Seismic Reservoir Characterization in Hydrocarbon Exploration: An Effort to Unlock Gumai Play Potential in South Sumatra Basin, Indonesia

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ABSTRACT

Gumai Play is considered to be the least explored play in South Sumatra Basin. This formation is well known as the regional seal for Talang Akar Formation, one of the most prolific reservoir in South Sumatra Basin and the main exploration target in this area. It consists of generally marine clastic deposits where calcareous shales, claystone and siltstone interbedded with very fine-grained calcareous and glauconitic sandstones therefore reservoir continuity and quality become the biggest risk.

To date, little exploration has been done to fully evaluate this play in the study area. Most wells drilled in the study area were targeting the deeper intervals and did not consider the Gumai interval as one of the drilling objectives. However, recent drilling campaigns in the study area have shown encouraging results from Gumai play and this has triggered a look back analysis of previous wells drilled through the Gumai interval. The analysis showed that many of these wells had encountered high gas reading through the Gumai interval but no effort was made to properly evaluate this interval. In view of these new findings, an integrated geological and geophysical study has been conducted to fully evaluate the reservoir characteristics and distribution, and to unlock the potential of the Gumai play in the study area.

This paper describes the result of a quantitative interpretation study that has been delivered in order to improve the predictability of the reservoir distribution. A geostatistical inversion was executed on the single stack seismic data (fullstack) guided by the regional geology information and rock physics local knowledge. The final result would be a lithofacies model and reservoir properties distribution as a part of risk assessment in term of reservoir presence and effectiveness to unlock the potential of this play. Limitation on the geophysical data successfully covered by geostatistics and geological data information.