DEPARTMENT OF THE INTERIOR
OCEAN ENERGY SAFETY ADVISORY COMMITTEE
WASHINGTON, D.C.
APRIL 18, 2011

MEETING MINUTES

The Ocean Energy Safety Advisory Committee (OESC) held its first meeting on Monday, April 18, 2011, at the U.S. Access Board, 1331 F Street N.W., Suite 800, Washington, DC. 20004.

The purpose of the meeting was to introduce the members, provide context for the Committee's work through an agenda (Appendix I) focused on lessons learned from the Deepwater Horizon (DWH) incident, and create a roadmap for the Committee's future work.

Thirteen of the fifteen Committee members were in attendance (Appendix II). The two Committee members who were not present during the meeting represented the Wilderness Society (non government organization - NGO) and the National Oceanic and Atmospheric Administration (NOAA - Federal government).

In accordance with the provisions of the Federal Advisory Committee Act, Public Law 92-463, the meeting was open to the public from 9:00 a.m. to 5:30 p.m. Approximately 90 members of the public and press were in attendance (Appendix III).

The meeting was called to order by Designated Federal Officer (DFO) Brad J. Blythe after establishing quorum. He then introduced OESC Chairman Thomas O. Hunter to lead meeting proceedings.

Remarks from Department of the Interior (DOI) Deputy Secretary David J. Hayes

Deputy Secretary Hayes thanked Chairman Hunter and the OESC members for serving on the Committee. He recognized the significance of the OESC's first meeting close to the one-year anniversary of the DWH blowout disaster and the enormous amount of attention on the safety of offshore drilling practices and appropriately so. He noted that DOI had been engaged in a vigorous and disciplined reform agenda. New safety rules were put in place, new requirements for cementing for inspections for certifications, new management system requirements, a major reorganization of the Bureau of Ocean Energy Management, Regulations and Enforcement (BOEMRE), and new containment requirements for blowouts (Appendix IV).

Expert Panel Presentations

The opening session of the meeting included presentations from three expert panels on the findings and recommendations of the President's Commission, the investigations

into the causes of the DWH blowout, and the lessons learned from the DWH containment and response efforts.

In Session I, Dr. Cherry A. Murray, Commissioner, National Commission on the BP DWH Oil Spill and Deepwater Drilling, discussed the Commission's findings and offered recommendations on areas in need of further collaboration among government, industry and academia (Appendix V).

Session II consisted of two presentations about the investigations of the causes of the DWH blowout. Dr. Donald C. Winter, Chair of the National Academy of Engineering (NAE)/National Research Council (NRC) Committee Examining the Probable Causes of the DWH Explosion, presented on the NAE/NRC Committee's preliminary report (Appendix VI). Mr. Sean C. Grimsley, Deputy Chief Counsel to the National Commission on the BP DWH Oil Spill and Deepwater Drilling, presented the conclusions of the Chief Counsel of the President's Commission on the causes of the blowout (Appendix VII). Both Dr. Winter and Mr. Grimsley made recommendations to the Committee.

Remarks from DOI Secretary Kenneth L. Salazar

Secretary Salazar thanked Chairman Hunter and DFO Blythe for their leadership and support of the OESC, and stated that he looked forward to the results of OESC's effort. He noted that the OESC was one of the most outstanding groups of scientists and experts that have ever been assembled in the U.S. to deal with the issues of oil and gas drilling and thanked them for agreeing to be a part this important mission.

He thanked BOEMRE Director Bromwich for stepping in to assist with DOI reform efforts for oil and gas drilling. He was proud of the efforts underway and recognized that this was a dynamic situation that everyone would continue to learn from and would continue to implement the kinds of reforms that were necessary.

In closing he stressed, the OESC's assistance with determining how to safely develop oil and gas was critical. The major assignment as a committee would be to create subgroups to focus on spill prevention, determine the best containment strategies to ensure that an active spill was promptly contained and closely monitored; and to ensure that the most effective oil spill response was in place in the event of an oil spill (Appendix VIII).

Remarks from BOEMRE Director Michael R. Bromwich

Director Bromwich thanked Secretary Salazar for participating in the OESC's inaugural meeting. He thanked the OESC members for serving on the Committee, and looked forward to their future efforts.

He noted that the presentations during the morning session highlighted a number of areas that were in need of further research and consideration. He highlighted the three activities of particular interest to him and the Secretary, and to the entire Department as they

move forward: (1) a thorough assessment of the existing procedures and technologies for drilling and workplace safety, source containment and spill clean up, as well as recommendations for additional research in those fields were needed; (2) a comprehensive survey of existing and planned government and workplace safety, containment and spill response to identify gaps in the current knowledge base was needed; and (3) the Committee's recommendations for the best mechanism or mechanisms for long-term cooperation among government, industry and academia (Appendix IX).

Expert Panel Presentations (Continued)

Session III focused on the lessons learned from the Deepwater Horizon containment and response efforts. Mr. James H. Dupree, BP Regional President, Gulf of Mexico (Appendix X); Rear Admiral Roy A. Nash, Deputy Federal On-Scene Coordinator, DWH Response for New Orleans, Louisiana (Appendix XI); and Mr. Lars T. Herbst, Regional Director, Gulf of Mexico Region, BOEMRE (Appendix XII) discussed their experiences with the deepwater horizon containment and cleanup efforts and identified areas in need of future research.

Following the panelist presentations, the Committee members discussed their future activities, identified next steps and discussed the agenda/potential location for the Committee's second meeting.

Committee Decisions Regarding Future Activities and Next Steps

Based on the suggestion of OESC Chairman Hunter, the OESC decided it would focus its activities and recommendations on outer continental shelf (OCS) oil and gas development, with primary focus on the following four areas:

1. Oil Spill Prevention – How can blowout and oil spills be prevented?
2. Oil Spill Containment – How can spills be stopped and contained if a blowout occurs?
3. Oil Spill Response – How can spills best be cleaned up once they occur?
4. Safety Management Systems – How can the human factor be incorporated to increase the safety of OCS oil and gas development?

The OESC also agreed to focus on the technological and research and development (R&D) aspects of OCS oil and gas development. OESC Member Stephen H. Hickman, DOI U.S. Geological Survey, noted, and the Committee agreed, that the OESC should consider existing scientific and ecological data in preparing its recommendations. The OESC agreed that the scope if its activities would not be limited to issues within the jurisdiction of DOI, and that, in fact, the OESC could play an important role in identifying areas of overlap and opportunities for collaboration among other agencies represented on the Committee.

The OESC agreed that its mission was not to analyze the DWH blowout and its aftermath, but to build on, and go beyond, the lessons learned from that event. Further,

the OESC's activities would not be limited to the GOM, but would address the entire U.S. OCS.

In order to study and address these issues, the OESC recommended that subcommittees be established to focus on the four issue areas, as identified below:

Oil Spill Prevention Subcommittee. This Subcommittee would focus on issues related to preventing blowouts and oil spills. The focus would primarily be on drilling safety technologies and practices, rather than on worker safety. The following seven OESC members volunteered to serve on the Subcommittee: Mathy V. Stanislaus (Environmental Protection Agency - EPA), Paul K. Siegele (Offshore Energy Industry), Richard A. Sears (NGO), Nancy G. Leveson (Academia), Stephen H. Hickman (USGS), Donald E. Jacobsen (Offshore Energy Industry), and Christopher A. Smith (Department of Energy - DOE).

Oil Spill Containment Subcommittee. This Subcommittee would focus on issues related to containing a well after a blowout has occurred. The following four OESC members volunteered to serve on the Subcommittee: Walter D. Cruickshank (BOEMRE), Charles R. Williams II (Offshore Energy Industry), Christopher A. Smith (DOE), and Stephen H. Hickman (USGS)

Oil Spill Response Subcommittee. This Subcommittee would focus on issues related to oil spill clean-up and response. The following two OESC members volunteered to serve on the Subcommittee: Mathy V. Stanislaus (EPA) and Patrick E. Little (USCG).

Safety Management Systems Subcommittee. This Subcommittee would examine the human/management factors that contribute to the risk of an uncontrolled blowout and oil spill. The OESC would re-evaluate whether to merge the Subcommittee with the Oil Spill Prevention Subcommittee in the future. The following four OESC members volunteered to serve on the Subcommittee: Joseph M. Gebara (Offshore Energy Industry), Tadeusz W. Patzek (Academia), Nancy G. Leveson (Academia), and Charles R. Williams II (Offshore Energy Industry).

Each subcommittee was assigned the following questions:

1. What is the state of existing operations and technology for each topic area?
2. What is the state of the current R&D undertaken by government, industry and academia for each topic area?
3. What needs to be done or should be done to advance each topic area?
4. What work products can the Committee reasonably produce by end of calendar year 2011 in each topic area?

It was agreed that each subcommittee would self-organize and develop a plan for addressing its assigned issue area, which will be presented at the next Committee meeting, to be held in approximately tow months. It is anticipated that prior to the next

meeting, subcommittees would meet to define their scope of activity, identify necessary resources, establish initial milestones and expected timeline for completion, select a spokesperson for the next Committee meeting, and prepare a presentation for the full Committee.

The roundtable concluded with a discussion of the timing and location for the Committee's second meeting. Chairman Hunter proposed a two-day meeting in the GOM in approximately two months. Day 1 would include field visits to see spill response and containment equipment, and potentially travel offshore to a rig. Day 2 would be a public meeting, the subcommittees would present their planned activities, including milestones and expected timeline for completion.

The OESC members proposed have full Committee meetings every 2-3 months as appropriate to assist DOI and BOEMRE as charged in the charter's scope and objectives.

Current Deliverables

Members were asked to inform the DFO of their availability to meet during the months of May through July 2011 by April 27, 2011. Edits and/or comments to the proposed tasking memorandum from Director Bromwich should be submitted to Chairman Hunter no later than May 1, 2011. The DFO was asked to compile a working glossary of terms for OESC members to ensure terminology consistency.

Public Comment

Public comments were made by Mr. Michael Gravitz, Oceans Advocate, Environment America, on the need to understand the human geological and technological risks to improve safety and other recommendations for OESC (Appendix XIII) and Mr. James Pappas, Vice President, Ultra-Deepwater Program, Research Partnership to Secure Energy for America, on proposed institution independent of any particular operator and of government be employed or formed to characterize the safety of offshore operations, identify areas for improvement, and promote the highest levels of safety and reliability in offshore oil and gas operations (Appendices XIV and XV).

The meeting was adjourned at 5:30 p.m.

Dr. Thomas O. Hunter
Chairman, Ocean Energy Safety Advisory Committee

Appendices

I. Meeting Agenda
II. Members in Attendance
III. Public and Press in Attendance
IV. Remarks by Deputy Secretary David J. Hayes, Department of the Interior
V. Presentation by Dr. Cherry A. Murray, Commissioner, National Commission on the BP Deepwater Horizon Oil Spill and Deepwater Drilling
VI. Presentation by Dr. Donald C. Winter, Chair of the National Academy of Engineering/National Research Council Committee Examining the Probable Causes of the Deepwater Horizon Explosion
VII. Presentation by Mr. Sean C. Grimsley, Deputy Chief Counsel to the National Commission on the BP Deepwater Horizon Oil Spill and Deepwater Drilling
VIII. Remarks by Secretary Kenneth L. Salazar, Department of the Interior
IX. Remarks by Mr. Michael R. Bromwich, Director, Bureau of Ocean Energy Management, Regulation and Enforcement
X. Presentation by Mr. James H. Dupree, BP Regional President, Gulf of Mexico
XI. Presentation by Rear Admiral Roy A. Nash, Deputy Federal On-Scene Coordinator, Deepwater Horizon Response for New Orleans, Louisiana
XII. Presentation by Mr. Lars T. Herbst, Regional Director, Gulf of Mexico Region, Bureau of Ocean Energy Management, Regulation and Enforcement
XIII. Public Comments by Michael Gravitz, Oceans Advocate, Environment America
XIV. Public Comments by James Pappas, Vice President, Ultra-Deepwater Program, Research Partnership to Secure Energy for America
XV. Public Comments by James Pappas, Vice President, Ultra-Deepwater Program, Research Partnership to Secure Energy for America (Follow-up E-mail)

Additional Material Distributed at Meeting
Members' Bios
Speakers' Bios

Appendix I

MEETING OF THE
OCEAN ENERGY SAFETY ADVISORY COMMITTEE
WASHINGTON, D.C.
APRIL 18, 2011

The Ocean Energy Safety Advisory Committee is a public federal advisory committee consisting of 15 members from federal agencies, the offshore oil and gas industry, non government organizations and academia who will advise the Secretary of the Interior and the Director of the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) on improving all aspects of ocean energy safety.

8:00 a.m. **Registration**

9:00 a.m. **Welcome and Introduction**
David J. Hayes Deputy Secretary of the Interior

9:10 a.m. **Opening Remarks and Member Introductions**
Thomas O. Hunter Committee Chair
Committee Members in Attendance

9:45 a.m. **Session I - Findings and Recommendations of the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling**
Cherry A. Murray Commissioner, National Commission on the BP Deepwater Horizon Oil Spill and Deepwater Drilling

10:30 a.m. **Session II – Investigations into the Causes of the Deepwater Horizon Blowout**
Donald C. Winter Chair of the National Academy of Engineering/National Research Council Committee Examining the Probable Causes of the Deepwater Horizon Explosion

Sean C. Grimsley Deputy Chief Counsel to the National Commission on the BP Deepwater Horizon Oil Spill and Deepwater Drilling

11:30 a.m. **Lunch**

1:00 p.m. **Remarks**
Kenneth L. Salazar Secretary of the Interior

1:15 p.m. **Remarks**
Michael R. Bromwich Director of the Bureau of Ocean Energy Management, Regulation and Enforcement

1:30 p.m.	**Session III – Lessons Learned from the Deepwater Horizon Containment and Response Efforts**	
	James H. Dupree	BP Regional President, Gulf of Mexico
	Roy A. Nash	Rear Admiral, United States Coast Guard; Deputy Federal On-Scene Coordinator, Deepwater Horizon Response, New Orleans, Louisiana
	Lars T. Herbst	Regional Director, Gulf of Mexico Region, Bureau of Ocean Energy Management, Regulation and Enforcement
3:00 p.m.	**Break**	
3:10 p.m.	**Roundtable on Committee Activities and Next Steps**	
4:30 p.m.	**Public Comment**	
	Mike Gravitz	Oceans Advocate, Environment America
	James Pappas	Vice President, Technical Programs, Research Partnership to Secure Energy to America
5:30 p.m.	**Meeting Adjourns**	

Appendix II

REPRESENTATIVES IN ATTENDANCE AT THE OCEAN ENERGY SAFETY ADVISORY COMMITTEE MEETING
Washington, D.C.
April 18, 2011

MEMBERS

Thomas O. Hunter	Chair
Nancy G. Leveson	Academia
Tadeusz W. Patzek	Academia
Richard A. Sears	Non Government Organization
Joseph M. Gebara	Offshore Energy Industry
Donald E. Jacobsen	Offshore Energy Industry
Paul K. Siegele	Offshore Energy Industry
Charles R. Williams II	Offshore Energy Industry
Walter D. Cruickshank	Bureau of Ocean Energy Management, Regulation & Enforcement
Christopher A. Smith	Department of Energy
Mathy V. Stanislaus	Environmental Protection Agency
Patrick E. Little	U.S. Coast Guard
Stephen H. Hickman	U.S. Geological Survey

INTERIOR DEPARTMENT REPRESENTATIVES

Kenneth L. Salazar	Secretary, Department of the Interior
David J. Hayes	Deputy Secretary, Department of the Interior
Michael R. Bromwich	Director, Bureau of Ocean Energy Management, Regulation & Enforcement

PUBLIC AND PRESS ATTENDEES
OCEAN ENERGY SAFETY ADVISORY COMMITTEE MEETING
Washington, D.C.
April 18, 2011

PUBLIC

Robert Walker	Chevron
Russell Johnson	Chevron
James Pappas	Research Partnership to Secure Energy for America
Ken Richardson	ABS
Jack Jacobson	Hogan Lovells
Jerry Holsomback	NASA
Fred Kuo	NASA
Ben Norris	Sutherland
Greg Wilson	U.S. Environmental Protection Agency
James Votaw	Wilmer Hale
Paul Sawyer	Louisiana
Danny Walker	LRMA Inc.
Emily Lindow	National Oceanic & Atmospheric Administration - National Marine Fisheries Service
Mike Gravitz	Environment America
Paul Mussenden	Department of the Interior
Sam Sankar	Self
John Spain	Baton Rouge Area Foundation
Kevin Pekarek	U.S. Coast Guard
Pamela Garrans	MODU Spec
Pisces Carmichael	Lloyd's Register Energy Americas, Inc.
Anna Tweten	Environment America
Cherry Murray	Harvard School of Engineering & Applied Sciences
Donald Winters	National Academy of Engineering/National Research Council Committee
Sean Grimsley	Bartlit Beck Herman Palenchar & Scott LLP
James Dupree	BP PLC
Roy Nash	U.S. Coast Guard
Lars Herbst	Bureau of Ocean Energy Management, Regulation & Enforcement
Eileen Angelico	Bureau of Ocean Energy Management, Regulation & Enforcement
Kenneth Salazar	Department of the Interior
David Hayes	Department of the Interior
Michael Bromwich	Bureau of Ocean Energy Management, Regulation & Enforcement
Melissa Schwartz	Bureau of Ocean Energy Management, Regulation & Enforcement
Raya Bakalov	Bureau of Ocean Energy Management, Regulation & Enforcement
Brian Screnar	Department of the Interior
Sue Fitzgerald	Bureau of Ocean Energy Management, Regulation & Enforcement
Blossom Robinson	Bureau of Ocean Energy Management, Regulation & Enforcement
Charlie Broadwater	Bureau of Ocean Energy Management, Regulation & Enforcement
Jeevan Perara	NASA - JSC
Bart Szewczyk	Wilmer Hale
Bonnie Wise	Vanscoyol Associates/International Association of Drilling Contractors
Elen Melchert	U.S. Department of Energy
Ben Powell	Wilmer Hale

Nancy Kete	Self
Suzanna Erlich	Self
Eden Katz	Self
Elie Katz	Self
Michael Greenberg	Self
Yonatan Greenberg	Self
Allie Dodd	Vanscoyol Associates/International Association of Drilling Contractors
Doug Slitor	Bureau of Ocean Energy Management, Regulation & Enforcement
Cheri Hunter	Bureau of Ocean Energy Management, Regulation & Enforcement
Jeryne Bryant	Bureau of Ocean Energy Management, Regulation & Enforcement
David Smith	Bureau of Ocean Energy Management, Regulation & Enforcement
Vicki Cornish	Marine Mammal Commission
Elliott Grollman	U.S. Department of Homeland Security

PRESS

Kuim Asinsca	Bloomberg
James Cook	C-Span
Greg Hellman	BNA
Victor Montoro	C-Span
Jen Diouhy	Hearst Houston
Meghan Gordon	Platts
Zachary Wormbrodt	Argus
Dina Cappiello	AP
Montet	AFP
Alan Korski	BNA
Rick Cockerham	Fox News
Mike Green	CNN
Barry Schlegal	CNN
Darren Goode	Politico
Ayesha Rascoe	Reuters
Nikole Killion	Hearst TV
Ryan Tracy	Dow Jones
Joey Skoloda	Energy, Environment Tech News
Eric Skalac	MEDILL
Christopher Smyth	Hearst TV
Tanya Chattman	C-Span
Phil Taylor	E&E Publishing
Ben Geman	The Hill
Brea Alp	Times PIC -GIC

Appendix IV

DEPARTMENT OF THE INTERIOR (DOI)
OCEAN ENERGY SAFETY ADVISORY COMMITTEE MEETING
WASHINGTON, D.C.
APRIL 18, 2011

DOI DEPUTY SECRETARY REMARKS

DEPUTY SECRETARY DAVID J. HAYES: Thank you, Tom, and thanks to all of you serving on this very important new Committee, the Ocean Energy Safety Advisory Committee. I want to thank you for your agreement to serve on this Committee, and to serve the Department and the country.

It is very appropriate, I think, that our first meeting of the Committee comes just short of the first year anniversary of the Deepwater Horizon blowout disaster. As you know, over the past year, there's been an enormous amount of attention on the safety of offshore drilling practices and appropriately so.

We've had a searing experience with the blowout itself and its aftermath. I was the first administration official down in the Gulf the morning after the blowout, flying down that morning, huddling with Rear Admiral Landry, on the phone with Thad Allen in the command center of the Minerals Management Service, watching that night and the next day, as the remotely operated vehicles tried to hot-stab the blowout preventers, new terms for America that we've become very acquainted with.

Since then, as you know, we at the Department have been engaged in a vigorous and disciplined reform agenda. New safety rules have been put in place, new requirements for cementing for inspections for certifications, new management system requirements, a major reorganization of the Bureau of Ocean Energy Management regulations and enforcement for deepwater, new containment requirements for blowouts.

But it is apparent throughout that we need more, and we need your help to help us define how to do more. The idea of this Committee grew out of conversations that we had throughout the summer of 2010, with Tom Hunter, your Chair, Thad Allen, and others.

It became apparent as we struggled to get the Deepwater Horizon blowout situation under control, and as we dealt with the aftermath of the spill, that offshore drilling research and development had lagged in all phases from the drilling safety requirements themselves to containment, where clearly industry and government were unprepared, and to oil spill response, where we watched skimmers ineffectively dealing with surficial spills, and we scrambled to deal with a 21st century problem with the technology of the 20th, or it seemed the 19th century.

And the question that we talked about during many late nights with Tom and others was how could we gather in one place the expertise needed to have this country lead when it comes to offshore drilling safety? We should have a center of excellence, where industry, as it moves

forward with expertise, does not leave behind the academic community, the NGO community, or government.

I think that is your basic charge, this Advisory Committee: How can you help us put together a center of excellence? Perhaps something like the Ocean Energy Safety Institute that will enable collaboration in real time in these three important areas of drilling safety, of containment, and of oil spill response.

We need this. We have the opportunity to do this, and all of you have given your service to this effort.

I will warn you, having served alongside Tom Hunter in a number of capacities, that you'll be working hard. Tom Hunter does not let moss grow under his feet, and that is why the Secretary, Director Bromwich, and I are all so excited that this public process is now underway. While we are proud of the reforms we have put in place, we know that more needs to be done, and we look forward to your guidance as we move forward. And the Secretary will be here shortly after lunch to reinforce these messages. In the mean time, I look forward to the morning sessions, and to Tom's leadership.

Let me make one final comment. I want to thank some of the key folks who have helped put this together, including Brad Blythe, who you just heard from, who has been a huge organizer of this entire effort, with the full support of Mike Bromwich, Tommy Beaudreau, Melissa Schwartz, and the entire BOEMRE team.

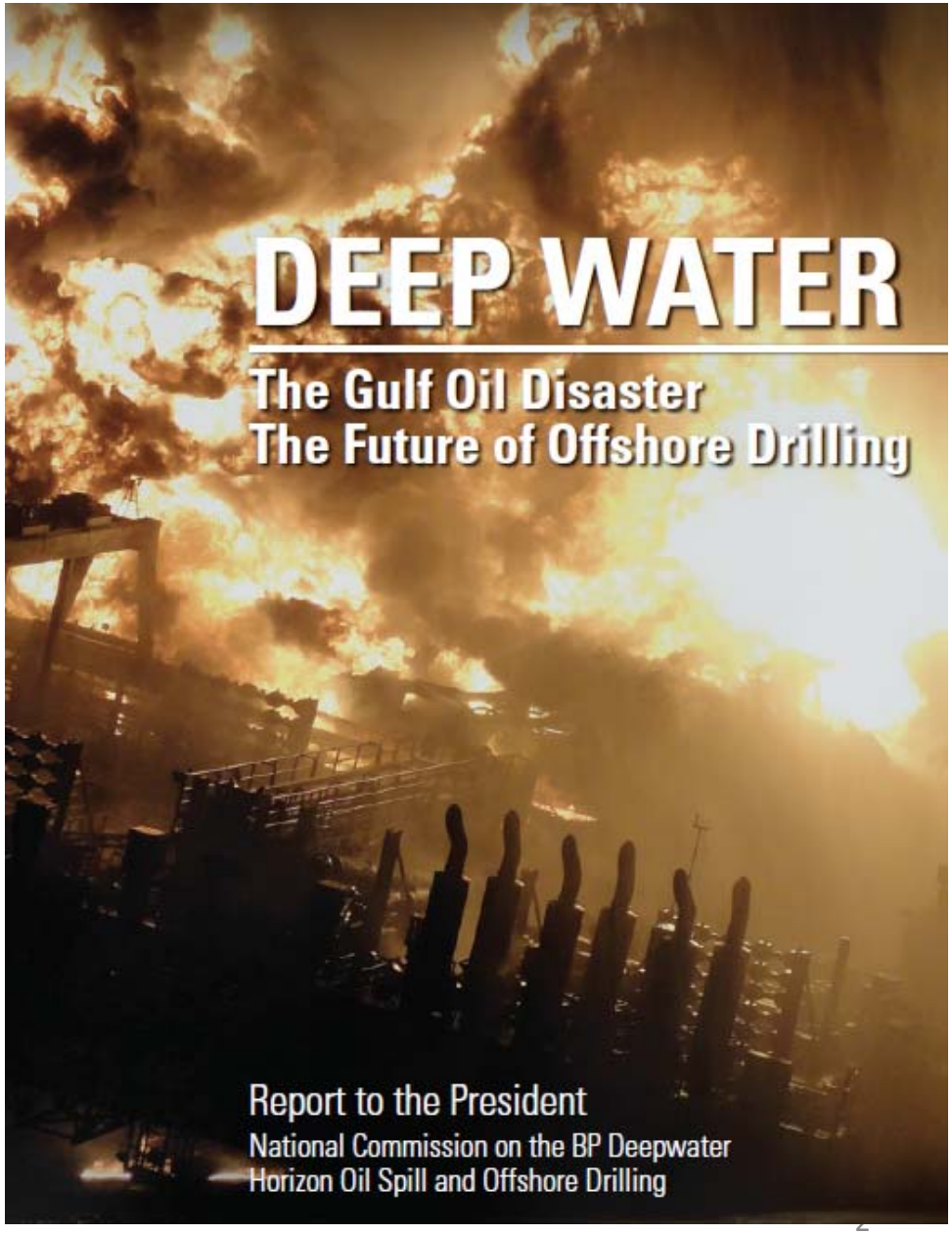
I'd also like to thank Raya Bakalov, who has been a leader for Mike in this effort, and Brian Screnar from my own staff. It is a -- it was a tremendous effort to frankly sift through the enormous number of nominations we received for the seats around this table, and congratulations to all of you who are in these seats because there was significant competition.

