



GO RADICAL P&A

DRIVING RADICAL CHANGE IN OIL&GAS WELL PLUGGING

2023 PAF P&A Seminar

Tim Croucher – GRaPA Project Manager

“Fit for purpose rig-less P&A units and scaling”

Primary Project Goals

Go Radical P&A, an initiative organized under ETN, is a project with the fundamental goal of delivering radically new technical solutions enabling a step change reduction (>50%) in the environmental footprint and cost to perform the plugging and abandonment of oil and gas wells, while ensuring the prevention of longer-term leakage from abandoned wells.

Primary Project Deliverable

A radical new solution for Oil and Gas well P&A supported by a portfolio of enabling technical development projects

~~Never~~

~~Impossible~~

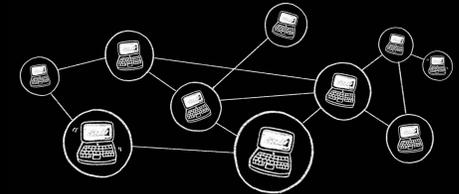
- How can we as an industry solve the future challenges and assignments within the P&A space?
- How can we learn from each other and ensure that we as an industry are able to execute at a lower cost and at the same time maintain a high safety record with zero incidents and minimal environmental impact?
- How can the introduction of new technology help us in achieving these goals?
- Are we actually entering into a radical switch with respect to how we execute future operations and at the same time achieve our goals as an industry?
- How can the governmental bodies assist us in this journey?



50% improvement in \$/Co2 can only be achieved by removing the traditional / big rigs from the equation!

GRaPA Core Focus – **Work Pack #1:**

Deliver radical downhole solutions allowing rig-less P&A

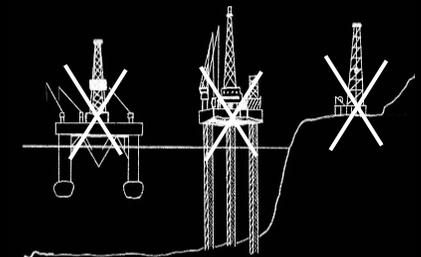


Necessary Projects:

Work Pack #2: Deliver a fit for purpose risk-based P&A design / verification process allowing delivery of new radical solutions



Work Pack #3: Prove the feasibility of small footprint P&A surface units to allow lower cost field testing / qualification / application of radical P&A solutions



Define the challenge statements – “The wheel of fortune”

GRaPA has developed a model to identify missing solutions that could enable delivery of a step change reduction in P&A cost and environmental footprint

