System Sustainability & Obsolescence Management

The foundation for optimised life of field partnership

SUT – Controls Down Under
19th October 2016
Most of us enjoy a few glasses of wine to accompany our evening meal, especially during industry events where we often meet up with old colleagues and friends.

However, we mustn’t forget that it takes time for alcohol to work its way out of our systems.

As a rough guide, drivers should allow at least one hour to absorb alcohol, plus at least one hour for each unit consumed.

Just three 250ml glasses of wine and you can’t drive for 13 hours!

Being banned from driving would change your life in so many ways…

The only way you know you’ll be safe to drive is if your blood alcohol is at 0.
Current Production Efficiency Challenges of Aging Infrastructure

Production Efficiency Decline

- No Control
- Limited Control: In many cases it’s the hand you’re dealt
- Significant Control: The ball is very much in your court

Higher unplanned downtime

- Maintenance backlog

- Oil Price
- Platform Design
- Asset Age
- Network Position
- Well Stock
- Company Strategy
- Operating Model
- Maintenance Philosophy
- Systems & Procedures
- Wrench Time
- Reliability
- Data Analysis
System Sustainability

**Sustaining**
- Upgrades
- Spares
- DCV Upgrades
- M.C.S. Review
- SEM Obsolescence

**Enhancing**
- SEM2K to SemStar5 Emulation
- SEM1 to SemStar5 Emulation
- Back-Fit SMU
- Next Gem MCS

**Maintaining Installed Base**
- Obsolescence Reporting
- Brownfield

Product Life Cycle & Obsolescence Management
Upgrading Brownfields – Systems Solutions

1. Full Controls System
2. Controls Upgrade Subsea
3. Controls Refurb Subsea

Existing MCS

Old SEM

Legacy SCM

Statoil ‘TVCM’

Esso Norge ‘Balder’ Stone Energy

Statoil ‘Troll B’ Statoil ‘Snorre B’
Case study: *SmartCenter* delivers savings for Canadian Natural Gas Company

*SmartCenter* delivers considerable value and savings for a Canadian natural gas company:

- **Remotely located** platform
- Logistics for field service engineers complex and considerable.
- *SmartCenter* deployed during the commissioning phase of the project to enable **maximum impact and savings**.
- Majority of engineering support conducted remotely through *SmartCenter* by **expert engineers** in the subsea controls Centre of Excellence, Bristol UK.

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**Value Driver #1 – Remote ad-hoc fault diagnosis**

- Commissioning and fault diagnosis conducted remotely by onshore experts for the commissioning period of 6 months.
- Removed the need and cost of a full-time offshore commissioning support engineer.
- Conducted over 2 man weeks of fault finding which saved at least 4 mobilisation charges.

~$200k saved

**Value Driver #2 – Remote software updates**

- Delivered 3 remote software updates to the system during commissioning.
- Removed the need for 3 x 1 week offshore trips and associated mobilisation costs.

~$120k saved

**Value Driver #3 – Remote implementation of Modbus links**

- Implemented a Modbus transparent link to DHPT cards and enabled the periodic gathering of data remotely.
- Removed the need for a 1 week offshore trip and associated mobilisation costs to install the link.
- Data gathered remotely every week for 5 weeks, which would have otherwise required an offshore mobilisation each week.

~$70k saved

~$390k saved over a 6 month period
Analysis = *what’s happening*
Diagnosis = *why this is happening*
Prognosis = *if this continues to happen then the outcome is* ……….
Hosting a Subsea Digital Service – the ‘Predix’ Platform

Why Predix?
- Common Historian
- Data exchange between Apps
- Open Source Host
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<th>Enablers</th>
<th>Benefits</th>
<th>Outcomes</th>
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<td>Data-driven asset performance and Failure mode management</td>
<td>Improve MTTR/MTBR</td>
<td>Avoid Unplanned Downtime</td>
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<td>Life of Field Monitoring</td>
<td>Enhance field and system knowledge</td>
<td>Optimise:</td>
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<td>Subsea-focussed analytics for flow and assets</td>
<td>Support Fast, accurate decisions</td>
<td>Maintenance</td>
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<td>Subsea System operations scenario planning toolkits</td>
<td>Reduce Vessel Costs &amp; utilisation</td>
<td>Consumables</td>
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<td>Informed, risk-based strategies for maintenance planning &amp; spares holding</td>
<td>Optimise spares holding</td>
<td>Flow rates</td>
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<td>Field maintenance costs</td>
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Customer Challenge

Increasing volumes of Hydraulic control fluid being lost Sub-Sea, but no understanding where loss was occurring

Eliminate Sub-Sea Hydraulic fluid loss, by using supplied System Data to support targeted intervention

Solution Delivery

1. **Collaboration** with client on scale and history of problem
2. **Remote System analysis** takes place with zero production impact
3. **System Data** identified failure event. Targeted Intervention with minimal recovery scope.

SMARTCENTER: A remote connection allowing domain expert access to off-shore systems, allowing faster analysis / solution deployment

Action

- Operator contacted GE to report they had excessive hydraulic fluid loss Sub-Sea, but no idea where it was occurring.
- Operator shared operational data. G.E. remotely analysed SCM logs and isolated failure using flow meter data.
- Operator recovered effected SCM. Excessive hydraulic fluid loss eliminated

Results

- Environmental impacts avoided.
- $0.75M of OPEX Costs avoided per year.
- Reduction in HPU cycle & Valve events. Early life failures avoided
Commercial Opportunities Overview

The move to continuous & consistent monitoring i.e. Data Stream promotes the introduction of innovative commercial arrangements. Typically these involve:-

• Cash flow optimization
• Production performance
• Equipment availability and performance
• GE operational performance