

**Post-Workshop Report**  
**2015 BSEE Domestic and International Standards Workshop**  
**May 8, 2015**  
**Houston, Texas**

**Background**

The 2015 BSEE Domestic and International Standards Workshop (Workshop) was held in Houston, Texas on May 8, 2015, and brought together representatives from domestic governmental agencies, industry, international regulators, and standards development organizations. This one-day workshop provided participants the opportunity to have an open dialogue about industry and regulatory concerns, learn about ongoing efforts to address those concerns, and discuss gaps or issues that need to be addressed in the future.

**Profile of the Participants**

The overwhelming majority of the approximately 237 attendees represented standards development organizations (SDOs) and U.S. domestic oil and gas organizations. A total of 24 BSEE employees attended the Workshop as well as 6 international regulators with representatives from United Kingdom, Mexico, Norway, Canada and Saudi Arabia. Other U.S. government agencies represented at the Workshop included Pipeline and Hazardous Materials Safety Administration (PHMSA), Department of Energy / National Energy Technology Laboratory (DOE/NETL), and United States Coast Guard (USCG). See Appendix 1: Attendees.



**Workshop Methodology**

The Workshop focused on four topics that were identified either internally or via external reports as areas of concern for BSEE: Cementing, Quality Management and Equipment Reliability, High Pressure High Temperature, and Emergency Disconnect Systems. Unlike previous workshops, this workshop was more technical in nature and provided participants the opportunity to have an open dialogue into the current state of domestic and international regulations, industry standards and research initiatives, industry and governmental concerns, and recommendations on how to resolve the identified concerns.

**Workshop Performance**

The Workshop began with a 1 hour introductory session for all participants with opening remarks by the BSEE Director and the Chief of the Office of Offshore Regulatory Programs. Participants then broke out into four different sessions for the remainder of the day. Each session followed a similar format discussing domestic and international regulatory concerns, current standards work, assessment of gaps, and identifications of issues that

need to be addressed. See Appendices 2-6 for the Combined Workshop Agenda and Individual Session Reports.



A number of general recommendations from the various sessions listed below demand BSEE attention:

1. Consideration of research on the use of resins to achieve wellbore isolation in lieu of or in conjunction with traditional cement;
2. Discussion of the need for a standard focused on the competency for cementing personnel with the appropriate SDOs;
3. BSEE needs to work with SDOs to develop standards on the design of HPHT equipment including verification and validation methodologies, material qualification, load case definitions, and post installation monitoring and inspection;
4. Clarification of the Independent Third Party verification process for HPHT equipment;
5. BSEE should consider becoming more actively involved in API SC 18 and SC 20 committee work as well as obtain copies of the IOGP report on crew management and risk reduction;
6. Clarification on the enforceability of the recommendations in safety alerts;
7. Consideration on guidance of various load cases both for the design of equipment (extreme, survival, etc.) and for in-situ loading scenarios (squalls, hurricane, drive off, drift off, etc.);
8. Consideration of the need to define well specific operating criteria for disconnect situations including watch circle boundaries, and deadman test requirements;
9. Guidance on post-incident reporting and inspections including coordination between affected governmental agencies;
10. Collaboration with API on standard(s)/regulation(s) regarding the on bottom deadman testing and the classification of intervention vessels;
11. Continue publication of QC-FIT reports as quality and reliability issues are identified;
12. Provide assistance to SDOs in working together to harmonize quality and reliability requirements;
13. Consideration of API 20E, API Spec Q1 9th edition, and the new API 18LCM document, when published, for incorporation into regulation; and
14. BSEE should begin to follow the ASTM standard on materials for oil and gas.

The Workshop provided BSEE an opportunity to communicate to the national and international standard development organizations, industry experts, and regulatory counterparts what BSEE's concerns were and hold an open dialogue on recommendations and action items to address those concerns. BSEE amassed those recommendations and will use them to develop new or expand existing regulations and policies that will improve safety in the Outer Continental Shelf.

## **End-of-the Workshop Feedback**

The Workshop evaluation surveys were highly positive, praising the networking opportunity, the information sharing, and the outreach by BSEE to industry; overall, the Workshop was a success. An analysis of the survey responses revealed that many of the participants recommend there be more dialogue on specific subtopics that BSEE needs help with; greater clarity from BSEE on expectations; potential future regulations; and to have dialogue with BSEE management on regulatory concerns as a majority of dialogue was from industry experts and standards development organizations. It is recommended that guidance and dialogue between decision makers on specific items be provided at the next workshop.

## **Appendices**

Appendix 1: Attendees

Appendix 2: Workshop Agendas

Appendix 3: Cementing Session

Appendix 4: Emergency Disconnect Sequence Session

Appendix 5: High Pressure High Temperature Session

Appendix 6: Quality Management and Equipment Reliability Session

## **Appendix 2: Workshop Agenda's**



# 2015 BSEE Domestic and International Standards Workshop

## Cementing Session Agenda

May 8, 2015  
University of Houston Hilton

*The cement job has been identified as a contributing cause of the well control failure in both the 2010 Macondo blowout and 2013 liner seal incident. This session will highlight 4 cementing issues that were raised in the Macondo reports and liner seal investigation, specifically: cement evaluation, barriers and cement integrity during plug and abandon operations, sustained casing pressure and borehole-cleaning evaluation. This session will discuss cementing-related domestic and international standards, current status and needs of the regulations, and international approaches and views.*