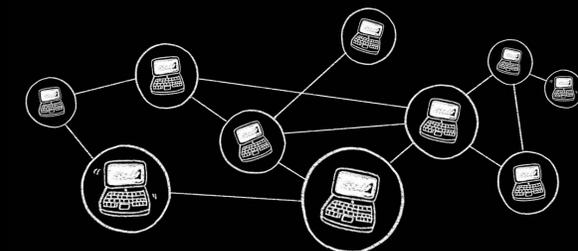
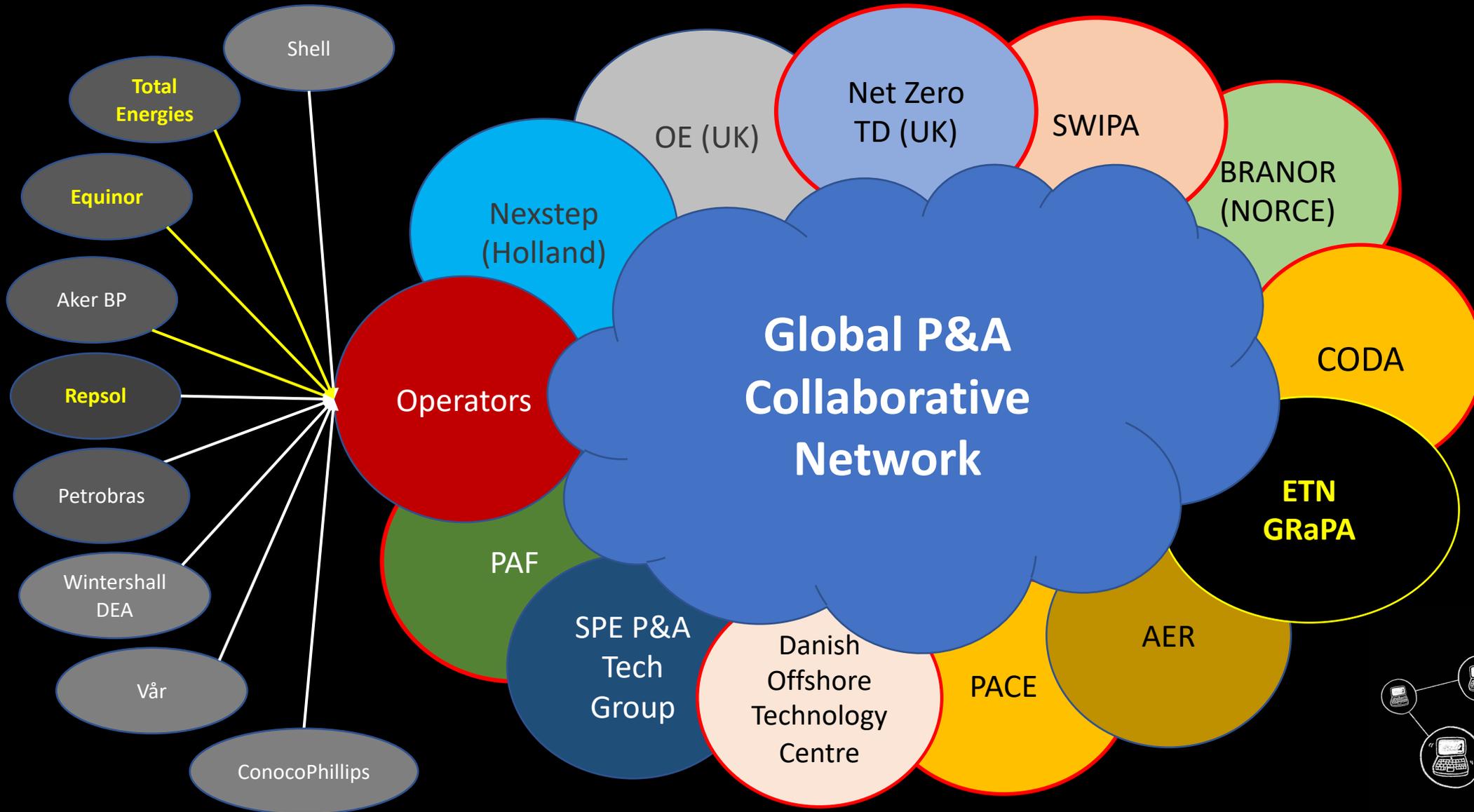
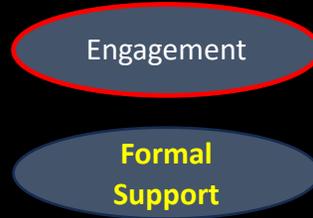




Global P&A Tech Development Initiatives



Work Pack #1: Delivery of necessary technical solutions - a global collaboration of like-minded P&A Technology development organizations



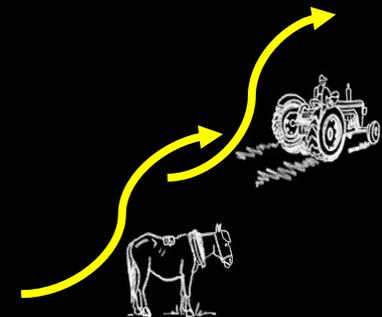


Focus Area #1- Deliver Radical P&A Solutions



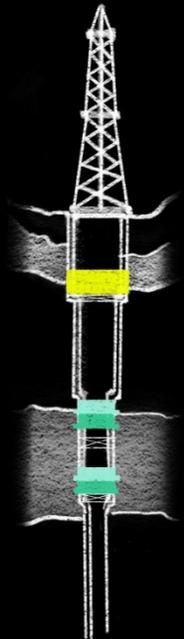
Ongoing Initiative – Partnering with the DOTC (Danish Offshore Technology Centre) joining the “2023-2024 Radical Innovation Sprint” process

- Supported by Equinor and Repsol, GRaPA has submitted a “Radical P&A Solution Challenge” to the 2023/2024 Radical Innovation Sprint program
 - Clear opportunity for involvement of other operators
- GRaPA has taken advantage of DOTC’s extensive network of diverse Research and Development organizations to source Radical P&A R&D project opportunities
- Evaluate proposed Radical P&A solution research projects for funding via the GRaPA network (Nov/ Dec 2023)
- Execute “de-risking” research projects and deliver radical solution development opportunities (Q1/Q2 2024). Project results will be presented in May 2024.



