



Decommissioning and Restoration – Fostering Excellence through Regulations, Innovation, and Sustainable Practices

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Maximising Cross-Functional Integration

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INTRODUCTION



Sikui Field & Project Overview



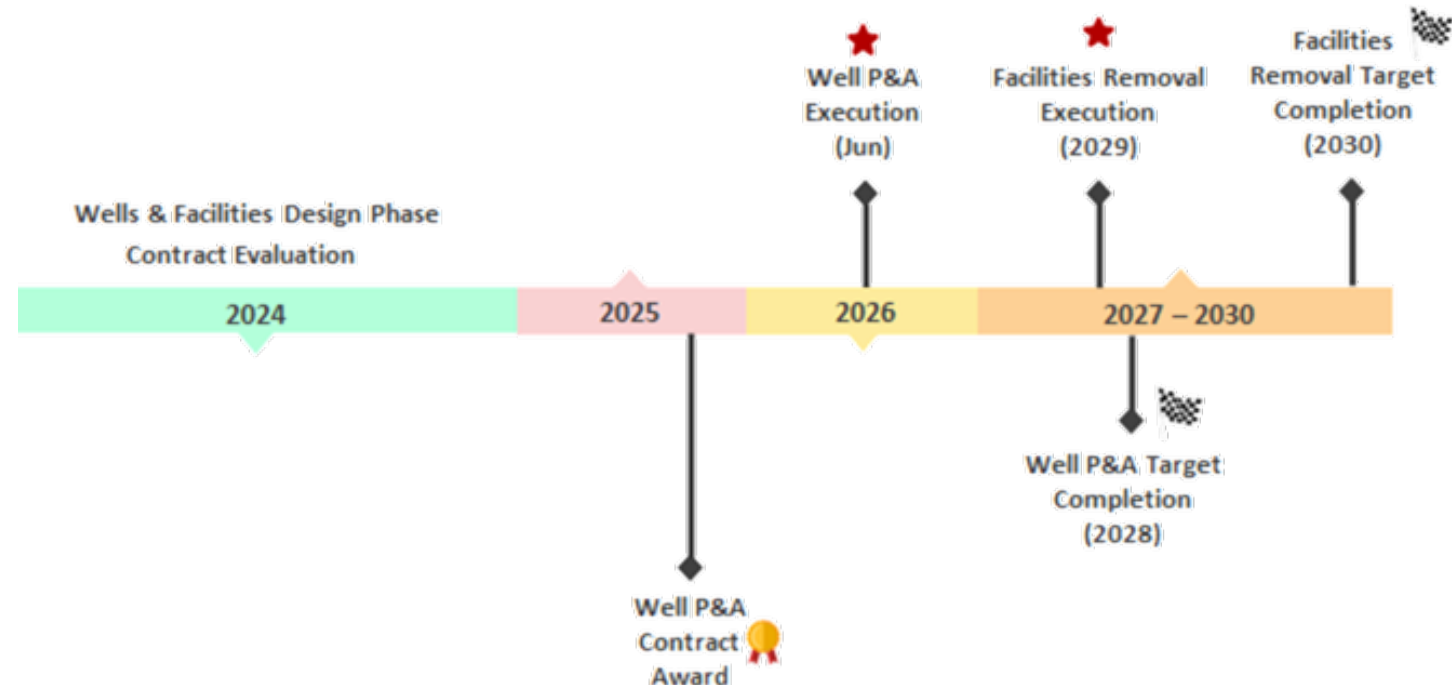
Field Overview

- Nearshore development, Located 2-3 km from shore in 5 – 12 m water depths
- Production started in 1959 and ceased in 2015
- 6 subsurface blocks, penetrates 55 reservoirs

