Slim Barricade®

Archer Rigless & Through-Tubing Perf, Wash & Cement

Presentation to : Havtil P&A Event

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07.05.2026

Archer

Agenda

1. Intro to Archer Driving Innovation
2. Workflow for Rig-less and Through-Tubing operations
3. SLIM Barricade – Technology System Integration Test
4. Summary

Driving innovation

Stronghold® Barricade®

2009
First Generation Stronghold Barricade

2019
Stronghold Barricade+ was launched

2019
THOR system was launched

Sizes from 5 ½ ’’ – 14’’

500+ successful jobs in **20+** countries

From Rig based to Rigless Solutions

Slim Barricade®

2023
Project start

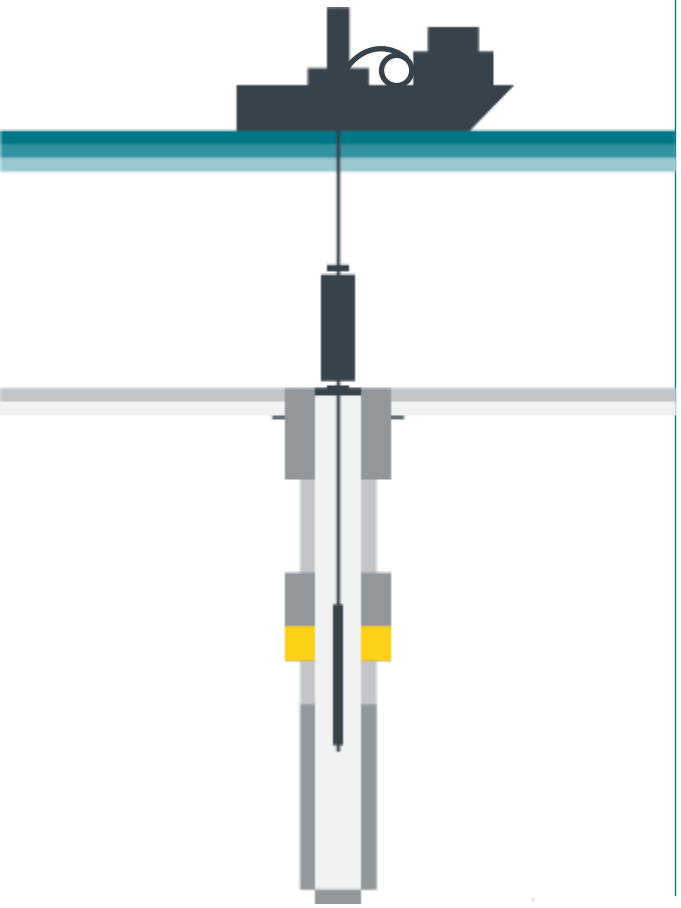
2025
Launching **Slim Barricade**

2026
Global deployment

Sizes 4 ½, 5 ½’’ & 6 5/8’’

7500+ computational hrs CFD
70+ tool iterations

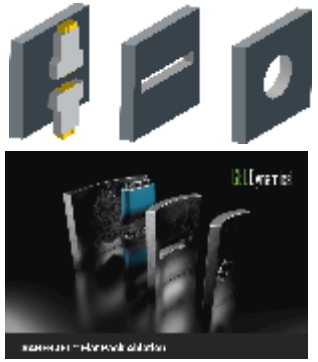
Workflow for Rigless and Through-Tubing operations



1

SaberJet™

New ablation techniques with symmetrical shaped charges and ablation verification with Archer proprietary logging tools.

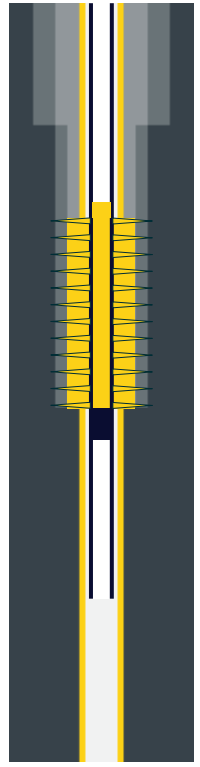


2

Slim Barricade®

Slim Perforate, Wash & Cement family of tools for through tubing and dual annulus applications.

