or production wells.

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