Paper C13

Cascading Inversion Application for Lithology and Porosity Estimation of Deepwater Thinly-Bedded Reservoirs

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The deep water basins are major targets for hydrocarbon exploration to contribute a significant undiscovered resources. The geological processes in DW environments commonly include deposition of thinly-bedded pay zones that are difficult to characterize using standard seismic and logging techniques, and are often left unexploited and even overlooked during drilling.

This pilot project was the first collaboration study conducted in Malaysia for DW Thinly-Bedded Reservoir Characterization. The essential of reservoir model is including the Cascading Inversion of an integrated multiple disciplines workflow: (1) Seismic Data Conditioning, (2) Sedimentology, SHARP and Rock Model Building, (3) Simultaneous AVO Inversion, (4) Lithology and pay prediction, (5) Stochastic inversion and Geo-Modeling, and (6) Validation.

This paper emphasized on a calibrated deterministic Simultaneous AVO Inversion of 4ms samples and utilized as one of the essential inputs to the stochastic seismic inversion to produce a higher resolution 1ms dataset. In essence, the stochastic inversion workflow incorporated 7 exploration wells with SHARP logs are used as the definitive model, and a number of realizations generated within the given geo-cellular grid over the zone of interest. These simulated realizations afforded the improved lithology and porosity computations which would lead to more robust volumetric computations of thinly bedded reservoirs.