The P&A Innovation Program – an International R&D Collaboration

1. NORCE and P&A
2. P&A facilities
3. The P&A Innovation Program

Dave Gardner

04.06.2026

Brief history of P&A at NORCE

SFI 2011-19: DrillWell – Drilling and Well Centre for Improved Recovery

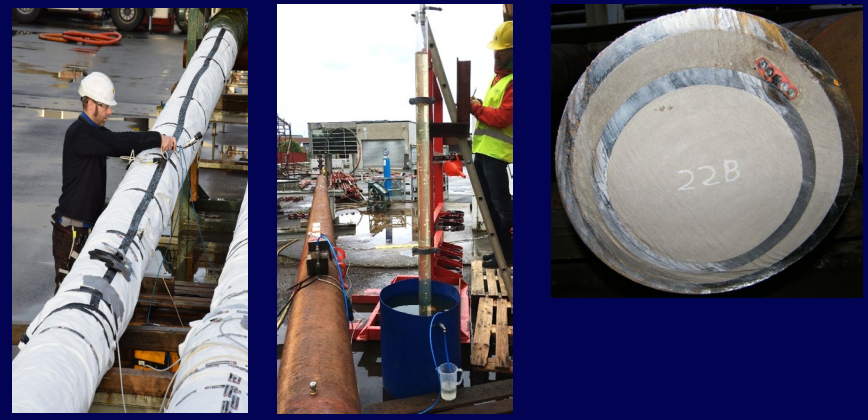
AkerBP, ConocoPhillips Norway, wintershall, equinor, SINTEF, University of Stavanger, The Research Council of Norway, NORCE, NTNU Norwegian University of Science and Technology, sfi Centre for Research-based Innovation

RCN Infrastructure 2019-24: NorPALabs Norwegian P&A Laboratories

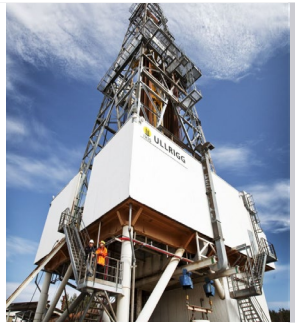
SFI 2020-28: Swipa

JIP 2018- : ***P&A Innovation Program***

Highlight: Tubing left in hole experiment



Current P&A Activities



Norwegian P&A Laboratories

The Research Council of Norway

SINTEF NORCE Universitetet i Stavanger NTNU

- CBL reference well U7
- P&A test well U8
- Full-scale Pressure & Leakage Testing Lab
- NORCE WP Manager; Dave Gardner

SFI SWIPA

swipa

The Research Council of Norway AkerBP equinor Harbour Energy vår energi

SINTEF NORCE IFE Institute for Energy Technology Universitetet i Stavanger NTNU

- Center for Research-Driven Innovation (SFI)
- Scientific understanding of permanent well barriers
- Improved well barrier design methodologies
- NORCE WP Manager; Erlend Randeberg

