

Fast and slim — a creative development concept in an oil field offshore Sabah, Malaysia

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Shell Malaysia took-up a new challenge when faced with the task of commercialising an oil field recently discovered offshore North Sabah in the South China Sea. The field contains ca. 200 MMstb STOIP, trapped in turbidite deposits within a structurally complex geological setting.

The primary recovery factor assumed for the reservoirs at these shallow depths (1,500–3,000 ft TVss) containing 18 deg API saturated oil, were initially conservative. The reservoir heterogeneity, structural complexity and the likely absence of natural water drive further dictate the need for a creative development concept. Conventional natural depletion and artificial lift development methods alone did not seem to yield maximum life cycle value to the asset.

Based on lessons learnt, SSPC/PN/PCSB jointly has been quick to pull together a fast-track development framework, which ensures application of new technology and full life-cycle development planning for the field. Whilst gaining the advantage of early first oil, this approach will also lead to a scheme with improved recovery and economic robustness.

A phased development is proposed to further pin down the subsurface uncertainties in view of the limited well penetration in the accumulation. A slim jacket with splitter wellhead technology will allow early drilling of a first phase of production-appraisal wells. As well correlation is insufficient, utilising state of the art seismic evaluation methods were used to create realistic static reservoir models to optimally position the first few development and appraisal wells. By making use of ullage in nearby production platform facilities, early oil can be produced within 18 months from field discovery. Utilising novel sand control techniques, it is expected that this early oil productivity will further increased. Meanwhile, first phase development is flexible in design such that facilities could be added to re-inject excess gas back into the reservoir, further increasing the recovery factor.

When more subsurface data is available and uncertainties further assessed and narrowed down after the Phase I development, additional wells will be positioned in areas to further enhance the recovery factor. To tap into all field corners, highly deviated wells are planned. Completions applying SMART well technology to enable increased downhole data gathering and selective production from each of the reservoir sub-units are also being considered.

In the second phase of development, water injection is proposed to arrest the decline in reservoir pressure and further boost the recovery factor. In addition, use of Coiled Tubing (CT) deployed Electro Submersible Pumps (ESP) inside existing wells is proposed to add development flexibility. All these demonstrate a significant paradigm shift in areas of field development concepts, production practices, the need for speed, contracting strategies, drilling practices and cost optimisation etc.

The tremendous effort being put into the proposed development concept has proven that “Bigger” is not necessarily better than adopting a Slim and Phased development approach. It has become symbol for a new

way of teamwork that achieves fast, flexible and robust development results. The benefit of technology application is transparent in delivering maximum business results.