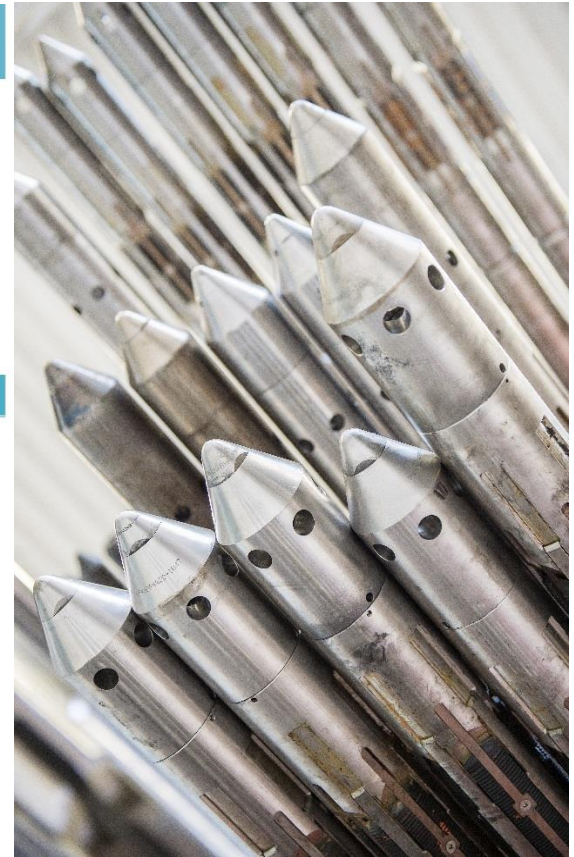


Serving
Every
Well

**Interwell Anchored Production Straddle (APS) for Gas Lift in
the North Sea (A Case Study)**

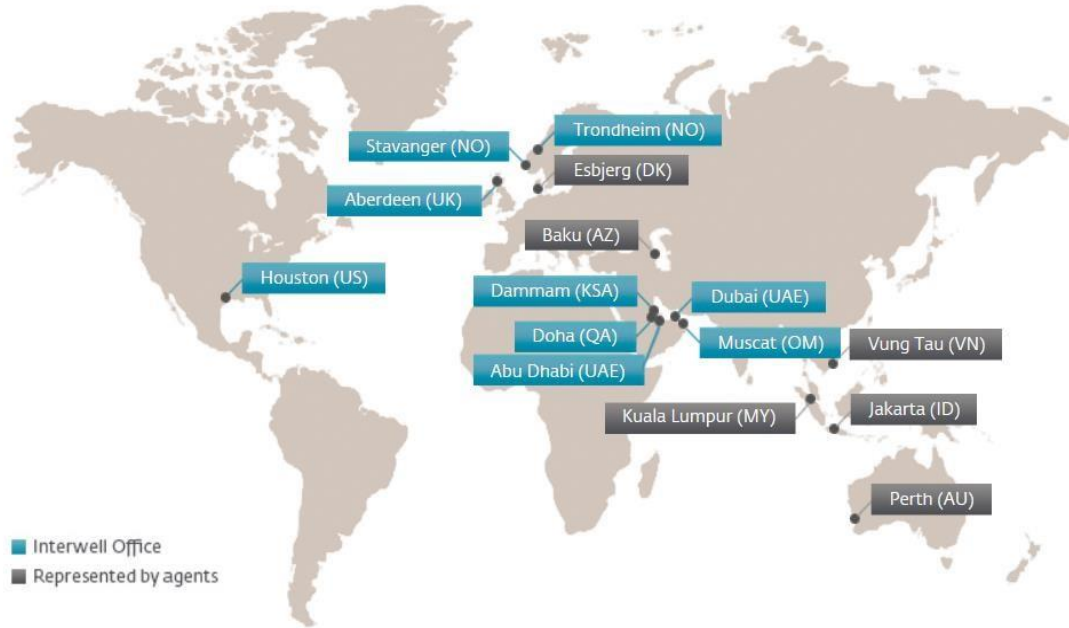
6th April 2017

Paul Vettese – APAC SALES MANAGER



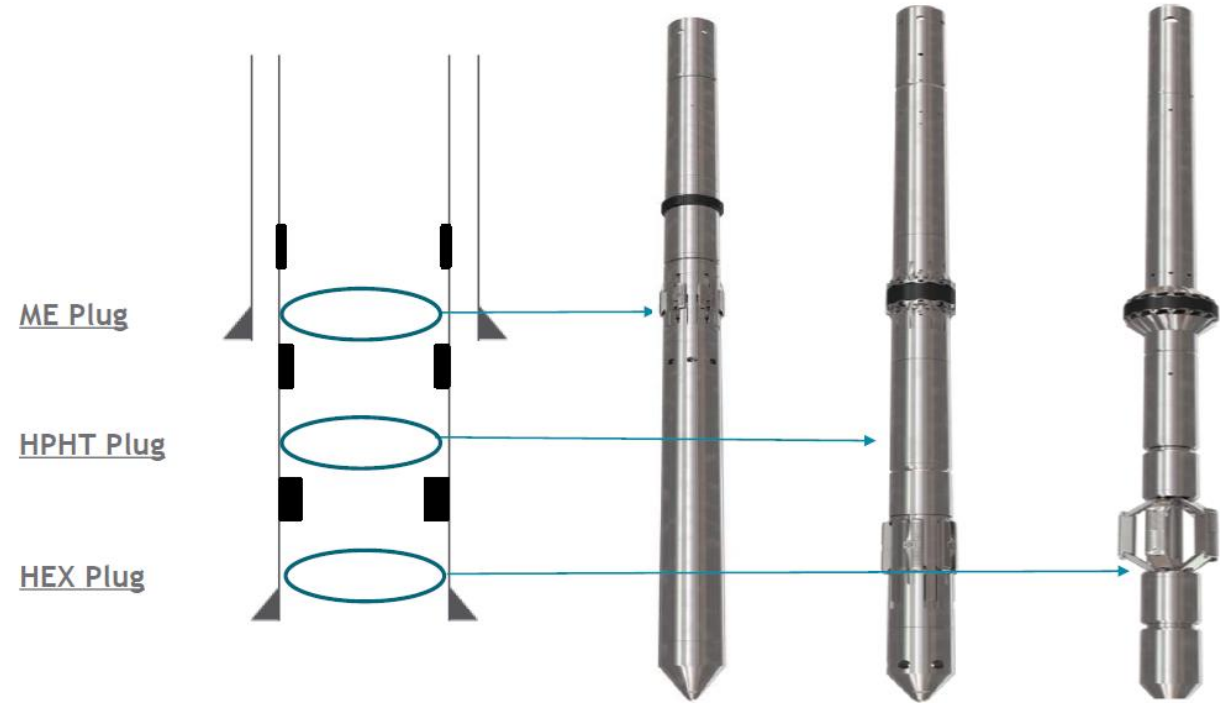
Serving Every Well

Background



- Founded in 1992
- Number of employees: 350+
- Headquarter: Stavanger, Norway
- Engineering and R&D Center: Trondheim
- Operations in 21 international locations; Norway, UK, Azerbaijan, Houston, Malaysia, Saudi Arabia, Oman, Abu Dhabi, Qatar, Australia
- Operational track record delivering solutions for 96 oil companies in 35 different countries across - 3800 wells

Our Core Technology





Serving Every Well

Straddle Technology



- The straddles can be incorporated with:
 - 1. Medium Expansion (ME)**
For standard wells (110C)
 - 2. HPHT**
High Pressure and High Temperature wells (160C)
 - 3. High Expansion (HEX)**
For tight wellbore restrictions set in larger casing ID
- Can be run on Slickline, E-line, CT and pipe
- Can be custom made depending on the length to straddle off

Straddle Overview

Anchored Production Straddle (APS)

- The APS suits tubing sizes from 2-3/8" to 9-5/8"
- ISO 14310 V0 qualified
- Up to temperatures of 160C and up to maximum differential pressures of 6,000psi



Gas-Lift APS System

- Gas Lift Straddle is a means of retrofitting a gas lift device in an existing well
- To repair failed gas lift systems where the Gas-lift valves have failed in the SPM
- Extend the point of gas lift in the well
- Tubing is punched and a straddle system with a new gas-lift valve between the two sealing elements, can be set across the punched hole



