



# HydraWell

**Developing a through-tubing, coiled tubing PWC tool with expandable nozzles for annular remediation.**

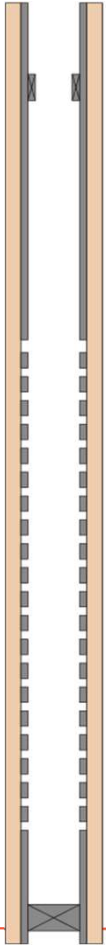
*Marcelo Jaculli, Technology Development Lead*



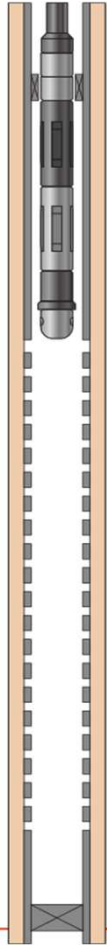
**POWERED BY INVENTION**

# Simplified procedure

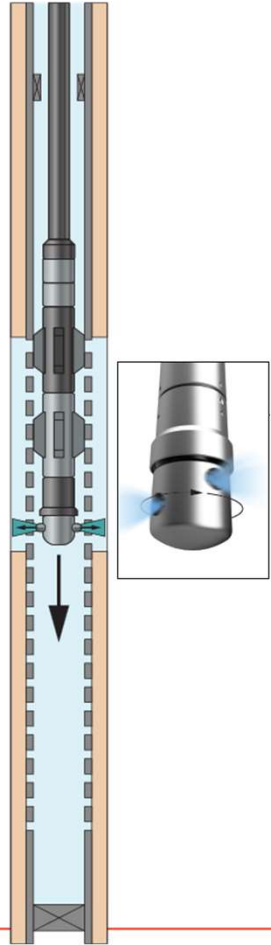
Perforate & Set  
inflatable plug



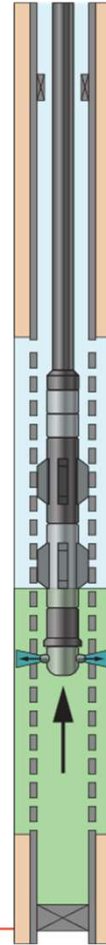
RIH



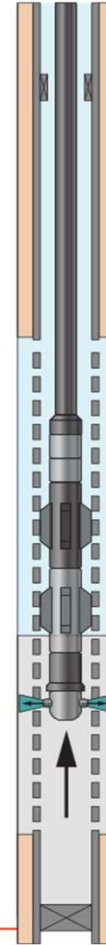
Perform necessary  
number of passes



Place spacer



Switch to cement  
nozzles and place  
cement

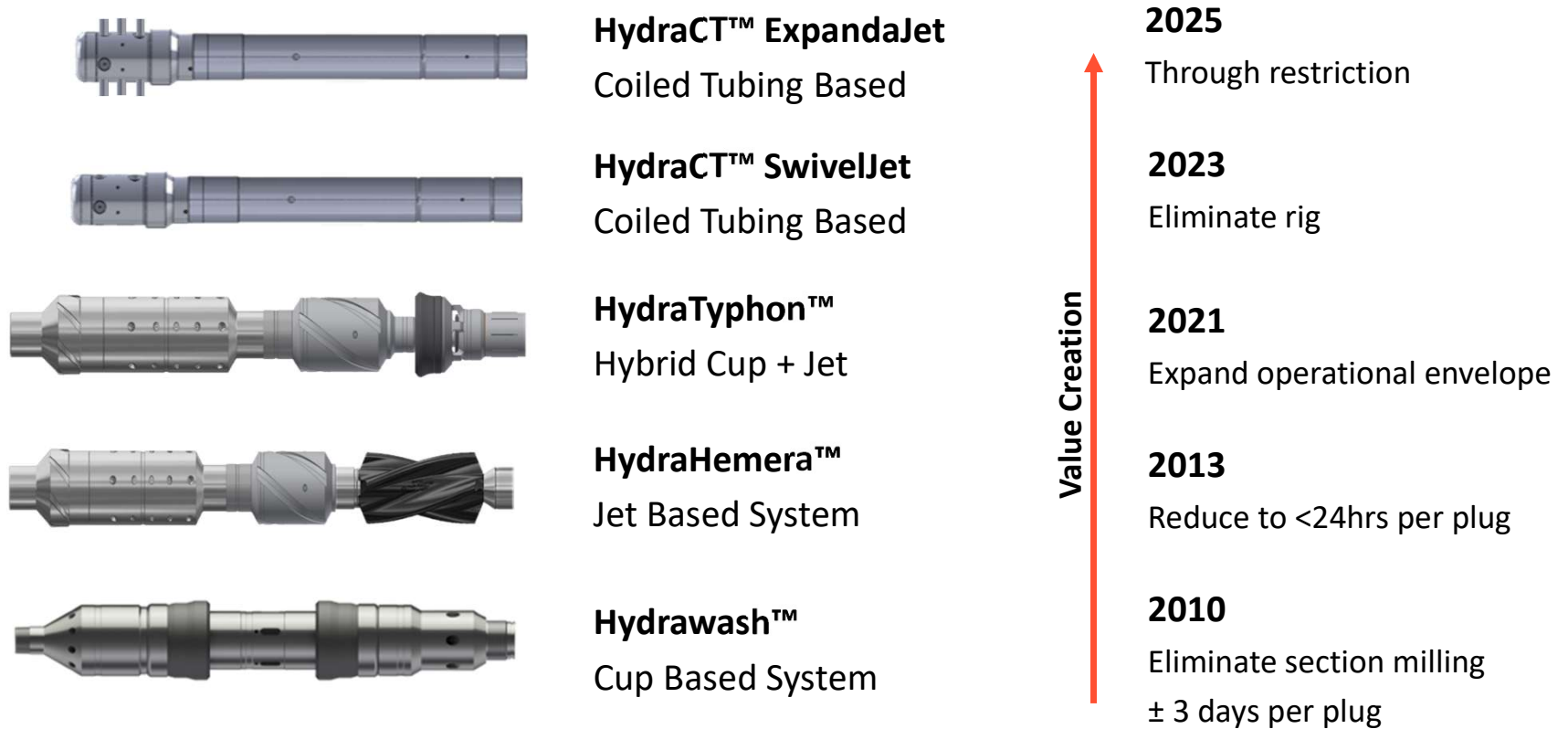


