Driving Innovation & Operational Efficiency

Thu 27 Aug 2015
Aker Solutions, Aberdeen International Business Park, Aberdeen
Sarah Hutcheeon
Regional Manager Scotland & Norway
EIC
• Founded in 1943 when 13 companies met in London under the name of the British Development Company for Petroleum Installations.

• Thirty years later in 1980, a membership survey found that interest had extended beyond oil & gas to the energy sector as a whole CBMPE became Energy Industries Council (The EIC) in July 1981.

• Benefits – virtual office, hot desk, conference facilities, global reach, project information

• EIC Datastream – new version launching at OE 2015 – Wednesday 9th September in EIC Lounge at 10.30am

• Export – shows, delegations
EIC Datastream – new version

- Launch at Offshore Europe 2015
- Project search and contract search
- Increased functionality and information
- Dynamic updates on saved lists
- Addresses what members want from the system
- Live demos and Early Access Programme available before launch
Upcoming Events

- UKCS Showcase – 29th September 2015
  - Collaboration & Commodity Sharing
- Export Showcase – 29th October 2015
  - Norway
- UKCS Showcase – 3rd December 2015
  - Decommissioning
- Business Presentation – TBC (November 2015)
- Members Update – December 2015
- Full programme for 2016
The Global Energy Sector

- Oil & Gas
- Subsea
- Petrochemical
- Nuclear
- Renewables
- LNG
- Pipelines
- Power Generation
- Transmission & Distribution
Global Coverage

UK and Europe
Offices in London, Teesside & Aberdeen

Head of Americas
North/Central & South America
Offices in Rio and Houston

Head of Asia Pacific
ASEAN, Australasia, China, India, Afghanistan & Pakistan
Office in KL

Head of ME, Africa & CIS
Office in Dubai

© Energy Industries Council (EIC)
Driving Innovation & Operational Efficiency

- New Showcase event for EIC Scotland
- Acknowledging market conditions
- Demand from Operators & members
- Innovation and efficiency – road to recovery
- Wood Review
- OGA
- What happens next?
- Learn from other industries
Driving Innovation & Operational Efficiency

• Panel Introduction
  • Andy Leadbetter – BP
  • Jeremy Cutler – TOTAL
  • Craig McGuinness – Aker Solutions
  • Steve Johnson – Simply Joined

• Presentations
  • Safehouse Habitats Scotland Limited
  • Blaze Manufacturing Solutions
  • Magma Global

• One 2 Ones
  • Cetco
  • Nautronix
  • Senscient
• 13.15 - Begin with Presentations from the Panel

• 14.00 - Members presentations

• 15.00 - Q&A

• 16.00 - One 2 Ones & Networking
Thank You & enjoy the event
Andrew Leadbetter
PSCM Regional Director, North Sea Region
BP
UKCS showcase: driving innovation and operational efficiency

August 2015
Andy Leadbetter, VP PSCM
BP’s North Sea portfolio
Building a competitive future

- Oil Price continues to decline to < $50/bbl
- BP’s response
  - Maintain safe and compliant operations
  - Focus portfolio
  - Review organisation
  - Remove or defer activity
  - **Negotiate commercial terms and re-bid**
  - **Improve simplification and efficiency**
Efficiency examples

Time saving

Reduced complexity

Cost saving
Thank you!
PSCM@uk.bp.com
Jeremy Cutler
Head of Technology Innovation
TOTAL E&P UK Limited
UKCS SHOWCASE
DRIVING INNOVATION & OPERATIONAL EFFICIENCY
- TECHNOLOGY INNOVATION

Jeremy G Cutler : Total E&P (UK) Limited
Thu. 27th August 2015, Dyce, Aberdeen
INTRODUCTION TO TEP UK
TOTAL E&P UK LIMITED (TEP UK)

- One of the top three operators in the UK in terms of production and reserves
- 2013 - 2014 production about 100 - 120 Kboepd
- Employs around 1,200 people (staff and contractors) > 40 nationalities represented
- Will contribute almost 10% of the TOTAL Group's daily production by end 2015 (< 200 Kboepd)
- Operated budget of £2.35 billion in 2014
- Expenditure of £6 billion over the next five years
EXTERNAL ENVIRONMENT
CURRENT UK OIL & GAS INDUSTRY STATUS - THE PERFECT STORM?

