DEPARTMENT OF THE INTERIOR
OCEAN ENERGY SAFETY ADVISORY COMMITTEE
NEW ORLEANS, LOUISIANA
JULY 13-14, 2011

MEETING MINUTES

The Ocean Energy Safety Advisory Committee (OESC) held its second public meeting on July 13-14, 2011, at the Astor Crowne Plaza Hotel, 739 Canal Street, New Orleans, Louisiana 70130.

The meeting agenda (Appendix I) focused on industry, state, academia and Federal initiatives and outreach relevant to the work of the Committee; new technology; and OESC subcommittees' progress to date.

Thirteen of the fifteen Committee members were in attendance (Appendix II). The two Committee members who were not present during the meeting represented the Massachusetts Institute of Technology (Academia) and the U.S. Environmental Protection Agency (EPA - 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 1:00 p.m. to 5:30 p.m. on July 13 and 8:00 a.m. to 5:00 p.m. on July 14. Approximately 50 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.

Wednesday, July 13, 2011

The first day of the meeting consisted of presentations on industry initiatives by the Marine Well Containment Company (MWCC) and DeepStar, as well as a presentation by Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) on the Well Containment Screening Tool.

BOEMRE Director Michael R. Bromwich offered a few remarks (Appendix IV) of encouragement to the OESC and its subcommittees on their progress to date and future efforts. He also announced the reorganization effective October 1, 2011, when BOEMRE will become to separate bureaus – the Bureau of Ocean Energy Management and the Bureau of Safety and Environmental Enforcement.

Industry Initiatives: MWCC and DeepStar

Mr. Martin W. Massey, Chief Executive Officer, MWCC, discussed the MWCC's subsea containment capabilities (Appendix V). Key points from his presentation include:

Membership. The MWCC has 10 member companies: ExxonMobil, Shell, Chevron, ConocoPhillips, BP, Apache, Anadarko, BHP, Statoil and Hess. The MWCC system is also available to all industry on a contract basis, and the MWCC currently has one contract with a non-member.

Responsibility. In case of an oil spill, MWCC would provide equipment to the operator, but responsibility for cleanup remains with the operator. MWCC's team would support the operator in the cleanup activity by assisting with equipment installation and operation. The size of the MWCC organization is 40-50 people, but MWCC also has reach into its10 member companies committed to support cleanup efforts both with human capital and technical resources. OESC members expressed concern about operators' ability to deploy the MWCC equipment and government's ability to make decisions about its deployment. They stressed importance of early engagement. Chairman Hunter stressed the importance of developing expertise within government on deploying the capping stack in order to enable rapid, informed decision-making in case of crisis.

Use of System in Different Scenarios. A range of scenarios have been considered in designing the MWCC's containment system and a predefined plan of operation has been established for these scenarios, including a plan that takes into account need for debris cleanup. Mr. Massey pointed out several times that the lessee/contracting company has primary responsibility for debris removal. MWCC would only conduct removal at the request of the lessee/contracting company.

International Deployment. MWCC is set up for response in the U.S. Gulf of Mexico (GOM) only. MWCC has collaborated with foreign industry groups, but members have decided that given the activity level in US GOM, the equipment needs to be available for use in the US GOM. OESC member Walter D. Cruickshank (BOEMRE) added that there are industry consortia in other parts of the world working to develop containment capabilities there.

Equipment. Capping stack is 30 feet tall, 14 feet wide. It has been proven capable to operate in up to 10,000 feet of water. The capping stack is pressure- and function-tested on a quarterly basis. The MWCC also has a stock of dispersant held in Houston, as well as other equipment maintained in a response-ready state. MWCC is reviewing potential sites for storing its equipment and expects to make a decision on storage location by the end of this year.

Flow Measurement. In response to a question from Chairman Hunter, Mr. Massey said that the MWCC has not installed any flow meters or other devices to measure the flow of oil.

Cooperation with BOEMRE. MWCC has engaged BOEMRE, including through a Responsible Party Checklist workshop for new member companies, seeking

BOEMRE feedback on functional specifications, and allowing BOEMRE to perform two on-site reviews and witness testing of the capping stack.

Expanded Containment Response. The MWCC is currently working on developing an expanded containment response system, to include a subsea containment assembly, an accumulator unit, dispersant fluid system, and risers connected to vessels on the surface to dedicated capture vessels. The full containment system will be able to operate in depths of up to 10,000 feet and have a higher capacity (1000 barrels per day). Construction is underway on this equipment, and the expected release date for the expanded system is next year.

Mr. Hani Sadek, Director, DeepStar, discussed the consortium's structure, processes, and its research and development (R&D) projects (Appendix VI). Key points from his presentation include:

Introduction to DeepStar. DeepStar is a R&D collaboration between oil companies, vendors, regulators and academic/research institutes. It is a forum to leverage financial and technical resources and competency for deepwater projects. DeepStar participants are 10 operators (Chevron, BP, Total, Petrobras, Nexen, Statoil, Marathon, ConocoPhillips, Maersk, and Anadarko). It also has a large number of contributing members from industry and academia.

Structure. DeepStar's Management Committee consists of one member from each operator. DeepStar also has nine technical committees and a regulatory committee that deals with engagement with government (BOEMRE and U.S. Coast Guard – USCG). The technical committees include representatives from the operators in addition to academia and other contributing members.

Project Selection and Completion Process. Each DeepStar project has an operating company "Champion" who monitors the contractor performing the work. Working committee volunteers support the champion in the contractor selection process and also assist in reviewing technical reports and providing guidance to the contractor during the performance of the work. Project ideas start with the preparation of a Cost, Time and Resources (CTR) summary at the technical committee level. CTRs are generated by operator subject matter experts (SMEs), vendors/service companies or academics. They are discussed, ranked and prioritized by the technical committees. The Management Committee then votes on a portfolio of R&D projects.

Current R&D Focus. DeepStar is currently working on a complete development scenario for 10,000 feet of water, including dry tree systems and subsea components and system integration. The budget for this phase is $8.6MM and will include R&D work in response to lessons learned from Deepwater Horizon (DWH). DeepStar currently has approximately 30 ongoing projects. DeepStar R&D projects cover subject matter areas including subsurface (geosciences and reservoir), flow assurance,

vessels/riser and mooring systems, drilling & completions, met-ocean, subsea systems, and systems engineering.

Budget. DeepStar's overall; budget is $100 MM over 20 years. Typical project size is $250K- $1MM. In response to Chairman Hunter's question about the typical scale of an operator's R&D budget, Paul Siegele said that for Chevron, it is $1 billion per year, of which about $400M was pure research (this includes both downstream and upstream work).

Intellectual Property (IP) Rights. DeepStar tries to retain the IP for the work that it generates. Pre-existing IP rights do not go to DeepStar.

Business-Driven R&D. DeepStar's projects are business-case driven and focused on actual needs. Mr. Sadek made the case that industry-driven R&D projects are more efficient (not subject to government contracting/procurement/administrative protocols) and also ensures relevancy and speed to market (performed by and for members who are in the business of manufacturing/marketing/distributing/ maintaining)

Testing. When DeepStar develops a new piece of equipment, it does not have independent funding for testing that equipment – a company will generally step up to pay for that. DeepStar participates in the testing, but it does not have independent funding for it.

Other R&D Organizations. DeepStar also collaborates and coordinates with a number of other R&D organizations to avoid duplication of technology development efforts.

Committee Roundtable: State and Academia Outreach Plan

Committee members discussed strategies for reaching out to the academic community.

- OESC member Tadeusz W. Patzek (Academia) noted that academia works in 5-year increments (time to finish a PhD thesis) which was incompatible with industry's needs/timelines. Academia can provide student support. Importance of engaging professors and industry – academics need to hear more about the practical reality of industry; industry needs be aware of the theoretical difficulties that industry does not focus on.

- Suggestion to identify groups of academics that focus on particular subject matter issues and consider how they might assist with issues that industry faces. The Committee agreed to start with the "usual suspects" (the best-reputed petroleum engineering schools), but not to rule out smaller programs with strong faculty.

- By engaging with faculty and students, BOEMRE can attract talented students. Students are attracted to those organizations that show interest in them.

- Committee members agreed that at the next meeting Lois N. Epstein (Non-Governmental Organization – NGO), Nancy G. Leveson (Academia), Richard A. Sears (NGO) and Tadeusz W. Patzek would present on the state of R&D/development activity in American universities, including: (1) what it is; (2) what it should be; and (3) what mechanisms should be used to improve it.

BOEMRE Well Containment Screening Tool

Mr. Bryan A. Domangue (BOEMRE) presented on the BOEMRE well containment screening tool, which is a calculation to determine if a well could be shut in developed through a joint industry-government task force (Appendix VII).

- The well containment screening tool analyzes the geological and mechanical integrity to determine if the well falls into which of the three categories: (1) full mechanical and geological integrity; (2) mechanical or geological integrity not intact, but consequences of failure acceptable; and (3) wellbore integrity does not exist and well cannot be shut-in without hydrocarbons escaping/broaching to sea

- Within the screening tool, there are two levels of evaluation: Level 1 is designed to expedite approval for wells that can be fully shut-in without causing underground flow. Cases/scenarios analyzed at this level include: collapse during uncontrolled flow to seafloor; burst after shut-in with a full hydrocarbon gradient; and trapped annulus screening. Level 2 uses field/offset data and more advanced calculations to mitigate the probability of the failures identified in Level 1. If the failure cannot be mitigated or eliminated then a consequence analysis is performed to see if failure is acceptable. This level makes the following calculations: annulus pressure buildup for trapped annuli; secondary string collapse and burst verification; formation strength verification for failed string; and broaching analysis if an underground flow occurs from a weak formation fracturing.

Discussion Summary Points:

- The screening tool was built primarily as a tool to show containment. It allows you to address the risk of cap and containment as well as formation integrity analysis.

- The screening tool produces the need to evaluate the trade-off associated with the importance of well designs and thickness of casing walls.

- Other analysis includes burst loan analysis and fluid loss modeling. Understanding the balance of fluids in the well is key

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

Thursday, July 14, 2011

The second day of the meeting consisted of presentations by the OESC's four subcommittees on their scope of work, action plans and planned tasks, followed by presentations by the five government agencies represented on the Committee on their activities relevant to the Committee's work.

Subcommittee Presentations

Oil Spill Prevention Subcommittee. OESC member Christopher A. Smith presented on behalf of the Oil Spill Prevention Subcommittee (Appendix VIII). Key points from his presentation include:

Framing questions. The Oil Spill Prevention Subcommittee will examine the following issues: (1) the state of existing technologies; (2) current R&D on spill prevention; (3) what further R&D needs to be done; (4) what the subcommittee will accomplish in the next year; and (5) recommendations for R&D to be completed.

Activities to date. The Subcommittee has held three meetings to date to crystallize subcommittee scope, goals and framing questions.

Focus Areas. The Subcommittee will focus on addressing the following questions: (1) identify technologies to prevent blowouts and spills, including technologies to predict fracture gradients/pressure to better design wells for safe mud balance and technologies used throughout the well design; (2) identify spill prevention R&D by government. The Subcommittee has already identified ongoing prevention R&D in government; more to be elaborated in the afternoon's sessions. Subcommittee identified budgeting challenges because the scale of the projects is so large; (3) identify spill prevention R&D by industry. The Subcommittee is currently canvassing R&D activity within industry, including through contacts with American Petroleum Institute (API), International Association of Drilling Contractors (IADC), International Association of Oil and Gas Producers (OGP) and others to ensure that the Subcommittee has a comprehensive view of current activities; and (4) summarize regulations and oversight governing spill prevention activities, including regulations in place prior to DWH and regulations put in place subsequently.

The Subcommittee is developing a white paper on these questions. Preliminary conclusions: (1) there is a substantial amount of ongoing federal R&D, but there are budgeting challenges because of the scale of the projects; and (2) there is a significant amount of industry R&D underway on spill prevention, but there are opportunities to increase collaboration in drilling and completion

Oil Spill Containment Subcommittee. OESC member Richard A. Sears (NGO) presented on behalf of the Containment Subcommittee (Appendix IX). Key points include:

Subcommittee Scope. Evaluate gaps in containment technologies and practices

Core Questions. The Subcommittee will address the following broad questions:

(1) What scenarios could lead to loss of well control? This question builds on the work of the prevention subcommittee. The containment subcommittee will consider various loss-of-well scenarios involving various mobile offshore drilling unit (MODU) and Spar position.

(2) What diagnostic equipment is currently in place to quantify data after loss of well control? The subcommittee will evaluate what equipment currently exists to measure the extent of the damage to the well, quantify the flow of oil, determine the status of critical components, etc. The subcommittee identified gaps in flow characterization, blowout preventer (BOP) indicators, and additional pressure information at subsea hardware. Subcommittee to review the work done by the national laboratories during the DWH incident to estimate the flow.

(3) What technology is currently available to protect worker safety? The scope of the subcommittee's review will be limited to evaluating systems for unlatching and moving the rig to a safe position, including considering what automatic systems might be advisable to unlatch and move the rig offsite.

(4) What technology is in place to clear debris or bring the well to a controllable state? The Subcommittee will consider issues such as operating multiple remotely operated vehicles (ROVs) simultaneously and issues relating to powering the ROVs to be able to handle large debris sites.

(5) What secondary capabilities and systems exist and are necessary as backups for BOP capabilities?

(6) How will well integrity throughout the well depth be assessed and assured during containment? The subcommittee will consider both well design and testing to ensure that well integrity can be maintained in a containment scenario.

(7) What equipment needs to be maintained in readiness for containment response?

(8) What is the status of the current effort to provide containment response? Subcommittee is looking at the work of Helix, MWCC and other companies working on containment solutions. OESC member Lois Epstein (NGO) suggested considering issues specific to Arctic containment.

(9) What technology is being developed and should be developed (beyond what MWCC, Helix are doing today)?

The Subcommittee will also address what containment capabilities should be in place, as well as what personnel and organizational readiness systems should be in place. OESC member Tadeusz Patzek (Academia) also suggested considering development of software and network capacity to allow fast, efficient and effective communication.

The Subcommittee will address whether there are aspects of industry technical standards and recommended practices that the Subcommittee can address. It was suggested that the full Committee should address this issue as well.

OESC member Joseph M. Gebara (Offshore Energy Industry) suggested considering containment associated with production units.

Oil Spill Response Subcommittee. OESC member David G. Westerholm (National Oceanic and Atmospheric Administration – NOAA) discussed the work of the Oil Spill Response Subcommittee (Appendix X). Key points from his presentation include:

Scope. The Subcommittee will consider gaps and inadequacies in BOEMRE's offshore response construct, including planning, preparedness for response, cleanup and coordination with other agencies.

Activities to Date. The Subcommittee has met three times to date and has had presentations from the Interagency Coordinating Committee on Oil Pollution Research (ICCOPR) and BOEMRE (David Moore, Oil Spill Response).

