P&A of Subsea Completed Wells from a RLWI Vessel

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Plug & Abandonment Forum 2023

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Agenda

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Why RLWI, Track Record

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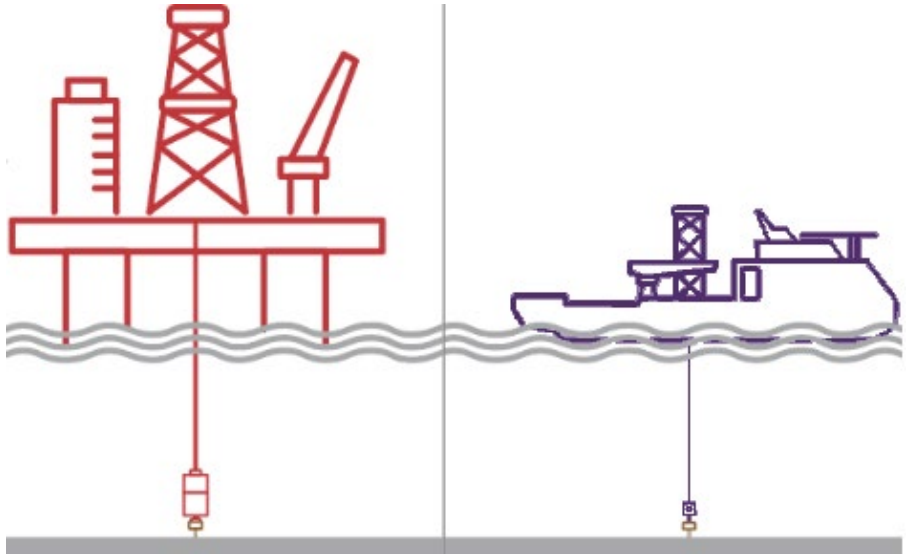
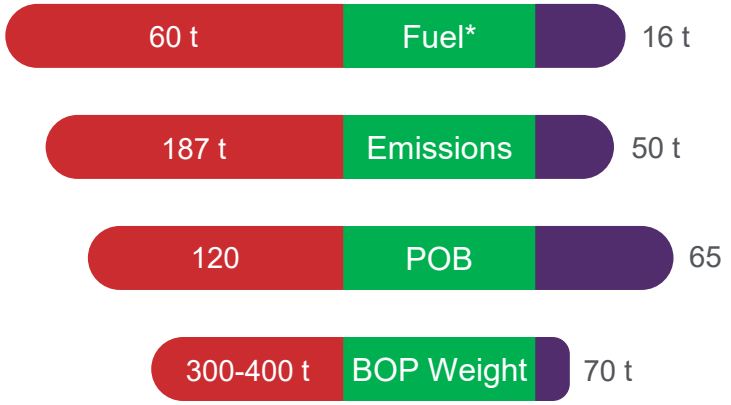
Background

Why Riserless P&A?





*Fuel consumption per day on DP

- Simpler Setup and Operations
- Reduced POB and Personnel Exposure
- Reduced Environmental Impact
- Reduction in Wellhead Stresses and Fatigue
- RLCT and Additional Tooling Expands the RLWI Offering

REDUCED COSTS FOR P&A

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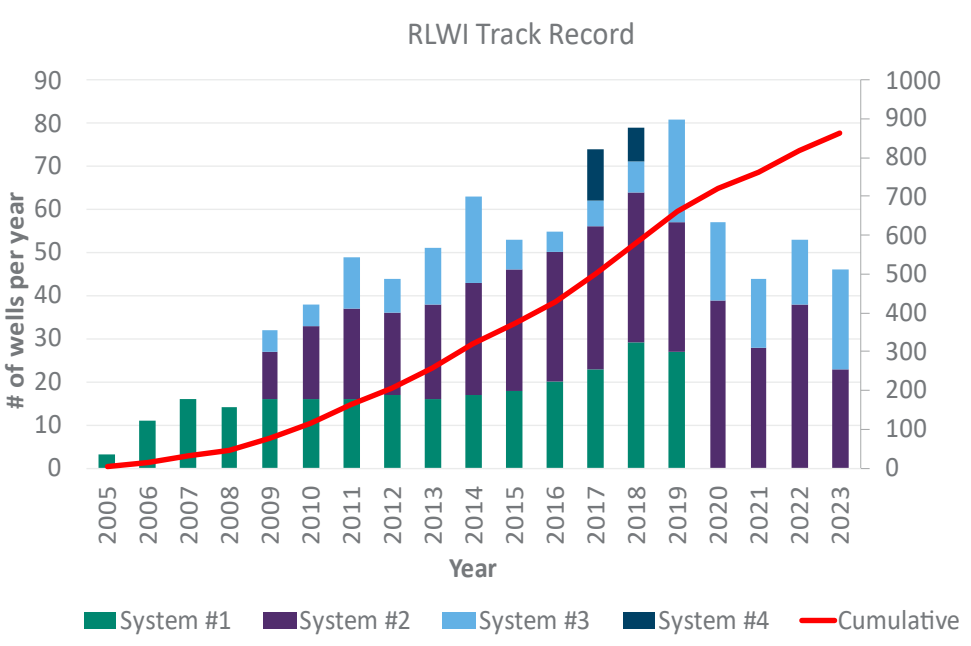
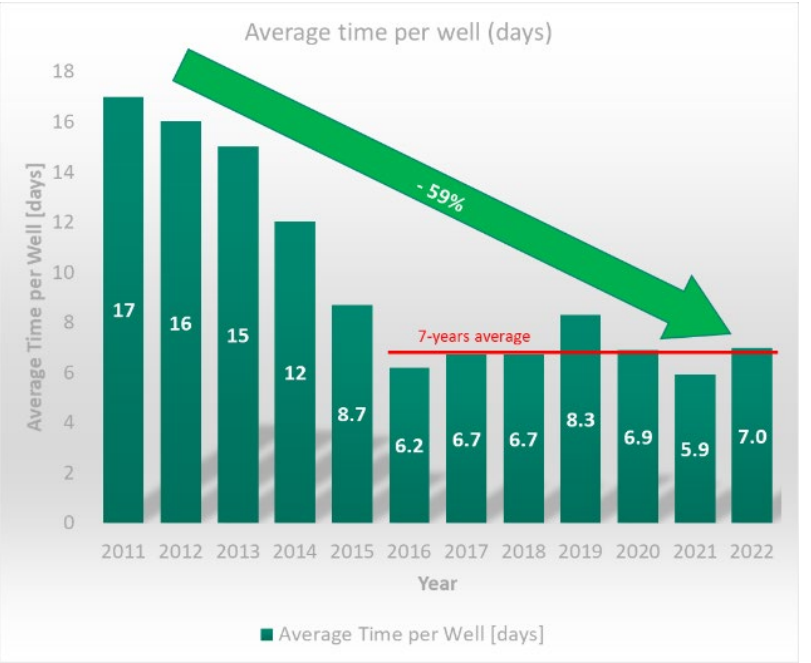
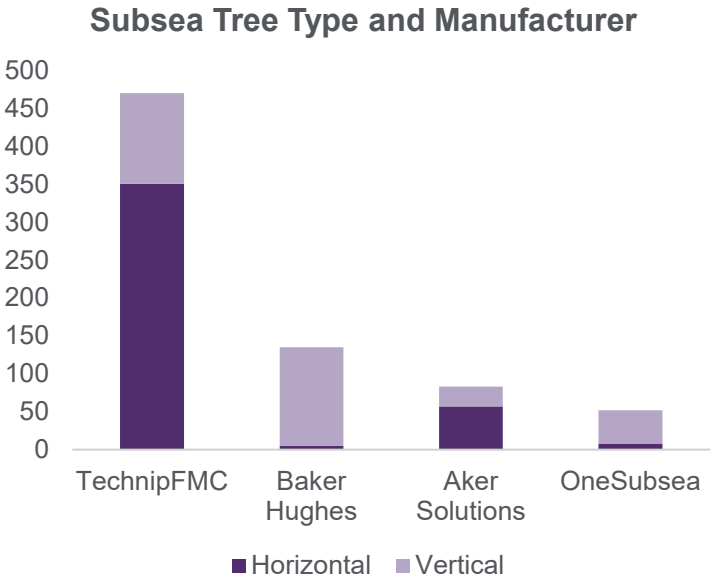
Global RLWI Track Record

