

Draugen Infill: Optimizing late life production with Subsea Processing

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Draugen Infill Pump: working together – Outstanding HSE performance



Draugen Field

- Haltenbanken area, 140km North of Kristiansund
- Discovered in 1984 and production start 19.10.1993
- First and only Single-leg GBS platform with extensive subsea infrastructure
- Water Depth ~ 250-280 m
- Peak Production 225 000 bbl (1999 2001)
- 6 platform wells, 11 subsea wells
- Robust and sustainable design
- Fit-for-purpose for potential future 3rd party Tie- ins



Draugen Infill Drilling Campaign SURF scope (2013 - 2017)

- 4x New Subsea Production Wells
- Subsea Boosting Pump
- Subsea Tee Manifold @ Rogn South
- 19 km of New Flowlines
- 11 km of New Umbilicals
- 52 tie-ins
- 113 GRP Covers
- 70 Concrete Mattresses
- 245 000 m3 Rock Installation
- 11 000 m3 Rock Removal



Draugen Infill Drilling Campaign Topside scope

Methanol tanks, injection skid with distribution system



Hook-up of 2 new gas lift lines and 3 new umbilicals

- 304 field welds safely executed on producing platform
- 130 000 offshore hours
- 402 000 engineering hours
- Scope completed on live production platform
- Integrated planning with other projects ongoing simultaneously on the same platform



PCM and new MOB-boat deck



Scale inhibitor injection kid with distribution system



From Drawing Board in 2012 to Installation in 2014



- Size Protection Structure 15m x 33m x 11m
- Weight ~294 MT



- Size Pump Manifold
 13m x 16m x 8m
- Weight ~301 MT

From Drawing Board in 2012 to Installation in 2016







 Size Power and Control Module 9m x 12mx 7m
 Weight ~200 MT









- Length ~4km; Diameter 169 mm
- Termination Assembly ~20MT







- Size: 4,3m x 3,3m x 6,3 m
- Weight ~43 MT

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Proper planning is key for Flawless Installation, Integration, Commissioning and Start/up

- >The Plan is showing both the sequence and the dependencies between all planned activities.
- Each activities refers to a procedure or a section of a procedure
- ≻Good tool for alignment between:
 - SURF team
 - Commissioning team
 - Contractors
 - Operations



Innovative solution for changing sequence for Pumps installation

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Commissioning

+ Good cooperation with Vendors and Operations+ Good quality of equipment delivered

- + Use of the training simulator
- + Successful Start-up

- Commissioning subsea without everything topside completed is challenging

- Fine tuning of Drive parameters was required

Pumps Early Operation – Learning process

Operating experience – Pump start-up and early operation

Pump Start-up – November 24th, 2016

- + Increased Oil production by approx. 20%
- + Reduces time and effort on starting up wells
- + Provides stable pressures
- + Reduces need for gaslift, i.e. reduces hydrate risk
- + Operators find it comfortable to operate

Questions and Answers