But it was Brad, Raya, Brian in particular who worked with Tom to put this thing together. So, a special thanks to them. Tom?

National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling

Report to the President

National Commission on the
BP DEEPWATER HORIZON OIL SPILL
AND OFFSHORE DRILLING



Preventing Accidents: *Changing Business As Usual*

The Compelling Need for a Culture of Safety

National Commission on the
BP DEEPWATER HORIZON OIL SPILL
AND OFFSHORE DRILLING

Improving the Safety of Offshore Operations

Safeguarding the Environment

Strengthening Spill Response, Planning and Capacity

Advancing Well Containment Capability

Restoring the Gulf of Mexico

Ensuring financial responsibility

Anticipating the challenges of Frontier Areas and the Arctic

Preventing Accidents: *Changing Government*

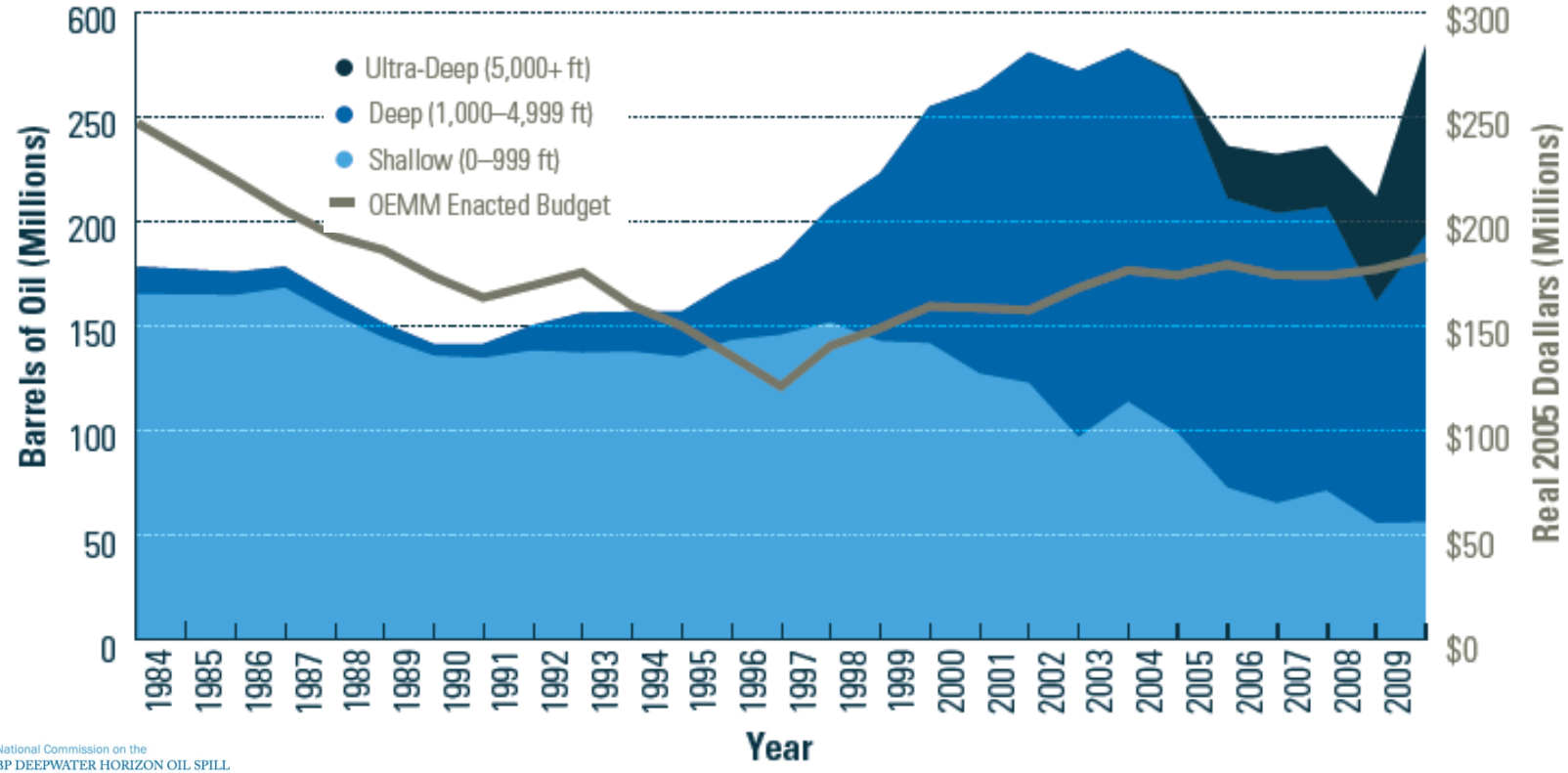
U.S. offshore drilling regulations and enforcement practices should be the most advanced in the world

National Commission on the
BP DEEPWATER HORIZON OIL SPILL
AND OFFSHORE DRILLING

Advancing Safety: *Changing Government*

Adequate, Stable Resources for Regulatory Oversight Funded by Industry

FIGURE 3.3: MMS Budget and Gulf of Mexico Crude Oil Production, 1984-2009



National Commission on the
BP DEEPWATER HORIZON OIL SPILL
AND OFFSHORE DRILLING

Preventing Accidents: *Changing Government*

Raising Liability Caps and Promoting Financial Responsibility

National Commission on the
BP DEEPWATER HORIZON OIL SPILL
AND OFFSHORE DRILLING

Mitigating Harm: *Containment and Response*

Increased Industry & Government Investment in Spill Response Technology

Exxon Valdez – March 24, 1989

National Commission on the
BP DEEPWATER HORIZON OIL SPILL
AND OFFSHORE DRILLING

Mitigating Harm: *Containment and Response*

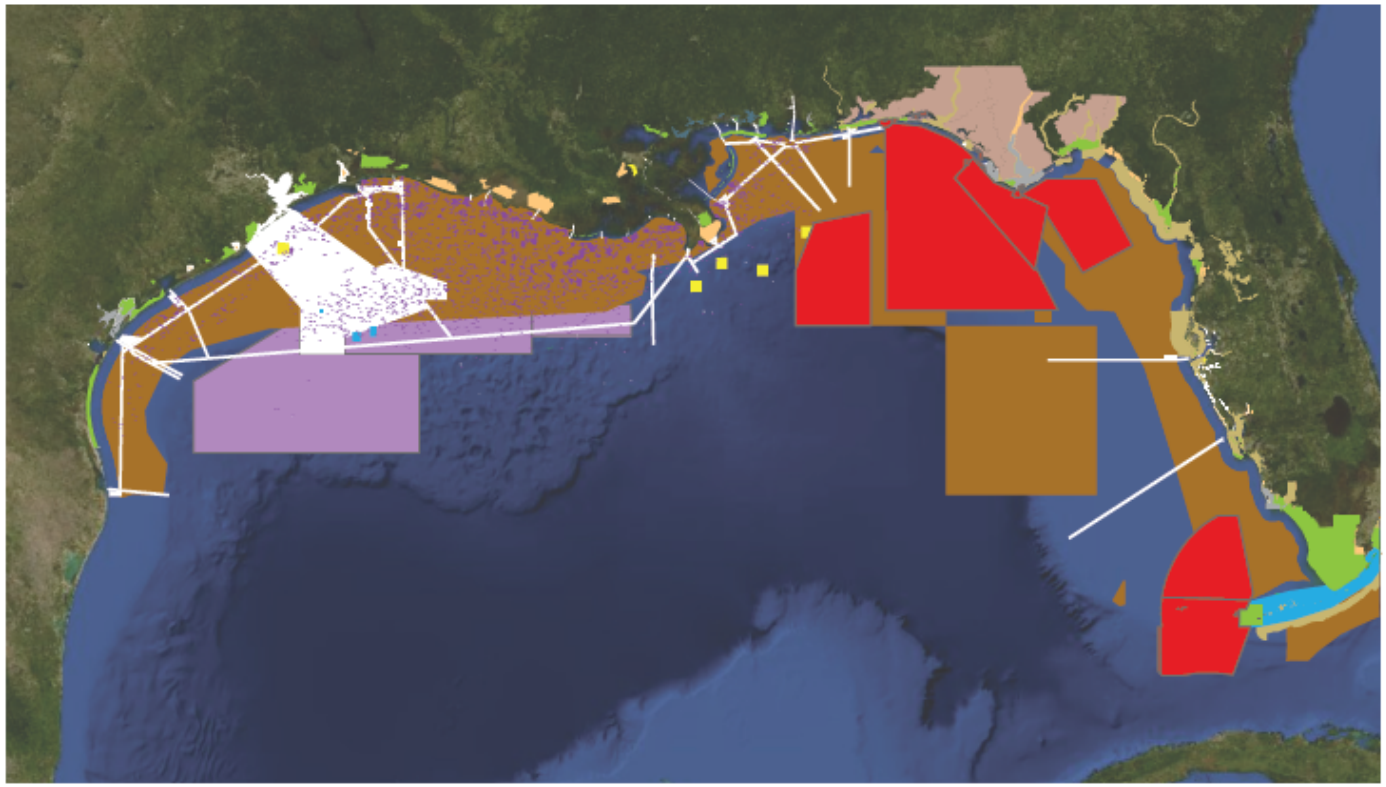
Restoration: *Providing Adequate & Sustained Funding*

Devoting damages and penalties paid by responsible parties to Gulf restoration, including 80 percent of Clean Water Act penalties

Tyrone Turner/Photo courtesy of National Geographic

Ensuring Restoration: *Promoting Science*

FIGURE 7.2: Coastal Marine Users



Industrial
- Shipping
- Military
- Oil Lighting Area
- Oil Platform

Preservation
- Marine Sanctuary
- Coastal Preserve
- National Wildlife Refuge & Shoreline

Manage
- Fisheries Management Area
- Water Magagement Area
- Wildlife Magagement Area
- State Magagement Area

Other
- Research Area
- Archeological

NOAA

Better, Science-Based Planning with Actual Plan Implementation

LA DAF

Arctic Boundary as defined by the Arctic Research and Policy Act (ARPA)

All United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering and Chukchi Seas; and the Aleutian chain.[1]

Acknowledgement: Funding for this map was provided by the National Science Foundation through the Arctic Research Mapping Application (armap.org) and Contract #0520837 to CH2M HILL for the Interagency Arctic Research Policy Committee (IARPC).

Map author: Allison Gaylord, Nuna Technologies. May 27, 2009.

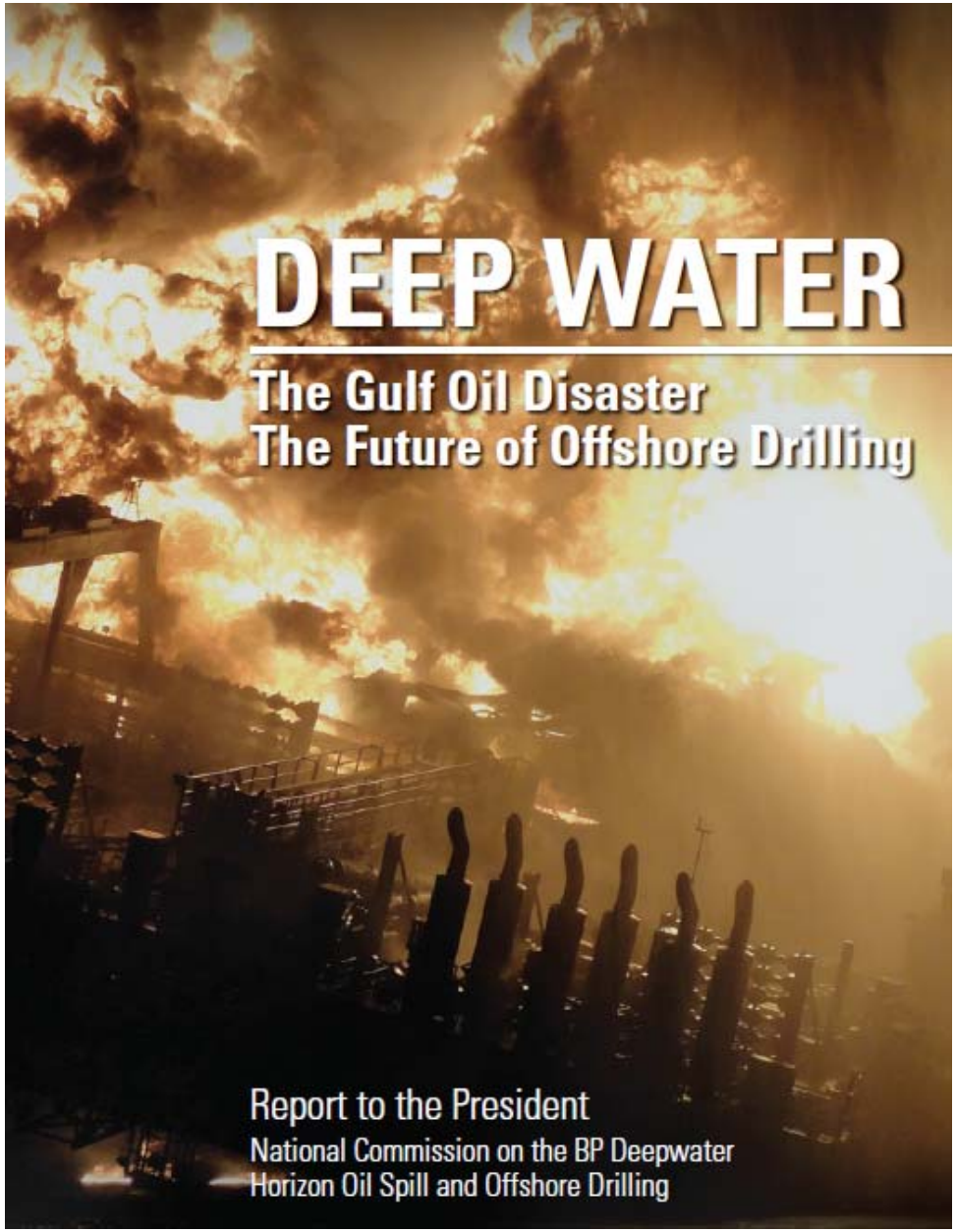
1. The Aleutian chain boundary is demarcated by the 'Contiguous zone' limit of 24-nautical miles.

National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling

Report to the President

www.oilspillcommission.gov

National Commission on the
BP DEEPWATER HORIZON OIL SPILL
AND OFFSHORE DRILLING



National Academy of Engineering
and
National Research Council
Interim Report
on

Causes of the *Deepwater Horizon* Oil Rig Blowout

Presentation by

Donald C. Winter, Chair
4/15/2011

Study Origin and Task

Origin

- Request from U.S. Department of Interior Secretary Salazar

Study Task:

- Examine probable causes of the *Deepwater Horizon* incident in order to identify measures for preventing similar harm in the future.
- Prepare an interim letter report … to inform other formal investigation of the incident.
- Prepare a final report by June 2011 that presents the committee's overall findings regarding the causes … and recommended approaches for the future.

Committee Roster

- Donald Winter (chair) University of Michigan, Ann Arbor
- Paul Bommer, University of Texas, Austin
- Chryssostomos Chryssostomidis, MIT
- David Daniel, University of Texas, Dallas
- Thomas Eccles, US Navy
- Edmund Giambastiani, Jr., US Navy (retired)
- David Hofmann, University of North Carolina, Chapel Hill
- Roger McCarthy, McCarthy Engineering
- Najmedin Meshkati, University of Southern California
- Keith Millheim, Strategic Worldwide LLC
- Elisabeth Pate-Cornell, Stanford University
- Robert Sawyer, University of California, Berkeley
- Jocelyn Scott, DuPont
- Arnold Stancell, Georgia Institute of Technology
- Mark Zoback, Stanford University

Context

- May not be possible to definitively establish specific failure mechanism and hydrocarbon pathway leading to blowout
  - Loss of 11 witnesses
  - Sinking of rig along with records,
  - Difficulty in conducting forensics at depth of the Macondo well.
- Committee has developed a good understanding of key factors and decisions that may have contributed to the blowout of the well

Decision to Proceed to Temporary Abandonment

- The Macondo well blowout was precipitated by the decision to proceed to temporary abandonment despite negative pressure test indications that the cement job failed to provide an effective barrier to hydrocarbon flow.

Decision to Proceed was Compounded by Impact of:

- Delays in recognizing the flow of hydrocarbons into the well and riser.
- Failure to take timely and aggressive well-control actions.
- Failures or limitations of actuated BOP that inhibited its effectiveness in controlling the well.

Implications of Decisions to Proceed

- Suggests an insufficient consideration of risk and a lack of operating discipline.
- Raises questions about the adequacy of operating knowledge on the part of key personnel.
- Reduces available margins of safety that account for complexities of hydrocarbon reservoirs and well geology

Multiple Decisions Potentially Contributed to the Blowout, Including:

- Changing key supervisory personnel on the rig just prior to abandonment procedures.
- Cementing multiple zones in the well in a *single* operational step, despite markedly different fluid pressures.
- Selecting a long-string production casing instead of a cement liner over the uncased section of the well.
- Deciding that only six centralizers would be needed, even though modeling results suggested the need for more.
- Limiting bottoms-up circulation of drilling mud prior to cementing.
- Not running a bond log to assess cement integrity.
- Not incorporating a float shoe at the bottom of the casing.
- Removing drilling mud from the well without installing the lockdown sleeve on the production casing.

Drilling and Abandonment Operations

- Available evidence points to insufficient checks and balances for decisions involving:
  - Schedule to complete well abandonment procedures, and
  - Considerations for well safety.

Management and Regulatory Oversight

- None of these questionable decisions was identified or corrected by
  - Operating management of BP or their contractors, or
  - Oversight of MMS or other regulators.

Cementing Process

- Aspects of cement process could have had a material impact on well integrity:
  - Type and volume of cement used
  - Adequacy of the time provided for the cement to cure

Well Control Actions

- BOP did not control—or recapture control of—the well after hydrocarbons were flowing into the well.
- Emergency disconnect system and automatic sequencers failed to operate.

Alarms and Safety Systems of the *Deepwater Horizon*

- Given the large quantity of gas released onto the rig, ignition was most likely.
- However, reports of failed alarms and safety systems on the rig warrant consideration.

Management of Risk, Uncertainties, and Dangers

- Observations of various failures indicate:
  - Lack of a suitable approach for anticipating and managing the inherent risks, uncertainties, and dangers associated with deepwater drilling operations, and
  - Broader failure to learn from previous near misses

A Systems Approach

- There is an apparent lack of a systems approach to:
  - Integrate many factors potentially affecting well safety,
  - Monitor the overall margins of safety, and
  - Assess various decisions from perspectives of well integrity and safety.

Presentation to Ocean Energy Safety Advisory Committee
April 18, 2011

LESSONS LEARNED FROM MACONDO

Sean C. Grimsley, Bartlit Beck Herman Palenchar & Scott LLP
Deputy Chief Counsel
The National Commission on the Deepwater Horizon Oil Spill and Offshore Drilling

Background

What Happened – High Level

Root Causes

Thoughts for Committee

Background

The Commission – Executive Order

Sec. 3. Mission. The Commission shall:

(a) examine the relevant facts and circumstances concerning the ***root causes*** of the Deepwater Horizon oil disaster;

. . .

(c) ***submit a final public report*** to the President with its findings and options for consideration within 6 months of the date of the Commission's first meeting.

Task of Chief Counsel's Investigative Team

- Investigate and identify root causes of the blowout
  - Other staff investigated containment and response
  - Did not investigate BOP failure post-explosion and blowout
- Present preliminary findings at hearing on November 8-9, 2010
- Assist in preparing Commission's Final Report
- Prepare and submit Chief Counsel's Report detailing findings on root causes of blowout

Two Reports Containing Findings on Root Cause of Blowout

Commission's Report

- Released January 11, 2011
- Chapter 4 sets out Commission's findings regarding root causes

Chief Counsel's Report

- Released February 17, 2011
- More detailed explanation of findings contained in Chapter 4 of the Commission's Report
- Contains some additional information not available at time Commission's Report written – confirmed findings

Background

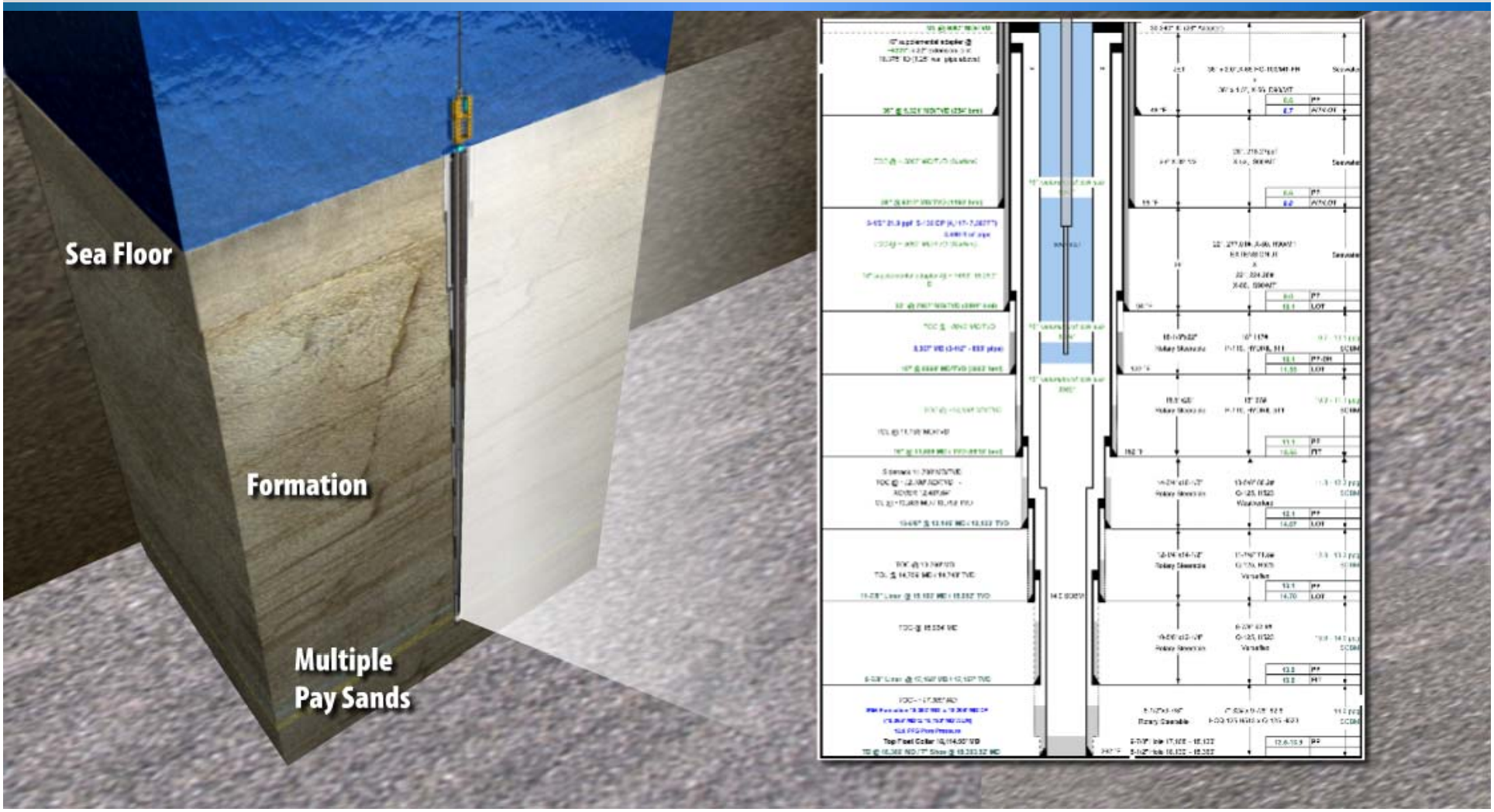
What Happened – High Level

Root Causes

Thoughts for Committee

What Happened: High-Level

The Macondo Well



What Happened – High Level

1. Bottomhole cement was the only “active” barrier when blowout occurred
   - Mud removed (underbalanced) and BOP was open
   - BP chose not to put additional barriers in place prior to displacement of mud from the riser