Highlights







Takeaways

RLWI Track Record of >863 wells, >5,500 runs in hole

Over 508 wells (59%) were Horizontal Trees with crown plugs

Average days per well has decreased by 59% in the past 12 years

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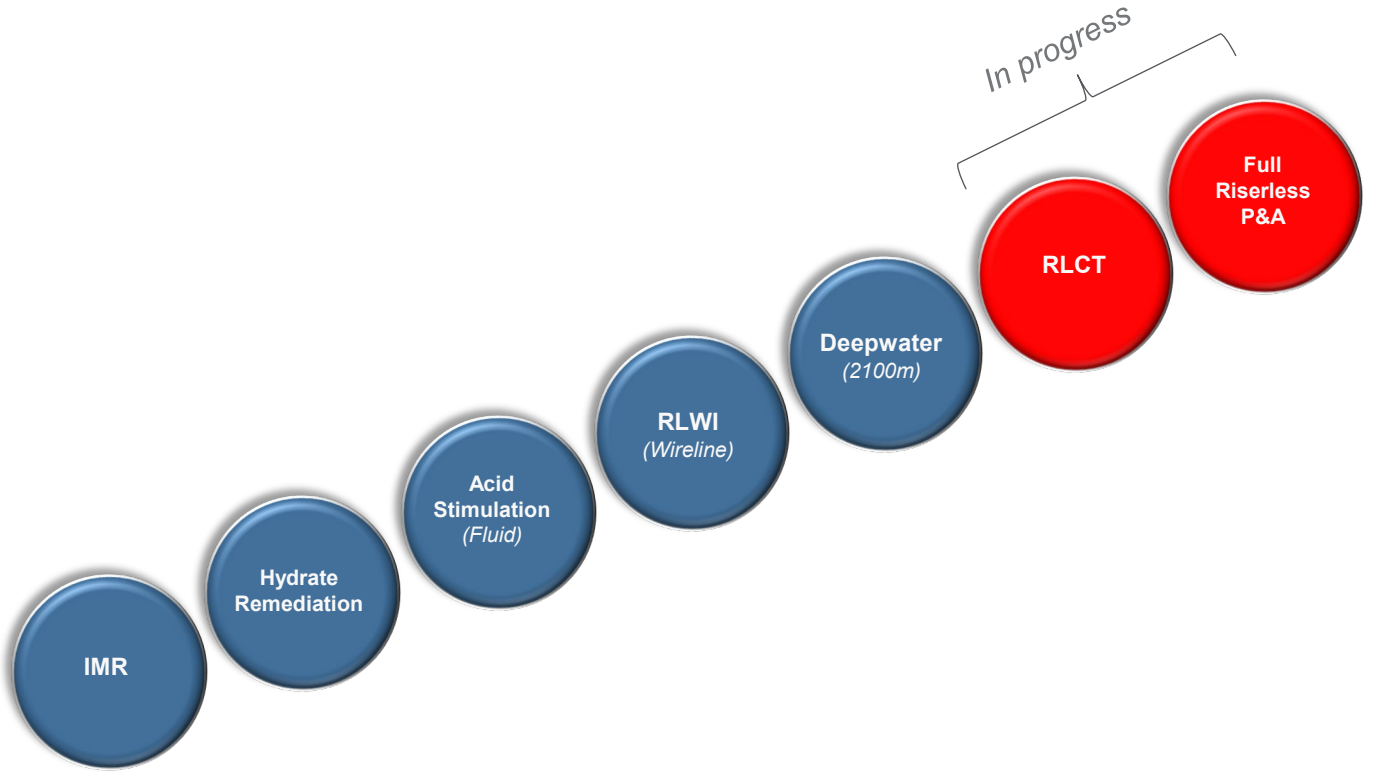
RLWI Assets & Roadmap

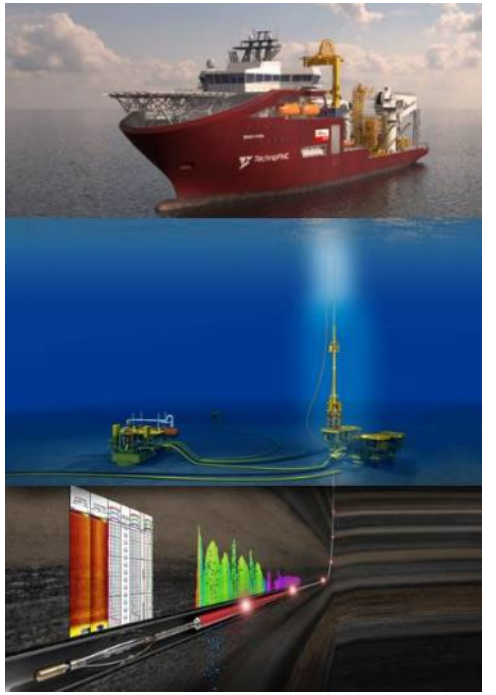
Long-Term Vision: From Rig to Vessel

Current Toolbox → Toolbox Expansion →

Hydraulic Intervention	Wireline	Pump Cement	Spot Acid / Cement	Sand Cleanout	Pull Tubing/ Casing	Well Testing	Drilling

Riserless Capabilities





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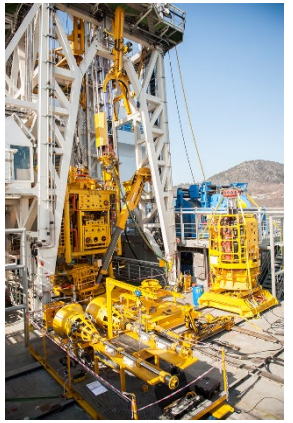
Current Assets & Fleet