Annual Production from the UKCS – million boe/d

- 1999: 4.6 MM boe/d
- 2014: 1.4 MM boe/d

70% downturn from plateau

Current UK Oil & Gas Industry Status - The Perfect Storm?

EIC – UKCS Showcase: Driving Innovation & Operational Efficiency – 27th August 2015
UK OIL & GAS INDUSTRY RESPONSE

- UK Government Oil & Gas Strategy 2013 +
- Sir Ian Wood’s Final Report (issued 24th Feb 2014)
  - Establish Oil & Gas Authority (OGA) – The New Regulator
  - Collaboration between Government & Industry to “Maximise Economic Recovery”
  - UK Technology Strategy → launch of the Technology Leadership Board
  - Remaining resources 12 – 24 GBoe
    - Exploration discovery rates to > 35%
    - Average oil recovery factor to > 50%
    - Production efficiency to > 80%

Scottish Gov Oil & Gas Strategy 2012
Maximise Recovery, Strengthen Supply Chain by applying Innovation & Technology and utilising Skills
Increase contribution from Scottish Universities
TECHNOLOGY LANDSCAPE

- KEY STAKEHOLDERS
Role of the Technology Leadership Board (TLB)

- Provide a mechanism to give strategic clarity, direction and priority to oil and gas technology development
- Work with ITF as a technology implementer/facilitator for the UKCS-TLB
- Work with the new Oil and Gas Innovation Centre (SFC Funded) to help connect innovation communities to oil and gas technology development, focusing on SMEs and Universities
TECHNOLOGY NEEDS
TEP UK “TOP 6” TECHNOLOGY PRIORITIES

**Intelligent Operations & Maintenance**
- Robotics
- Wireless monitoring technology
- ASSET INTEGRITY / SMART ROOM / BIG DATA

**Subsurface Imaging**
- Improve acquisition and processing techniques
- Improve sub-volcanic (basalt) imaging for new West of Shetland exploration plays
- Accurately visualise individual thin sand units

**Effective Drilling & Completion**
- Low cost drilling / increasing productivity
- Alternative technologies for tight sands (lower cost and increased productivity)

**Small Pool Development**
- Long distance subsea tie-backs
- Subsea remote chemical storage and injection
- Remote power generation and umbilical-less subsea systems

**Onshore Shale Gas (East Midlands)**
- Gainsborough Trough Area – PEDLs 139 & 140
- Future Onshore Licencing Rounds

**Decommissioning**
- Development of technologies to reduce costs and improve safety
- Well plug & abandonment

**ACTIVELY WORKING WITH STAKEHOLDERS**

EIC – UKCS Showcase : Driving Innovation & Operational Efficiency – 27th August 2015
Theme #1 : Small Pool Development
- Develop a 15 MMBoe gas or oil field for less than £150 MM
- Champion:

Theme #2 : Asset Integrity
- Internal vessel inspection to reduce shutdown time
- Detection system for Corrosion Under Insulation (CUI)
- Champion:

Theme #3 : Low Cost Well Construction
- Develop a low cost well, not optimum but fit for purpose, to reduce well costs by 50%
- Champion:
BARRIERS TO INNOVATION
SOMETIMES IT MAY FEEL LIKE THIS…

DON'T BOTHER ME WITH THESE THINGS NOW, I'VE GOT A WAR TO FIGHT!
# Breaking Through the “Valley of Death” – From Research Through to Commercialisation