Action Items and Scope. The Subcommittee wants to explore BOEMRE's activities in three areas: (1) consideration of oil spill response activities and processes in evaluating exploration and production (E&P) plans; (2) activities with respect to preparedness and exercises; and (3) ongoing R&D for spill response. The Subcommittee will consider activities of different agencies in all three areas and recommend improvements to interagency coordination. It will also identify and evaluate industry activities with respect to spill response and any gaps between government plans and industry actions. One of the issues the Subcommittee intends to consider is whether the U.S. should use controlled discharges for testing oil spill response equipment and capabilities. The Subcommittee will also identify issues specific to spill response in the Arctic and other frontier areas. For example, much of the response equipment that worked in the Gulf may not work in Arctic conditions. Subcommittee members will identify and catalog long-term ecosystems issues related to spill response. They will also do stakeholder outreach to vet issues identified during the process. OESC member Lois Epstein (NGO) suggested considering and clarifying what are realistic expectations and goals for spill response.

Safety Management Subcommittee. OESC member Joseph Gebara (Offshore Energy Industry) presented on behalf of the Safety Management Subcommittee (Appendix XI). Key points from his presentation include:

Scope. The Subcommittee will review and recommend enhancements to safety management systems, industry practices, and associated government and NGO entities roles and responsibilities. The Subcommittee will focus on two tasks:
(1) evaluate and recommend enhancements in safety management; and
(2) provide input on the safety and environmental management systems (SEMS) management program elements.

Enhancements in safety management. The Subcommittee will evaluate the framework of safety management, organizational structure and safety culture. It will consider mechanisms to incentivize information sharing that can enhance safety and operational effectiveness. The Subcommittee stressed the importance of common safety standard to be used in the operation of facilities.

SEMS elements.[1] The Subcommittee members will divide the SEMS elements among themselves for review and recommended improvements. They will consider issues such as information management (reporting of events and information sharing); risk management and analysis (current systems for quantifying risk should be developed further; risk should be identified at a system level, rather than component/sub-component-level); management of change; operating procedures (address key decision points and decision-makers, as well as necessary tools); training and workforce development (including an evaluation of certification and qualification requirements and practices); emergency response and control; investigation of incidents; and SEMS audits.

Deliverables. The Subcommittee will develop a scope of work document by the end of the year addressing the SEMS elements, as well as recommended enhancements to safety management more generally.

Center for Offshore Safety. The Subcommittee will explore the work of the Center for Offshore Safety and how it can play a role in enhancing safety management.

Activities to Date. The Subcommittee has held two meetings to date and has reached out to BOEMRE to request information on activities related to SEMS.

Action Plan. The Subcommittee will review BOEMRE and industry activities related to safety management and workforce development, qualification and

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[1] Lois Epstein noted that the subcommittee did not have a chance to review the detailed discussion of activities related to each element in the subcommittee's presentation and therefore that discussion did not necessarily reflect subcommittee consensus.

competency plans, as well as how other countries are using information systems to share lessons learned.

Is a separate Safety Management Systems Subcommittee necessary? The Committee discussed whether these issues should be addressed by a separate subcommittee or as part of the other subcommittees, such as the Oil Spill Prevention Subcommittee. The members decided to keep the Subcommittee separate in order to ensure that human factor issues get appropriate attention, but stressed the importance of cross-fertilization with the Oil Spill Prevention Subcommittee and others. Committee members discussed assigning a liaison on each subcommittee to communicate with others.

Government Agency Reports

In the afternoon portion of the meeting, the Federal government members of the Committee presented on their respective Agency's activities related to the Committee's work.

National Oceanic and Atmospheric Administration. OESC member David G. Westerholm (NOAA) gave an overview of NOAA's activities related to spill response (Appendix XII).

- NOAA's role in spill response includes providing science support (trajectory forecast using oceanographic reports); ensuring seafood safety (sampling and monitoring water safety); protecting wildlife/ habitats; and assessing resource damage.

- Challenges faced by NOAA in the aftermath of DWH included: flow rate calculation; use of subsea dispersants; fate and effect of oil rising up from the bottom; potential biological impacts of subsurface oil; movement of oil by wind and current, hurricanes; and what methods to use (mechanical, in-situ burning, dispersants)

- NOAA has entered into several partnerships, including through a memorandum of understanding with BOEMRE, to coordinate efforts related to spill response

- NOAA has dedicated R&D funding to improve 3-D model for oil transport and for response countermeasures (for ex: ongoing work on impact of dispersants in marine environment on commercial fisheries, etc.)

- Going forward, NOAA highlighted issues in need of further attention including: the decisions regarding fisheries closures and re-opening; preserving and managing data; communications within the command structure and beyond.

- Budget: $6 million for oil spill response with a larger sum for damage assessment

Department of Energy (DOE). OESC member Christopher Smith (DOE) presented on the DOE's offshore research and development activities (Appendix XIII).

- DOE's area of focus is on quantifying risks. A technically sophisticated industry is creating ever-more sophisticated technologies. DOE's challenge is to keep up with that evolution to quantify risks as technology progresses in order to allow government (DOI and others) to regulate effectively.

- DOE's research is done through three different vehicles: (1) appropriated base program; (2) Research Partnership to Secure Energy for America (RPSEA), a public-private partnership to sponsor oil and gas R&D; and (3) National Energy Technology Laboratory (NETL). RPSEA and NETL are funded out of the Energy Policy Act of 2005, which created a fund from royalties paid by producers that produce on public lands.

- Current research topics regarding quantifying risks, understanding evolving types of hazards and putting in place regulation to effectively mitigate against these hazards.

- DOE is facing a number of issues, including: how to effectively cooperate with other state and federal agencies; how to ensure the best use of DOE's scientific and core competencies in offshore R&D; how to ensure that DOE's R&D mission is relevant and appropriate.

- DOE has five federal advisory committees, including one on ultra deepwater, which is creating a subcommittee specifically to explore risk issues.

- DOE does not currently have an agreement with DOI to share information on R&D and make sure there is no overlap. OESC member Christopher Smith noted that this would be a potential recommendation that the Committee could make.

- Budget: $50 million, with $37.5 million per year for RPSEA and $12.5 million for NETL per year.

U.S. Geological Survey (USGS). OESC member Stephen H. Hickman (USGS) presented on USGS's involvement in the DWH response and its current spill-related activities (Appendix XIV).

- The USGS's role in the DWH spill response included:

  (1) Oil fingerprinting – taking the bio-chemical signature of DWH oil so that oil found in marine and terrestrial environments could be genetically linked to or excluded from DWH.

(2) Flow rate technical group led by USGS Director Marcia McNutt developed methods to estimate oil flow rates through mass balance calculations from surface observations, acoustic/sonar analysis, etc.

(3) Subsurface well integrity analysis; extensive monitoring

(4) Provided data and mapping products to identify sand resources and impacts; identified risk of deposition on barrier islands (what parts of barrier islands might be impacted by oil); investigating impacts on choral reefs; and examining the impact of berms on the Chandeleur Islands.

- USGS is taking long-term DWH science strategy to guide USGS ecosystems research (current research includes sediment redistribution to determine impacts of sand berms; chemical/microbial degradation of hydrocarbons)

- USGS is one of many agencies involved in the Natural Resource Damage Assessment (NRDA) process to determine damage on natural resources as a result of the spill. USGS is also supporting restoration in GOM through its science programs, such as Operation Clean Sweep and USGS Ecosystems Task Force.

- USGS has an active gas hydrate research program, including environmental impacts of gas hydrates and the impact of hydrates on drilling safety.

- USGS has an active submarine landslides research program, studying geologic setting, size distribution, timing and impact of submarine landslides.

- USGS is undertaking an Arctic OCS study which is considering information from BOEMRE, industry, USCG, NOAA, EPA and international governments.

- USGS has a large program in climate change studies.

- Most R&D has been on response, but a lot of work done by USGS is germane to prevention. No guess on R&D budget figure for this research.\

- Budget: no numbers given.

U.S. Coast Guard (USCG). OESC member Patrick E. Little (USCG) presented on the USCG's activities related to oil spill response (Appendix XV).

- Five oil-spill related R&D projects, all related to response, are being funded by USCG: (1) recovery of heavy submerged oil; (2) recovery of oil in ice; (3) capabilities for tracking oil in water or on beach; (4) systematic analysis of DWH response technology; and (5) submerged detection of oil within the water column and in deepwater.

- USCG has several operational initiatives underway, including reviewing USCG practices – resulted in implementation of a risk-based oversight program for MODUs.

- USCG responsibilities are related to vessel operation and fire systems; BOEMRE is responsible for drilling systems. There is an interface between subsurface and surface operations, so the two agencies cooperate on a regular basis, including through the Prevention Working Group and a joint Response Working Group, which is looking at regional contingency plans, compliance inspections, identifying improvements to USCG's response assets database, assessment of response planning standards, etc. Joint review of Oil Spill Response Programs in GOM and Alaska identifying gaps, which are currently being addressed by area committees.

- USCG R&D piece is $4 million and it is all focused on oil spill response.

- Committee members discussed the need to clarify the relationship between BOEMRE and USCG and who is responsible for system hazards assessments – possible Committee recommendation to review this. OESC member Walter Cruickshank (BOEMRE) pointed out that there is an MOU between BOEMRE and USCG that defines the relationship between the two agencies, that conversations are underway on this issue through the Prevention Working group.

- Budget: no numbers given.

Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE). OESC member Walter Cruickshank (BOEMRE) presented on BOEMRE's activities, including BOEMRE's regulatory reforms, changes to the safety rules, oil spill response capacity requirements and ongoing research initiatives (Appendix XVI). The Committee expressed an interest in commenting on which topics of the Interim Final Rule should be re-opened for public comment.

- Regulatory Initiatives:

  (1) **SEMS Rule.** American Petroleum Institute (API) Recommended Practice (RP) 75 dictates mandatory compliance. SEMS plans must be developed, implemented and available by November 15, 2011. Second SEMS rule being developed to address issues concerning ultimate work authority, stop work authority, and reporting unsafe working conditions.

  (2) **New Drilling Safety Rule.** Tighter primary cementing practices and guidelines. New BOP inspection and testing requirements, autoshear and deadman systems for dynamically-positioned rigs, ROV capabilities, new casing and cementing design requirements, new fluid displacement procedures, and deepwater well-control procedure guidelines.

(3) **Regulatory "Effects of Water Depth: Workshop.** Technical workshop to be held November 2-3, 2011 in Galveston, Texas. Workshop expected to identify various topics including critical issues and effects of water depth on equipment and operations as well as adequacy of current regulations.

- Oil spill response planning and preparedness initiatives will do the following: (1) establish oil spill response office in Bureau of Safety and Environmental Enforcement; (2) identifying lessons learned from DWH and coordinate with USCG; and (3) influence direction of the Private initiatives such as joint industry task forces, acquiring oil spill removal organization equipment and developing subsea containment systems designs/operating systems.

- BOEMRE-funded research comes from two areas within the agency: Environmental Studies Program and Technology Assessment and Research (TA&R) Program. Areas of study include topics such as marine environmental monitoring, well control, and oil spill response.

- Budget: $6.3 million for oil spill response appropriations in fiscal year (FY) 2010. Large increase to $8 million in FY 2011 and further increase expected in FY 2012. TA&R outside of oil spill response was $1.5 million in FY 2010.

Public Comment

The Committee received public comment from Gabriel Scott, Public Citizen (Appendix XVII); Paul Sawyer, Director of Federal Programs, Louisiana Department for Economic Development (Appendix XVIII); Messiah Darryl Paul Ward, Public Citizen (Appendix XIX); Phil Nugent, Phil C. Nugent and Associates (Appendix XX); and Matthew Welch, Love Us Now (Appendix XXI). A PowerPoint presentation distributed by Phil Nugent during his presentation, as well as a letter and notebook of patents from Paul J. Hubbell, Jr., Inventor, have been entered in the Committee's official record for the meeting.

Committee Discussion

The Committee concluded its meeting with a discussion of a number of outstanding items:

- **Outreach to academia, state and industry groups.** OESC member Richard Sears (NGO) presented a preliminary outreach list of universities in the four focus areas of the Committee. Richard Sears, Nancy Leveson (Academia), Tad Patzek (Academia) and Lois Epstein (NGO) will send a plan for reaching out to these and other institutions to the Committee and will begin outreach, with a report to the Committee at the next meeting. The Committee will also evaluate whether it should reach out to international institutions and universities. Tad Patzek was selected as the lead for university outreach.

- **Outreach to state and local government.** To determine what R&D initiatives are ongoing, OESC member Charlie Williams (Offshore Energy Industry) suggested reaching out to the GEST organization, which has been working with the State of Louisiana (joint industry-state government initiative). OESC member Christopher Smith (DOE) suggested the Interstate Oil and Gas Compact Commission. OESC member David Westerholm (NOAA) suggested reaching out to spill response state-industry consortia.

- **Subcommittee Deliverables for Next Meeting.** Chairman Tom Hunter gave the subcommittees direction to focus on developing the following information within their area of focus: (1) clarity on scope; (2) clarity on action; (3) clarity on results; and (4) clarity on relevant information. At the next OESC meeting, the subcommittees will come back with specific milestones and deliverables for the remainder of the year.

- **OESC Deliverables.** By the first quarter of next year (early spring 2012), the OESC will issue a report assessing the current state of R&D/activities and what should be improved. Chairman Hunter stressed the need to issue an interim product this fall (2011), given the ongoing federal budget discussions. Therefore, the Committee's goal for the next meeting will be to come up with summary/preliminary observations and recommendations. Between now and the next meeting, the OESC, through the four subcommittees will work on developing an outline of the final work product.

- **Staff Support.** Members stressed the importance of sufficient staff support, and Chairman Hunter said he would reach out to DOI with a request for staff support. Committee members discussed adding additional subcommittee members from outside parties. BOEMRE to look into applicable FACA rules.

- **Next meeting.** Members discussed Washington, D.C. or Houston, Texas, as possible meeting locations. In the meantime, members expressed interest in participating in field visits. They discussed the possibility of tying a Committee field visit and/or the next meeting to a conference in order to allow the Committee access to key representatives.

The meeting was adjourned at 5:00 p.m.

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

Appendices

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II. Members in Attendance
III. Public and Press in Attendance
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V. Presentation by Mr. Martin W. Massey, Chief Executive Officer, Marine Well Containment Company
VI. Presentation by Mr. Hani Sadek, Director, DeepStar
VII. Presentation by Mr. Bryan A. Domangue, Bureau of Ocean Energy Management, Regulation and Enforcement
VIII. Report by Oil Spill Prevention Subcommittee
IX. Report by Oil Spill Containment Subcommittee
X. Report by Oil Spill Response Subcommittee
XI. Report by Safety Management Systems Subcommittee
XII. Report by National Oceanic and Atmospheric and Oceanic Administration
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XVII. Public Comment by Mr. Gabriel Scott, Public Citizen
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XIX. Public Comment by Messiah Darryl Paul Ward, Public Citizen
XX. Public Comment by Mr. Phil C. Nugent, Attorney at Law, Phil C. Nugent and Associates
XXI. Public Comment by Matthew Welsh, Public Citizen

Additional Material Distributed at Meeting

- Members' Bios
- Speakers' Bios
- *DeepStar™ 20 Years of Deepwater Innovation*
- Public Comment Card and Attachment received by Phil C. Nugent, Attorney at Law, Phil C. Nugent and Associates
- PowerPoint presentation distributed by Phil Nugent during his public comments
- Letter to Chairman Hunter along with notebook of patents from Paul J. Hubbell, Jr., Inventor
- Written Comment received from Darlene Eschete (E-mail July 13, 2011)

Appendix I

MEETING OF THE
OCEAN ENERGY SAFETY ADVISORY COMMITTEE
NEW ORLEANS, LOUISIANA
JULY 13, 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, and non-governmental 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.

