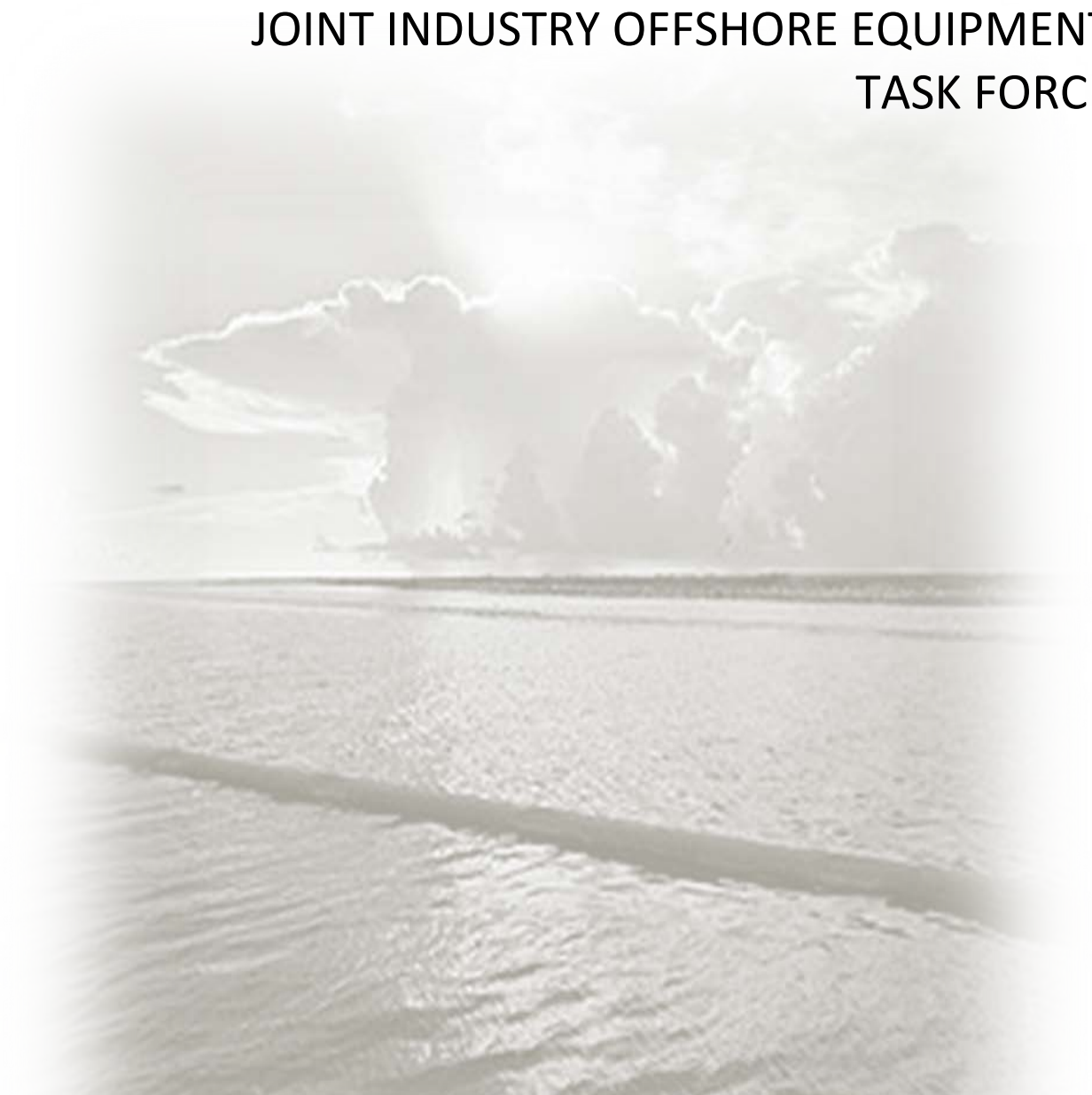
JOINT INDUSTRY OFFSHORE OPERATING PROCEDURES TASK FORCE
JOINT INDUSTRY OFFSHORE EQUIPMENT TASK FORCE



FINAL REPORT on INDUSTRY RECOMMENDATIONS to IMPROVE OFFSHORE OPERATING PROCEDURES AND EQUIPMENT

March 13, 2012

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1. Introduction

In response to the Gulf of Mexico (GOM) Macondo incident, the oil and gas industry (Industry), with the assistance of the American Petroleum Institute (API), International Association of Drilling Contractors (IADC), Independent Petroleum Association of America (IPAA), National Ocean Industries Association (NOIA), and the United States Oil and Gas Association (USOGA), assembled two Joint Industry Task Forces (JITFs) to focus on critical areas of GOM offshore activity: the Joint Industry Offshore Operating Procedures Task Force (Procedures JITF) and the Joint Industry Offshore Equipment Task Force (Equipment JITF).