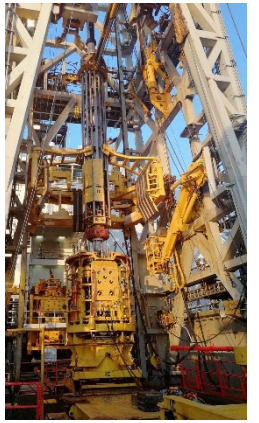
Island Wellserver



2009

2nd Generation [500m]
North Sea
Equinor

Island Constructor



2009

2nd Generation [2,100m]
North Sea, West Africa

Core Fleet

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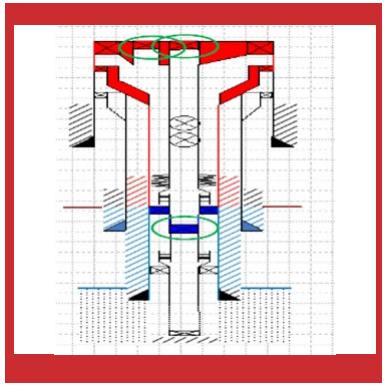
P&A Development Roadmap



2005

RLWI

- 18 year track record
- 863+ wells
- 5500+ runs in hole

2011

Pre-P&A

- 120+ wells
- Bullhead well
- Punch/cut tubing above production packer
- Set suspension plugs
- Set annulus plug if needed
- Retrieve VXT

2020

P&A
Incl. Cementing

- Patented subsea injection spool enables cement injection below WCP
- Reservoir cementing
- Through tubing cementing

2021

P&A
Tubing Retrieval

- Installed primary and secondary cement barrier plugs
- Unlock and retrieve subsea tubing hanger
- Retrieval of tubing in open water

2022

P&A
Gravity-Fed RLCT

- Subsea CT stripper
- Riserless gravity-fed coiled tubing capabilities
- Joint Industry Project (JIP)
- Waiting on 1st well

2023

P&A
Full RLCT

- Riserless coiled tubing with subsea injector now available
- Operator support and participation needed

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Riserless Coiled Tubing (RLCT)

Why Riserless Coil Tubing?

FEATURES	WIRELINE	COIL TUBING
Production Logging	✓	✓
Replacement of Hardware, Shifting Sleeves	✓	✓
Plug & Perforation	✓	✓
Temporary P&A	✓	✓
Stimulation & Circulation	✗	✓
Fracturing	✗	✓
Sand/ Scale Removal	✗	✓
Permanent P&A	✗	✓

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RLCT Achievements Summary

Water Depth Range: 66 – 3085 m.

CT Size: 2 7/8” and 2 3/8”

Number of CT runs: 68

- Gravity-Fed: 14 runs
- Subsea Injector: 54 runs

CT Services:

- Directional Drilling
- Logging
- Coring
- Cementing

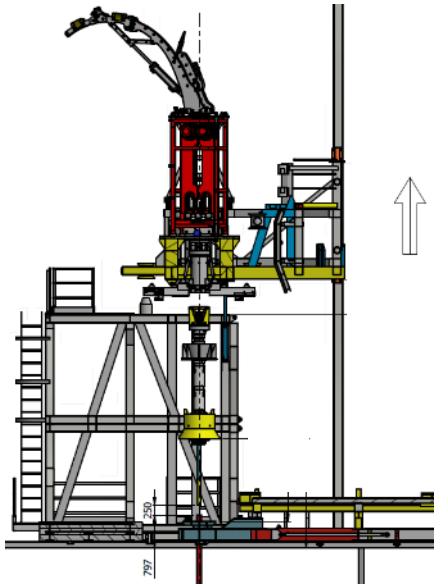
Vessels:

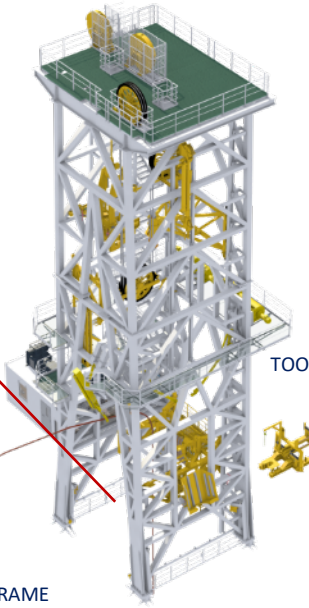
- Island Performer (RLWI vessel)
- Island Constructor (RLWI vessel)
- Island Valiant (AHTS vessel)