North Sea - A Case Study



Challenges

- In 2013, a client's **production had ceased** following the suspected failure of the artificial-lift system
- The subsea well had three gas lift mandrels installed; the lower two valves were installed too deep which led to the well lifting from the top valve only
- This then resulted in the suspected failure occurring in the top valve

Background

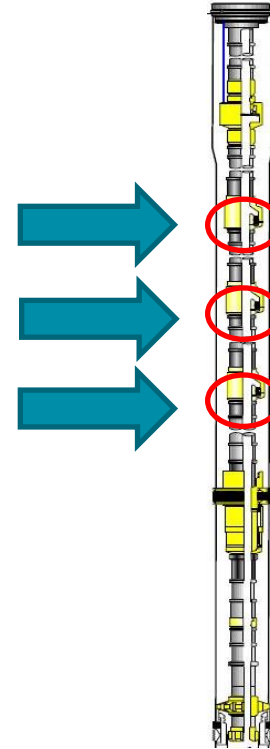
Subsea well completed in 2006

3 Gas lift mandrels installed

Lower 2 mandrels deemed too deep for Well Conditions

Historically Well lifting from the top valve only

Potential blockage/failure occurred in the top valve



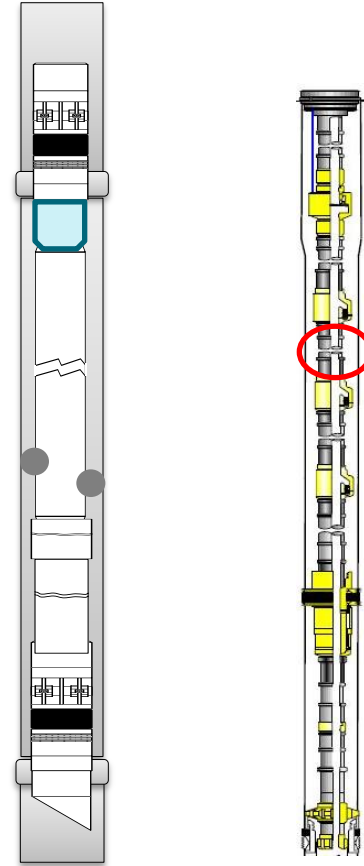
Problem Approach

- To increase the lower gas-lift efficiency and to straddle the existing upper side-pocket mandrel (SPM)
- Interwell did a collaboration between a gas lift valve provider and the client, to **create a retro-fit gas-lift straddle**

The Solution

Lower Dual Packer Straddle

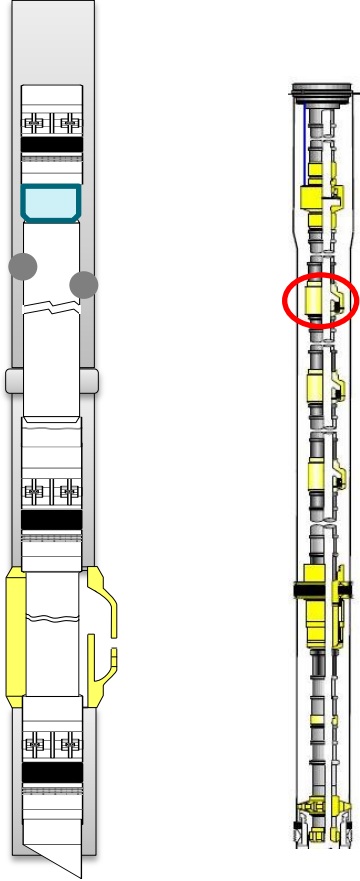
Run in and set lower
straddle code with
Valve



The Solution

Upper Triple Packer Straddle

Drill with Dual Straddle
 Running in Upper Packer out
 upper case. Middle
 Module



Result

- The client was able to achieve a higher production rate (BOPD)
- Well continued producing at the same rate months later
- Interwell's collaboration with the gas lift valve provider and the client resulted in a safe and successful operation and the well regaining full production

Conclusion

- Well back on full production
- Cross company collaboration to meet project objectives
- Safe & successful operation
- All well intervention objectives achieved
- Design production rates correspond well to actual achieved production
- Gas-lift system optimised for remaining life of field

Questions?