Sessions for these JITFs began May 10, 2010, to provide recommendations to the United States (US) Department of the Interior's (DOI) *Increased Safety Measures for Energy Development on the Outer Continental Shelf*[1] (Safety Report). The JITFs were not involved in the review of the incident; rather they brought together Industry experts to identify best practices in offshore drilling operations and equipment, with the goal of further enhancing safety and environmental protection.

This final report outlines how the JITFs transformed their recommendations into improved Industry standards not only through evaluation and revision of Industry guidelines, but also active engagement with Federal policy development and revisions.

1.1 General Objectives

The initial objective of both JITFs, outlined in their May 17, 2010, White Paper: *Recommendations for Improving Offshore Safety: Joint Industry Task Force to Address Offshore Operating Procedures and Equipment*[2], was to prepare immediately actionable recommendations regarding GOM deepwater drilling operations. These recommendations were to: 1) close any identified gaps in current blowout preventer (BOP) operating practices; and 2) align Industry standards for well drilling and completion practices/procedures with recognized Industry best practices.

The JITFs developed a strategy to achieve their shared long term objective of incorporating findings from the GOM Incident Root Cause Analysis[3] into: (1) existing API standards and (2) Bureau of Ocean Energy Management and Enforcement's[4] (BOEMRE's) regulations. In so doing, these standards and regulations would reflect identified improvements in offshore drilling operations.

2. Timeline of Events

The timeline reflected in Table 1 illustrates not only the commitment of these JITFs to engage in active participation with Federal policy makers for improved safety of offshore operating equipment and procedures, but also the commitment to put forth improved Industry standards and guidelines in a timely manner.

[1] http://www.doi.gov/deepwaterhorizon/loader.cfm?csModule=security/getfile&PageID=33598

[2] White Paper: Recommendations for Improving Offshore Safety; *Joint Industry Task Force to Address Offshore Operating Procedures and Equipment*

[3] BOEMRE/US Coast Guard Joint Investigation Team (JIT) released its final Investigative Report in two volumes on the April 20, 2010, *Deepwater Horizon* incident

[4] DOI implemented a reorganization of the BOEMRE on October 1, 2011: BOEMRE is now the Bureau of Ocean Energy Management (BOEM) and Bureau of Safety and Environmental Enforcement (BSEE)

Table 1: Timeline of Events

Joint Industry Task Forces	Department of Interior
May 2010	
1- API publishes Recommended Practice (RP) 65-Part 2 *Isolating Potential flow Zones During Well Construction,* 1st ed. 10- JITF sessions convene 17- Provides recommendations to DOI	27- Releases *Increased Safety Measures for Energy Development on the Outer Continental Shelf*[5] (Safety Report)
June 2010	
21- Provides DOI a list of concerns and requests for clarifications on the Safety Report and Notice to Lessees (NTL) *Increased Safety Measures for Energy Development on the Outer Continental Shelf*[6] *(*NTL No. 2010-05) 24- Industry experts, as part of the JITF, participate in the API RP 96 *Deepwater Well Design and Construction* development (kick-off meeting) 25- Provides DOI with their position on resumption of drilling	8- Releases NTL No. 2010-05, as a supplement to the Safety Report 18- Releases NTL No. 2010-N06, *Information Requirements for Exploration Plans, Development and Production Plans, and Development Operations Coordination Documents on the OCS*[7]
July 2010	
7- Industry experts, as part of the JITF, participate in the API/IADC Bulletin 97 *Well Construction Interface Document Guidelines* development (kick-off meeting)	
September 2010	
- Provides DOI information related to issues to be addressed in their *Oil and Gas and Sulphur Operations in the Outer Continental Shelf– Increased Safety Measures for Energy Development on the Outer Continental Shelf Interim Final Rule*[8] (Interim Final Drilling Safety Rule)	
October 2010	
	14- Publishes the Interim Final Drilling Safety Rule 15- Publishes the Safety and Environmental Management Systems (SEMS) Final Rule[9]
November 2010	
	8- Publishes NTL No. 2010-10[10] *National Notice to Lessees and Operators of Federal Oil and Gas Leases,*

