

# **Society for Underwater Technology Middle East Branch**

## **Emergency Pipeline Repair Systems (EPRS)**

An overview of the tools and methods available for the  
on-bottom repair of rigid pipelines

**Tuesday 13 December 2022**

09:00 - 15:30 at Khalifa University, SAN Campus and  
Dolphin Energy KIZAD



**Presenter: Mr. Angus Bowie, Middle East Regional Director – STATS Group**



**STATS GROUP**  
Managing Pressure, Minimising Risk

**EPRS (Emergency Pipeline Repair System)  
Intervention Isolation Technology Developed**

**Angus Bowie**  
Director, Middle East & APAC



# Managing Pressure, Minimising Risk



**Market leaders in the supply of pressurised pipeline isolation, hot tapping and plugging services to the global energy industry. DNV type approved isolation tools provide leak-tight double block and bleed isolation that enables safe and efficient maintenance and repair of onshore, topsides and subsea pipeline infrastructure.**

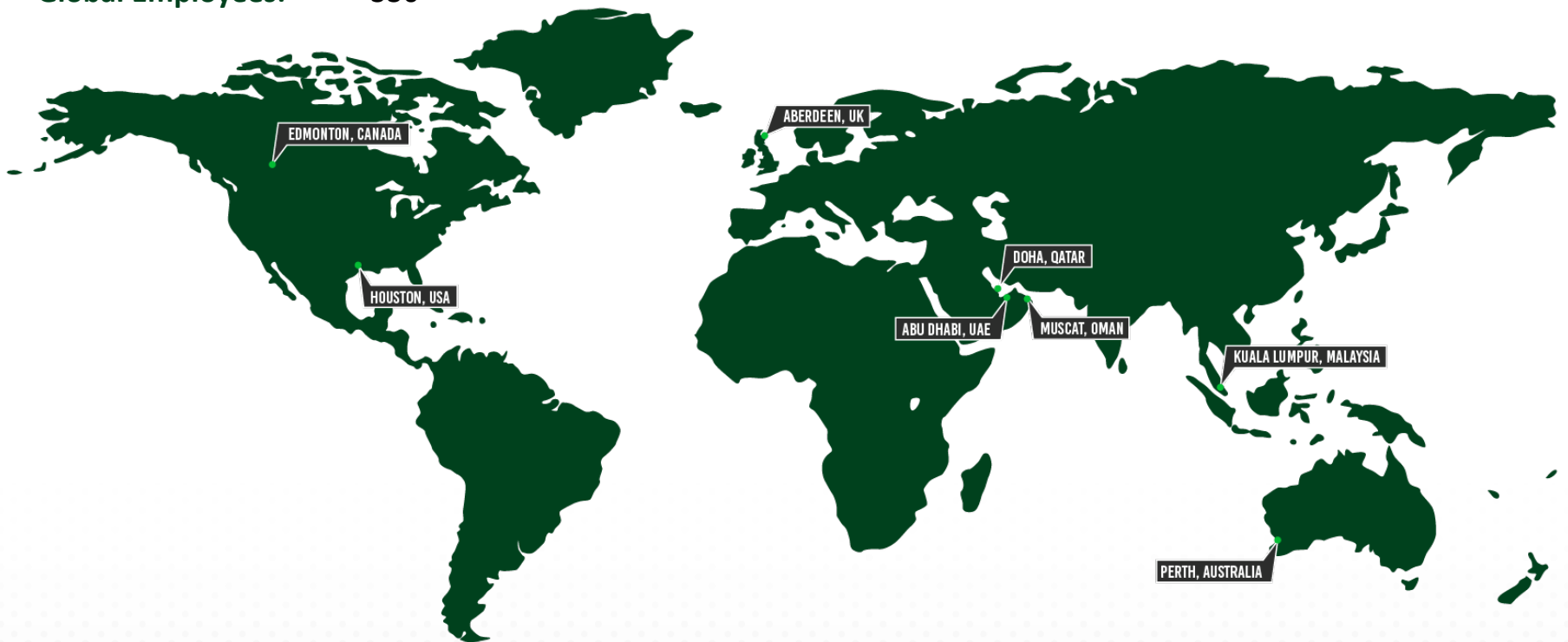
# Overview



**Operational Bases:** Aberdeen, UK - Abu Dhabi, UAE - Doha, Qatar - Edmonton, Canada  
Houston, USA - Muscat, Oman - Kuala Lumpur, Malaysia – Perth, Australia

