

# Maximising Value in Mature Waterflood Field

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## Abstract

Malay Basin started operations more than 50 years ago, which means many of the existing assets are matured. A common theme amongst operators of mature fields is finding ways to economically maximize production through existing wells, including exploring underdeveloped reservoirs in a multi-reservoir commingled completion, or infill campaigns. To yield more production at typically a limited budget, mature assets need a more focused approach in revamping their strategies in managing assets suited to the current constraints of a mature field.

Understanding historical and current production performance are essential to identify areas for optimization within a field. One recommended method is segmenting a reservoir within a field to polygons bounded by faults, injectors, or areas and defining its “value” and “health”. Value of a pattern is defined by the remaining ultimate reserves within the polygon and good health is defined by maintaining good water injection rate and ensuring balanced Voidage Replacement Ratio (VRR) to obtain optimum pressure for production.

This analytical approach is done for individual polygon and supplement by remaining oil saturation from dynamic models to identify areas of bypass oil. Next step to extract these bypassed opportunities requires synergy between Subsurface & Wells team to identify economical methods of well intervention.

This paper intends to showcase recent examples of successful quick wins as product of strategy change in Field X to improve field recovery and maximize reserves capture by monetizing the remaining hydrocarbon resources especially associated with under-developed laminated sands. Both subsurface and wells team needed alignment on reservoir ‘chance of success’ and review the complexity of well jobs. The benefit of utilizing integrated approach, eventually brings value with the recent success of add-perf via one well from ‘minor’ reservoir, at low recovery factor. Reservoir connectivity between current lobe and new add- perf lobe, risk of having high GOR from current trend, and scale threat - are amongst the risks that have been agreed by the team. Additionally, predicted simulation results only bears a ‘small’ incremental of oil rate from the new zone due to its limited connected hydrocarbon volumes. Nevertheless, the final rate from add-perf job showing ‘tremendous’ build-up rate, almost six times higher than predicted. With this encouraging result, future plan includes increasing water injections in that small area for pressure support, based on low VRR identified in previous assessment. To conclude, pattern analysis exercise is useful for opportunity identification and complementing overall surveillance strategy of any asset.

Despite the generally mature field development stage, hydrocarbon resources in laminated sandstones remain a viable target and offer vast opportunities that are worthy of pursuit. This case study is evident that there are sizeable quantities of bypassed and undeveloped hydrocarbon awaiting to be monetized by implementing and adopting more creative and cost-effective tools and technologies; and unless we do something differently, these resources will remain in the ground and be left unexploited.