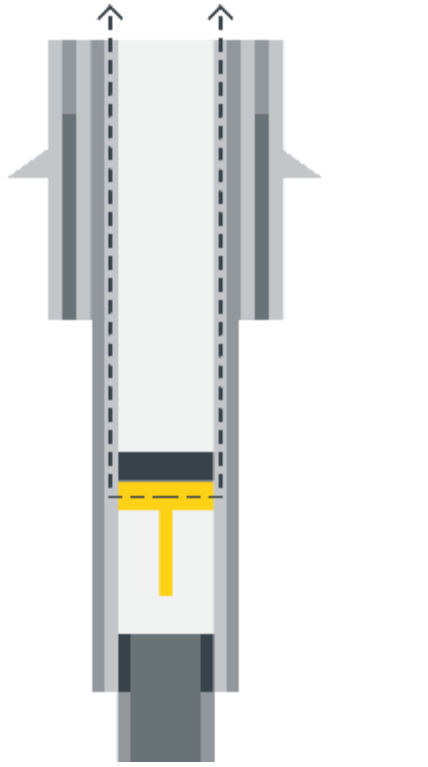
3.54” OD
4.30” OD



3

Raptor WHISPR™

Acoustic telemetry platform for the transmission of data from below the barrier (pressure and temperature).



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Slim Barricade®: Perforate, Wash and Cement

Technology Development Archer Rigless & Through-Tubing Method

Perforate

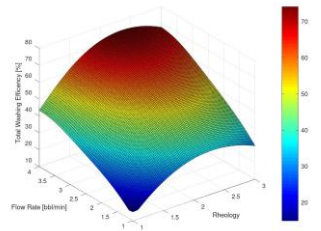
Wash

Cement

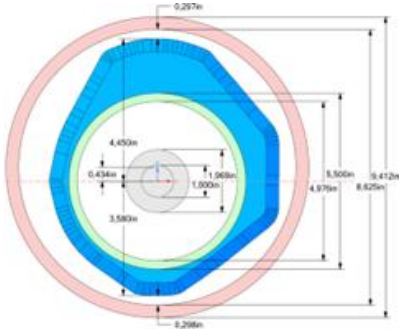
What is CFD and what it means for the project?

CFD = Computational Fluid Dynamics
Important method to understand feasibility and optimize tools and methods

