

Penentuan Sebaran Litologi Batupasir Berdasarkan Metode Seismik Inversi dan Analisis Properti Petrofisika di Lapangan "X", Cekungan Sumatera Selatan = Determination of Sandstone Lithology Distribution Based on Seismic Inversion Method and Analysis of Petrophysical Properties in "X" Field, South Sumatera Basin

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Abstrak

Cekungan Sumatera Selatan merupakan salah satu cekungan utama penghasil minyak dan gas bumi di Indonesia. Lapangan "X" pada Cekungan Sumatera Selatan merupakan salah satu lapangan yang memiliki reservoir hidrokarbon. Penelitian ini berfokus pada zona target Lower Talang Akar Formation (LTAF) pada Sumur G-46, G-47, dan G-49. Pada penelitian ini, penentuan sebaran litologi batupasir dilakukan menggunakan metode seismik inversi post-stack model based serta properti petrofisika. Inversi seismik model based dilakukan untuk menghasilkan nilai impedansi akustik. Properti petrofisika pada penelitian ini meliputi volume shale, porositas, dan saturasi air. Reservoir pada daerah penelitian ini memiliki litologi shaly sand sehingga digunakan metode pengukuran saturasi air persamaan Indonesian dan porositas menggunakan parameter neutrdensity. Berdasarkan hasil analisis petrofisika, zona reservoir LTAF memiliki prospek hidrokarbon dari reservoir yang baik dengan nilai porositas efektif berkisar 18%-25%, nilai saturasi air berkisar 23%-42%. Analisis petrofisika diakhiri dengan analisis lumping, di mana menghasilkan net reservoir dan net pay. Berdasarkan hasil analisis sensitivitas – analisis yang ditunjukkan untuk memisahkan litologi sand dan shale, nilai impedansi akustik tidak dapat memisahkan litologi sand dan shale karena sand bersifat tight. Inversi seismik model based menghasilkan rentang nilai impedansi akustik berkisar 7000 ((m/s)*(g/cc)) – 10500 ((m/s)*(g/cc)). Berdasarkan hasil inversi, nilai impedansi akustik tidak dapat memisahkan litologi sand dan shale karena ketebalan lapisan reservoir sand yang sangat tipis berkisar 10-20 ft.

.....The South Sumatra Basin is one of the main oil and gas producing basins in Indonesia. Field "X" in the South Sumatra Basin is one of the fields that has a hydrocarbon reservoir. This research focuses on the Lower Talang Akar Formation (LTAF) target zone in Wells G-46, G-47, and G-49. In this study, determining the distribution of sandstone lithology was carried out using the post-stack model based seismic inversion method and its petrophysical properties. Model based seismic inversion is performed to produce acoustic impedance values. Petrophysical properties in this study include shale volume, porosity, and water saturation. The reservoir in this study area has a shaly sand lithology so that the Indonesian equation of water saturation and porosity measurement methods are used using the neutron-density parameter. Based on the results of petrophysical analysis, the LTAF reservoir zone has good prospects for hydrocarbons from the reservoir with effective porosity values ranging from 18% -25%, water saturation values ranging from 23% - 42%. The petrophysical analysis ends with a lumping analysis, which produces a net reservoir and net pay. Based on the results of the sensitivity analysis - the analysis shown to separate sand and shale lithology, the acoustic impedance value cannot separate sand and shale lithology because sand is tight. Model based seismic inversion produces a range of acoustic impedance values ranging from 7000 ((m/s)*(g/cc)) – 10500 ((m/s)*(g/cc)). Based on the inversion results, the acoustic impedance value cannot separate the lithology of

sand and shale because the thickness of the reservoir sand layer is very thin, ranging from 10-20 ft.