12:00 p.m. **Registration**

1:00 p.m. **Welcome and Introduction**
Michael R. Bromwich Director, Bureau of Ocean Energy Management, Regulation and Enforcement

1:30 p.m. **Opening Remarks and Member Introductions**
Thomas O. Hunter Chair, Ocean Energy Safety Advisory Committee
Committee Members in Attendance

1:45 p.m. **Industry Initiatives**
Martin W. Massey CEO, Marine Well Containment Corporation
Hani Sadek Director, DeepStar

3:00 p.m. **Break**

3:15 p.m. **Committee Roundtable – State and Academia Outreach Plan**

4:15 p.m. **BOEMRE Well Containment Screening Tool**

Bryan Domangue District Operations Support Section, Bureau of Ocean Energy Management, Regulation and Enforcement

5:00 p.m. **Meeting Recess**

MEETING OF THE
OCEAN ENERGY SAFETY ADVISORY COMMITTEE
NEW ORLEANS, LOUISIANA
JULY 14, 2011

8:00 a.m.	**Committee Announcements**	
	Thomas O. Hunter	Chair, Ocean Energy Safety Advisory Committee
8:15 a.m.	**Subcommittee Reports**	
	Christopher A. Smith	Member, Spill Prevention Subcommittee
	Richard A. Sears	Member, Containment Subcommittee
	David G. Westerholm	Member, Spill Response Subcommittee
	Joseph M. Gebara	Member, Safety Management Systems Subcommittee
10:15 a.m.	**Break**	
10:30 a.m.	**Government Agency Presentations**	
	David G. Westerholm	Director, Office of Response & Restoration, National Oceanic & Atmospheric Administration
	Christopher A. Smith	Deputy Assistant Secretary for Oil & Natural Gas Office of Fossil Energy, Department of Energy
	Stephen H. Hickman	Senior Research Scientist, U.S. Geological Survey
12:00 p.m.	**Lunch**	
1:45 p.m.	**Government Agency Presentations Continued**	
	Patrick E. Little	Commanding Officer, U.S. Coast Guard Marine Safety Center
	Walter D. Cruickshank	Deputy Director, Bureau of Ocean Energy Management, Regulation and Enforcement
3:00 p.m.	**Break**	
3:15 p.m.	**Public Comment**	
	Gabrielle Scott	Public Citizen
	Paul Sawyer	Director, Louisiana Department of Economic Development
	Messiah Darryl Paul Ward	Public Citizen
	Phillip C. Nugent	Phillip C. Nugent and Associates, PC
	Matthew Welch	Public Citizen
4:00 p.m.	**Open Committee Discussion**	
5:00 p.m.	**Meeting Adjourns**	

Appendix II

REPRESENTATIVES IN ATTENDANCE AT THE OCEAN ENERGY SAFETY ADVISORY COMMITTEE MEETING
New Orleans, Louisiana
July 13-14, 2011

MEMBERS

Thomas O. Hunter	Chair
Tadeusz W. Patzek	Academia
Lois N. Epstein	Non Government Organization
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
David G. Westerholm	National Oceanic and Atmospheric Administration
Patrick E. Little	U.S. Coast Guard
Stephen H. Hickman	U.S. Geological Survey

INTERIOR DEPARTMENT REPRESENTATIVES

Michael R. Bromwich	Director, Bureau of Ocean Energy Management, Regulation & Enforcement

PUBLIC AND PRESS ATTENDEES
OCEAN ENERGY SAFETY ADVISORY COMMITTEE MEETING
NEW ORLEANS, LOUISIANA
JULY 13-14, 2011

PUBLIC

Phil Nugent	Phil C. Nugent & Associates PC
Robert North	North Star Maritime Inc
Armando Garza	Self
Art Schroeder	Energy Valley
David Borns	Sandia National Labs
Hani Sadek	Chevron
George Carter	Carter Inventions
Darryl Paul Ward	Garden of Eden
Michael Manning	Rep. of Marshall Islands
Jake Stahl	Marine Expertise
Loeke Loeb	Chevron
Jim Javes	U.S. Environmental Protection Agency
Margaret Laney	BP America
Hunter Rowe	BP America
Andy Radford	American Petroleum Institute
Joe Levine	Bureau of Ocean Energy Management, Regulation & Enforcement
Christy Lan	Bureau of Ocean Energy Management, Regulation & Enforcement
Mike Conner	Bureau of Ocean Energy Management, Regulation & Enforcement
Mik Else	Bureau of Ocean Energy Management, Regulation & Enforcement
Steve Sutton	U.S. Coast Guard
Fred Brink	Bureau of Ocean Energy Management, Regulation & Enforcement
Ronald Washington	Bureau of Ocean Energy Management, Regulation & Enforcement
Gabriel Scott	Self
Michelle Erenberg	Gulf Restoration Network
John Nadeau	U.S. Coast Guard
Damian Yemma	U.S. Coast Guard
Paul Sawyer	Louisiana Economic Development
Allison Marquette	Self
Kent Satterlee	Shell
Sean Priby	U.S. Coast Guard
Peter Gautier	U.S. Coast Guard
Ken Wells	PEC Premier
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
Kyle Moorman	Bureau of Ocean Energy Management, Regulation & Enforcement
Ericka Williams	Bureau of Ocean Energy Management, Regulation & Enforcement
Jeryne Bryant	Bureau of Ocean Energy Management, Regulation & Enforcement
Eileen Angelico	Bureau of Ocean Energy Management, Regulation & Enforcement
Charlyn Spies	Bureau of Ocean Energy Management, Regulation & Enforcement
Bill Lee	Bureau of Ocean Energy Management, Regulation & Enforcement
Jim Adams	Offshore Marine Service Association
Joseph Braun	Argonne National Laboratory
Lars Herbst	Bureau of Ocean Energy Management, Regulation & Enforcement

Bryan Domangue	Bureau of Ocean Energy Management, Regulation & Enforcement
Sarah Branch	Offshore Marine Service Association
Caryl Fagot	Bureau of Ocean Energy Management, Regulation & Enforcement
John Spain	Baton Rouge Area Foundation
Paul J. Hubbell	Self
Matthew Love Welch	Love Us Now The World
Stephen P. Anderson	Anderson Court Reporting

PRESS

Jeremy Alford	Louisiana Public Broadcasting/BR
Rex Q. Forterberry	Louisiana Public Broadcasting/BR

Appendix IV

DEPARTMENT OF THE INTERIOR (DOI)
OCEAN ENERGY SAFETY ADVISORY COMMITTEE MEETING
NEW ORLEANS, LOUISIANA
JULY 13-14, 2011

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

BOEMRE DIRECTOR MICHAEL R. BROMWICH: Well, thank you very much, Brad. And good afternoon, everyone. It's great to be here in New Orleans with you today. I want to begin by thanking the members of the Committee and the Panelists and those of you in attendance for being here. This is a very important Committee doing extraordinarily important work. So I'm delighted to be here to spend a little time with you.

As you know this is the second meeting of the Committee. Through my staff and through contacts with Dr. Hunter, I've followed the activities of the Committee and some of the preliminary work of the subcommittees with great interest. And I'm pleased to know the Committee and Subcommittees are off to an excellent start. As you know, Tom and you divided yourselves into four subcommittees: Oil Spill Prevention, Subsea Containment, Spill Response, and Management Systems. And my understanding is that over the past few weeks all of the Subcommittees have been hard at work extending through this morning, I understand, developing action plans and deliverables for the rest of this year and beyond.

So I want to thank all of you for the hard work that you've already done to date and your demonstrated commitment this extremely important task. I truly look forward to seeing your action plans and receiving your recommendations in the months to come.

Now at our first meeting in D.C. in April I think both Secretary Salazar and I stressed how important the work of this Committee is to our overall reform agenda at BOEMRE. The work that you're doing and the recommendations that we ultimately get are really key elements of our agency's long-term strategy to address the various challenges, engineering primarily, and the inherent risks that are associated with offshore drilling and deepwater drilling in particular.

As I think almost all of you know, we're going through a very important reorganization right now. And as of October 1, BOEMRE will be no more. And we're dividing into two agencies. One will be the Bureau of Ocean Energy Management or BOEM. And the second will be the Bureau of Safety and Environmental Enforcement or BSEE. And BSEE will have the safety and enforcement functions that the work of this Committee, I think, is going to be so crucial to. So as October 1 draws nearer, your audience will ultimately be BSEE. But also the higher reaches of the Department of the Interior because both the

Deputy Secretary and the Secretary continue to be extremely interested and engaged in safety and safety reforms.

Whether our organizational reform and the substantive reforms that we've been so hard at work at over the last 13 months succeed depends to a large degree on our ability to create mechanisms and institutions that spur continued government and industry focus on both drilling safety issues and workplace safety issues.

One of the things I think we all realized coming out of Deepwater Horizon and was reinforced by the Deepwater Horizons Center presentations we received in April was the need to establish institutions and systems that maintain continuing forward momentum on issues related to safety as they relate to offshore exploration and development.

Industry, government, the academic community all of those institutions and entities need to contribute to continue progress. And that's why this Committee is so critically important. And obviously that's where you come in. Your work is going to be a centerpiece of keeping the momentum going for continued improvement of all kinds, both technical and human. And so I want to again thank you for helping to chart the path forward.

Now I know that the Committee is already working to identify gaps in existing technology. And I looked with great interest and satisfaction at the ambitious agenda you have both for presentations as well as for reports of subcommittee. And I think that will, certainly based on the agenda, dramatically help to advance your progress and our ability to take advantage of the good work that you're doing.

So I want to keep my remarks short so I can turn them over to Tom Hunter. I just wanted to repeat my thanks to you for your hard work and your commitment. And I simply want to repeat that those of us in the agency, both in BOEMRE and in the Department on up to the Secretary, eagerly await your continued work, the reports of the subcommittees, and specific recommendations on how we can improve what we currently do. So thank you very much.

Marine Well Containment Company

Ocean Energy Safety Advisory Committee

Martin W. Massey, Chief Executive Officer
July 13, 2011

MARINE WELL CONTAINMENT COMPANY

Marine Well Containment Company's Commitment

- Continuously ready to respond to a well control incident in the deepwater U.S. Gulf of Mexico
- Continuously Advancing deepwater Well Containment in the U.S. Gulf of Mexico
- Recognized and Respected Leader in deepwater Well Containment in the U.S. Gulf of Mexico

MARINE WELL CONTAINMENT COMPANY

Marine Well Containment Company Timeline

July 21: ExxonMobil, Chevron, Shell, ConocoPhillips commit to establish Marine Well Containment System (MWCS)

July 15: Macondo well initially capped

April 20: Macondo incident

MARINE WELL CONTAINMENT COMPANY

Marine Well Containment Company Timeline

March 31: Formation period ends; 10 member companies

February 17: Interim Containment Response System (ICRS) ready; officers announced

December 10: MWCC created

July 21: ExxonMobil, Chevron, Shell, ConocoPhillips commit to establish Marine Well Containment System (MWCS)

July 15: Macondo well initially capped

April 20: Macondo incident

MARINE WELL CONTAINMENT COMPANY

MWCC's Membership

ExxonMobil

Chevron

ConocoPhillips

bp

Apache

Anadarko

bhpbilliton

Statoil

HESS

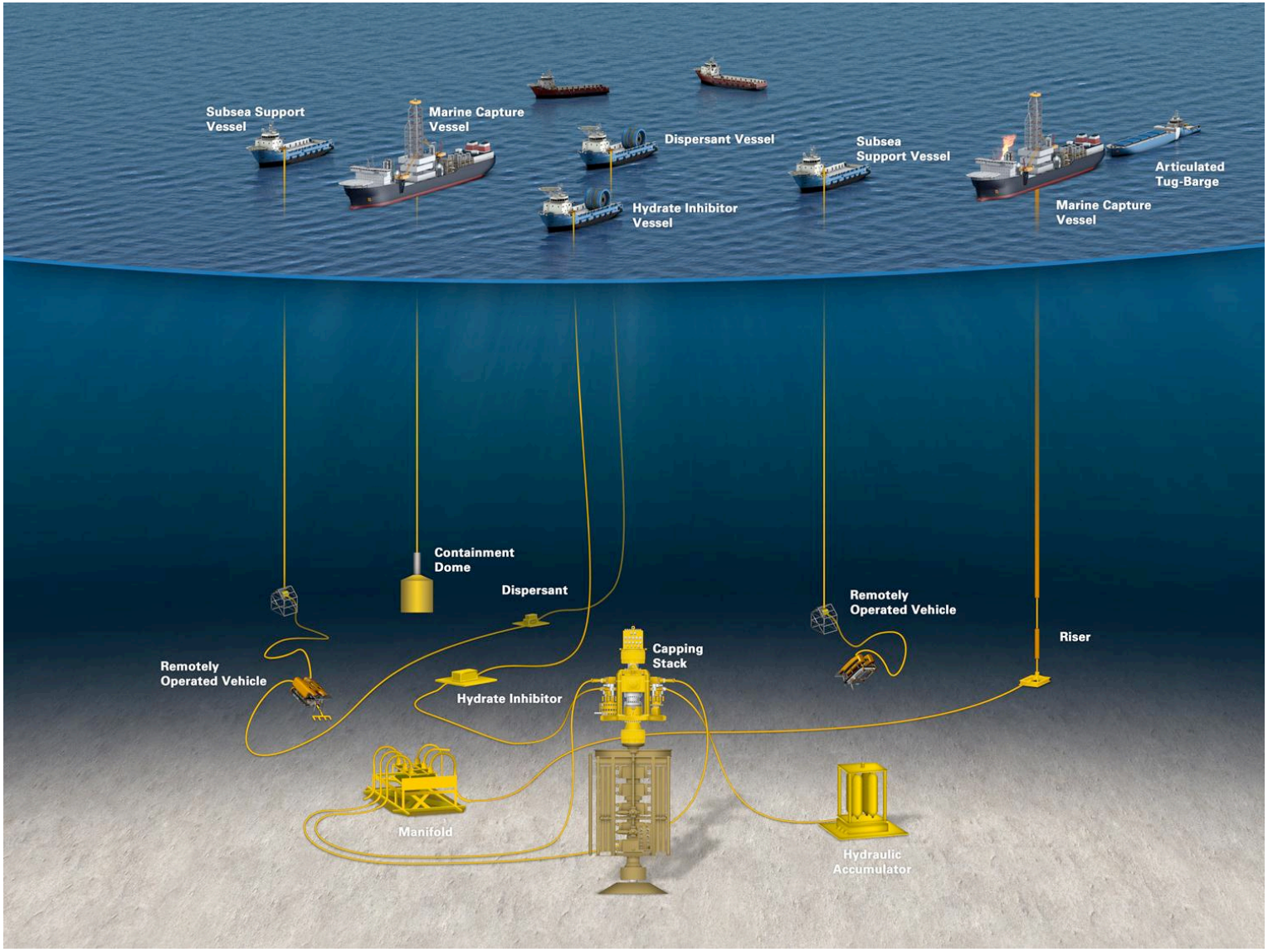
MARINE WELL CONTAINMENT COMPANY

About Our Company

- Independent, not-for-profit company
- 10 members, each with an equal share and an equal vote
- Investment of over $1 billion
- Maintain equipment and be prepared for deployment
- System available to all
- Advancing well containment technology