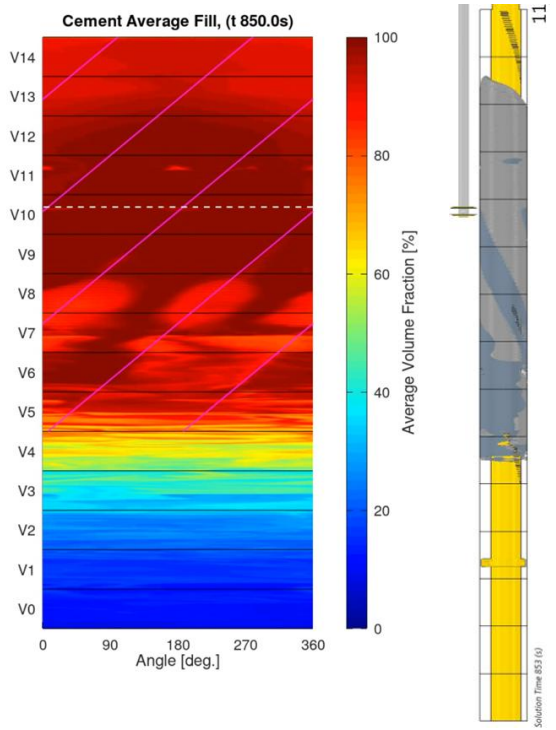
1. Feasibility



2. Modelling



3. Detailed analysis

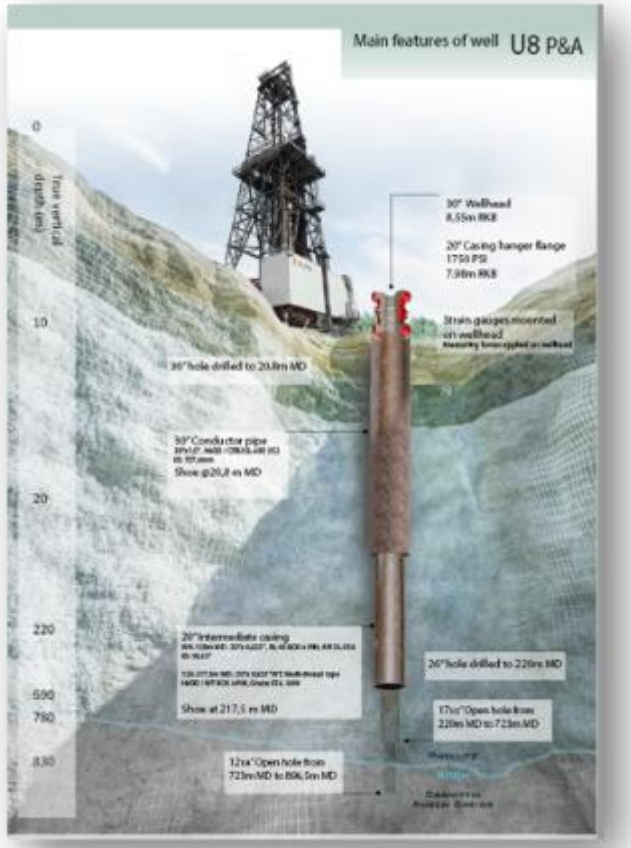


4. Execution

5. Result

System Integration Test (SIT)

- **Objective**
  - Successfully form a 60 m cement barrier in a 5 ½" x 9 7/8" scenario
- **Executed in U-8 at Ullrigg:**
  - All conveyance on CT
  - Ablate control lines clamped outside 5 ½" tubing
  - Verify ablation
  - Install cement base, shear free and wash
  - Place cement across interval
  - Pressure test from above and below



CT - Slot Perforating Charge for Flatpack Ablation

- 3-1/8” perforating gun system with controlled phasing to ablate every 6.5 m
- Guns centralized inside 5-1/2” casing, inside 9-5/8” outer casing
- System passed gauge and swell checks <3.69” ID of TRSV
- Flat-pack ablation demonstrated across multiple standoff distances during testing

Pressure Testing – Simulating Downhole Conditions

- Test #1 – pressure test
- Test #2 – seepage test
- 70 bar internal pressure
- 0 bar, 70 bar, 160 bar external pressure

Dual Annulus Washing

Test Configuration:

- Dual annulus test vessel: **4-1/2” x 9-5/8” x 13-3/8”**
- Cemented inner annulus with perforation holes (0.3 in, 6 SPF) through **4 ½” x 9 5/8”**
- Barite placed in outer annulus **9 5/8” x 13 3/8”**

Washing Results:

- Single wash pass across slot interval
- Clean returns achieved in < 2 minutes.
- Effective barite removal

Conclusion:

- Washing system delivered strong annular debris removal across the dual-annulus configuration

Barite returns @400 lpm / 2.5 bpm

Clean returns wihin 2 min

Residual barite ~7.5 cm

Slim Perforate, Wash & Cement Summary

Features

- Integrated cement base with expandable steel slips
- Reinforced rubber elements for extended durability
- Designed to be run dormant before and after operation
- Symmetrical shaped charges for flatpack ablation

Benefits

- Accurate depth verification with taggable cement fundament
- Ability to do extended length intervals
- Navigates restrictions and in through-tubing operations
- Efficient flatpack control line cut with proven high-quality cement coverage

Specifications

- Tubing size: 4 ½”, 5 ½”, 6 5/8”
- Safety Valve ID: 3.69", 4.42"