<table>
<thead>
<tr>
<th>TRL</th>
<th>Research</th>
<th>Development</th>
<th>Deployment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Description</td>
<td>Basic principles</td>
<td>Concept validation</td>
</tr>
<tr>
<td>2</td>
<td>Concept development</td>
<td>Experimental pilot</td>
<td>Demonstration pilot</td>
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<tr>
<td>3</td>
<td>Concept and application</td>
<td>Demonstration pilot</td>
<td>Production unit in operation for &gt; 3 years</td>
</tr>
<tr>
<td>4</td>
<td>Concept validation</td>
<td>Industrial pilot</td>
<td>Extensive implementation</td>
</tr>
<tr>
<td>5</td>
<td>Experimental pilot</td>
<td>Production unit in operation for &gt; 3 years</td>
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<tr>
<td>6</td>
<td>Concept validation</td>
<td>Production unit in operation for &gt; 3 years</td>
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<tr>
<td>7</td>
<td>Experimental pilot</td>
<td>Extensive implementation</td>
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<td>8</td>
<td>Demonstration pilot</td>
<td>Extensive implementation</td>
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<tr>
<td>9</td>
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<td>Extensive implementation</td>
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</tbody>
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“Valley of Death”
CONCLUSIONS
CONCLUSIONS

● TEP UK is a leading producer within the UKCS
  - By end 2015, production of 180,000 boepd from three technically diverse production hubs
  - Technology innovation support from the supply chain will be a key to future success

● UKCS “Technology Innovation Landscape” is adapting to the challenges of “Maximising Economic Recovery” (MER)
  - Establishment of the Oil & Gas Regulator (OGA)
  - Launch of the Technology Leadership Board

● In partnership with industry, the Technology Leadership Board will work with ITF and OGIC (and other industry bodies) to identify technology needs and define priorities to progress innovation through development, testing, qualification and field trial to field deployment.
THANK YOU FOR LISTENING
Craig McGinness
Vice President - Technical & Project Services
Aker Solutions
Driving innovation and efficiency in the current market – A contractor’s perspective

Aker Solutions, AIBP – Aug 27, 2015

Craig McGinness | VP Technical and Project Services
Welcome

- Welcome to our new offices at AIBP
- Craig McGinness MIMechE, BEng (Hons) in Mech. Engineering
- Joined Aker Solutions in 1996 as Graduate Mechanical Engineer
- Held engineering and management positions at various levels
- Engineering and Technology Manager from Aug 2009 to May 2014
- Invited to join the SMT as VP for Technical and Project Services

My role covers functional responsibility for:
- Engineering
- Construction, commissioning, certification
- Project controls (cost, planning, estimating and doc. control)
- Information systems
Driving innovation and efficiency in the current market

- Current conditions and their impact on Aker Solutions
- In-house initiatives to drive innovation and operational efficiency
- Collaboration, innovation and efficiency through the supply chain
- What we need from you…
Driving innovation and efficiency in the current market

- The message today is all about collaboration and cost efficiency
- We are absolutely committed to working with the supply chain and be able to deliver more to our clients for less money
- But … it is not just about reducing margins. Doing so would risk destroying the research and development that is vital to securing the future of the industry
- Technology development to drive efficiency and reduce cost
  - e.g. Point cloud survey techniques
    - 10 years ago this technology was in its infancy with limited application
    - Now it is a fundamental part of our engineering design process
    - Improved design efficiency and reduced costs
- Innovation is not always about new technology, often just adapting a technology from one industry to another:
  - e.g. Return to Scene (R2S) technology – originally used by the emergency services now being applied to Asset Integrity Management
Driving innovation and efficiency in the current market

- What are we looking to do differently in working with the supply chain?
  - Be more open with our suppliers
  - Engage with them earlier
  - Greater levels of collaborative working
  - Give you an opportunity to present your ideas and be a real part of the solution
  - One team approach - we are not experts in everything
Current conditions and their impact on Aker Solutions

- View is the current conditions are likely to be with us for some time
- We expect to see some ‘glimmer’ of change in late 2016 but impact on supply chain may not appear until mid / late 2017