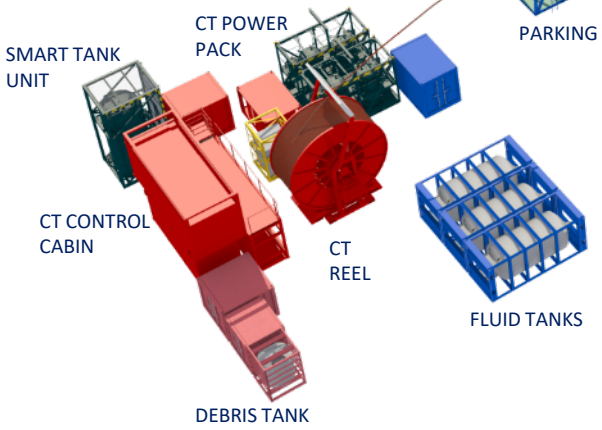
System Deliverables

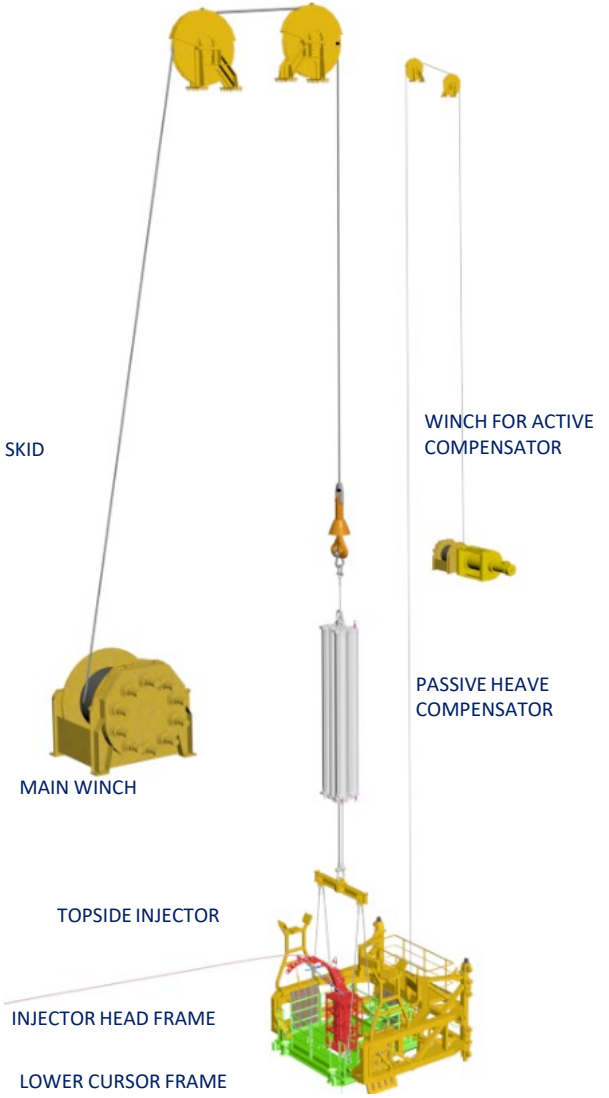
Phase 1
Gravity-Fed

Phase 2
Subsea Injector









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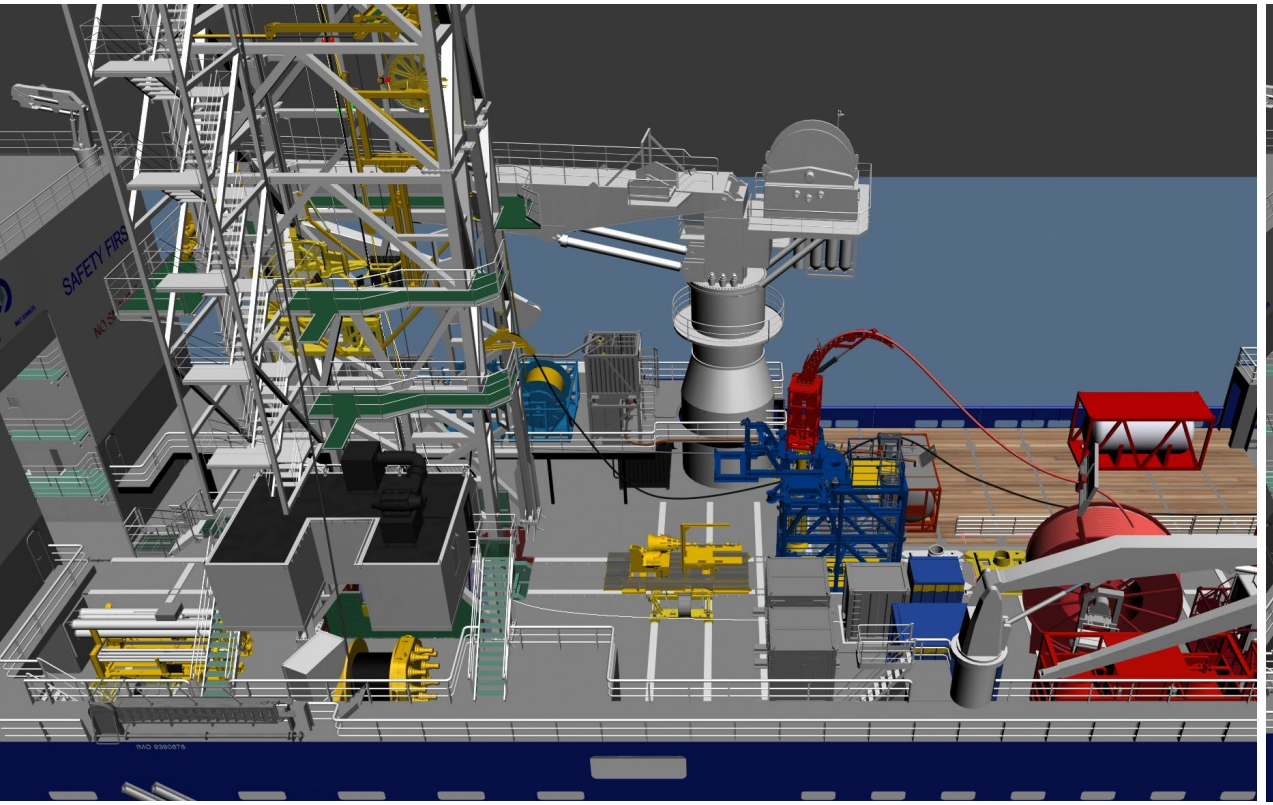
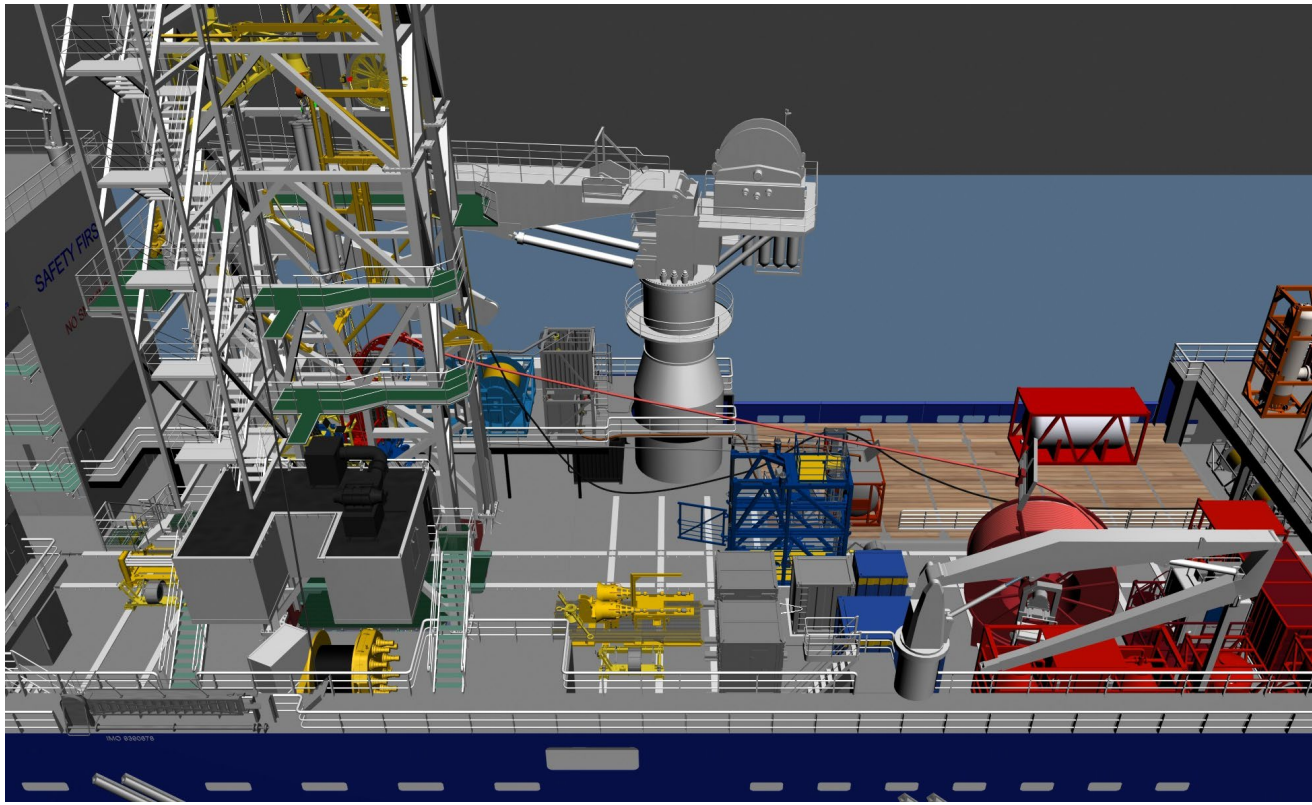
Efficient Change of Modes

