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Strengthening Marginal and Mature Field Ecosystems: Technology, Innovation, and Collaboration

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Strengthening Marginal and Mature Field Ecosystems: Technology, Innovation, and Collaboration



Delivering First Hydrocarbon Within 3-Years of Appraisal Drilling in a Marginal Oilfield: Case Study from Sarawak

Ankaj Kumar Sinha

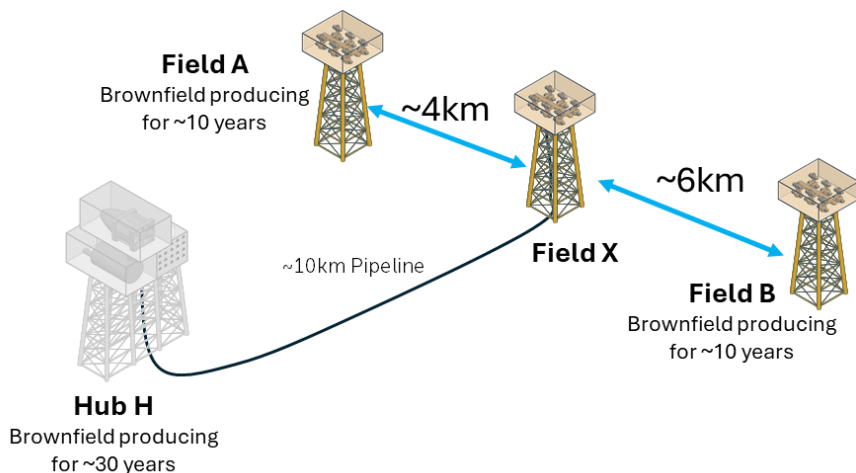
PETRONAS Carigali Sdn Bhd

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Aidil Aznan Azwan A Azid, Nur Hazwani Izyan, Rosana Polo, Mohamad Ali M Yunos, Juniza bt Jamaludin



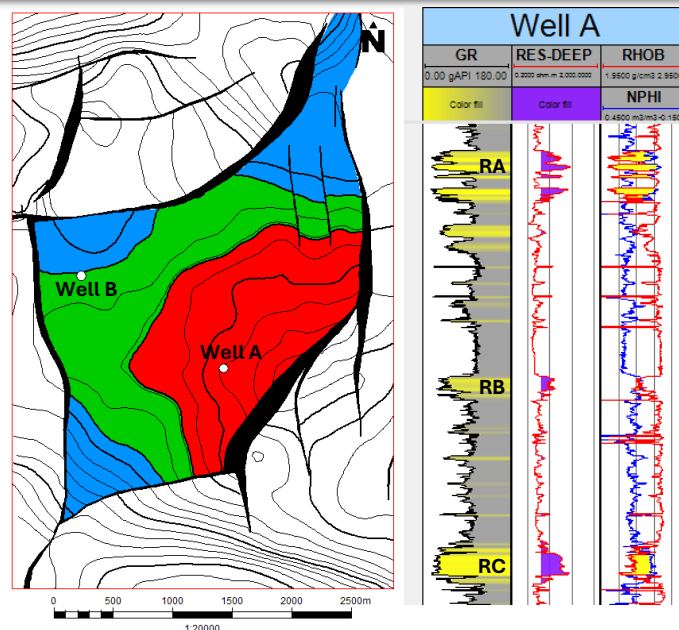
Field Overview

Field Location



- ~150km from Bintulu shore, ~10km from nearest processing hub
- Nearby fields under production for >10 years providing good regional understanding

Reservoir Information



- Three-way dip faulted anticline
- Cycle-II Clastic Reservoirs
- Gas-cap drive mechanism
- 33 deg API Oil
- No H₂S, <4% CO₂

Strategy for Development

- ❖ To evacuate full well-stream fluids to the nearest processing hub for minimizing capex investment
- ❖ To maintain production volumes within hub capacity limits to avoid major brownfield modifications
- ❖ Fast-tracked development to secure ullage assurance at the hub