MARINE WELL CONTAINMENT COMPANY

Interim Containment Response System: Ready To Be Deployed



MARINE WELL CONTAINMENT COMPANY

Interim Containment Response System Capping Stack

MARINE WELL CONTAINMENT COMPANY

Interim Containment Response System Continually Ready to Go

- Quarterly Capping Stack Pressure/Function Test
- Dispersant stock held in Houston
- Equipment maintained in response ready state
- Emergency Response Plan developed and resource training and drills on-going

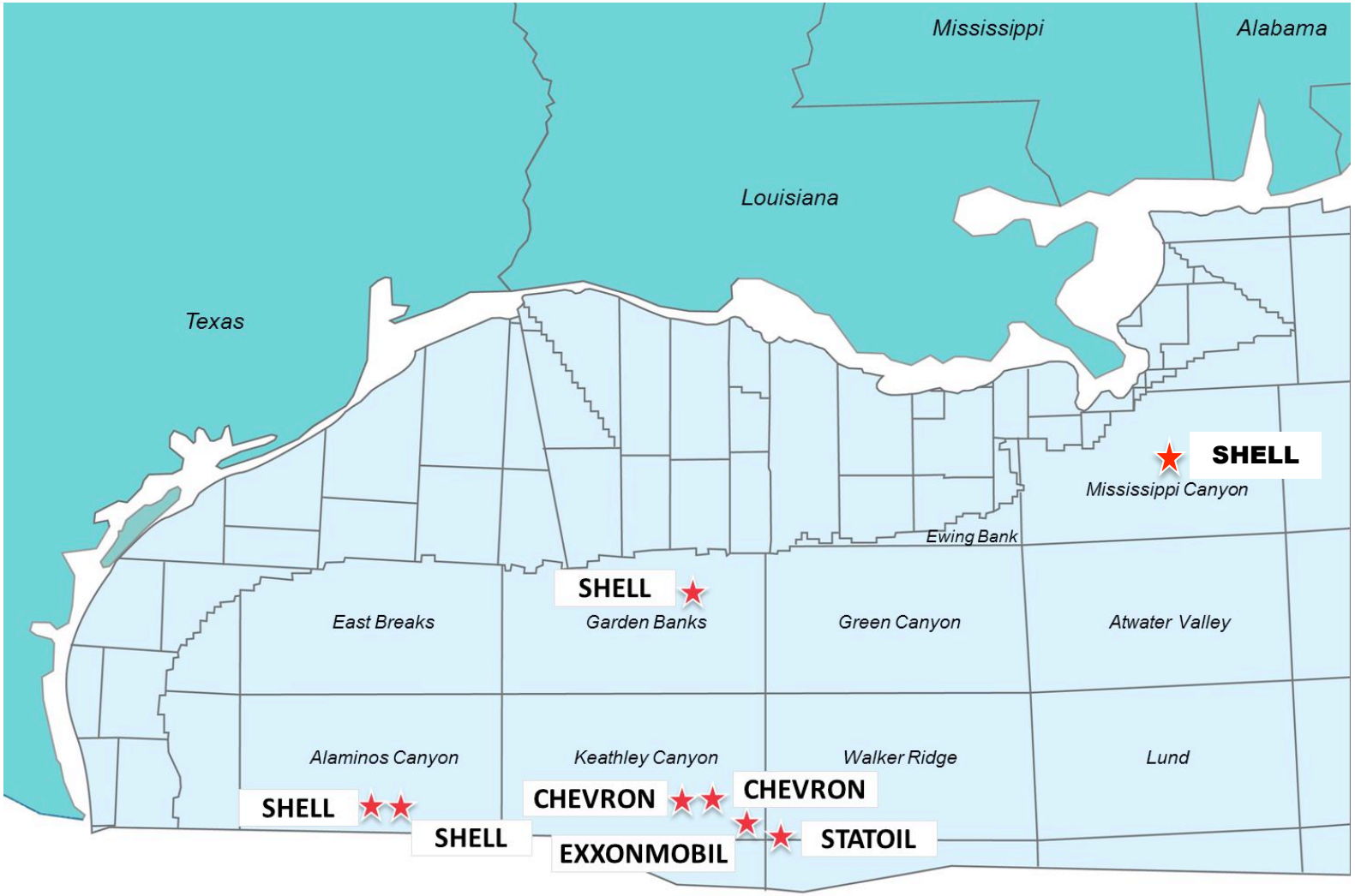
MARINE WELL CONTAINMENT COMPANY

Fully Engaged with BOEMRE

- Participation in Responsible Party Checklist workshop for new member companies
- Functional Specification review
- Onsite review and witness testing of capping stack—two different site visits
- Onsite review of Interim Containment Response System equipment
- Quarterly updates to BOEMRE
- TLP/SPAR containment plan development
- Interim Containment Response System documentation for 10,000 feet capping stack