**Design Houses:** Aberdeen, Abu Dhabi, Houston

**Global Employees:** 330



**Aberdeen | Abu Dhabi | Doha | Edmonton | Houston | Muscat | Kuala Lumpur | Perth**



## 1. Small Dent – no breach – Piggable

- ❖ Normal repair is to assess the damage and apply an external repair clamp to reinforce the pipe. This can be a single seal encapsulation clamp as it can be pressure tested against the pipe.
- ❖ Option for back to back Tecno-plugs to isolate to facilitate removing the damaged section.

## 2. Small Breach – Piggable

- ❖ First action is to reduce pipeline pressure to either just above or just below the sea-bed to prevent erosion to a large leak and to minimise pollution / water ingress into pipe.
- ❖ If possible fit a repair clamp over the breach. This needs to be dual seal so the installation can be tested and preferably full structural
- ❖ Option for isolation with plugs or BISEP to minimise exposure and facilitate repair

## 3. Large Dent – no breach – not Piggable

- ❖ Pipeline will be de-rated to damaged section capability pending repair. Often shut in
- ❖ See below in presentation – EPRS plugs and BISEPs can be utilised to facilitate repair.



## 4. Large Breach / severed line

1. In this scenario, the pipeline is out of action, pipeline contents lost to sea and pipeline partially flooded. Note: flooding will be limited to the height of the pipe.

### 2. Options here include:

- ❖ Local intervention to cut pipe, attach a connector with valve, pig from shore to clean pipe, Install local isolation plug and affect repair
- ❖ Pig plugs from shore with cleaning pigs and set close to pipe end then cut and effect repair
- ❖ Flood pipe fully and affect repair
- ❖ Use clamps and BISEP past the flooded section to allow repair without having to empty the pipe of product. Option for bypass to be added here to resume production while the repair is executed.

## 5. Leaking or Damaged Fitting

This could be a subsea flange, Valve Wye, check valve or leaking repair clamp.

Normal operation would be to utilise EPRS plugs to isolate for repair to minimise fittings remaining on the pipe.

# EPRS Systems



Historical EPRS systems based primarily on subsea pipeline applications

These comprise:

- ❖ Mechanical connectors
- ❖ Clamps
- ❖ Pipeline handling equipment
- ❖ Isolation Plugs
- ❖ **Hot Tap clamps and BISEPs**
- ❖ Cutting and concrete removal
- ❖ Welding habitats
- ❖ PLR (Temporary Pigging Launcher / receiver)

These systems are based on minimising a subsea intervention campaign

They require a significant investment in engineering and tooling

Land based pipelines are not covered

Typical mobilisation still 3 weeks

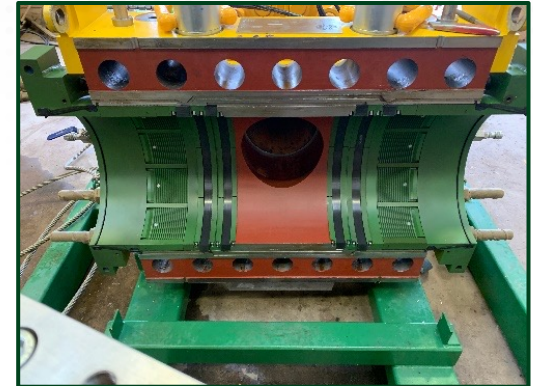


# Hot Tap Clamps

## Dual Seal / Structural Design

These are generally supplied by subsea equipment manufacturers:

- ❖ STATS Group
  - ❖ Oceaneering
  - ❖ Oil States
- 
- ❖ These clamps are generally forged construction for subsea applications
  - ❖ STATS offer dual seal along the split line and at each end allow full assemble pressure to be applied, with no pipeline pressure during application
  - ❖ Supplied with structural locks to reinforce the pipe axially as well as replacing the hoop and pressure integrity.
  - ❖ Compression flange for setting seals and locks to be compliant to poorer pipe condition
  - ❖ Hot tap penetration
  - ❖ Made to order for EPRS system or specific application