- All our key contracts and projects have been impacted in some way:
  - Subsea Tie-back to Existing Facility
    - Client looking for cost savings
    - Greater demand on supply chain
  - Decommissioning Project
    - Strategic change in removal method
    - Significant reduction in our scope
  - Increased tendering activity
    - Hugely competitive with customers looking for innovative cost reduction solutions
    - Smaller entrants are now competitors
    - Splitting of scopes within the ITT giving Operators flexibility
In-house initiatives to drive innovation and operational efficiency

**Cost and efficiency**
- Using more hours per total installed weight than before
- Marginal projects becoming too expensive to execute

**Predictability**
- Growth in projects from all contractors shows an industry challenge (e.g. 62% offshore hour growth)
- Problematic for marginal projects

**Profitability**
- Challenge in meeting target sums and other bonuses (e.g. KPIs)
- More often than before lower realised margin versus as-sold

From Statoil

EBIDTA-% per project
In-house initiatives to drive innovation and operational efficiency

Working Smarter: MMO

**Improve efficiency: Engineering**
- Simplify TRs and reqs
- Front end loading
- Project start-up
- Leadership programme

**Improve efficiency: Fabrication**
- Subcontractor model
- Leaner fabrication
- Leadership programme

**Improve efficiency: Installation**
- Effective offshore days
- Offshore readiness
- Standardisation and compliance

**Visioneering and collaboration**
- 3D Animation
- Concurrent execution
- Construction / installation method

**Our journey to operational excellence**
- Lean methodology
- Removing waste
- Performance boards

**Supply chain cost reduction**
- Indirect spend reduction
- Bulk procurement improvement
- Vendor doc handling

**IT / IM cost reduction**
- Reduction of IT / IM cost
- Standardise and simplify project application portfolio

**Man-hour cost reduction**
- Lean/Value engineering
- Optimisation of resource mix

**Overhead cost reduction**
- Optimise cost level across MMO
Collaboration, innovation and efficiency through the supply chain

- **“One team” approach**
  - Key suppliers fully incorporated into project delivery – no “man-marking”
  - Use best fit tools and solutions

- **Best value supplier selection**
  - Use the right company for the job
    - Big = Greater capability, fill more gaps
    - Small = More innovation and responsiveness
  - Buy-in to collaboration is key

- **Standard specs and just enough documentation**
  - Faster, lower cost, “fit for purpose” solutions
  - Commit to standard model ITTs and terms & conditions

- **Working Smarter**
  - Early supplier engagement
  - Actively encourage innovation

- **2015 Cost reduction initiative**
  - Not only reduced man and hour equipment rates:
    - e.g. reduced hire rates for equipment not in use / on standby
    - e.g. improved equipment change out process – F.O.C.
    - e.g. consolidated invoicing
Aker Solutions’ SCM expectations

- Aker Solutions values the relationships we have with our suppliers and we recognise the important role they play in the development and ongoing success of our business.

- Aker Solutions believes that successful relationship management within our supply chain is fundamental to our delivery of safe and excellent projects.

- We expect our chosen suppliers:
  - To deliver on their promises and aid us in delivering projects excellently
  - To be safe and take care of the environment
  - To value our business
  - To be ethical and fair

- Our expectations for all our suppliers are that they share the same core values as Aker Solutions.
Industry related initiatives

- Aker Solutions is a signatory to the Oil and Gas UK Supply Chain Code of Practice (SCCoP)
- Aker Solutions is committed to FPAL, therefore our preferred suppliers shall be registered within the FPAL database
- PILOT Forward Workplan: A web based information sharing website to provide up-to-date information on business opportunities for the supply chain
- Receive annual visits from:
  - Dutch Trade Mission (Netherlands British Chamber of Commerce)
  - Energy North
  - Scottish Enterprise
- Attendance at supply chain events
  - Pilot Share Fair (Meet the buyer one-to-ones)
  - EEEGR SNS Conference (Meet the buyer one-to-ones)
What we need from you…