P&A Innovation Program

AkerBP ConocoPhillips Shell equinor

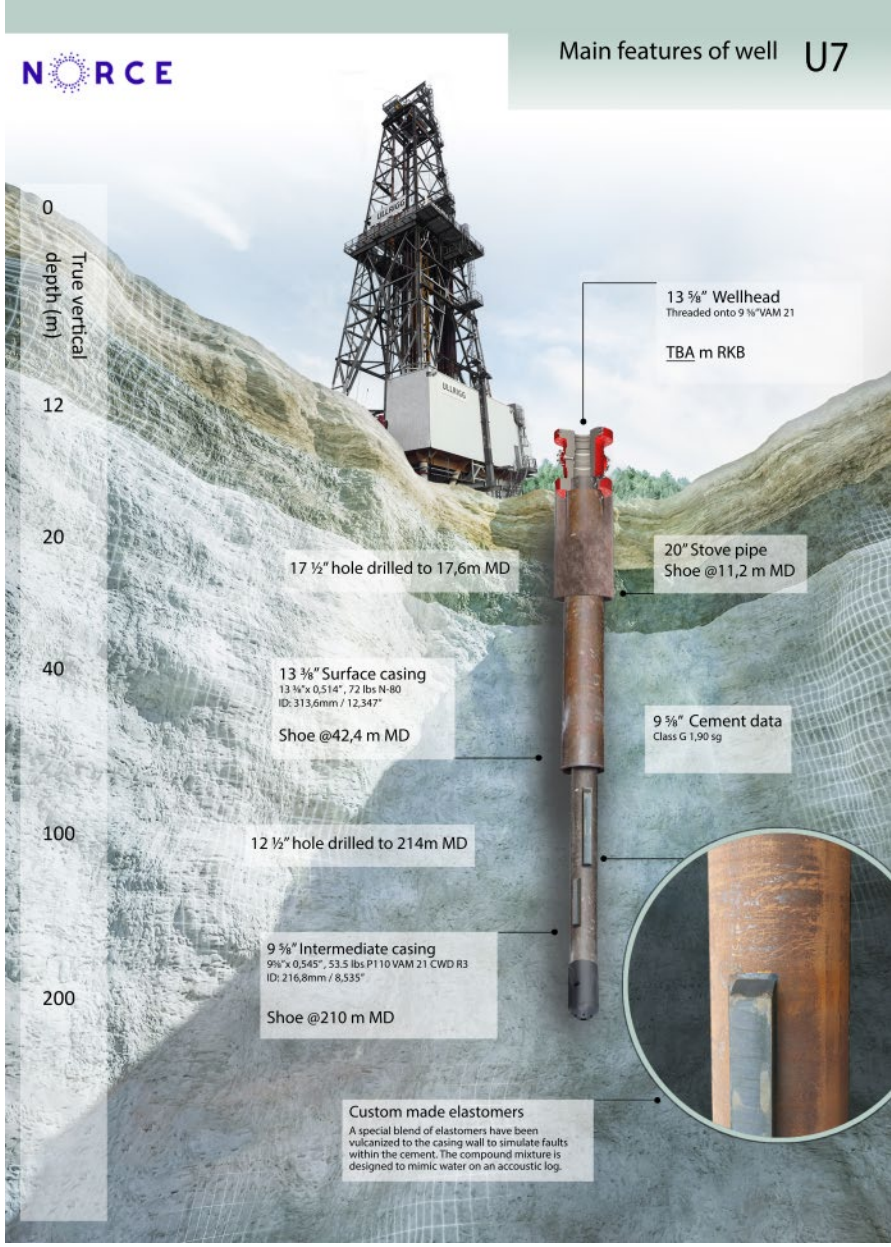
Havtil Norwegian Ocean Industry Authority PETROBRAS TotalEnergies

- JIP – 7 partners
- Applied Research
- Full-scale testing and verification
- Program manager; Erlend Randeberg
- Ph. I: 2018-2023, Ph. II: 2023-2026

U7 CBL Reference Well

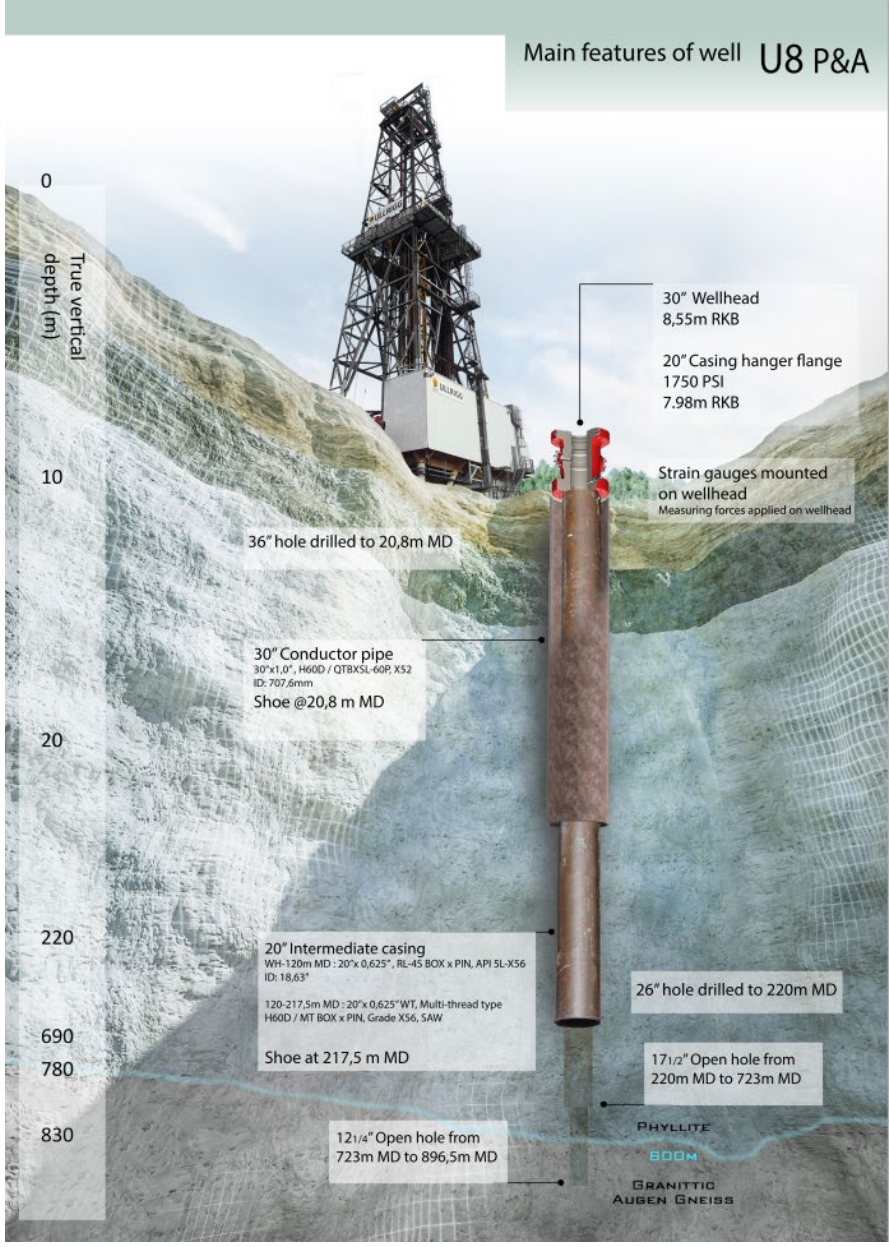
- Constructed in 2021, funded by Equinor
- Focus on through-tubing-logging verification
- 9 ⅝” casing is cemented with phantom "water channels"
- NZTC Cased Hole Logging Campaign – October 2025