[5] http://www.doi.gov/deepwaterhorizon/loader.cfm?csModule=security/getfile&PageID=33598
[6] http://www.gomr.boemre.gov/homepg/regulate/regs/ntls/2011NTLs/11-n05.pdf
[7] http://www.gomr.boemre.gov/homepg/regulate/regs/ntls/2010NTLs/10-n06.pdf
[8] http://www.boemre.gov/federalregister/PDFs/AD68FEDREG1014.pdf
[9] http://www.federalregister.gov/articles/2011/03/01/2011-4334/oil-and-gas-and-sulphur-operations-in-the-outer-continental-shelf-safety-and-environmental
[10] http://www.gomr.boemre.gov/homepg/regulate/regs/ntls/2010NTLs/10-n10.pdf

Joint Industry Task Forces	Department of Interior
	Outer Continental Shelf; a supplement to the Safety Report
December 2010	
10 – API publishes Standard 65-Part 2, second edition *Isolating Potential flow Zones During Well Construction*[11] 13- Provides comments on DOI's Drilling Safety Rule	
January 2011	
- Forms workgroup to work with BOEMRE on a Well Containment Screening Tool	
March 2011	
17- API endorses the formation of the Center for Offshore Safety	20- Releases Det Norske Veritas (DNV) *Forensic Examination of Deepwater Horizon Blowout Preventer* Report[12]
April 2011	
- Provides preliminary response to DNV report	30- Releases addendum to DNV Report[13] 14- BOEMRE accepts the Well Containment Screening tool Version 1.18, rolls it out to Industry through a workshop, and issues it to the members of Marine Well Containment Company (MWCC) and Helix Well Containment Group (HWCG)
September 2011	
	14- BOEMRE/US Coast Guard Joint Investigation Team (JIT) releases its final investigative report on the April 20, 2010, *Deepwater Horizon* incident[14]
2nd Quarter 2012	
-Publish API RP 96 *Deepwater Well Design and Construction* -Publish API/IADC Bulletin 97 *Well Construction Interface Document Guidelines* (WCID) -Publish API Standard 53 *Recommended Practices for Blowout Prevention Equipment Systems for Drilling Wells*	

3. Joint Industry Task Force Developments

3.1 Joint Industry Offshore Operating Procedures Task Force

The Procedures JITF reviewed critical processes associated with drilling and completing deepwater wells to identify gaps between existing practices and current regulations and Industry best practices. Their

[11] http://www.shalegas.energy.gov/resources/65-2_e2.pdf

[12] http://www.uscg.mil/hq/cg5/cg545/dw/exhib/DNV%20Report%20EP030842%20for%20BOEMRE%20Volume%20I.pdf

[13] http://www.uscg.mil/hq/cg5/cg545/dw/exhib/Addendum%20to%20DNV%20Report%20EP030842.pdf

[14] http://www.boemre.gov/ooc/press/2011/press0914.htm

recommendations were the catalyst for moving Industry standards to a higher level of safety and operational performance. Their recommendations resulted in either revision or new development of API standards, which are considered the Industry best practices for US oil and gas operations. The following is a summary of each API document development or revision associated with this JITF's recommendations.

API/IADC Bulletin 97 *Well Construction Interface Document Guidelines* (new)

In July 2010, the Procedures JITF held a kick-off meeting to outline initial content for the Well Construction Interface Document (WCID) Guidelines. The WCID Guidelines will be the bridging document between the drilling contractor's Health, Safety, and Environmental (HSE) plan and the operator's Safety and Environmental Management System (SEMS), and will address safety and risk management considerations on a well-by-well basis. Since the initial meeting, the task force has developed the guidelines through: 1) additional detail and explanation of use, 2) Industry-led workshops, and 3) development of sample WCIDs and outreach material. In early 2011, a review with BOEMRE was sought and received, and the document was updated accordingly. The WCID has been through a first ballot for consensus and the workgroup is currently addressing comments. The WCID is expected to be published in early 2012.