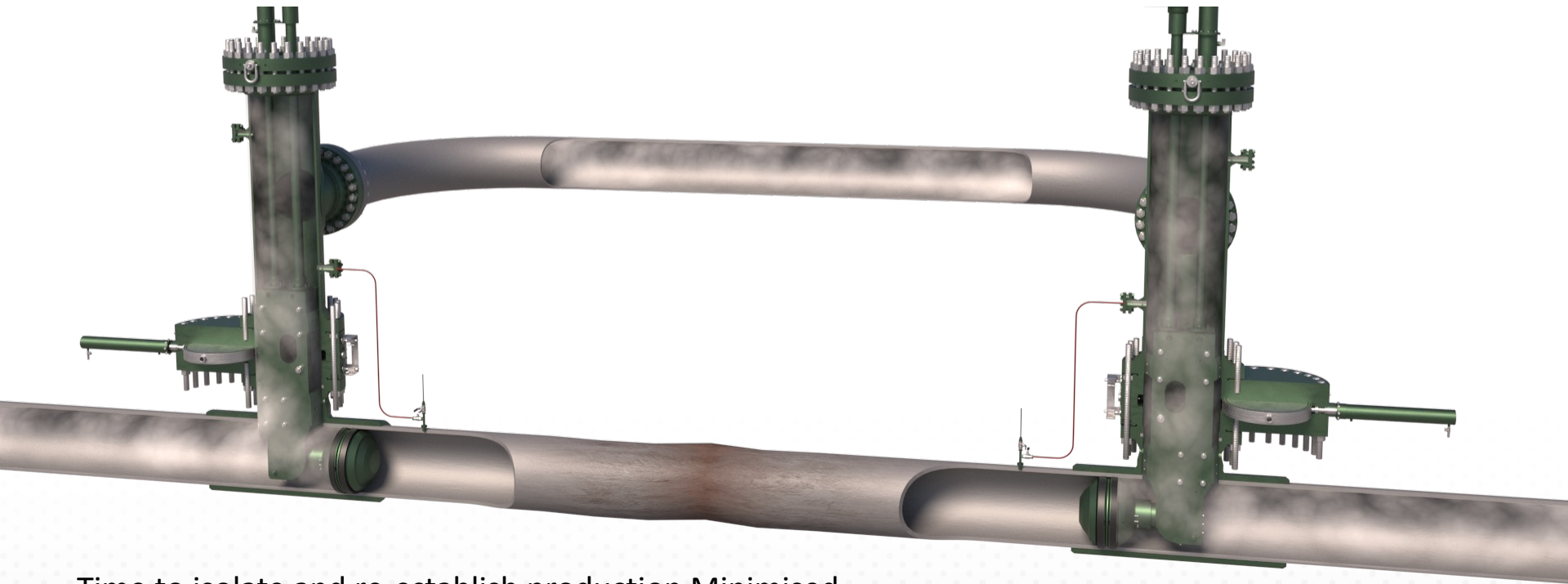


# Emergency Pipeline Repair Isolation - Benefits

STATS proposal for land based EPRS (also suitable for Subsea)

Safer worksite / Reduced inventory losses

Minimal discharge to environment



Time to isolate and re-establish production Minimised

**Pipeline's "Out of Service" period is minimised**

# Double Block Isolation Tools For Unpiggable Pipeline Defects



**BISEP®**  
Branch Installed Self Energised Plug

**Remote Tecno Plug®**



# BISEP® Tools - Mechanical Clamp



When a defect is noticed on a pipeline confirming pipeline piggability is not always viable and would always take time and delay the intervention. Using a hot tap intervention close to the defect removes this process.

In this situation, a damaged section of pipeline can still be removed safely without having to depressurise and flood / drain the entire line, by using double block and bleed Isolation tools that can be installed into a pipeline via a single full bore hot tap penetration

Seen below is a mechanical clamp used as oppose to the conventional split TEE fitting.



