



ADVANCED ISOLATION AND REPAIR SOLUTIONS

Pipeline Through Wall Communication Capabilities

PPSA Seminar, Aberdeen

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Tracking, Location and Communication

Utilizing tracking devices

- Pigging:
 - Pre-commissioning, line proving, cleaning, liquid removal, batching, decommissioning.
- Inline Inspection
- Inline Isolation



Tracking, Location and Communication

Tracking methods

Permanent fittings:

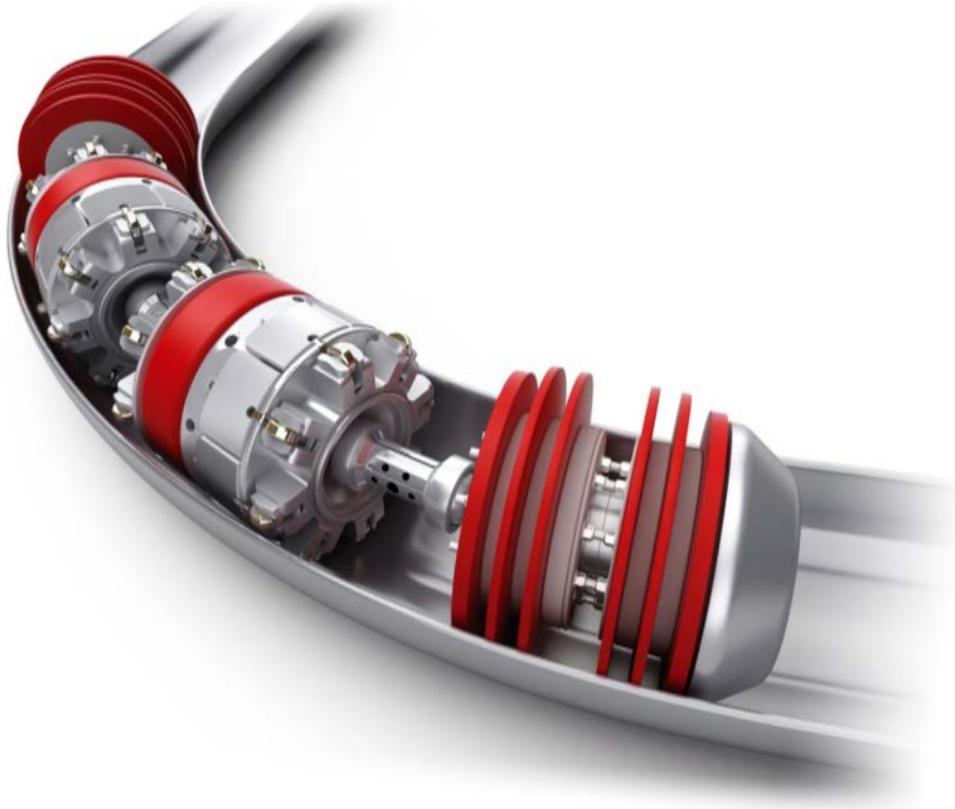
- Pig-signalers

Temporary/semi-permanent fittings

- Transmitters (electromagnetic or acoustic signal)
- Radioactive sources
- Pressure pulse monitoring



SmartPlug® Inline Isolation System



SmartPlug® System

- Remote through wall communication and operation
- Bi-directional/piggable
- 8" to 48" diameter
- Double block isolation
- Full system DNV Type approval
- 3D bends passing capability

2x Control Modules

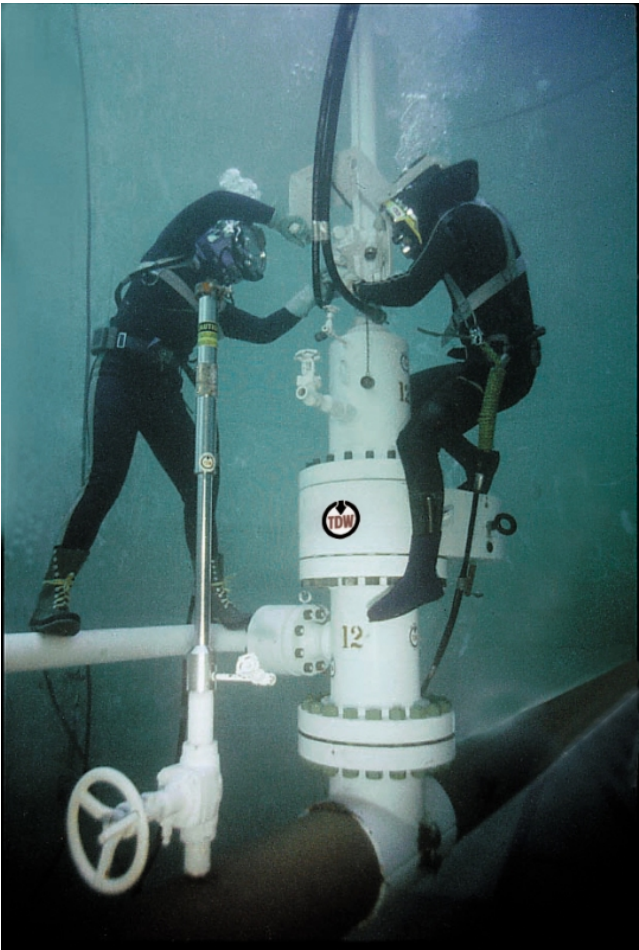
- Communication system
- Battery pack
- Hydraulics system

2x Plug Modules (optional 3 modules)

- Independent isolation
- 3000 psi (200 bar gauge) isolation capability
- Fail-safe lock via differential pressure
- Hydrotest capability (3rd module)