API Standard 65-Part 2 *Isolating Potential Flow Zones During Well Construction*[15] *(revised)*

API Recommended Practice (RP) 65—Part 2 *Isolating Potential Flow Zones During Well Construction,* was first published in May 2010. BSEE incorporated this document by reference in the *Oil and Gas and Sulphur Operations in the Outer Continental Shelf–Increased Safety Measures for Energy Development on the Outer Continental Shelf Interim Final Rule*[16] (Interim Final Drilling Safety Rule) in October of the same year. API then revised the document based on: 1) lessons learned from the Macondo incident; and 2) alignment with the planned *Deepwater Well Design and Construction* RP (discussed below). The revisions resulted in the API RP becoming API Standard 65-Part 2, second edition. The Standard was published in December 2010. Industry is working with BSEE to update the incorporation by reference to the second edition.

API Recommended Practice 96 *Deepwater Well Design and Construction (new)*

In June 2010, an API work group held a kick-off meeting to outline initial content for the new API RP 96 *Deepwater Well Design and Construction*. Soon after the initial meeting the team formed focused groups and progressed development of the document. By August, an engineering consultant was selected to draft the outlined content; review of the first draft took place in September. In April of 2011, following four rounds of reviews and drafts, the first ballot for consensus took place. The document passed initial ballot with significant comments; those comments were resolved in Summer/Fall 2011. The second ballot was issued in October 2011 and closed on November 18. Comments will be resolved and the document is expected to be published in early 2012.

3.2 Offshore Equipment Joint Industry Task Force

The Equipment JITF reviewed current BOP equipment designs, testing protocols and documentation. Their recommendations were intended to close any gaps or capture improvements in these areas. After submitting its recommendations, the Equipment JITF formed three subgroups to evaluate information regarding BOP shearing capabilities, BOP acoustics systems, and BOP-Remotely Operated Vehicles (ROVs) interface. These subgroups each produced white papers in January 2011 regarding their topics.

[15] http://www.api.org/~/media/Files/Policy/Exploration/Stnd_65_2_e2.ashx
[16] http://www.boemre.gov/federalregister/PDFs/AD68FEDREG1014.pdf

In addition to the BOP Shearing recommendation evaluation, the BOP Shearing subgroup was tasked with acquiring and sharing all BOP shearing data Industry had compiled over the last 40-50 years, with the hope of posting the collection online for access by contractors and operators. BSEE, in its Interim Final Drilling Safety Rule, now requires third party verification of the shear testing and new shearing tests are being completed. These new requirements, new testing, and possible Original Equipment Manufacturers (OEM) sharing of data superseded the JITF subgroup's original goal of acquiring and sharing BOP shearing data.

The Equipment JITF also developed a white paper that raised concerns with the March 2011 *Forensic Examination of Deepwater Horizon Blowout Preventer* Report[17] written for DOI by Det Norske Veritas (DNV) (a third party consultant). An addendum[18] from the consultant soon followed to the report.

As shown in the recommendations table (Table 2) and discussed below, an API guideline that addresses most of the Equipment task force's recommendations is currently undergoing revision.

API RP/Standard 53 *Recommended Practices for Blowout Prevention Equipment Systems for Drilling Wells (revised)*

Resulting from the Equipment JITF's recommendations, an API work team began development on the fourth edition of API RP 53 *Recommended Practices for Blowout Prevention Equipment Systems for Drilling Wells*. This edition will be updated to a Standard and is likely to be published early in 2012. Meanwhile, the third edition is incorporated by reference in the Interim Final Drilling Safety Rule under Documentation Requirements for BOP inspections and maintenance.

4. Recommendations Status

The initial recommendations from the JITFs addressed measures to enhance risk and safety management, deep water well design and control, and the use of BOPs and ROVs. DOI adopted many of these recommendations in its Safety Report, which developed into the Interim Final Drilling Safety Rule.

Table 2 lists the initial recommendations of the JITFs, the current status, and if applicable, the Federal regulation and/or Industry guideline under which the recommendation is implemented. For a full synopsis of the initial recommendations, please see the May 2010 White Paper: *Recommendations for Improving Offshore Safety: Joint Industry Task Force to Address Offshore Operating Procedures and Equipment*[19].