**Check-in time: 7:00 a.m. to 10:00 a.m.**

<b>8:00 a.m. – 9:00 a.m.</b>	<p><b>Introductory Session</b> Welcome – <i>Christy Lan, BSEE</i></p> <p>Safety Moment – <i>Julian Pham, BSEE</i></p> <p>Opening Remarks – <i>Brian Salerno, BSEE Director</i></p> <p>Standards Past, Present and Future – <i>Doug Morris, Chief OORP</i></p>
<b>9:00 a.m. – 10:30 a.m.</b>	<ul style="list-style-type: none"> <li>● Cementing Session Introduction - <i>Christopher Martens, BSEE</i> <ul style="list-style-type: none"> <li>○ Welcome and overall introduction to BSEE Cementing Session and objectives, agenda overview and format</li> <li>○ Cementing job as a major contributing factor for many loss of well control incidents including Macondo</li> <li>○ What are the needs of U.S. regulatory agencies?</li> </ul> </li> <li>● Borehole Cleaning Introduction - <i>Christopher Martens, BSEE</i></li> <li>● Annular Gas Migration: A Unique Perspective - <i>Loran Galey, Apache</i> <ul style="list-style-type: none"> <li>○ How can we improve borehole cleaning and gas migration?</li> </ul> </li> <li>● IADC Drilling Manual and Cementing Chapter - <i>Kate Baker, IADC</i> <ul style="list-style-type: none"> <li>○ Overview of the new cementing chapter in the IADC drilling manual</li> </ul> </li> </ul>
<b>10:30 a.m. – 10:45 a.m.</b>	<b>Break</b>
<b>10:45 a.m. – 12:15 p.m.</b>	<ul style="list-style-type: none"> <li>● Cement Evaluation Introduction - <i>Christopher Martens, BSEE</i></li> <li>● Cement Evaluation – A Risky Business - <i>Glen Benge, Benge Consulting</i> <ul style="list-style-type: none"> <li>○ How to improve cement evaluation. Framework of proper evaluations using field data analysis, pressure testing, passive and active well logs</li> </ul> </li> <li>● Open Dialogue Forum – <i>Glen Benge</i> <ul style="list-style-type: none"> <li>○ Discussion for the audience on any questions, suggestions, requests</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>○ Standards requests</li> </ul>
<b>12:15 p.m. – 1:15 p.m.</b>	<b>Lunch</b>
<b>1:15 p.m. – 3:00 p.m.</b>	<ul style="list-style-type: none"> <li>● Petroleum and natural gas Industries – Well Integrity Standard – <i>ISO 16530-1 Well Integrity Lifecycle Governance Document - Paulus Hopmans, Shell/ISO</i> <ul style="list-style-type: none"> <li>○ Overview of the ISO Well Integrity document including its history, status, development and approach by the Well Integrity Management System</li> </ul> </li> <li>● Cementing Standards Update - <i>Dan Mueller, Conoco</i> <ul style="list-style-type: none"> <li>○ Review of the status of multiple cementing standards</li> <li>○ SC 10 documents as well as 65, 65-1</li> </ul> </li> <li>● Sustained Casing Pressure - <i>Christopher Martens, BSEE</i> <ul style="list-style-type: none"> <li>○ Current regulatory process for SCP, regulatory perspective</li> </ul> </li> <li>● Industry Practices to Address SCP - <i>Ronald Sweatman, RS Consulting LLC</i> <ul style="list-style-type: none"> <li>○ SCP causes, industry standard practices and management of SCP</li> </ul> </li> </ul>
<b>3:00 p.m. – 3:15 p.m.</b>	<b>Break</b>
<b>3:15 p.m. – 5:00 p.m.</b>	<ul style="list-style-type: none"> <li>● Plug and Abandonment - <i>Christopher Martens, BSEE</i> <ul style="list-style-type: none"> <li>○ Regulatory perspective on P&amp;A operations, and the future</li> </ul> </li> <li>● Strategies for Cost-Effective, Reliable Long-term Well Abandonment - <i>Mike Cowan, CAZIT Inc.</i> <ul style="list-style-type: none"> <li>○ Well Abandonment strategies</li> </ul> </li> <li>● Standards Requests: Facilitated Session- <i>Co-facilitators: Dan Mueller and Glen Benge, Conoco and Benge Consulting</i> <ul style="list-style-type: none"> <li>○ Discussion for the audience on any questions, suggestions, requests</li> <li>○ Standards requests</li> </ul> </li> <li>● Closing Remarks – <i>Christopher Martens and Julian Pham, BSEE</i> <ul style="list-style-type: none"> <li>○ Did the workshop achieve BSEE goals? Anything BSEE needs more follow up?</li> <li>○ Workshop surveys, close-out and thanks</li> </ul> </li> </ul>



**2015 BSEE Domestic and International Standards  
Workshop**

**Emergency Disconnect Sequence (EDS) Agenda**

May 8, 2015

*There have been multiple incidents where loss of dynamic positioning (DP) has resulted in the need for an emergency disconnect (EDS) internationally and in the GOM. When an EDS occurs, safety systems must function reliably in order to safely shut in the well. The session will focus on DP issues raised by both BSEE and the USCG in the draft safety alert as well as incidents that have occurred internationally and the response of international regulators. The session will also touch on the BOP stacks, requirements, standards, and concerns which need to be addressed by industry.*

**Check-in time: 7:00 a.m. to 10:00 a.m.**

<b>8:00 a.m. – 9:00 a.m.</b>	<p><b>Introductory Session</b>          Welcome – <i>Christy Lan, BSEE</i></p> <p>Safety Moment – <i>Julian Pham, BSEE</i></p> <p>Opening Remarks – <i>Brian Salerno, BSEE Director</i></p> <p>Standards Past, Present and Future – <i>Doug Morris, Chief OORP</i></p>
<b>9:00 a.m. – 10:30 a.m.</b>	<ul style="list-style-type: none"> <li>● Case Study of EDS in the GOM -<i>Trent Fleece, BP</i></li> <li>● Emergency Disconnect Sequence (EDS) [ENI Experience in GOM] - <i>Brian Stiel, ENI Petroleum</i></li> </ul>
<b>10:30 a.m. –10:45 a.m.</b>	<b>Break</b>
<b>10:45 a.m. - 12:15 p.m.</b>	<ul style="list-style-type: none"> <li>● Emergency Disconnect Sequence - <i>Pat Watson, Anadarko</i> <ul style="list-style-type: none"> <li>○ Driller Panel</li> <li>○ Weather</li> </ul> </li> <li>● Dynamic Positioning- <i>David Hillier and John Macdonald, Transocean</i></li> </ul>
<b>12:15 p.m. –1:15 p.m.</b>	<b>Lunch</b>
<b>1:15 p.m. – 3:05 p.m.</b>	<ul style="list-style-type: none"> <li>● Guidelines for Dynamic Positioning Systems - <i>Sue Wang, ABS</i></li> <li>● Emergency Disconnect Procedures: Industry Approaches to DP Drift-off Analysis - <i>James Brekke, ABS</i></li> <li>● UKCS (United Kingdom Continental Shelf) Recent Experience of DP -<i>Simon Brown, Health and Safety Executive (HSE) UK</i></li> <li>● Dynamic Positioning NPRM Overview - <i>Joshua Reynolds, USCG</i></li> </ul>
<b>3:05 p.m. - 3:15 p.m.</b>	<b>Break</b>