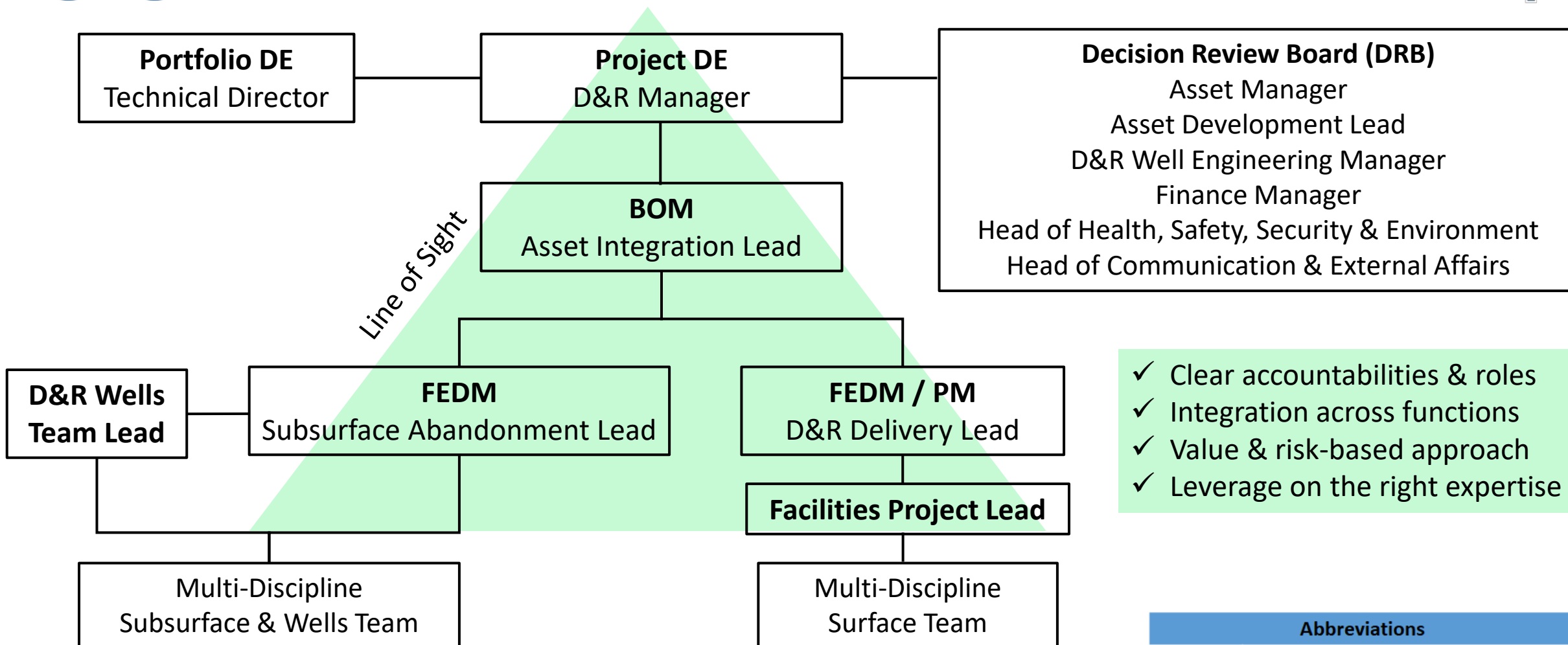
Project Scope Overview

- 38 wells to Plug & Abandon (P&A)
- 21 offshore structures to remove
 - 2 Production platforms
 - 17 Well Jackets, 1 Vent Jacket
 - 1 Stand-alone Conductor
- 58 offshore pipelines
 - 16 pipelines with shore approach

High Level Project Timeline



Team Structure – Line of Sight



- ✓ Clear accountabilities & roles
- ✓ Integration across functions
- ✓ Value & risk-based approach
- ✓ Leverage on the right expertise

Strong integration and collaboration within a multi-discipline team creates alignment towards achieving a common goal

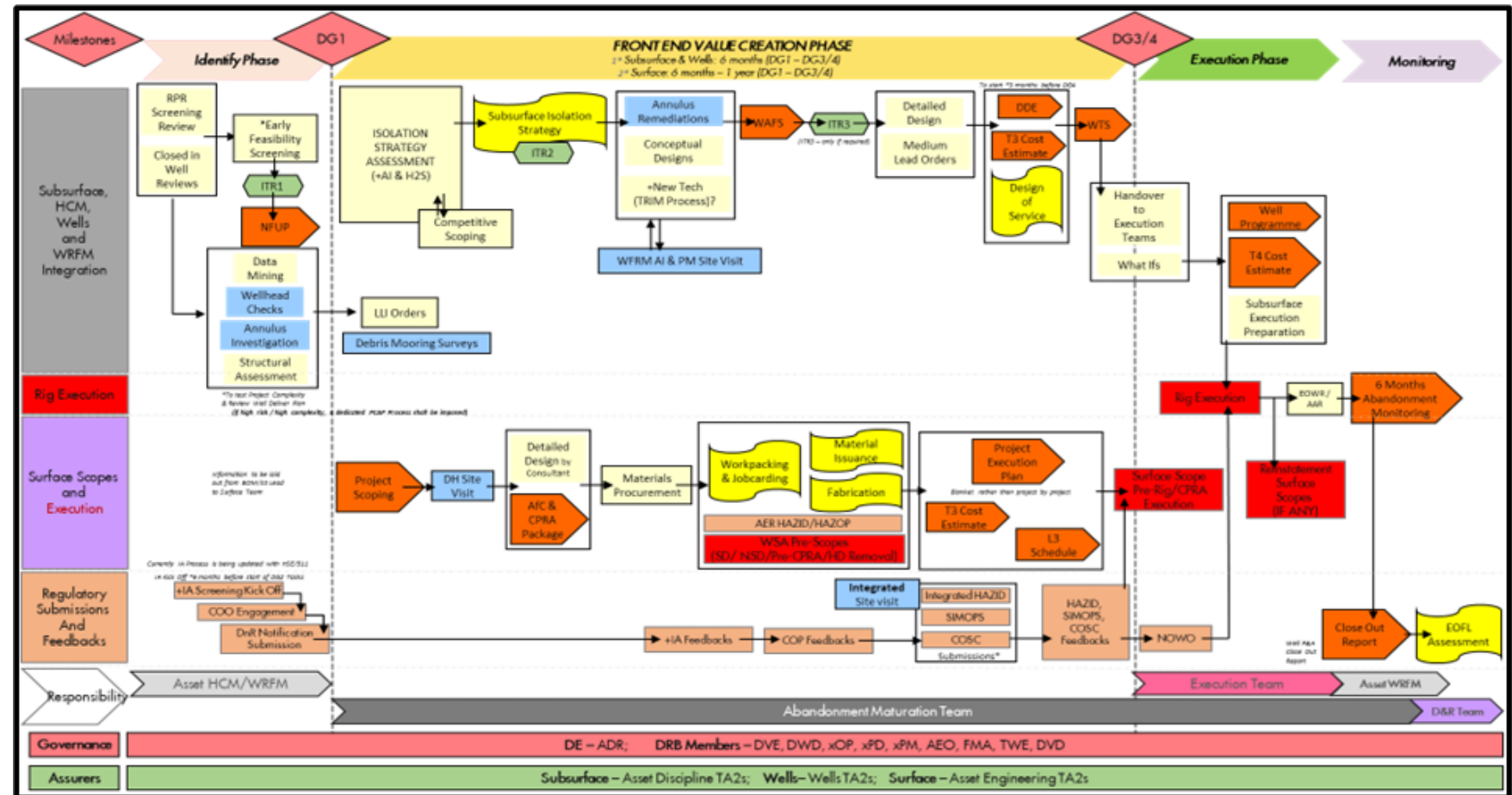
Abbreviations	
DE	Decision Executive
BOM	Business Opportunity Manager
FEDM	Front End Development Manager
PM	Project Manager