Retract nozzles &  
centralizers, and POOH



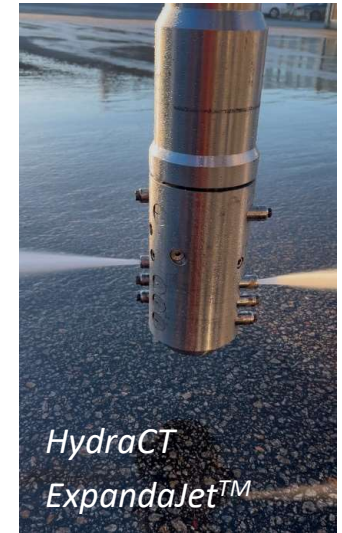
# How did we get here?

As responsible P&A innovators, our PWC<sup>®</sup> method for annular remediation has evolved over the years.



# HydraCT™ - Development timeline

## HydraCT SwivelJet™



HydraCT  
ExpandJet™

**2020-2021**

Early development

**2021**

Ullrigg SIT

**2022-2023**

Alaska campaign  
(12 plugs)

**2024**

Australia campaign  
(4 plugs)

**2023-2025**

Expandable  
nozzles

# Coiled Tubing PWC – HydraCT ExpandaJet



## Challenge:

P&A inside 9-5/8" casing through 5.62" restriction. Max tool OD 5.5"