**3:15 p.m. - 5:00 p.m.**

- EDS - Disconnects in the GOM – Jarvis Outlaw, BSEE
- DP Incidents – *Fred Brink, BSEE*
- Roundtable on the EDS process - *Jarvis Outlaw and Fred Brink, BSEE*
- Closing - *Jarvis Outlaw and Fred Brink, BSEE*
  - Lessons learned
  - Wrap up and path forward
  - Surveys



# 2015 BSEE Domestic and International Standards Workshop

## High Pressure High Temperature (HPHT) Session Agenda

May 8, 2015  
University of Houston Hilton

*The QC-FIT Technical Review of Connector and Bolt Failures highlighted quality concerns with the bolt materials including the need for updates to existing standards on material properties, testing, quality assurance, and lifecycle management. This is especially true as operators move into high pressure high temperature environments. It is recognized that there is a lack of consensus within industry, regulatory bodies, and academia on how to design, verify and validate HPHT designs.*

**Check-in time: 7:00 a.m. to 10:00 a.m.**

<b>8:00 a.m. – 9:00 a.m.</b>	<p><b>Introductory Session</b> Welcome – <i>Christy Lan, BSEE</i></p> <p>Safety Moment – <i>Julian Pham, BSEE</i></p> <p>Opening Remarks – <i>Brian Salerno, BSEE Director</i></p> <p>Standards Past, Present and Future – <i>Doug Morris, Chief OORP</i></p>
<b>9:00 a.m. – 11:00 a.m.</b>	<ul style="list-style-type: none"> <li>● HPHT Session Welcome, Expectation and Goals - <i>Russell Hoshman, BSEE</i></li> <li>● Approval Process for HPHT Projects in the Gulf of Mexico – <i>Russell Hoshman, BSEE</i> <ul style="list-style-type: none"> <li>○ What are the needs of U.S. regulatory agencies? What are the concerns? What information does BSEE need submitted when reviewing applications for the use of HPHT equipment?</li> <li>○ Q&amp;A</li> </ul> </li> <li>● Ultra Deep Gulf of Mexico 25K Completion – <i>Billy Richey, David Lewis, Richard Sukup, and Ravi Krishnamurthy, Freeport-MaMoRan Oil and Gas and Blade Energy</i> <ul style="list-style-type: none"> <li>○ Project Presentation</li> </ul> </li> <li>● The Independent Third Party Process for HPHT Material Characterization, Equipment Design Verification and Validation – <i>Mohsen Shavand and Ramgopal Thodla, DNV-GL</i> <ul style="list-style-type: none"> <li>○ Discussion of Independent Third Party Verification for HPHT</li> </ul> </li> <li>● Independent Third Party Review Process for HPHT Equipment: Material Characterization and Design Verification and Validation – <i>Ramon San Pedro and Kirk Brownlee, Stress Engineering Services</i> <ul style="list-style-type: none"> <li>○ Discussion of Independent Third Party Verification for HPHT</li> </ul> </li> </ul>
<b>11:00 a.m. – 11:15 a.m.</b>	<b>Break</b>

<p><b>11:15 a.m. – 12:15 p.m.</b></p>	<ul style="list-style-type: none"> <li>● Standards Updates – Current status, next steps, identified road blocks <ul style="list-style-type: none"> <li>○ API 17TR8: High-Pressure High-Temperature (HPHT) Design Guidelines – <i>Man Pham, BP</i></li> <li>○ Status Report on ASME Task Group on Subsea Applications – <i>Dan Peters, Structural Integrity Associates, Inc.</i></li> <li>○ Subsea Well Intervention Systems, API Specification 17D – <i>Brian Skeels, FMC</i></li> </ul> </li> </ul>
<p><b>12:15 p.m. – 1:15 p.m.</b></p>	<p><b>Lunch</b></p>
<p><b>1:15 p.m. – 2:55 p.m.</b></p>	<ul style="list-style-type: none"> <li>● Standards Updates – Current status, next steps, identified road blocks, cont. <ul style="list-style-type: none"> <li>○ HPHT - API Spec 6A Equipment – <i>David Zollo, FMC Technologies</i></li> <li>○ Subsea Well Intervention Systems: Working Draft 6, API Standard 17G – <i>Ray Stawaisz, Chevron</i></li> <li>○ API 16A – <i>Kent Grebing, NOV</i></li> <li>○ API 14A 12th Edition Overview Addressing Critical Service and HPHT SSSV Applications – <i>Darren Bane, Baker Hughes</i></li> <li>○ API SC 19 Equipment Specifications for HPHT Downhole Completion Equipment – <i>Rob Hilts, Halliburton</i></li> </ul> </li> </ul>
<p><b>2:55 p.m. – 3:05 p.m.</b></p>	<p><b>Break</b></p>
<p><b>3:05 p.m. – 5:00 p.m.</b></p>	<ul style="list-style-type: none"> <li>● Standards Updates – Current status, next steps, identified road blocks, cont. <ul style="list-style-type: none"> <li>○ Verification Analysis and Validation Testing of Subsea Connectors: API Technical Report 17TR7 – <i>Dr. Jim Kaculi, Drill-Quip</i></li> <li>○ API RP 5C5: Procedures for Testing Casing and Tubing Connections – <i>David Coe, Hess</i></li> </ul> </li> <li>● Facilitated session – <i>Dan Fraser, Argonne National Labs</i> <ul style="list-style-type: none"> <li>○ Discussion of issues raised during the HPHT session <ul style="list-style-type: none"> <li>▪ Materials</li> <li>▪ Basis of Design</li> <li>▪ Monitor loads</li> </ul> </li> </ul> </li> <li>● Closing – <i>Brian Skeels, FMC</i> <ul style="list-style-type: none"> <li>○ Wrap up, path forward, surveys</li> </ul> </li> </ul>



# 2015 BSEE Domestic and International Standards Workshop

## Quality Management and Equipment Reliability (QM/ER) Session Agenda

May 8, 2015  
University of Houston Hilton

*BSEE has highlighted in its QC-FIT Technical Evaluations of Connector and Bolt Failures and Seal Assembly and Cement Failures Reports quality concerns with bolt material, seal assemblies and cement barrier systems. This includes the need for updates to existing standards on material properties, testing, quality assurance, and lifecycle management. This session will address domestic and international quality management and equipment reliability concerns. The emphasis will be on quality assurance of subcontracted components and services, lifecycle management for safety critical equipment, how near miss and failure reporting can contribute to equipment reliability, the current status of regulations and standards, and international needs and concerns.*

