Static and Dynamic Modeling of the Malampaya-Camago Gas-Condensate Field, Offshore Northwest Palawan, Philippines Utilizing an Experimental Design Methodology

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The Malampaya-Camago gas-condensate field is an Oligocene-Miocene carbonate reefal build-up situated in the South China Sea, offshore northwest Palawan Island (Philippines) in 800-1200m of water. The field has been supplying gas from 5 sub-sea production wells since October 2001 to three Gas to Power plants on Luzon Island.

This paper outlines an Experimental Design (ED) geocellular modeling workflow that was employed for uncertainty analysis of the Malampaya-Camago field. The ED workflow was used to define the required suite of static and dynamic models and model parameter combinations required to fully assess the impact of reservoir uncertainties on reserves and production forecast.

Simple map-base geologic and material balance models were used initially to establish a preliminary field history match. Key geologic and reservoir uncertainty parameters with ranges were identified and analysed using a Plackett-Burman (PB) ED and multiple geocellular static earth models were built as specified by the ED run table. Subsurface data used included a high resolution 3-D seismic survey and nine exploration/appraisal wells with wireline and borehole image data, including spot core in selected wells, magnetic susceptibility from cuttings, almost continuous static reservoir pressure data and well test data. High resolution geologic three dimensional grids were built with 1m vertical layering and aerial grid dimension of 100m2.

The geologic models were upscaled for flow simulation and history matched with production data. A genetic algorithm was utilised to optimise on the mismatch of the initial 25 geologic models with production data. This produced a selected set of acceptable models which could be evaluated in predictive runs to generate a range of production forecast. The above analysis and results are based on Chevron technical work and may not reflect operator's view.