What Happened – High Level

1. Bottomhole cement was the only “active” barrier when blowout occurred
   - Mud removed (underbalanced) and BOP was open
   - BP chose not to put additional barriers in place prior to displacement of mud from the riser

2. Bottomhole cement job failed
   - Unusually tricky cement job – many risk factors
   - Foamed cement slurry was likely unstable as well

What Happened – High Level

1. Bottomhole cement was the only "active" barrier when blowout occurred
   - Mud removed (underbalanced) and BOP was open
   - BP chose not to put additional barriers in place prior to displacement of mud from the riser

2. Bottomhole cement job failed
   - Unusually tricky cement job – many risk factors
   - Foamed cement slurry was likely unstable as well

3. Nobody detected failure until too late
   - Misinterpreted the negative pressure test
   - Failed to detect influx during displacement

What Happened – High Level

1. Bottomhole cement was the only "active" barrier when blowout occurred
   - Mud removed (underbalanced) and BOP was open
   - BP chose not to put additional barriers in place prior to displacement of mud from the riser

2. Bottomhole cement job failed
   - Unusually tricky cement job – many risk factors
   - Foamed cement slurry was likely unstable as well

3. Nobody detected failure until too late
   - Misinterpreted the negative pressure test – **Human Judgment**
   - Failed to detect influx during displacement – **Human Judgment**

Background

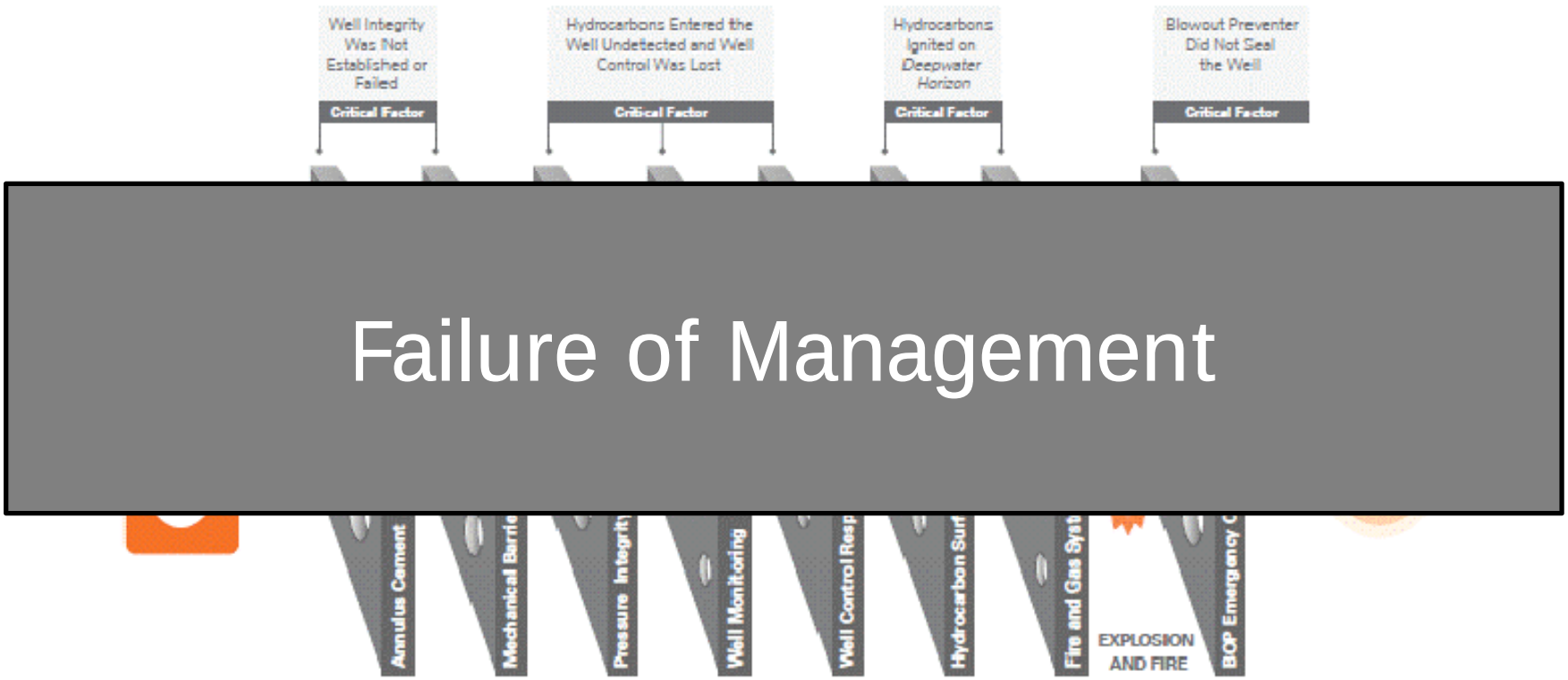
What Happened – High Level

Root Causes

Lists of Recommendations

Root Causes

BP's View of the Blowout



Failure of Management

Adapted from James Reason (Hampshire: Ashgate Publishing Limited, 1997).

Figure 1. Barriers Breached and the Relationship of Barriers to the Critical Factors.

Overview of Management Failures

1. Absence of responsibility
   - Diffuse decision making – within BP and between contractors
   - Ineffective communication
   - Lack of leadership

Overview of Management Failures

1. Absence of responsibility
   - Diffuse decision making – within BP and between contractors
   - Ineffective communication
   - Lack of leadership
2. Setting people up for failure
   - Overreliance on human judgment
   - Inadequate instruction and untimely procedures
   - Inadequate training and procedures for emergency situations
   - Poor management of staffing

Overview of Management Failures

1. Absence of responsibility
   - Diffuse decision making – within BP and between contractors
   - Ineffective communication
   - Lack of leadership
2. Setting people up for failure
   - Overreliance on human judgment
   - Inadequate instruction and untimely procedures
   - Inadequate training and procedures for emergency situations
   - Poor management of staffing
3. Inadequate risk assessment
   - Ad hoc and tunnel vision decision making during critical operations
   - Problems with safety metrics and process safety
   - Focus on efficiency biases decisions toward cost savings

Overview of Management Failures

1. Absence of responsibility
   - Diffuse decision making – within BP and between contractors
   - Ineffective communication
   - Lack of leadership
2. Setting people up for failure
   - Overreliance on human judgment
   - Inadequate instruction and untimely procedures
   - Inadequate training and procedures for emergency situations
   - Poor management of staffing
3. Inadequate risk assessment
   - Ad hoc and tunnel vision decision making during critical operations
   - Problems with safety metrics and process safety
   - Focus on efficiency biases decisions toward cost savings

Some of the Companies Involved at Macondo

bp

Rig and drilling — Transocean

HALLIBURTON | Sperry Drilling — Surface data logging

Cementing — HALLIBURTON

CAMERON — Blowout preventer

Drilling mud — MI SWACO, A Schlumberger Company

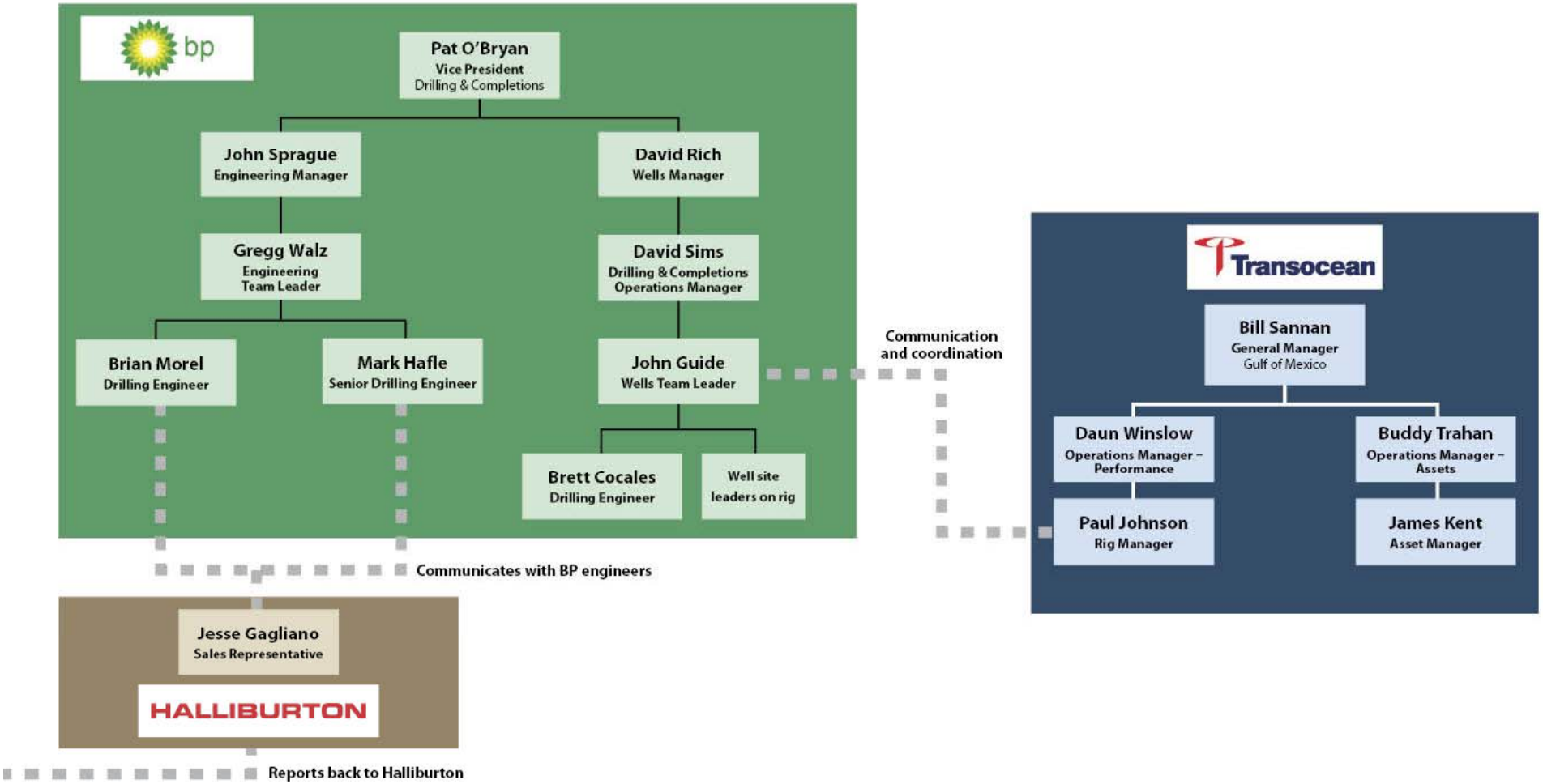
OCEANEERING — ROV support

Well and cement logging — Schlumberger

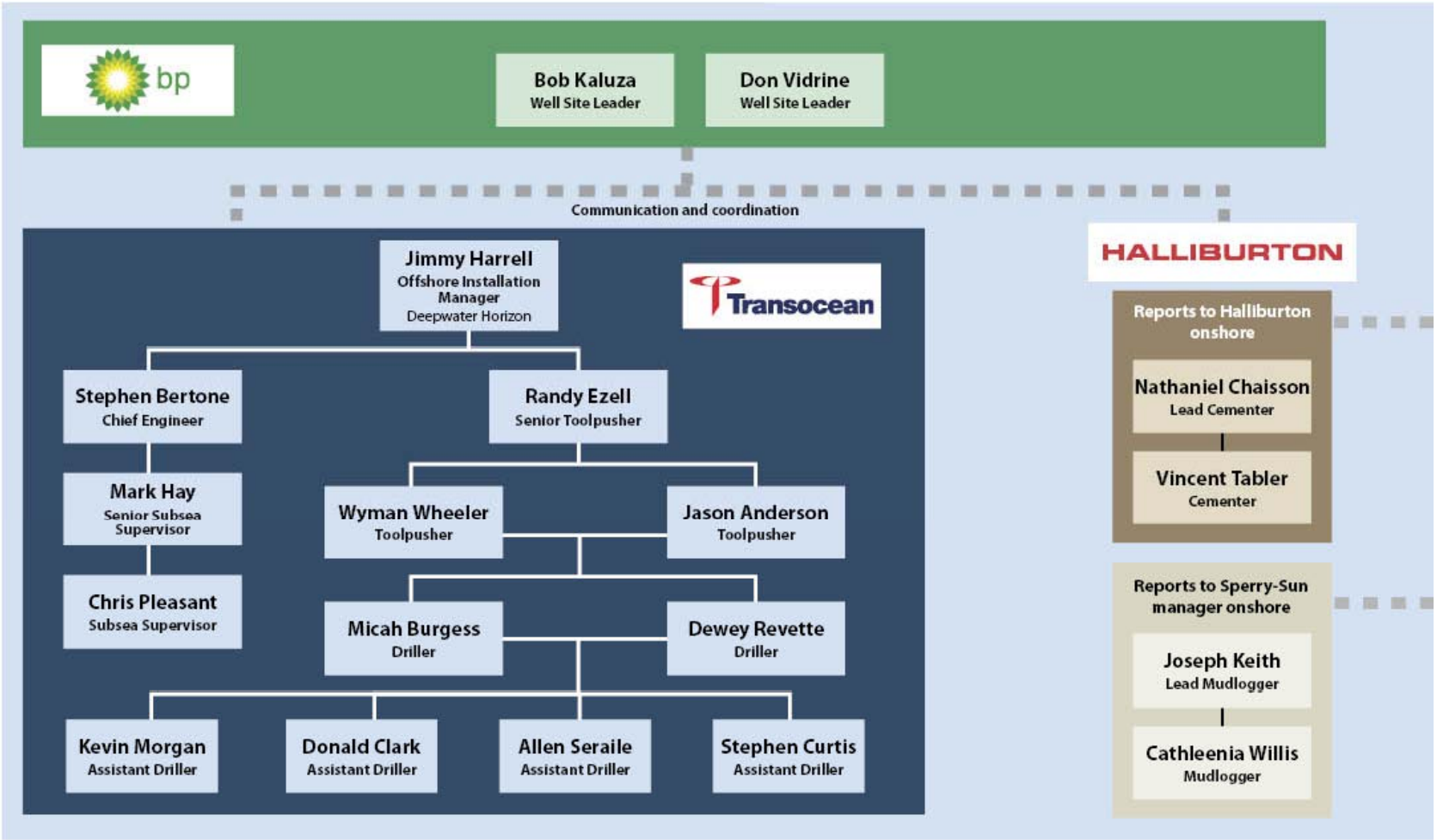
Setting a global standard — DRIL-QUIP — Wellhead, casing hangers

Weatherford — Centralizers, float collar, shoe track

Onshore Organizational Chart



Rig Crew Organizational Chart



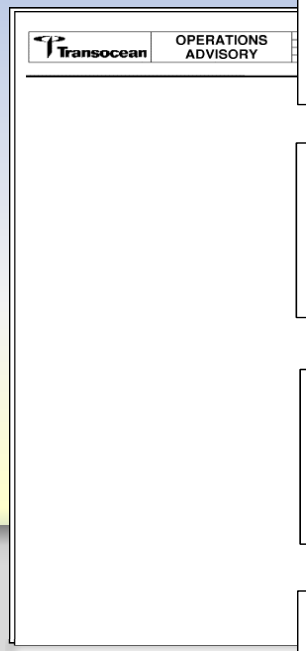
Cement Job: Example of Problems with Decentralized Decision-Making

- **Numerous different risk factors associated with cement job**
- **Little to no communication of those risks to individuals/contractors conducting the negative pressure test or monitoring well after cement job**
- **Resulted in looking at risks they knew about one at a time rather than collectively as a group**

Recommendation: Make Clear Who is Responsible

- **Much finger-pointing after event – saying someone else responsible**
- **Make clear entity responsible for critical decisions and operations**

Did Not Communicate Lessons Learned From Other Events



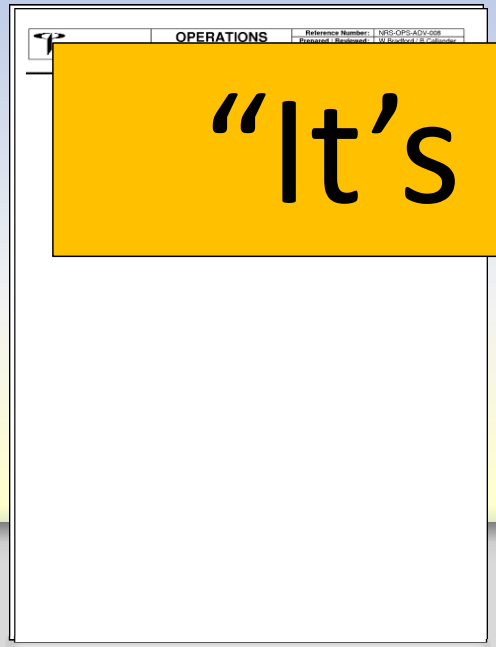
"drill crew did not consider well control as a realistic event during the…displacement operation as the [downhole barrier] had been successfully tested"

"tested barriers can fail and risk awareness and control measures need to be implemented"

"standard well control practices must be maintained throughout the life of the well"

"specify operations that induce underbalance conditions in the well bore"

Did Not Communicate Lessons Learned From Other Events



"It's in the database"

April 14, 2010 Advisory

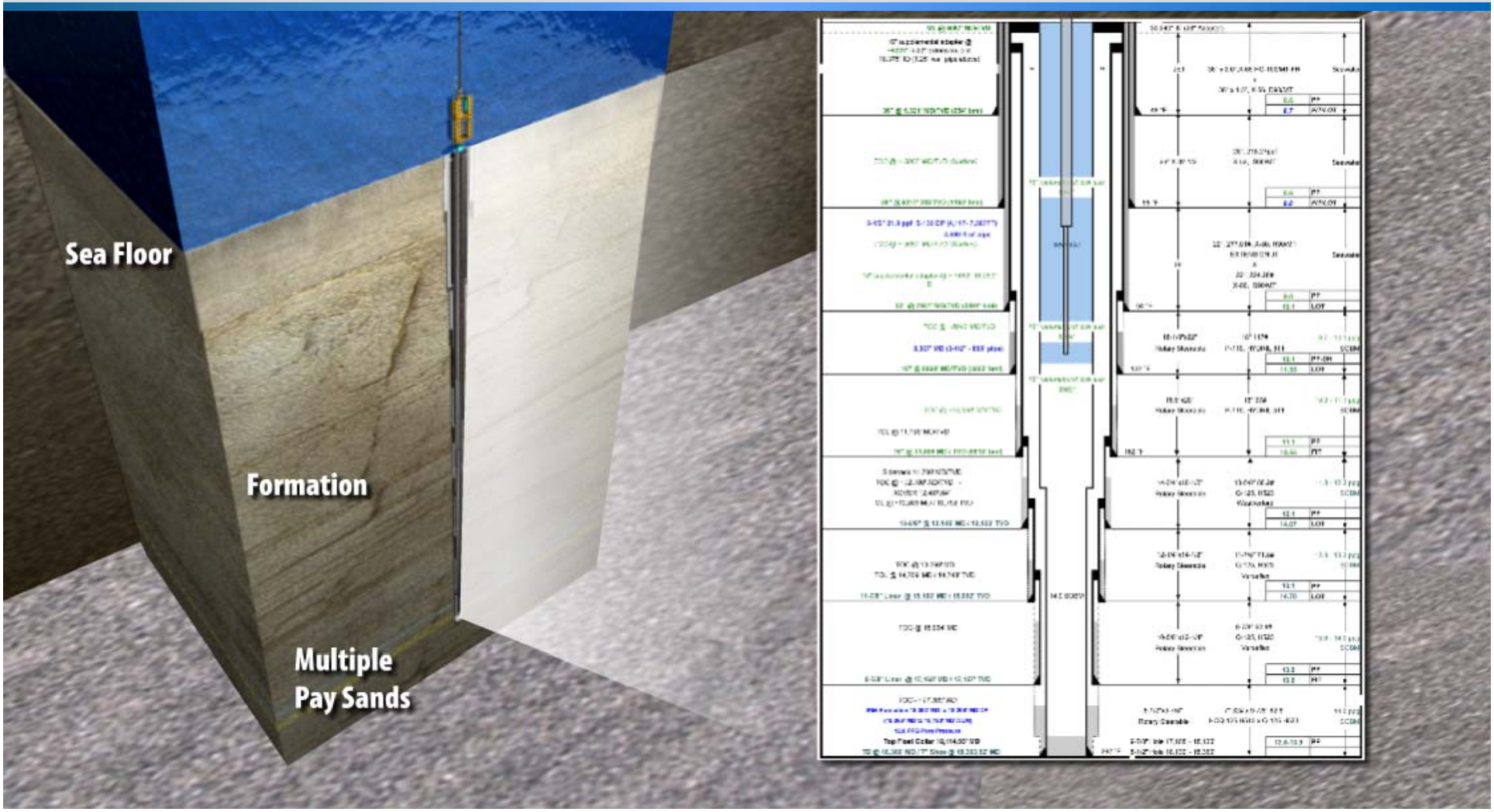
Recommendation: Create Centralized System for Communicating Lessons Learned and Best Practices

- **Create centralized, industry-wide system for alerting all players to lessons learned and near misses**
- **Keep better track of procedures used by different companies in order to facilitate study and identification of best practices**

Overview of Management Failures

1. Absence of responsibility
   - Diffuse decision making – within BP and between contractors
   - Ineffective communication
   - Lack of leadership
2. Setting people up for failure
   - Overreliance on human judgment
   - Inadequate instruction and untimely procedures
   - Inadequate training and procedures for emergency situations
   - Poor management of staffing
3. Inadequate risk assessment
   - Ad hoc and tunnel vision decision making during critical operations
   - Problems with safety metrics and process safety
   - Focus on efficiency biases decisions toward cost savings

The Macondo Well



Barriers to Hydrocarbon Escape

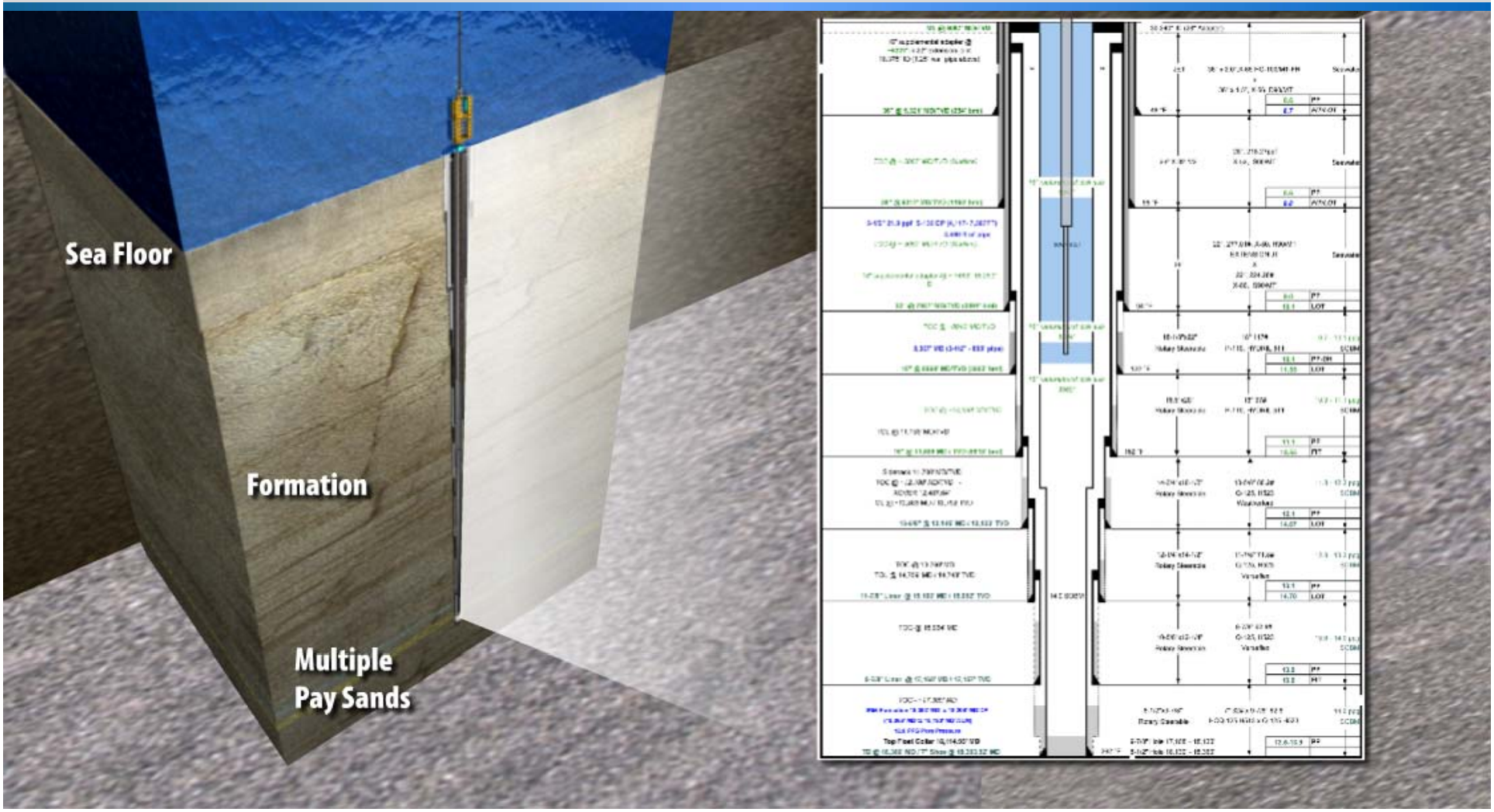
"Active" Barriers

- Mud (drilling fluid)
- Tested physical barriers
  - Bottom-hole cement
  - Cement plugs and other up-hole mechanical barriers
  - Closed BOP