SPE-208699; *Construction of a reference well to support the qualification of cement evaluation logging tools and data processing*



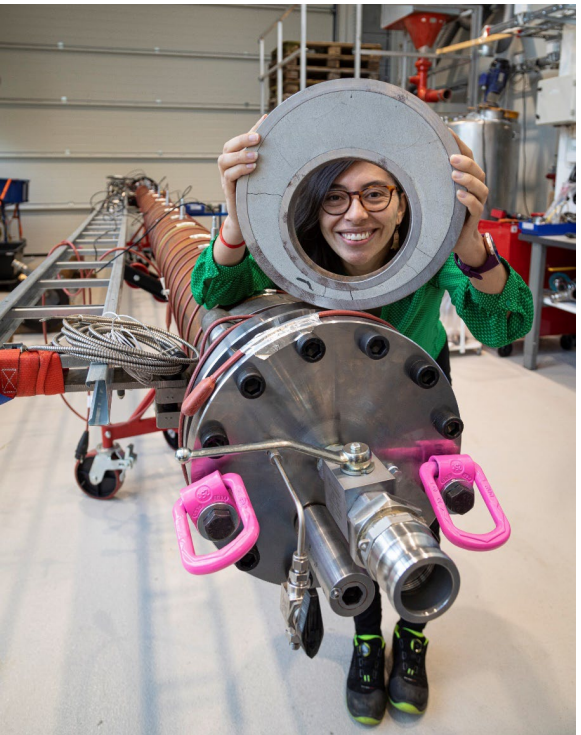
U8 P&A Test Well

- Dedicated P&A well, operating since 2020
- 20” casing to 217 m – retrievable
- 17 ½” openhole to 723 mMD
- 12 ¼” openhole to 896.5 mMD
- Wellhead, casing & tubing hangers
- Gas test from below; Well Barrier Test Sub
- Distributed temperature sensing (DTS)



Pressure and Leakage Testing lab

- Measure barrier material sealing performance under realistic conditions
- Full diameter, relevant length, vertical to horizontal
- Maintain downhole conditions for extended test intervals



- P&A plug testing (cement, geopolymer, bismuth..)
- Verify methods for treating leaking well barriers (Casing expander, resin, epoxy, ..)
- Experiments enabling Tubing Left in Hole
- Investigating downhole barrier verification methods

P&A Innovation Program

High TRL testing and validation:

- Wide industry involvement
- Proposals for projects/tests come from all partners
- Partner expert involvement; design through execution
- Sharing results – reported to Technical Committee
- Publications in scientific journals and SPE

