

Analisa sekatan sesar lapangan ara, cekungan Kutai, Kalimantan Timur = Fault seal analysis of ara field Kutai basin East Kalimantan

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Abstrak

[Lapangan ARA yang terletak di lepas pantai Delta Mahakam modern merupakan lapangan penghasil gas yang berproduksi sejak 2008 hingga sekarang. Sesar Utama yang merupakan sesar normal berorientasi NNE-SSW dengan kemiringan relatif ke arah Timur memisahkan Lapangan ARA menjadi dua panel: Panel Barat dan Panel Tengah. Studi konklusif mengenai sifat sekatan sesar utama ini diperlukan dalam optimisasi pemodelan geologi dan kelanjutan pengembangan lapangan. Studi internal telah menggunakan interpretasi horizon dan sesar dari seismik 3D beserta data log sumur sebagai dasar utama pembuatan model struktur, fasies, dan petrofisik Lapangan ARA. Prediksi SGR (shale gouge ratio), permeabilitas batuan zona sesar (Kf), dan fault-rock capillary pressure (FRPc) adalah parameter-parameter utama yang digunakan dalam analisis sifat sekatan sesar. Parameter-parameter tersebut di kalibrasi menggunakan analisis reservoir statik dan dinamik berdasarkan data pengukuran tekanan reservoir. Analisis sekatan Sesar Utama Lapangan ARA menghasilkan batas nilai parameter sekatan untuk zona sesar bersifat tersekat, yaitu $SGR > 0.39$, $Kf < 0.025 \text{ mD}$, dan $FRPc > 3.3 \text{ bar} / 47.8 \text{ psi}$. Variasi kapasitas sekatan sesar dikontrol lebih dominan oleh faktor penyebaran reservoir juxtaposition dibandingkan faktor penyebaran atribut fault throw. Peningkatan perbedaan tekanan reservoir saling kontak antar panel hingga melebihi kapasitas sekatan sesar akibat produksi intensif, menjadi penyebab kebocoran sesar; ARA Field, which is located in offshore area of modern Mahakam Delta, is producing gas since 2008. Main normal fault in the middle of the field separates the field into two panels: West panel and Central Panel. Conclusive study about the sealing behavior of this main fault is needed in order to optimize geology model and future field development. Internal study has used 3D seismic faults and horizons interpretation with its well logs as main input to made structural, facies, and petrophysic model of ARA Field. Shale gouge ratio prediction, fault-rock permeability (Kf), and fault-rock capillary pressure (FRPc) are main analyzed parameters used in this research. Those parameters are then validated with static and dynamic reservoir analysis based on available reservoir pressure data. ARA Field Main Fault seal analysis results cutoff value for each analyzed parameters: $SGR > 0.39$, $Kf < 0.025 \text{ mD}$, and $FRPc > 3.3 \text{ bar} / 47.8 \text{ psi}$. Fault sealing capacity distribution is controlled more dominantly by the reservoir juxtaposition distribution than fault throw attribute. Increase of across fault differential pressure in juxtaposed reservoirs that exceeds the maximum fault seal threshold capability is interpreted as the main cause of fault leak., ARA Field, which is located in offshore area of modern Mahakam Delta, is producing gas since 2008. Main normal fault in the middle of the field separates the field into two panels: West panel and Central Panel. Conclusive study about the sealing behavior of this main fault is needed in order to optimize geology model and future field development. Internal study has used 3D seismic faults and horizons interpretation with its well

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