"Contingent" Barriers

- Open BOP – depends on human judgment
- Untested physical barriers – tests often depend on human judgment (*e.g.*, negative pressure test)

Single Physical Barrier During Displacement: Placed Unnecessary Reliance on Human Judgment



Inadequate Focus on Technology

- One of biggest surprises in whole investigation
- Antiquated sensors, data presentation and very few automated safety systems or checks
- Appears to lag behind other industries when comes to safety-related technologies (*e.g.*, airline industry) particularly where no drilling efficiency payoff

Example: How Driller Sees Data

Recommendation: Eliminate Human Judgment as Much as Possible Where Mistake Could Have Huge Consequences

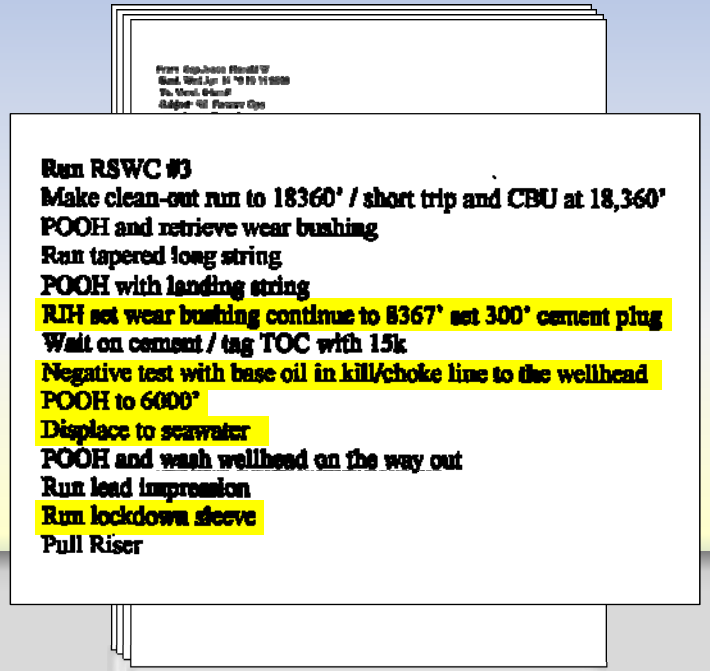
- Require redundant “dumb” safety barriers – for instance must have at least two “active” barriers when underbalanced
- Incentivize development of technology to eliminate reliance on human judgment where possible

Overview of Management Failures

1. Absence of responsibility
   - Diffuse decision making – within BP and between contractors
   - Ineffective communication
   - Lack of leadership
2. Setting people up for failure
   - Overreliance on human judgment
   - Inadequate instruction and untimely procedures
   - Inadequate training and procedures for emergency situations
   - Poor management of staffing
3. Inadequate risk assessment
   - Ad hoc and tunnel vision decision making during critical operations
   - Problems with safety metrics and process safety
   - Focus on efficiency biases decisions toward cost savings

Evolution of Temporary Abandonment Procedure

April 14 E-Mail From
Morel to R. Sepulvado



Run RSWC #3
Make clean-out run to 18360' / short trip and CBU at 18,360'
POOH and retrieve wear bushing
Run tapered long string
POOH with landing string
RIH set wear bushing continue to 8367' set 300' cement plug
Wait on cement / tag TOC with 15k
Negative test with base oil in kill/choke line to the wellhead
POOH to 6000'
Displace to seawater
POOH and wash wellhead on the way out
Run lead impression
Run lockdown sleeve
Pull Riser

April 14 Morel E-Mail	April 16 MMS Permit	April 20 Ops Note
Run in hole to 8,367'		
Set 300' cement plug in mud BARRIER		
Negative pressure test with base oil to wellhead		
Displace mud in well and riser from 6,000' with seawater		
Set lockdown sleeve		

Privileged & Confidential

Evolution of Temporary Abandonment Procedure

April 16 Application for Permit to Drill Sent to MMS

Temporary Abandonment Procedure: *(estimated start time Sunday, April 18, 2010)*

1. Negative test casing to seawater gradient equivalent for 30 min. with kill line.
2. TIH with a 3-1/2" stinger to 8367'.
3. Displace to seawater. Monitor well for 30 min.
4. Set a 300' cement plug (125 cu.ft. of Class H cement) from 8367' to 8067'.

   The requested surface plug depth deviation is for minimizing the chance for damaging the LDS sealing area, for future completion operations.

   This is a Temporary Abandonment only.

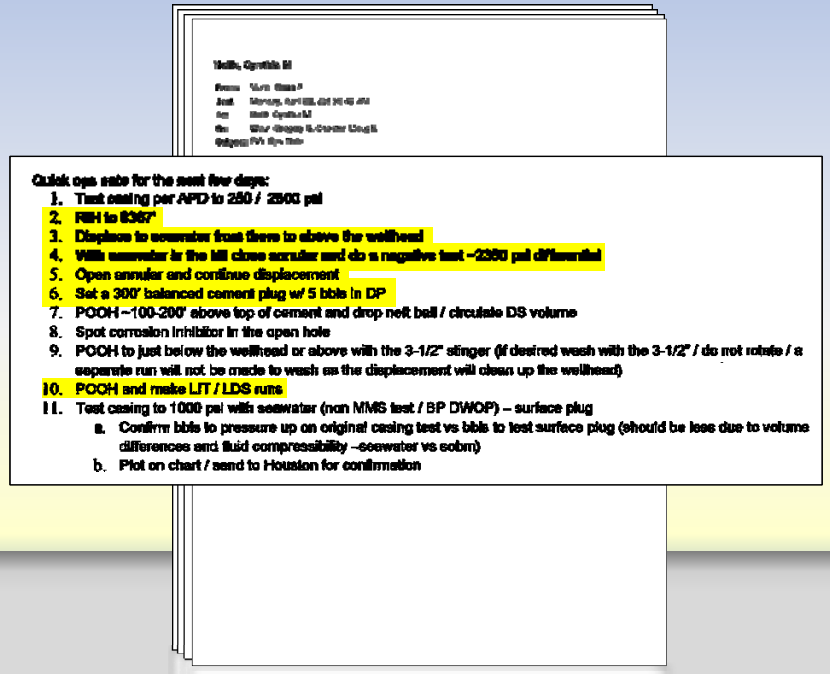
   The cement plug length has been extended to compensate for added setting depth.
5. POOH.
6. Set 9-7/8" LDS (Lock Down Sleeve)

April 14 Morel E-Mail	April 16 MMS Permit	April 20 Ops Note
Trip in hole to 8,367'	Negative pressure test to seawater gradient (with base oil to wellhead)	
Set 300' cement plug in seawater BARRIER	Trip in hole to 8,367'	
Negative pressure test with base oil to wellhead	Displace mud in well and riser from 8,367' with seawater	
Displace mud in well and riser from 6,000' with seawater	Monitor well for 30 minutes to ensure no flow	
	Set 300' cement plug in seawater BARRIER	
Set lockdown sleeve	Set lockdown sleeve	

Privileged & Confidential

Evolution of Temporary Abandonment Procedure

April 20 Operations Note
From Morel to Rig



Quick ops note for the next few days:

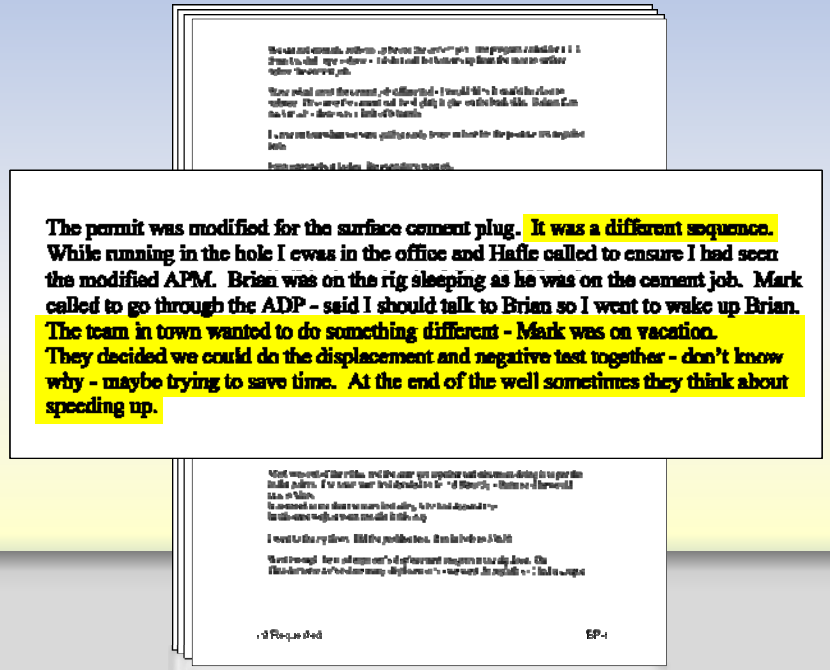
1. Test casing per APD to 250 / 2500 psi
2. RIH to 8367'
3. Displace to seawater from there to above the wellhead
4. With seawater in the hill close annular and do a negative test ~2350 psi differential
5. Open annular and continue displacement
6. Set a 300' balanced cement plug w/ 5 bbls in DP
7. POOH ~100-200' above top of cement and drop nerf ball / circulate DS volume
8. Spot corrosion inhibitor in the open hole
9. POOH to just below the wellhead or above with the 3-1/2" stinger (if desired wash with the 3-1/2" / do not rotate / a separate run will not be made to wash as the displacement will clean up the wellhead)
10. POOH and make LIT / LDS runs
11. Test casing to 1000 psi with seawater (non MMS test / BP DWOP) – surface plug
    a. Confirm bbls to pressure up on original casing test vs bbls to test surface plug (should be less due to volume differences and fluid compressibility –seawater vs sobm)
    b. Plot on chart / send to Houston for confirmation

April 14 Morel E-Mail	April 16 MMS Permit	April 20 Ops Note
Run in hole to 8,367'	Negative pressure test to seawater gradient (with base oil to wellhead)	Trip in hole to 8,367'
Set 300' cement plug in mud BARRIER	Trip in hole to 8,367'	Displace mud with seawater from 8,367' to above wellhead (BOP)
Negative pressure test with base oil to wellhead	Displace mud in well and riser from 8,367' with seawater	Negative pressure test with seawater to depth 8,367' rather than with base oil to wellhead
Displace mud in well and riser from 6,000' with seawater	Monitor well for 30 minutes to ensure no flow	Displace mud in riser with seawater Blowout
	Set 300' cement plug in seawater BARRIER	Set 300' cement plug in seawater BARRIER
Set lockdown sleeve	Set lockdown sleeve	Set lockdown sleeve

Privileged & Confidential

Evolution of Temporary Abandonment Procedure

April 28 Interview
of Bob Kaluza



The permit was modified for the surface cement plug. It was a different sequence. While running in the hole I ewas in the office and Hafle called to ensure I had seen the modified APM. Brian was on the rig sleeping as he was on the cement job. Mark called to go through the ADP - said I should talk to Brian so I went to wake up Brian. The team in town wanted to do something different - Mark was on vacation. They decided we could do the displacement and negative test together - don't know why - maybe trying to save time. At the end of the well sometimes they think about speeding up.

April 14 Morel E-Mail	April 16 MMS Permit	April 20 Ops Note
Run in hole to 8,367'	Negative pressure test to seawater gradient (with base oil to wellhead)	Trip in hole to 8,367'
Set 300' cement plug in mud **BARRIER**	Trip in hole to 8,367'	Displace mud with seawater from 8,367' to above wellhead (BOP)
Negative pressure test with base oil to wellhead	Displace mud in well and riser from 8,367' with seawater	Negative pressure test with seawater to depth 8,367' rather than with base oil to wellhead
Displace mud in well and riser from 6,000' with seawater	Monitor well for 30 minutes to ensure no flow	Displace mud in riser with seawater **Blowout**
	Set 300' cement plug in seawater **BARRIER**	Set 300' cement plug in seawater **BARRIER**
Set lockdown sleeve	Set lockdown sleeve	Set lockdown sleeve

Privileged & Confidential

Recommendation: Require Earlier Submission of Procedures for Approval

- BP did not submit temporary abandonment plan with original permit requests – did not develop until last 10 days before blowout
- Requiring earlier submission would allow greater time for agency review and force companies to develop procedures before last minute

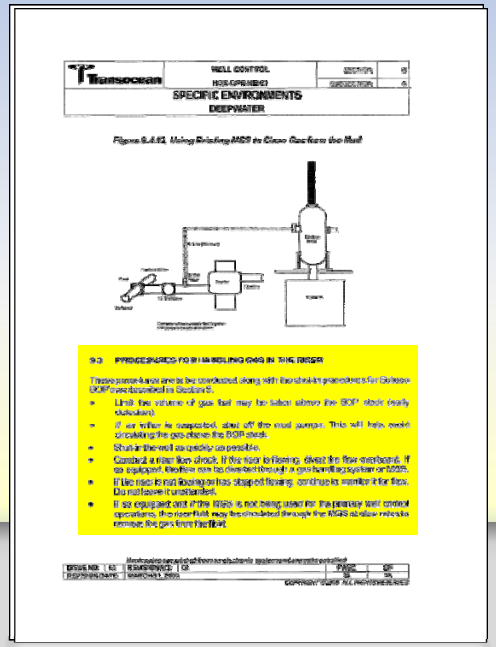
Recommendation: Require Strict Adherence to Approved Procedures

- BP altered the temporary abandonment procedure from those approved by MMS – said believed was safer procedure so no need to re-submit
- Requiring strict adherence to approved procedures will prevent ad hoc decision-making and force companies to do real risk assessment

Overview of Management Failures

1. Absence of responsibility
   - Diffuse decision making – within BP and between contractors
   - Ineffective communication
   - Lack of leadership
2. Setting people up for failure
   - Overreliance on human judgment
   - Inadequate instruction and untimely procedures
   - Inadequate training and procedures for emergency situations
   - Poor management of staffing
3. Inadequate risk assessment
   - Ad hoc and tunnel vision decision making during critical operations
   - Problems with safety metrics and process safety
   - Focus on efficiency biases decisions toward cost savings

Inadequate Training on Low Probability Emergency Events



Well Control Handbook

9.3 PROCEDURES FOR HANDLING GAS IN THE RISER

These procedures are to be conducted along with the shut-in procedures for Subsea BOP's as described in Section 5.

- Limit the volume of gas that may be taken above the BOP stack (early detection).
- If an influx is suspected, shut off the mud pumps. This will help avoid circulating the gas above the BOP stack.
- Shut-in the well as quickly as possible.
- Conduct a riser flow check. If the riser is flowing, divert the flow overboard. If so equipped, the flow can be diverted through a gas handling system or MGS.
- If the riser is not flowing or has stopped flowing, continue to monitor it for flow. Do not leave it unattended.
- If so equipped and if the MGS is not being used for the primary well control operations, the riser fluid may be circulated through the MGS at slow rates to remove the gas from the fluid.
- Circulate the riser at slow rates. Stop circulation and conduct a riser flow check after every 100 bbls (16 m^3) pumped or equivalent volume to +/- 250 ft (75 m) of riser.
- If gas is seen at surface, stop pumping and watch for flow. Allow the flow to deplete before continuing.
- If the flow rate increases, be prepared to open up the diverter line to send the mud overboard.
- Continue to circulate in stages at slow rate until the complete riser volume has been circulated.
- After killing the well and removing any gas trapped in the BOP stack, as described in Section 6, there is still the possibility that some gas trapped under the BOP stack may be released into the riser after opening the BOP. If this occurs, then the above procedures should be repeated.

Recommendation: Require and Approve Training, Procedures and Drills for Various Potential Emergencies

- Require that companies train and drill for various emergency scenarios, such as blowout
- Require companies to submit emergency procedures and training plans

Overview of Management Failures

1. Absence of responsibility
   - Diffuse decision making – within BP and between contractors
   - Ineffective communication
   - Lack of leadership
2. Setting people up for failure
   - Overreliance on human judgment
   - Inadequate instruction and untimely procedures
   - Inadequate training and procedures for emergency situations
   - Poor management of staffing
3. Inadequate risk assessment
   - Ad hoc and tunnel vision decision making during critical operations
   - Problems with safety metrics and process safety
   - Focus on efficiency biases decisions toward cost savings

Major Process Safety Gaps at BP

BP's "Stage Gate" Process

- ***Robust*** risk analysis/peer review during **design stage**
- Little to no risk analysis/no peer review during **execute stage**
  - *BUT major procedural and other decisions made*
  - *BP actually put off certain design decisions until execute stage*

Results in *ad hoc* decision-making on key decisions

- No formal structure for evaluating risk or peer review
- Decisions often one person on the fly without full information
  - *Centralizer decision*
  - *Temporary abandonment procedures*

Inadequate post-execution audit for evaluating decisions that increase risk of low probability, high consequence event

No Formal Risk Assessment of Temporary Abandonment Procedures

From: Hafle, Mark E
Sent: Fri Apr 16 02:15:36 2010
To: Morel, Brian P
Subject: Re: Negative Test
Importance: Normal

Seems ok to me. I really don't think mms will approve deep surface plug. We'll see

Did permit look ok?

From: Morel, Brian P
To: Walz, Gregory S; Cocales, Brett W; Hafle, Mark E; Guide, John
Sent: Thu Apr 15 20:53:40 2010
Subject: Negative Test

Recommendation out here is to displace to seawater at 8300' then set the cement plug. Does anyone have issues with this?

If we do a negative test prior to this with base oil to the wellhead the shoe will see about 360 psi less after the hole is displaced. Thoughts?

Thanks
Brian

April 15-16, 2010 Emails

Recommendation: Require Robust Internal Risk Assessment Procedures Throughout All Phases of Well

- Ensure companies have risk assessment regimes that do not have gaps in critical areas – particularly process safety
- Failure to adhere to own risk assessment procedures could be regulatory violation – hard to know how to enforce/check

Thoughts for Committee

Some Thoughts for Committee

- Make Clear Who is Responsible
- Eliminate Human Judgment as Much as Possible Where Mistake Could Have Huge Consequences
- Incentivize Investment in Safety-Related Technology
- Create Centralized System for Communicating Lessons Learned and Best Practices
- Require Earlier Submission of and Strict Adherence to Procedures
- Require and Approve Training, Procedures and Drills for Various Potential Emergencies
- Require Robust Internal Risk Assessment Procedures Throughout All Phases of Well

Background

What Happened – High Level

Particular Failures

Thoughts for Committee

Questions?

Appendix VIII

DEPARTMENT OF THE INTERIOR (DOI)
OCEAN ENERGY SAFETY ADVISORY COMMITTEE MEETING
WASHINGTON, D.C.
APRIL 18, 2011

DOI SECRETARY REMARKS

SECRETARY KENNETH L. SALAZAR: Thank you very much, Director Bromwich. And thank you to you, Chairman Hunter and Brad for you and your leadership of this Committee, and looking forward to the results of this effort.

Let me first make several points. The first is last night I read each and every one of your bios and your resumes, and I have to say that it is one of the most outstanding groups of scientists and experts that has ever been assembled in the United States to deal with the issues of oil and gas drilling.

So, for every one of you, I know what your responsibilities are within your companies, within the NGO communities, within government. I just want to say thank you for being very much a part of this effort.

To Dr. Tom Hunter, he and I and some of you in this room lived through the Deepwater Horizon national crisis for our country, and through all that, as he reminded us the other day at the International Containment Forum, for 140 days, we were on the phone almost every single day.

It started, I remember, on a plane trip when I was flying down to Houston in those early days of the Deepwater Horizon explosion, and he was drawing different diagrams for me on the plane on how he thought we might be able to bring the Macondo well under control at the time.

And in the ensuing days and weeks and many months that we went through that national crisis, he was the President's right hand man. He was Secretary Chu's right hand man, and he was my right hand man as we guided the nation through the crisis, working closely of course with James Dupree, who was very much a part of that team as well as other people who were involved with us. So, thank you Tom for agreeing to be the chairman of this organization.

I want to say just a quick word about Michael. We recruited him from a very safe and peaceful place in the private sector to come and help us reform how we do oil and gas drilling within the Department of Interior. He's had a very busy last year, and we have a lot more work to do.

He and I often talk and have meetings where we recognize that many of our reform efforts have been very good over the last year, and I'm very proud of the efforts we have underway. But we also know that this is a dynamic situation, and we will continue to learn, and we'll continue to implement the kinds of reforms that are necessary.

That's where your collective expertise and guidance is so important. Last week, when we brought together the twelve countries from throughout the world, including places like India and Brazil, Mexico and Canada, to talk about the future of ocean drilling, to do it in a way that is safe for workers and is safe for the environment, it reminded me once again about how global this industry is.

And so, it's not just what we do in the United States side of the Gulf of Mexico, but it obviously very much involves what is the future of the Gulf of Mexico on the Mexican side of the border. And so, we have been working very hard on that effort to try to make sure that we move forward with Mexico to develop a treaty in the Gulf of Mexico, and to develop a common set of protocols in how we develop oil and gas drilling in Mexico.

But beyond that, as I was in Brazil in the last several weeks, I was very impressed by what the Brazilian government has done with respect to its energy portfolio, but also recognized that in terms of the pre-salt finds in the deep water, they are the number one deep water producer now in the world, and how we move forward not only with Brazil but with Angola and with other countries around the world, I think gives us an opportunity because of the fact that we went through the national crisis of the Deepwater Horizon and the Macondo well to develop the gold standards for the world as we move forward with oil and gas production in the earth's oceans.

For this President, for President Obama and for me as his Secretary of Interior, our policy has been clear. We believe that oil and gas is part of our energy portfolio for the United States.

It is important for our economic security. It is important for our national security. And so, we will continue to have a policy that says we embrace oil and gas drilling in the oceans of America, including in the deep water. When we say in the deep water, we say yes, even though we went through the Deepwater Horizon and the Macondo Well, we believe that those lessons that we have learned and our continuing to learn will allow us to move forward in a way that allows us to develop that resource in a safe way.

So, you have a major assignment as a Committee to help our nation and really to help our world in terms of how we safely develop oil and gas in our nation.

The three points that have been laid out to all of you in terms of the possibility of creating subgroups really encapsulates things that we have been working on very hard, but recognizing that there's still additional work to do. You know, drilling and work place safety when you look back at all the different investigations and assessments that have been done about what happened on the Deepwater Horizon and the Macondo Well.

Well, you know, drilling and work place safety certainly is a key point to focus on because if we never have another Deepwater Horizon, that would be great. And so, the prevention side of what we do in this Committee is very important around drilling and work place safety.

But then a second area is what happens if you do have the very low probability event that you have another blowout that we had at Macondo? Okay, well, if that were ever to occur again, we want to make sure that we are prepared to be able to go in with containment programs that won't

allow the kind of spill to continue for the 87 days that we had the active spill here, and even beyond that as we continue to monitor the situation. So, what are the best containment strategies?

Then finally, dealing with oil spill response, and making sure that we have the most effective oil spill response in the event that we have to respond to an oil spill, and certainly having the United States Coast Guard, and Roy Nash, you being here with us today, and members of this Committee as well dealing with that particular issue is going to be a very important one.

So, I just wanted to really say thank you, and to say that in -- in reading your resumes once again, which is the second time I read them last night, I was very, very impressed by the expertise that you all bring to this effort. And with that, I'll turn it over to Michael Bromwich.