*The following 3 themes will be the primary points of discussion throughout the day:*

1. *Data Needs – Failure Reporting/Near Misses*
  - o *How are failures and near misses traced?*
2. *Quality Management and Subcontractor Oversight*
  - o *How is subcontractor oversight managed at all levels/tiers?*
3. *Lifecycle Management for Safety Critical Equipment*
  - o *How is a product’s traceability maintained throughout its lifecycle?*

*The morning sessions will be focused on identifying issues and the afternoon sessions will be focusing on discussing solutions.*

**Check in time: 7:00 a.m. to 10:00 a.m.**

<b>8:00 a.m. – 9:00 a.m.</b>	<p><b>Introductory Session</b> Welcome – <i>Christy Lan, BSEE</i></p> <p>Safety Moment – <i>Julian Pham, BSEE</i></p> <p>Opening Remarks – <i>Brian Salerno , BSEE Director</i></p> <p>Standards Past, Present and Future – <i>Doug Morris, Chief OORP</i></p>
<b>9:00 a.m. – 10:30 a.m.</b>	<ul style="list-style-type: none"> <li>● U.S. Discussion on Identified Issues – <i>Panel Discussion</i> <ul style="list-style-type: none"> <li>○ What are the needs of U.S. regulatory agencies/programs regarding QM/ER issues they have come across?</li> <li>○ How do other regulatory bodies/programs use standards to accomplish their regulatory objectives and address QM/ER issues?</li> <li>○ How are other regulators’/programs’ issues related to BSEE issues Similarities/Differences? Reference to the Quality Assurance/Quality Control issues recently identified by BSEE during QC-FIT evaluations:           <ul style="list-style-type: none"> <li>▪ Connector and Bolt Failures Report</li> </ul> </li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>▪ Seal Assembly and Cement Failures Report</li> </ul> <p>Panelists</p> <ol style="list-style-type: none"> <li>1. Joe Levine – <i>Emerging Technologies Branch Chief, BSEE</i> <ol style="list-style-type: none"> <li>a. Systems Reliability Evaluations</li> </ol> </li> <li>2. Roger Schaffer – <i>Deputy Director, Sub Safety and QA, NAVSEA</i> <ol style="list-style-type: none"> <li>a. The US Navy’s Submarine Safety Standards</li> </ol> </li> <li>3. Linda Daugherty – <i>Deputy Associate Administrator for Pipeline Safety – Field Operations, PHMSA-DOT</i> <ol style="list-style-type: none"> <li>a. How Incident Causes are Highlighting Material and Equipment Challenges and the Need for a Robust Quality Management System</li> </ol> </li> <li>4. Dr. Brian Craig – <i>Professor and Chair of Industrial Engineering Department – Lamar University</i> <ol style="list-style-type: none"> <li>a. Maritime Near Miss Reporting</li> </ol> </li> </ol>
<p><b>10:30 a.m. – 10:45 a.m.</b></p>	<p><b>Break</b></p>
<p><b>10:45 a.m. – 12:15 p.m.</b></p>	<ul style="list-style-type: none"> <li>● International Discussion on Identified Issues – <i>Panel Discussion</i> <ul style="list-style-type: none"> <li>○ What are the needs of international communities regarding QM/ER issues they have come across?</li> <li>○ How do international communities use standards to accomplish their regulatory objectives and address QM/ER issues?</li> <li>○ How are international issues related to U.S. issues? Similarities/Differences?</li> </ul> </li> </ul> <p>Panelists</p> <ol style="list-style-type: none"> <li>1. Simon Brown – <i>Operations Manager, Energy Division, UK Health &amp; Safety Executive</i> <ol style="list-style-type: none"> <li>a. Quality Management &amp; Equipment Reliability in the Context of the GB Regulatory Framework</li> </ol> </li> <li>2. Ola Heia – <i>Principal Engineer, Petroleum Safety Authority</i> <ol style="list-style-type: none"> <li>a. Petroleum Safety Authority of Norway</li> </ol> </li> <li>3. Paul Hopmans – <i>Shell Global Principal Technical Expert, Netherlands</i> <ol style="list-style-type: none"> <li>a. Petroleum and Natural Gas Industries – Well Integrity Standard</li> </ol> </li> </ol>
<p><b>12:15 p.m. – 1:15 p.m.</b></p>	<p><b>Lunch</b></p>
<p><b>1:15 p.m. – 3:05 p.m.</b></p>	<ul style="list-style-type: none"> <li>● Industry Discussion on Solutions – <i>Panel Discussion</i> <ul style="list-style-type: none"> <li>○ What are the upcoming gaps in data needs, quality management, and lifecycle management that the industry sees for the future?</li> <li>○ What current industry initiatives are addressing these gaps?</li> <li>○ What are the needs for new and emerging technologies regarding QM/ER? <ul style="list-style-type: none"> <li>▪ High Pressure/ High Temperature needs?</li> <li>▪ Service vs. manufacturing quality?</li> <li>▪ Maintaining traceability through a product’s lifecycle?</li> </ul> </li> </ul> </li> </ul> <p>Panelists</p> <ol style="list-style-type: none"> <li>1. Jim Raney – <i>Director of Engineering, Anadarko Petroleum Engineering &amp; Technology Group</i> <ol style="list-style-type: none"> <li>a. Equipment Design and Reliability from Design to Decommissioning</li> </ol> </li> <li>2. Jason Strouse – <i>Integrity Management Engineer, Wood Group Kenny</i> <ol style="list-style-type: none"> <li>a. Industry discussion on solutions – The third party perspective</li> </ol> </li> <li>3. Mike Briggs – <i>Director of Quality, Cameron Corporation</i> <ol style="list-style-type: none"> <li>a. Product Lifecycle Management</li> </ol> </li> <li>4. Jim Hood – <i>Quality Manager, Freeport-McMoRan Oil &amp; Gas</i> <ol style="list-style-type: none"> <li>a. Freeport-McMoRan perspectives on the development of processes to address lifecycle management , equipment reliability and subcontractor management issues</li> </ol> </li> <li>5. Peter Ireland – <i>Quality and Reliability Design Manager, Schlumberger</i></li> </ol>

