ICoTA 31st European Well Intervention Conference

Extended Coiled Tubing Straddle For Integrity Restoration: Three Deployment Cases From The Norwegian Continental Shelf

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Agenda / Presentation outline

- Problem Definition & Challenges
- Methodology & Engineering
- Qualification Process
- Installation Procedure
- Challenges
- Job Results
- Q&A

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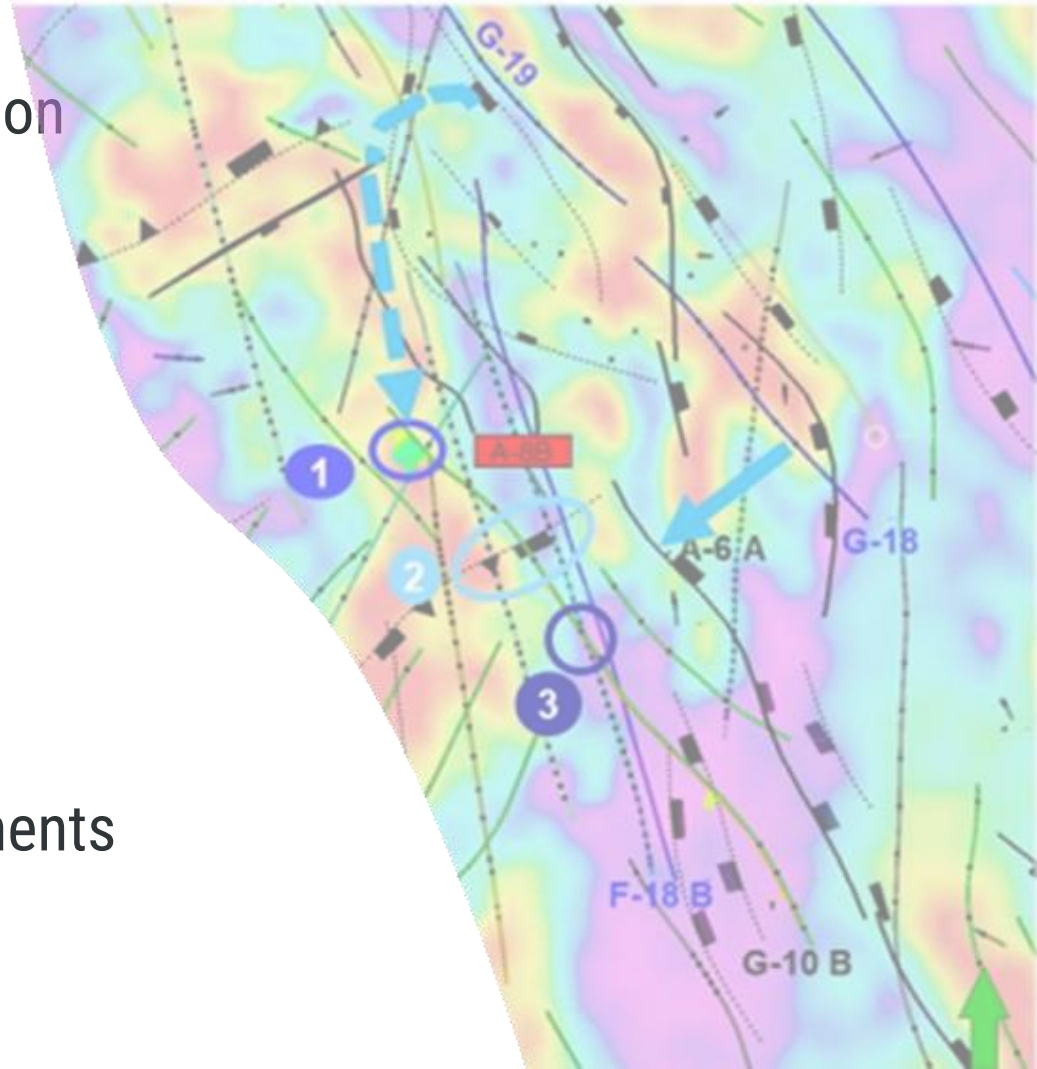
Problem

- Tubing-to-annulus communication (TTAC) from corrosion
- Multiple leaks caused by oxygen-induced pitting corrosion