Appendix IX

DEPARTMENT OF THE INTERIOR (DOI)
OCEAN ENERGY SAFETY ADVISORY COMMITTEE MEETING
WASHINGTON, D.C.
APRIL 18, 2011

BUREAU OF OCEAN ENERGY MANAGEMENT, REGULATION AND ENFORCEMENT (BOEMRE) DIRECTOR REMARKS

BOEMRE DIRECTOR MICHAEL R. BROMWICH: Thank you very much, Secretary Salazar, and thank you for joining us this afternoon.

It's really great to be here at the inaugural meeting of this Committee, and I want to join the Secretary in again thanking you for serving on this Committee, and look forward to the terrific work I'm sure you're going to be doing in the future with us.

With the anniversary of the Deepwater Horizon blowout just two days away, we're reminded how critically important it is for us to bring together the broad experience and the best minds to help us examine some of the problems that Secretary Salazar just mentioned, and to make progress on issues of drilling and workplace safety, on containment, and on spill response.

As he suggested, we're in a much different and much better place than we were a year ago, but we want to be in an even better place still as we push forward three months in the future, six months in the future, a year in the future.

I think in the aftermath of Deepwater Horizon, people have begun to realize the importance of bringing together a group such as this so that we can get the best out of people who are experienced in the industry, who have looked at these issues from an academic perspective, and from various other perspectives as well.

So, we, I know the Secretary and I, and others, feel very good not only about the concept of this Committee, but about the composition of this Committee.

The Secretary mentioned that he had reviewed the resumes last night. He didn't see the incredibly distinguished applicants for membership on this Committee. One of the toughest things I've done since I've been on this job is sifting through the incredible number of qualified people to distill it down to the group that we have today.

It's a tribute to the number of people who are interested in serving. It's a tribute to the importance of these issues, and frankly it's a tribute to you that you were the selections that the group of us made.

I think the presentations that we heard this morning have already highlighted a number of areas that are in need of further research and consideration, and I must say I was gratified by the number and the incisiveness of the questions that many of you asked of the presenters this morning.

It shows that you're up on the issues. It shows that you care about the issues, and that you're looking to help push us forward as we move forward.

Three activities are of particular interest to the Secretary and to me, and to the entire Department as we move forward, and I'd like to just lay those out very briefly. First, I think what we need is a thorough assessment of the existing procedures and technologies for drilling and workplace safety, source containment and spill clean up, as well as recommendations for additional research in those fields.

Second, and this is obviously related, we need a comprehensive survey of existing and planned government and workplace safety, containment and spill response to identify gaps in the current knowledge base. And then last but not least, we're very interested in hearing now and in the future the Committee's recommendations for the best mechanism or mechanisms for long-term cooperation among government, industry and academia.

I think that's what's been missing in the past. I think this Committee can help begin to fill that gap, but I think as the Secretary suggested, this is a continuous and dynamic process. So, we want to figure out what the appropriate institutions are to make sure that this kind of collaboration continues.

So, let me again just say thank you for your service to your country, and I look very much forward to working through Dr. Hunter with you, and look forward to your recommendations to ensure that offshore drilling can be conducted in a safer and more environmentally responsible way than ever before. Thanks very much.

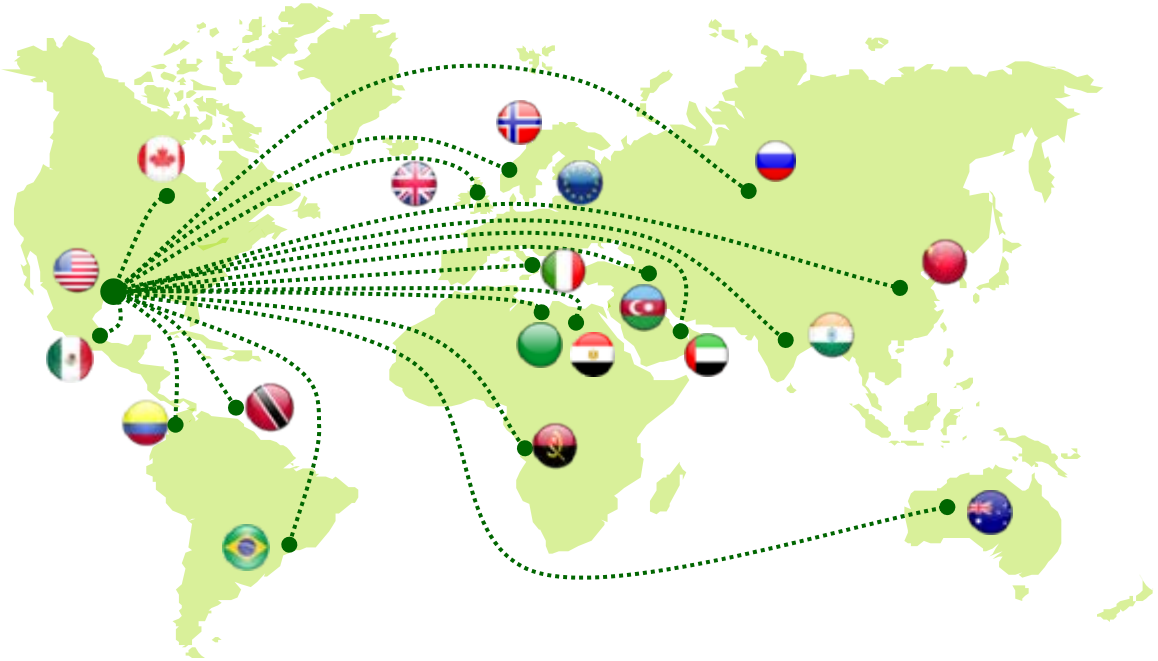
Advancing Global Deepwater Capabilities

Ocean Energy Safety Advisory Committee – April, 18, 2011 – James Dupree

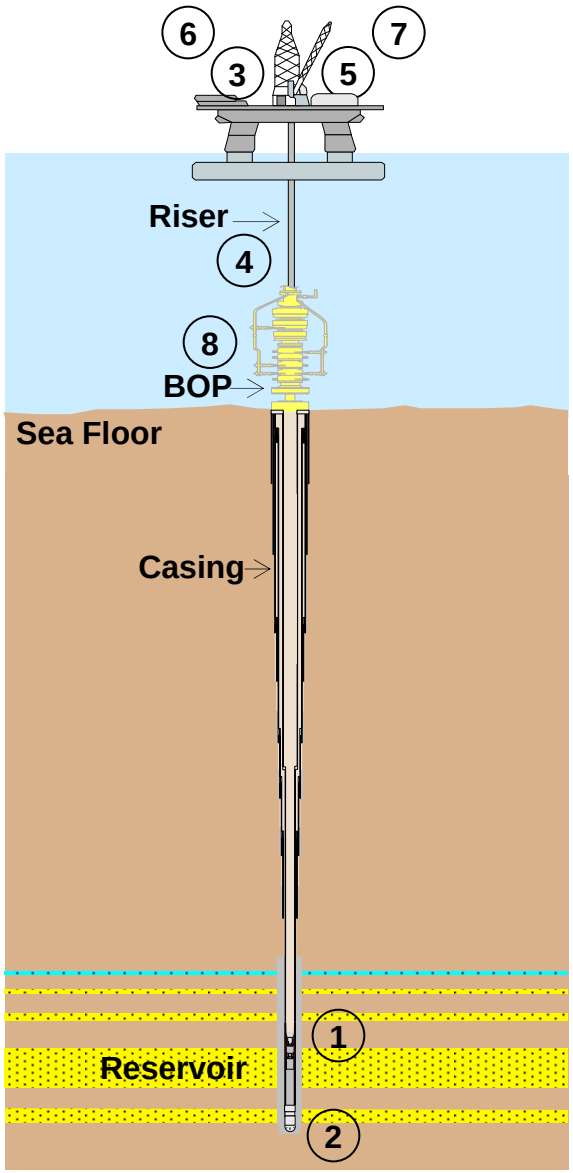
BP’s Commitment

Going forward, we are

- **Determined to accelerate and further develop the capabilities and practices** that enhance safety in our company and the deepwater industry
- **Committed to sharing our learnings globally** so an accident of this magnitude never happens again



Investigation Summary



Well integrity was not established or failed

1. Annulus cement barrier did not isolate hydrocarbons
2. Shoe track barriers did not isolate hydrocarbons

Hydrocarbons entered the well undetected and well control was lost

3. Negative pressure test was accepted although well integrity had not been established
4. Influx was not recognized until hydrocarbons were in riser
5. Well control response actions failed to regain control of well

Hydrocarbons ignited on the *Deepwater Horizon*

6. Diversion to mud gas separator resulted in gas venting onto rig
7. Fire and gas system did not prevent hydrocarbon ignition

Blowout preventer did not seal the well

8. Blowout preventer (BOP) emergency mode did not seal well

BP's Experience from the Accident and Numerous Investigations Inform Our Learnings

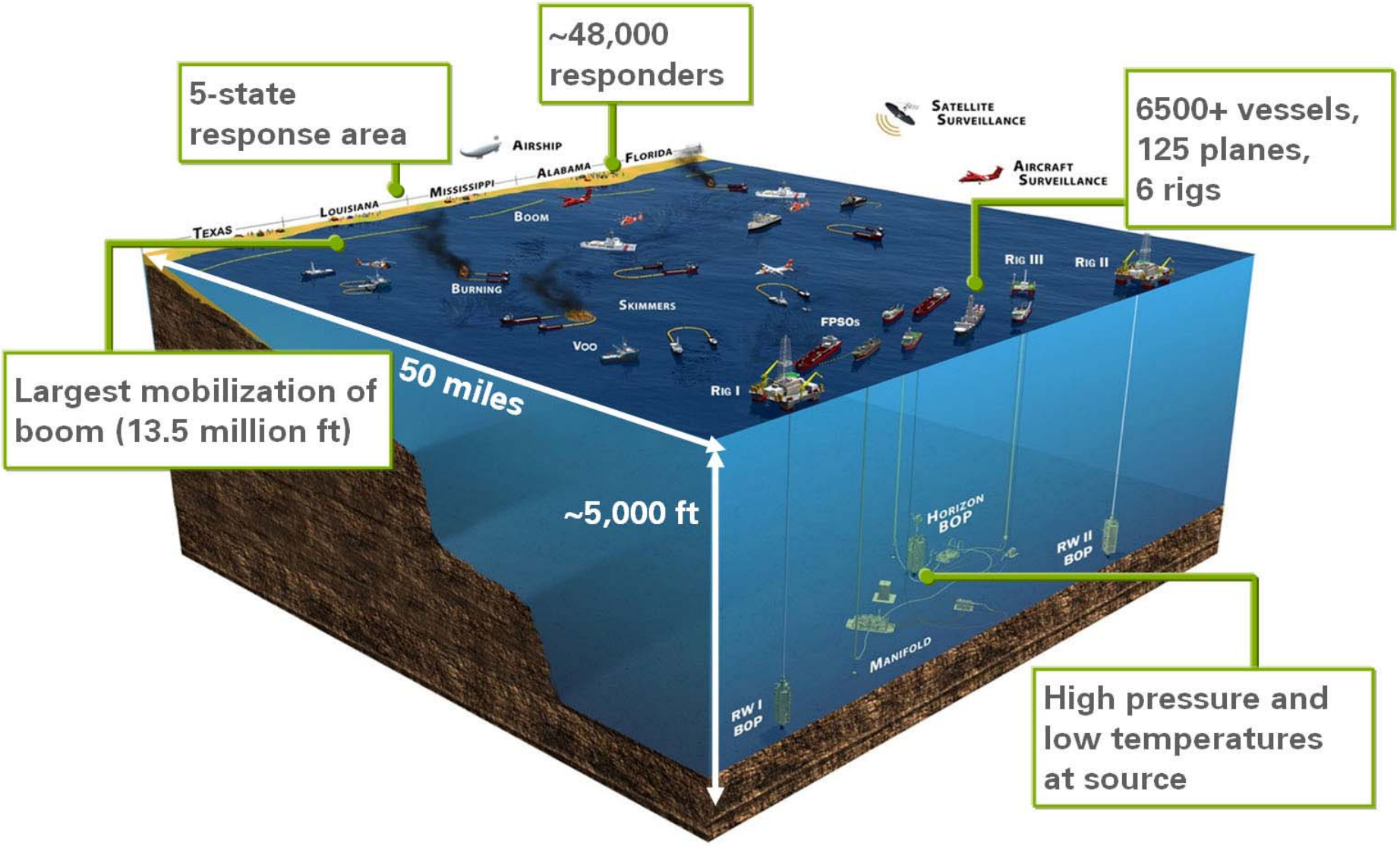
Learnings from DWH incident and response

Lessons Learned

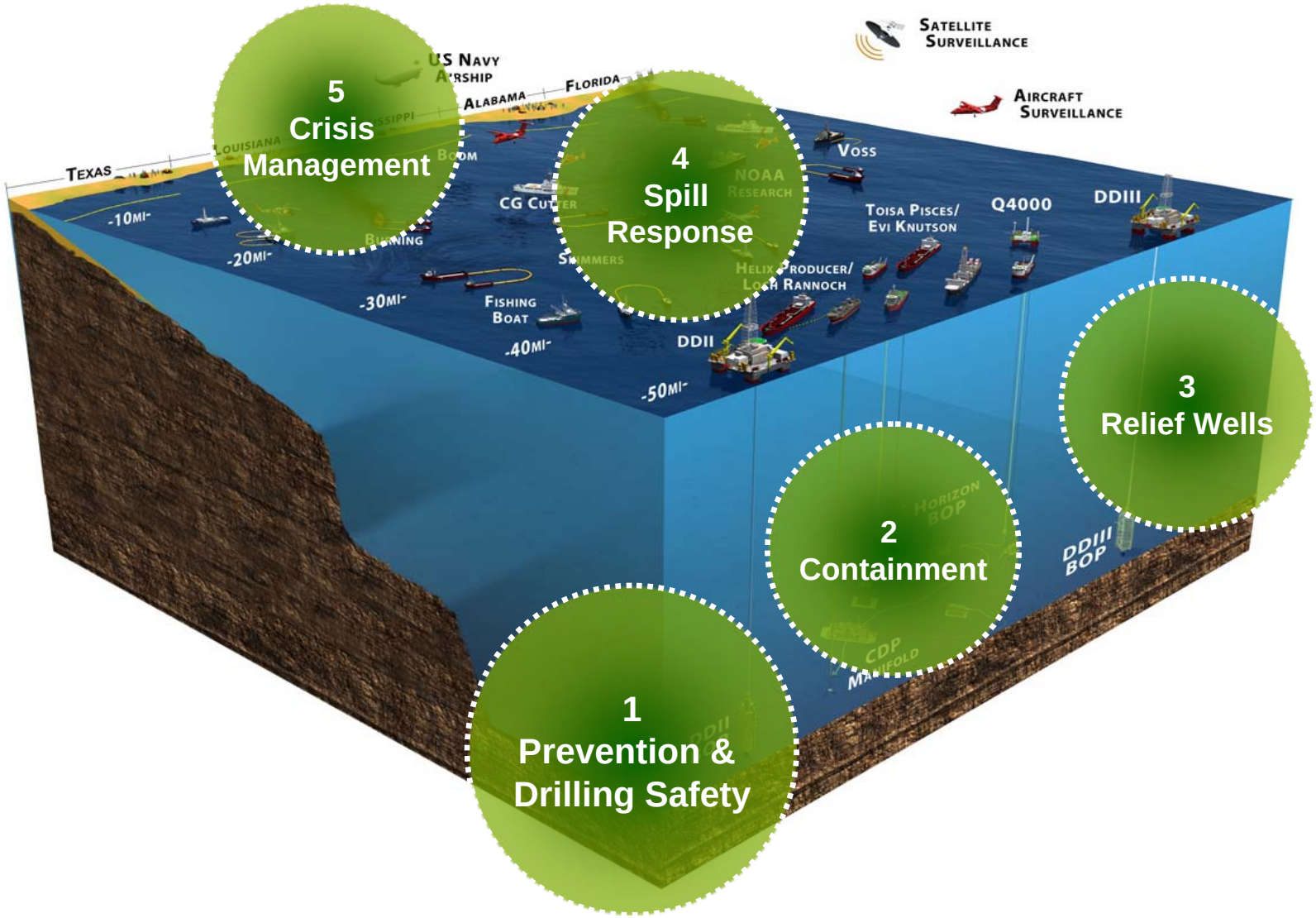
- **BP internal investigation**
- **Presidential Commission**

- DWH Joint Investigation (BOEM & USCG)
- US Chemical Safety Board
- National Academy of Engineering
- Montara Commission
- European Commission on Offshore Safety
- API Task Forces

Unprecedented Scale of Response in Challenging Conditions

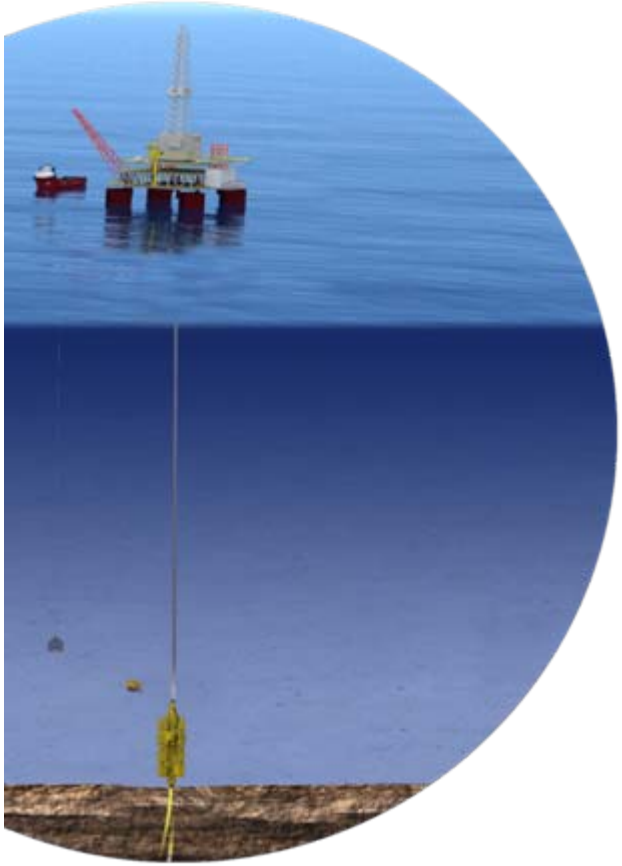


BP acquired unique knowledge and experience across five key areas



Prevention / Drilling Safety

The Highest Priority



Equipment and Procedures

- Enhancing global standards for BOPs, cementing, well integrity testing, and rig audits
- Establishing rigorous well checks
- Reviewing contractor oversight relating to safety

Top to Bottom Focus on Safety and Risk Management

- Additions to BP's board
- Empowering centralized Safety and Operational Risk group
- Creating centralized Global Wells Organization to drive standardization and consistent implementation
- Reviewing employee compensation to ensure safety-first behavior is appropriately incentivized

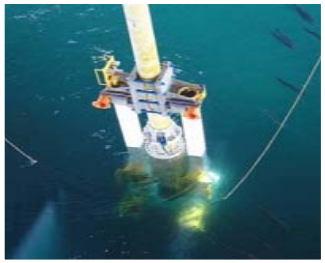
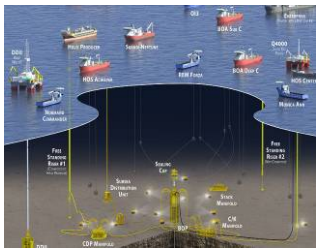
Prevention / Drilling Safety

Embedding Critical Recommendations

Critical Capabilities	Advance and Deploy
Procedures and Technical Practices	• Refreshing drilling and well operating engineering technical practices • Ensuring conformance to these practices
BOP Management	• Third party verification of BOP maintenance and testing now required • ROVs capability tested subsea to confirm BOP activation in emergency situations
Cementing Services Oversight	• New standards and technical review process developed for critical cementing operations • More stringent contractor laboratory quality audits

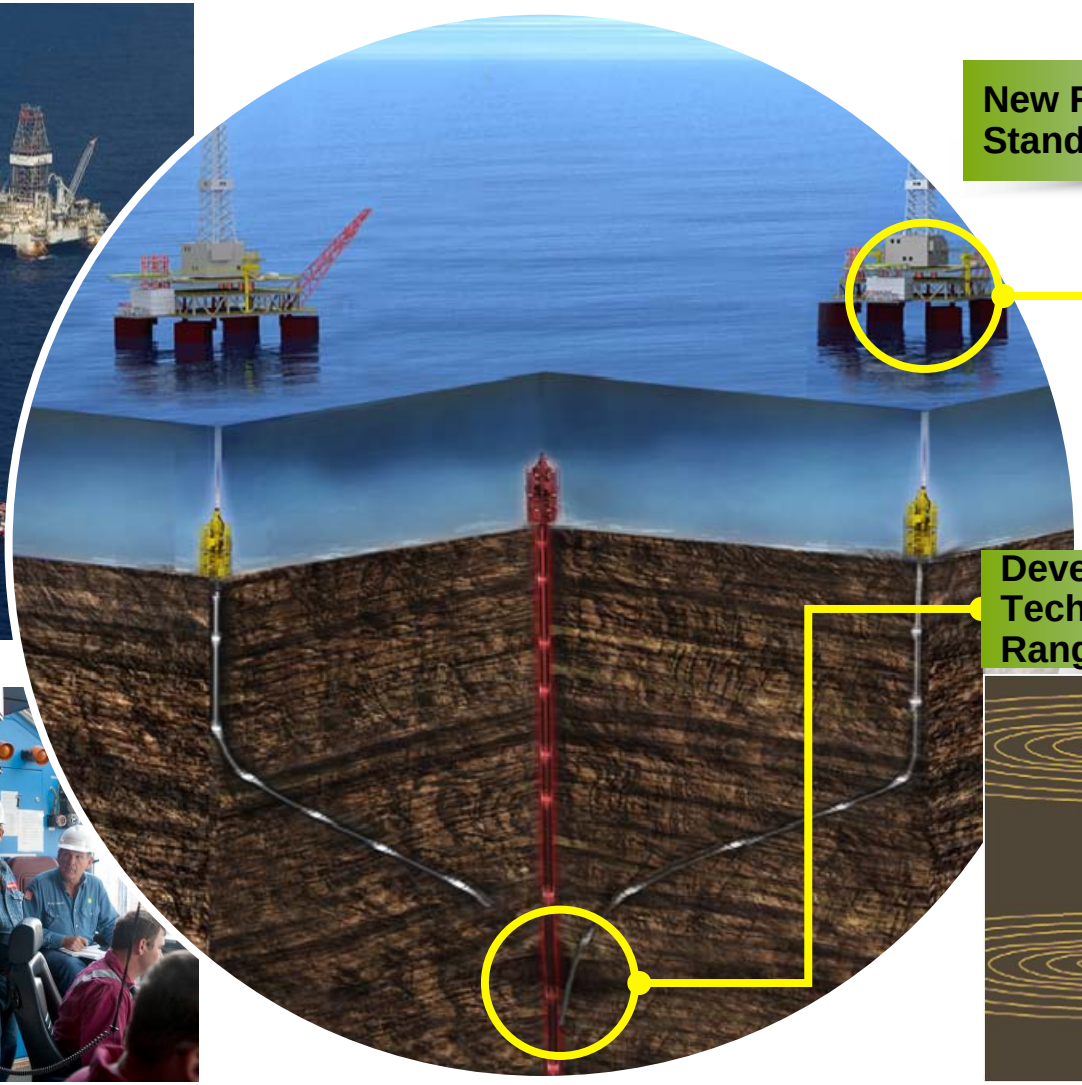
Containment

Advancing Solutions for the Industry

Critical Capabilities	Advance and Deploy
Immediate access to capping equipment for multiple scenarios	• Developing and making next generation solutions ready for deployment • Optimizing global equipment positioning
 **Rapidly-deployable collection system**	• Working with industry organizations to provide access to permanent free standing riser system for global deepwater basins
 Large scale **simultaneous operations management**	• Codifying protocols to manage subsea ops within small area • Extending 4D capability for day-to-day operations to plan and monitor surface and sub-sea activity