	<ul style="list-style-type: none"> <li>a. Life Cycle Management and Reliability at Schlumberger</li> <li>6. Rick Faircloth – <i>Principal Engineer, Cameron Valves and Measurement</i> <ul style="list-style-type: none"> <li>a. API 20 Series Supply Chain Management Standards</li> </ul> </li> </ul>
<p><b>3:05 p.m. – 3:15 p.m.</b></p>	<p><b>Break</b></p>
<p><b>3:15 p.m. – 5:00 p.m.</b></p>	<ul style="list-style-type: none"> <li>• Standards Organizations Discussion on Solutions – <i>Panel Discussion</i> <ul style="list-style-type: none"> <li>○ What are the long-term plans to develop standards that address the identified domestic and international concerns regarding data needs, quality management and lifecycle management?</li> <li>○ How have standards organizations addressed technical gaps in the past and how can current gaps be addressed?</li> <li>○ What are the data needs for standards organizations?</li> </ul> </li> </ul> <p>Panelists</p> <ol style="list-style-type: none"> <li>1. Bob Badrak – <i>Vice Chairman of NACE Policy Committee and Vice Chairman of ISO 15156 Maintenance Panel</i> <ul style="list-style-type: none"> <li>a. ANSI NACE MR0175/ISO 15156: Materials for use in H2S-containing environments in oil and gas production</li> </ul> </li> <li>2. John Koehr – <i>Managing Director, Technology &amp; Personnel Certification, ASME</i> <ul style="list-style-type: none"> <li>a. The American Society for Mechanical Engineers</li> </ul> </li> <li>3. Joe Greenslade – <i>Director of Engineering Technology, Industrial Fasteners Institute</i> <ul style="list-style-type: none"> <li>a. ASTM F16 Fastener Committee Information</li> </ul> </li> <li>4. Kim Wiita – <i>Chairman of API Subcommittee on Quality and Vice Chair of API Monogram Program Board</i> <ul style="list-style-type: none"> <li>a. API Subcommittee 18 – Quality Standards and Activities</li> </ul> </li> </ol> <ul style="list-style-type: none"> <li>• Closing – <i>Doug Morris, BSEE</i> <ul style="list-style-type: none"> <li>○ Wrap up and path forward</li> </ul> </li> </ul>

## **Appendix 3: Cementing Session**

## **Background**

Cement has been identified as a contributing factor to many loss-of-well control incidents. Despite the 2010 Macondo blowout and the 2013 Liner Seal incident, little has been done to regulate cementing operations offshore or onshore.

## **Session Objectives/Topic Areas**

The objective of the cementing session at the 2015 BSEE Domestic and International Standards Workshop was to determine how to approach regulating cementing operations, to communicate BSEE's concerns with industry and discuss what can be done to improve cementing operations and assure well integrity. Four major topics were selected that reflect cementing operations throughout the lifecycle of a well: borehole cleaning, cement evaluation, sustained casing pressure, and plug and abandonment.

**Borehole Cleaning:** BSEE does not have any specific regulations on borehole cleaning but it is known that improper borehole cleaning can lead to drilling fluid and cuttings intermixing with the cement slurry creating a pathway for gas migration. An "incorporated gas" migration theory was presented, which hypothesized latent gas released from drill cuttings intermixing with the cement slurry during the cementing process and expanding as it is displaced up the wellbore. The gas coalesces and migrates upward, creating a flow path. The audience discussed the need for industry to develop a recommended practice on wellbore cleaning and what laboratory tests are necessary. A wellbore cleaning document is not available through API or IADC, though is addressed to some degree in the wellbore preparation section of the IADC cementing chapter. There was no resolution on a path forward on developing an industry document on wellbore cleaning but it was recommended that BSEE make a request to API or other standards development organizations (SDOs) for such a document.

**Cement Evaluation:** One of the great challenges of cement jobs is evaluation of the cementing bond integrity. Three traditional evaluation methods include cement bond logs, ultrasonic imaging, and pressure testing of the shoe. Cement bond logs, a commonly used evaluation technique, do not allow for definitive determination of isolation. The logs provide information about the apparent presence of cement in the annulus against pipe. Ultrasonic imaging tools provide a better picture of the immediate annulus, but do not allow cement evaluation in outer annuli. Performing a shoe test gives some degree of confidence in the presence of a barrier at the shoe, but does not give an indication of the presence of a barrier for any particular distance. Additional work is ongoing in the industry in the form of alternate logging technologies and tracer technologies that may allow for better determination of the quality and quantity of the cement in the annulus. Funding the research and development of these technologies should be evaluated and considered by BSEE. API Standard 65-2, Isolating Potential Flow Zones During Well Construction, contains information on cementing design and operations, but further work may be needed to ensure contingency plans are identified before cement operations begin. The document may be able to serve as the basis for the development of company specific requirements, but a risk-based analysis approach needs to be considered when determining isolation. It was recommended that risk-based analyses should be conducted for each well.

**Sustained Casing Pressure (SCP):** BSEE data revealed that a high percentage of older wells have SCP. Best practices to prevent SCP can be found in API 65-2, Cementing Design, Execution, Evaluation and Sealing Devices, and API 96, Deepwater Well Design and Construction, for Deepwater well pressure design and verification. BSEE already incorporates by reference API 65-2 and is considering incorporating API RP 96 into regulations. Currently BSEE requires operators to monitor and submit to BSEE the pressures of SCP wells with



varying frequencies depending on well-type (fixed, subsea, hybrid). BSEE also allows “self-approvals” for continued production under certain conditions. If those conditions are not met, departures to allow continued production are granted on a case-by-case basis. There was considerable discussion on the use of risk assessments to determine whether SCP in an individual well presents a need for intervention. BSEE recognized that having the expertise and personnel on hand to perform risk assessments internally would be a challenge. Also, the general agreement is that the current process for addressing SCP is robust, however BSEE may look at risk assessments in the future.

Plug and Abandonment: BSEE and industry provided an overview of the current plug and abandonment regime and strategies for cost-effective, reliable, long-term well abandonment barriers. Plug and abandonment is of particular interest to BSEE. Many wells are expected to be abandoned in the near future and BSEE's NTL 2010-G05 Idle Iron Initiative was published with that in mind. API is drafting a recommended practice on Well Plug and Abandonment operations which would be of great interest to BSEE and should be considered for incorporation.