Abandonment Roadmap

- An integrated end-to-end roadmap from initiation → execution and completion
- Application of Shell's Opportunity Realisation Standards and Process (ORS, ORP)

Integrated delivery roadmap, featuring all functions relevant to the project

The initial and longest phase is the **Value Creation phase**





SUBSURFACE & WELLS

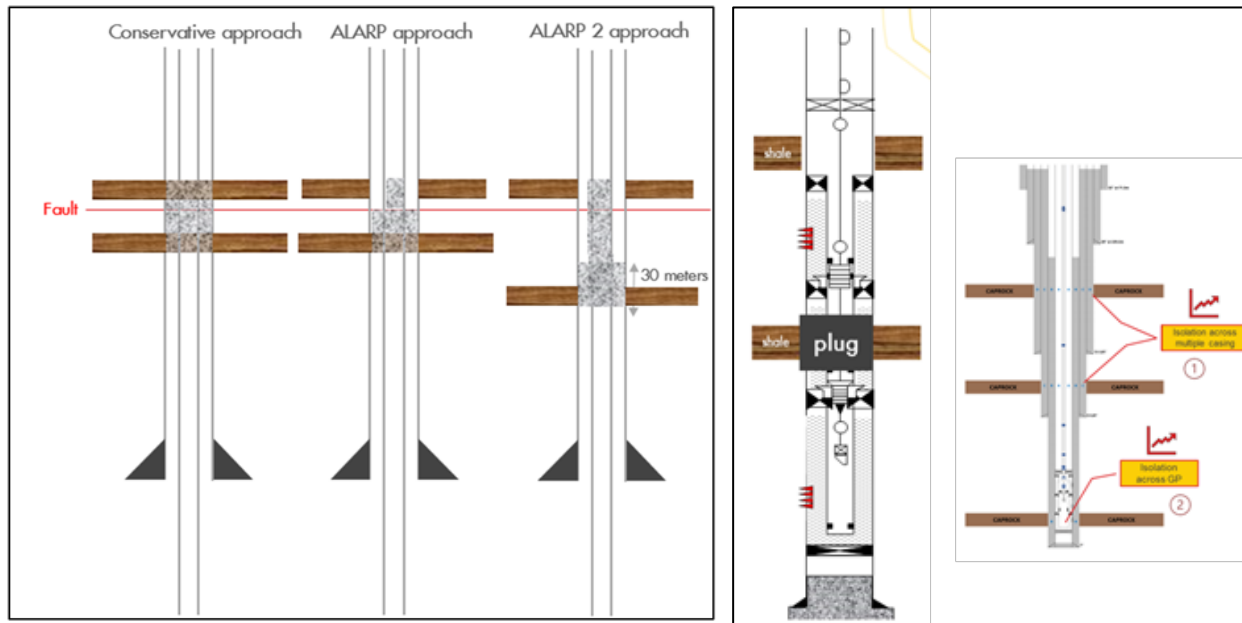
Key Subsurface Technical Challenges & Risks

- Unknown fluid fill – more robust approach by applying gas gradient across field
- Sustained annulus pressure – challenging when entering the well, may require remediation prior to rig entry
- Standalone conductor – poor integrity and limited accessibility, inability to record annulus pressure readings
- No log in the shallow section – correlation from offset wells
- Fluid leaking within different blocks – application of Dynamic Fault Sealing (DFAS)



Key Subsurface Technical Challenges & Risks (cont'd)