WL Mode



CT Mode



Will take less than 8 hours to change between WL and CT mode on the well location

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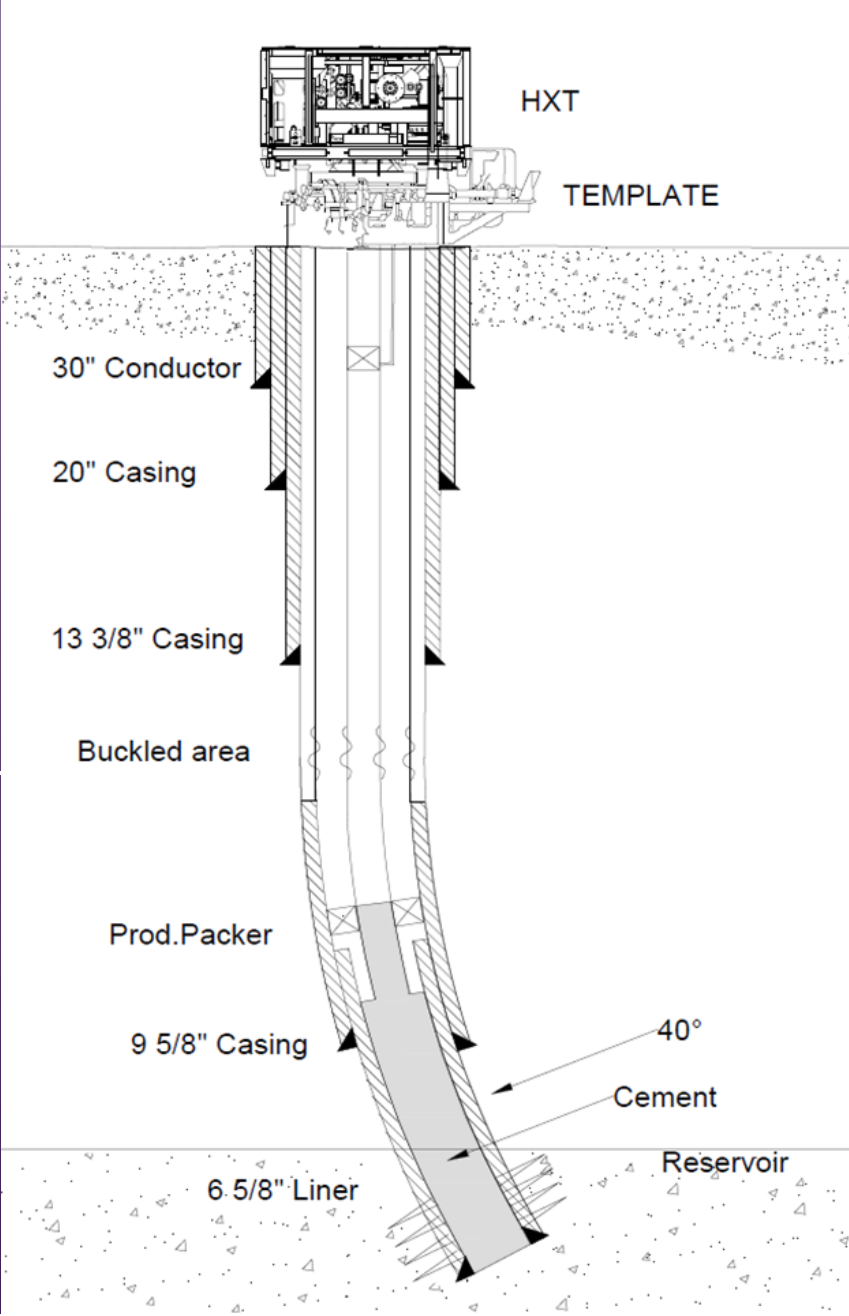
P&A – A Look Ahead



P&A – Synergies

RLWI, in combination w/ rig (pre-P&A), is a cost effective, proven method for P&A.

Pre-P&A

- Kill wells, punch tubing and set plugs
- Remove X-mas trees

Permanent P&A

- Permanently plug & abandon wells

Subsea Equipment Removal

- Cut wellheads, remove subsea equipment
- RLWI/ construction vessel

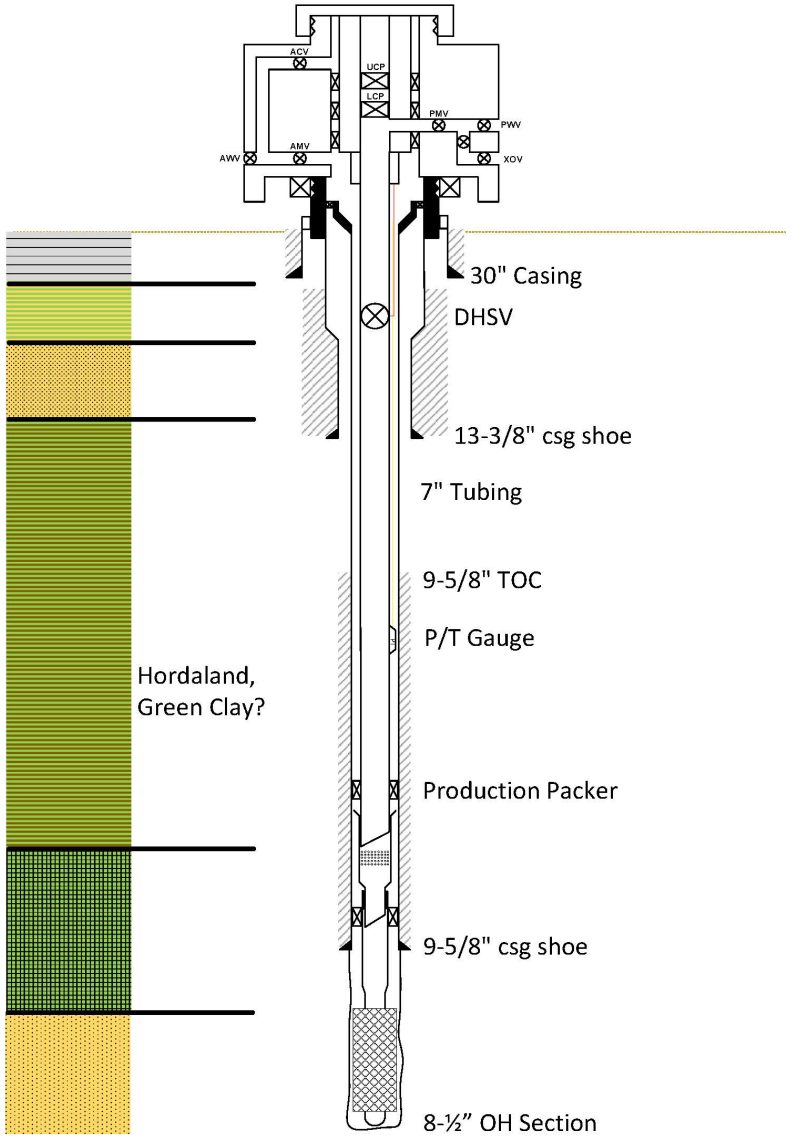
>120 Pre-P&A Projects

150+ Operations in UK, Norway & Denmark

- 60+ wells using SWAT and WASP technologies
- 90+ wellhead-severances and removal
- 35 mud-line suspended wells cleaned out and cut/removed, including pulling pieces of casing

Subsea Well Candidate for PP&A from RLWI Vessel

What is a good candidate?