### **Other Areas of Interest for BSEE Consideration**

Other issues that BSEE may have interest in:

1. The use of resins to achieve isolation: Resins have seen field use before but the general consensus is that they are far too costly. BSEE may need to take a leadership role in the development of alternative additives or alternatives to cement to better ensure isolation. They can be brought into the API Plug & Abandonment standard.
2. The need for a standard focused on the competency for cementing personnel: It was unanimously agreed that a licensed professional engineer simply does not have the competency to evaluate cement plans without prior cementing experience. It was recommended that API or IADC take a lead in developing competency standards for cementing personnel similar in scope to drilling fluids engineers. The industry will revisit this effort but it is recommended that BSEE provide support.
3. Regulatory requirements specify the amount of cement required in different annuli: Many would like to know the science behind those requirements. BSEE may also pursue research into this or at minimum, find the origination of those requirements.

### **Session Results/Outcomes**

This session provided an arena for communication of BSEE concerns to the industry including BSEE's focus on the integrity; design; testing; remediation and impact of poor cement operations; as well as allowed discussion of other cementing issues that were previously unknown to BSEE.

The cementing session benefited BSEE by providing more insight on steps to take to improve well integrity which include awareness of the limitations of current tools and technology available to qualify cement isolation; possible research and development for alternative technologies; characterizing qualified cementers for review of high-end cement operations; and evaluating the incorporation of certain standards into the CFR such as API 96 and the draft plug and abandonment document.

# **Appendix 4: Emergency Disconnect Sequence Session**

## **Background**

Over the past several years, there have been multiple incidents where loss of dynamic positioning (DP) has resulted in the need for an emergency disconnect (ED) internationally and in the Gulf of Mexico (GOM). When an ED occurs, safety systems must function reliably and timely in order to safely shut in the well. Dynamic positioning, strictly speaking, is under the jurisdiction of the USCG even though the implications of a DP failure for MODU's often cross into BSEE's jurisdiction, i.e. activation of the BOP or other safety devices. BSEE currently has a joint Memorandum of Understanding (MOU) with the USCG and coordinated this session jointly.

## **Session Objectives/Topic Areas**

The session focused on DP issues raised by both BSEE and the USCG in the 2015 Safety Alert. The session also discussed the Blowout Preventer (BOP) stack response, requirements, standards, and concerns which need to be addressed by industry relating to these issues.

The morning session focused on four instances of EDs in relation to weather, equipment, configuration, and maintenance. When faced with EDs, industry generally followed guidance provided by API Standard 53 (API Std 53), Blowout Prevention Equipment Systems for Drilling Operations, API Recommended Practice 53 (API RP 53), the previous edition of API Std 53, API Spec 16D, Specification for Control Systems for Drilling Well Control Equipment and Control Systems for Diverter Equipment, and the government's Safety Alert. The primary topic of discussion focused on industries desire to adhere to the requirements in API Std 53 in lieu of API RP 53 which BSEE currently references in the CFR's. Industry prefers to use API Std 53 because of the requirements for deadman testing, autoshear, and ROV functionality.

In the afternoon, participants discussed possible requirements for inclusion either directly into a BSEE / USCG regulation or via a standard that is incorporated by reference (IBR). Participants expressed the need for the safety critical components of the DP system to be identified, requirements for safety critical components of a DP system to be clearly defined, and for requirements on the fully integrated system to be clearly stated in the regulations directly or through a standard that is IBR.

Industry also discussed the need for information sharing after an incident occurs. Safety alerts have been published after DP incidents, but neither the regulations nor standards mandate a review of or compliance to the recommendations in safety alerts.

## **Other Areas of Interest for BSEE Consideration**

There were several suggestions made during the workshop that require further attention by BSEE, the USCG, SDOs, or all three. First of all, the governmental agencies should consider how to disseminate the results of any incident investigation industry wide to increase awareness and reduce the probability of future incidents. BSEE, USCG, and the SDOs should consider the most appropriate way of collecting and sharing information with industry and coordinate to ensure the technical findings and recommendations captured in safety alerts and incident investigations are incorporated into the appropriate standards and recommendations.

Other issues discussed that require further attention by BSEE, USCG, and the SDOs include:

Equipment and manufacturing standards which address specific drilling related activities and components of Emergency Disconnect Systems  
Clarification on the API requirement to finish a disconnect sequence in 90 seconds;  
The need for a standard addressing accumulator capacity;  
Research on methods for testing of shear rams in the field;  
Research into the risks involved for on-bottom deadman testing and possible alternative requirements;  
Discussion between industry and regulators on the MODU and DP classification of vessels that is acceptable for drilling, workover, and intervention operations;  
Consideration of guidance concerning squalls?  
Should BSEE define well-specific operating criteria including watch circle boundaries, and deadman test requirements?  
Is there a need for either the government (BSEE and/or the USCG) or API to clearly define “drive off” vs “drift off” and the post-incident reporting and inspections that should take place?  
The need for DP incident reporting requirements.

The session participants also had questions directly relevant to BSEE and the USCG’s jurisdiction that they would like to see addressed by the governmental agencies, including:

Can BSEE/USCG enforce the recommendations in safety alerts?  
Can a company be INCed for not following the guidance in a safety alert?  
Coordination of critical operations and clearly defined jurisdiction between BSEE and USCG concerning DP failures that is clearly articulated to the industry;  
Operators are concerned that an abnormality may happen in which they are unable to control the well during the 30 minute downtime needed for deadman testing. They would like to see consideration of a revision to the regulations requiring for deadman testing upon latch up;  
Clearly defined requirements for the class of intervention vessels that should be allowed to operate in the GOM;  
A clearly defined reporting structure for incidents involving offshore oil and gas activities. Currently, drilling contractors report DP incidents to the USCG while operators report incidents to BSEE. Both agencies have a stake in results of a DP incident and therefore need to coordinate a transfer of information when an incident is reported.