Development Roadmap

Fit-for-purpose Subsurface Studies & Project Scoping

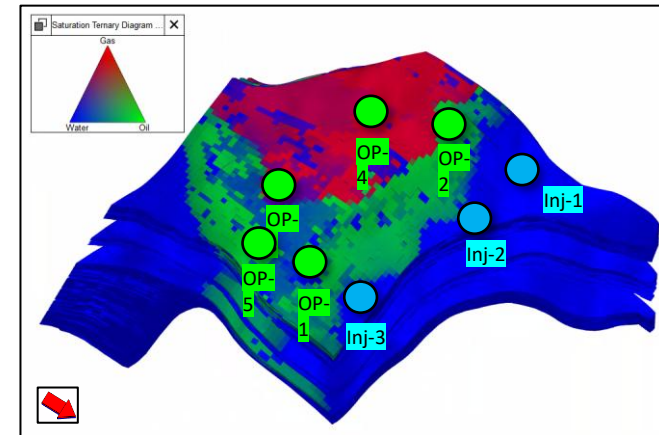
- ❖ Phase-I modeling for major oil reservoirs development with 5 oil producers with minor reservoirs planned for future monetization
- ❖ Simplified project scope for early screening of development concepts for pace of pre-development studies
- ❖ Leveraging on integrated technical assurance roadmap for simplified governance and expedited internal approvals

Mitigating Project Uncertainty & Optimized FDP

- ❖ Concurrent planning & execution of appraisal well drilling for additional data acquisition for optimal field planning
- ❖ Assessment on potential modes of reservoir pressure maintenance for recovery factor improvement
- ❖ Optimization to development well trajectory and field production forecast to maximize field recovery & secure ullage at tie-in hub

Fast-Tracked Project Execution for Value Creation

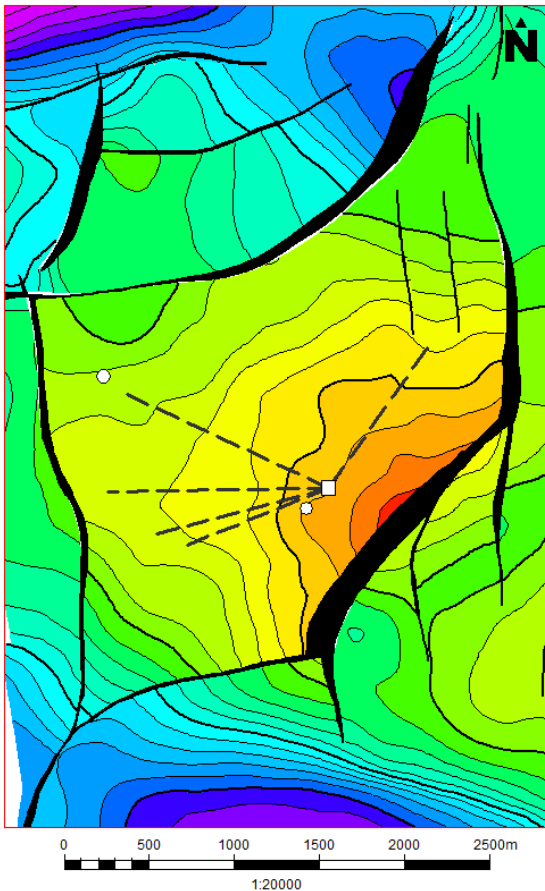
- ❖ Cost optimization for wells design and facility concept to support project valuation for a marginal field
- ❖ Paced execution plan by leveraging on integrated project team for resource optimization & bringing synergy across similar projects
- ❖ Strategizing for delivering 1st Oil through fit-for-purpose drilling-completion & well unloading strategy



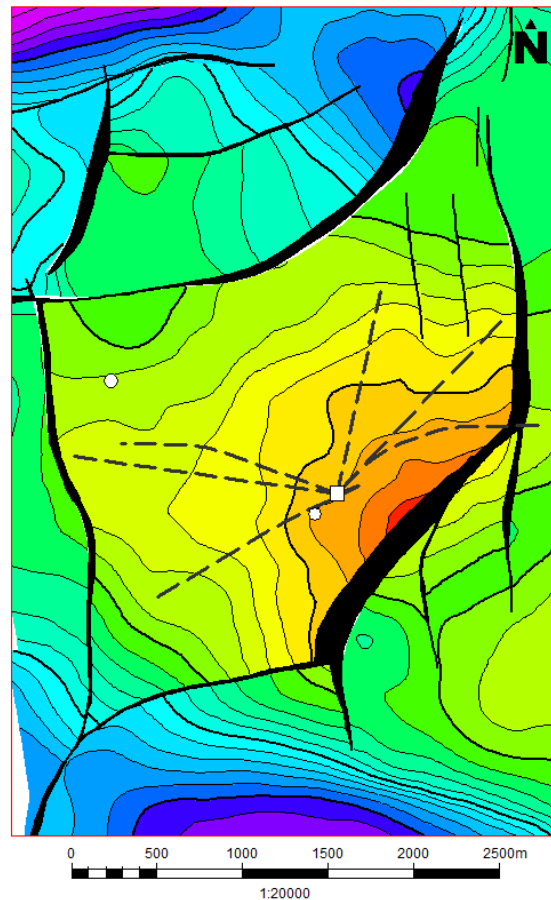
Model Schematic showing Notional Well Placement for WI Scenario Assessment

