Development Well and Execution Planning in a Complex Subsurface Environment – the Impact of Large and Small Scale Modeling on Well Deliverability

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The Thylacine Gas Field is in the Otway Basin (Offshore SE Australia). The interplay of intra-field faulting and the intrinsic layered geology mean that there is the potential for a high degree of compartmentalisation. A significant proportion of the reserves are thought to reside in the reservoirs of the Thylacine Sandstone Member, which are poor quality marine sands interbedded with thick successions of thinly bedded sand-shale and shale.

The Thylacine development required a low cost, high efficiency development concept to tap these difficult reservoirs. The horizontal wells required careful positioning and design to best exploit the resource due to a mix of the complex structure within the field as well as reservoir quality and distribution uncertainties. Installation of the Thylacine Alpha platform provided a base for drilling of these horizontal well. In an effort to better place the wells, and in some way predict the outcome of the wells, both deterministic (using Jason RockTrace) and probabilistic (using Shell proprietary software) AVO inversions were carried out. Simple acoustic impedance models showed improved resolution over the PSDM data, and provided considerable insight into reservoir architecture and geometry. In parallel, a review of the available core and log data from the exploration/appraisal wells supported construction of a geological model with a large degree of built-in predictability. The combination of predictive geological model, aimed at improving sub-seismic resolution, and seismic inversion to identify trends in seismic scale reservoir geometry proved invaluable in both the well planning and execution phases of the project.

This paper outlines first the planning phase of the wells and the outcome of the execution phase.