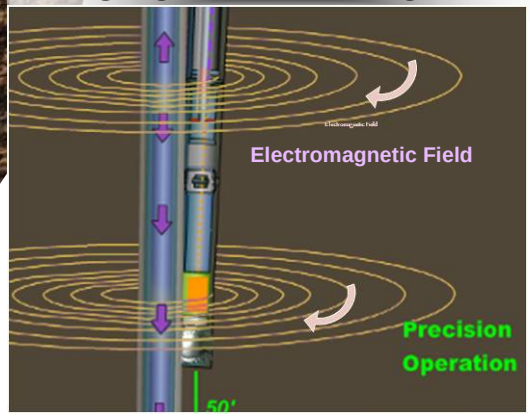
3 Relief Wells

Preplanning and Technology to Accelerate Bottom Well Kill



New Relief Well Planning Standards

Developed Early Technology for Active Ranging While Drilling

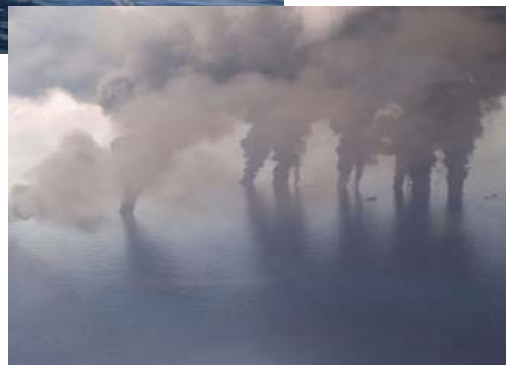


Spill Response

Developed Technology in Dispersants, Burning and Skimming

Subsea Dispersants

In-situ Burning



Booming and Skimming

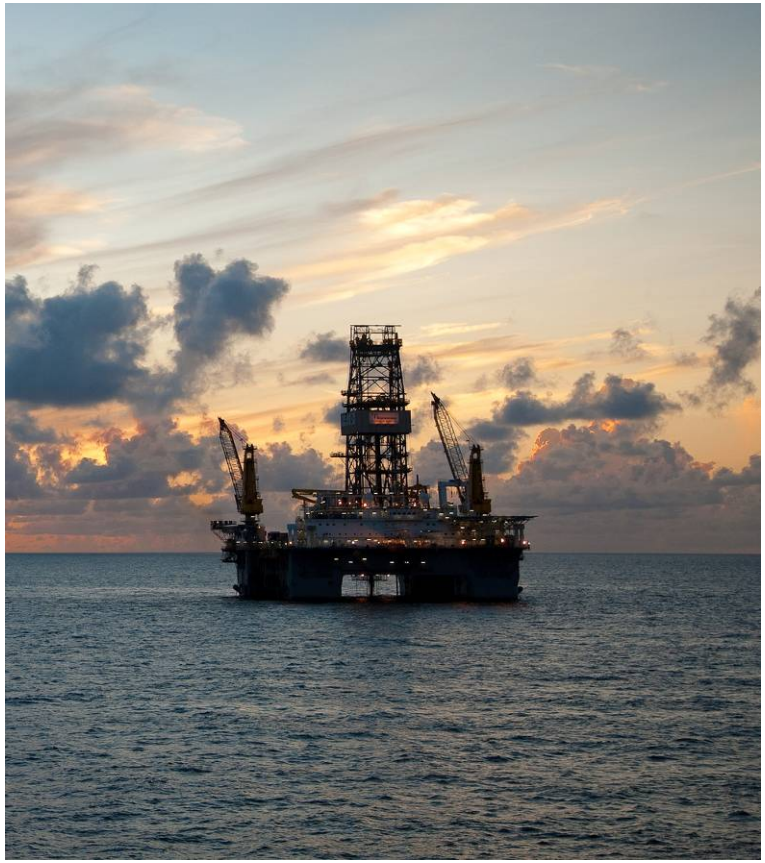
U.S. Coast Guard photo by Petty Officer 3rd Class Jaclyn Young

Crisis Management

Extending Proven Structure and Deploying Technology

- Co-ordination / Planning
- Unified Command Structure and Community Outreach
- Common Operating Picture and plan
- Simultaneous Operations

Committed to Enhancing Deepwater Safety



Continuing to develop capabilities across the 5 critical areas. Focus on

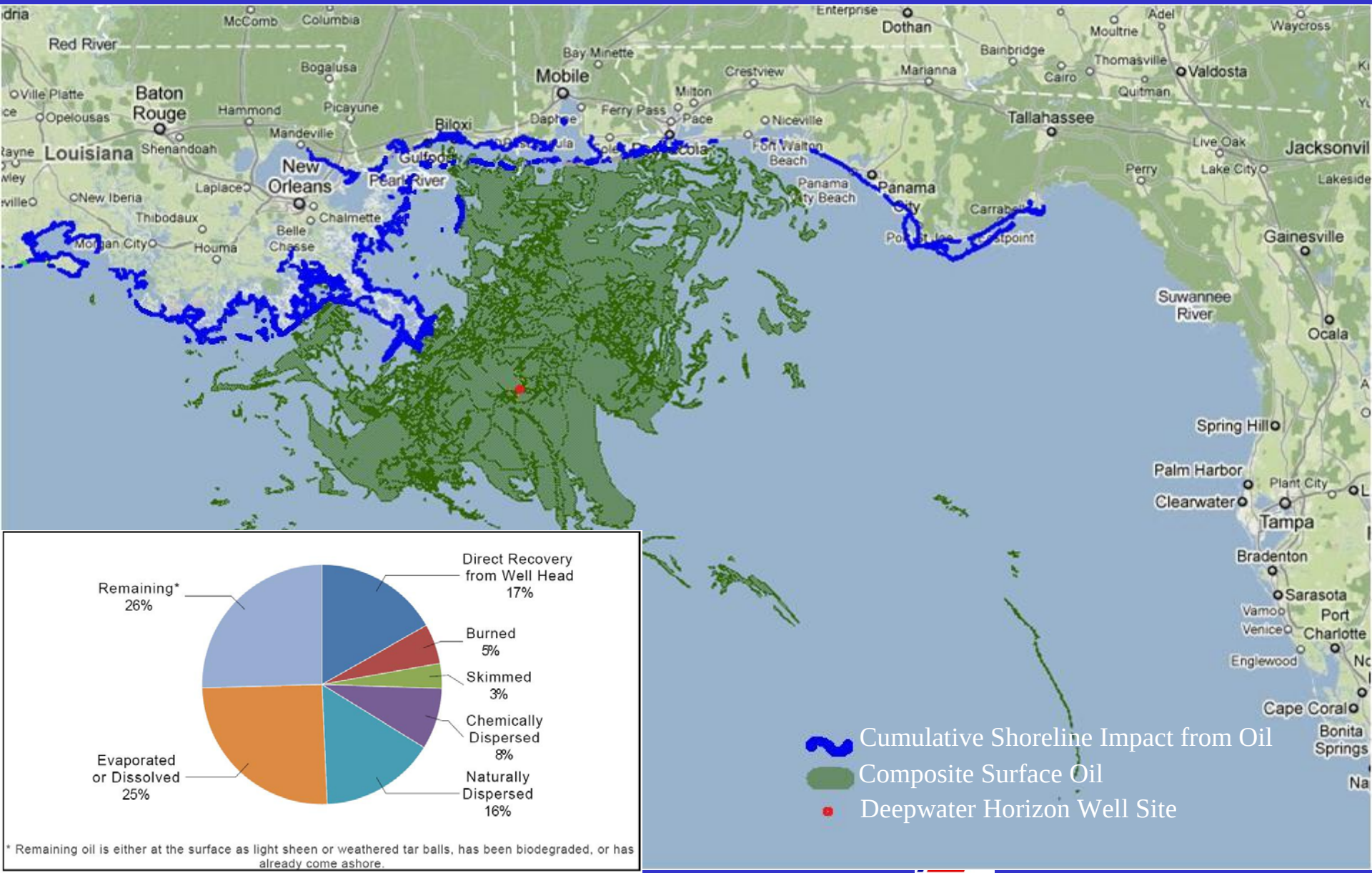
- **Technology innovation**
- **Further enhanced standards** in drilling safety
- Ensuring **inventory of response equipment** and consumables in global BP deepwater basins
- **Sharing our lessons learned** around the world

Homeland Security

Ocean Energy Advisory Committee

RADM Roy Nash
April 18th, 2011

Scope and Complexity



Background

Mobile Offshore Drilling Unit (MODU) Deepwater Horizon (DWH)

- Dynamically positioned, semi-submersible drilling unit located 45 miles SE of Venice, LA

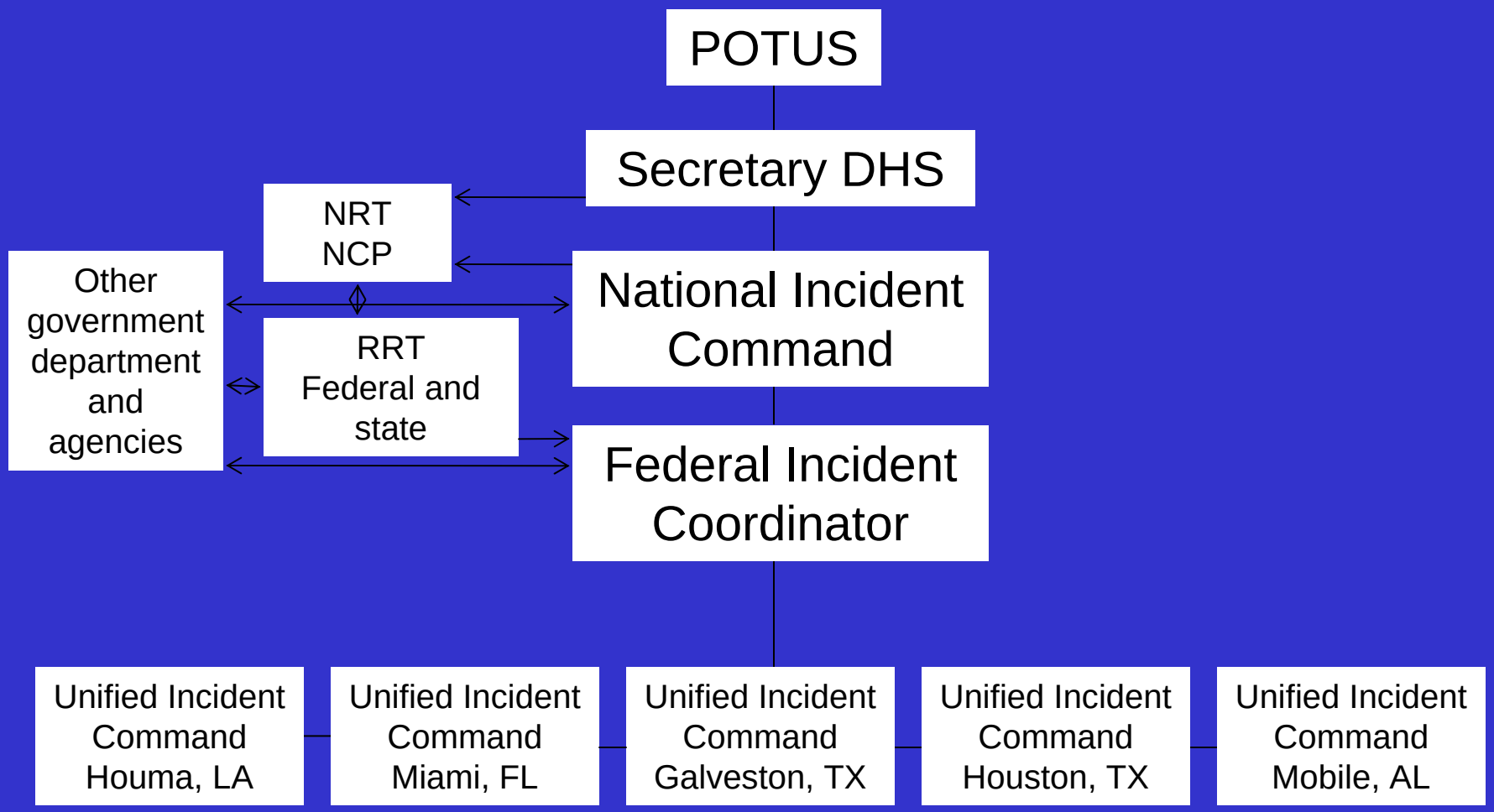
Day 1-April 20th

- D8 Command Centers notified of fire/explosion on MODU DWH approx 10:00 pm
- Initiated Search and Rescue efforts
- Firefighting efforts coordinated by MODU IAW Firefighting Plan
- Established incident command post

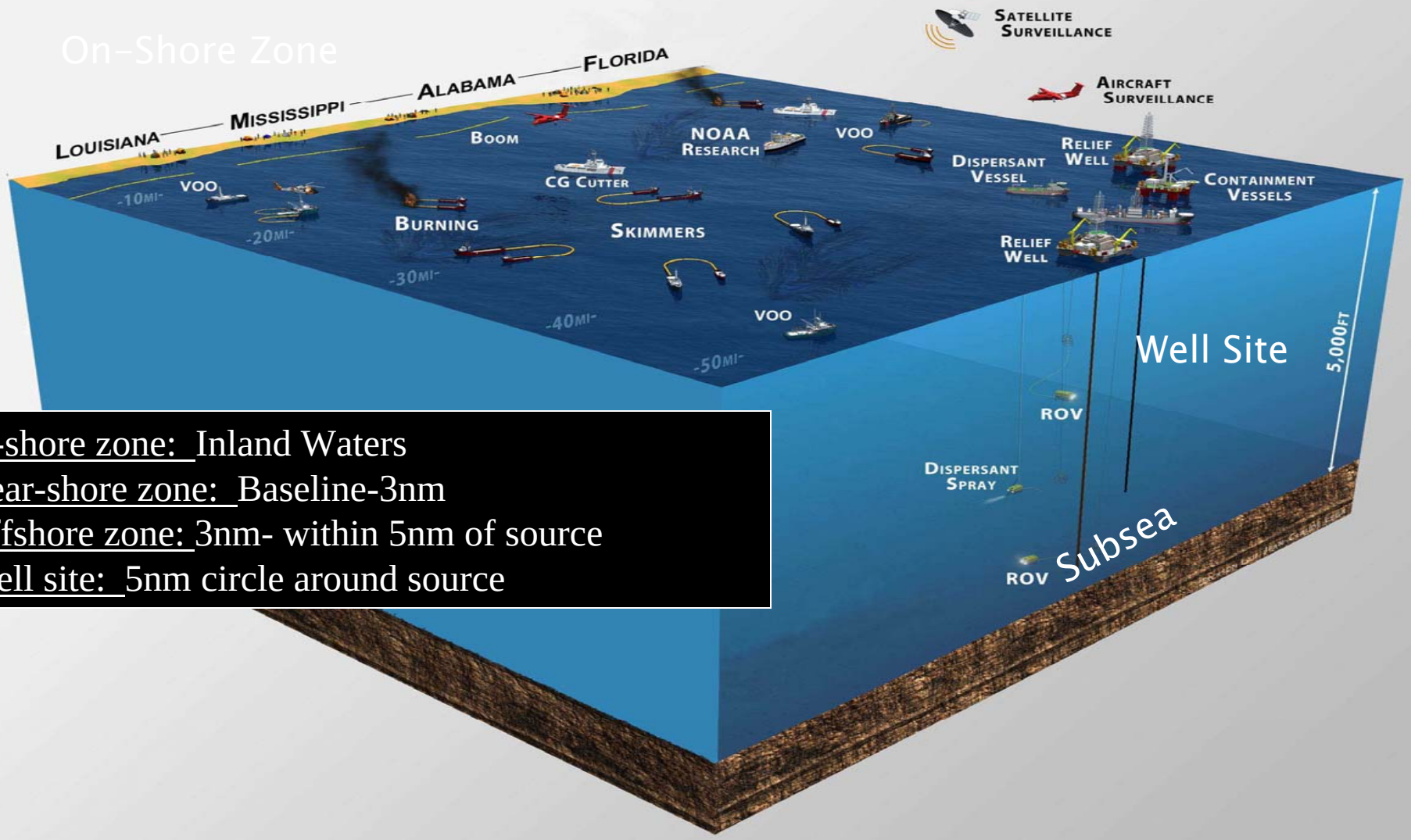
USCG Authorities on OCS

- Clean Water Act (CWA)
- Oil Pollution Act of 1990 (OPA 90)
- National Contingency Plan (NCP)
- Outer Continental Shelf Lands Act (OCSLA)

Overall Organizational Chart



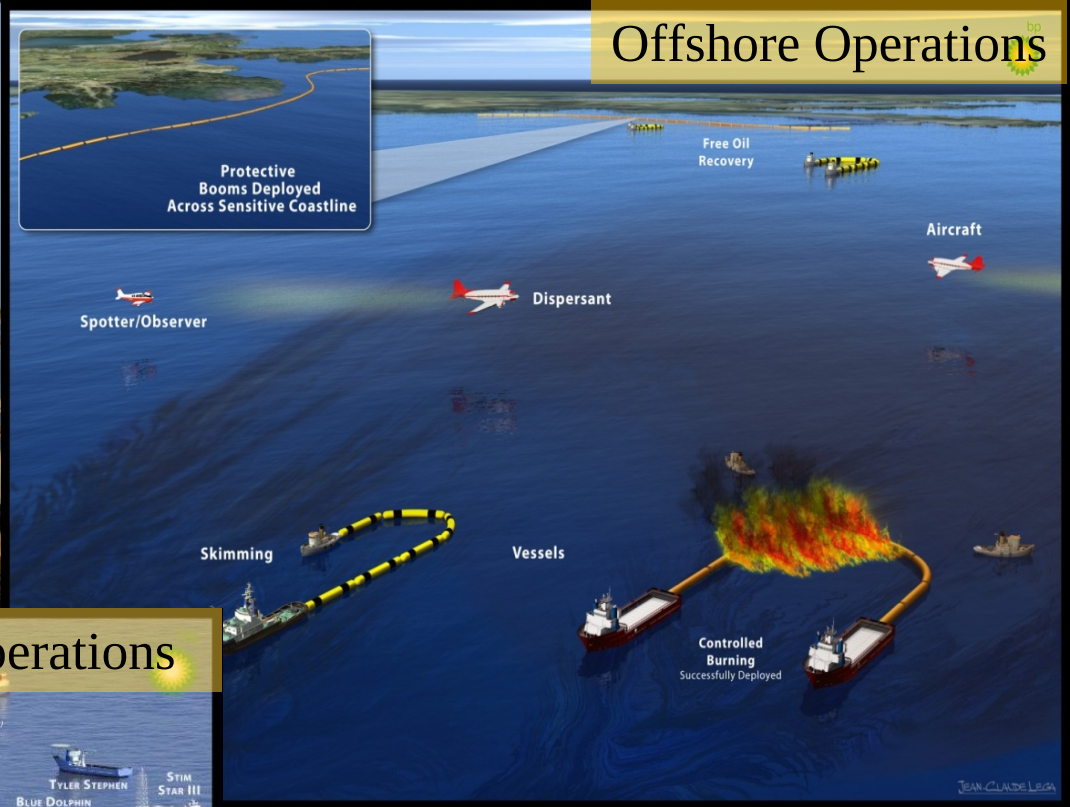
Concept of Operations



In-shore zone: Inland Waters
Near-shore zone: Baseline-3nm
Offshore zone: 3nm- within 5nm of source
Well site: 5nm circle around source

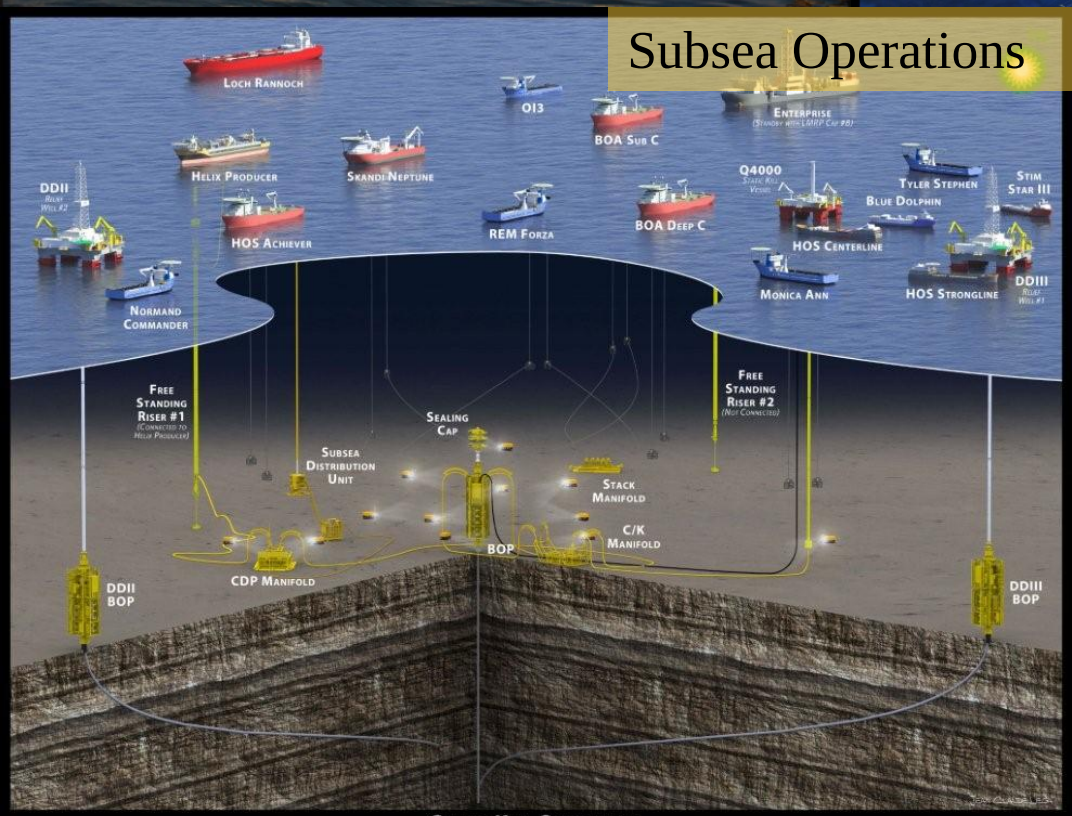
Vessels of Opportunity

Offshore Operations



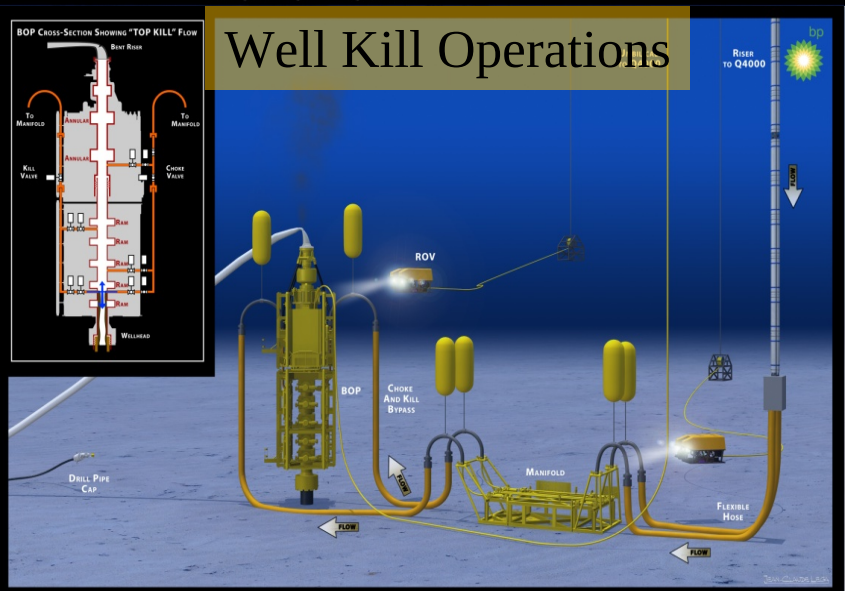
Oil Spill Response Operation

Subsea Operations



Static Kill Operations

Well Kill Operations



Top Kill

Going Forward

- Complete "Response Phase" of oil removal from beaches and marshes
- Continue Natural Resource Damage Assessment (Trustees)
- Transition to long-term recovery
- Identify areas for improvement
- Implement means to more effectively respond to future spills
- Review the National Contingency Plan and National Response Framework, identify national-level issues, enhance methods for a coordinated government response to "Incidents of National Significance."

Lessons

- Oil Spill Response governance constructs are sound overall
- A spill is not the right time to conduct Research and Development
- Greater collaboration between USCG and BOEMRE is needed on Oil Spill Response Plans and the development of well containment standards

Interagency Coordinating Committee on Oil Pollution Research

- Est. by Section 7001 of the Oil Pollution Act 90 and reports biennially to Congress

- Two-fold purpose:
  - Prepare a comprehensive, coordinated Federal oil pollution R&D plan
  - Promote cooperation w/industry and universities through information sharing, coordinated planning, and joint funding of projects.