Havtil Norwegian Ocean Industry Authority

AkerBP

ConocoPhillips

equinor

PETROBRAS

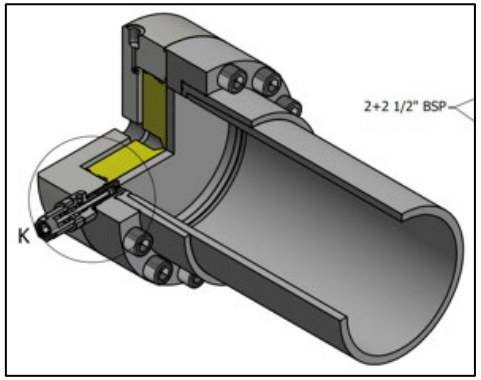
TotalEnergies

Phase I project summary (2018-2023)

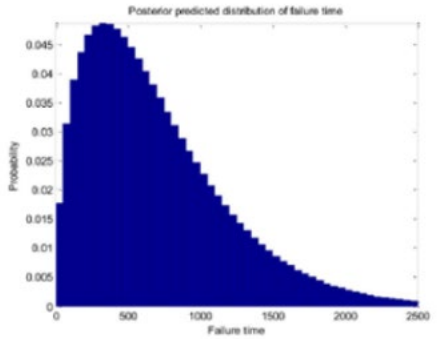
Valhall sandwich sections

Fluid migration modelling and treatment

Full-scale P&A test



Industry-standard risk acceptance criteria

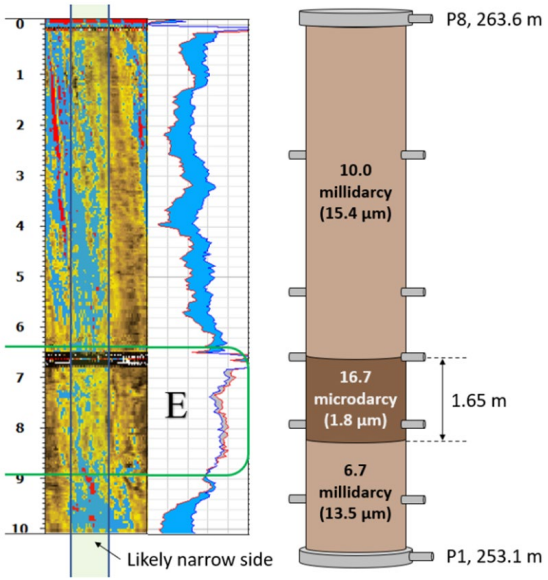


Rigless P&A Experiments

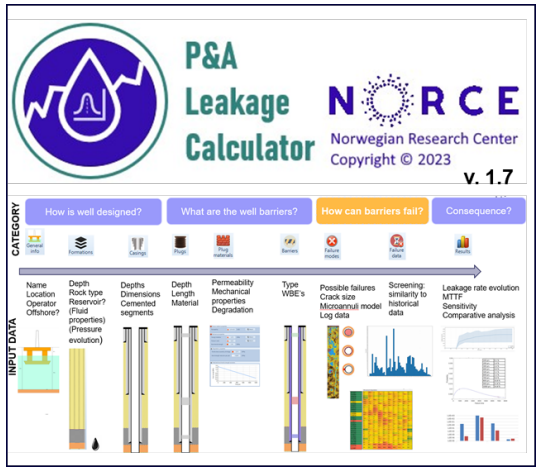
→32 publications and technical reports

Phase II project summary (2023-2026)