Optimized Field Development Plan

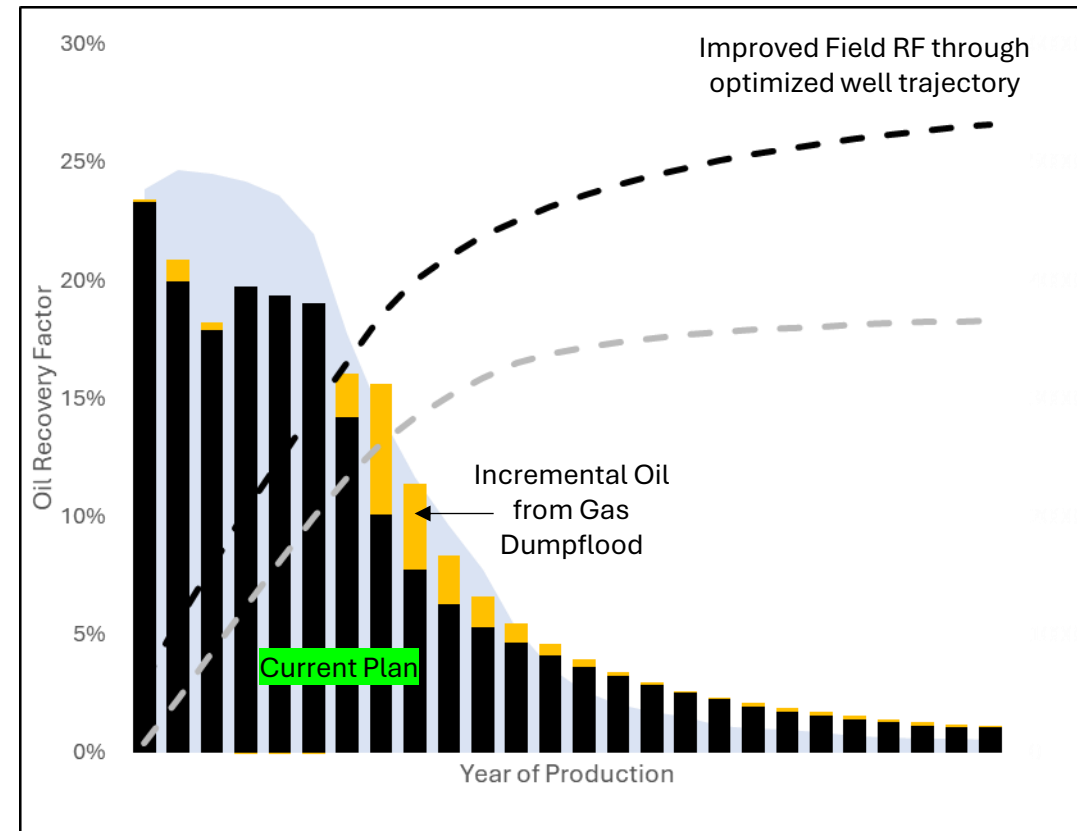
Original Plan – 5 Dev Wells
4 Deviated & 1 Horizontal