- How can you help increase our awareness of what is out there
  - Often we do not see or hear about the innovation until it’s too late

- Are you looking for new / adapted products to trial before launch?
  - No promises, but we are willing to look for potential client / installation opportunities

- Do you want to draw on our technical expertise?
  - Confidential support on product development, usability, application

- How to increase our knowledge on developments without encroaching on the necessary competitive edge
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SafeHouse Habitats (Scotland) Ltd
Driving Innovation and Operational Efficiency

27th August 2015

Aberdeen
Safehouse and what is a Safehouse Habitat

Focus to address current market conditions

Introducing the solution to our Customers

Impact on Safehouse

Sharing our learning curve so far…
Safehouse Engineered Control Measure

Safehouse ATEX Certified Pressurised Habitats control the risk of ignition of Hydrocarbons or other hazardous/flammable gasses during Hot Work when conducted in Zone 1 & 2 hazardous areas.

ATEX Certified for use in DSEAR Zone 1 or 2 applications

H.S.E. Dangerous Substances & Explosive Atmospheres Regulations

Only ATEX Fully Certified Habitat System available worldwide
Safe operating ethos behind the use of pressurised habitats

**Containment**
The flexible flameproof panel arrangement creates a positive barrier ensuring naked flame, grinding sparks and/or welding slag have no possible way to escape from the habitat enclosure.

**Pressurisation**
Controlled inflation creates an internal overpressure which acts as a secondary barrier preventing the ingress of hydrocarbons.
Focus to address current market conditions

Maintaining production
Positive Impact to TARs & Shutdowns
Optimising productivity
Maintaining production

- Create safe hot work environments on live facilities
- Integration with process safety management system
- Undertake emergent work as it is required
- Avoid disruption with SIMOPs
Innovation: Maintaining Production

Offshore Deck Extension Project
North Sea

- Reviewed operations and CoW procedures
- Re-draft to adopt Safehouse engineered control measures
- Completed tie-ins during normal operations and production
- Adopted updated project delivery methodology
- Planning Shutdown to complete tie-in process

24 to 26 day shutdown avoided
Positively impacting TARs & Shutdowns

Installations now spend more days in shutdown than ever before, with approx. 70% over-runs due to scope creep

Source – Oil & Gas IQ Industry wide survey 2014
Innovation: Positive impact to TARs and Shutdowns

Onshore Plant Upgrade Project

UK

- Safehouse integration within SOPs & CoW
- Safehouse fully managed service
- 125 hot work scopes required over two years
- All 125 hot work scopes delivered to schedule without extension of planned TARs

All activities completed without shutdown
Optimising productivity

Create a work environment appropriate for the task
Ability to work at any time controlling conditions
Safety, flexibility and reliability
Optimise spanner time
Innovation: **Optimise spanner time**

**Offshore Asset Turbine Maintenance Project**

*North Sea*

- **High temperatures requiring short-shift patterns**
- **SAFEHOUSE Habitat with SafeCool**
- **Standard shift pattern adopted reducing work party size 25%**
- **Project delivered to schedule without extension of planned TARs**
- **Personnel productivity increased**

**Increased personnel productivity, decreased POB**
Approach to operators and contractors

---------always thinking about customer drivers

Thought Leadership ....
Safety leadership through innovative solutions
Production efficiencies
Cost optimisation
Education
Demonstration of ‘value’
Educational approach
Impact on Safehouse business

- Internally challenge
- Stronger voice to be heard
- Better integration
- Build stronger relationships
Sharing our learning curve so far....