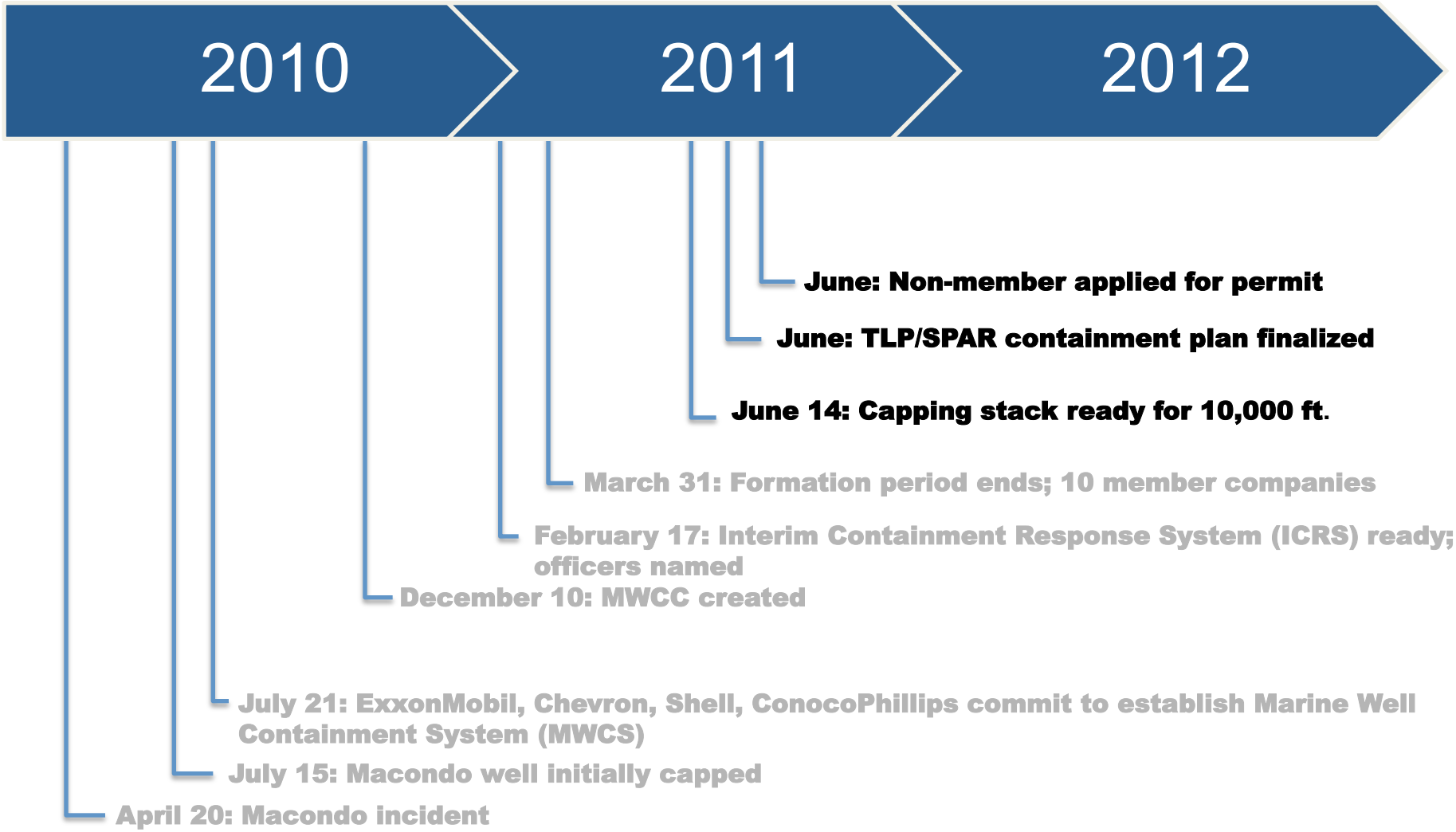
MARINE WELL CONTAINMENT COMPANY

Permits Granted Based on MWCC's Interim Containment Response System



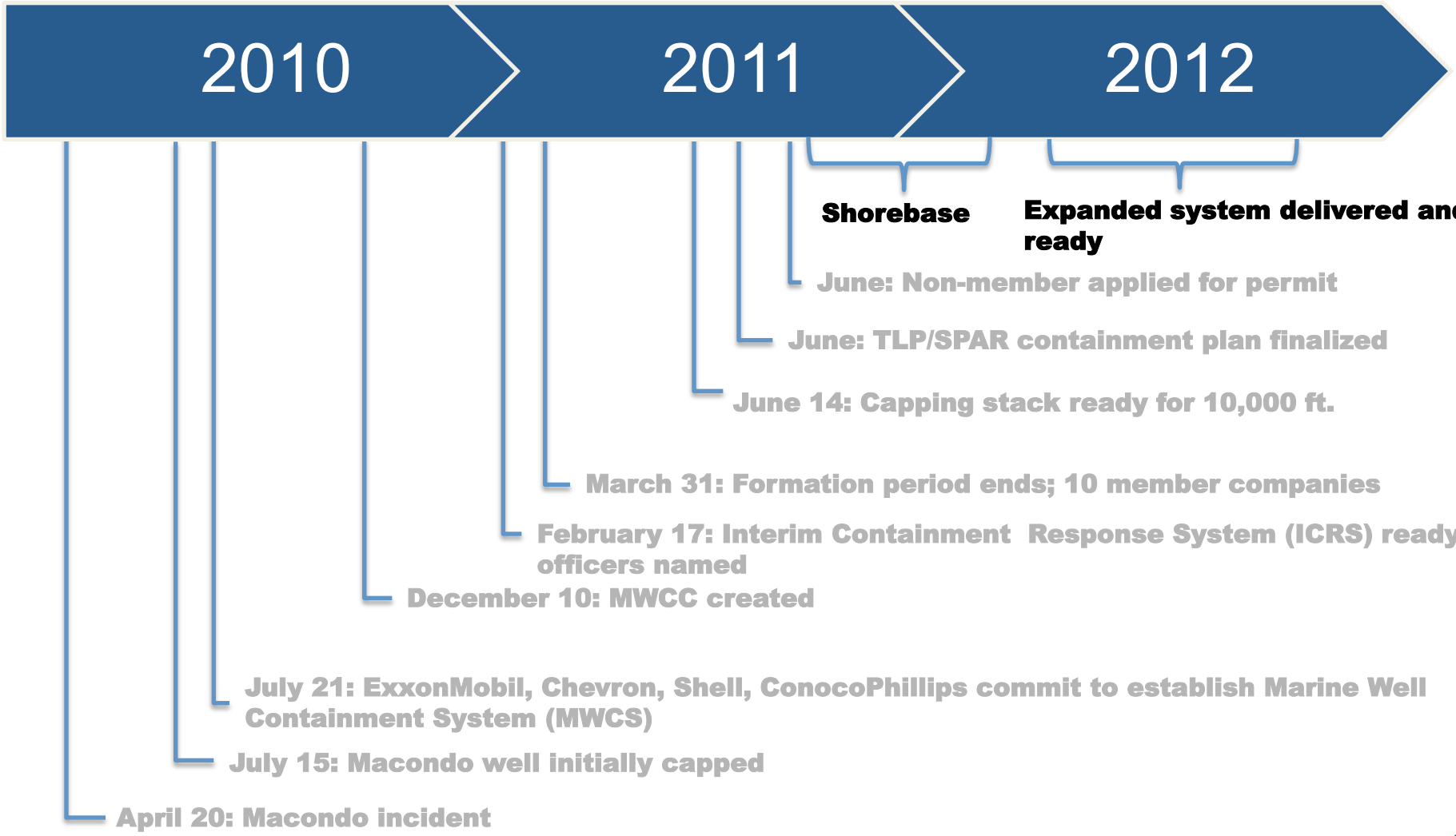
MARINE WELL CONTAINMENT COMPANY

Marine Well Containment Company Timeline



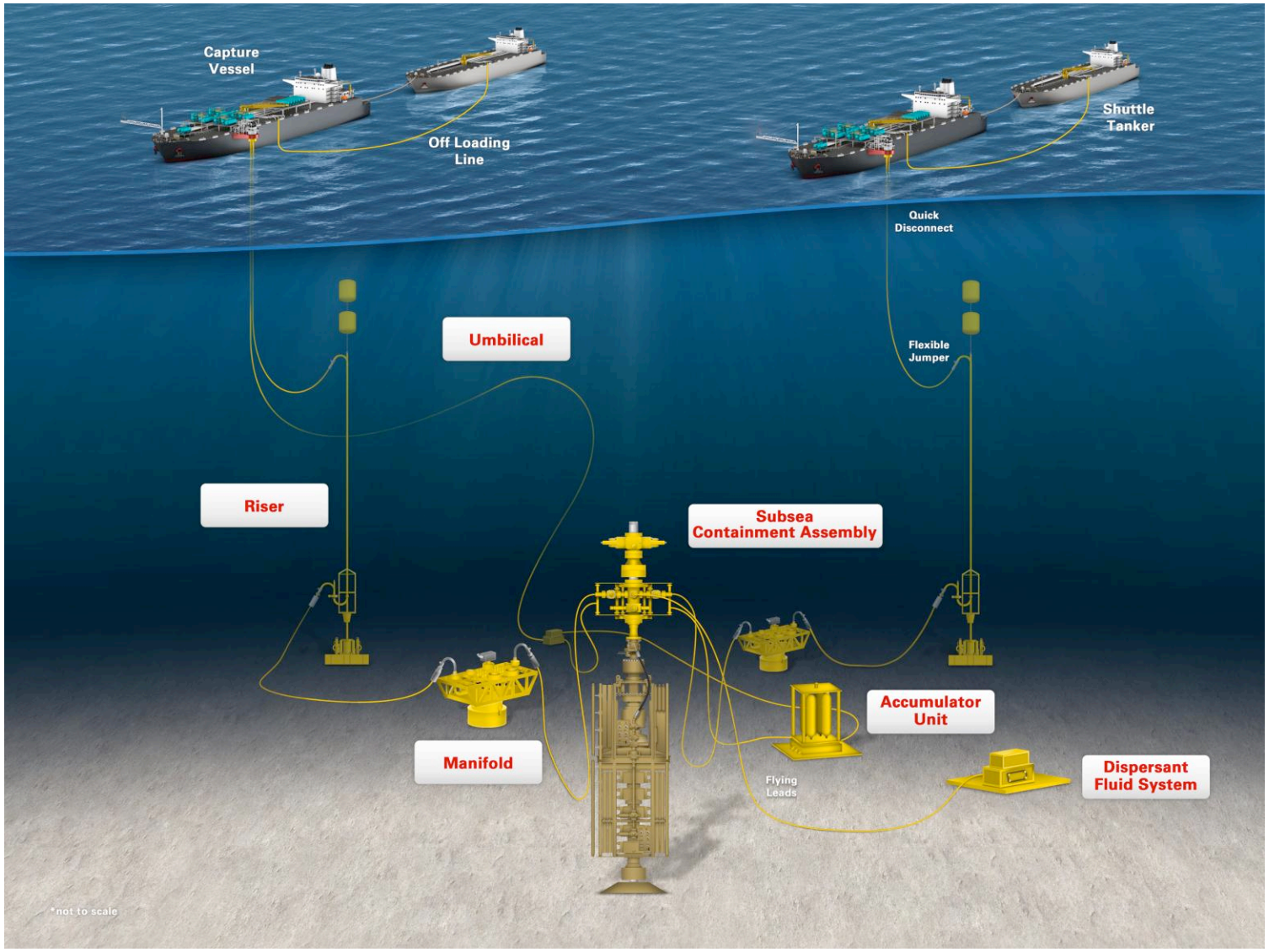
MARINE WELL CONTAINMENT COMPANY

Marine Well Containment Company Timeline



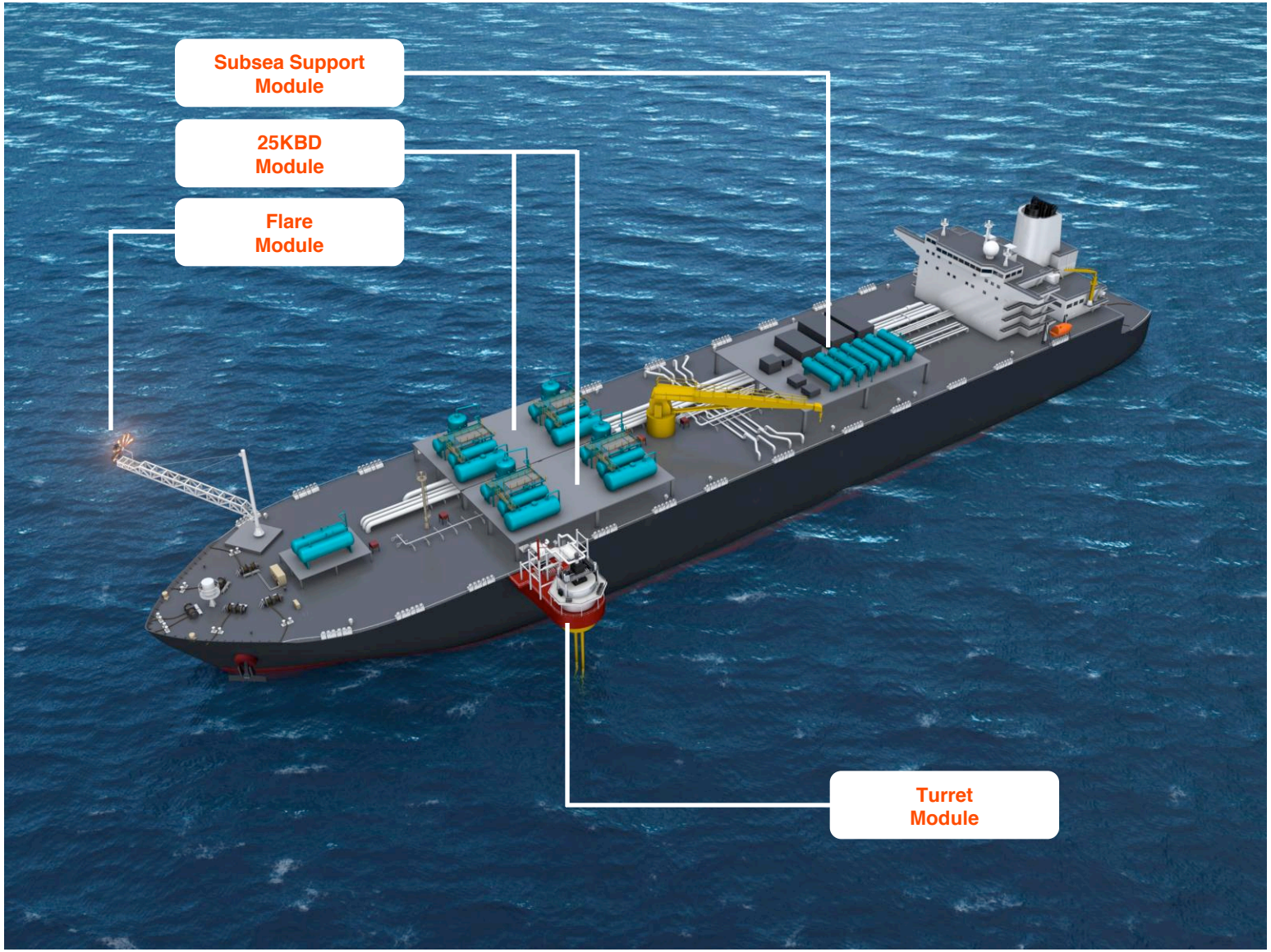
MARINE WELL CONTAINMENT COMPANY

Expanded Containment Response System: In Development



MARINE WELL CONTAINMENT COMPANY

Expanded Containment Response System Capture Vessel



MARINE WELL CONTAINMENT COMPANY

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Offshore Energy Safety Advisory Committee (OES_AC)

New Orleans, Louisiana

July 13th, 2011

DeepStar™

A Global Deepwater R&D Consortium

Hani Sadek, Director

Presentation Outline

- **Vision, Value & Strategy**
- **Organization, Structure & Process**
- **R&D Projects**
  - General scope, size and duration
- **Lessons Learned**
- **Summary**

20 Years of Deepwater R&D Excellence

DeepStar is a Research & Development collaboration between oil companies, vendors, regulators and academic/research institutes started in 1991

- **Vision**
  Premier global forum to execute development and adoption of deepwater technology projects

- **Value**
  Leverage financial and technical resources to:
  Deliver technology needs
  Build deepwater technical competency

- **Strategy**
  Technology development aligned with business needs
  Transfer and apply technology to deepwater assets
  Gain acceptance of deepwater technologies by industry, standards organizations and regulators

DeepStar Project Evolution

1991 through 2011 – 20 years of Technology Development *

- Semi as a Production Host (Phase 1**)
- Subsea Production in 2000-4000 ft (Phase 3)
- Production in 6,000 ft (Spars & TLP's) (Phase 6)
    - Mooring and Riser Analysis
    - VIV
    - Flow Assurance
    - Metocean
    - Subsea & Systems Engineering
- Complete Development Scenarios for 10,000 ft (Phase 8 through Phase 10)
    - Dry Tree Systems
    - Subsea Components & System Integration (w/long distance TB)

Throughout the Phases, input to standards' organizations (API RP, DNV, ISO) & industry best practices

*** World Oil supplement**

**** each Phase – 2 years**

DeepStar Members

Phase X Participants

Chevron · bp · TOTAL · PETROBRAS · nexen · Statoil

Marathon Oil Corporation · ConocoPhillips · MAERSK OIL · Anadarko Petroleum Corporation

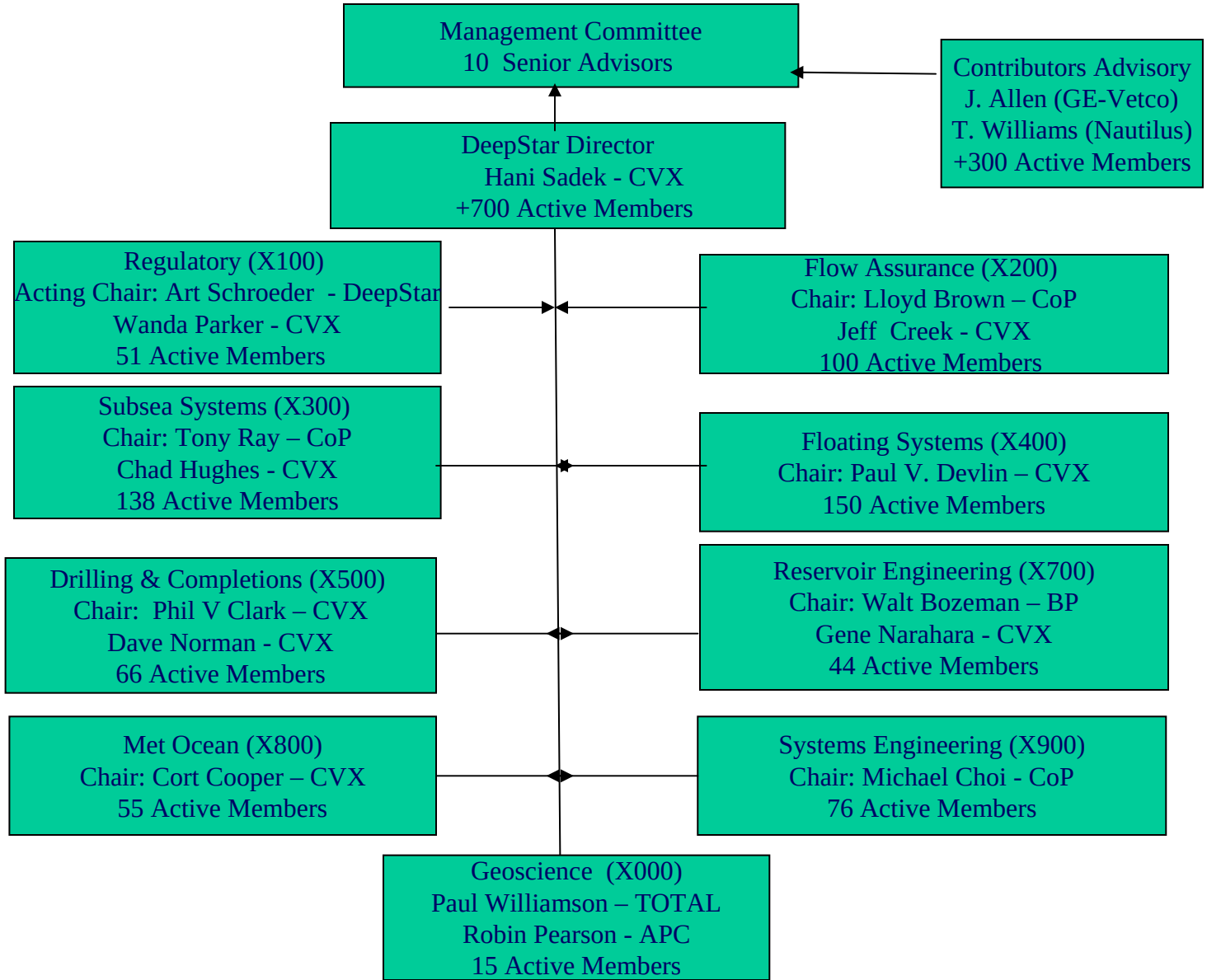
Phase X Contributor Members

2H Offshore Inc.
3D at Depth
Acergy US Inc.
Advanced Production & Loading Inc.
Aker Field Development
Alan C. McClure Associates, Inc.
Alcoa
America Bureau of Shipping
AMOG Consulting Inc.
Applus RTD
Baker Hughes Corporation
Blade Energy Partners, Ltd.
Bluewater Energy Services B.V.
BMT Reliability Consultants, Ltd.
Bureau Veritas Marine Inc.
Cameron
Champion Technologies, Inc.
The Consortium for Ocean Leadership
COTEC Inc.
CSI Technologies, LLC
Det Norske Vertias (USA) Inc.
Doris Engineering
Dresser, Inc.
EDG, Inc.
Exmar Offshore Company
Fluor Enterprises, Inc.
FMC Technologies, Inc.
GE Oil & Gas
General Marine Contractors
GMC, LLC
Granherne
Halliburton Energy Services, Inc.
Heerema Marine Contractors B.V.
Horton Wison
The Houston Advanced Research Center
IntecSea
Intergrated Ocean Drilling Program
International Design, Engineering and Analysis
Jacobs Engineering Group, inc.
Knowledge Reservoir, LLC
Kongsberg Maritime Inc.
Lighthouse R&D
Lockheed Martin Corporation
Marintek
MMI Engineering, Inc.
Moog Inc
Multi-Chem Group, LLC.
Multiphase Solutions, Inc.
Nalco Company
National University of Singapore
Nautilus International, LLC
Noble Denton Group Ltd.
Oceaneering International, Inc.
Oceanic Consulting Corporation
Octave Technologies Inc.
Oil States Industries Inc.
Parker Hannifin
Pules Structural Monitoring
Rimkus Consulting Group, Inc.
Saipem S.A.
SBM Atlantia, Inc.
Schlumberger Technology Corporation
SeaTrepid International, LLC
Siemens Energy, Inc.
Sonomatic
Southwest Research Institute
Stress Engineering Services, Inc.
Technip USA Inc.
Transocean Offshore Deepwater Drilling
Weatherford International, Inc.
Wild Well Control, Inc
XODUS Group.
ZEiTECS, Inc.