Offshore Pipeline Environment



- Offshore Steel Structures
- Pipeline Wall thicknesses
- Oscillating/rotating equipment
- Sub-sea pipelines



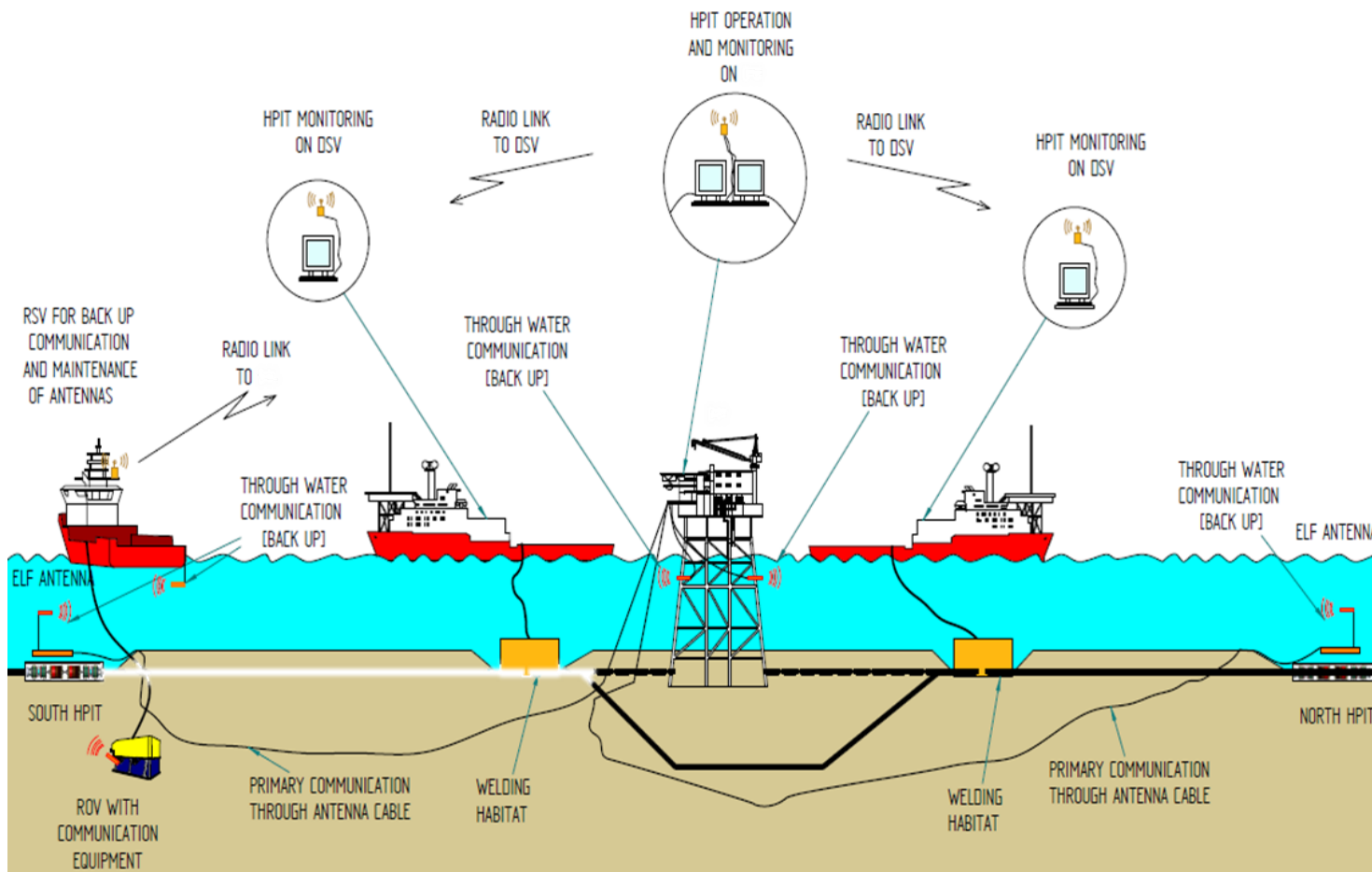
SMARTTRACK™ ELF Communication



- Extremely Low Frequency (<15 Hz)
- Electromagnetic signal
- Tracking, location and 2 way communication
- Frequency inline adjustable
- Identify inline device
- Improved signal processing and filtration
- Reduced power consumption
- Tracking capability – 80mm WT
- Communication capability – 65 mm WT