Challenges

- Extensive damage over long tubing intervals
- Cost-effective solution that is robust
- Maintain access for future interventions
- Ensure deep gas-lift injection functionality
- Comply with stringent well-control and barrier requirements



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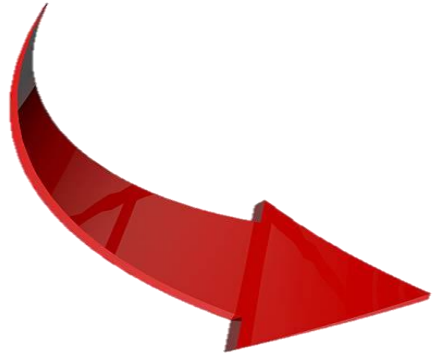
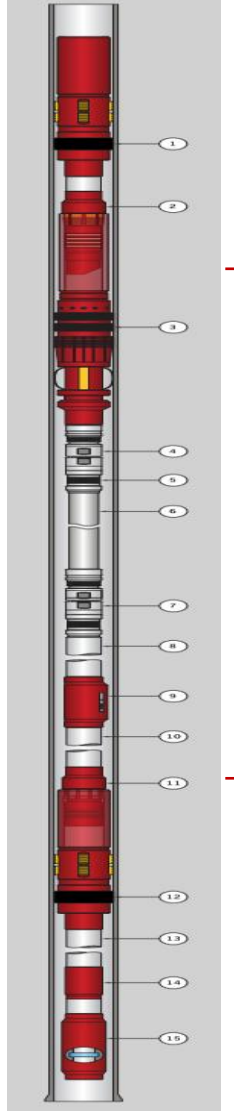
Methodology

- Using a 2-7/8” CT string as a straddle
- Modified with an injection gas lift mandrel
- Ability to cover thousands of meters
- Ease of installation – 3 runs

Engineering

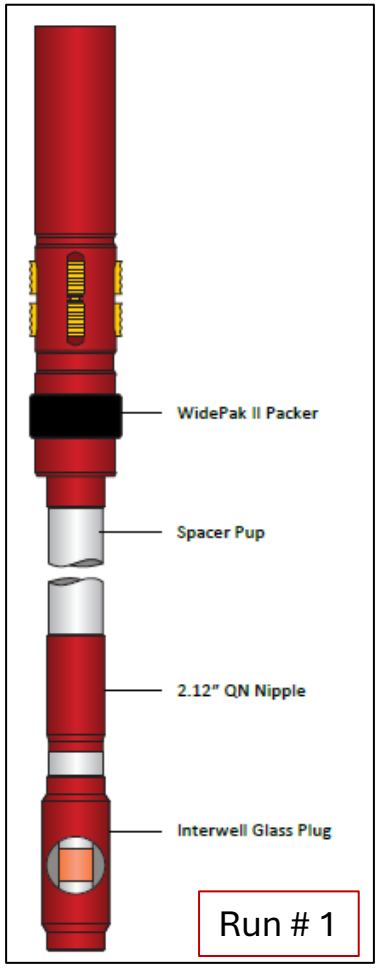
- Glass plug as well barrier
- Mechanical hanging system for tailpipe load
- Seam-less CT design
- Nipple profile for system recovery

