Remote operation of Valemon
General concept and the role of human factors
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Valemon

- Gas and condensate field operated from 2015
- Drilling ongoing from West Elara jackup rig
- To be remotely operated from Sandsli

- Platform deck and assembly in South Korea
- Steel foundation and living quarter from Netherlands
- Equipment packages from Norway
Valemon remote operation

- Built to be **periodically** unmanned
- Ongoing modification for remote operation
- Periodically unmanned after drilling (2017)

- Two parallel control rooms
  - New main control room at Sandsli
  - Existing control room at Valemon

**Operational model**

- Sandsli MCR: shift plan of 7 shifts where 1 shift does slow offshore rotation
- Kvitebjørn: Management, emergency, ad-hoc assistance when unmanned
- Ad-hoc team of 5
- KvB approves work permits
- Planned maintenance by team of 17

- Sandsli CCR: 2 operators day/night
- Valemon: 14 days manned, 28 days unmanned

Kvitebjørn – Valemon supported by same operating onshore unit
Main Control Room

- Valemon designed as a fail safe process plant with high degree of automation
- Automatic shutdown at loss of communication with MCR
- Sandsli MCR with same user interface as Valemon CCR

Why Sandsli and onshore?

- Communication logically and physically separated from other net
- Two always up routes
- Designed with cyber security in mind

Why remote operation?

- Lower OPEX
  - Saves 2 shift at Valemon
- Drives efficient campaign-based maintenance
  - Must fit within #hours on maintenance plan
- Improves Statoil’s capability for future concept selections
- Potential to scale Sandsli MCR
Key issues

• Develop and verify a new operational model

• Ensure safe and efficient operation

• Engineering designed for safe, efficient, and secure operation

• Valemon As Built HF Analysis and specification

• Which changes follow from new operational model

Engineering design

• Which requirements apply?
  - NORSOK or TEK 10
  - TR’s and standards not written with intention to support onshore solutions

Some considerations in design

• Redundancy in support systems such as cooling and power supply

• Security design

• Engineering numbering system
Safety issues

• Maintain safety barriers
• Verify emergency preparedness
• Security in new model
• Impact on health and working environment

Operational barrier: Safetycritical action performed by operating personnel

• Are operational and technical barriers still intact?
• How do we man and plan emergency preparedness in different «modes» of operation
• Security challenges with an unmanned installation, cybersecurity for a new network and security for MCR at Sandsli
• Uncomfort entering an unmanned installation
• Sufficient work for operators at Sandsli – tedious?

Operation

• Virtual team – communication and collaboration through electronic tools
  – Trust
  – Common understanding
  – Distance vs situational awareness
  – Slow rotation vs familiarity

• Uncover complexity, structure communication tasks and identify specification for communication equipment
Virtual teams and situational awareness

- Telecommunication as Valemon
  - VHF, UHF, telephony, public announcement
- Large screen display with increased real estate for awareness and collaboration
- Valemon has 150+ CCTV cameras
  - Check and report when unmanned
  - Replace the field operator
- Valemon regarded as a simple process plant

Do we need more?

Connecting A VR model to CCTV cameras
Summary and conclusions

- Firm plan for remote operation and unmanned installation from 2017
- Solutions can not degrade safety and efficiency
- Human factors analysis important to address operations, engineering design and risk and safety assessment as an integrated solution
- Technically and operationally feasible
- Done before at Huldra and Sleipner B

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