Honorees and University Collaboration

- Colorado School of Mines
- Cranfield University
- Ensenada Center for Scientific Research and High Education
- Florida State University
- Heriot Watt University
- King's College – London
- Louisiana State University
- Massachusetts Institute of Technology
- Memorial University of New Foundland
- New Mexico Institute of Mining & Technology
- Norwegian Technical University – Trondheim
- Pennsylvania State University
- Rice University
- Texas A&M University
- University of California Santa Cruz
- University of Florida
- University of Miami
- University of São Paulo
- University of Texas
- University of Tulsa

DeepStar Organizational Structure



DeepStar Organization

Champions and Working Committees:

•Each Technical Project within DeepStar requires an Operating Company "Champion" who technically monitors the contractor performing the work

•Working Committee volunteers support the Champion by participating in contractor selection process, review meetings, reviewing technical reports and providing guidance to the contractor during performance of the work

•Participation in Technical & Working Committees, Chairmen and Champions are voluntary by member organizations

•1000 + Subject Matter Experts (SME) to draw for experience and expertise

DeepStar Processes

Project Identification: (business need driven)

- All projects ideas start with preparation of a CTR (Cost, Time & Resources) Summary Sheet at the Technical Committee Level

- CTRs are generated by:
  - Operator SMEs who see a business need within their operations
  - Vendors / Service companies who see opportunities for improvements
  - Academics who see potential applications for their work

- CTRs are discussed, vetted and consolidated (as needed) into distinct CTRs

- CTRs are ranked and prioritized by the Technical Committees

- Management Committee votes on portfolio of R&D projects

- Approved projects are bid, negotiated, contracted and managed utilizing industries' best practices

DeepStar Processes

Tech Transfer is an important part of each project:

- DeepStar Website (www.DeepStar.org)
- Subject Matter Experts project involvement
- Monthly Project Reports
- Quarterly Meetings
- Project Working Committee Meetings
- Workshops
- Conferences
- Papers

DeepStar Projects

Projects are business need driven :

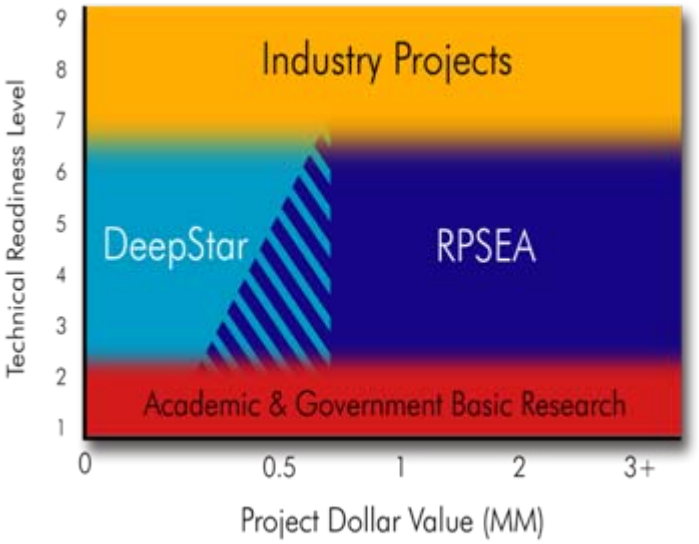
- $100 MM over 20 years. Phase X - 30 projects & $8.6 MM budget

- Typical projects are stage-gated
  - Low TRL (Technology Readiness Level) 1-5 (proof of concept)
  - 12-24 months duration
  - Single prime contractor (some with multiple subs)
  - $250K– $1 MM
- Projects cover subject matter areas of
  - Subsurface (Reservoir & Geosciences)
  - Flow assurance
  - Vessels, Riser and Mooring systems
  - Drilling & Completions
  - Met-ocean
  - Subsea Systems
  - Systems Engineering

Cooperative R&D Organizations

DeepStar collaborates with other R&D organizations to avoid duplication of technology development efforts:

- RPSEA in USA (Public Money) – DeepStar has developed the technology roadmaps and development strategy for this initiative
- DEMO 2000 and PetroMax in Norway – (Public money) This R&D program is now limited
- PRAC is a Newfoundland, Canada R&D program (Public Money) – Focused on Canadian – principally arctic needs
- Procap 3000 is a Petrobras – Brazil based R&D Initiative (Private Money)
- ITF is a UK based JIP facilitator (Private Money)
- DEA (Drilling Engineering Association) is a JIP Facilitator for Private Money
- PRCI (Pipeline Research Council International) is a JIP Facilitator for Private Money



DeepStar Other Involvement

- Stood up RPSEA UDW Program and provided organizational structure, technical review processes and expertise for first four years of operation. SMEs from DeepStar member organizations continue to support active projects

- API Task Force responding to DOI call for comment on OESI

- Engaged with providing support to industry efforts (MWCC, etc.) and feedback to members of OES Advisory Committee and subcommittees

- Members provide technical input to various standards' organizations and technical committees (IADC, API, ISO, etc.) as well as the recently launched API Center for Offshore Safety.

DeepStar Lessons Learned

DeepStar projects are Business case driven:

- Business drivers include integrity management, reliability, efficiency, waste minimization and safety of operation
- Collaborative approach generates better results and helps drive adoption
- Champions & Working committees (In-kind SME input is extremely valuable)
- Roadmaps
  - Goal / endpoint
  - Identify / track existing relevant technologies and capabilities (global), then leverage
  - Gap analysis
- Projects are prioritized and phased (stage gate) with milestones and metrics
  - Scalable solutions that are flexible and adaptable
  - Systems engineering approach
  - Life cycle; IMR (inspection, maintenance and repair), operability & training requirements
  - Prototype, field test, demo and commercialize
- Stakeholder governance with strong & transparent management processes and clearly delineated regarding CoI & IPR policies
  - Strong programmatic approach with portfolio management
  - Relevancy, continuity & sustainability are important success factors (20 years)

DeepStar Lessons Learned

Experience with industry managed versus government managed R&D:

- Industry projects are business case driven and solve real / actual needs

- Government contracting, procurement, and administrative reporting protocols
  - Slow projects down & add time to schedule
  - Increases costs
  - Causes SMEs to lose interest / focus
  - Contribute to scope creep
  - Disconnect R&D results from market
  - Diminishes program relevancy

- Market pull with industry managed projects ensures commercialization
  - Industry consortium members are in the business of manufacturing, marketing, distributing, inspecting, maintaining / repairing
  - Speed to market is improved as operator solution based R&D is more likely to be adopted and deployed
  - R&D done w/o market connectivity can flounder and end up in binders on bookshelves

DeepStar Summary

- Twenty years of successfully identifying and leading deepwater technology development and application
  - $100 MM of projects
  - 325+ technical reports
  - 1000 + Subject Matter Experts
  - 90+ member organizations provide ample opportunities for field test and demo

- Collaborative, bottoms-up process for identifying R&D projects helping ensure R&D is focused on prioritized value-added projects

- Timely and cost effective R&D utilizing best practice processes and procedures
  - Procurement & Contracting
  - Portfolio & Project Management
  - Tech Transfer & Commercialization

- Global collaboration with other organizations to leverage learning's and minimize duplication / overlap

DeepStar: A collaborative R&D model

Questions ?

BOEMRE

Bureau of Ocean Energy Management, Regulation and Enforcement

UNITED STATES DEPARTMENT OF THE INTERIOR

Well Containment Screening Tool

By:
Lance C. Labiche
District Operations Support
Section Chief

Well Containment Screening Tool

- A joint industry task force was established to develop an evaluation tool to demonstrate if a well design and equipment is adequate for Well Containment.
- The WCST analyzes the well's mechanical and geologic integrity to determine which of the 3 following categories the well falls into:
  - Full mechanical and geologic integrity
  - Mechanical or geologic integrity not intact, but consequence of failure is acceptable
  - Wellbore integrity does not exist and well cannot be shut-in without hydrocarbons escaping/broaching to sea

Level 1 Screening Tool

- Level 1 is designed to expedite approval for wells that can be fully shut-in without causing underground flow using very conservative assumptions and simple calculations

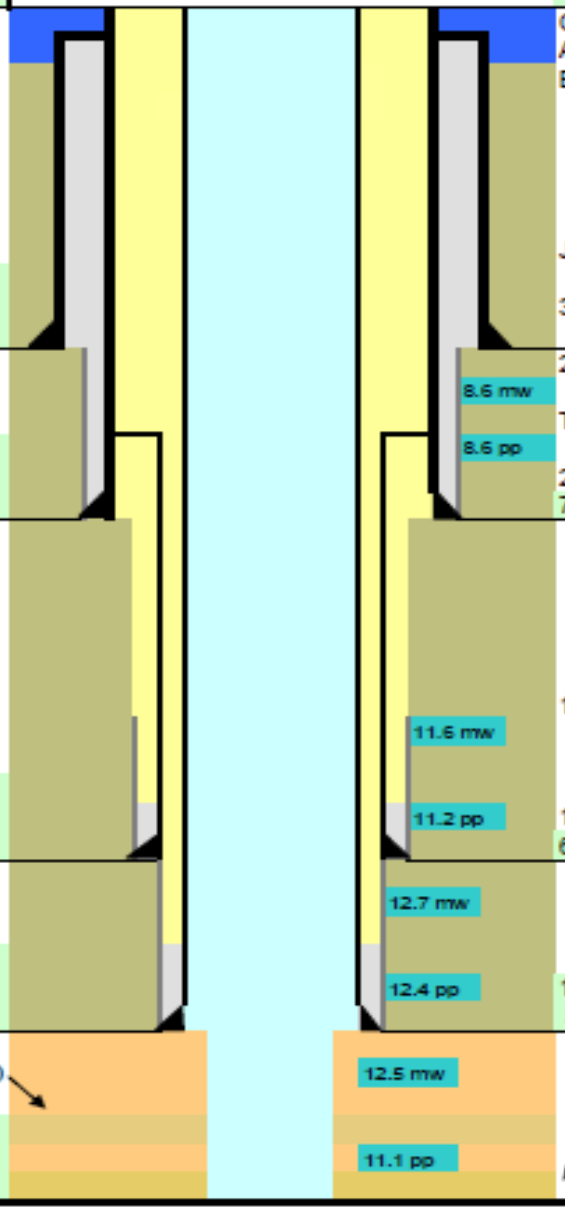
- The WCST analyzes 2 load cases:
  - Collapse during uncontrolled flow to seafloor.
  - Burst after shut-in with a full hydrocarbon gradient.

BOEMRE Well Containment Screening Tool Example Well
Wellbore Schematic

18-3/4" HP housing @ 5167' RKB (12' AML)
36" LP housing @ 5170' RKB (9' AML)
Mudline @ 5179' RKB (est)

RKB: 81'
Water Depth: 5098'

Top	(angle)	Bottom	CASING Burst	Collapse	MUD PP	MW	FG	CEMENT
			Capping Stack Rating = 15,000 psi Annular (below LMRP) = 10,000 psi BOP = 10,000 psi					
5170' TVD 5170' MD	0 degrees	5479' TVD 5479' MD	Jetted 36" 1.50" WT X80 552.69#			Seawater-Gel		Jet
5167' TVD 5167' MD	0 degrees	7880' TVD 7880' MD	26" hole TOL 16" 7338' MD 22" 1.25" WT X80 277.27#			Seawater-Gel 8.6-13 ppg mudline returns		TOC - Mudline 100% excess
			7950 psi	6670 psi	8.6	8.6	12.5	
7338' TVD 7338' MD	0 degrees	14400' TVD 14400' MD	16.5" x 20" hole 16" 0.715" WT HC N-80 118#			Synthetic		TOC - 13417' MD HID - 13909' TVD
			6260 psi	5750 psi	11.2	11.6	13.7	
5170' TVD 5170' MD	0 degrees	17438' TVD 17438' MD	14.25" x 17" hole 13-5/8" 0.625" WT Q125 88.20# cross over at 11500' TVD 13-3/8" 0.514" WT Q125 72.20#			Synthetic		TOC - 16672' MD HID - 17055' TVD
			10030 psi 13-5/8"	4800 psi				
			8410 psi 13-3/8"	2880 psi	12.4	12.7	14.65	
Weak Zone @ 20589' TVD/MD			12.25" hole			Synthetic		
17438' TVD 17438' MD	0 degrees	23790' TVD 23790' MD	Reservoir 1 - 23246' TVD Pore Pressure = 11.1 ppg Flowing = 0.280 psi/ft Static = 0.375 psi/ft		11.1	12.5		



General Well Information

THIS WORKSHEET IS VALID FOR WELLS WITH SUBSEA BOP STACKS ONLY.

1) General Well Information

Well Name:	Appraisal Well #1
Lease/Block:	Block XXX
Water Depth (ft):	6,941
RKB to Mudline Depth (ft):	7,047
Location (lat/long):	XXX Lat, YYY Long
Planned TD (ft):	20,500 ft -MD/TVD
Planned Spud Date:	MM/DD/YYYY

2) Offset Well Information

	Well	Distance/Direction
1)	Exploration Well 1	X.X miles SE
2)	Exploration Well 2	Y.Y miles SE
3)	Exploration Well 3	Z.Z miles SW
4)	Exploration Well 4	A.A miles NE
5)	Exploration Well 5	B.B miles NW
6)	Exploration Well 6	C.C miles NW

Casing Design Information

3) Well Design

Wellhead Description	GE Vetco DMS-700 Fullbore 2; 15,000 psi
Capping Stack Description	1 x NOV Ram Preventer; 15,000 psi

Casing Plan

Size/Weight/Grade/Connection	Top (ft-TVD)	Bottom (ft-TVD)
36", 552#, X56, RL-2HCX	7,047	7,347
22", 224.3#, X80, RL-4S	7,047	9,650
13-5/8", 88.2#, Q125, Hydril 513	7,047	12,700

Productive Formation Information

4) Productive Formation Information

HOLE SECTION: 12-1/4" SHOE DEPTH(FT-TVD): 12,700

Name	Depth (ft-TVD)	Reservoir Fluid	Reservoir Pressure (ppg)	Reservoir Pressure (psi)	Assumed fluid gradient for calc (psi/ft)	Mud Line Shut in Pressure (psi)	Shut in ppg @ shoe	Comments
Reservoir 1	16,210	Gas	9.43	7,949	0.15	6,574	11.24	
Reservoir 2	16,976	Oil	9.44	8,333	0.23	6,050	11.13	
Reservoir 3	18,408	Oil	10.78	10,319	0.23	7,706	13.64	
Reservoir 4				-		-	-	
Reservoir 5				-		-	-	
Reservoir 6				-		-	-	
Reservoir 7				-		-	-	

Level 1 assumptions are as follows:

- Gas fluid gradient = .1 - .15 psi/ft
- Fluid gradient of any mixture of oil, water or gas = .23 psi/ft

Formation Integrity Analysis

5) Formation Integrity Analysis Zone of interest	Depth	Frac gradient at depth (ppg)	Max pressure (ppge)	Is shut-in ppge< FG at depth?	Comments
Deepest exposed shoe	12,700	13.80	13.64	YES	
Other (e.g. base of salt or depleted zone)	15,400	12.80	12.02	YES	

- This section analyzes the deepest exposed shoe as well as any other potential loss zones in open hole to determine if there will be underground flow when the well is shut-in

Level 1 Burst Loads

Level 1 Survival DW Well Loads – Cap and Shut In

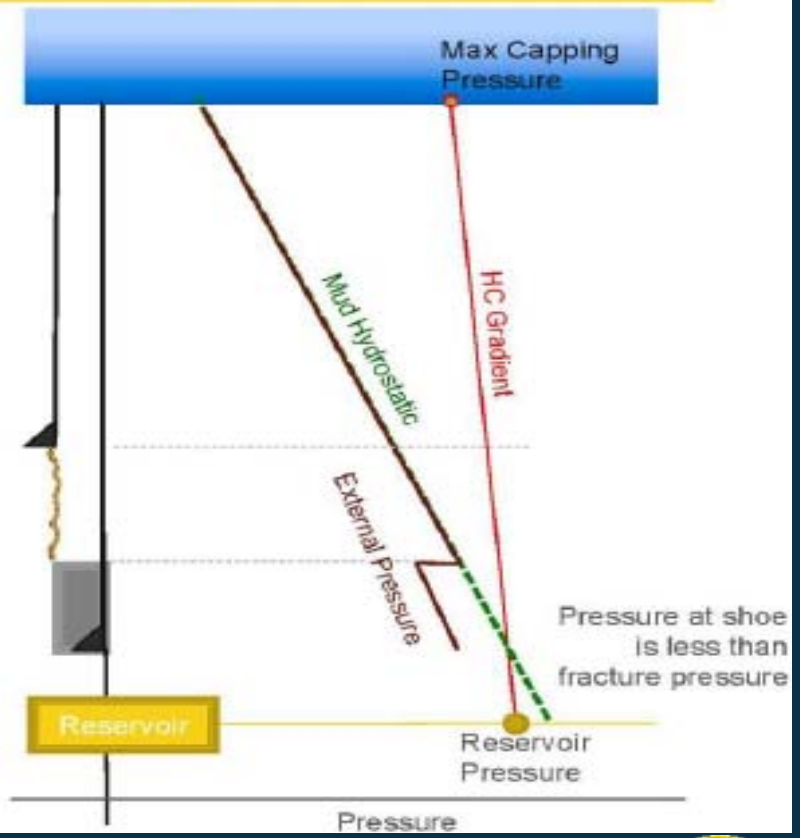
- Burst Case: Cap and Long Term Shut-In (Casing Annulus open to bleed APB to formation)

— Internal Pressure
  - At Reservoir Depth = Reservoir Pressure
  - At ML = Res Pressure – HC Gradient

— External
  - From ML to TOC = Mud Weight Casing was set in
  - In OH below top of cement = Pore Pressure

Assumptions

- Burst Rating in the Level One Screening is the eWell burst rating or the manufacturer rating for other components.
- The pressure calculated at the deepest exposed shoe does not exceed fracture gradient.
- HC gradient for gas <= 9,000', use 0.1 psi/ft. 9,000' to 11,000' linearly increase to 0.15 psi/ft. HC gradient for oil or mixed oil/gas/water use 0.23 psi/ft.
- External pressure assumes trapped pressure resulting from mud column hydrostatic when the seal was set.