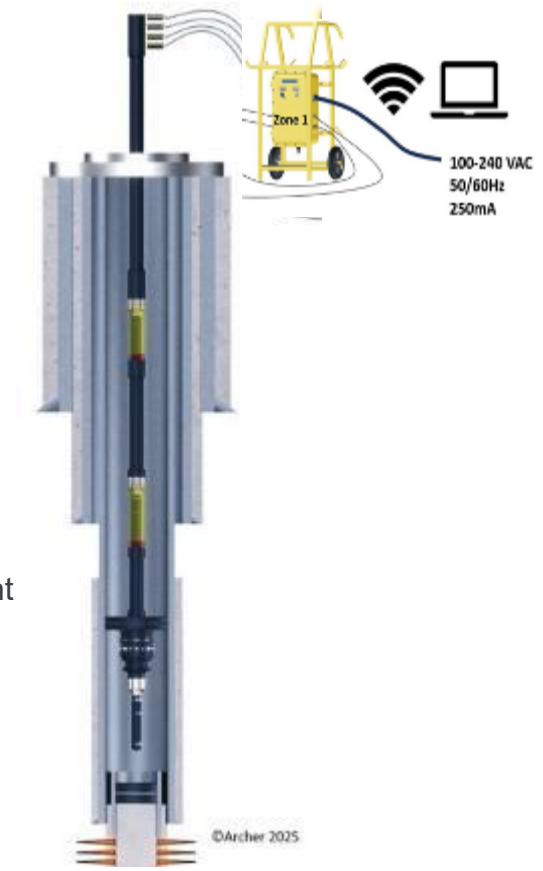
Raptor WHISPR™ – Wireless Acoustic Barrier Monitoring

Wireless Acoustic Platform

- Innovative downhole acoustic monitoring with wireless data transmission
- Features an acoustic transmitter positioned below the barrier
- Reliable signal transmission through the well structure
- Transmission can be directly to a surface system or via a repeater.

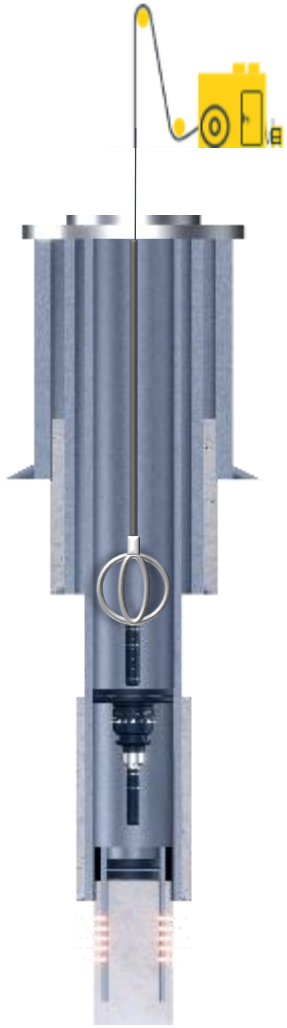
Barrier Verification & Monitoring

- Surveillance of barriers in temporary and long-term abandonment
- Pressure and Temperature data below the Barrier
- Unique transmission technique
- No calibration, easy setup
- Wireline, slickline or pipe conveyed