### **Session Results/Outcomes**

This session was beneficial to BSEE because it brought all the key stakeholders, operators, rig owners, SDOs, BSEE and USCG together for an open dialogue. All the interested parties were able to share lessons learned from past DP incidents, discuss current concerns, and make suggestions for BSEE and the USCG to consider to improve safety and environmental compliance. The planning of the session also brought BSEE and USCG staff together which has assisted in bolstering communication between the agencies on this issue. BSEE should continue to work with USCG to make sure the causes and effects of DP incidents are understood and to construct consistent policies on disconnects and dynamic positioning that ensure safety for people and the environment.

# **Appendix 5: High Pressure High Temperature Session**

## Background

The High Pressure High Temperature (HPHT) session provided an opportunity for dialogue between regulators, independent third party (I3P) verification agencies, operators, manufacturers, and Standards Development Organizations (SDOs). Communication with all interested parties concerning the design, verification, validation, and lifecycle management of HPHT wells and equipment is critical to ensuring safe operations in the offshore Outer Continental Shelf (OCS). As regulators, BSEE has received an increased number of questions related to the approval process for HPHT developments. In response, BSEE has pushed the SDO to develop HPHT documents, many of which are either recently published or under development. This session also allowed for feedback and lessons learned from operators who have received regulatory approval for the development of a HPHT project.

## Session Objectives/Topic Areas

The introductory session began with a presentation from BSEE on how to apply for approval of a HPHT project through the Deepwater Operations Plan (DWOP) Process. The presentation included what must be submitted within the Conceptual Plan (C DWOP) to receive Conceptual approval and the requirements for I3P equipment design verification, equipment validation testing and well design as required by 30 CFR 250.807. It was clearly stated that final DWOP approval will not be granted until every aspect of all HPHT equipment and well design has been reviewed and approved by an I3P. BSEE also conveyed the need for the development of HPHT materials standards and clearly defined load cases which should be considered in all HPHT designs.

BSEE's presentation was followed by a McMoRan and Blade Energy presentation on the HPHT design process, BSEE approval process, and discussion of the completion of two 25 ksi gas wells: Davy Jones No. 1 and No. 2. The presentation focused on how McMoRan and Blade Energy went through the design and approval process with the lack of standards in place at that time. They highlighted areas the standards still need to address, concerns they had with the BSEE regulatory requirements, and how they came to a consensus on their HPHT design.

The last presenters in the introductory session were two I3Ps, Stress Engineering and DNV GL. The Stress Engineering presentation included some of the potential pitfalls of the I3P process and some recommendation to help improve the process. The DNV GL presentation described both the API 17TR8 and BSEE HPHT review process. They did provide some focus on material behavior in a stress corrosion cracking environment. This material behavior issue is what makes HPHT equipment design so difficult.

The afternoon sessions focused on updates from various SDO committees who are currently working on HPHT documents. The goal in bring all the committees together was to harmonize, where possible, the requirements so that when the components are integrated, the system has been designed in a cohesive manor. The committee updates also allowed everyone involved in the HPHT arena to discuss and get a better understanding of the gaps that are not currently being addressed by the SDOs or regulators.

- **API 17TR8, High Pressure High Temperature (HPHT) Design Guidelines:**

After many years the first edition of API 17 TR8 is now published. This is currently the most comprehensive HPHT oil field equipment design document. This is a technical report, it is not a recommended practice or a specification. It is intended to be used as guidance for other API committees who are trying to update their documents to address HPHT equipment design. API 17TR8 has initiated

work on the second edition to address some of BSEE and industries concerns regarding material qualification and characterization in a stress corrosion cracking environment. Also new load conditions need to be defined for a HPHT environment. The committee is focused on defining “Extreme and Survival loads”.

- **ASME Boiler and Pressure Vessel Code (BPVC) Section VIII Division 2 & 3**

Although ASME representatives have participated as members on the API 17TR8 committee, both API and ASME recognize that some work needs to be done to improve the alignment between the two organizations. To address this, ASME Section VIII Div 3 has created a sub-committee focused on the design of oilfield equipment. Since many API documents reference ASME design methods, this work will improve the applicability of the ASME design codes.

- **API Spec 6A and Std 6X, Specification for Wellhead and Christmas Tree Equipment and API/ASME Design Calculations**

The existing API 6A document already covers designs up to 20K, but Subcommittee (SC) 6 is considering what else needs to be developed to address the recommendations made in 17TR8. In the 21<sup>st</sup> edition of API 6A, the design requirements will be removed and a reference will be made to the newly published API 6X document.

- **API Spec 17D, Specification for Subsea Wellheads and Trees**

API 17TR8 was written specifically to provide guidance to API 17D to increase the current pressure design limit of 15K to 20K or greater. There will be a 20K subsea well head and tree designed and in service before the next revision of API Spec 17D is completed. BSEE needs to be aware of design considerations currently proposed in 17D and any additional work that needs to be done for HPHT wellheads and trees.

- **API Std 17G, Subsea Well Intervention Systems**

API 17G 3<sup>rd</sup> edition has been under revision for over 8 years and will address subsea well intervention equipment such as subsea test trees, lower workover riser packages and intervention riser systems. The over 700 page document is out for comment but does not address HPHT. The committee intends to fill this gap in the next edition.

- **API Spec 16A, Specification for Drill-through Equipment**

It does not appear that API 16A has made any progress on attempting to address HPHT as of yet. This is a recognized gap that BSEE would like to see addressed by SC16.

- **API Spec 14A, Subsurface Safety Valves**

The 12<sup>th</sup> edition of API 14A was published on January 2015 but does not become effective until January 2016. The 12<sup>th</sup> edition has an HPHT Annex for Design Verification and Validation which is not entirely consistent with API 17TR8 because it was specifically written for only subsurface safety valves.

- **API Spec 11D1, Specification for Packers and Bridge Plugs**

API 11D1 3<sup>rd</sup> edition was published April 2015 with an Annex for HPHT equipment. It is recognized that HPHT connections are not adequately addressed in the SC 19 suite of documents and is an area where additional work is needed.

- **API 17TR7, Subsea Connector Technical Report**

This Technical Report considers verification and validation testing for subsea connectors and is also trying to define the load conditions, normal, extreme and survival, that should be considered during design. A clear and consistent understanding of the loads that should be considered during design is critically important to BSEE and to industry.

The day ended with a facilitated session which was heavily focused on the need for more explicit standards addressing testing, qualification, and inspection of HPHT materials. Several committees within API, ASME, and ASTM are all working on HPHT materials issues. It was recommended that all interested parties be kept apprised of the work going on in the committees to ensure consistency and efficiency in the development of materials requirements.

