Pipeline Through Wall Communication Capabilities

PPSA Seminar, Aberdeen

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Utilizing tracking devices

• Pigging:
  o 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
• 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
EXPANDING PROVEN ISOLATION OPTIONS

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
EXPANDING PROVEN ISOLATION OPTIONS

Phase 2

[Diagram showing pipeline and offshore structures with labels such as 'RFO support vessel', 'Pipeline Cut Point KPs 0.7', 'Glycol batches', 'Hydrocarbon Gas', 'Inhibited Seawater', 'Pigs', 'Isolation Plug', '22" Gas Export Combined System 177km', 'Diver Installed Spool', 'Holmdal', 'Huldra', 'Valemon']
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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