Riserbased Well Intervention System: Optimized Operations in Harsh Environments

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The Aasta Hansteen Project

- Dry gas field
- Harsh weather conditions
- Seabed temperatures -1.5 Deg. C
- 1300 m water depth
- Reserves 47 billion Sm³
- Process capacity 23 million Sm³/day
- Seven production wells
- New 480 km gas pipeline to Nyhamna

- Production start up: Q4 2018
Animation
Deepwater Developments in Harsh Conditions

Focus areas

Aasta Hansteen conditions
Harsh Weather
300km from shore
1300m water depth
-2°C at seabed
Currents
Waves

Operational Challenge #1
Weather Window

Operational Challenge #2
HSE

Operational Challenge #3
Fatigue
A Fit for Purpose WOS Essential for the Life of Field Economics

- Workover System is needed for:
  - **Field development**
    - Completion of wells
    - Clean up of wells
  - **Life of field operation**
    - Well control contingency
    - Interventions / IOR / maintenance
  - **Plugging and abandonment**
    - Prepare for drilling of new well from same location
    - Plugging and abandonment of wells

Statoil industry compliance mapping performed ahead of Aasta Hansteen:

**No existing workover system technology could enable safe and economically viable operations** for Aasta Hansteen
Operational challenge #1

Weather window
HSE IN OPERATION
Tension Frame moving relative to the rig results in high-risk manual operations.

Operational challenge #2
HSE
Operational Challenge #3
Fatigue and Strength
Solving the Operational Challenges through New Technology

Example 1: Heave Eliminator

- High-pressure sleeve
- Existing Telescopic Joint
- Heave Eliminator latch
- Workover riser

Operational Challenge #1
Weather Window

Simplified hang-off opens a greater operational window. EDP and LRP still connected to the well.

Operational Challenge #2
HSE

Disconnecting the HP riser in the Heave Eliminator eliminates manual work on heaving equipment.

Illustrating likelihood of being disconnected over a year in operation.
Solving the Operational Challenges through New Technology

Example 2: Safety Joint

Operational Challenge #1
Weather Window

Operational Challenge #2
HSE
Solving the Operational Challenges through New Technology

Example 3: riserLOCK

Operational Challenge #1
Weather Window

Operational Challenge #2
HSE

Operational Challenge #3
Fatigue
Summary

Estimated achievements:

- Work in riding belt reduced by 70%
- Work in riding belt on heaving equipment reduced by 100%
- Work in red zone reduced by 95%
- All year operational efficiency increased with 95% due to less time waiting on weather
- Running time reduced by 10% due to auto running and spider
- Riser maintenance cost reduced by 90%
- Typical rig interface cost reduced
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