Major Accident Hazard (MAH) Stewardship
Mike Backus, Vice President - UK Operations
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For a description of these and other risks and uncertainties, please see the documents the Company has filed from time to time with the United States Securities and Exchange Commission, including the 2015 Annual Report on Form 20-F filed on 21 April 2016.
A challenge posed to our business

- What is the condition of our barriers? (safety critical elements)

- Are we confident the barriers will perform when required?

- Operations Director:
  
  “When should I intervene?”
  
  “How do I interpret all the data that is available to me?”
Major Accident Hazards

• High consequence events
  – multiple fatalities, major environmental incident
Barrier Model

MAH Barriers

People
- Leadership
- Culture
- Competency
- Knowledge
- Skills

Process
- Management System
- Procedures
- Audit

Plant
- Safety Critical Elements
- Maintenance
- Inspection
- Verification

MAH

Harm
MAH Key Performance Indicator (KPI) Tool

- 2011
  - Prototype spreadsheet tool

- 2012
  - Prototype software solution
  - Development of KPI set
  - KPI owners identified
  - Roles and responsibilities defined

- 2013
  - Understanding the trends
  - Improving data governance
  - New and improved KPIs identified and developed
MAH KPI Tool

- **2014**
  - Major software change
  - Major update to KPI definitions
  - Review cycle established

- **2015**
  - Ownership transferred to Operations
  - Tool developed for drilling
  - Share with industry
  - New and improved KPIs identified and developed

UK Major Accident Hazards Dashboard

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Instructions
Select an Asset then click a Stream

Asset: Buzzard

Stream:
- Hazard Stream
- Barrier Stream
- System Stream

View KPI Groups
KPI Group
KPI Score (Bottom Level)

Safety Critical PM Backlog PS1, PS10, PS11, PS15, PS22, PS32, PS34

Remarks Entered 02 Oct 2015 at 09:32:32
*Work Order(s) Non-compliant:
20879980 RISER ESDV CLOSURE TEST I 3M (1 HR)
20878319 RISER ESDV CLOSURE TEST II 3M (1 HR)
20668532 NUCLEONICS CHECKS - TRACERCO (0 HR5)
20589224 REBOILERS GYCOOL 1 Y (3 HRS)
20558747 PSSV21570 OVERHAUL AND RECERT M 6Y (18 HRS)
20551720 VALVE SHUTDOWN FLOWLINE SX 660 1Y (2 HRS)
System Health Score

Maintenance, Inspection, Verification

<table>
<thead>
<tr>
<th>Trend</th>
<th>KPIs</th>
<th>Current State</th>
<th>Current Value</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Defined Life Repairs exceeding Compliance criteria</td>
<td>Green</td>
<td>0</td>
<td>20.00%</td>
</tr>
<tr>
<td></td>
<td>Topside System Integrity Engineering Assessment (PS11 - Hydrocarbon Containment)</td>
<td>Red</td>
<td>2</td>
<td>30.00%</td>
</tr>
<tr>
<td></td>
<td>Percentage Safety Critical PM&amp;CM Backlog Non Compliant P82, P910, P911, P915, P922, P932, P34</td>
<td>Red</td>
<td>100 %</td>
<td>15.00%</td>
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<tr>
<td></td>
<td>Safety Critical PM Backlog P82, P910, P911, P915, P922, P932, P34</td>
<td>Green</td>
<td>30 hours</td>
<td>10.00%</td>
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<tr>
<td></td>
<td>Verification Findings Level 2/3 with No NQFRAS P811, P815, P834</td>
<td>Green</td>
<td>0</td>
<td>5.00%</td>
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<tr>
<td></td>
<td>No. 'live' hydrocarbon seeps</td>
<td>Amber</td>
<td>14</td>
<td>10.00%</td>
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<tr>
<td></td>
<td>Safety Critical CM Backlog P82, P910, P911, P915, P922, P932, P34</td>
<td>Green</td>
<td>162 hours</td>
<td>10.00%</td>
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Hazard Health Score

<table>
<thead>
<tr>
<th>Trend</th>
<th>Barriers</th>
<th>Current State</th>
<th>Current Health Score</th>
<th>Weighting</th>
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<tbody>
<tr>
<td>2. Process Containment</td>
<td>Amber</td>
<td>58</td>
<td></td>
<td>30.00%</td>
</tr>
<tr>
<td>3. Ignition Control</td>
<td>Amber</td>
<td>62</td>
<td></td>
<td>30.00%</td>
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<tr>
<td>4. Detection Systems</td>
<td>Amber</td>
<td>62</td>
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<td>15.00%</td>
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<tr>
<td>5. Protection Systems</td>
<td>Green</td>
<td>85</td>
<td></td>
<td>5.00%</td>
</tr>
<tr>
<td>6. Shutdown</td>
<td>Green</td>
<td>85</td>
<td></td>
<td>10.00%</td>
</tr>
<tr>
<td>7. Emergency Response</td>
<td>Green</td>
<td>100</td>
<td></td>
<td>5.00%</td>
</tr>
<tr>
<td>8. Life Saving</td>
<td>Green</td>
<td>96</td>
<td></td>
<td>5.00%</td>
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Asset Health Score (Top Level)

<table>
<thead>
<tr>
<th>Trend</th>
<th>Hazards</th>
<th>Current State</th>
<th>Current Health Score</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Process Hazards (Topsides)</td>
<td>Green</td>
<td>68</td>
<td>70.00%</td>
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<tr>
<td></td>
<td>2. Process Hazards (Wells &amp; Blowout)</td>
<td>Green</td>
<td>88</td>
<td>10.00%</td>
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<tr>
<td></td>
<td>3. Process Hazards (Pipelines &amp; Risers)</td>
<td>Green</td>
<td>72</td>
<td>10.00%</td>
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<td>4. Non-Process Hazards (Structures)</td>
<td>Green</td>
<td>90</td>
<td>10.00%</td>
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Stewardship of the Data and Process

**DATA QUALITY**

- **Week 1**
  - Input Data
  - Technical Safety TA Detailed Analysis
  - Preparation of Monthly Report

- **Week 2**
  - KPI Owner Team Review With Operations

**DECISIONS & DIRECTION**

- **Week 3**
  - Field Manager Review
  - Preparation of presentation detailing key issues and action plan to address

- **Week 4**
  - Management Team Review
  - Action Plan for Continuous Improvement and Barrier Maintenance
CROSS ASSET COMPETITION HAS PROVEN TO BE A HEALTHY BEHAVIOUR
MAH Focus – The hidden benefits

Tangible Benefits: **Compliance**
- Maintenance
- Training
- Audit
- Action Management

Less Tangible Benefit: **Culture**
- Leadership accountability
- Depth of MAH knowledge (onshore and offshore)
- Depth of planning
Sustaining the right Culture

- Continuous improvement of the process; refresh of the KPI’s
- Leverage tool/process/behaviour across functions
  - D&C Interventions
  - Production Loss Management
- Accountable in delivering targets and understanding gaps
- Management support and drive
- Sharing across Industry
- Relentless drive for learning and improvement – you can always find something…
Sustaining the Right Culture

Most importantly…engaging the workforce

Spadeadam Investment

MAH Awareness Workshops
More Acronyms

Part of our Vocabulary

PSM

MAH
MORE INFORMATION

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www.flickr.com/photos/nexenenergy
www.twitter.com/nexenenergy

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