**ABSTRAK**

# ANALISIS PETROFISIKA DAN *VELOCITY MODEL* UNTUK KARAKTERISASI RESERVOIR FORMASI NGIMBANG KLASTIK : STUDI LAPANGAN "KINGSMAN", CEKUNGAN JAWA TIMUR UTARA

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Lapangan "Kingsman" merupakan salah satu area *mature basin* yang terletak di selatan *Rembang Line*, Cekungan Jawa Timur Utara. Secara struktural, wilayah ini diapit oleh *Central High* dan *Southern High*, sehingga menjadikannya prospektif untuk akumulasi hidrokarbon. Target penelitian ini adalah Formasi Ngimbang Klastik berumur *Middle Eocene* yang tersusun atas *sandstone* (reservoir) dan *shale*. Penelitian ini menggunakan data dua sumur, yaitu BMJ-1 dan BMJ-2, serta data seismik 3D *post-stack time migration* seluas 429 km² dengan pendekatan integrasi analisis petrofisika dan *time to depth conversion* untuk memetakan persebaran lateral zona prospek. Hasil petrofisika menunjukkan interval prospek berada pada horizon T_ME (*Middle Eocene*) dengan kualitas reservoir sangat baik (porositas 20–25%). Sumur BMJ-1 memiliki *net pay* 20,5 ft dengan konfirmasi *oil show* dari uji DST, sedangkan BMJ-2 memiliki *net pay* 68 ft dengan indikasi kuat keberadaan minyak berdasarkan karakter petrofisika. Struktur geologi di area penelitian dikontrol oleh sistem *normal fault* berarah timur–barat yang membentuk geometri *horst* dan *half graben*. Hasil *velocity model* dan *time to depth conversion* berhasil menyelaraskan data seismik dan data sumur, menunjukkan zona tinggian prospektif pada interval T_ME dengan rentang waktu 2.514–2.800 ms setara kedalaman 7.539–8.200 ft. Integrasi kedua metode mengindikasikan arah migrasi hidrokarbon dari Basin X dan Y di utara menuju tinggian BMJ-2 dan BMJ-1, dengan akumulasi utama di area di antara keduanya. Berdasarkan hasil tersebut, direkomendasikan tiga titik *proposed well* ntuk menguji kontinuitas lateral reservoir dan memperkuat konfirmasi keberadaan hidrokarbon di Lapangan "Kingsman".

Kata kunci : Cekungan Jawa Timur Utara, Formasi Ngimbang, Karakterisasi Reservoir, Petrofisika, *Velocity Model*

***ABSTRACT***

# *PETROPHYSICAL ANALYSIS AND VELOCITY MODEL FOR* RESERVOIR *CHARACTERISATION OF THE CLASTIC NGIMBANG FORMATION: 'KINGSMAN' FIELD STUDY, NORTH EAST JAVA BASIN*

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*The "Kingsman" field is one of the mature basin areas located south of the Rembang Line, North East Java Basin. Structurally, this area is flanked by the Central High and Southern High, making it prospective for hydrocarbon accumulation. The target of this study is the Middle Eocene Ngimbang Clastic Formation, which consists of sandstone (reservoir) and shale. This study uses data from two wells, BMJ-1 and BMJ-2, as well as 3D Post Stack Time Migration seismic data covering an area of 429 km² with a petrophysical analysis integration and time to depth conversion approach to map the lateral distribution of the prospect zone. Petrophysical results show that the prospect interval is located at the T_ME (Middle Eocene) horizon with excellent reservoir quality (porosity of 20–25%). The BMJ-1 well has a net pay of 20.5 ft with confirmation of oil show from the DST test, while BMJ-2 has a net pay of 68 ft with strong indications of oil based on petrophysical characteristics. The geological structure in the study area is controlled by an east-west normal fault system that forms a horst and half graben geometry. The velocity model and time to depth conversion results successfully aligned the seismic and well data, indicating a prospective high zone at the T_ME interval with a time range of 2,514–2,800 ms, equivalent to a depth of 7,539–8,200 ft. The integration of both methods indicates the direction of hydrocarbon migration from Basins X and Y in the north towards the BMJ-2 and BMJ-1 high points, with the main accumulation in the area between the two. Based on these results, three proposed well locations are recommended to test the lateral continuity of the reservoir and reinforce the confirmation of hydrocarbon presence in the Kingsman Field.*

*Keywords : North East Java Basin, Ngimbang Formation, Reservoir Characterization, Petrophysics, Velocity Model*