Understanding the true ‘value’
Now solutions driven as opposed to product
Strive to gain the right audience
Voice still needs to be stronger

..........and still learning
Blaze Manufacturing Solutions
Flameshield 300
Flexible Firewater System
By
Andy van Vloten Martin &
Steve Cox
Flameshield Non-Corroding Replacement Deluge System – Market driven need

• Deluge systems beyond design life
• Traditional materials yield 75% of their strength @ circa 450°C
• Repair or Replace pipework to remove extensive nozzle blockages
  – Alternatives are £££ & require hotwork / extensive surveys & fabrication works
• Chemical cleaning vs replacement of firewater pipework

Typical carbon steel dry deluge system
Flameshield 300 – Key Innovations

• Flexible pipe deluge systems facilitate a simplified approach to the engineering process and increase installation speeds when compared with fixed pipe systems.
• No Scaffolding
• Installation in parallel with existing system: no process shutdown
• No corrosion – minimal nozzle blockage: key driver to reduce annual maintenance costs
• No welding is required, which means that no time consuming hot work precautions / NDT are needed. No sparks or fumes are generated.
• Due to the properties of Flexible piping it is able to withstand the impact of projectiles which significantly increases the probability of surviving a blast / explosion.
• Flexible piping resists fire and heat much better than fixed systems. Even without water in the pipe for the first five minutes it can withstand jet fires with a heat flux of 390kW/m², temperatures above 1350°C.
**DNV Type Testing**

- We have undertaken testing to IMO A 753
- We have subjected 1”, 4” & 8” samples to explosion overpressures at 35, 10 & 5 PSI.

<table>
<thead>
<tr>
<th>Peak overpressure</th>
<th>Maximum wind speed</th>
<th>Effect on structures</th>
<th>Effect on the human body</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 psi</td>
<td>38 mph</td>
<td>Window glass shatters</td>
<td>Light injuries from fragments occur</td>
</tr>
<tr>
<td>2 psi</td>
<td>70 mph</td>
<td>Moderate damage to houses (windows and doors blown out and severe damage to roofs)</td>
<td>People injured by flying glass and debris</td>
</tr>
<tr>
<td>3 psi</td>
<td>102 mph</td>
<td>Residential structures collapse</td>
<td>Serious injuries are common, fatalities may occur</td>
</tr>
<tr>
<td>5 psi</td>
<td>163 mph</td>
<td>Most buildings collapse</td>
<td>Injuries are universal, fatalities are widespread</td>
</tr>
<tr>
<td>10 psi</td>
<td>294 mph</td>
<td>Reinforced concrete buildings are severely damaged or demolished</td>
<td>Most people are killed</td>
</tr>
<tr>
<td>20 psi</td>
<td>502 mph</td>
<td>Heavily built concrete buildings are severely damaged or demolished</td>
<td>Fatalities approach 100%</td>
</tr>
</tbody>
</table>
Conclusions & Challenges

• Whilst the 2.45 pressure was ridiculous in its magnitude it has taught us the failure mechanisms
  • The peeling away of supports
  • The rotation forces from blast wave
  • Effects of turning moments

• These are the things we need to be aware of and eliminate / reduce from our designs
Cable Racking & Supports

• The second series of testing we utilised
  – 4” deep cable racking turned the “right way”
  – Bolted horseshoe pipe clamps (not M-series Unistrut)
  – Up & over clamps to pin ladder down
  – Bolted through unistrut rather than beam clamps (for testing purposes only)
  – Extensive use of square washers to spread the forces under bolt heads
After the second blast

- Even with the square washers and the horseshoe clamps you can see the rotational forces that have been applied.
- But critically there has been no movement from the support and everything remains in place.
Fire Test Results

• A.753 (18) PFM 1-98 dry/wet tests for a 30 mins duration
• Jet Fire testing in accordance with the requirements of BS EN 22899-1 has been completed to 350kW/m²
• Leakage after the 1hr test was circa 10%
## Type Tests Results