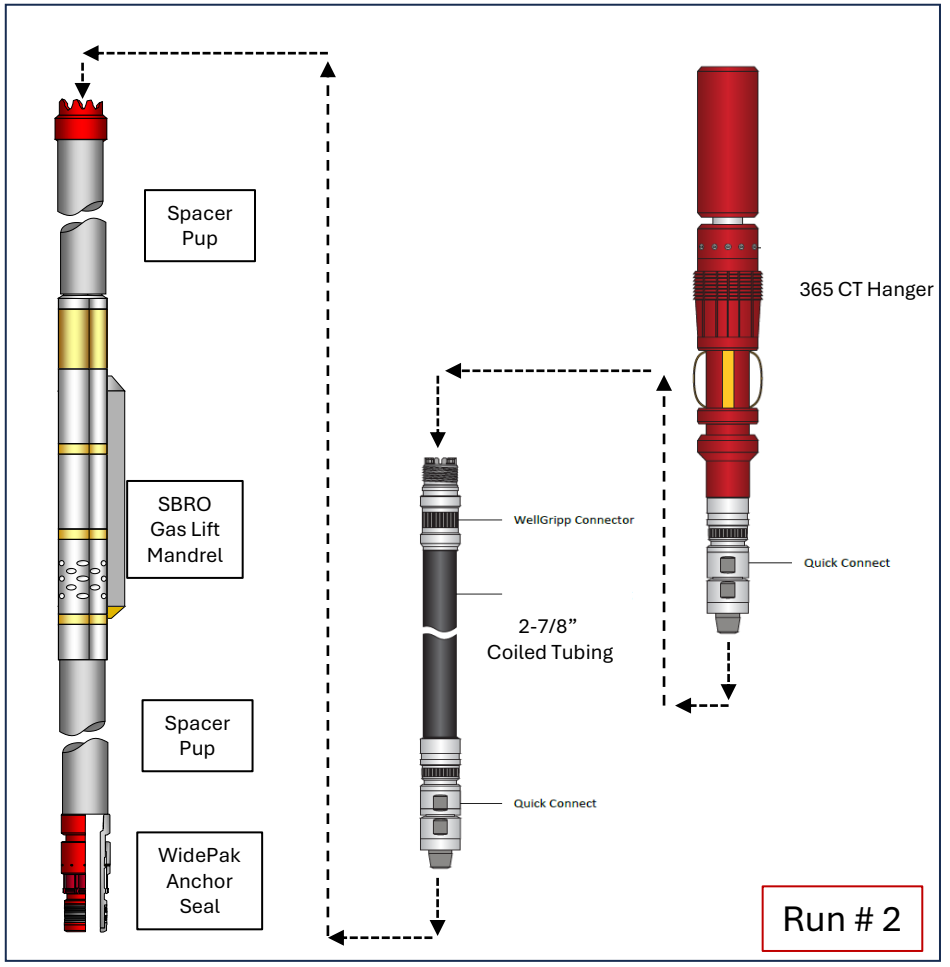


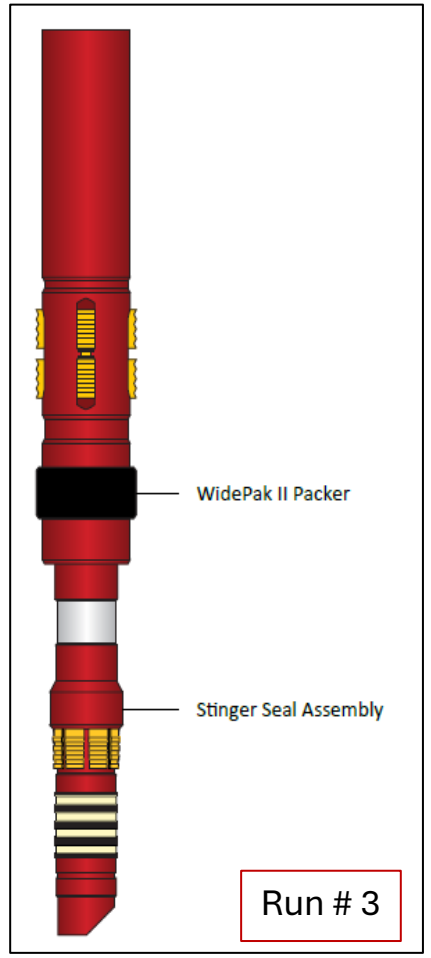


Item	Description
1	Upper Packer
2	Seal Stinger Assembly
3	365 CT Hanger
4	Quick Connect
5	Connector
6	2-7/8” Coiled Tubing
7	Quick Connect
8	Spacer Pup
9	Gas Lift Mandrel
10	Spacer Pup
11	Anchor Seal
12	Lower Packer
13	Spacer Pup
14	1.50” QN Nipple
15	Glass Plug