[17] http://www.uscg.mil/hq/cg5/cg545/dw/exhib/DNV%20Report%20EP030842%20for%20BOEMRE%20Volume%20I.pdf

[18] http://www.uscg.mil/hq/cg5/cg545/dw/exhib/Addendum%20to%20DNV%20Report%20EP030842.pdf

[19] White Paper: Recommendations for Improving Offshore Safety; *Joint Industry Task Force to Address Offshore Operating Procedures and Equipment*

Table 2: Recommendations Status

JITF	Original Recommendations	Status	Related Document/Regulation
Both	- Develop a Well Construction Interface Document (WCID) to manage well construction activities and mitigate unexpected events that impact health, safety and the environment.	The 1st edition of Bulletin 97 WCID Guidelines is in final draft stages.	API/IADC Bulletin 97 WCID Guidelines
	- A safety case is produced by the owner of the deepwater mobile offshore drilling unit (MODU) (i.e., Drilling Contractor) and reviewed by a competent and independent regulator who may prohibit activities if there are significant shortcomings in the safety case. - The IADC has developed a guideline to provide a sound basis for drilling contractors to initiate Safety Case requirements in the OCS.	IADC HSE Guidelines for MODUs Issue 3.3[20] was published December 1, 2010 and Issue 3.4[21] was published November 1, 2011. DOI implemented similar guidelines in the SEMS rulemaking. In addition, Industry has recently opened The Center for Offshore Safety, whose initial focus is to ensure Operator compliance with SEMS regulations.	*IADC HSE Guidelines for MODUs* Issue 3.4 SEMS Final Rule[22] API RP 75 3rd ed. *Development of a Safety and Environmental Management Program for Offshore Operations and Facilities*
Operating Procedures	- Form API work group to study physical loads, design practices for subsea well completions and completion configurations that provide maximum reliability.	API is currently developing an API RP that will address this recommendation.	API RP 96 *Deepwater Well Design and Construction*
	- Upon release, adopt API RP 65 Part 2: Isolating Potential Flow Zones during Well Construction.	DOI Incorporated by Reference under the Drilling Safety Rule. API released the second edition as a standard in December 2010.	The Drilling Safety Rule (§250.198(h)(79)) API Standard 65-Part 2, 1st and 2nd ed. *Isolating Potential Flow Zones During Well Construction*
	- Provide two independent barriers, including one mechanical barrier, for each flow path prior to displacement to underbalanced fluid columns. - Perform negative tests to a differential pressure greater than or equal to anticipated pressure after displacement. - Positively test each casing barrier to a pressure exceeding the highest estimated integrity of casing shoes below that barrier.	API RP96 includes recommendations for the barriers that should be in place during phases of the well cycle and for operational practices that enhance well integrity and reliability. These are now similar requirements in The Drilling Safety Rule.	API RP 96 *Deepwater Well Design and Construction* The Drilling Safety Rule (§250.420(b)(3), §250.423(b)and (c))

[20] http://www.iadc.org/hsecase/MODU%20HSE%20Guidelines%20ALL.pdf
[21] http://www.iadc.org/wp-content/uploads/2011/11/MODU-HSE-Case-Guidlines-Issue-3.4.pdf
[22] http://www.lrenergy.org/App_Common/122/119/Library/8/SEMS%20Rule.pdf

JITF	Original Recommendations	Status	Related Document/Regulation
	- Close blowout preventers during displacement to underbalanced fluid columns. - Perform separate displacement operations for riser and casing. Monitor displacement volumes in and out. - Ensure shearable drillstring components are positioned in the shear rams during displacement.	The API RP 96 discusses the content of each of the specific JITF recommendations.	API RP 96 *Deepwater Well Design and Construction*
Offshore Equipment	- Ensure BOP can automatically close blind/shear ram (s) and close choke/kill line valves. - Perform full surface function / pressure testing prior to running of the BOP stack to simulate 1) unintended disconnect of lower marine riser package; and 2) loss of surface control of the subsea BOP stack. - At prescribed intervals, conduct subsea testing of hydraulic function of rams and valves downstream of the trigger to simulate 1) unintended disconnect of lower marine riser package (LMRP); and 2) loss of surface control of the subsea BOP stack. - Verify proper operation of the system by testing to the Mineral Management Service (MMS)-approved Application for Permit to drill (APD) casing pressure below blind / shear rams after system activation. Arm the system when BOP stack is latched on the wellhead. - Disarm and rearm only if approved through a formalized Management of Change Process. - Upon completion of the testing, forward test charts and function test work sheets to the District MMS office that approves the well permit.	API is addressing this in the revision of RP 53. DOI addressed these recommendations with similar regulations in the Drilling Safety Rule.	API Standard 53 4th edition *Recommended Practices for Blowout Prevention Equipment Systems for Drilling Wells* The Drilling Safety Rule (§250.442(c), §250.515(e), §250.615(e))