- Coordination between ICCOPR and OESC on offshore energy safety

Thank You

BOEMRE

Bureau of Ocean Energy Management, Regulation and Enforcement

UNITED STATES DEPARTMENT OF THE INTERIOR

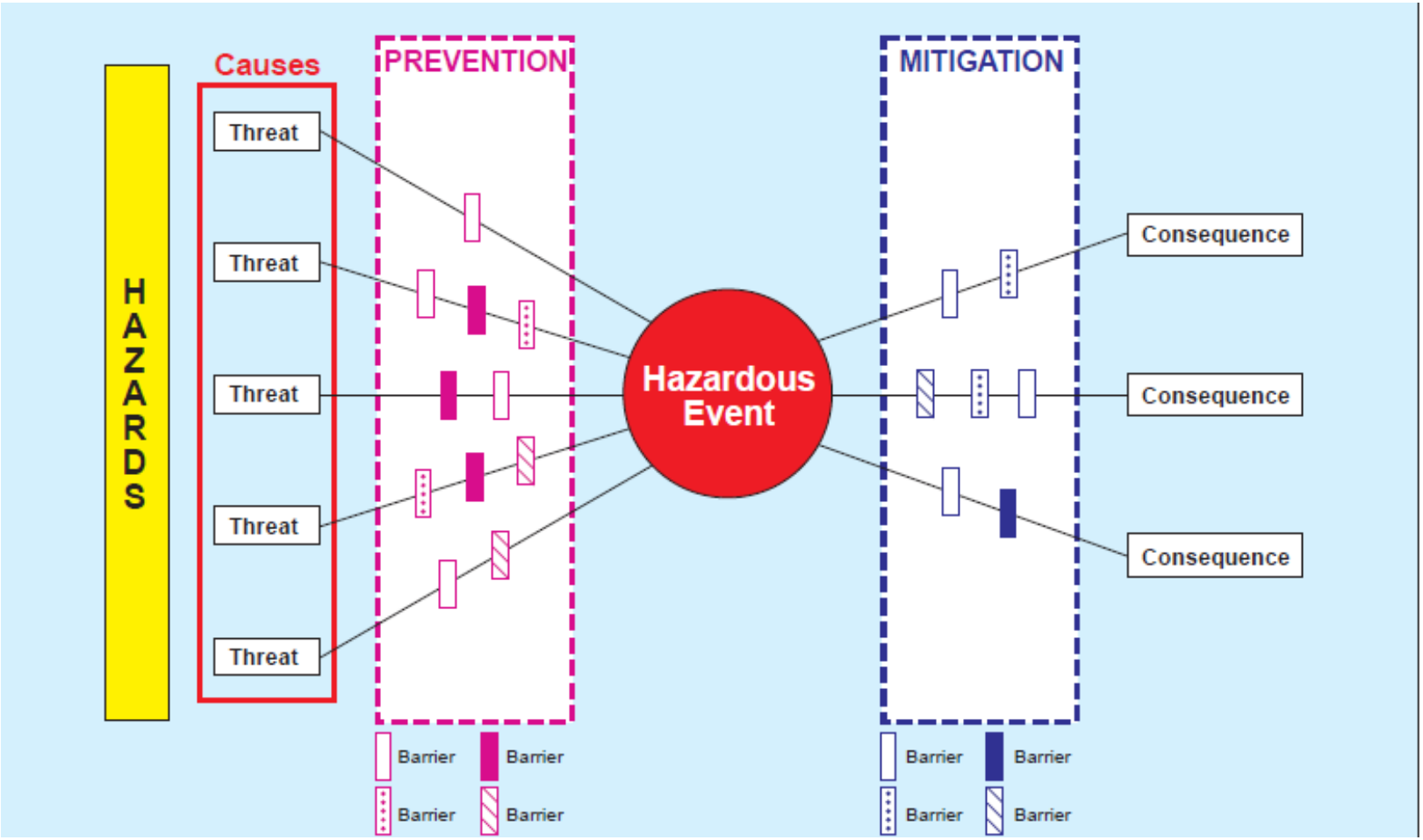
DEEPWATER HORIZON

Lessons Learned on Containment

Ocean Energy Safety Advisory Committee
Washington DC
April 18, 2011

By: Lars Herbst
Gulf of Mexico Regional Director

“ Bow-tie” Diagram of Hazards and Barriers



WELL BORE INTEGRITY

- Best cement practices – API RP 65-Part 2
- Certification by PE that casing & cement program is fit for purpose
- Two independent tested barriers across each flow path during completion (PE certification)
- Proper installation, sealing and locking of casing & liner
- BOEMRE approval before displacing fluids
- Enhanced deepwater well control training

WELL CONTROL EQUIPMENT & PROCEDURES

- Documentation & schematics for all control systems
- I3P verification that B/S rams cuts DP at MASP
- Subsea BOP equipped w/ ROV intervention
- Maintain ROV & trained crew on all floating rigs
- Auto-shear and deadman on all DP rigs
- Documentation of subsea BOP Inspection & Maintenance procedures per API RP 53
- ROV intervention testing on subsea BOP stump test
- Function test of auto-shear and deadman during subsea BOP stump test
- Deadman test during initial seafloor test

Safety and Environmental Management Systems (SEMS) RULE

- Final Rule Published in Federal Register 10/15/10
  - New "Subpart S"
- Effective 11/15/2010
- SEMS plan needs to be operational by 11/15/2011
- Companies are required to develop and implement their own SEMS
  - Based on API RP 75 (SEMP), 3d Edition, May 2004

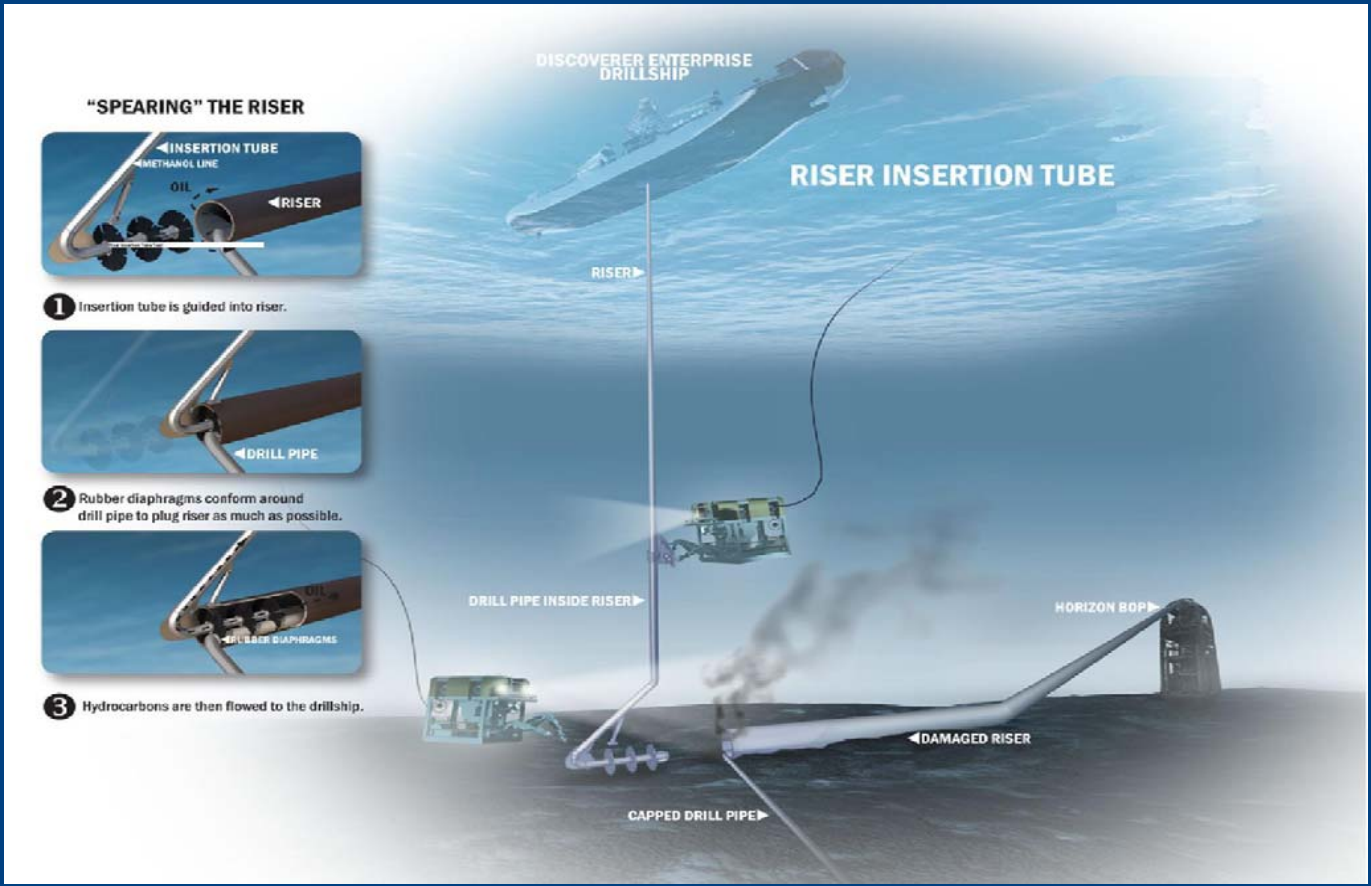
API RP 75 – 13 ELEMENTS

1. General – Principles & Scope
2. Safety & Environmental Information
3. Hazards Analysis
4. Management of Change
5. Operating Procedures
6. Safe Work Practices
7. Training
8. Mechanical Integrity
9. Pre-Startup Review
10. Emergency Response & Control
11. Investigation of Accidents
12. Auditing the Program
13. Records & Documentation

Transocean

April 20, 2010	• Macondo Well Blowout
APRIL 21, 2010	• ROV intervention on BOP
April 22, 2010	• Horizon Rig Sinks
April 23, 2010	• Hydrocarbon flow at two locations subsea
April 27,2010	• Two Relief Well Permits are approved
May 5, 2010	• Capping valve placed on drillpipe
May 6, 2010	• Coffer dam attempted
May 15, 2010	• Riser insertion tube installed
May 26, 2010	• Top Kill Attempted
June 4, 2010	• Top hat installed w production to vessels
July 13, 2010	• Containment cap installed to stop flow
August 3, 2010	• Static kill attempt successful
September 19, 2010	• Cement permanently seals well

EARLY STAGES OF SOURCE CONTROL

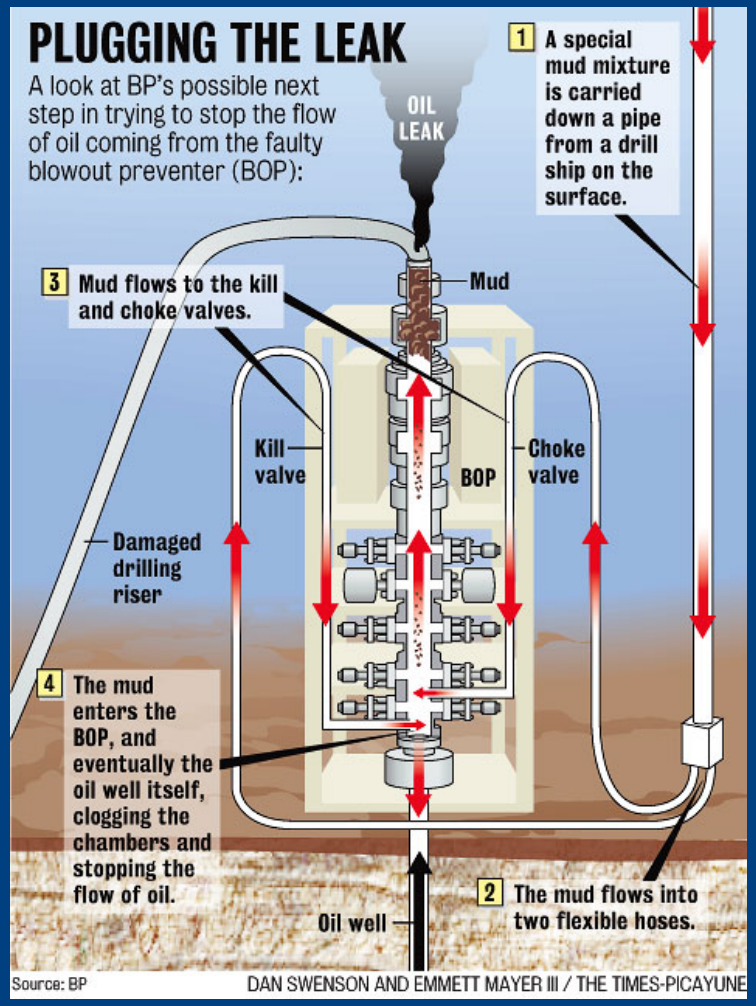


BOEMRE

Bureau of Ocean Energy Management, Regulation and Enforcement

UNITED STATES DEPARTMENT OF THE INTERIOR

TOP KILL ATTEMPTED



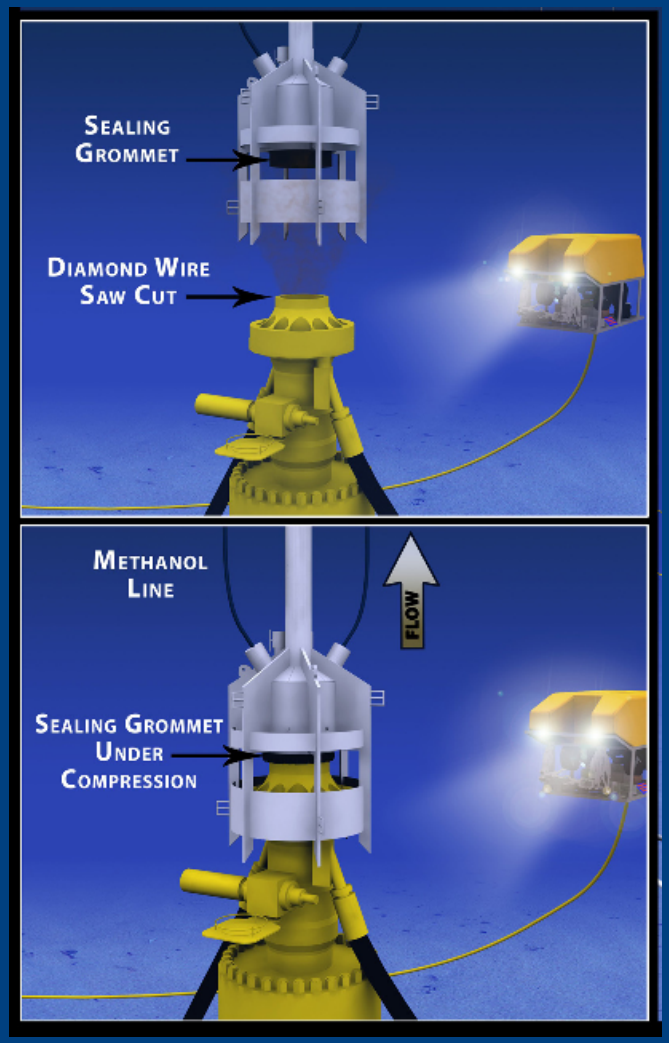
BOEMRE

Bureau of Ocean Energy Management, Regulation and Enforcement

UNITED STATES DEPARTMENT OF THE INTERIOR

TOP HAT INSTALLED,

PRODUCTION FLOWS TO VESSELS ON SURFACE



CAPPING STACK INSTALLED TO STOP FLOW

BOEMRE

Bureau of Ocean Energy Management, Regulation and Enforcement

UNITED STATES DEPARTMENT OF THE INTERIOR

Post Response

- Public Forums addressed various aspects of containment
- Issued Notice to Lessees to clarify regulations regarding containment
- Worked closely with Containment Organizations to meet expectations

Notice to Lessees N-10

The section titled "Information Demonstrating Adequate Spill Response and Well Containment Resources" states the following:

> "For operations using subsea BOPs or surface BOPs on floating facilities, BOEMRE will evaluate whether each operator has submitted adequate information demonstrating that it has access to and can deploy surface and subsea containment resources that would be adequate to promptly respond to a blowout or other loss of well control….BOEMRE will evaluate whether each operator has provided adequate information in its current OSRP describing the types and quantities of surface and subsea containment equipment that the operator can access in the event of a spill or threat of spill, and the deployment time for each, pursuant to 30 CFR 254.23(d)."

MWCC Capping Stack

BOEMRE

Bureau of Ocean Energy Management, Regulation and Enforcement

UNITED STATES DEPARTMENT OF THE INTERIOR

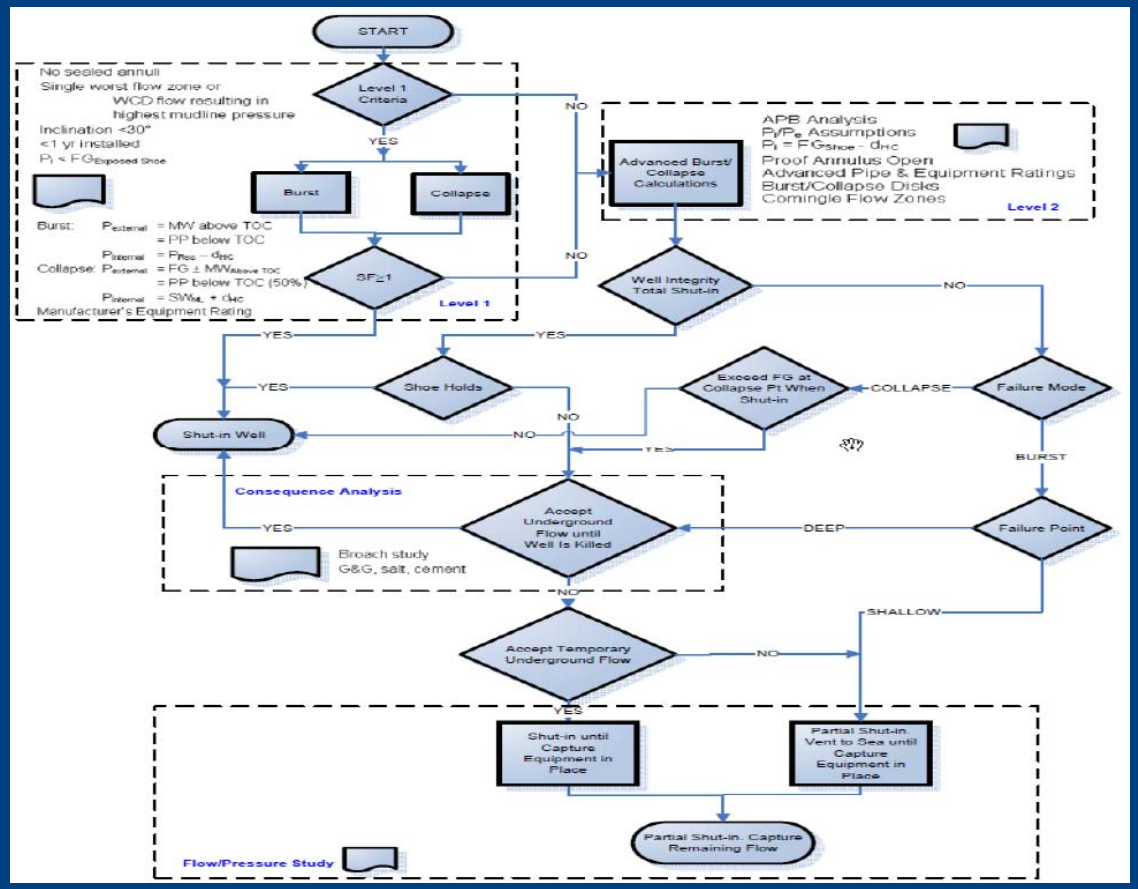
HWCG Capping Stack

BOEMRE

Bureau of Ocean Energy Management, Regulation and Enforcement

UNITED STATES DEPARTMENT OF THE INTERIOR

Well Containment Screening Tool



BOEMRE

Bureau of Ocean Energy Management, Regulation and Enforcement

UNITED STATES DEPARTMENT OF THE INTERIOR

Well Containment Screening Tool

BOEMRE will then evaluate the well design to determine which of the following categories a well falls into:

a. Can the well be shut in with full well bore integrity?

- This means that if the well is shut-in, will the casing burst and/or will shut-in pressure break down a casing shoe and cause an underground flow? .
- If the well bore passes this evaluation, containment can be approved if all of the other items mentioned previously (items a through e) are in place.

Well Containment Screening Tool

b. If well bore integrity cannot be demonstrated and it is determined that a casing shoe will breakdown causing underground flow, will the underground flow eventually broach the sea floor?

- This evaluation will require BOEM Resource Evaluation Section (G&G) to evaluate local faulting capable of transmitting flow to the surface. This is an evaluation of seismic data, and an operator's latest interpreted volume of seismic data should be submitted.
- If seismic data indicates that the underground flow **will not** broach to the seafloor, containment can be approved if all of the other items mentioned previously (items a through e) are in place.

Well Containment Screening Tool

c. If well bore integrity is not capable of being achieved or if a shut-in will result in an underground flow that broaches the sea floor, **containment can only be approved if an operator can demonstrate cap, flow, and collection capability** in additions to the other items mentioned previously (items a through e).

- At this time, no operator has approached BOEMRE with a suggestion that cap, flow, and collect is a preferred option.
- This option requires a complete flow analysis by the operator to determine the required surface process flow capacity.
- Industry appears ready to design wells that can be shut in at the sea floor without compromising well bore integrity; however, our well analysis will ultimately determine this outcome.
- This flow analysis will ultimately drive how much flow capacity the containment organization and/or operators acquire.

Well Containment Screening Tool

- **WCST Section 6A screenshot:**

6) Capping Analysis

6A) BURST MECHANICAL INTEGRITY AT GIVEN DEPTH

Component	Burst Rating (psi)	Depth to Top of Component (ft)	Setting MW, PP or SW (ppg)	Exposed to SW? (above top hanger)	Internal Shut-in Pressure (psi)	External pressure (psi)	Burst Load (psi)	Design Factor	Comment
Capping BOP stack	10,000	4295	8.55	Y	9,415	1,843	7,572	1.32	
LMRP connector	10,000	4300	8.55	Y	9,416	1,845	7,571	1.32	
Drilling BOP stack	15,000	4300	8.55	Y	9,416	1,845	7,571	1.98	
Subsea Wellhead	15,000	4305	8.55	Y	9,417	1,847	7,570	1.98	
13-5/8" Casing Hanger/Seal Assembly	10,000	4314	14.30	N	9,419	3,208	6,211	1.60	
13-5/8" Casing	10,030	4320	14.30	N	9,420	3,212	6,208	1.61	
14" Casing	12,450	12474	14.30	N	11,296	9,276	2,020	6.16	
					-	-	-		
					-	-	-		
					-	-	-		

<<Insert additional rows as necessary for other zones of interest - do NOT delete this line

Lessons Learned Summary

- Have capping stack and flowback capability and all support equipment to deploy. This must be analyzed on a well by well basis for both pressure and flow rate capacity

- Operator must have capability to prepare a a well or BOP stack to receive a capping stack. This means subsea debris removal (shears and saws) equipment must be available.

- Have Temporary flowback plan utilizing a subsea divert method such as a “top hat”

Lessons Learned Summary

- Proper hazard analysis is critical to a safe and successful containment effort
- Sim ops planning is also critical to completing containment
- Equipment to deploy subsea dispersant is necessary to protect the safety of workers at surface that are conducting direct vertical access work and other support vessels

Forward Looking

- 1. The robustness of the flowback systems need continued development. This includes riser systems and processing systems
- 2. Redundancy of systems should be improved. Eliminating single point failures from systems
- 3. Capture of flow from outside of the main wellbore
- 4. Better systems to address high angle connection to BOP or wellhead
- 5. Continue to develop improvements to top kill equipment and procedures

Forward Looking

6. Continue to conduct drills on incident command structure and responsibilities. Ensure decision makers are clearly identified within the individual responsibility parties and the Federal Government . Ensure that they have the proper technical background, are not swayed by outside influences, and are fully supported all the way up the chain of command on both sides.

- 7. Ensure DP systems on response vessels are state of the art and are properly maintained.

In excess of 50 BOEMRE staff members worked directly on the response and source control efforts involved with the Deepwater Horizon explosion and oil spill. Countless other BOEMRE staff supported their co-workers and kept the everyday work of the agency continuing, which was crucial to the United State's energy security.

We are and will remain proud of the hard work that was accomplished through this time of extraordinary challenge.

Appendix XIII

DEPARTMENT OF THE INTERIOR
OCEAN ENERGY SAFETY ADVISORY COMMITTEE MEETING
WASHINGTON, D.C.
APRIL 18, 2011

PUBLIC COMMENTS BY
MIKE GRAVITZ
Oceans Advocate
Environment America

MR. MIKE GRAVITZ (Environment America): My name is Mike Gravitz, and thank you for the opportunity to testify or comment here. Thank you, ladies and gentleman, for agreeing to serve on this Committee. I work for an organization called Environment America. I'm the Oceans Advocate for Environment America, and have worked on the issue of offshore drilling for a number of years now. I'm very pleased to see this Committee being formed and on its way. There is obviously a tremendous amount of experience and expertise here, and a great deal of stature in the Committee members, and that's very pleasing to see.

A couple of other reasons that we're very happy about this is that we think that the oil industry may, given the composition of this Committee, feel more comfortable with its recommendations, and ideas than perhaps they were, and maybe even the political environment in Washington, D.C., because of the composition of the Committee. And so, I'm hopeful that the oil industry will find your conclusions and recommendations whenever they happen to be very valuable for them.

You are focusing on longer term problems that the Bureau of Ocean Energy Management, Regulation and Enforcement hasn't already addressed, which is great. And despite the many things that they've done, I think we'd all agree that there are many things left to be done, and in particular to understand the human geological and technological risks to improve safety. Obviously, the commissions that have investigated the spill so far have done amazing work in a very short period of time, and I'm happy to see that you guys are able to take on some more problems.