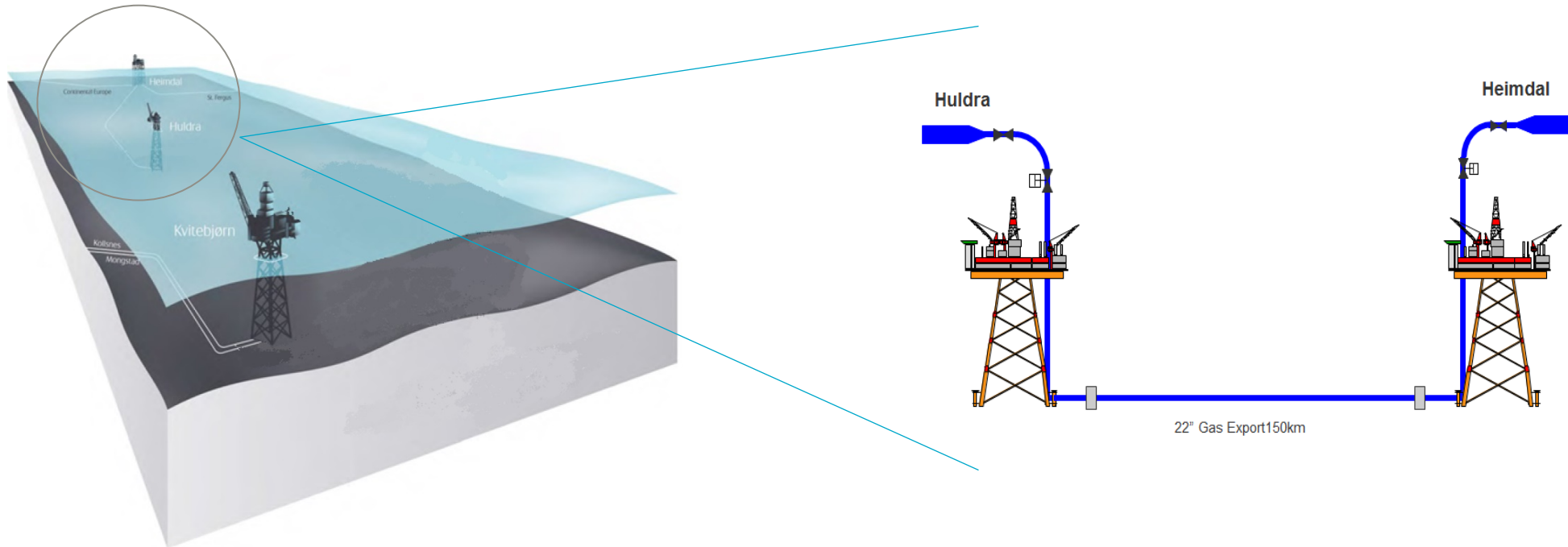
Typical Offshore Communication Setup



- Handheld device
- Hardwired to Laptop
- Acoustic transmission to receiver
- Radio link
- GSM/Satellite link



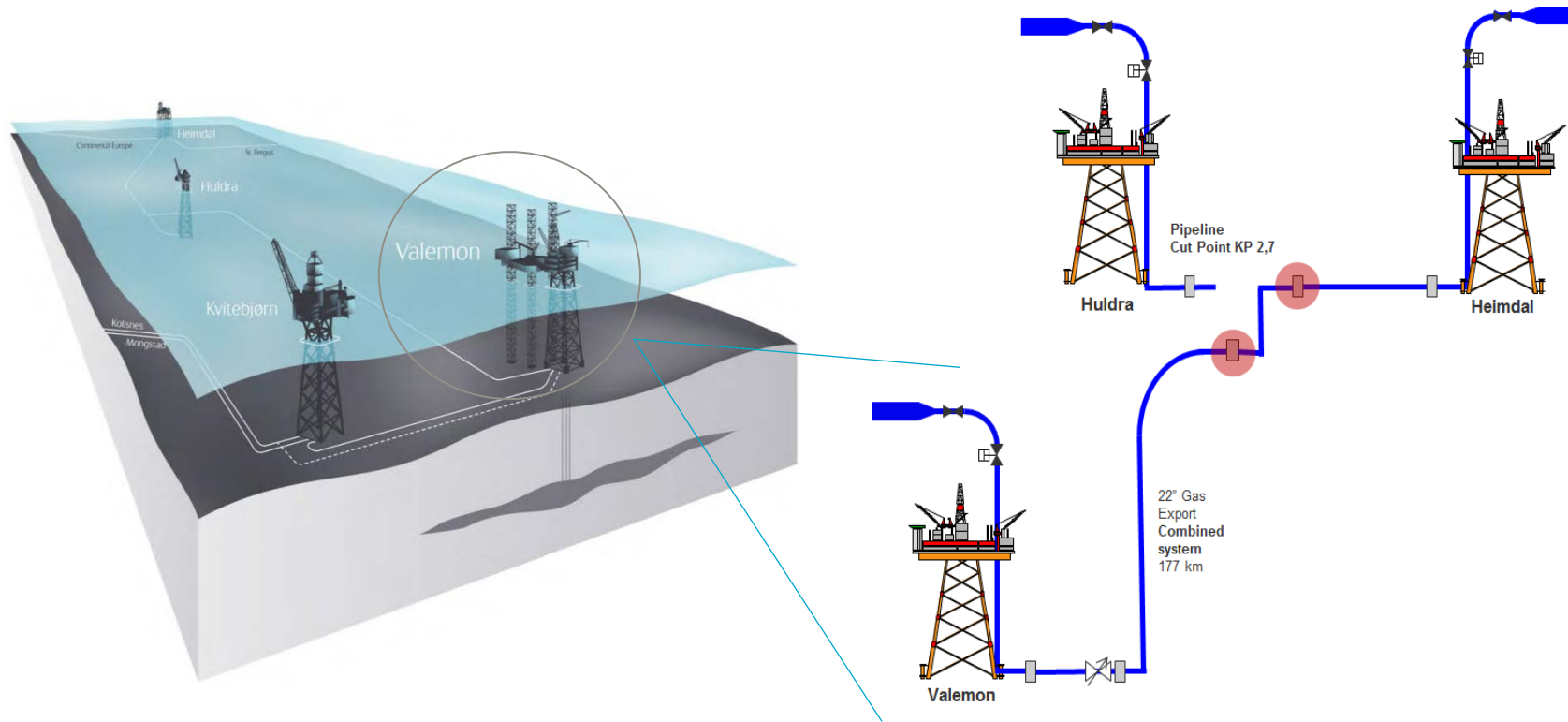
Case Study



- 22" gas export line, 150km long
- Water Depth 150m
- 90 barg operating pressure
- Production on Huldra terminated 3rd September 2014