Complex Isolations

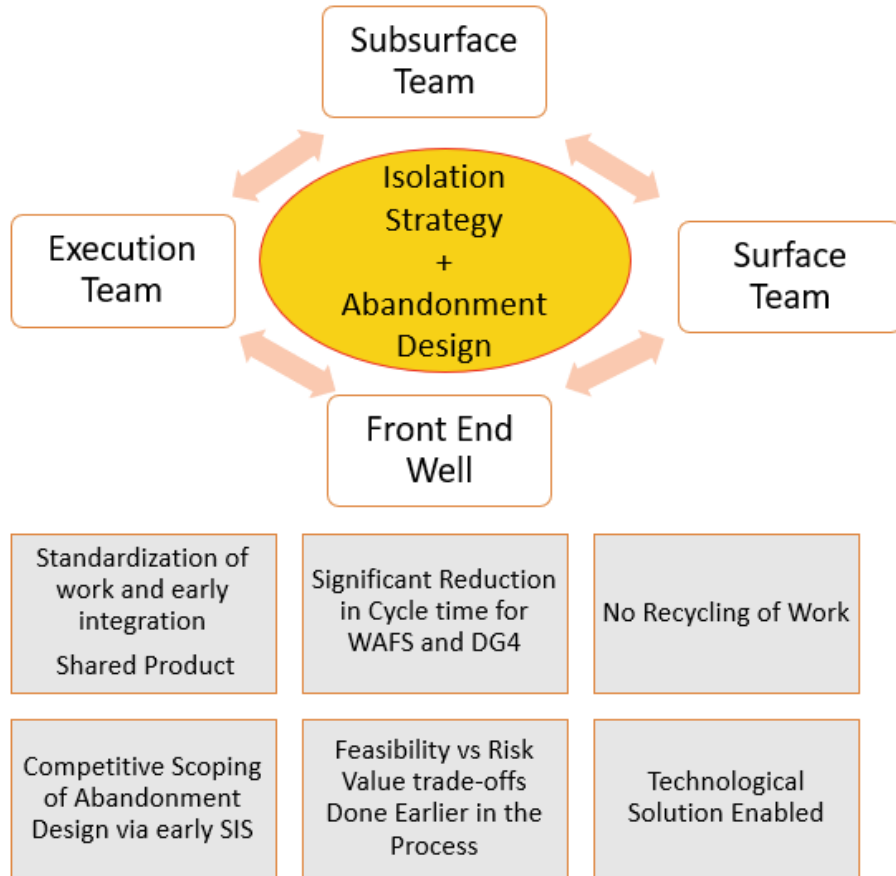


Legacy Abandonments



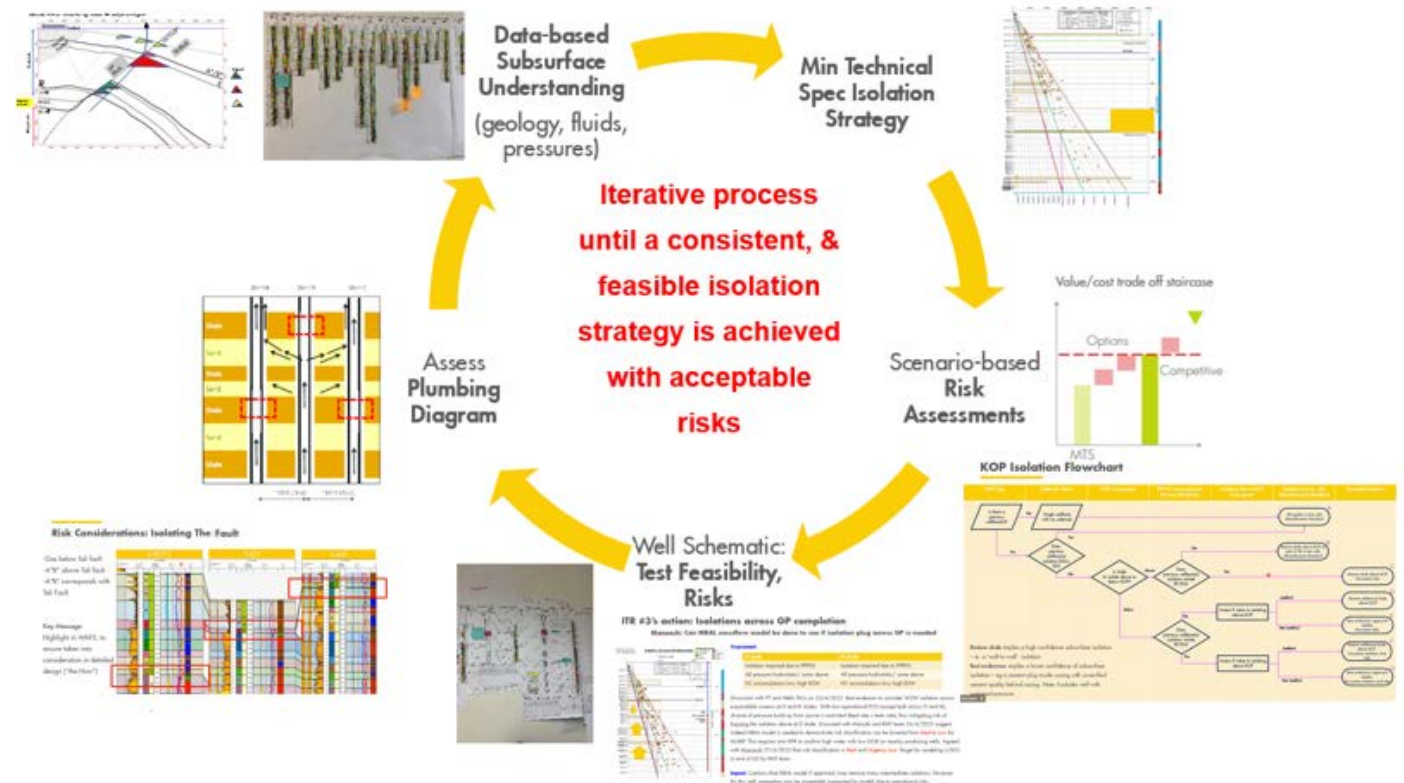
- Complex Isolations:
 - 1) Isolation across gravel pack
 - 2) Isolation across triple casings
- Legacy wells – wells that were previously abandoned with older abandonment standards/guidelines