This removes the challenges faced with welded split Tee Fittings:

- ❖ Hot work potentially in an explosive environment
- ❖ Required flow conditions to control heat input
- ❖ Long lead on fittings which are often specific to each pipe
- ❖ Weld procedure and welded qualification
- ❖ Overall time spent welding the split tee to the pipe

# Animation



- ❖ Can be deployed quickly to minimise any pipeline breach
- ❖ Hot tap deployed double block and bleed isolation tool
- ❖ Revolutionising market – technology significantly advanced in comparison to the competition
- ❖ Sealing technology based on Tecno Plug sealing; extensive track record
- ❖ Back pressure capability for pressure testing reinstated pipework
- ❖ Fail-safe, self-energised sealing (Leak-tight)
- ❖ Deployed upstream of fitting; vent and purge operations can be performed through launcher
- ❖ Full monitoring capability during isolation



# Double Block Test Sequence

## Secondary Seal Integrity Test

- ❖ Pressure locked in the annulus
- ❖ Pressure behind vented,

Secondary seal tested with:

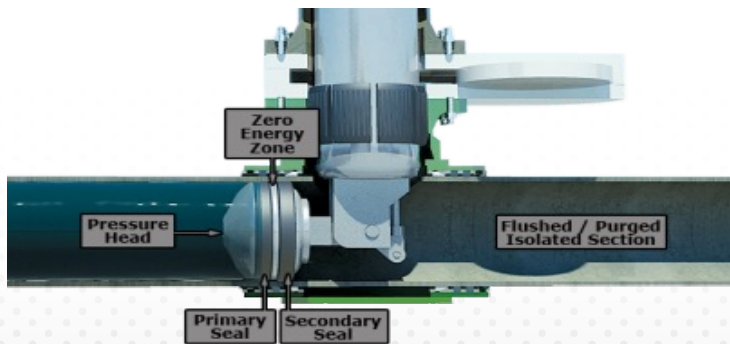
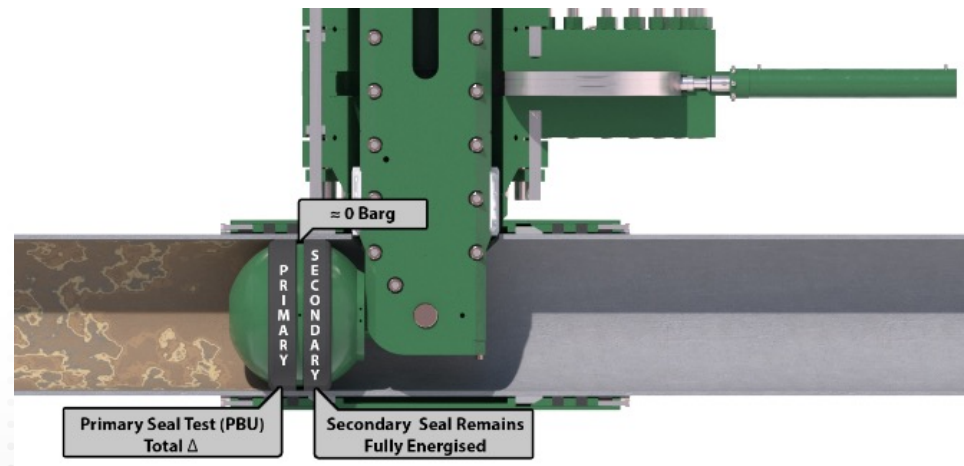
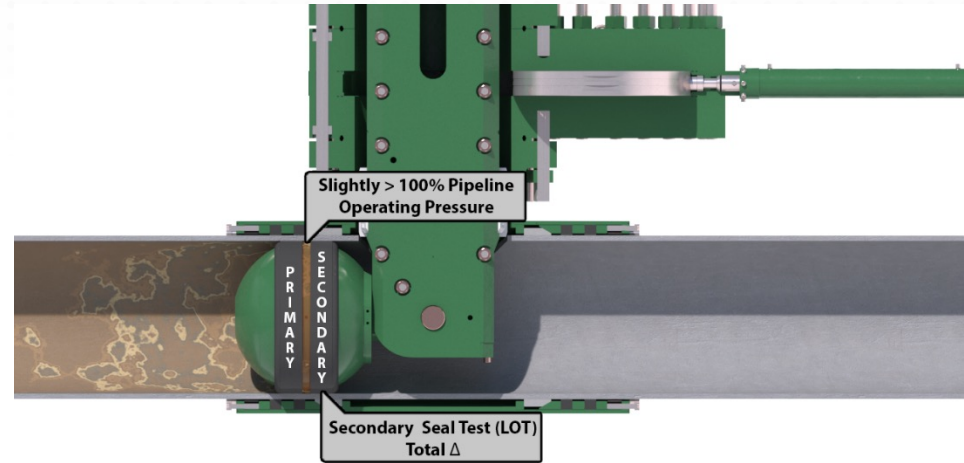
- ❖ Full differential pressure in correct direction