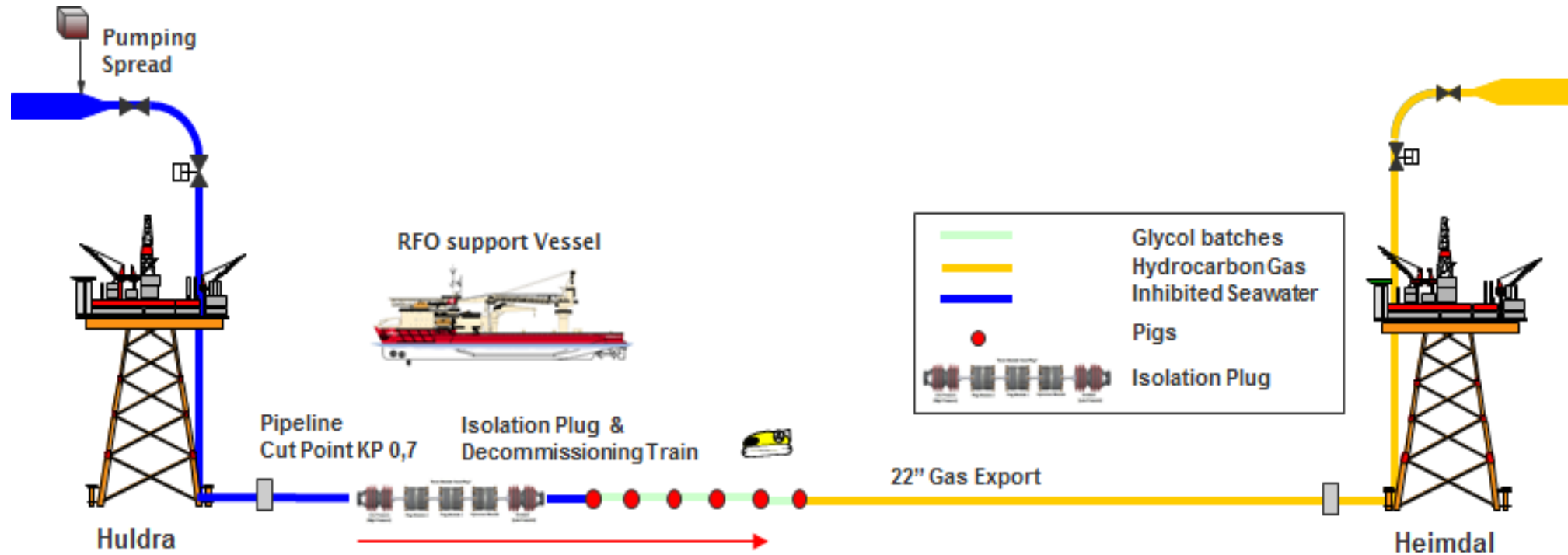
Case Study



- Valemon gas export to tie into existing pipeline
- 22km of laid pipe



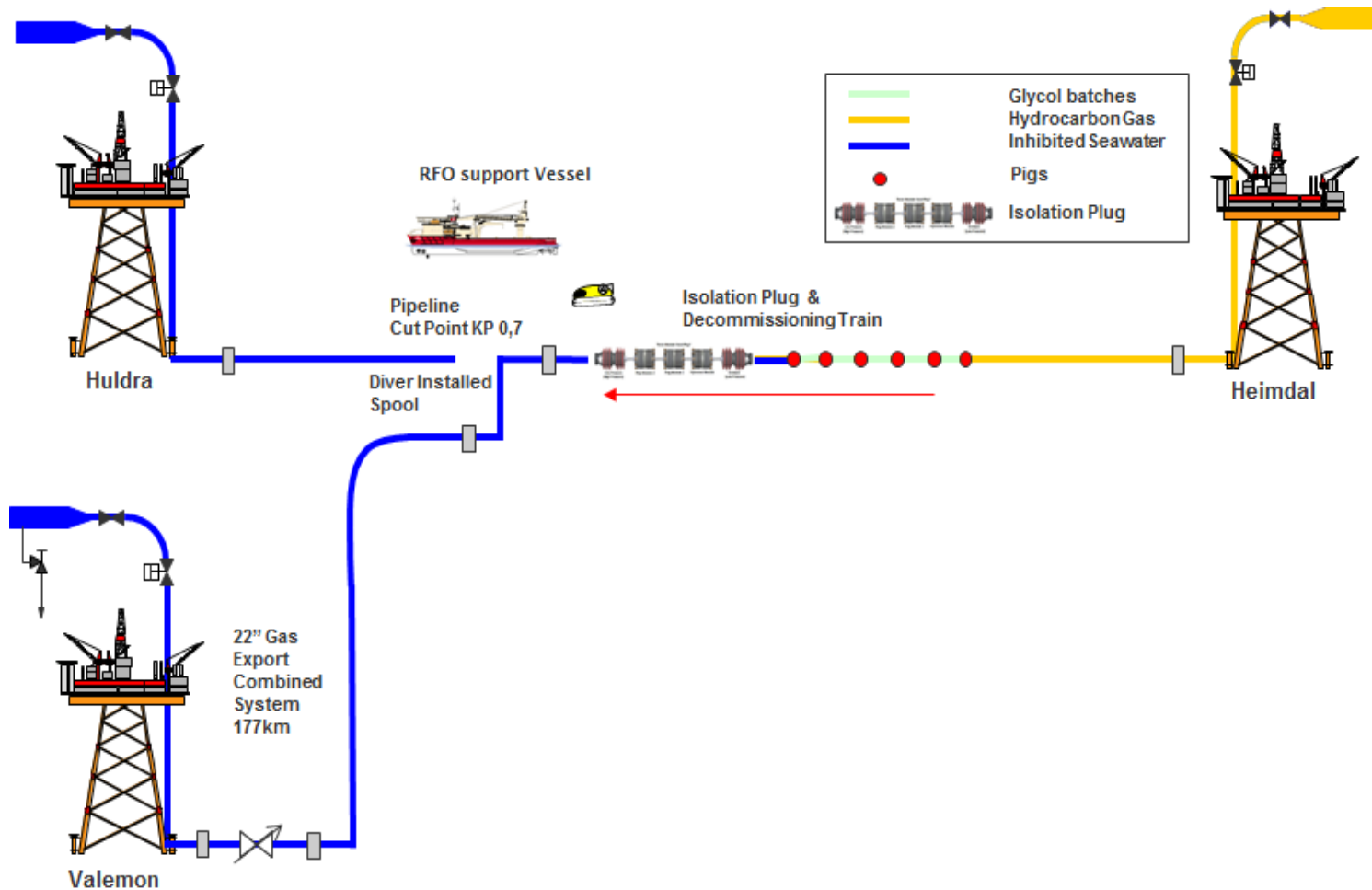
Phase 1



- Propel a 6x pig train followed by the TDW SmartPlug®, activating/setting the tool 1km into the Huldra pipeline.
- Compressing hydrocarbon gas in front of pipeline towards closed valves at Heimdal.
