Bayu-Undan – Use of Downhole Pressure Monitoring to Improve Reservoir Management in a Recycled Gas Reservoir

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The Bayu-Undan Field lies in the Timor Sea to the NW of Australia and is a world scale retrograde gas-condensate accumulation. Effective Reservoir Management of a large gas condensate recycling field requires early recognition of the degree of communication between injectors and producers, aquifer strength and management of the key reservoir uncertainties.

The objective of this presentation is to communicate requirement, applications and value of pressure data to improve reservoir management and reservoir simulation history matching process of the Bayu-Undan field. Copious down-hole pressure response observations, compared to base-case reservoir models, show that major faults in the field introduce anisotropy resulting in permeability enhancement of x10 in the east-west direction compared to north-south.

Acquired pressure data from permanent and temporary down-hole gauges provided invaluable information required to reduce well count, prove reservoir connectivity, and establish flow relationship between production and injection wells. A major field shut-down (6 weeks), the longest shut-down in company history, presented an excellent opportunity to plan and perform interference testing.

A simple one layer model built using well testing software 'Saphir' provided important information for reservoir simulation history matching. The simplicity of the Saphir model, as well as the capability of 'Saphir' to model conductive faults, aided reservoir characterization and ultimately the full field model history match.