Gas Lift Straddle



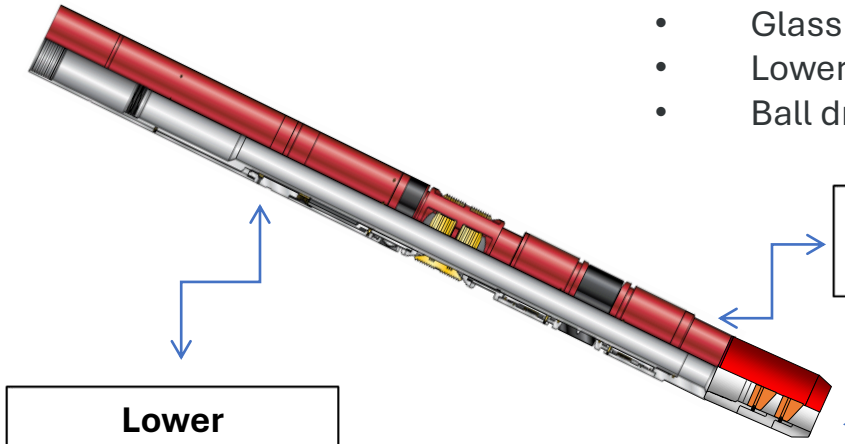




Run # 1

Section #1 – Conveyed via Hydraulic Setting Tool

- Glass Plug – Provides Isolation to the reservoir (In-Flow Test)
- Lower WidePak™ – Straddle Packer
- Ball drop activation



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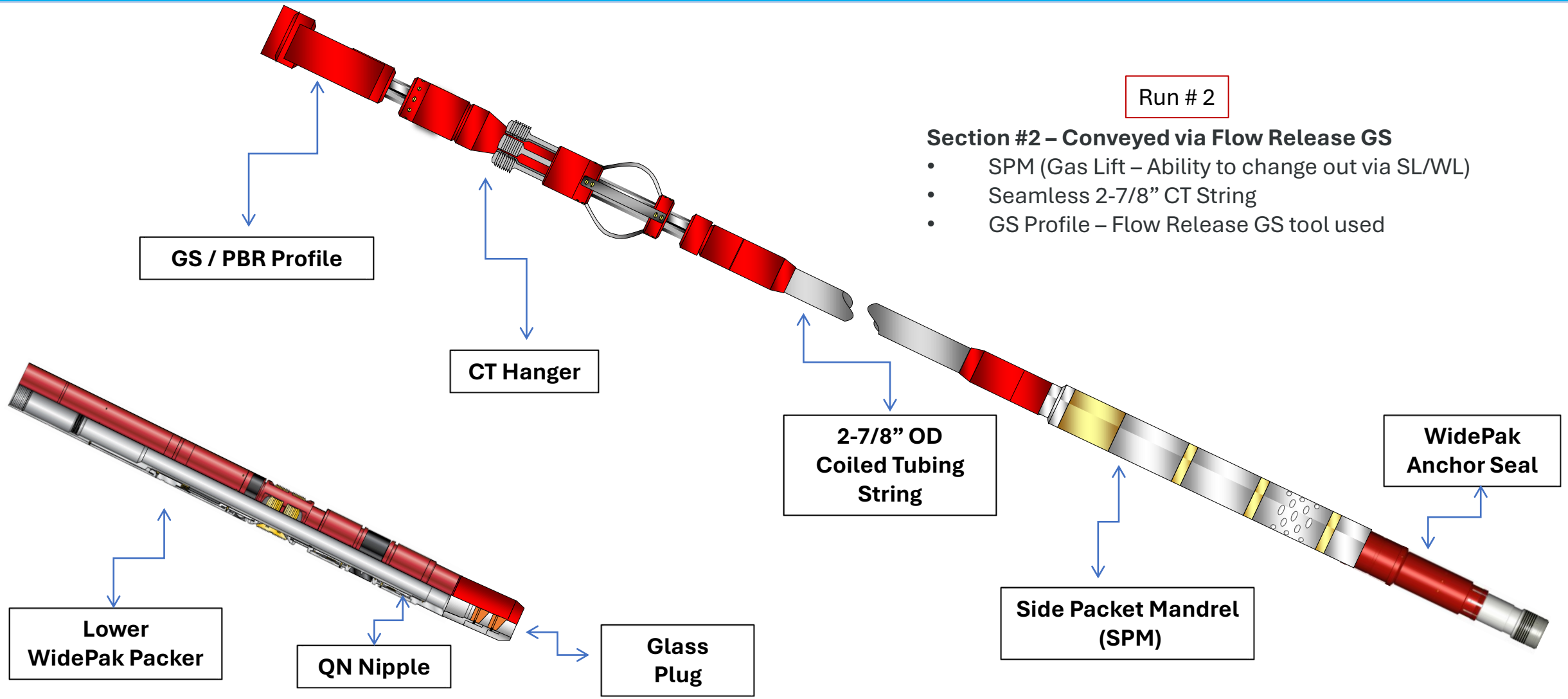
Run # 2