- Retain pressure in pipeline at 90 barg

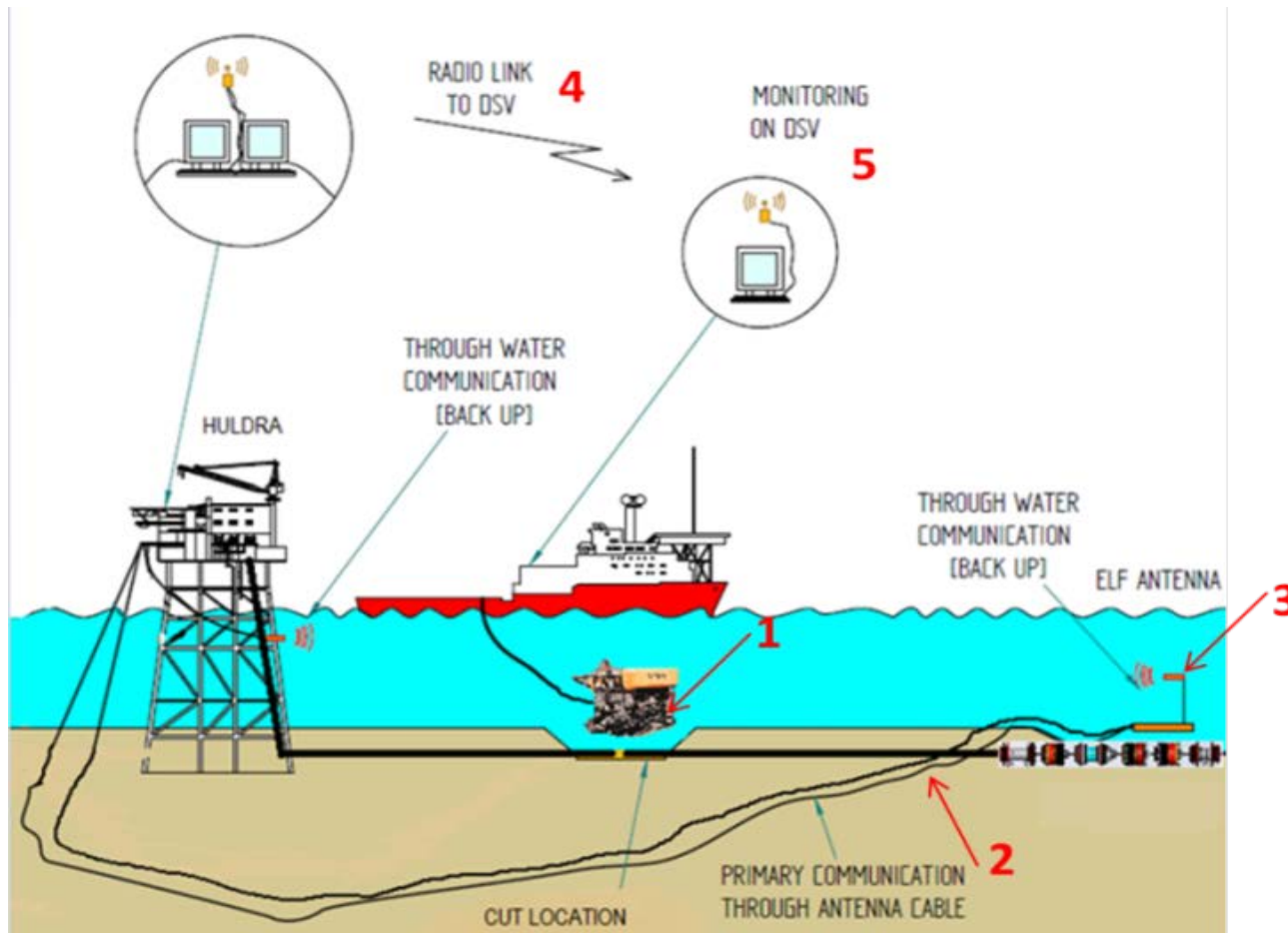


Phase 2





Phase 2

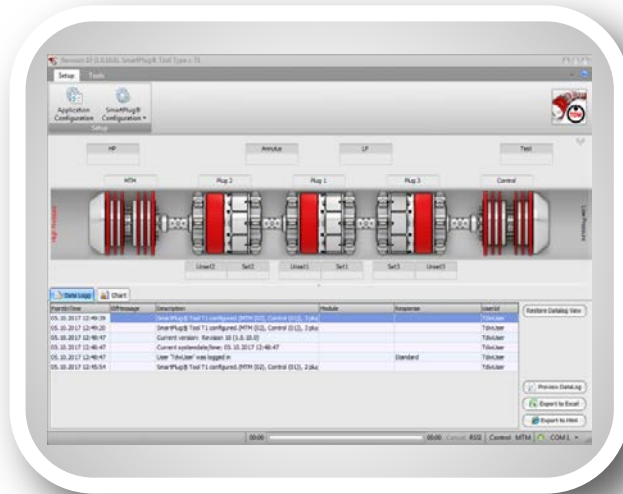


1. ROV held remote transceiver
2. Cabled communication with subsea skid transceiver
3. Acoustic communication with sub-sea skid
4. Radio link
5. GSM monitoring