Level 1 Burst Analysis

6) MECHANICAL INTEGRITY ANALYSIS

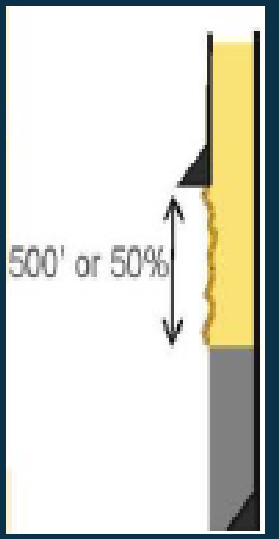
6.1 BURST ANALYSIS

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	Comments
Capping BOP stack	15,000	7047	8.55	Y	7,706	3,086	4,620	3.24	
LMRP connector	15,000	7047	8.55	Y	7,706	3,086	4,620	3.24	
Drilling BOP stack	15,000	7047	8.55	Y	7,706	3,086	4,620	3.24	
Subsea Wellhead	15,000	7047	8.55	Y	7,706	3,086	4,620	3.24	
13-5/8" Casing Hanger/Seal Assembly	15,000	7047	10.10	N	7,706	3,701	4,005	3.74	
13-5/8" Casing	10,030	7047	10.10	N	7,706	3,701	4,005	2.50	
					-	-	-		
					-	-	-		
					-	-	-		
					-	-	-		

Trapped Annulus Screening

6.2 TRAPPED ANNULUS SCREENING Casing / Liner Strings (show all strings exposed to HC flow)	Enter string type	Is string or liner lap fully cemented?	Liner lap <= 500 ft?	Setting Depth (ft-MD)	Setting Depth (ft-TVD)	Planned TOC (ft-MD)	Planned TOC (ft-TVD)	Previous Shoe Depth (ft-MD)	Max Angle above previous shoe	Idle < 1 year?	Hydraulic Isolation Depth		Trapped Annulus?
											ft-MD	ft-TVD	
13-5/8" Casing	Casing	N	N	12,700	12,700	10,700	10,700	9,650	0	Y	11,700	11,700	NO
											-		N/A
											-		N/A
											-		N/A

- The 3 criteria are used to determine if an annulus is trapped
  - Distance between TOC and previous shoe is > 500', or cement column < 50% open hole length in measured depth
  - Hole angle is less than 30 degrees at previous shoe and above
  - Casing has not been idle for more than 1 year



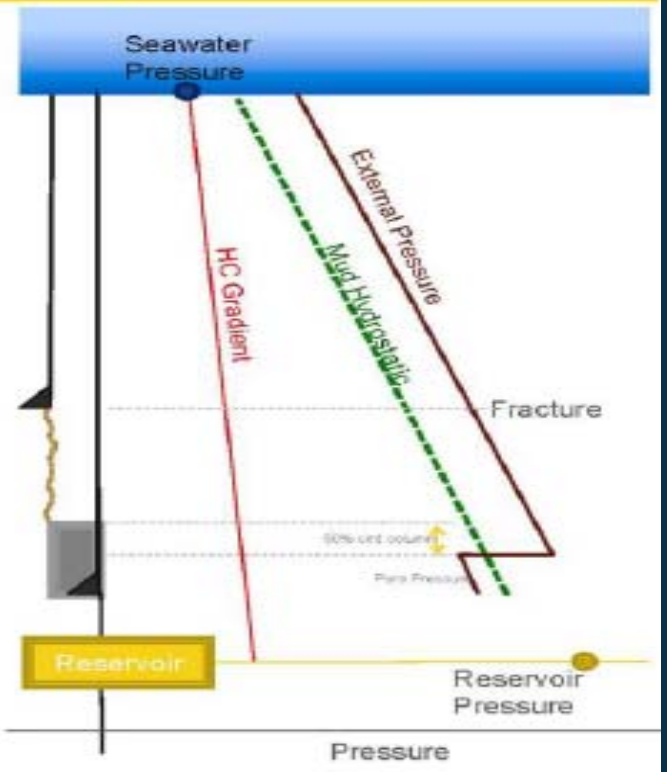
Level 1 Collapse Loads

Level 1 Survival Well Loads – WCD Collapse Loads

- Collapse Case for WCD to Sea Floor (Casing Annulus open to bleed APB to formation)
  - Internal Pressure
    - At Mudline = Seawater Hydrostatic Pressure
    - At Reservoir Depth = extrapolate to the deepest shoe using HC Gradient
  - External Pressure Profile
    - Above HID: Fracture pressure at previous shoe or weak formation in open hole above HID; project to other depths using as mud weight casing was run in.
    - Below HID: Local Pore Pressure

Assumptions:

- Hydraulic Isolation Depth (HID) = Shoe depth minus 50% of planned cement height
- Collapse Rating in the Level One Screening is the eWell collapse rating or the manufacturer rating for other components.
- HC gradient for gas <= 9,000', use 0.1 psi/ft. 9,000' to 11,000' linearly increase to 0.15 psi/ft. HC gradient for oil or mixed oil/gas/water use 0.23 psi/ft.
- Annular Pressure Buildup limited by Fracture Gradient at the previous shoe (unsealed case)
- Fracture gradient (including salt) based on PPFG submitted in APD



Screening based on Design Factor >= 1

Level 1 Collapse Analysis

6C) COLLAPSE ANALYSIS				Below HID	Above Hydr Isolation Depth				Un-trapped Annulus Calcs			
Component	Collapse rating (psi)	Depth of interest (ft TVD)	Hydraulic Isolation Depth (ft-TVD)	Pore Pressure @ Depth (ppg)	Previous Shoe Depth (ft-TVD)	Fracture Gradient @ Previous Shoe (ppg)	Setting Mud Weight (ppg)	Internal Pressure (psi)	External Pressure (psi)	Collapse Load (psi)	Design Factor	Comment
13-5/8" Casing	6370	12474	12,474		10,911.00	15.5	14.3	3,800	9,957	6,156	1.03	
14" Casing	11350	19622	18,675	12.3	10,911	15.5	14.3	5,444	12,550	7,106	1.59	
14" Casing	11350	18675	18,675		10,911	15.5	14.3	5,226	14,568	9,341	1.21	
								-	-	-		
								-	-	-		
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								-	-	-		
								-	-	-		

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

Level 1 Acceptance Criteria

Screening tool results	
5. Shut in Pressure below formation integrity when well shut-in	PASS
6.1 Burst Integrity	PASS
6.2 Trapped annuli check	PASS
6.3 Collapse Integrity	PASS

- If a well does not pass all 4 of the above level 1 criteria than a level 2 is required for that hole interval

Level 2 Screening Tool

Level 2 WCST:

- Uses field/offset data and more advanced calculations to mitigate the probability of the failures identified in level 1.
- If the failure cannot be mitigated/eliminated then a consequence analysis is performed to see if failure is acceptable

Level 2 is based on the Level 1 WCST, with the following modified/additional calculations:

- Annulus pressure buildup for trapped annuli
- Secondary string collapse and burst verification
- Formation strength verification for failed strings

Primary and Secondary Casings

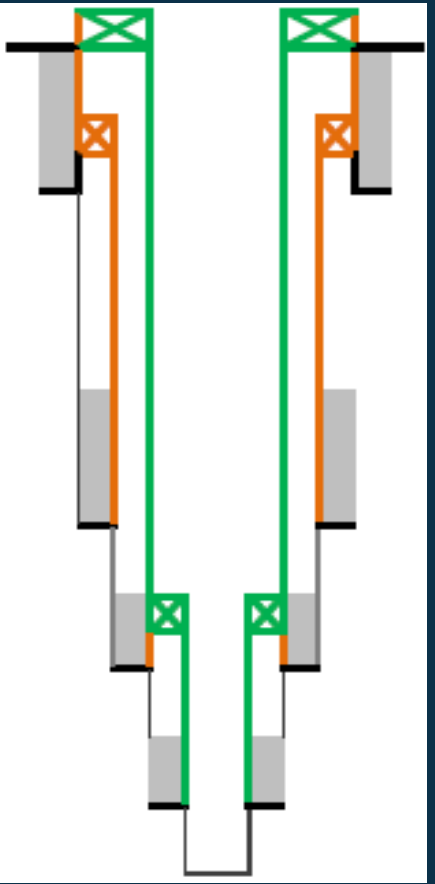
The Level 2 analysis tool and Summary Table use the terms “primary string” and “secondary string”. Refer to the illustration on the right.

Primary strings (green) are strings that are exposed to the flow from the reservoir, assuming no strings have failed.

A secondary string is a string that becomes exposed when a primary string fails. Potential secondary strings are colored orange on the illustration.

The BOEMRE requires an analysis of secondary strings and of the formation that becomes exposed to wellbore pressure when a primary string fails.

In some cases, only a short cemented piece of the previous string becomes exposed. If the lap into the previous string is 500-ft MD long or less, and there is no weak zone within 500-ft MD above the previous shoe (e.g., TOS, faults, or other weaker zones), a secondary string verification is not required.



Level 2 Productive Formations

4) Productive Formation Information

HOLE SECTION: 12 1/4" SHOE DEPTH(FT-TVD): 17,438

Name	Depth (ft-TVD)	Reservoir Fluid	Reservoir Pressure or Bottom hole Flowing Pressure (ppg)	Reservoir Pressure or Bottom hole Flowing Pressure (psi)	Assumed fluid gradient for calc (psi/ft)	Mud Line Shut in Pressure (psi)	Shut in ppg @ shoe	Comments
Reservoir 1 - Shutin condition	23,246	Oil	11.1	13,418	0.375	6,642	12.40	Justification for gradient is provided as attachment.
Reservoir 2 - Shutin condirion				-		-	-	
Reservoir 3 - Shutin condition				-		-	-	
Reservoir 4 - Shutin condition				-		-	-	
Reservoir 5 - Shutin condition				-		-	-	
Reservoir 6 - Shutin condition				-		-	-	
Reservoir 7 - Shutin condition				-		-	-	
Lowest UNRESTRICTED FLOWING gradient (any combination of reservoirs)					0.28			Justifcation for gradient is provided as attachment

- Since the fluid gradients are different for Shut-in and Flowing conditions, separate gradients are entered, for each.

Level 2 Burst Loads

6) MECHANICAL INTEGRITY ANALYSIS
6.1 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	15,000	5,100	8.60	Y	6,613	2,244	4,368	3.43	
LMRP connector	15,000	5,124	8.60	Y	6,622	2,255	4,367	3.43	
Drilling BOP stack	15,000	5,127	8.60	Y	6,623	2,257	4,366	3.43	
Subsea Wellhead	15,000	5,167	8.60	Y	6,638	2,274	4,364	3.43	
13 5/8" hanger & seal assy	15,000	5,170	12.70	N	6,639	3,414	3,225	4.65	
13 5/8" Casing	10,030	5,170	12.70	N	6,639	3,414	3,225	3.11	
13 5/8" Casing (at cross over)	10,030	11,500	12.70	N	9,013	7,595	1,418	7.07	at 13-5/8" x 13-3/8" crossover
13 3/8" Casing (at cross over)	8,410	11,500	12.70	N	9,013	7,595	1,418	5.92	at 13-5/8" x 13-3/8" crossover
13 3/8" Casing Shoe	8,410	17,438	12.70	N	11,240	11,516	(276)	>100	

- The same table and formulas are used as in the Level 1 WCST.
- The operator may chose to use burst ratings that differ from the standard burst values in eWell, e.g., ratings based on triaxial methods.
  - A justification must be provided if burst ratings higher than the standard eWell ratings are used.

Level 2 Collapse

COLLAPSE ANALYSIS Component	Collapse rating (psi)	Depth of interest (ft TVD)	Hydraulic Isolation Depth (ft-TVD)	Annulus Pressure Buildup (psi)	Setting MW, or PP (ppg)	Internal Pressure (psi)	External Pressure (psi)	Collapse Load (psi)	Design Factor	Comments
13 5/8" Casing	4,800	5,170	17,055	749	12.7	2,264	4,163	1,899	2.52	
13 5/8" Casing	4,800	11,500	17,055	749	12.7	4,036	8,344	4,307	1.11	Cossover depth between 13 5/8" and 13 3/8" casing
13 3/8" Casing	2,880	11,500	17,055	749	12.7	4,036	8,344	4,307	0.66	Cossover depth between 13 5/8" and 13 3/8" casing
13 3/8" Casing	2,880	17,055	17,055	749	12.7	5,592	12,012	6,420	0.44	HID at 17055' is most likely depth of collapse

- Level 2 collapse table has a separate column for APB. If an annulus is trapped then an APB model must be run and the results entered into APB column. If an annulus is untrapped then use the level 2 APB calculator for untrapped annulus.