## Primary Seal Integrity Test

- ❖ Pipeline pressure in front
- ❖ Annulus pressure vented

Primary seal tested with:

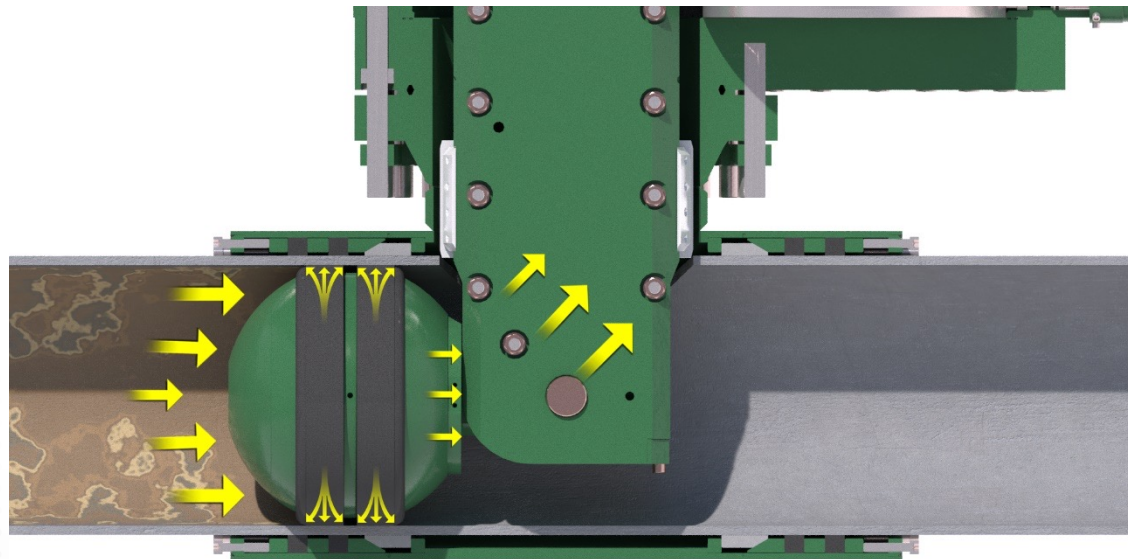
- ❖ Full differential pressure in correct direction





# Fail-Safe Isolation: Self-Energisation

- ❖ Pipeline differential pressure across BISEP activates seals independent of hydraulics
- ❖ Hydraulic set pressure ensure two independent activation mechanisms
- ❖ Seal support head bears on two solid clevis arms, each one capable of taking the full load (100% contingency)
- ❖ Clevis arms are axially retained by the hot tap penetration and fitting