Necessary balance - Technical Solutions vs Methodology

- Align P&A Project planning with all other O&G Operational projects – access project specific risk
- Move from generic NORSOK D-010 standard to Well Specific Risk-Based Design

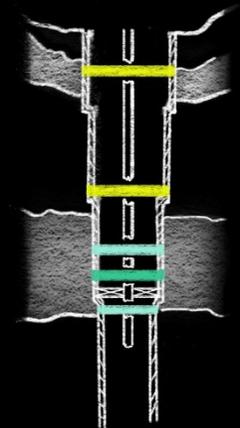


NORSOK Compliant P&A

- Remove tubing
- Perform necessary wellbore diagnostics
- Clean out well to P&A depth
- Remove casing / old cement as necessary
- Place long / duplicate cement barriers (via work string)
- Verify plug integrity

Rig-less / Radical Solution P&A

- Perform necessary wellbore diagnostic through tubing
- Create necessary barrier spaces (pump / coil / wireline)
- Place multiple hybrid barriers (pump / coil / wireline)
- Verify plug integrity



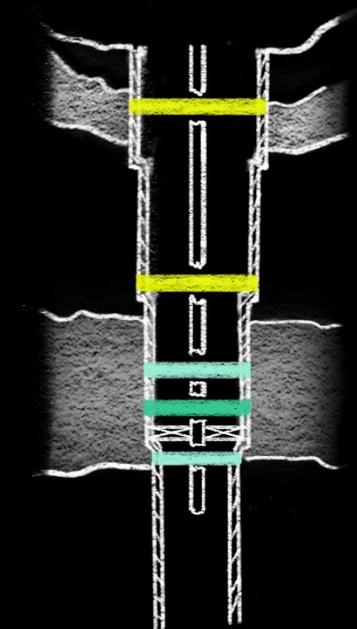
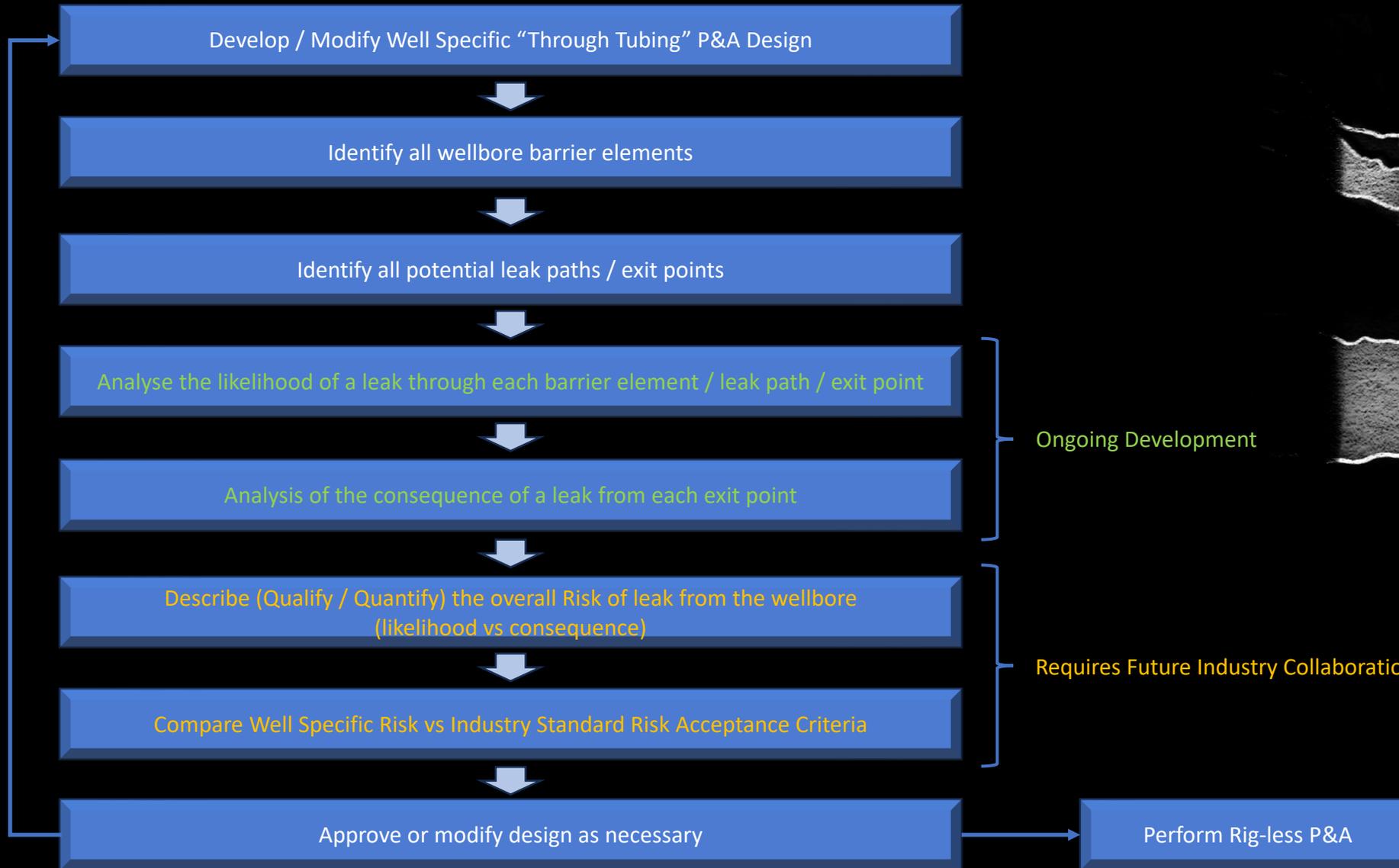
Deliverables:

1. Industry Standard Process and Tools to perform P&A Design Risk Assessment
2. Industry Standard P&A Risk Acceptance Criteria



Work Pack #2 – Create a well specific risk-based P&A design process

Develop and Deliver Industry Standard Risk Assessment Process / Industry Standard Acceptance Criteria:



Ongoing Development

Requires Future Industry Collaboration / Alignment



Phased Approach to Rig-less Solution:

1. Small “P&A Unit” to pull tubing + Phase 1 P&A / Big Rig for Phase 2&3 P&A
2. Small P&A Unit full P&A scope
3. Full Rig-less P&A

Why is Radical Change Taking So Long?

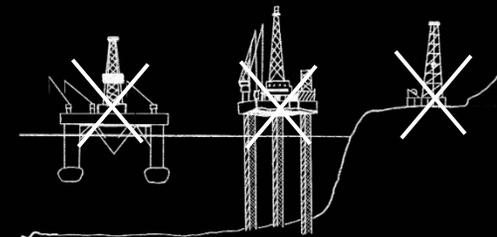
Over the last 25 years,
the industry has gone in the wrong direction?



Current P&A design methodology does not allow use of more radical downhole solutions which would **enable** small P&A Unit / Rig-less P&A

- Small Footprint / Low Weight Surface Unit
- Easy Build / Modularized / Limited Lifts
- Self-Contained / Low POB
- Necessary Functionality / Spec
- Fully Norwegian Regulatory Compliant

GRaPA is building a proposal for a fully scoped / funded comparative feasibility study to evaluate the capability of multiple new concept surface units on multiple platform P&A scenarios



- To succeed, the industry will need to raise the bar on **funding / resource support** for P&A initiatives. Potential for 50% public funding support thereby reducing the burden on the industry.
- There is a clear need for **alternative P&A design methodology** to enable technology necessary to deliver Rig-Less P&A to save cost and minimize environmental impact. **This will require involvement and alignment of the majority of Norwegian Operators.**
- There are multiple like-minded organizations across the globe with similar goals of radical change in P&A. They must **work together to succeed in delivering radical change.**