Section #2 – Conveyed via Flow Release GS

- SPM (Gas Lift – Ability to change out via SL/WL)
- Seamless 2-7/8” CT String
- GS Profile – Flow Release GS tool used



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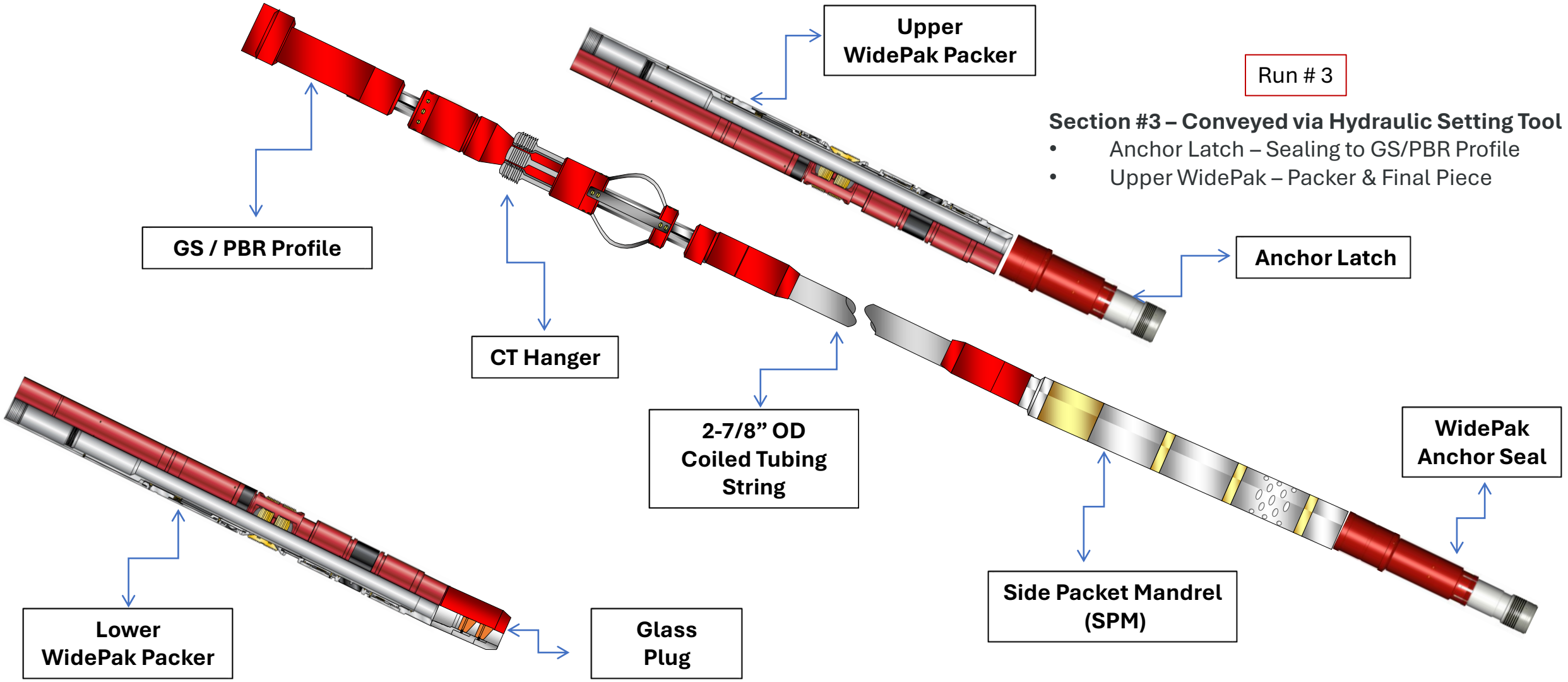
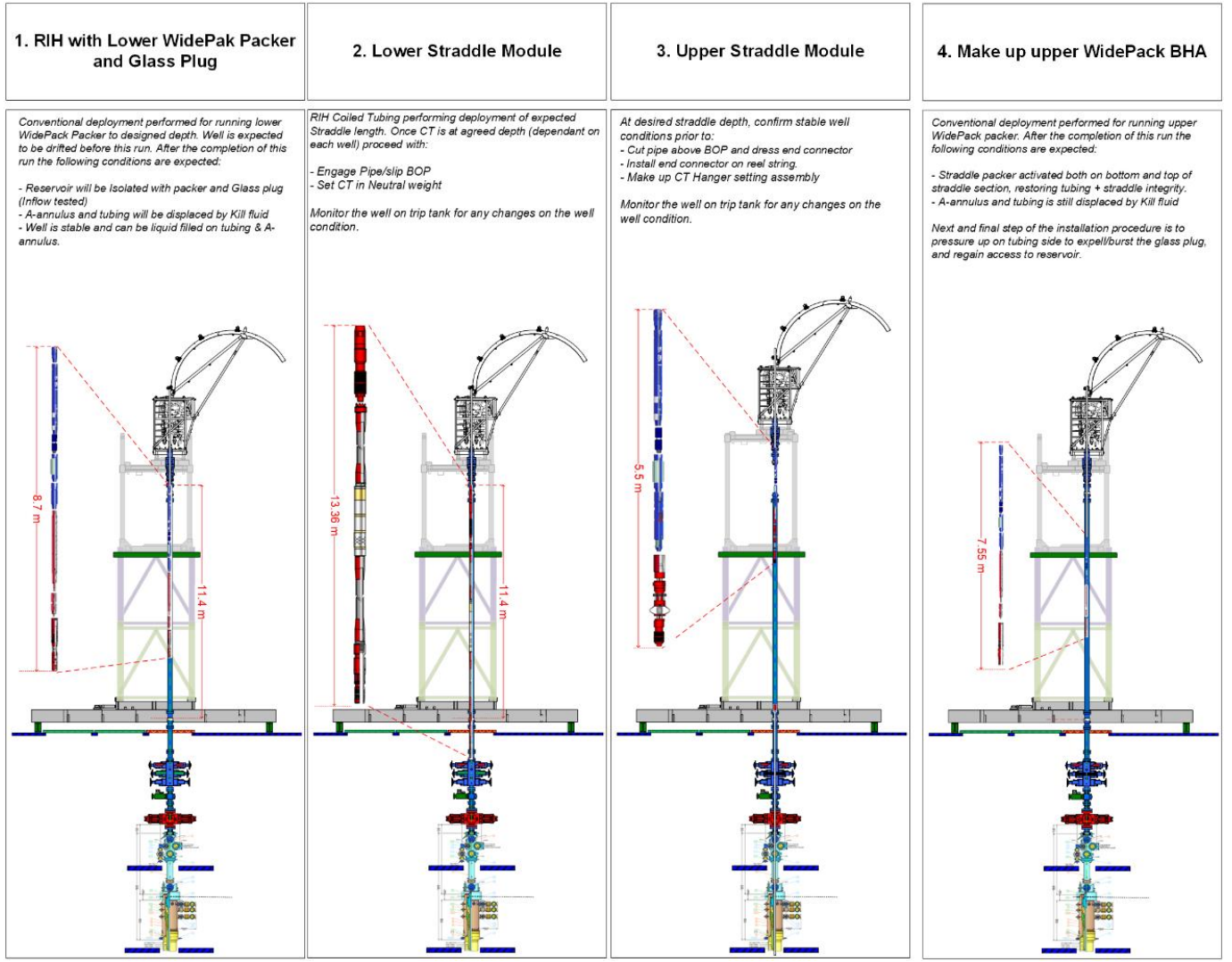