General Workflow

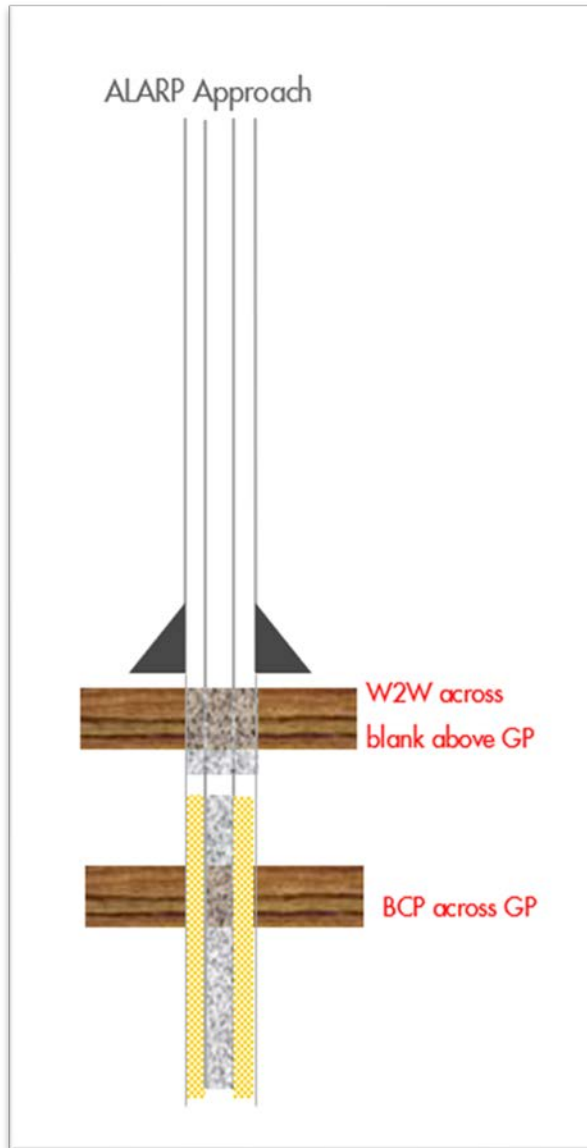


- ✓ Multi-discipline team members are aligned on the a fit-for-purpose, risk-based approach

Technical Integration Process

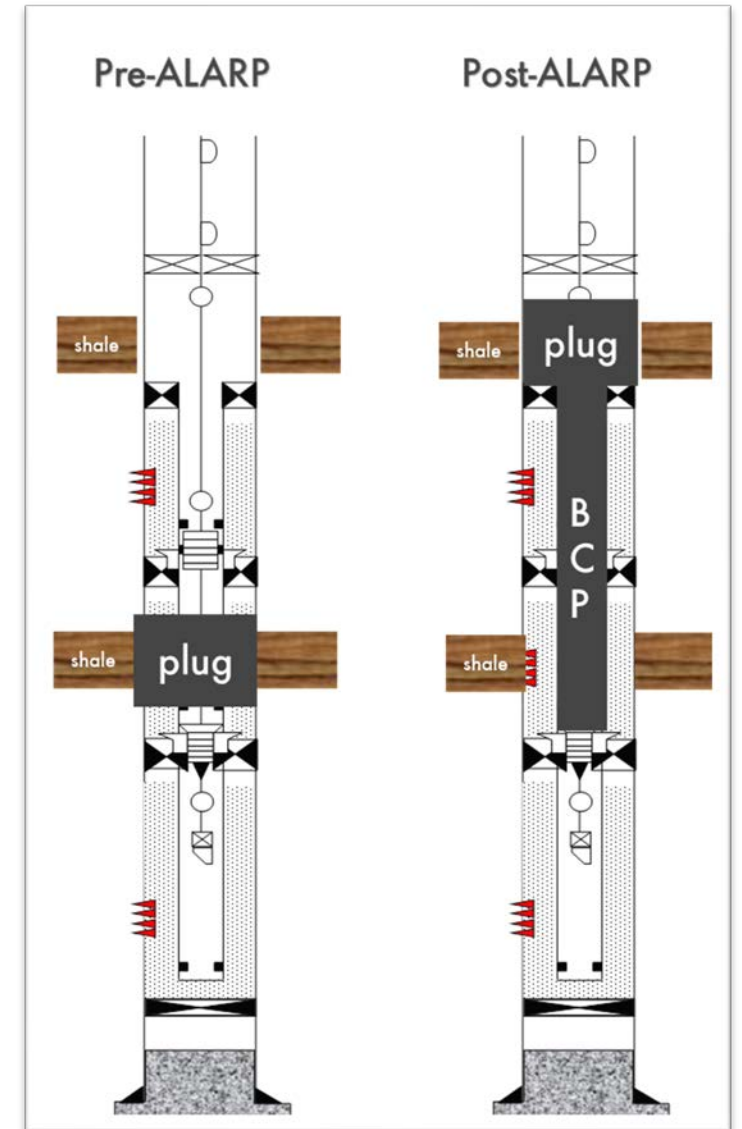


- ✓ Objective is to achieve a robust subsurface isolation strategy with acceptable risks → aiming for cost-efficient D&R



ALARP Approach for Subsurface Isolation Across/ Below Gravel Pack

The ALARP approach is to pump GP zones with cement & cap-off with W2W isolation just above the GP where isolation is easy or not complex