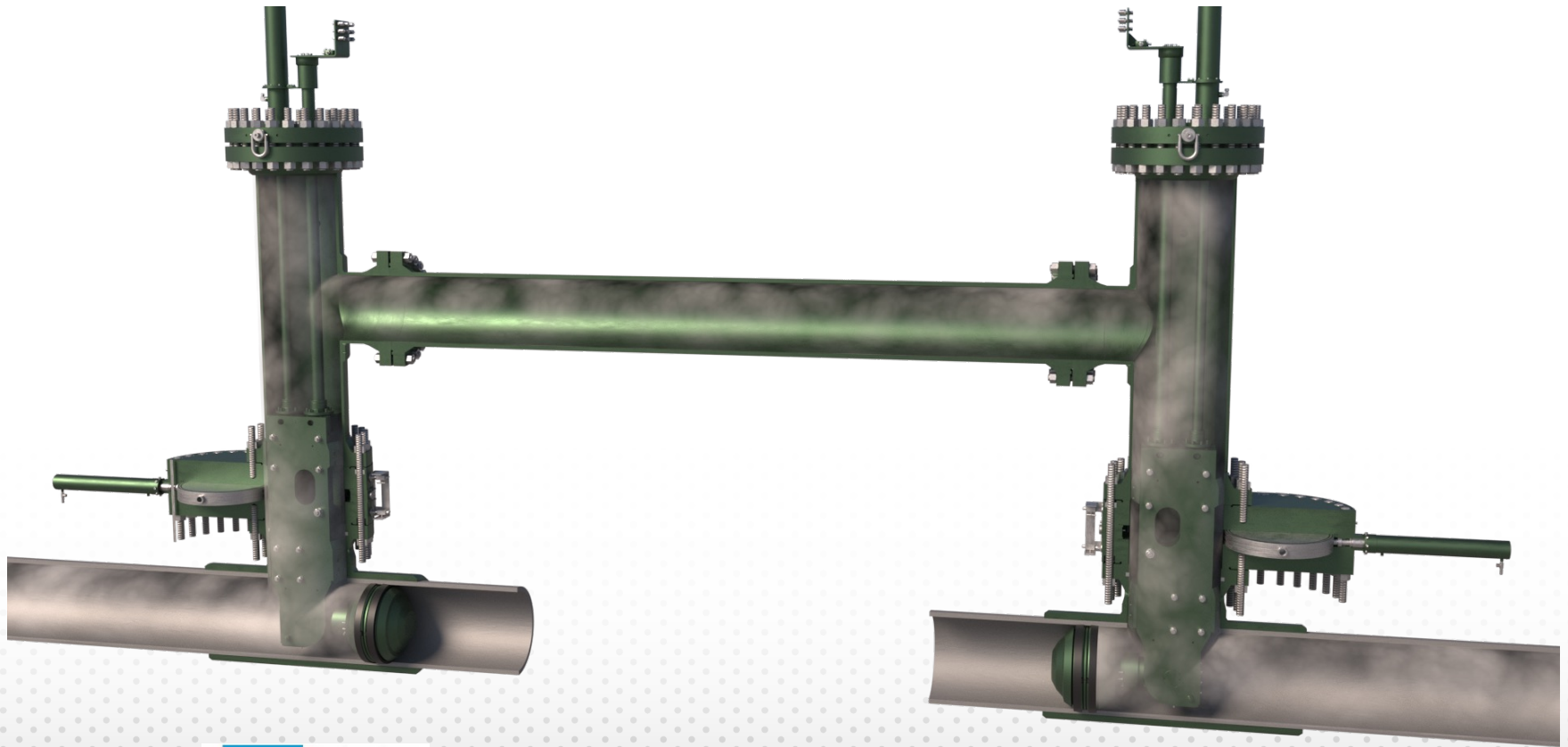
**BISEP Self-Energisation**

# Downstream BISEP®



Downstream BISEP is an alternate deployment option whereby the spherical head is rotated away from pressure source toward isolated section creating the bypass flow through the fitting branch.