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Subsea Well Candidate for PP&A from RLWI Vessel

What is a good candidate?

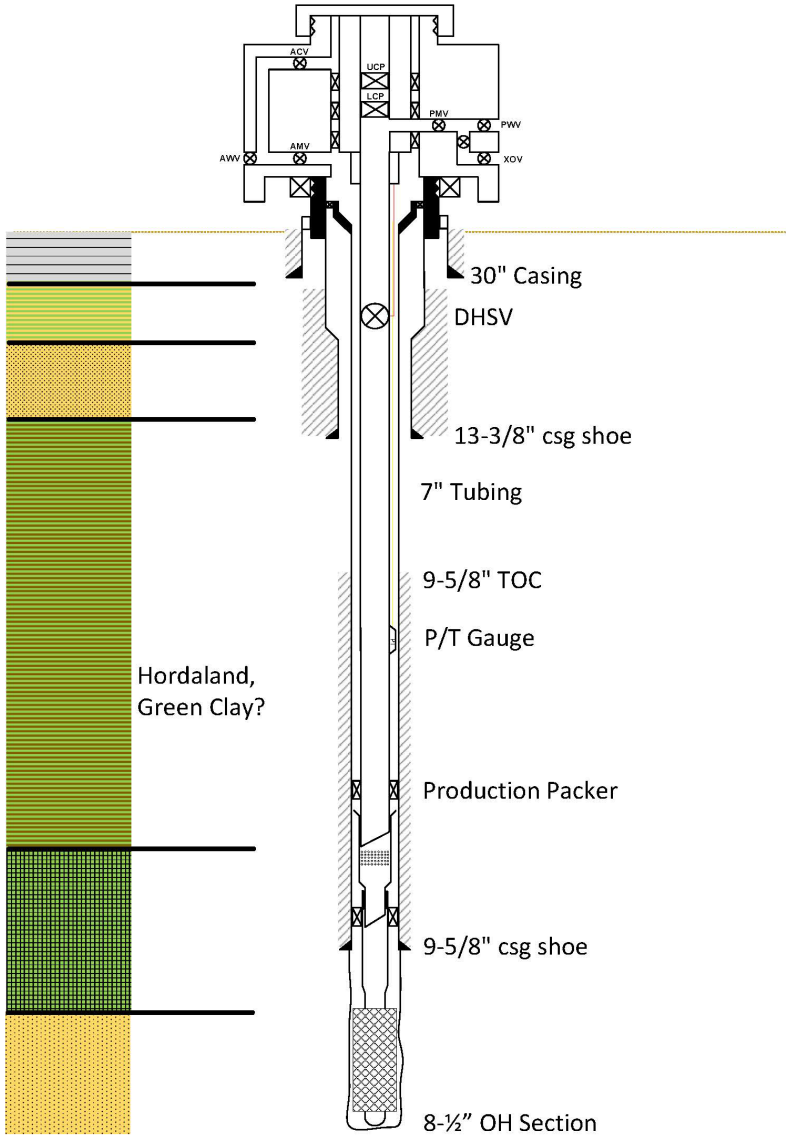
- Known Cement status behind production casing

Why?

- Majority of tubing string can be left in hole

What if?

- Cement quality and isolation is unknown
  - Pull or lift tubing and log for cement behind casing
  - Dual String logging
  - Selective tubing removal



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Subsea Well Candidate for PP&A from RLWI Vessel

What is a good candidate?

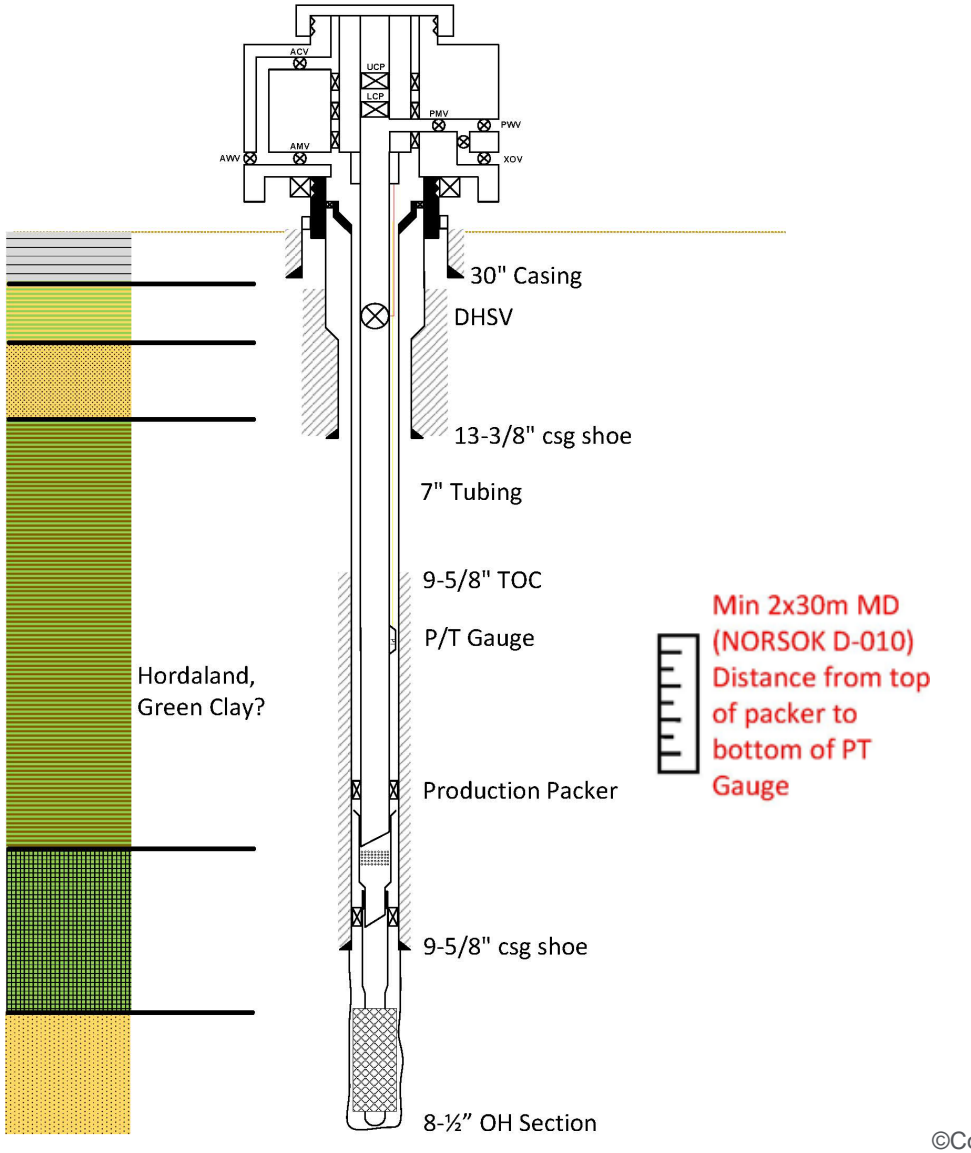
- No control line interference

Why?

