

# Roadmap for New P&A Technologies

Move scope from Rig to Rigless



## Wellbore Diagnostics

- Wireline to verify access
- Further develop casing deformation models based on caliper data/sonic tools
  - Dual string logging
  - Slim (1-1,5") digital calipers

## Access to establish barriers

- Upwards milling CT
- Tubing /Casing erosion
- Further develop DP based cut and pull operations (Jack, Upwards milling, Perf and wash barite, Cut and pull assemblies)
- Remove casing in Dual string

## Establish barriers

- Alternative to cement
- Creeping shale
- Activate formation
- Material (steel, geopolymers, natural material)

## Verify barriers

- Develop new use of existing WL tools for barrier verification (listening tool etc.)

## Casing & Conductor removal

- Optimize tools and processes for casing / conductor removal
- Mechanical, abrasive, explosive or laser cut offline
- Retrieval with HLV/ jacking unit - offline
- Leave to be pulled with jacket
- Hydraulic pinning of conductor/csg

2022

2024

2026 +

- Access to wellbore data without entering wellbore
- Wellbore drone
- Sound waves/acoustics based WBD

- Pull tubing in open sea (LWI)
- Enhanced scale and debris milling/removal solutions
- High energy solutions (melt, burn & ablate)
- Ultra slim solutions to lift tubing to log/place barriers

- Termite plug
- Alternative materials
- chemical materials
- new cement type (magnetic)
- Handle control line/ leave tubing with control lines in hole

- Tracer gas
- Wireless sensor technology
- New WL tools for barrier verification

- Wellbore diagnostics without entering wellbore
- Sensors on WH to give SCP rate and source
- Analytical fluid verification for offshore disposal

- Enhanced electro chemical corrosion
- Further develop high energy solutions for optimized plugs / formation barriers

- Full Subsea Rigless PP&A
- Use of umbilical to handle downhole tools and placement of barriers - rigless
- Placement of barrier plugs in dual casing
- Improve fluids challenge to solve intermix viscosity

- Verification of dual casing barriers