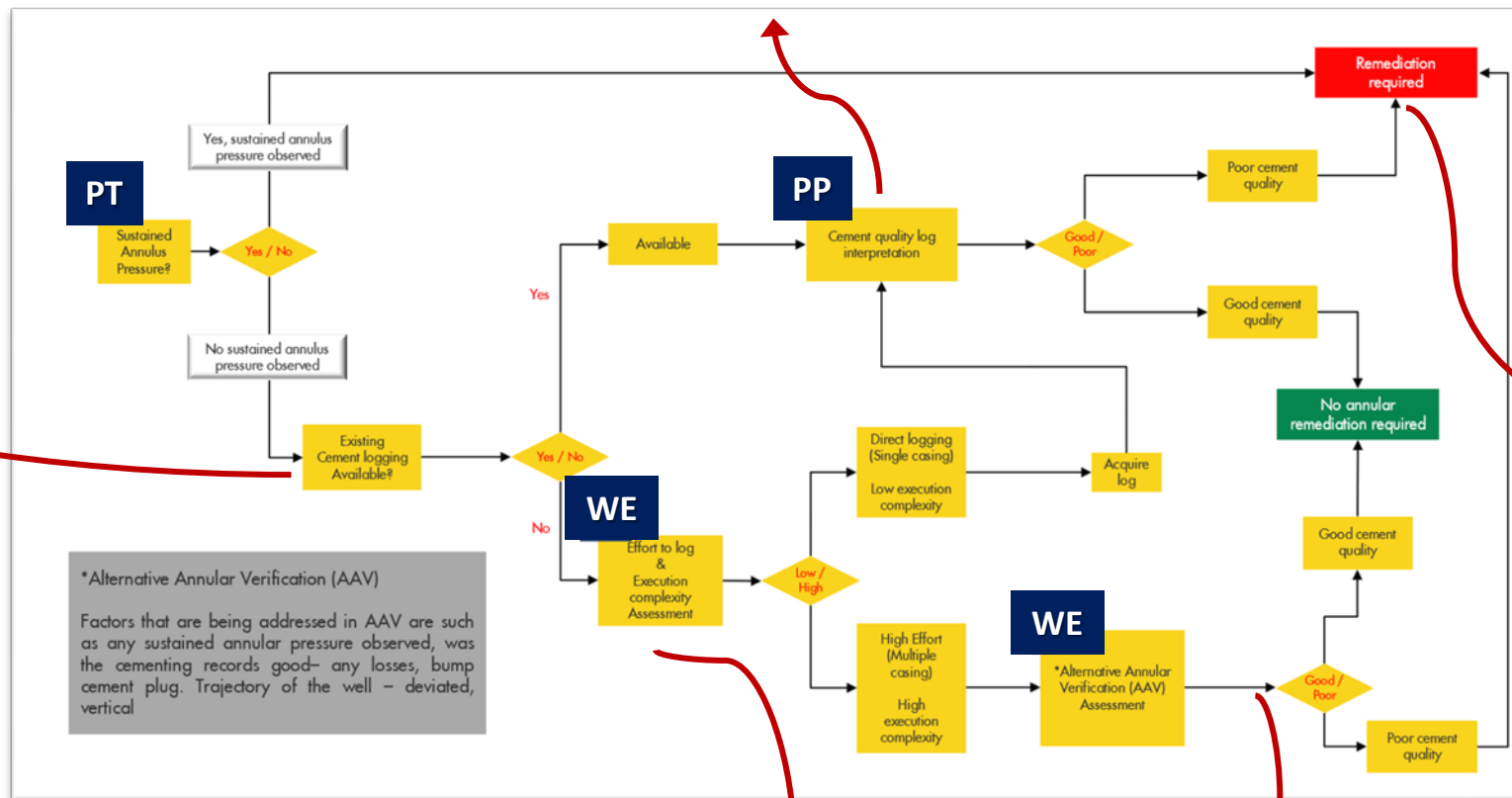
Integrated Decision Tree for the Alternative Annular Verification (AAV) ALARP Approach

Cement quality log interpretation

Confirm the availability of existing cement logging data

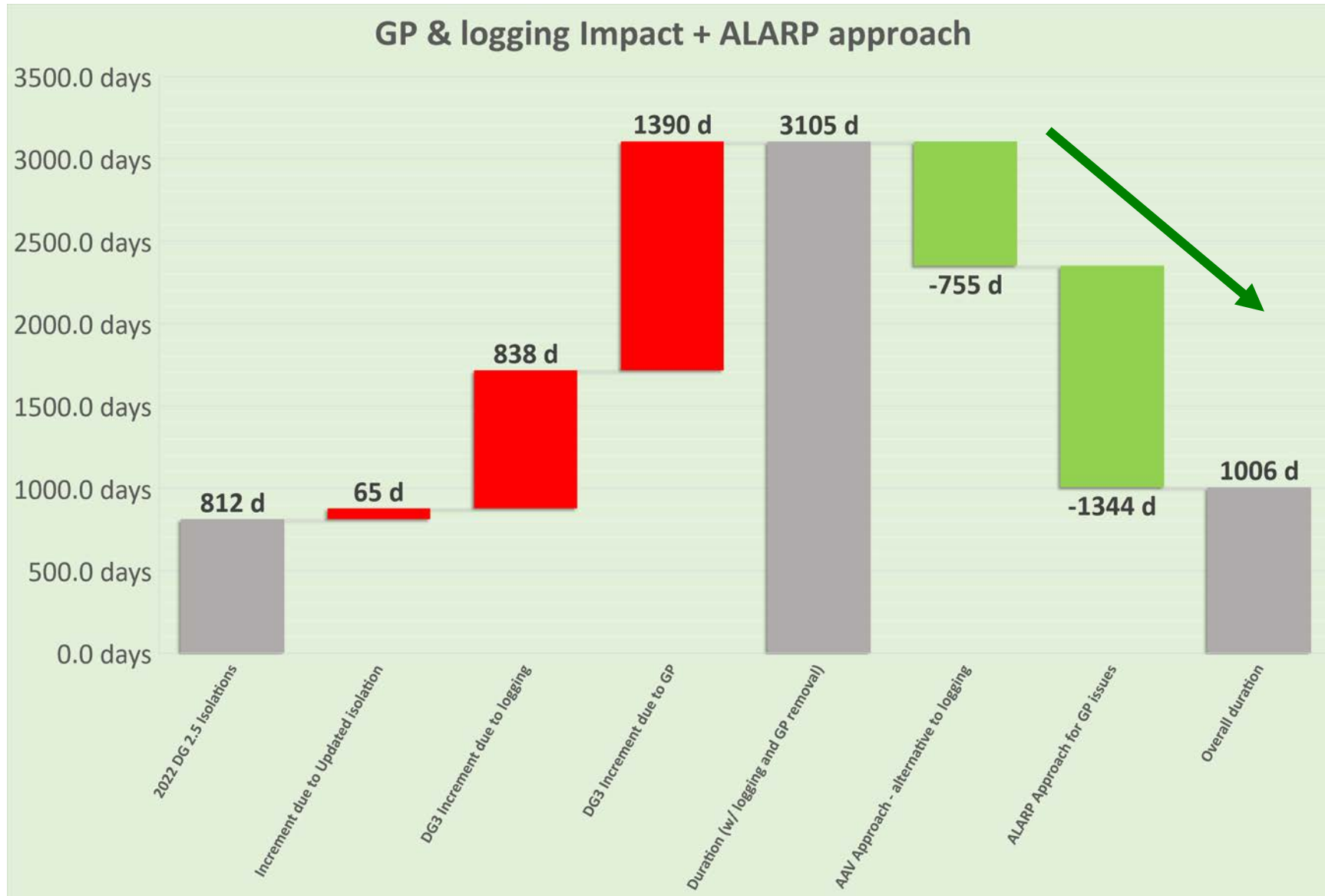
Decision on whether or not remediation is required