## Building on the success of the HydraCT™ SwivelJet™

Evolving the technology to PWC through restrictions



# Testing at workshop – BHA functionality



Expandable wash nozzles



Expandable stabilizers

# Testing at workshop – barite/cement cleaning



**Barite with 6% cement**

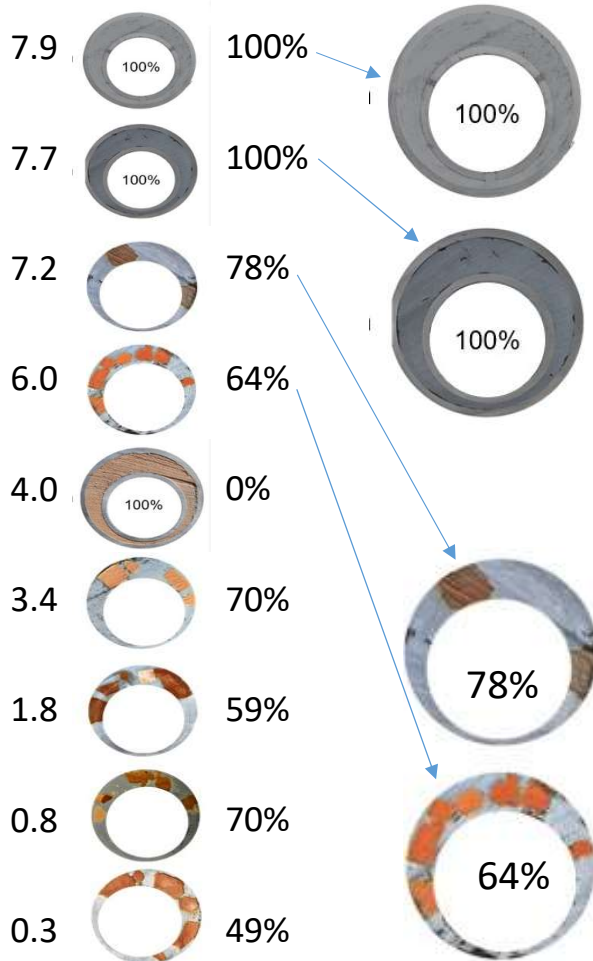
# Test at NORCE – System Integrity Test (SIT)

Execution all according to plan



# Test at NORCE – System Integrity Test (SIT)

## Cement content in various slices



## Barite with 6% cement

Hard cement



Some barite lumps remain from the washing operation

Fully cemented in clean areas

## Tool Functionality

- Tool working as expected

## Washing

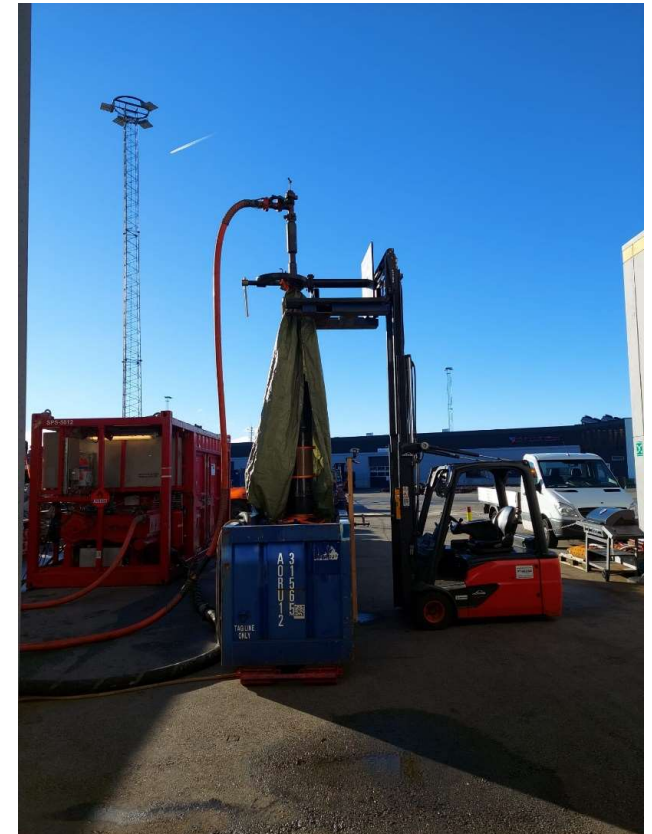
- Tough barite/cement composition
- Limited access to high side through small perfs
- 100% clean in the upper ~0.5m
- ~70% clean in lower ~7.5m
- Remaining barite lumps primarily located on high side

## Cementing

- Excellent cement placement in all clean areas

## Second barite wash test at the workshop

- Casing fixture now with **doubled perforations** (18x2 = **36 SPF**)
  - Still retaining the worst-case decentralized gun scenario (larger holes on low side, smaller holes on high side)
  - Same barite mixture used in the first test (6% cement)
- Great test execution without any incidents
  - 1 ft/min, 950 l/min
- 100% clean of barite in the interval tested after **only 2 passes**
  - **Significant improvement** over the first test with single perforations (18 SPF)
  - Also shows that the **small hole size** with a decentralized gun is **not an issue** if there are enough holes
  - Holes were pre-drilled, not shot (shooting breaks down barite even further)



## Second barite wash test at the workshop



After 1st pass



Clean after 2nd pass



Downwards and upwards  
annulus views



Video from the test

- **Functional tool that works through restrictions**
  - 5.5" OD to PWC 9-5/8" casing through 5.62" restriction
  - Great performance with a higher SPF (18 -> 36), despite a worst-case scenario gun decentralization
  - Other scenarios can be investigated.
- Unfortunately, the intended **field trial** was canceled (a cement barrier was found in place)
  - Looking forward to deploying the tool in a field trial!



**Thanks!**

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