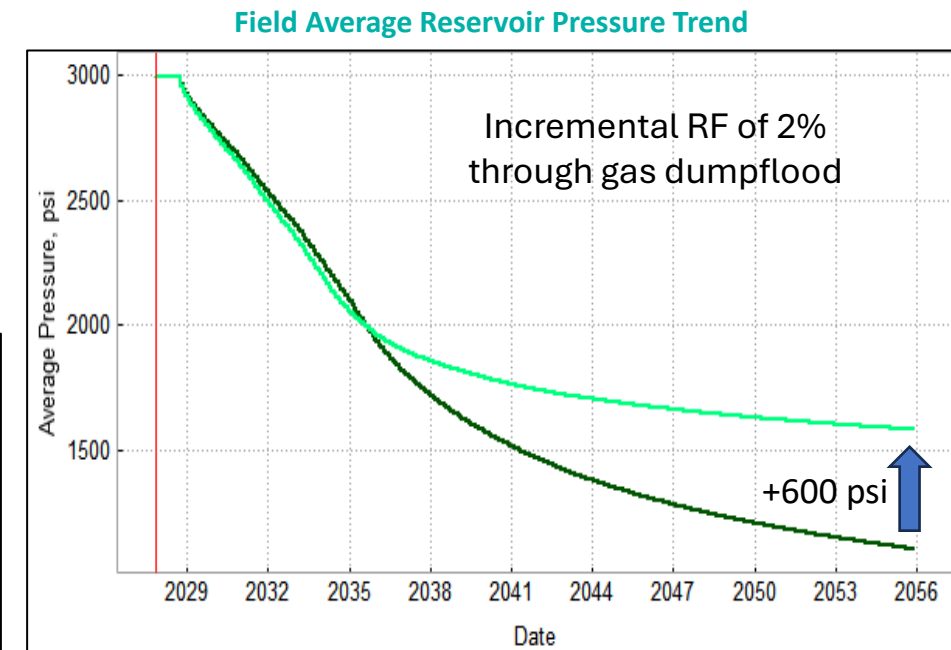
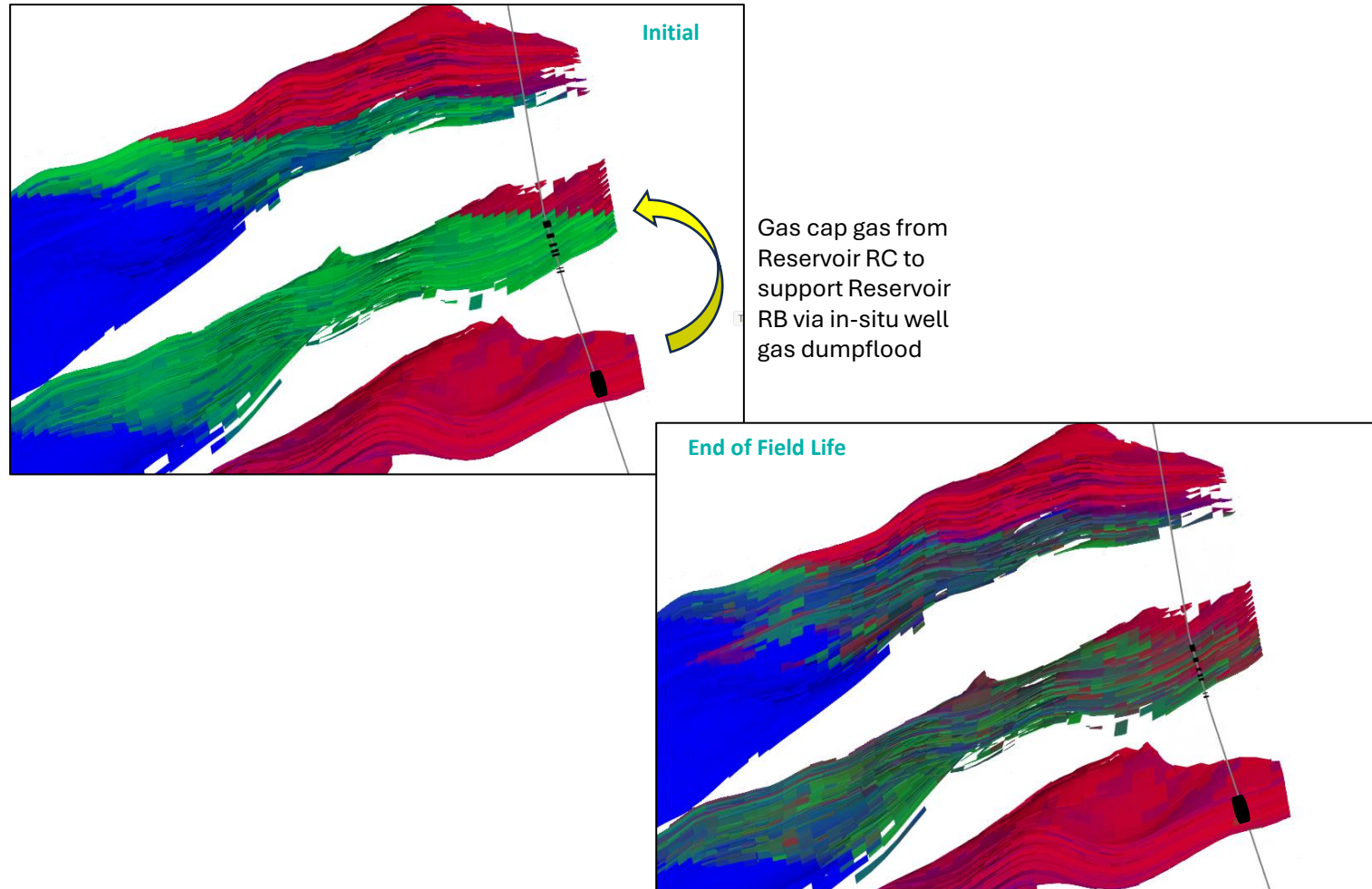
Revised Plan – 5 Dev Wells + 1
Gas Dumpflood Well
4 Deviated, 2 Horizontal