- Not required to pull tubing string

What if?

- Control line is present
  - Remove control line by pulling tubing
  - Remove control line locally
    - Abrasive technology
    - Mechanical technology
    - Explosives
    - Rocket fuel



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Subsea Well Candidate for PP&A from RLWI Vessel

What is a good candidate?

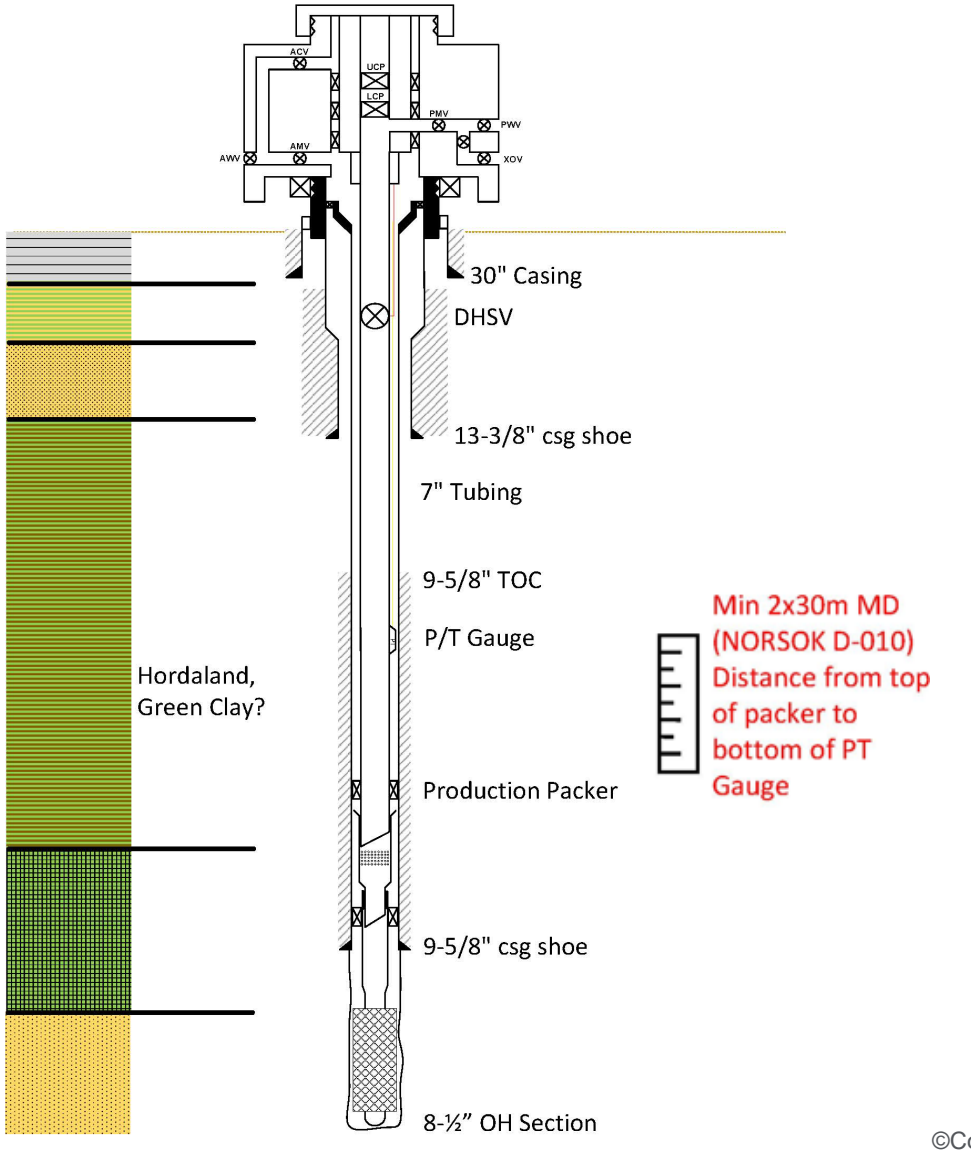
- No integrity issues with tubing

Why?

- Can use tubing string as a conduit for placing cement barriers

What if?

- Integrity issues with tubing
  - Pull tubing string
  - Install straddle/ patches
  - Use coiled tubing for accurate cement placement



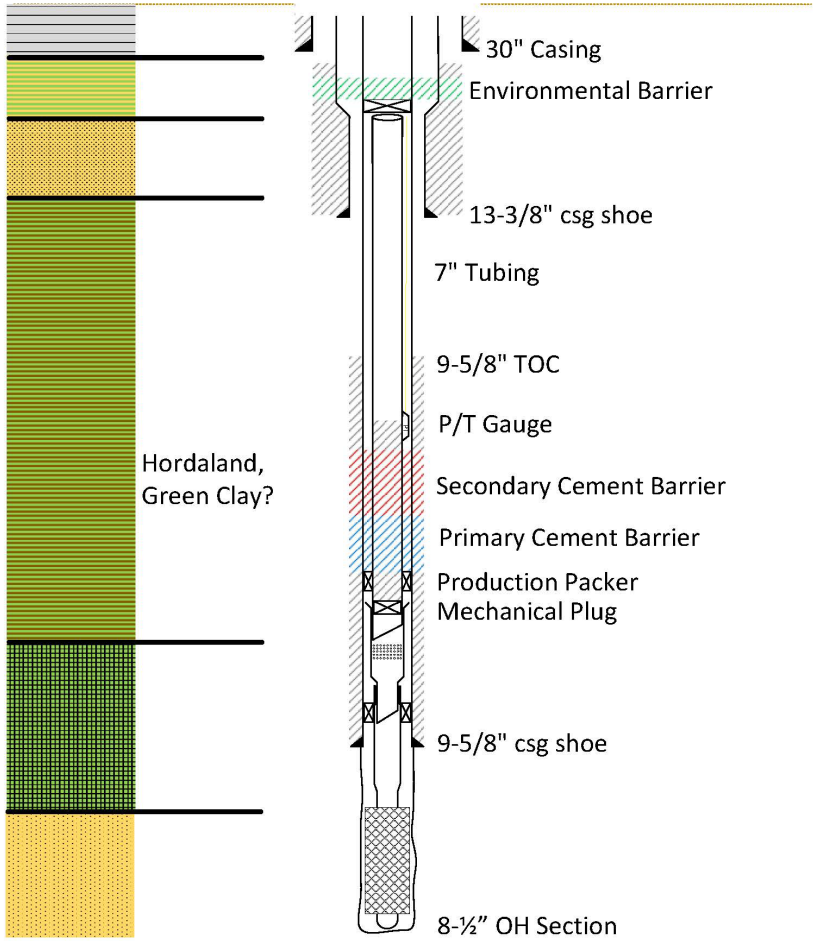
Subsea Well Candidate for PP&A from RLWI Vessel

What do we do today?