Qualification Process

- CT String Selection (Grade 90)
  - Seamless
  - Minimize future wear on any bottom hole assemblies (BHA) to pass through
  - String grade was selected based on material compatibility with well fluids while maintaining sufficient mechanical properties
- Barriers
  - Glass plug in lower most assembly
  - Fluid monitoring on surface via trip tank
  - Standard CT Well-stack with compliance to NORSOK (2 pipe rams)
- Integrity
  - Minimum CT runs due to tubing wear (abrasion)

Installation Procedure Summary

- Run #1 – Drift & Cleaning setting areas
- Run #2 – Installing lower packer and glass plug
- Run #3 – Running lower straddle BHA, straddle string and upper straddle BHA.
- Run #4 – Running upper packer
- Activity #5 Leak test straddle assembly



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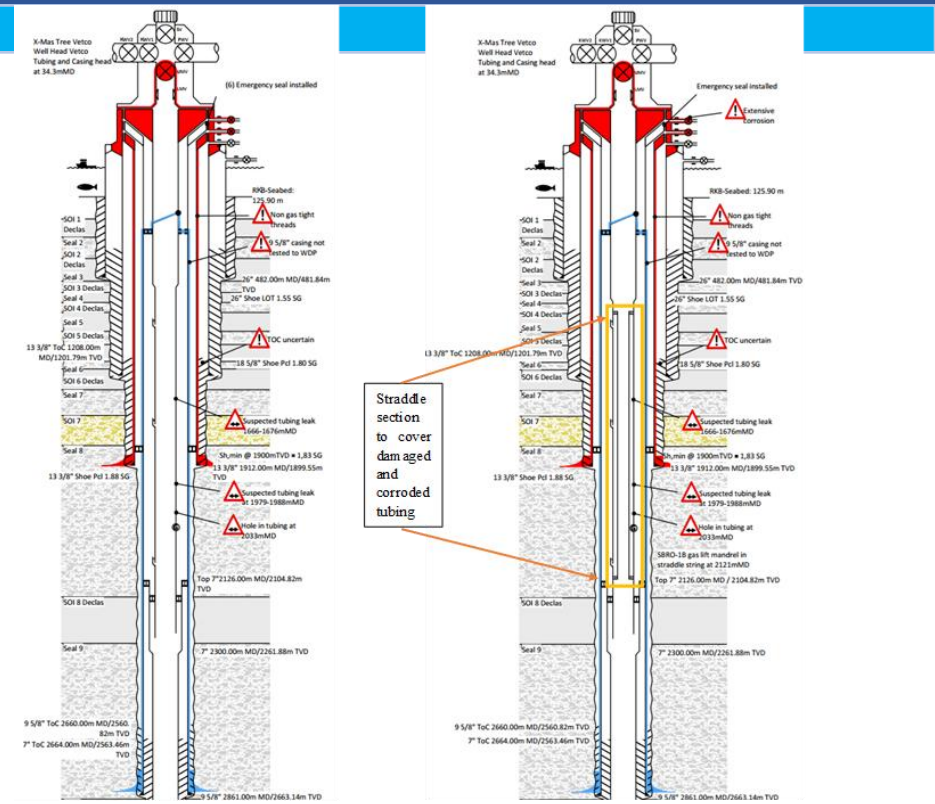
Challenges during Installation

- Packer Hydraulically Set by differential pressure
  - Dropping 0.5” steel ball into a 2-7/8” CT String in a sub-hydrostatic well
  - Used aluminum ball for subsequent wells

- Stabilization of Well
  - Difficulty to stabilize & circulate well due to communication between A-Annulus and Tubing

- Leak on Final Installation on Well 3
  - Leak/communication was established between the tubing and a-annulus.



	Well #1	Well #2	Well #3
Straddle Distance (meters)	1 127	1 149	1 743
Objective Score (%)	100%	100%	0%
Actual Duration (days)	22.17	13.8	14.29
P10 Duration (days)	23.1	17.7	12.2
Actual Inc Oil Rate (mboe/day)	0.37	0.40	-

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Job Results

Total of 4018 m of straddle installed in 3 offshore wells

Technology qualification of only 3 runs for straddle installation and gas lift capability in a straddle string

All 3 wells were completed in 50 days in highly challenging unmanned offshore platforms. This beat P10 timing estimated by 15%

Lessons Learnt incorporated into future straddle installations. 1 well lined up in December 2025

Q&A

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