Overall, the work within API 17TR8 and ASME Section VIII Div 3, is ongoing and somewhere in the 50% to 80% complete range. There is still some work that needs to be resolved for the design of HPHT equipment including verification and validation methodologies, material qualification, load case definitions, and post installation monitoring and inspection. The industry appears to be more than 5 years away from fully addressing the issues around HPHT. As always, engineering standards do not lead technology development, they follow its implementation.

### **Session Results/Outcomes**

There were several important outcomes from the HPHT session. The BSEE Technical Assessment Section was able to provide industry guidance on seeking HPHT project approval. BSEE was able to convey the need for standards addressing HPHT materials, clear and consistent definition of the load cases which should be considered during design, and post installation monitoring and inspection to ensure the design is fit for purpose. Various SDO committees were also able to get a better understanding of the different requirements for HPHT equipment so that the industry as a whole can move toward ensuring system reliability.

Recommendations for any future HPHT session include more involvement from upper level BSEE management. There is a major concern within the industry about what the requirements from BSEE will be. Operators and manufacturers need to understand what BSEE may require of them years in advance of the final product execution. It is also recommended future HPHT Workshop sessions be more discussion based with BSEE management and industry subject matter experts equally sharing the presentation/discussion time. The use of a professional facilitator in the planning and execution of the session is recommended.



# **Appendix 6: Quality Management and Equipment Reliability Session**

## **Background**

The need for updates to existing standards on material property requirements, testing, quality assurance, quality control, and lifecycle management were noted as recommendations in the QC-FIT reports. Considering these concerns, the QM-ER session focused on identifying speakers to participate in a panel discussion addressing domestic and international quality management and equipment reliability issues. The emphasis was on quality assurance and control of subcontracted components and services; lifecycle management for safety critical equipment; how near miss and failure reporting can contribute to equipment reliability; the current status of regulations and standards; and international needs and concerns.

## **Session Objectives/Topic Areas**

The QM-ER session focused on four primary themes: quality management, failure reporting and data needs, subcontractor oversight, and lifecycle management for safety critical equipment. A total of seventeen speakers participated in four panel sessions (two sessions in the morning, two in the afternoon). The morning sessions focused on issues that domestic and international regulators and organizations identified in recent years. The afternoon sessions focused on solutions implemented by manufacturers, operators, consultants, contractors and Standards Development Organizations (SDOs) to address current or similar issues.

The first morning session panelists presented QM-ER issues that have been identified by domestic agencies: BSEE, Naval Sea Systems Command (NAVSEA), Department of Transportation - Pipeline and Hazardous Materials Safety Administration (DOT-PHMSA), and a presentation from Lamar University on near miss reporting statistics for equipment. These discussions were referred to throughout the day, specifically the similarities of issues identified by different agencies and the techniques that different agencies have found to be effective. BSEE conveyed interest in collaborating with industry to find solutions to the issues identified during QC-FIT evaluations for connectors, bolts, seal assemblies and cement which was met with interest by the stakeholders present. The NAVSEA presentation emphasized the importance of continuously reminding workers of the consequences of failing to act, which was conveyed multiple times by other panelists and was a key lesson of this session.

The second morning session panelists presented QM-ER issues that arose internationally (namely in Norway – the Petroleum Safety Authority (PSA), and in the UK – the Health & Safety Executive (HSE)). An additional presentation was given on the new ISO standard for assuring well integrity over the lifecycle of a well. PSA covered their regulatory framework and requirements to trace and trend the lifecycle of equipment. HSE provided an overview of their organizational structure and their regulatory requirements which are heavily based on the 1988 Piper Alpha incident. HSE also discussed how they evaluate whether equipment is fit for service and their shift from providing oversight on only duty holders to also providing oversight on independent third parties.

The industry panelists in the first afternoon session were comprised of manufacturers, operators, service companies, and independent third parties. Several members were involved in API committees and discussed API's efforts to address BSEE's findings from the QC-FIT reports regarding connectors and bolts. Multiple work groups have been assigned to begin work on this effort. Some API subcommittees, equipment manufacturers, and other oil and gas companies have made plans to reference API Spec 20E, Alloy and Carbon Steel Bolting for Use in the Petroleum and Natural Gas Industries, as a requirement for bolting. One panelist also recommended that the participants look at the International Association of Oil & Gas Producers (IOGP)

report on crew management for suggestions on reducing risk during operations and as part of a quality management system.

The final panelists of the day represented industry standards organizations: API, ASME, NACE, and ASTM. ASTM focused on addressing the QC-FIT Bolt report, interpretations of ASTM standards, and the applicability of such standards to oil and gas subsea operations. ASTM is currently drafting a document that will standardize materials used in oil and gas subsea applications. API provided updates on their quality standards documents. There have been dramatic changes between editions 8 and 9 of API Spec Q1, Quality Management System Requirements for Manufacturing Organizations for the Petroleum and Natural Gas Industry (i.e. a scope change, additional requirements, and incorporation of risk). A new lifecycle management standard for equipment called 18LCM is also being drafted. NACE and ASME focused on examples of how their organizations have addressed similar QM-ER issues in the past.

### **Other Areas of Interest for BSEE Consideration**

A representative from Asociación de Emprendedores de Mexico, ASEA, (<http://www.asea.gob.mx/>) was quite interested in the QM-ER session. ASEM is beginning to address similar issues and wanted to get a global perspective since Mexico's regulatory framework recently changed. This representative approached the organizers of the QM-ER session to express their interest and appreciation for having such a timely discussion.

### **Session Results/Outcomes**

The QM-ER session added value to both the industry and BSEE by providing an opportunity for open dialogue between domestic and international stakeholders with a focus on quality management, failure reporting, data needs, and life cycle management of safety critical equipment. The stakeholders shared different methodologies for identifying and solving QM-ER issues. The session also raised awareness about the ongoing efforts to address the concerns identified in the BSEE QC-FIT reports. It is recommended that BSEE continue publishing QC-FIT reports as they provide an excellent means of communicating gaps that have been identified in quality management systems. It is also recommended SDOs work together to harmonize quality and reliability requirements. BSEE should review API 20E, API Spec Q1 9th edition, and the new API 18LCM document for incorporation into regulation and also follow the ASTM standard on materials for oil and gas.