Casing plug
Transmission
via Drill Pipe

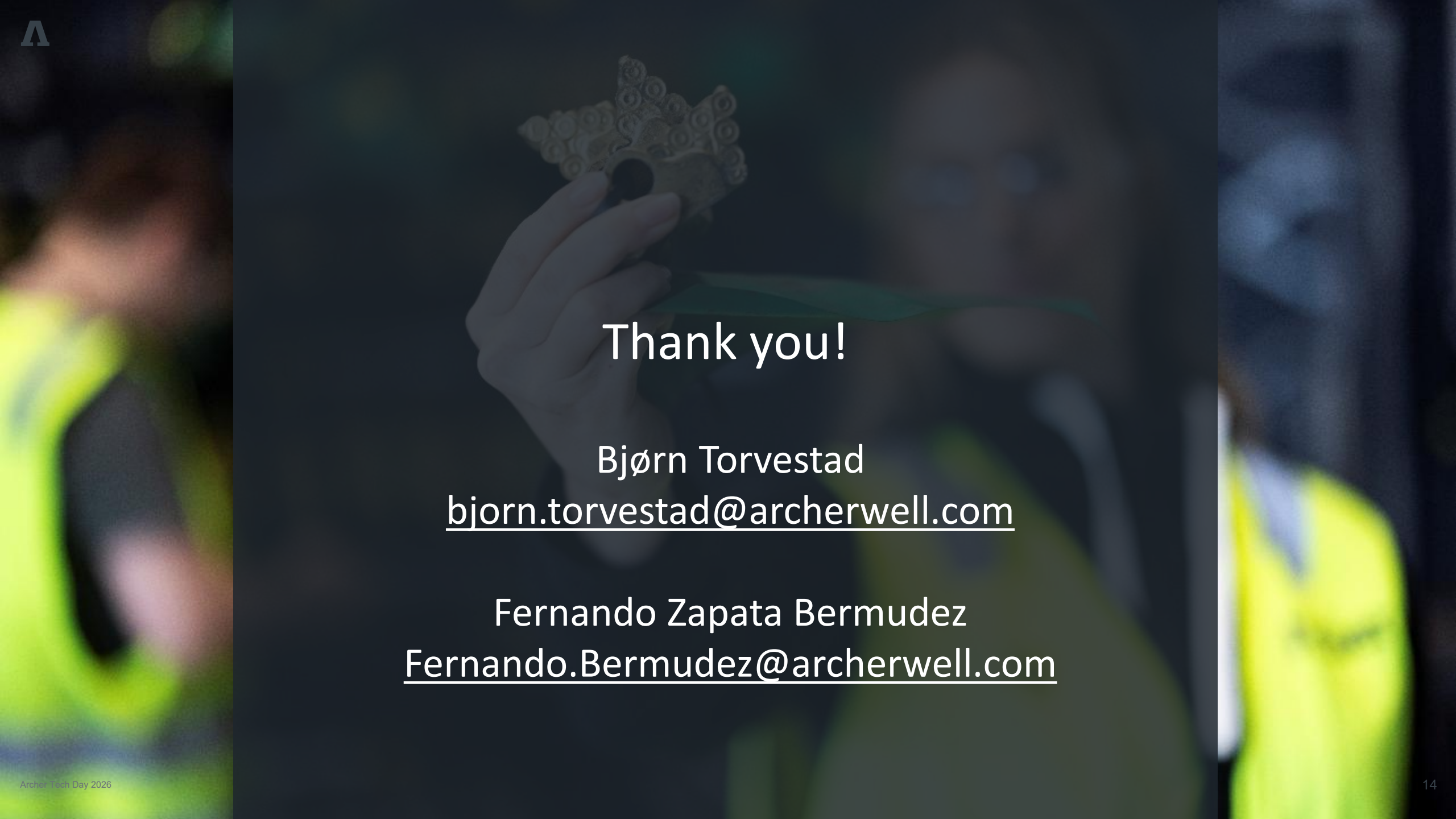
Tubing plug with
Repeaters/Boosters



Memory recording via
Slickline cable

Conclusions

- **P**erforating with Slot Charges - Ablation
  - Slot Size CFD simulation & test optimal for flow performance.
  - Flat pack ablation in multiple parts over 60 m interval
- **W**ashing settled barite
  - Single and dual annulus washing barite is possible.
  - High durability of rubber elements
- **C**ement Confidence in well barrier isolation
  - Visual cement fill in tubing, annulus and control line tubes
  - Cement hardness testing successfully done
  - Pressure test top and bottom of the test vessel
  - Raptor –Verification below Plug, pressure transmitted to surface over cemented interval



Thank you!

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