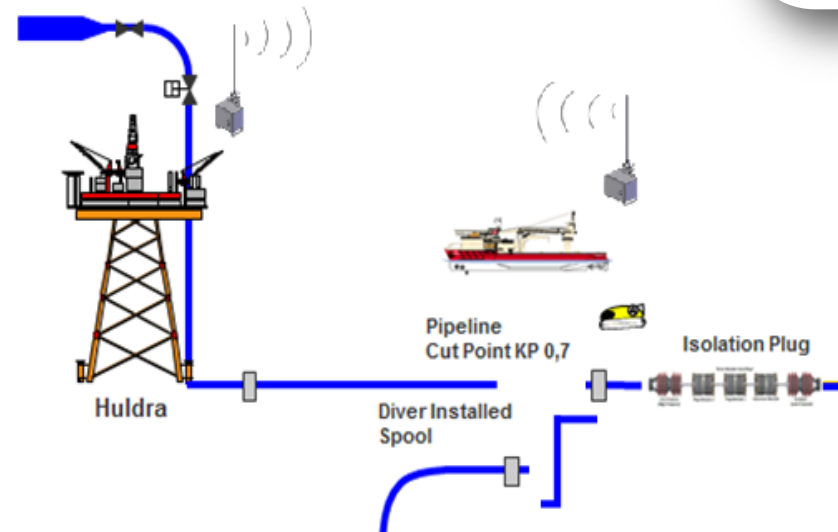


Phase 2

- Dive support vessel performed the tie in
- Dive supervisors had real time status on SmartPlug® integrity. Transfer via radio link from Huldra
- Risk reducing for divers
 - No delay in any alarms or pressure changes
 - Not relaying in VHF/UHF or telephone communication between platform and vessel



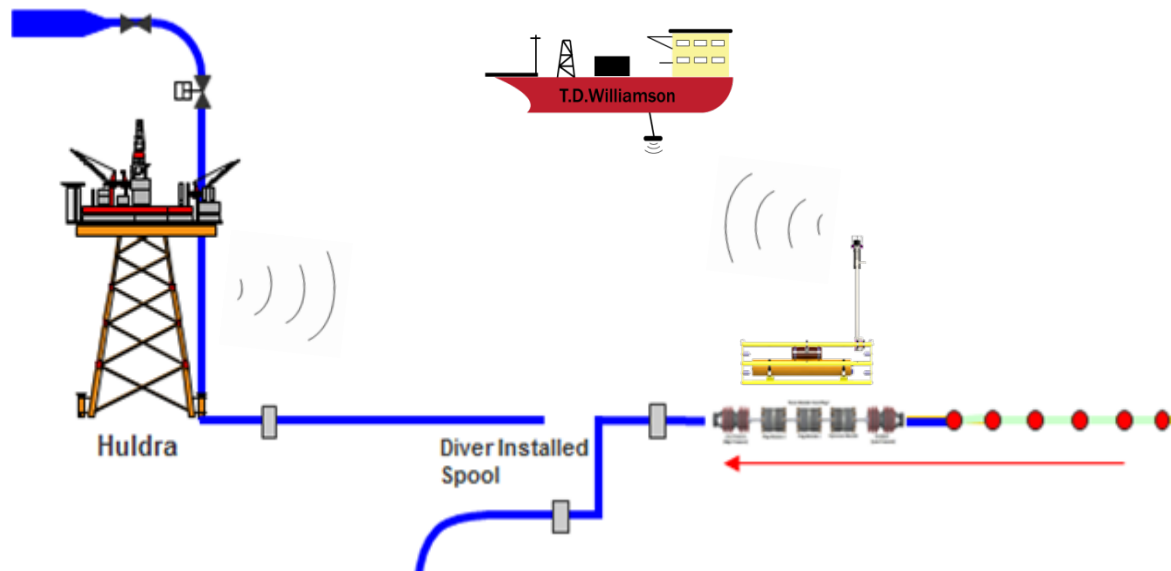
Control Room SmartStudio computer set up