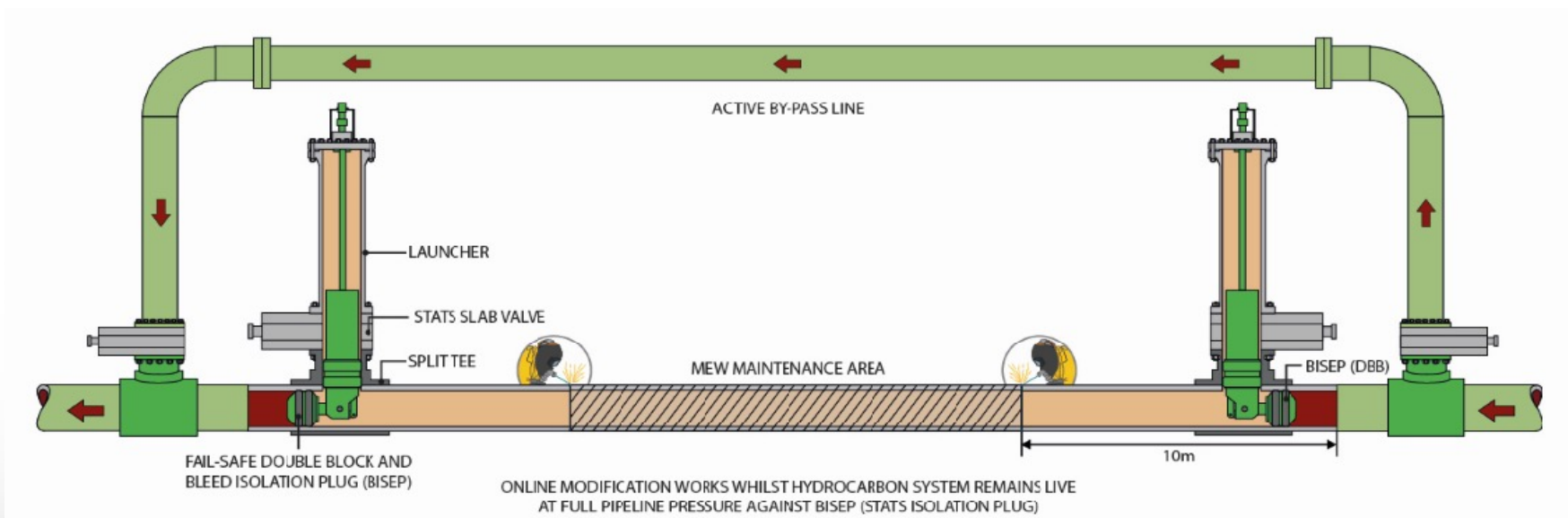
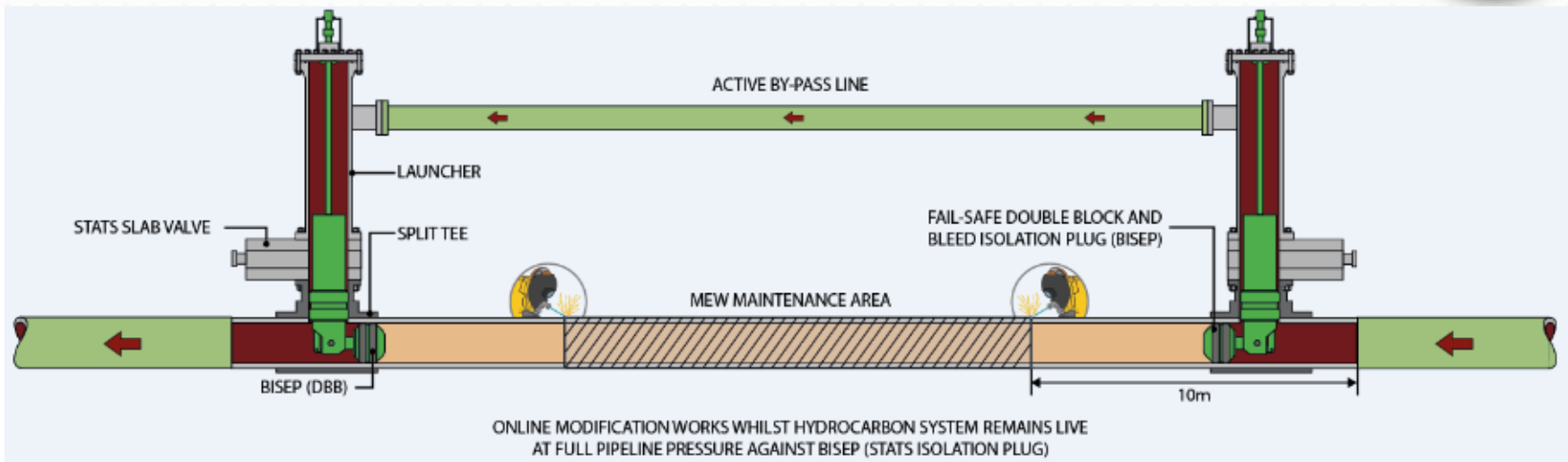
50% less fittings than BISEP option and 75% less than conventional hot tap and stopple methods







# Downstream Vs Conventional Bypass





**Thank You For Your Attention  
Questions?**



**for more information visit  
[www.statsgroup.com](http://www.statsgroup.com)**