In that regard, having watched you settle on some issues, I would like to make some suggestions in that regard. One, I think it would be wise for this Committee to undertake or have people undertake a study of systematic risk in the industry. The Three Mile Island incident, I believe was done at Hanford or somewhere else, where people were specialists in operations, research and policy and technology sort of got down to a very detailed risk analysis of operating nuclear reactors. We'd love to see a recommendation from this Committee at some point for real testing of the containment and BOP devices under real conditions, rather than in a laboratory tank kind of situation. We'd love for you, and I understand you are undertaking recommendations on research for cleanup activities.

It is really pretty pathetic that in the best of circumstances, 30 years after the Exxon Valdez, we can still clean up only eight to ten percent of the oil that gets spilled in the open ocean. Either that's the way it's going to be forever thereafter because there's some physical property that weights the limits the rate of clean up a la the speed of light, or we'll find new and better ways to do this. But we, if in fact there aren't new and better ways to do this, we ought to know that going forward. And so, it would really be, I think, a valuable contribution that this Committee could make to get that process started in an intelligent way.

Finally, the -- or two more things. The agency has issued a number of permits to resume drilling, both exploratory and otherwise. In the environmental community, we have a great deal of respect for the renewed efforts of the agency, but are concerned about some of the spill clean up and containment plans. There isn't a lot of transparency there. We'd like a third party to look at those for one or two or three, or some number of the existing recently permitted activities to make us feel more comfortable that not only the agency is okay with those calculations and those promises.

Two more things: floating platforms will be an increasing part of the Gulf as production moves farther and farther offshore, and pipelines simply won't be built that deep and that far out. So, floating platforms an area where, I'm not familiar with the regulatory activity there, but clearly it's a heck of a lot of oil floating out, very far out, into the Gulf. We all ought to feel comfortable with that as a solution. And finally, the Arctic I don't think has been mentioned yet today, at least not while I was here. A lot of Arctic research needs to be done before I think a reasonable person could conclude that it could be done safely.

Finally, you do have a -- I think a heavy responsibility because many of you are engineers or engineering or scientists, and I know that you all feel very comfortable, given your backgrounds with calculating things and understanding very tangible things. I would just refer to the Donald Rumsfeld notion of the world, which is that there are known things. There are known unknowns, and there are unknown unknowns. And I caution you to think about the unknown unknowns in the area of offshore drilling. Because in many ways, that's what happens when you get out to the right or left hand side of the risk curve.

And finally, I note that much of the expertise on the Committee is sort of technical, geologic, geophysical, engineering, etcetera. I would say that the additional burden you have is to represent the fish and the wildlife, and the turtles and the underwater fauna and flora that are in the Gulf of Mexico. Those have no person that I can tell at this table. I'm sure you can ably do that. I would just urge that you not forget those things. Thank you very much.

Appendix XIV

DEPARTMENT OF THE INTERIOR
OCEAN ENERGY SAFETY ADVISORY COMMITTEE MEETING
WASHINGTON, D.C.
APRIL 18, 2011

PUBLIC COMMENTS BY
JAMES PAPPAS

Vice President
Technical Programs
Research Partnership to Secure Energy for America (RPSEA)

MR. JAMES PAPPAS (RPSEA): Thank you. Mr. Chair, Distinguished Members of this Committee, I've got some prepared comments I'd like to address today to offer you some insight, and some ideas. It may be quite early in the process, but this is my best shot at it, so I thought I'd give it a try. Thank you.

My name is James Pappas. I represent the Research Partnership to Secure Energy for America (RPSEA). It is an existing 501 © 3 membership organization that administers a research program devoted to alter deepwater and unconventional natural gas and other petroleum resources. So, the requirement for safe offshore operations transcends any single entity, and government safety regulation cannot take the place of industry-based attention and commitment to sharing the best understanding about safe offshore operations. Thus, it seems timely and appropriate that an institution independent of any particular operator and of government be employed or formed to characterize the safety of offshore operations, identify areas for improvement, and promote the highest levels of safety and reliability in offshore oil and gas operations.

The proposed organization would be supported by the companies operating offshore in the U.S., with the mission to promote excellence in offshore oil and gas operations, leading to the highest level of safety and reliability. While the specific activities undertaken by this organization will be determined by representatives of the companies supporting it, the following are some of the possible areas that could be a focus:

- To serve as a clearinghouse for information developed by offshore operators and service companies to promulgate best practices while analyzing incidents across the entire group of offshore companies to identify trends and develop information that can be used to improve operating practices;
- To conduct research to identify and characterize those risks, especially those associated with rare events that have sufficiently severe consequences that any occurrence is unacceptable;
- To develop standards for safe operations in the offshore environment; such standard should ensure safety in specific operational areas and promote an industry-wide culture of safety;
- To evaluate offshore facilities and operations to assess compliance with accepted standards'
- To provide training and support for oil and gas professionals operating in the offshore environment; to evaluate individual training programs to identify strengths and weaknesses and suggest improvements;
- To serve as an accreditation agency for offshore oil and gas training; and
- To identify any safety technology needs and recommend the development of such technologies.

This proposed organization would be governed by an advisory board that would include the nation's leading scientific, engineering and technical experts and representatives of the companies supporting that organization. These companies have an interest not only in ensuring that all operations are conducted to the standards that result in the highest levels of safety, but also in ensuring that the public and the regulatory bodies are aware of the safety culture that is promoted within the offshore industry by the proposed organization. Thus, there may be a role for regulatory agencies and other industry bodies, interested bodies, in sharing information with and learning from the organization.

The proposed offshore safety organization would be a new effort for RPSEA. Managed separately and distinctly from our ongoing research activities, but building on our existing member network and relationships it has with leading academic research institutions with regulatory bodies and NGOs. The required staffing could be brought on as soon as funding was available, and the existing RPSEA member network could be leveraged to develop the appropriate governance and advisory body structure. RPSEA looks forward to working with key companies involved in offshore oil and gas development to further explore this concept. Thank you.

From: Pappas, James [mailto:jpappas@rpsea.org]
Sent: Friday, April 22, 2011 8:49 PM
To: Ocean Energy Safety Advisory Committee
Subject: Comments: OESC Meeting, 04/18/11

Dear Members of the Committee:

First of all, thank you for your service and for allowing me to comment on behalf of RPSEA at the meeting.

I have a few additional comments regarding the proceedings of the meeting. My review below should not be construed as a criticism. Rather it is a summary of my knowledge, experience, and opinions, meant to set the record straight in some cases and to provide the committee with food for thought in others. I will address the point by presenter.

Cherry Murray
I believe she stated that DOE should have expertise in containment or spill response. To my knowledge, DOE does not have that sort of expertise. Furthermore, while DOE might be able to provide assistance in these regards via research (provided they have the funding), I believe this work associated with containment and spill response should be under the jurisdiction of DOI. The same goes for restoration. In fact, DOE should not, in my opinion be involved in any restoration R&D or rule-setting.

She also stated incorrectly that water depth is not a factor in spills. Since water depth is related to distance from shore, it is a factor. Deeper waters translate to wider spill plumes as fluids come up from the seabed, colder mudline temperatures, and additional opportunities for fluids to interact with sea water and sea life. Longer distances mean that there is more opportunity for oil contamination and degradation, as well as spreading long the surface before it reached land. Therefore, there may actually be increased dangers from deepwater spills than for those closer to land, at least from a land perspective.

Sean Grimsley
He stated that the Horizon spill indicated a lack of leadership. I'm not so sure. I would characterize the spill and being indicative of a lack of sufficient and decisive management processes, coupled with a lack of training and/or experience. There seemed to be leadership on behalf of BP's field personnel, but without the management process, proper training, and experience, he leadership decisions turned out to be wrong. I believe he correctly noted it by stating that there was inadequate risk assessment – I would add "and follow-up action."

One item that was not mentioned was the ongoing work by the National Academy of Engineers to get industry response to the questions of responsibilities and training that should be required for deepwater drilling. Their preliminary finding suggests that industry believes that, despite the attractiveness of the safety case, the on-site company person in charge (i.e., the drilling engineer) should be ultimately responsible for all activities related to the well plan and while drilling. The safety case should not undermine the accountability and responsibility of the operating company, but it should allow for anyone onboard to halt operations if deemed dangerous without repercussions. There were many more

preliminary findings and recommendations – too many to review here. I suggest the committee get its hands on the documents to assist it in identifying short term and longer term solution possibilities.

James Dupree
He mentioned work that has been undertaken as a result of the spill, as well as additional needs that might not yet be met. While dual ram BOPs are an improvement that might solve a similar issue, if pipe buckling did indeed results in not allowing the ram to cut off flow completely and if the dual rams are too close to each other, a similar result might occur in the future. Two are better than one, to b sure. However, their relative locations to one another are critical. One possible solution might be to have a second surface BOP and a high pressure riser. While such a set-up will surely be more costly, a risk assessment should take place to determine its feasibility.

Nothing was mentioned regarding much needed improvements in deepwater boom designs. The ones used simply were inadequate given the harsh conditions. And relegating untrained vessel operators to assist resulted in increased dangers to those people. This gap needs to be addressed, too. Along the same lines, cleaning equipment needs to be addressed, so that unloading contaminated booms close to shore doesn't just transfer the problem to the near-shore area.

He mentioned the relief well . One piece of equipment that could readily improve relief well speed and accuracy would be a reliable, high transfer rate wireless telemetry. Such product exists in other industries, yet it has not been called for by the E&P industry.

All in all, I think he did an admirable job of describing BPs learnings.

Lars Herbst
He discussed training among other things. The same NAE work that I noted above addressed training from the industry's perspective. It was the view of th vast majority of the industry representatives that each responsible and accountable person working within a drilling program should be required to have proper training in his specialty area. Certification was noted, but the group could not come to a consensus regarding the particulars. Instead, they decided that an independent third party that specializes in such matters should address the issue. While some felt that a Professional Engineers license would be helpful from the standpoint that PEs are REQUIRED to do what I best for the safety, health and welfare of the general public and not for themselves nor their companies, the majority claimed that the PE licensure proces does not properly train one to be a drilling engineer, and thus a company representative in charge on a drilling rig.

Going Forward
I am completely in sync with the committee's decision to focus half of its energies on prevention. I truly believe that the commendations coming from your group will be the basis for a safer, more risk averse drilling environment in deepwater. Furthermore, I think that the key to the success will ultimately revolve around an independent (of both government and industry) agency, comprised of seconded individuals, who will collectively tackle the issues of safety, training, development, risk, regulations, feedback, and cooperation. Industry needs to realize that by withholding a learning related to safety one company does not gain a competitive advantage; it actually puts the whole rest of the industry, as well as itself, at greater risk. This effort isn't about socialism; it is about saving lives and leaving the world a better place.

Thank you for your time and attention. I wish you all the best and will pray for your success. This is a difficult task to tackle.
Regards,
James Pappas

James Pappas, P.E., M.B.A.
VP, Ultra-Deepwater Program
Research Partnership to Secure Energy for America (RPSEA)
1650 Highway 6, Suite 325
Sugar Land, TX 77478
Office: (281) 313-9555
Fax: (281) 313-9560
Direct: (281) 690-5511
Cell: (832) 465-5741

www.rpsea.org

This communication is for the use of the intended recipient only. It may contain information that is privileged and confidential. If you are not the intended recipient of this communication, any disclosure, copying, further distribution or use thereof is prohibited. If you have received this communication in error, please advise me by return e-mail or by telephone and delete/destroy it.

From: Pappas, James [mailto:jpappas@rpsea.org]
Sent: Friday, April 22, 2011 8:49 PM
To: Ocean Energy Safety Advisory Committee
Subject: Comments: OESC Meeting, 04/18/11

Dear Members of the Committee:

First of all, thank you for your service and for allowing me to comment on behalf of RPSEA at the meeting.

I have a few additional comments regarding the proceedings of the meeting. My review below should not be construed as a criticism. Rather it is a summary of my knowledge, experience, and opinions, meant to set the record straight in some cases and to provide the committee with food for thought in others. I will address the point by presenter.

Cherry Murray
I believe she stated that DOE should have expertise in containment or spill response. To my knowledge, DOE does not have that sort of expertise. Furthermore, while DOE might be able to provide assistance in these regards via research (provided they have the funding), I believe this work associated with containment and spill response should be under the jurisdiction of DOI. The same goes for restoration. In fact, DOE should not, in my opinion be involved in any restoration R&D or rule-setting.

She also stated incorrectly that water depth is not a factor in spills. Since water depth is related to distance from shore, it is a factor. Deeper waters translate to wider spill plumes as fluids come up from the seabed, colder mudline temperatures, and additional opportunities for fluids to interact with sea water and sea life. Longer distances mean that there is more opportunity for oil contamination and degradation, as well as spreading long the surface before it reached land. Therefore, there may actually be increased dangers from deepwater spills than for those closer to land, at least from a land perspective.

Sean Grimsley
He stated that the Horizon spill indicated a lack of leadership. I'm not so sure. I would characterize the spill and being indicative of a lack of sufficient and decisive management processes, coupled with a lack of training and/or experience. There seemed to be leadership on behalf of BP's field personnel, but without the management process, proper training, and experience, he leadership decisions turned out to be wrong. I believe he correctly noted it by stating that there was inadequate risk assessment – I would add "and follow-up action."

One item that was not mentioned was the ongoing work by the National Academy of Engineers to get industry response to the questions of responsibilities and training that should be required for deepwater drilling. Their preliminary finding suggests that industry believes that, despite the attractiveness of the safety case, the on-site company person in charge (i.e., the drilling engineer) should be ultimately responsible for all activities related to the well plan and while drilling. The safety case should not undermine the accountability and responsibility of the operating company, but it should allow for anyone onboard to halt operations if deemed dangerous without repercussions. There were many more

preliminary findings and recommendations – too many to review here. I suggest the committee get its hands on the documents to assist it in identifying short term and longer term solution possibilities.

James Dupree
He mentioned work that has been undertaken as a result of the spill, as well as additional needs that might not yet be met. While dual ram BOPs are an improvement that might solve a similar issue, if pipe buckling did indeed results in not allowing the ram to cut off flow completely and if the dual rams are too close to each other, a similar result might occur in the future. Two are better than one, to b sure. However, their relative locations to one another are critical. One possible solution might be to have a second surface BOP and a high pressure riser. While such a set-up will surely be more costly, a risk assessment should take place to determine its feasibility.

Nothing was mentioned regarding much needed improvements in deepwater boom designs. The ones used simply were inadequate given the harsh conditions. And relegating untrained vessel operators to assist resulted in increased dangers to those people. This gap needs to be addressed, too. Along the same lines, cleaning equipment needs to be addressed, so that unloading contaminated booms close to shore doesn't just transfer the problem to the near-shore area.

He mentioned the relief well . One piece of equipment that could readily improve relief well speed and accuracy would be a reliable, high transfer rate wireless telemetry. Such product exists in other industries, yet it has not been called for by the E&P industry.

All in all, I think he did an admirable job of describing BPs learnings.

Lars Herbst
He discussed training among other things. The same NAE work that I noted above addressed training from the industry's perspective. It was the view of th vast majority of the industry representatives that each responsible and accountable person working within a drilling program should be required to have proper training in his specialty area. Certification was noted, but the group could not come to a consensus regarding the particulars. Instead, they decided that an independent third party that specializes in such matters should address the issue. While some felt that a Professional Engineers license would be helpful from the standpoint that PEs are REQUIRED to do what I best for the safety, health and welfare of the general public and not for themselves nor their companies, the majority claimed that the PE licensure proces does not properly train one to be a drilling engineer, and thus a company representative in charge on a drilling rig.

Going Forward
I am completely in sync with the committee's decision to focus half of its energies on prevention. I truly believe that the commendations coming from your group will be the basis for a safer, more risk averse drilling environment in deepwater. Furthermore, I think that the key to the success will ultimately revolve around an independent (of both government and industry) agency, comprised of seconded individuals, who will collectively tackle the issues of safety, training, development, risk, regulations, feedback, and cooperation. Industry needs to realize that by withholding a learning related to safety one company does not gain a competitive advantage; it actually puts the whole rest of the industry, as well as itself, at greater risk. This effort isn't about socialism; it is about saving lives and leaving the world a better place.

Thank you for your time and attention. I wish you all the best and will pray for your success. This is a difficult task to tackle.
Regards,
James Pappas

James Pappas, P.E., M.B.A.
VP, Ultra-Deepwater Program
Research Partnership to Secure Energy for America (RPSEA)
1650 Highway 6, Suite 325
Sugar Land, TX 77478
Office: (281) 313-9555
Fax: (281) 313-9560
Direct: (281) 690-5511
Cell: (832) 465-5741

www.rpsea.org

This communication is for the use of the intended recipient only. It may contain information that is privileged and confidential. If you are not the intended recipient of this communication, any disclosure, copying, further distribution or use thereof is prohibited. If you have received this communication in error, please advise me by return e-mail or by telephone and delete/destroy it.

Cherry A. Murray
Dean, Harvard School of Engineering and Applied Science

Cherry Murray became Dean of the Harvard School of Engineering and Applied Science and John A. and Elisabeth S. Armstrong Professor of Engineering and Applied Science and Professor of Physics in July, 2009. As Dean, she manages new faculty recruitment and faculty relations; directs and leads strategic planning; coordinates fundraising and alumni relations; determines and implements educational, research, and administrative goals for the most recent new School of Harvard. Previous to that she was Deputy Director and then Principal Associate Director for Science and Technology at Lawrence Livermore National Laboratory from December 2004. She led the Laboratory's science and technology activities including management of 3500 scientists and engineers and the development of the strategic science and technology plan. Formerly Senior Vice President for Physical Sciences and Wireless Research at Bell Labs, Lucent Technologies, Dr. Murray first joined Bell Labs in 1978. She received her BS and Ph.D. in physics from Massachusetts Institute of Technology. She is a member of the National Academy of Science, the National Academy of Engineering and the American Academy of Arts and Sciences. Dr. Murray is a fellow of the American Association for the Advancement of Science (AAAS), as well as fellow and Past President of the American Physical Society (APS). She chairs the National Research Council Division of Engineering and Physical Science and served on the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling.

The Honorable Donald C. Winter

Donald C. Winter chairs the National Academy of Engineering / National Research Council Committee on the Analysis of the Causes of the Deepwater Horizon Explosion, Fire, and Oil Spill. He is Professor of Engineering Practice in the Department of Naval Architecture and Marine Engineering at the University of Michigan. He served as the 74th Secretary of the Navy from January 2006 to March 2009. As Secretary of the Navy, he led America's Navy and Marine Corps team. Previously, Dr. Winter served as President and CEO of TRW Systems, later known as Northrop Grumman Mission Systems Sector. Dr. Winter received a doctorate in physics from the University of Michigan. He is also a graduate of the University of Southern California Management Policy Institute, the UCLA Executive Program, and the Harvard University Program for Senior Executives in National and International Security. In 2002, he was elected a member of the National Academy of Engineering.

Sean C. Grimsley
Deputy Chief Counsel to the National Commission on the BP Deepwater Horizon Oil Spill and Deepwater Drilling

Sean C. Grimsley is a partner at the law firm of Bartlit Beck Herman Palenchar & Scott LLP. In 2010, Mr. Grimsley served as Deputy Chief Counsel for the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling. In this role, Mr. Grimsley investigated and presented findings regarding the root causes of the Deepwater Horizon blowout and oil spill. Mr. Bratlit also assisted in drafting portions of the Commission's final report released on January 11, 2010 and assisted in drafting the Chief Counsel's final report released on February 17, 2011 detailing the investigative team's final conclusions regarding the root causes of the blowout.

Prior to joining Bartlit Beck, Mr. Grimsley was a judicial law clerk to the Honorable Sandra Day O'Connor in the United States Supreme Court from 2003-2004. Prior to that, he served as.Assistant Federal Public Defender in Washington, DC from 2001 to 2003 and a judicial law clerk for Chief Judge Harry Edwards at the United States Court of Appeals for the District Court of Columbia Circuit from 2000-2001.

Mr. Grimsley holds a Bachelor of Arts Degree from the University of Texas and a Juris Doctor degree, summa cum laude, from the University of Michigan Law School.

James Dupree
Regional President, Gulf of Mexico
James Dupree is currently Regional President of BP plc, accountable for all of BP's business in the Gulf of Mexico. James has worked for BP since 1985 and has held many leadership positions, including Group Vice President Russia & Kazakhstan, President BP Angola, President BP Offshore Inc. USA and President of BP's Canadian Oil Unit. James has also worked inside of BP's Russian joint venture TNK-BP as an Executive Vice President, and later he served on the Board of the TNK-BP.
In his early years with BP, James held various engineering posts at the company divisions in Alaska and California. In 1992 he was named chief engineer of major projects in Colombia. In 1998 he worked in BP's headquarters and was involved in management and planning of corporate business in the North Sea, Alaska and Australia.
James holds a bachelors and masters degree from the University of Texas (Austin) in Natural Sciences and Petroleum Engineering. James is also a Sloan fellow of the Stanford Graduate School of Business and holds a masters degree in business administration from Stanford University.

Roy A. Nash
Rear Admiral, United States Coast Guard
Deputy Federal On-Scene Coordinator, Deepwater Horizon Response, New Orleans, Louisiana

RADM Nash is currently assigned as Deputy Federal On-Scene Coordinator, Deepwater Horizon Response, New Orleans, Louisiana. Since July 2009, he has been assigned as Deputy Director, National Maritime Intelligence Center. Before this assignment, he served as Chief of Staff of the Thirteenth Coast Guard District.

A native of Clifton Park, New York, Rear Admiral Nash is a 1979 graduate of the Coast Guard Academy and has served in a variety of operational and staff assignments including serving as the Executive Assistant to the Coast Guard Assistant Commandant for Marine Safety, Security and Environmental Protection; as Assignment Officer for the Marine Safety program; and as staff engineer, conducting technical review of commercial ship designs and systems at the Coast Guard Marine Safety Center and Headquarters Ship Design Branch.

From 2005 to 2007 he served as Commander, Coast Guard Sector Southeastern New England where he led 550 personnel carrying out search and rescue (SAR), maritime law enforcement, marine safety, security and environmental protection missions, and served as Captain of the Port, Federal Maritime Security Coordinator, SAR Mission Coordinator, Officer-in-Charge of Marine Inspection and Federal On-Scene Coordinator. He served as Commanding Officer of the Marine Safety Center in Washington, DC from 2003 to 2005, overseeing the review of commercial vessel ship design and review and approval of vessel security plans. From 1998 to 2001, he served as Captain of the Port, Officer-in-Charge of Marine Inspection and Federal On-Scene Coordinator for Maine and New Hampshire at Marine Safety Office Portland. From 1995 to 1998 he served as Executive Officer of Marine Safety Office Charleston, South Carolina. His initial operational assignments were served at Marine Safety Office Hampton Roads in Norfolk, Virginia, and aboard Coast Guard Cutter INGHAM (WHEC-35) as Deck Officer and Assistant Engineer. Rear Admiral Nash holds a Master of Science degree in Fire Protection Engineering from Worcester Polytechnic Institute, and served as Federal Executive Fellow at The Brookings Institution.

Rear Admiral Nash’s military decorations include the Legion of Merit, Coast Guard Meritorious Service Medal, Coast Guard Commendation Medal, Coast Guard Achievement Medal, and various unit and team awards.

Lars Herbst

Regional Director
Gulf of Mexico Region
Bureau of Ocean Energy Management, Regulation and Enforcement
U.S. Department of the Interior

Mr. Lars Herbst is the Regional Director for the Gulf of Mexico OCS Region of the Bureau of Ocean Energy Management, Regulation and Enforcement. As the Regional Director, Mr. Herbst manages the leasing of the OCS lands for oil, gas, and other mineral development, and supervises the regulation of operations and protection of the environment on those leases which involve 3,600 platforms. This area covers the five Gulf Coast States. He manages a staff of 550, which includes geologists, geophysicists, petroleum engineers, biologists, and environmental scientists.

Before his selection as Regional Director, he served as Acting Regional Director and as Regional Supervisor for Field Operations. The Field Operations office evaluates and approves operator proposals to install and modify platforms and pipelines on Outer Continental Shelf (OCS) leases, evaluates new technology to be used in the Gulf of Mexico (GOM), reviews and approves exploration and development plans, carries out the agency's enforcement and inspection program, and administers the GOM accident investigation and civil penalty programs. He managed 180 employees, including District Offices in Houma, Lafayette, Lake Charles, and New Orleans, Louisiana, and Lake Jackson, Texas.

Mr. Herbst began his career with the former Minerals Management Service in 1983 as a staff engineer in the Gulf of Mexico OCS Region's Technical Assessment unit. He is a registered professional engineer in the State of Louisiana and holds a BS degree in petroleum engineering from Louisiana State University.

BOEMRE's mission is to manage the ocean energy and mineral resources on the Outer Continental Shelf and Federal and Indian mineral revenues to enhance public and trust benefits, promote responsible use, and realize fair value.

-BOEMRE-