Riserless Coil Tubing for Plug & Abandonment, SubSea-wells
Challenges for P&A of Subsea-completed wells from a LWI-vessel

- Set cement in annulus behind casing(s)
- Control-line on outside of production-tubing
- Verify cement behind casing-strings
- Set primary and secondary barrier in/above the reservoir
- Pull production-tubing
E39 Rogfast, drilling and coring 2014

First Riserless Coil Tubing operation!

- Drilled 3 wells at waterdepth down to 300m
- Total length drilled, 450 meter
- Core-samples, 148 meter
SCOPE OF WORK:

- Drill a shallow gas pilot-hole to 420 m below RKB
- Water-depth 66 meter
- Log well for gas; Gamma Ray & Resistivity
- Perform dynamic well kill if required
- Abandon the pilot-hole with cement
Riserless Coil Tubing

«a step change in Coil Tubing services»
**FMC MARK II STACK**

Subsea-stripper

**NEW SS-STACK**
SYSTEM OVERVIEW

Main Deck

CT REEL
PARKING FRAME

Seabed

NEW EQUIPMENT
EXISTING EQUIPMENT

Main Deck

ACTIVE HEAVE COMPENSATED MAIN WINCH
PASSIVE HEAVE COMPENSATOR
TOPSIDE INJECTOR
BEND RESTRICCTOR FUNNEL AND TOPSIDE CT CUTTER
LOWER CURSOR FRAME

Seabed

SUBSEA INJECTOR
SUBSEA STRIPPER
SHEAR RAM
LUBRICATOR
LLP
WCP
XT ADAPTER
XT
**RISERLESS CT - SERVICE RANGE**

**LWI Service (Mark II and New SS-stack)**
- Scale and Sand cleanout
- Stimulation, Circulation, Fracturing and Acidicing
- Cement Squeeze
- Etc

**P&A (Mark II and New SS-stack)**
- Circulation and Cleaning
- Milling
- Cementing
- Etc

**CT Drilling**
- Sidetrack drilling in existing wellbores
- Drilling in shallow reservoirs
Challenges for P&A of Subsea-completed wells

- Pull production-tubing
- Set cement in annulus behind casing
- Verify cement behind casing-strings
- Control-line on outside of production-tubing
- Set primary and secondary barrier in/above the reservoir
### Pull production-tubing

#### Existing subsea-lubricator

- **XT**

#### Sub-sea Shut-off Device

- **Punch tubing above production packer and circulate well to weighted fluid**
- **Plan A, Step 4**

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<tr>
<th>Existing subsea-lubricator</th>
<th>Sub-sea Shut-off Device</th>
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| **XT**                      | **WCP, LS and Christmas Tree**
|                             | **Install SSD & MUD recovery system**
|                             | **Plan A, Step 5**

- **Plan A, Step 5**

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**Legend**:
- **WCP**
- **LS**
- **Christmas Tree**
- **SSD**
- **MUD recovery system**
Pull production-tubing

Existing Sub-sea Shut-off Device
Main components of the system for controlling mud volume during pulling of production tubing

Wellhead Interface with level sensor, light and camera

Vessel surface fluid tank with level sensor and pump

Fluid from/to vessel

Subsea Volume Control Skid
Verify cement in annulus behind casing.

Verify cement behind casing-strings.
Solution to “look behind” several casings?

Drilled through 3 casings

Core-sample

www.maxperf.ca
Challenges for P&A of Subsea-completed wells

- Set cement in annulus behind casing
- Verify cement behind casing-strings
- Pull production-tubing
- Control-line on outside of production-tubing
- Set primary and secondary barrier in/above the reservoir
Conclusions – Future P&A

- Need more new downhole technology
  - Interwell, SPEX, others
- Unpredictable market, testing and qualification of new equipment takes time and cost money
- Need commitment – campaign-work
- Need to challenge the methodologies used today (legislation)
  - Why are things different in the UK
  - Alternatives to cement
  - Etc.
Thank you for your attention!