<table>
<thead>
<tr>
<th>SECTION</th>
<th>DESCRIPTION OF TEST</th>
<th>STANDARD</th>
<th>TEST REPORT NUMBER</th>
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<tbody>
<tr>
<td><strong>Component part tests</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Liner volume swell test</td>
<td>ISO 1817: 2011 Liquid C at 40 deg C for 48 hrs</td>
<td>54511</td>
</tr>
<tr>
<td>B</td>
<td>Cover volume swell test</td>
<td>ISO 1817: 2011 Liquid B at 40 deg C for 48 hrs</td>
<td>55125</td>
</tr>
<tr>
<td>C</td>
<td>Cover Din abrasion test Adhesion test between hose layers</td>
<td>ISO 4649: 2010 ISO 8033: 2006</td>
<td>55510</td>
</tr>
<tr>
<td>D</td>
<td>Oxygen (Flammability) test</td>
<td>BS EN ISO 4589-2</td>
<td>324212</td>
</tr>
<tr>
<td>E</td>
<td>Smoke and toxicity test</td>
<td>MSC 307 (88)</td>
<td>324213</td>
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<tr>
<td>F</td>
<td>Liner volume swell test</td>
<td>ISO 1817: 2011 Seawater &amp; AFFF</td>
<td>54539</td>
</tr>
<tr>
<td>G</td>
<td>Liner volume swell test</td>
<td>ISO 1817: 2011 Hypochlorite</td>
<td>55089</td>
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<tr>
<td><strong>Finished hose assembly tests per EN 1765</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HI</td>
<td>Change in length at max WP</td>
<td>EN1765</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resistance to proof pressure</td>
<td>EN1765</td>
<td></td>
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<tr>
<td></td>
<td>Bend test resistance</td>
<td>EN1765</td>
<td></td>
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<td></td>
<td>Electrical continuity test</td>
<td>EN1765</td>
<td></td>
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<tr>
<td></td>
<td>Min burst pressure test</td>
<td>EN1765</td>
<td>PCD 005</td>
</tr>
<tr>
<td><strong>Other hose assembly tests</strong></td>
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<tr>
<td>JK</td>
<td>Jetfire test</td>
<td>IMO Resolution A 753 (18) dry / wet test (5 mins dry then 25 mins wet with flowing water)</td>
<td>TFFT-020</td>
</tr>
<tr>
<td>L</td>
<td>Explosion test</td>
<td>PER REPORT</td>
<td>13381 plus pressure test results</td>
</tr>
</tbody>
</table>
Perenco 23A Case Study

• Blaze had a severe time constraint to install Flameshield system around columns. Installation techniques utilising rope riggers ensured systems were installed within time envelope resulting in significant project savings for client.

• Contract value £6 million. Design supply install commission deluge systems, deluge skids, fire main
Perenco 27A Case Study

• Fixed price lump sum contract. Value £9.5 million
• Blaze scope and activities as 23A
• Reason for award: Perenco satisfaction with Blaze performance on 23A.
Enquest Knightsbridge FPSO

- Lump sum fixed price contract value £11.7 million. Amec Management Contractor
- Design, supply, install and commission Flameshield flexible piping systems, deluge/foam skids, water mist systems, hot foam systems, hydrant stations.
- Blaze managing contract from client offices in Wallsend and head office in Laurencekirk providing 24hr installation support
Going Forward

• Identify & target decision makers within operators & explain benefits directly
• Don’t cut corners, provide good value even with rising costs
• Continue innovating
  – Blaze-o-let
  – Integral heat traced pipework for arctic conditions (<=-40°C)
Some of our Satisfied Customers
Magma Global
EIC UKCS Showcase

Improving Operational Efficiency
with Carbon Composite Jumper Spools

27th August 2015

Asaf Hisherik
Magma Global Ltd
Agenda

- Challenges with existing subsea jumper spools – why is a new solution required?
- Why Magma m-pipe® is an enabling technology to improve subsea jumper longevity
- Two example studies of Magma m-pipe® - 2in methanol jumper and 6in 250m jumper
- Operational subsea applications and benefits of m-pipe® jumper spools
- Lessons: key drivers of innovation in a tough oil and gas project environment
Challenges with existing jumper spools

Jumper spools are a mature product but a challenging feature of subsea architecture