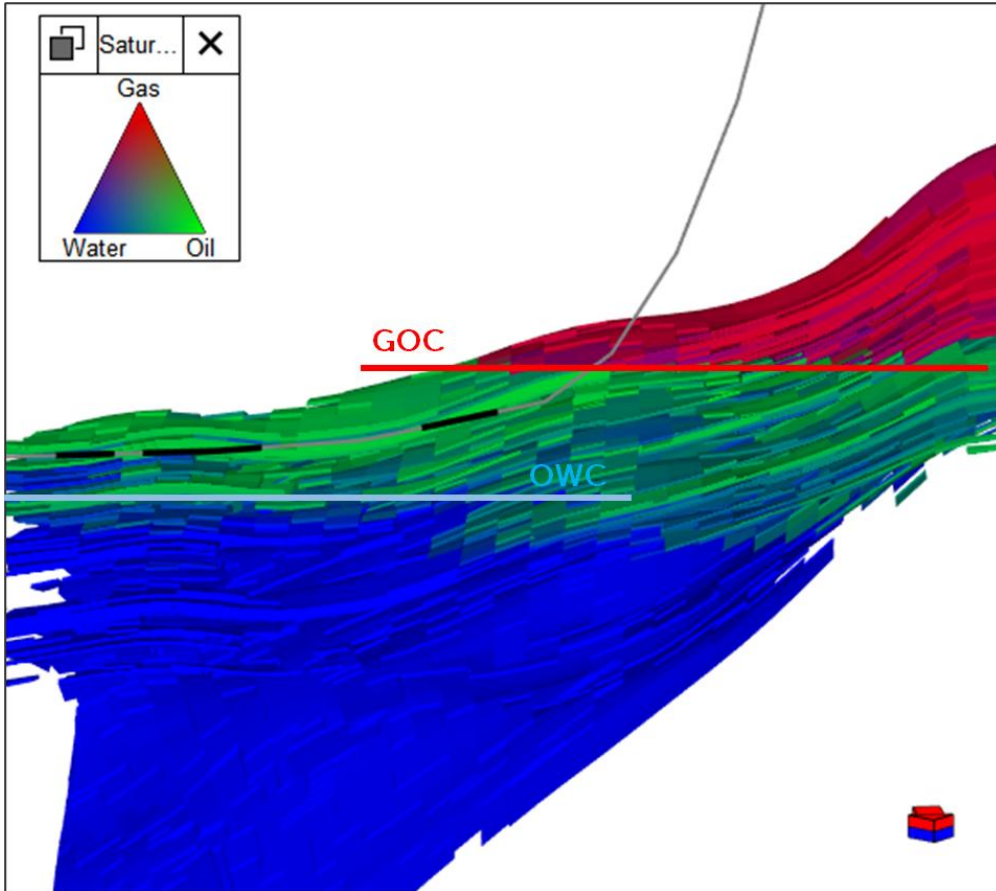
Optimised Field Production Forecast



Pressure Support through Gas Dumpflood



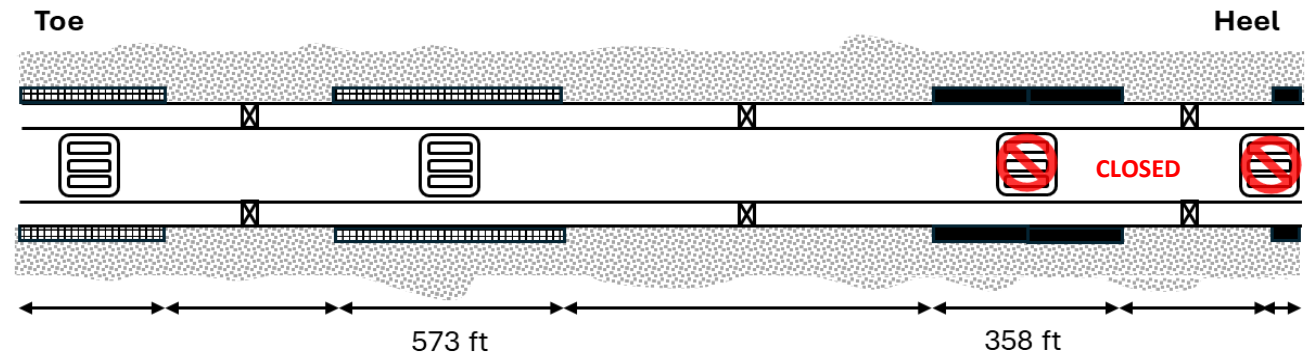