- ▶ All Wireline Services
- ▶ Through Tubing Cementing
- ▶ Using Tubing String as a Conduit
- ▶ Pull Tubing and Tubing Hanger
- ▶ Pumping (Bullheading / Circulating)
- ▶ Pull XT

What are we ready for?

- ▶ Riserless Coiled Tubing Services



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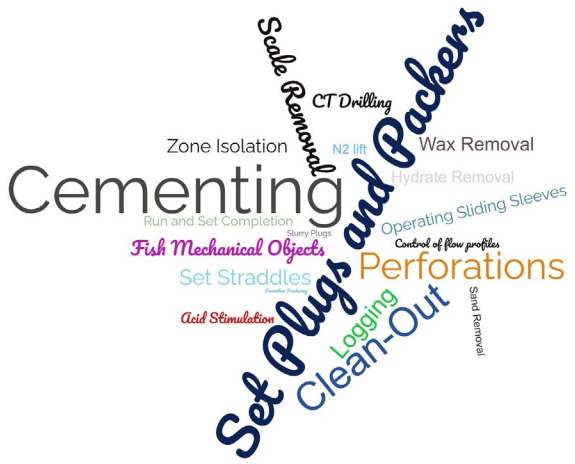
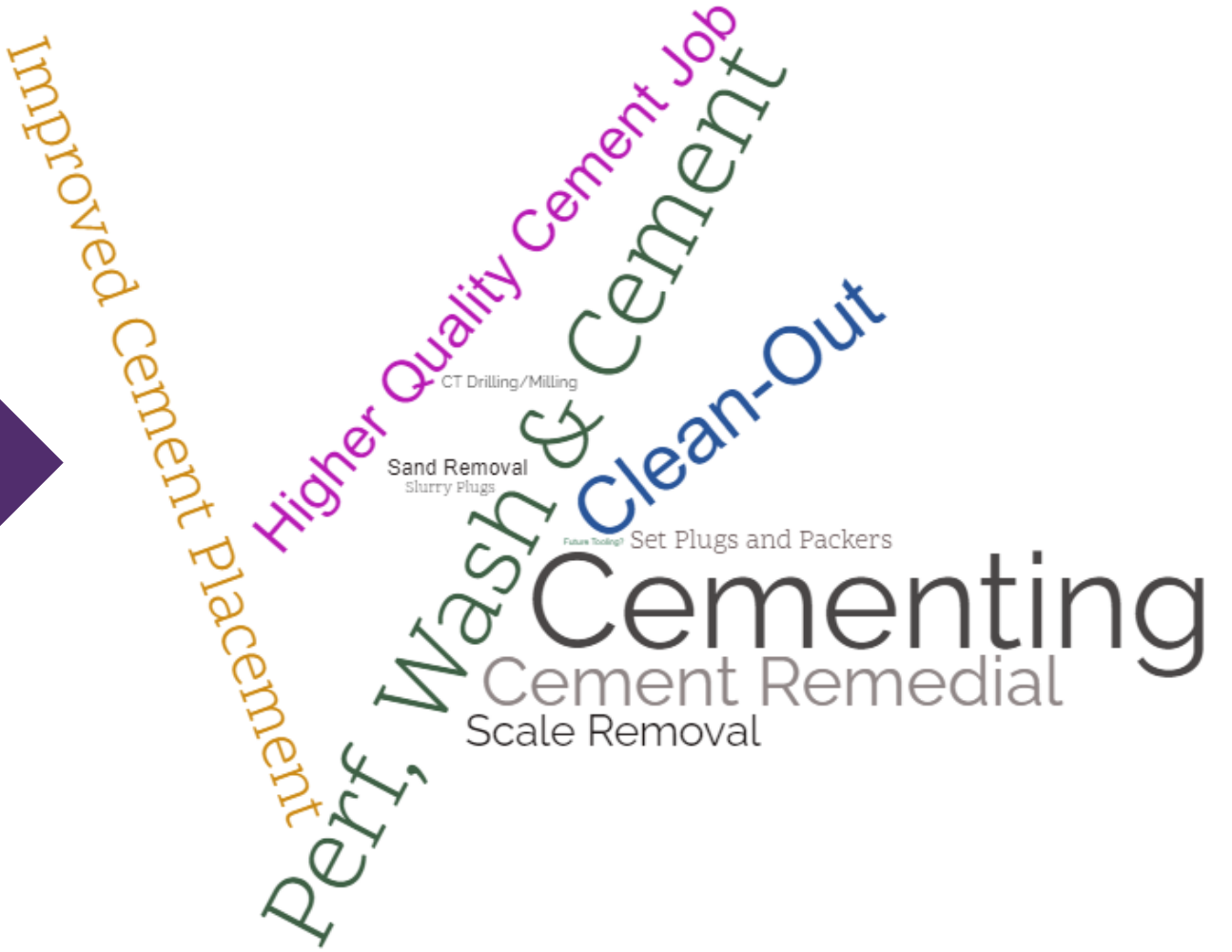
Riserless Coiled Tubing Services – P&A



P&A Focused



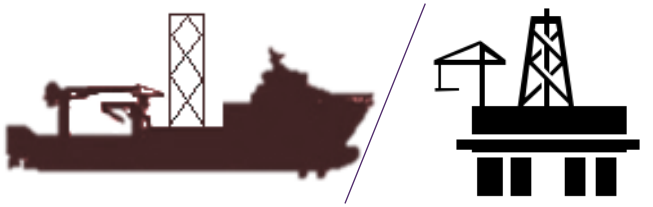
P&A – Way Forward

RLWI, in combination w/ rig, can significantly improve time and cost for P&A.

Pre-P&A

- Kill wells, punch tubing and set plugs
- Remove X-mas trees

Permanent P&A



- Permanently plug & abandon wells

Subsea Equipment Removal

- Cut wellheads, remove subsea equipment
- Construction Vessel

- Pre-P&A campaigns can provide us with new information that allows better planning
  - Can rule out the need for a rig
- Multi-well campaigns
- Multi-client campaigns
  - Internal requirements?

Summary

- **Riserless Coiled Tubing will be a game changer within well intervention service.**
  - An enabler for full permanent P&A from a vessel
- **We will have Riserless Coil Tubing services established as a standard offering.**
  - Expect similar evolution of downhole tools for CT as for the wireline industry
- **Will increase utilization of the intervention business and drive efficiency and lower the overall cost.**
  - All-year utilization is key to deliver a cost optimum service
- **What are we waiting for?**
  - Well candidates to field prove Riserless Coiled Tubing

Thank you!

Riserless Light Well Intervention

Leading the way into the future of
Subsea Well Intervention and
Plug & Abandonement