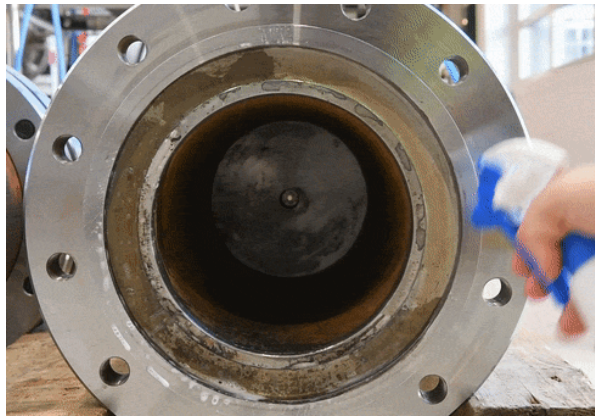
Stacked vs Continuous Barriers



P&A Leakage Calculator Phase II



Well Barrier Material & Seepage Treatment Testing



Rig-less Operations and Through-Tubing Abandonment

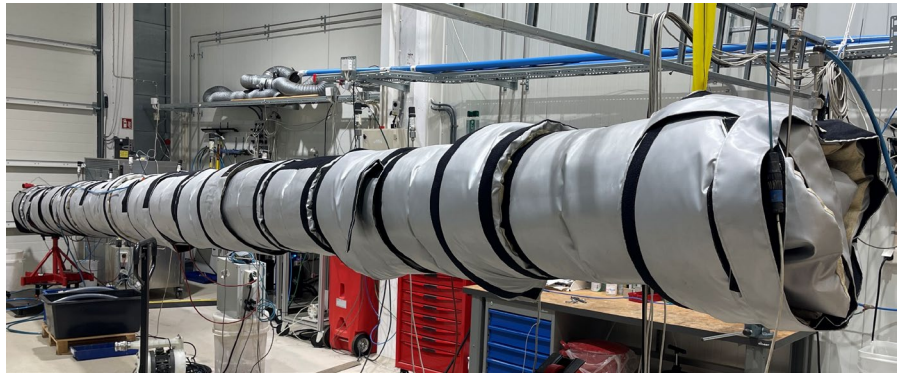
Well Barrier Material & Seepage Treatment Testing

WP1. P&A Plug Material Testing

Class G with 0%, 1.5%, 3% & 6% CEA

WP2. Fluid Migration Treatment Testing

1. SLB Nanosealant
2. Reaction-based from VitriTech
3. Resin-based from ExperWell



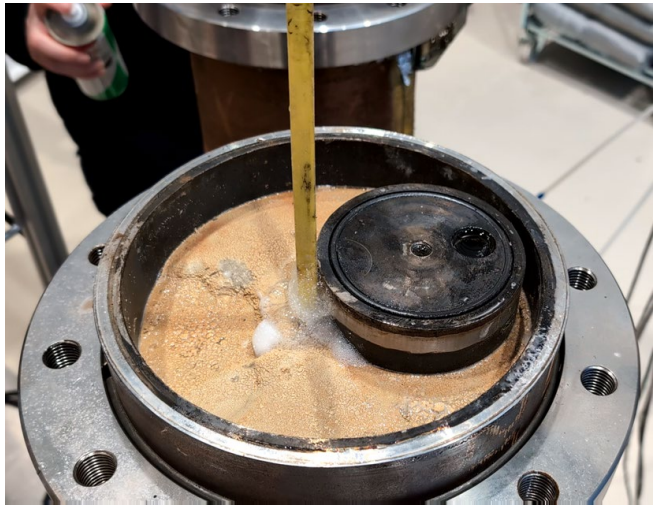
Large scale, resin placed using “Punch & Inject” Tool

WP3. Composite Barrier Material Testing

Annular cement integrity before, during and after setting a Bismuth alloy plug

Rig-less Operations & Through-Tubing Abandonment

- Local casing expander tested in dual annulus test vessels – conventional and HP operation
- TTA plug test with & without gauge cable – all seepage pathways individually tested
- Axter MTR and CAST SIT in tubing with gauge cable followed by TT cementing
- PWC benchmark test methodology developed and System Integration Test on CT tools



Axter by Aarbakke Innovation's Post

Axter by Aarbakke Innovation
918 followers
1mo

Axter success in Ullrigg SIT – Paving the way for Rigless P&A! We're pleased to share the successful completion of a System Integration Test (SIT) at Ullrigg (Norway), conducted in collaboration with TotalEnergies and the Plug & Abandonment (P&A) Innovation Program at NORCE.

Welltec
65,041 followers
1mo

Axter success in Ullrigg SIT – Paving the way for Rigless P&A! We're pleased to share the successful completion of a System Integration Test (SIT) at Ullrigg (Norway), conducted in collaboration with TotalEnergies and the Plug & Abandonment (P&A) Innovation Program at NORCE.

This test validated Axter technology and its Retrieve configuration, designed for the efficient removal of control lines and gauge cables during P&A operations. By integrating scanning, cutting, and retrieval of control lines into one toolstring, Axter drastically optimizes intervention — bringing the industry closer to rigless P&A.

Watch this space...

P&A Innovation Program Phase III (July 2026→)

Vår Energi have joined Phase III

Additional partners are welcome

Maintain strong user-involvement & ensure industry relevance

Publication of scientific achievements