JITF	Original Recommendations	Status	Related Document/Regulation
	- Establish Phase 2 work group to develop a matrix showing system combinations and capabilities under various conditions. Evaluate these options and recommend systems to be adopted. - Evaluate processing in acoustic systems to remove ambient noise and to prevent inadvertent activation. - Engage national research facilities to assess major acoustic system manufacturers' signal processing technologies.	The Acoustic BOP Group established and evaluated previous acoustic experience. Their conclusion, as stated in their January 2011 white paper, found that digital acoustic BOP control systems currently manufactured are comparable in reliability to hard wired digital control systems. Reliability is supported by manufacturers' testing and the use experience of drilling contractors and operators over a range of drilling operations. Additional testing is needed to prove reliability in low signal to noise ratio conditions which can occur around a flowing well.	API Standard 53 4th edition *Recommended Practices for Blowout Prevention Equipment Systems for Drilling Wells* API SPEC 16D *Specification for Control Systems for Drilling Well Control Equipment and Control Systems for Diverter Equipment*
	- Ensure ROV can close blind shear ram(s), pipe ram(s), casing shear ram(s), and choke and kill valves. Ensure ROV can unlatch the lower marine riser package. Develop capability to function within prescribed closing times. - Standardize ROV hot stab and receptacle per API Spec 17H. Standardize hot stab designs between drilling and production operations. - Surface test ROV functionality and ROV pump and verify closure visually. Develop visual reference capability to confirm ram closure (position indicator). - Identify methods for testing without introducing detrimental effects of seawater in BOP system. - Stage ROV tooling / external hydraulic power supplies strategically in Gulf of Mexico for rapid mobilization.	Another API led JITF, the Joint Industry Oil Spill Preparedness and Response Task Force, is addressing ROV evaluations and improvements in-depth. The 17H Hi-Flow 1" ROV manifolds and hot stabs will become the standard for ROV intervention ports on BOP stack functions.	API Standard 53 4th edition *Recommended Practices for Blowout Prevention Equipment Systems for Drilling Wells* API Spec 17H *Recommended Practice for Remotely Operated Vehicles (ROV) Interfaces on Subsea Production Systems*

5. Conclusion

Industry continues its efforts to identify and drive improvements in offshore operating procedures and equipment in the GOM and beyond. A prime example of these continued efforts is The Center for Offshore Safety, which was recently created by Industry to serve as the focal point for deepwater operators to work together to enhance offshore operations. The Center will initially focus on the SEMS of companies operating offshore in deepwater, and will include audits and certifications of SEMS programs for Center members by independent third party auditors, which will also ensure compliance with the SEMS Regulations.

The collaboration with regulatory agencies is imperative to these efforts as well. Industry looks forward to its continued engagement with DOI to:

- Pursue the adoption of the JITF's recommendations;
- Participate in the rulemaking processes;
- Pursue incorporation of new and updated Industry guidelines into the Code of Federal Regulations; and
- Continue the enhancement of The Well Containment Screening Tool.

Industry remains committed to upholding safety standards during subsea well operations. The JITFs evaluated current guidelines, made and implemented recommendations, and stayed engaged in US policy and Industry development afterward. Due to JITF efforts, two new Industry guidelines are under development, and two current Industry guidelines are under revision, and DOI has adopted several of the improved safety recommendations. Along with other initiatives, these activities assist in creating a model safety program in the GOM for well operations crews and the environment. Active participation from and coordination with the public sector, academia, and other stakeholders has been fundamental to turning initial recommendations into enhanced safety guidelines. Industry will continue to proactively pursue the utmost standards in drilling operations safety.