Carry out the AAV desktop exercise



Assess the need for logging as well as the effort required & complexity involved

- PT** Production Technologist
- PP** Petrophysicist
- WE** Well Engineer



Applying these As Low As Reasonably Practicable (ALARP) approaches significantly reduces the execution duration and associated cost

Various execution proposals were gathered through Expression of Interest (EOI) exercises to understand market capabilities.

GROUP A			GROUP B			GROUP C	GROUP D	GROUP E
GROUP 1	GROUP 2	GROUP 4	GROUP 3	GROUP 5	GROUP 6	GROUP 7	GROUP 8	GROUP 9
Marine Vessel/ barge	Marine Vessel	Accommodation Work Barge	Lift boat (Cantilevered)	Lift boat (Cantilevered)	Jack up barge (Cantilevered)	Jack Up (Cantilevered)	Jack Up (Cantilevered)	Island Concept
WL/Pumping unit	CTU	HWU on Wellhead	WL/Pumping unit/CTU	HWU	HWU/WO	Light Rig	Traditional Rig	HWU Traditional rig (land rig)



Self-Propelled Jack Up Barge or Cantilevered Lift-Boat equipped with Workover Unit / P&A spread

With these market insights, an execution strategy workshop was conducted aiming to produce fit-for-purpose P&A solutions.

Various factors were considered:

- Shallow water capability & limitations
- Platform/wellhead loading capability & constraints
- Scope capability
- Rig move/mob and demob efficiency
- Through-tubing abandonment opportunities



