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## Abstract

This paper describes how a comprehensive and integrated play-based methodology was used to support regional to prospect scale analysis of the Permian carbonate petroleum system within the within the B8/38 license, Gulf of Thailand. This provided focused areas of interest and a robust foundation for prospect generation and further ongoing exploration.

Southeast Asia has a rich history of petroleum exploration with a well understood series of prolific hydrocarbon basins. Within the Gulf of Thailand, production has largely been from Cenozoic clastics; however, within the west, Permo-Carboniferous carbonates remain a commercially viable play with reservoir presence and effectiveness defined as the critical risk for the play. A data-driven regional assessment of well penetrations and onshore outcrops was used to support definitions of reservoir potential. This potential was limited to areas of secondary porosity; a series of analogue and data supported reservoir models were developed which aided the definition of reservoir play segments.

Regional and data-supported plate-reconstructions, gross deposition environment (GDE) and lithofacies mapping of the reservoir interval supported the reservoir model, which highlighted that there is little potential for primary effective reservoir. Detailed work was undertaken to assess analogue data where secondary enhancement was shown to provide effective reservoir. Several mechanisms for enhancement were demonstrated, including karstification, structuration and geothermal alteration. Reservoir concepts were developed and preferential areas within the licence used to focus the generation of several exploration prospects.

While drilling losses within some wells that penetrated the Paleozoic carbonate section provided encouragement for potential flow zones, others had generally tight reservoir. As such, although the presence of reservoir was readily demonstrated, prediction of potentially productive intervals remained challenging. With that in mind, an integrated approach using all available data was imperative, two key findings from which were that: 1) there needs to be an element of structuration or otherwise combination of chemical and structural alteration to enhance generally poor carbonate host rocks; 2) seismic data was critical in predicting where effective reservoir was more likely. Both these aspects enable de-risking of the reservoir for an exciting play, taking it one step closer to being drill-ready.

The development and definition of viable new play concepts and models are desirable to support ongoing investment in declining assets; this paper demonstrates how integrated: regional play analysis, analogues driven carbonate reservoir model and detailed seismic analysis supported detailed prospect generation within a relatively un-tested play within a mature asset.