Phase 2

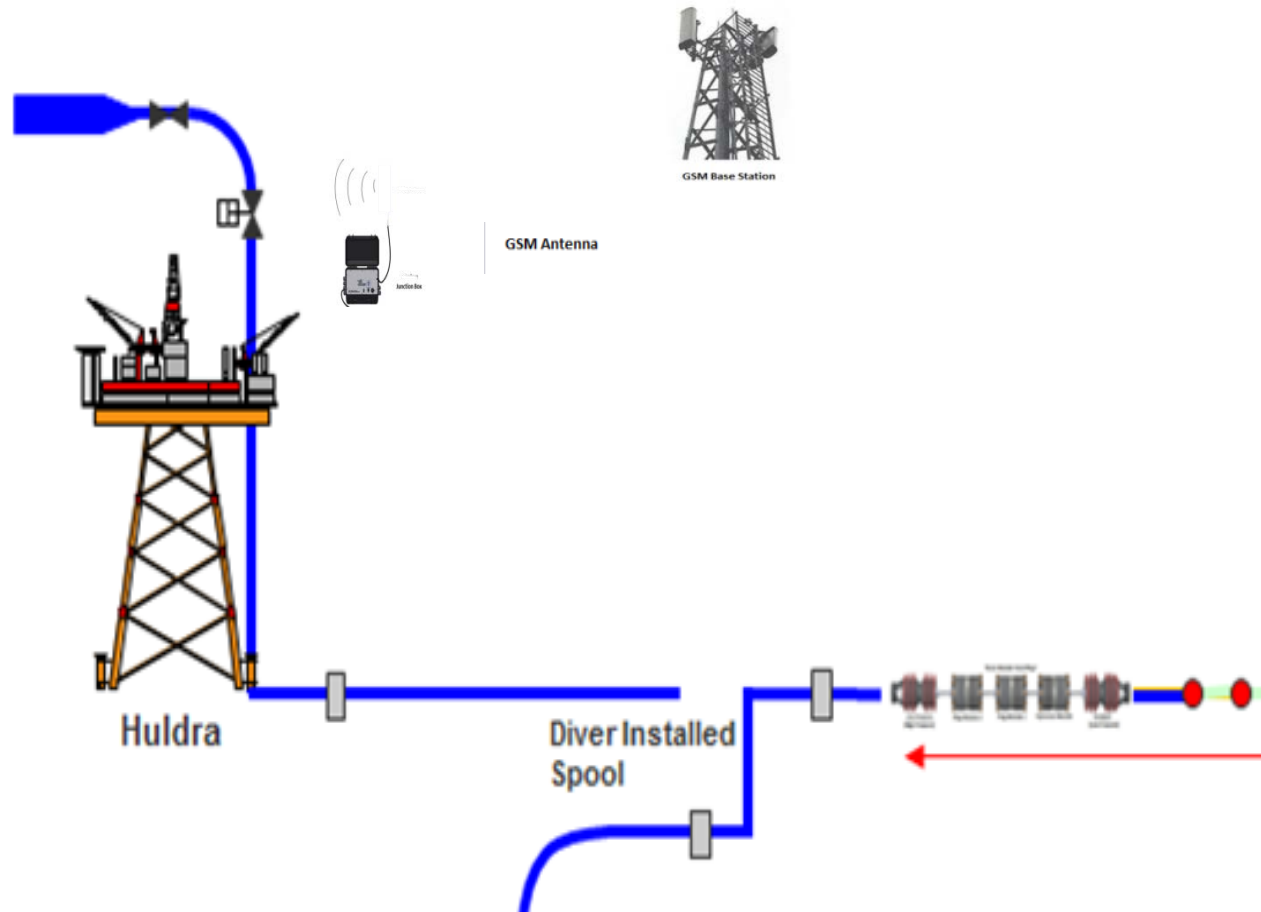
Acoustic Through Water communication



- Used as contingency solution for hard wire during monitoring
- Cost effective, requires little vessel time for deployment vs cable deployment.
- Good alternative for monitoring isolations from diver support vessel
- On completion of tie in, communication with SmartPlug® sets the 3rd module on the train.
- Hydrotesting of the new section only was carried out.