- External erosion and internal sour gas and liquid corrosion, yet high performance and long life is required
- Long steel pipe sections with multiple flow bends are typically required to achieve required flexibility
- Current steel spools are challenging to design, fabricate and install, often with high levels of insulation
- Both steel and NBF jumpers suffer from sour gas, high in-service motions and extended slugging loads
**m-pipe® jumper spool solutions**

**m-pipe®** is designed to replace existing non bonded flexible and rigid steel jumpers

- **m-pipe®** fully installed project costs are comparable to NBF or steel pipe but with expected 25 year field life
- Lengths of 5-15ksi **m-pipe®** can be ‘flexed’ to the required subsea geometry, reducing installation costs
- **m-pipe®** subsea jumper spools reduce jumper weight and complexity, enabling Capex and Opex reduction
- High flexibility and strain capability means simpler jumper spool design and lower interface loads
- **m-pipe®** low thermal conductivity reduces the criticality of insulation requirements in the North Sea
- **m-pipe®** light weight enables ROV manipulation without a support vessel above and /or under a drill ship
- Risk mediated by a 30 month **m-pipe®** DNV certified qualification programme with a major IOC and north sea operator
Light weight and flexible for subsea jumper use

m-pipe® jumper spool bend test
6in - jumper spool - m-pipe configurations

- North Sea production field with existing 250m unbonded flexible jumper
- Jumper is at end of life due to high H₂S levels
- m-pipe® option selected:
  - Broad chemical compatibility
  - Excellent fatigue performance
  - High bending strain capacity
  - High pressure rating
  - High collapse rating
  - Low flow resistance

A range of 250m m-pipe® configurations can be deployed for the jumper

The 250m m-pipe® can follow the existing route, shortest route or lowest stress route

No preconfiguration is required with m-pipe®
10in jumper spool - riser base

Horizontal arc requires no metrology:
- m-pipe® jumper can accommodate all riser base movements and target box requirements
- Length dictated by target box
- Length adjustment via flexing of m-pipe®
Jumper spool applications

m-pipe® can be deployment in new fields, as tiebacks or steel / NBF pipe replacements

- m-pipe® can cope with a change of reservoir gases and fluids without undue concerns
- m-pipe® is less susceptible to corrosion, fatigue, seabed interaction and slug loading conditions
- Suits subsea configurations from 2 inch methanol jumpers up to 12 inch production applications
- Oilfield standard jumper spool hub, flange or threaded end fittings with collar and seal

Example m-pipe® short jumper spool installed between a riser base and PLET
Lessons: what Magma has learnt

- Clients seeking solutions offering an ability to cut install and overall costs and reduce risk
- A focus of our sales and marketing efforts on positioning m-pipe cost and risk benefits at executives rather than engineers has driven a clear increase in interest in use of m-pipe®
- New technology like m-pipe® seen as a key ingredient in vital O&G project cost reductions as well as interest from clients due to m-pipe® longevity reducing subsea maintenance
- BUT… we have still noticed the barriers common to the introduction of any new solution:
  - Over-reliance on existing solutions and supply chain – we needed to challenge the status quo
  - Lack of willingness to pilot new technology – answers for ‘too hard’ / ‘too challenging’ / ‘too risky’
  - Cultural and procedural barriers – lack of immediate benefit evidence or established standards meant that Magma had to establish an m-pipe qualification partnership with an IOC and Operator
Lessons: what our clients have said

- Many clients admitted that the 5 years of $85 a barrel slowed the pace of O&G innovation and that many of their subsea projects both over-ran and substantially overspent budget.

- Clients said a low oil price is now actively pushing them to seek new solutions that they would probably have not considered before, due to a need to deliver subsea project ROI.

- Client move towards optimising existing production rather than greenfield exploration.

- Clients are demanding that new products have a clear cost and risk reduction benefit.

- Clients also see a key to improving subsea projects is effective supply chain partnership.

- Clients are more willing to work with suppliers to find jointly developed subsea solutions.
Contact Magma Global

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