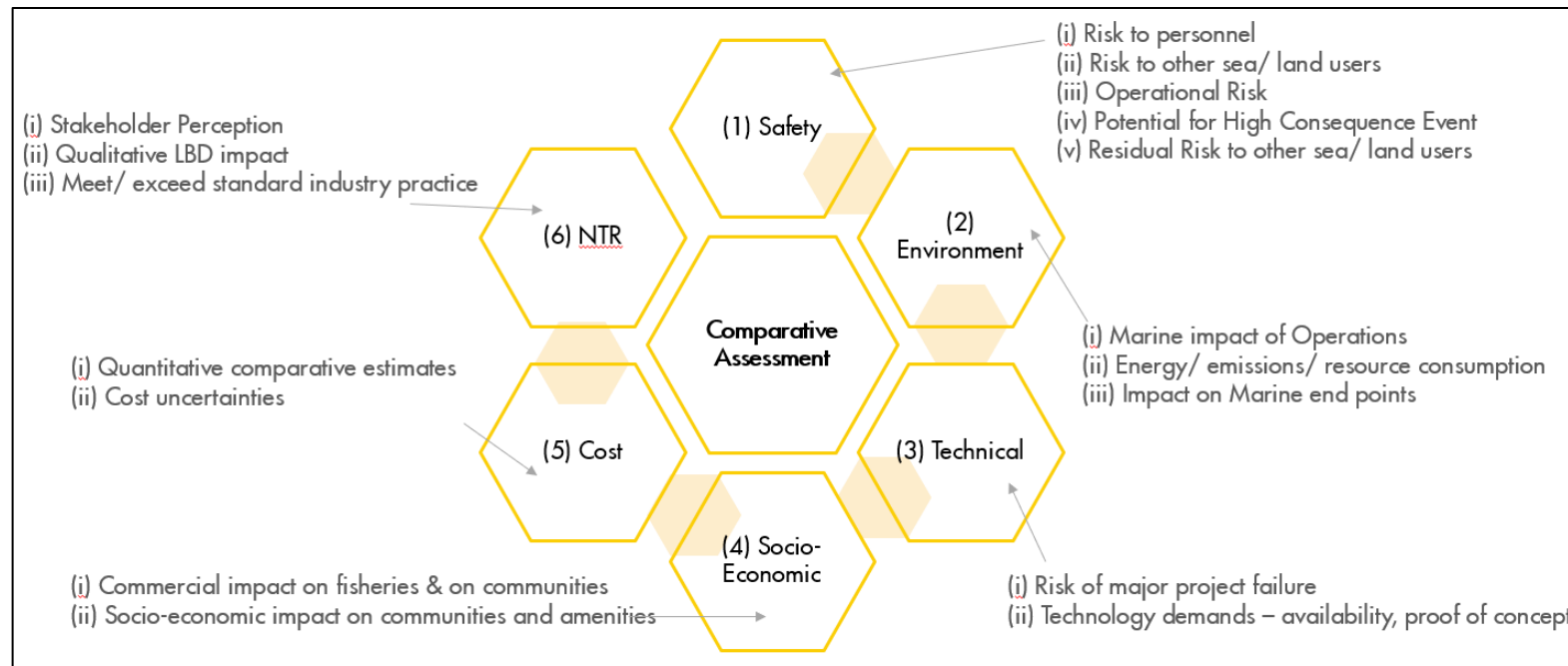
SURFACE FACILITIES & PIPELINES

Comparative Assessment and Facilities End State

Comparative Assessment – a 6-stage process to evaluate all feasible D&R solutions and justify the final declared end state for regulatory endorsement



Various functions and disciplines involved in assessing solutions against the 6 key elements



Early stakeholder engagements and strong collaboration with asset owners are critical

Execution Strategy

The EPRD contractor scope shall include EPRD and is not limited to the following:

Engineering – project management and engineering work

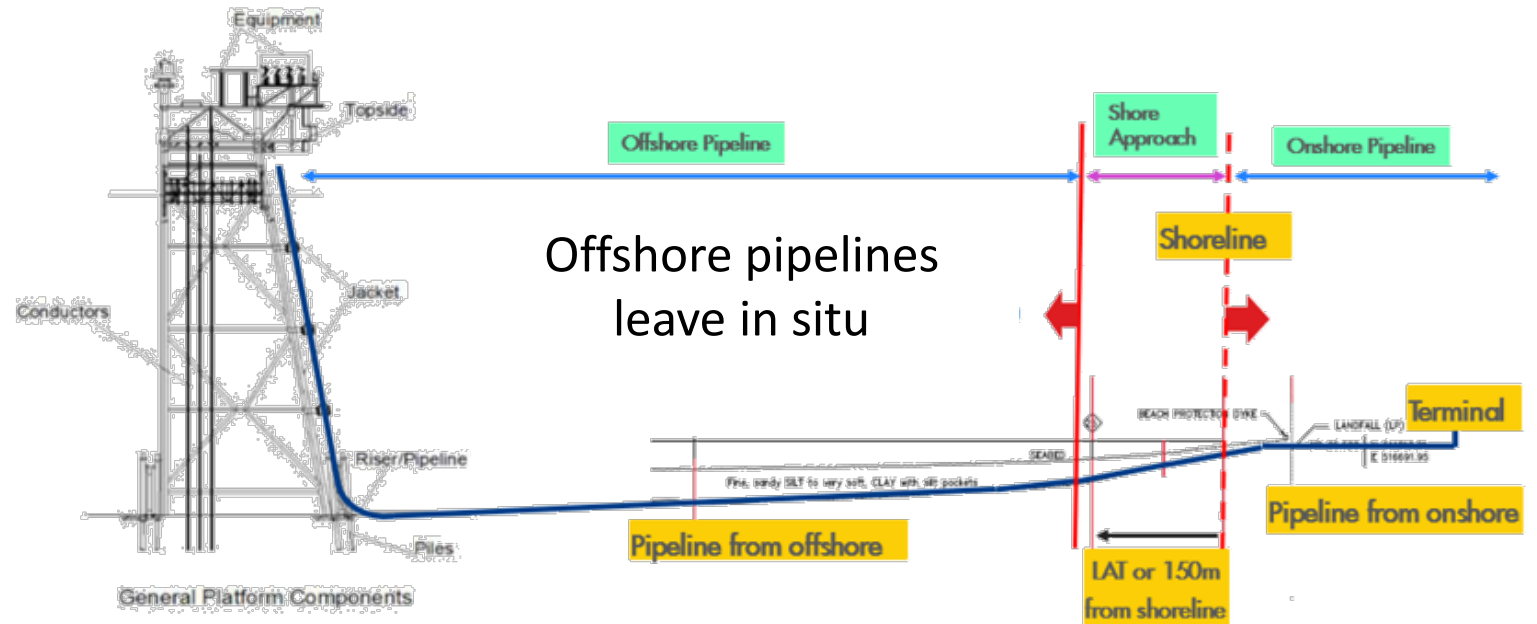
Preparation – pre-removal activities and site preparations

Removal – execution activities inclusive of cutting, lifting and transportation

Disposal – transfer of removed structures to decommissioning yard and waste disposal



Full platform removal, cut at seabed





SUMMARY



Summary, Key Takeaways



In effectively **Maximising Cross-Functional Integration** across our project, these are some of the critical success factors:

- ✓ Established governance structure, clear R&Rs within the Line of Sight (LOS) and clear top-down steer ensures team **alignment on common goals and objectives**
- ✓ There are many integrated workflows and processes available – practical application of these must be coupled with a **value and risk-based** mindset and ways of working
- ✓ **Leverage on the strengths and expertise**, be it technical or non-technical, of the various functions and multi-discipline team available
- ✓ Build a **strong collaborative network** and foster **effective communications**, both internally and externally