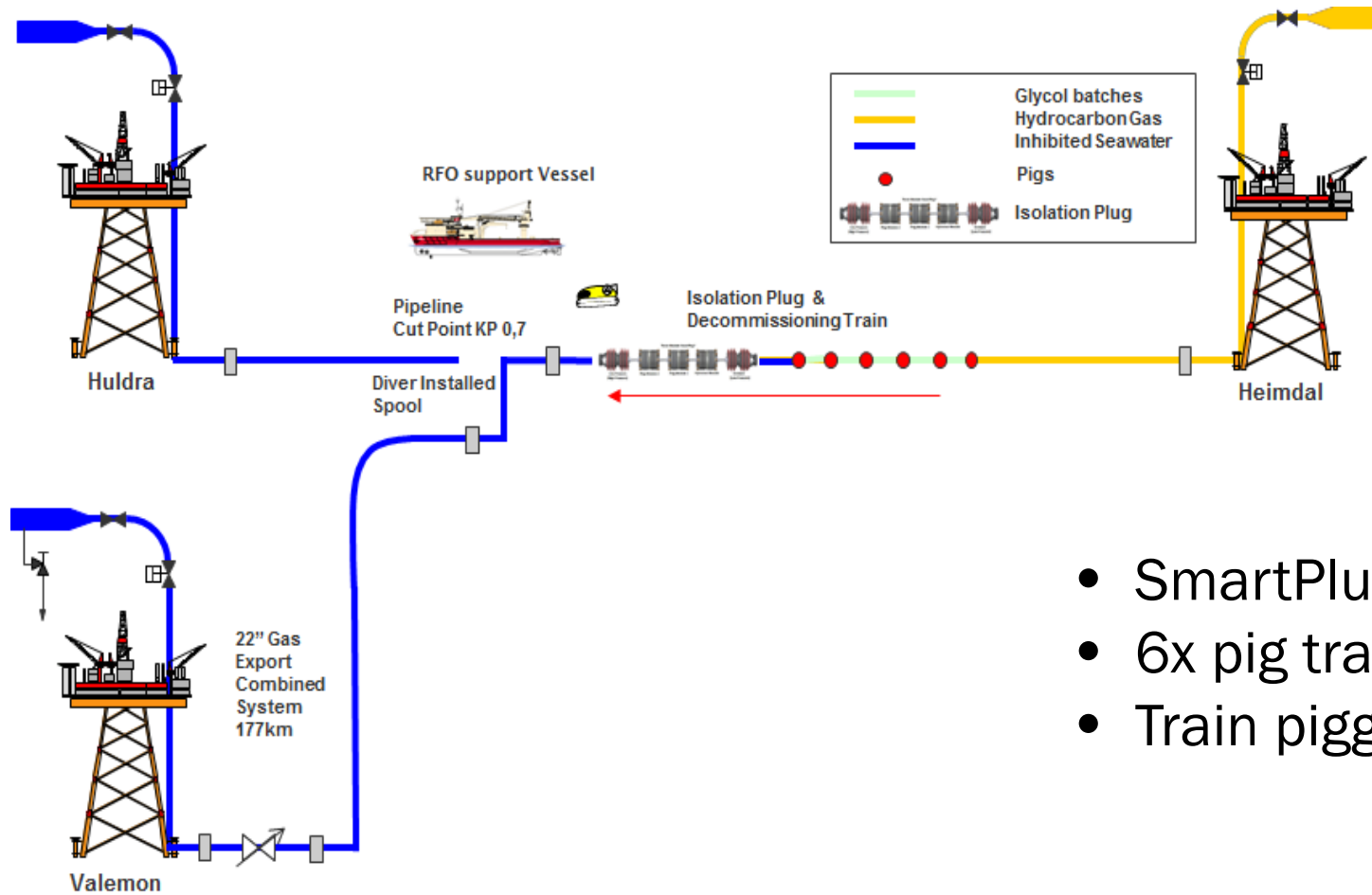
Phase 3



- GSM communication link between platform and Stavanger office
- Monitoring of the isolation maintained on 24/7 basis
- Crew remobilised for unsetting of the tool



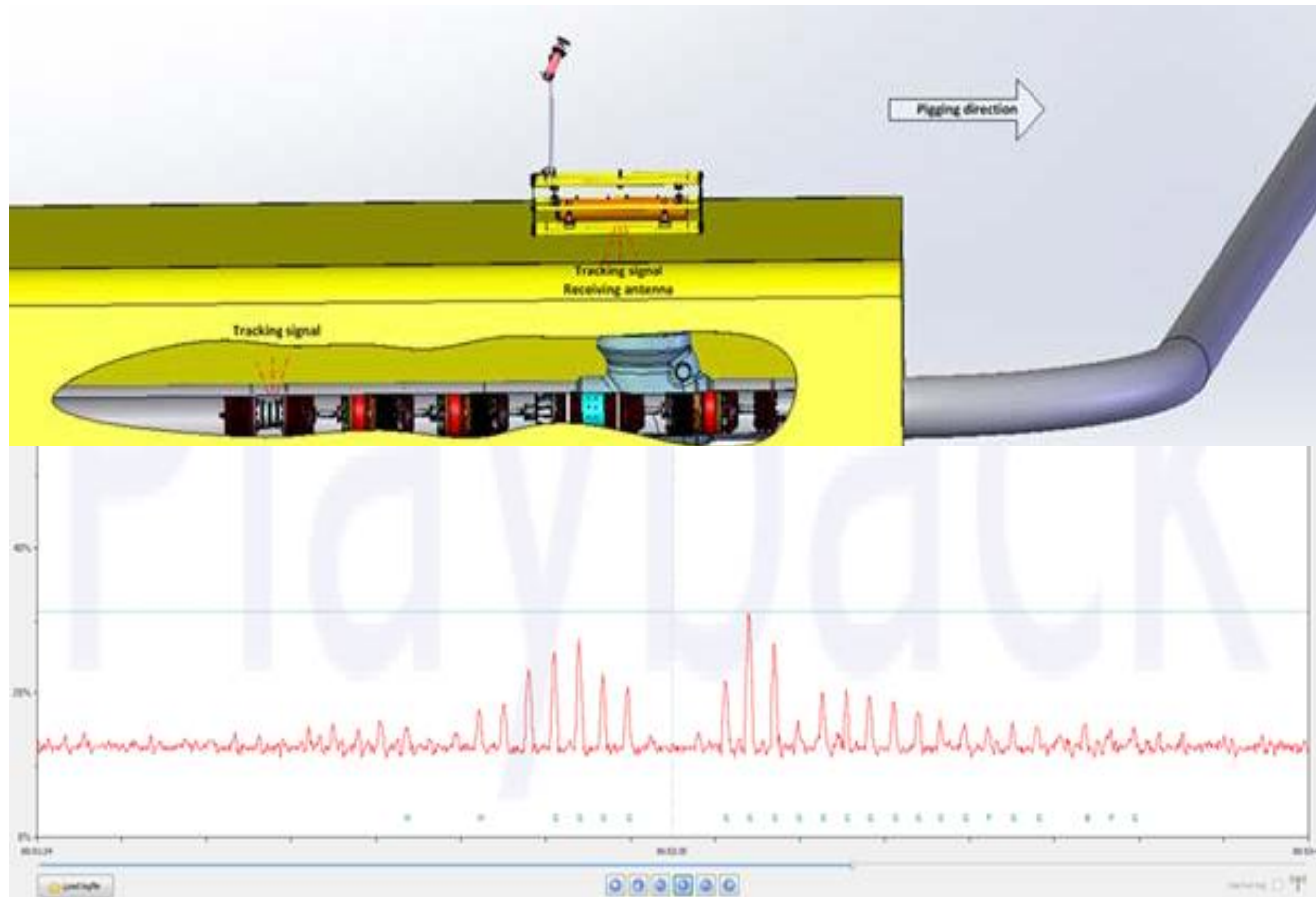
Phase 4



- SmartPlug® tool unset
- 6x pig train transmitters re-activated
- Train pigged to Valemon platform



Phase 4



- SmartPlug® tool pigged through non-return valve
- 6x pig train pigged through non-return valve



Project Benefits

- Maximised pipeline usage before shutdown
- Reduced downtime during tie in.
- Gave dive team real time updates on isolation integrity
- Reduced environmental risk

Questions

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