Simplified Completion Strategy



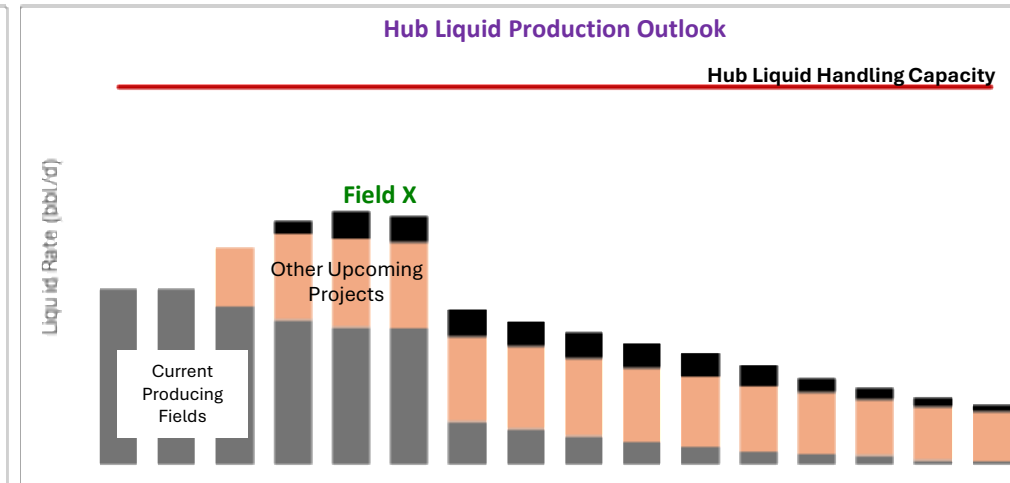
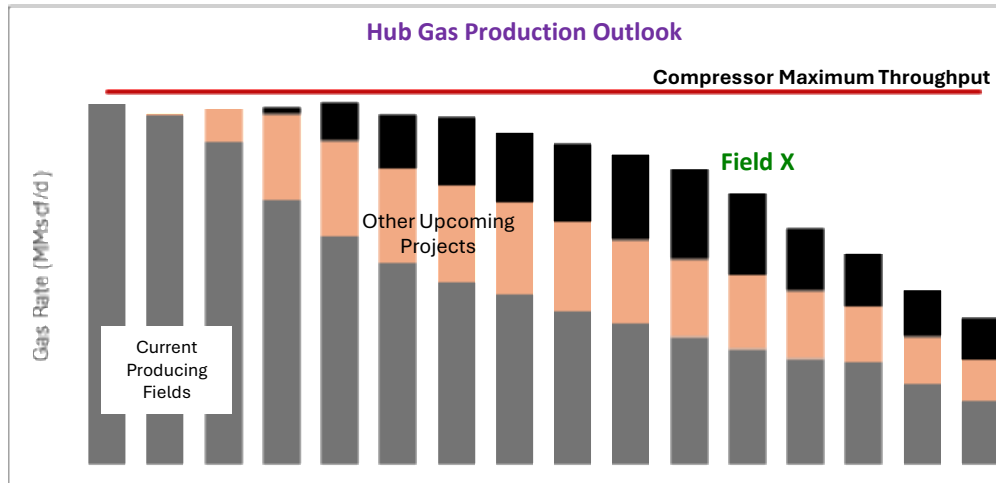
Risk: Potential Gas coning from the completion zone in the Heel

