Title: Distribution Mapping and Facies Interpretation of Sandstone Reservoir Unit D Using Seismic Attributes and Well Log Data in Suphan buri Basin

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ABSTRACT

The Suphan Buri Basin has been identified as a potential candidate for carbon capture and storage (CCS) due to its deep sandstone reservoirs overlain by shale-dominated sealing units. However, detailed understanding of reservoir geometry, heterogeneity, and structural controls is essential to evaluate storage capacity and long-term containment security. Seismic facies interpretation of Sandstone Reservoir Unit D is therefore crucial for assessing its suitability as a CO_2 storage formation.

This study integrated three-dimensional seismic data with well-log information to map sandstone distribution and interpret seismic facies. The workflow began with seismic–well tie analysis, which was the first step to enrich confidence of investigation. Six horizons, identified as maximum flooding surface (MFS), were picked as sequence boundaries. The second step was, structural interpretation of the fault systems followed by seismic facies analysis based on reflector configuration, continuity, amplitude, and frequency. The last step was applying RMS amplitude attribute to extract sandstone distribution pattern.

Five seismic facies were classified including SF1, SF2, SF3, SF4 and SF5. SF1 shows sub-horizontal to horizontal parallel configuration with high amplitude, low frequency and high continuity. It represented a prodeltaic environment. SF2 is characterized by low to moderate amplitude, low frequency and moderate to high continuity reflections with wavy to sub-horizontal parallel configuration and downlap

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terminations. SF2 is interpreted as delta front. SF3 occurs in cycles consisted of wavy alternates with sub-horizon parallel configuration. The reflections have moderate to high amplitude, high frequency and high continuity. SF3 was interpreted to represent distal bar deposits. SF4 shows wavy to sub-horizontal parallel configuration with high amplitude to upper part, high frequency and high continuity which suggest a delta top environment. SF5 shows progradational configuration with downlap terminations. It is characterized by moderate amplitude, high frequency and low continuity and interpreted as distributary mouth bar.

Sandstone within Unit D have potential for CCS development, particularly within the distributary mouth bar (SF5) and delta front (SF2) facies due to their high sand-to-shale ratios, which provide substantial volumetric storage capacity for CO_2.

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