Integrated and Remote Operations, the Future of Oil and Gas Production

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Innovative concepts for O&M
Stavanger, 6.5. 2009
Outline

- StatoilHydro challenges
- StatoilHydro R&D
- Integrated Operations
- Tail IO
- Virtual world for marine operations
- Conclusions
StatoilHydro challenges

- Deep water
- Arctic
- Aging infrastructure

New Development Solutions
Deepwater challenges

- Atlantic Margin
- Canada
- Brazil
- West Africa
The Arctic Challenge

CLIMATIC CONDITIONS - ICE

POTENTIAL GAPS DETERMINE TIME HORIZONT

AVAILABLE TECHNOLOGY

GEOLOGICAL/PROSPECT UNCERTAINTY

ENVIRONMENT & SOCIETY

StatoilHydro
Three R&D Centres in Norway

- Trondheim
- Bergen
- Kårstø/Porsgrunn

StatoilHydro forskningssenter Trondheim
StatoilHydro forskningssenter Bergen
StatoilHydro forskningssenter Porsgrunn og K-lab
Integrated Operations in StatoilHydro

• Collaboration across
  – Disciplines
  – Assets
  – Geographical boundaries
  – Culture
  – Companies
### IO example: Integrated Operations

#### Work processes

<table>
<thead>
<tr>
<th>Before Integrated Operations</th>
<th>With Integrated Operations</th>
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<tbody>
<tr>
<td>Serial</td>
<td>Parallel</td>
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<td>Reactive</td>
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</tbody>
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**IO example: Integrated Operations**

- Work processes
  - Before Integrated Operations
    - Serial
    - Single discipline
    - Dependent of physical location
    - Decisions based on experience data
    - Reactive
  - With Integrated Operations
    - Parallel
    - Multidiscipline teams
    - Independent of location
    - Decisions based on Real-time Data
    - Proactive
Tail IO Project facts and figures

• Collaboration model:
  – Equal effort from StatoilHydro and consortium with ABB, IBM, SKF and Aker Solutions
  – Joint project management
  – Use of Gate model for project execution

• Figures:
    • Main execution period 2006-2008
  – Budget $ 45 M
    • $ 12 M StatoilHydro
    • $ 12 M Consortium
    • $ 8 M from Norwegian Research Council
    • $ 8 M Assets

• Academia:
  – 5 PhD students
  – 5 Post Docs
  – Extensive collaboration with national and international Universities
Tail IO – Technology Areas

- Condition and Performance monitoring
- Common integration architecture
- Robotics technology
- Mobile ICT infrastructure
- Wireless communication
- Collaborative visualization
- Turnarounds and shutdowns

Concepts for safe and cost-effective operations of facilities
**F0B Integration Architecture-Target**

- Carry out a full-scale pilot of the F0B GODI solution
  - On Statfjord A and Oseberg Field Centre
- Verify value and functionality of solution
  - Support many different work processes
  - Read data from many source systems
  - Automate model management process
  - Support and operate solution
  - Configure to StatoilHydro’s infrastructure
  - Stage implementation or rollout process
- Prepare commercialization and rollout of solution
  - Prepare the ground for StatoilHydro’s MapIT project
  - Support IBM’s commercial launch of the IIF

**Global Operation Data Integration**

- Demonstrate & verify flexibility and business value
- Demonstrate & verify scalability and maintainability

**Drilling & completion**
**Reservoir & production management**
**Operations & maintenance**
Virtual World for Maritime and Subsea Operations
Reference list, Ormen Lange

Installation of PLET structure

Installation of 30 inch pipeline in PLET structure

Installation of 16 inch spool
Concluding remarks

• The project develops a new generation of processes, methods and tools for operation & maintenance of oil & gas fields

• Many promising & exiting pilots installed

• TAIL IO – A demanding, but rewarding project

• Linking the virtual and real world