Mitigation: Complete horizontal section away from the GOC

- Install blanks / closed SSDs in the heel and ONLY complete the zones in the toe to increase the stand-off from the GOC

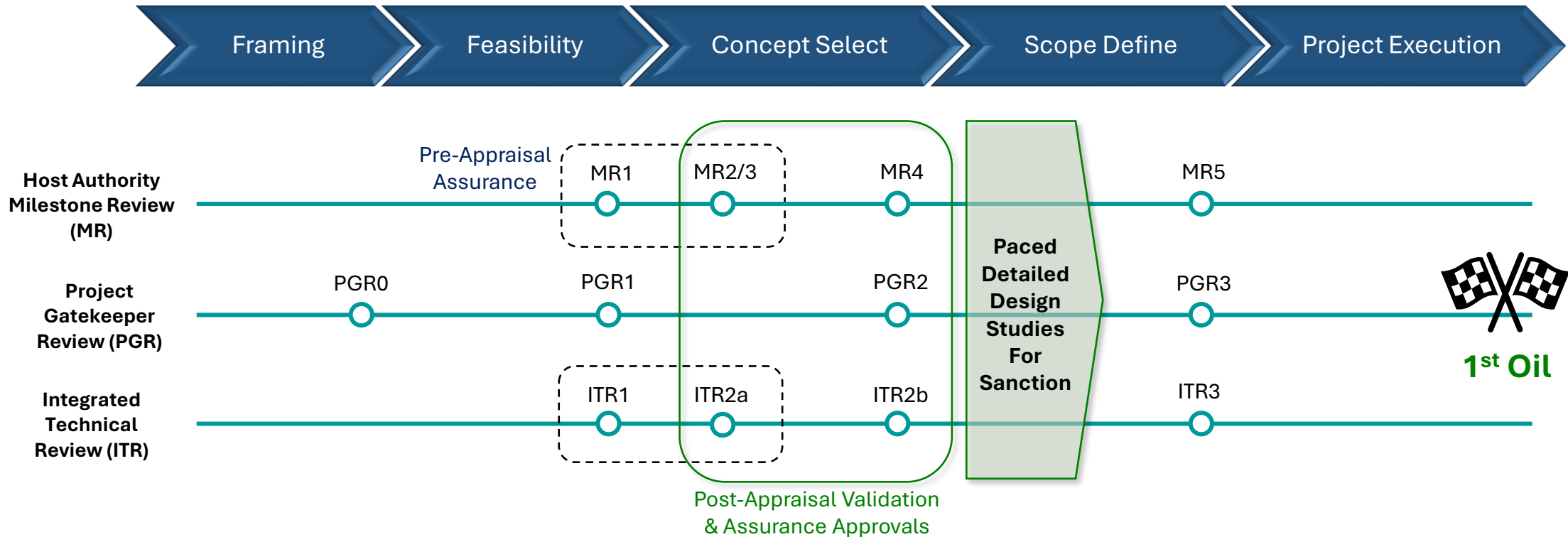


Optimized Development Scope Within Hub Capacity Limits



- ❖ Field production volumes within hub capacity limits to avoid major brownfield modifications
- ❖ Early screening of development concepts to identify wellhead platform as base plan with potential cost optimization through refurbished topside utilization. Ongoing studies for provisions on Phase-II plan
- ❖ Alignment with stakeholders for data sharing for facility design & securing production ullage at the hub

Paced Project Execution for 1st Oil within 3-Years of Appraisal Drilling



- ❖ Syndication with stakeholders to align on simplified governance process for project maturation
- ❖ Integrated gate reviews for technical assurance & decision making to support pace of delivery
- ❖ Cost optimization through utilization of refurbished topside and fit-for-purpose brownfield modification



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Conclusion

- ❖ An integrated project team has facilitated efficient collaboration to deliver the roadmap for 1st hydrocarbon in a greenfield within 3-years of last appraisal drilling
- ❖ Fit-for-purpose development planning with an agile approach for ‘new data assimilation’ has maintained the project pace with potential for future enhancements
- ❖ Good management support through simplified governance process and collaboration with stakeholders for hub production maximization for holistic value creation for the region



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Acknowledgements

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Colleagues at Development and PETRONAS Carigali Sdn. Bhd. (PCSB)