APB Calculator for Untrapped Annulus

6.3 COLLAPSE ANALYSIS

APB calculator for Untrapped Annulus String	OH Weak pt (ft TVD)	Setting MW (ppg)	FG at weak pt (ppg)	Calculated APB (psi)	Level 2 Alternative APB (psi)	Comments / justification of alternative APB used
13-5/8" x 13-3/8"	14,400	12.7	13.7	749		APB limited by sand formation FG @ 16" Shoe
16"	7,880	11.6	12.5	369		APB limited by sand formation FG @ 22" Shoe

$$APB = (FG_{shoe} - MW) \times TVD_{shoe} \times 0.052$$

- This simple model assumes that APB is limited to the FG at the previous shoe, at which point any additional APB generated would just bleed off to the formation.
- APB = (FGshoe – MW) x TVDshoe x 0.052

Secondary String Collapse

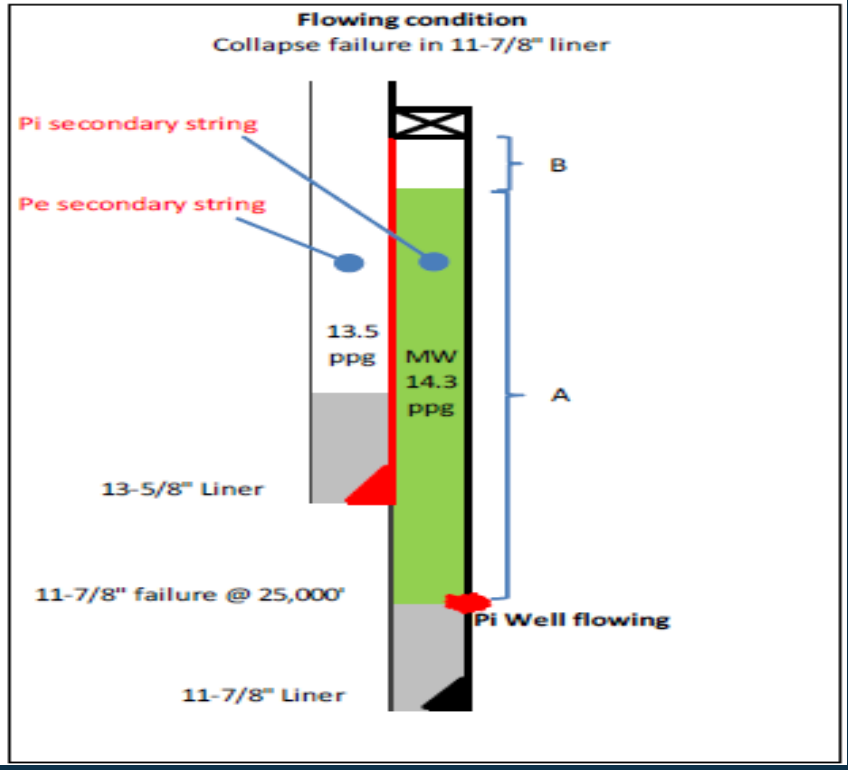
Internal pressure for the secondary string at a depth of interest (TVD) is calculated as follows:

$$P_{i\ Secondary\ String} = P_{i\ Well\ flowing} - (TVD_{\ Failure\ point} - TVD_{\ Depth\ of\ Interest}) \times MW_{annulus} \times 0.052$$

When a string fails and the annulus behind the string is exposed to internal well flowing pressure, the hydrostatic pressure of the annulus mud column at the failure point may exceed the internal well flowing pressure. The assumption is that the mud level in the annulus will fall (U-tube effect) until the hydrostatic of the remaining mud column equals the internal well flowing pressure.

If the mud level in the annulus drops, the above equation will give a negative result above the level the fluid column will drop to. When the formula turns negative, then Pi Secondary String = 0 (zero) will be used.

The external pressure is determined in a similar way as for the collapse calculations in the table in Section 6.3. For collapse, Annulus Pressure Buildup needs to be added if the Depth of Interest is above the Hydraulic Isolation Depth.

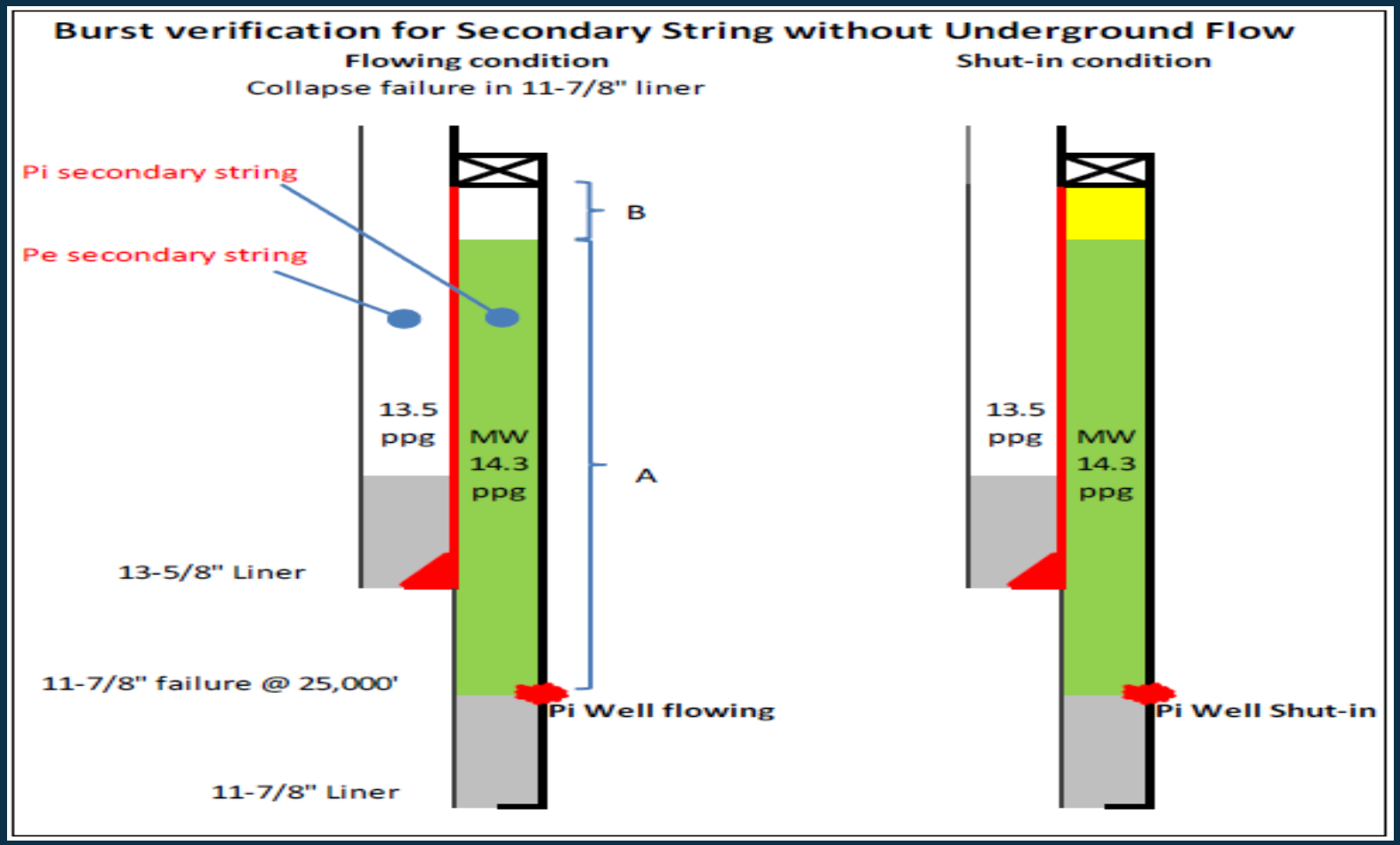


Secondary String Collapse

7) SECONDARY STRING VERIFICATION ======> Check box if no secondary strings exposed: ☐											
7.1 COLLAPSE VERIFICATION Secondary String	Collapse rating Secondary String (psi)	Depth of interest (ft TVD)	Primary string failure depth (ft TVD)	Internal Flowing Pressure at failure pt (psi)	MW failed string was set in (ppge)	Secondary string Internal pressure (psi)	Secondary string APB buildup (psi)	Secondary string setting MW, or PP (ppg)	Secondary string External pressure (psi)	Collapse load (psi)	Collapse DF
22" Casing	6,870	7,338	17,055	5,592	12.7	-	0	8.6	3,282	3,282	2.09
16" Liner	5,750	13,909	17,055	5,592	12.7	3,514	369	11.6	8,759	5,245	1.09
				-		-			-	-	

- All secondary strings that are exposed to collapse forces have to be analyzed in this table

Secondary String Burst



Secondary String Burst

Fluid drop Secondary String (to be verified)	Failed string(s)	Primary string failure depth (ft TVD)	Hanger depth of failed string(ft TVD)	MW failed string was set in (ppge)	Internal Flowing Pressure at failure pt (psi)	Fluid drop (ft TVD)	Hydrocarbon gradient (psi/ft)	Average fluid density in annulus (ppg)	Comments
22" Casing	13-5/8" x 13-3/8"	17,055	5,170	12.7	5,592	3,418	0.375	11.1	
16" Liner	13-5/8" x 13-3/8"	17,055	5,170	12.7	5,592	3,418	0.375	11.1	

- The fluid drop table is used to calculate the average fluid density in the secondary annulus so the secondary string can be analyzed appropriately for burst

7.2 BURST VERIFICATION WITHOUT UNDERGROUND FLOW Secondary String	Burst rating (psi)	Depth of interest (ft TVD)	Primary string failure depth (ft TVD)	Average fluid density in annulus (ppge)	Internal Shut-In Pressure at Primary string failure pt (psi)	Secondary String Internal pressure (psi)	Exposed to SW? (above top hanger)	MW / PP (ppg)	Secondary string External pressure (psi)	Burst load (psi)	Burst DF
22" Casing	7,950	5,167	17,055	11.1	11,096	4,234	Y	8.57	2,267	1,968	4.04
16" Liner	6,260	7,338	17,055	11.1	11,096	5,487	N	11.6	4,426	1,061	5.89
					-	-			-	-	

Level 2 Formation Integrity Analysis

8) LEVEL 2 FORMATION INTEGRITY ANALYSIS	Check box if no formation exposed behind failed strings: ☐							
Description of depth where formation checked & Strings that failed	Primary string Failure depth (ft TVD)	Depth of Previous shoe or weak point (ft TVD)	FG at previous shoe or weak point (ppg)	Average fluid density in annulus (ppge)	Internal Shut-in Pressure at Primary string failure pt (psi)	Annulus pressure at previous shoe or weak pt (psi)	Frac margin (psi)	Comments
16" Shoe	17,055	14,400	13.7	11.1	11,096	9,564	688	16" shoe survives shut in after 13 3/8" x 13 5/8" casing
					-	-		
					-	-		
					-	-		

- This section must be completed if a primary string fails and there is formation exposed behind the primary string.

Broaching Analysis

- A broaching analysis is performed if an underground flow occurs as a result of a weak formation fracturing when a well is shut-in
  - All faults are identified in area for potential conduit for hydrocarbons to broach to sea floor
  - Salt canopy will help prevent underground flow from broaching
  - All sands mapped in field that could act as a tank
  - Known seafloor anomalies are mapped identifying ongoing venting
- A determination is then made on the probability of broaching

Level 2 Results

Level 2 results	
5. Formation strength verification below deepest shoe	PASS
6.1 Burst Integrity - Primary strings	PASS
6.3 Collapse Integrity - Primary strings	L2 FORMATION INTEGRITY AND/OR SECONDARY STRING VERIFICATION REQUIRED
7. Secondary string verification	PASS
8. Formation strength verification for failed strings	PASS

Thank you

Spill Prevention Subcommittee

Presentation to the Ocean Energy Safety Advisory Committee

July 14 2011

Spill Prevention Subcommittee Introduction

- The Ocean Energy Safety Advisory Committee (OESAC) chartered on February 8, 2011, to advise the Secretary of the Interior, through the Director of the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), on a variety of issues related to offshore energy safety, has two primary functions:

- The OESAC Subcommittee on Spill Prevention intends to review risks of offshore oil and natural gas exploration and development (E&P) activities, and to demonstrate how those risks may be mitigated through development of effective technology and regulatory policy.

Subcommittee Scope

Current Spill Prevention Subcommittee Membership

- Chris Smith - DOE
- Richard Sears – MIT
- Don Jacobsen – Noble Corp.
- Paul Siegele - Chevron
- Mathy Stanislaus – EPA
- Lois Epstein -The Wilderness Society
- Steve Hickman – USGS
- Nancy Leveson, MIT

Subcommittee Goals

1. *What is the state of existing operations and technology?*
2. *What is the state of the current R&D undertaken by government, industry and academia?*
3. *What needs to be done or should be done to advance this topic area?*
4. *What work products can the Safety Committee reasonably produce by the end of CY 2011 in the area of spill prevention?*
5. Make recommendations on future research and oversight

Activities to date - Evaluated framing questions

The Spill Prevention Subcommittee

The Chairman of the Ocean Energy Advisory Safety Committee has charged the Subcommittee on Spill Prevention with investigating a range of issues pertaining to spill prevention in offshore oil and gas development, as follows:

- Identifying technologies to prevent blowouts and spills
- Identifying spill prevention R&D being conducted by the government
- Identifying spill prevention R&D being conducted by the industry
- Summarize regulations and other oversight governing spill prevention activities

Today, I will report to the Committee on information the Subcommittee has compiled and where we go from here.

Identifying Technologies to Prevent Blowout and Spills

The use of cutting-edge technologies is essential to all aspects of the process of drilling, well completion, and production. All of these technologies can contribute to the goal of preventing spills.

- Technologies are used to understand and control the high-pressure, high-temperature reservoir conditions in which wells are drilled.

- Technologies are used throughout the well design

- Once well construction begins, many operational technologies are used to reduce the likelihood of a spill and maintain well integrity

Spill Prevention R&D - Government

- The federal government has R&D capabilities relevant to spill prevention.
- **BOEMRE** program includes design and reliability of new production systems, pipeline integrity, and new mooring systems.

  Key initiatives include: Reliability of BOP Systems, Deepwater pipeline maintenance and repair, End-of-life removal of large platforms and equipment

  http://www.boemre.gov/tarprojectcategories/deepwate.htm
- The **Department of Energy** manages an oil and natural gas R&D program with many applications to spill prevention in deepwater.

  DOE's network of national laboratories and public-private partnerships support efforts.

  Key initiatives include: well integrity, ultra-deepwater imaging, hydrate plug characterization, extreme HPHT measurement and diagnostics, mechanical/structural stress analyses, integrated ultra-deepwater systems, and risk assessment through modeling and simulation.

  http://www.fossil.energy.gov/programs/oilgas/advisorycommittees/UltraDeepwater.html
- Other Federal agencies, including the **US Geologic Survey** , **NOAA**, and **EPA** have R&D in the following areas:

  ●Geological framework and reservoir characterization.

  ●Factors controlling the distribution and stability of gas hydrates and submarine landslides.

Spill Prevention R&D – Industry

- A canvas on industry R&D efforts is underway.
  - The American Petroleum Institute, International Association of Drilling Contractors, Association of Drilling Engineers and other global organizations are currently being engaged to provide this feedback.

- Some important findings so far include:
  - Most industry R&D progress in spill prevention has been derived from improvements by manufacturers to their existing products, or through meeting specific operator needs.
  - Some integrity management and general R&D work continues and is associated with managing pressures and well bore strengthening , etc.
  - Historically, drilling and completion organizations have not fully leveraged collaborative R&D opportunities.
  - Anti-trust and proprietary concerns formation of an industry center for safety R&D

Next Steps:

- Collaborative efforts between government , academia, and industry
- More data and information needs to be compiled

Regulations and Other Oversight

- The Department of the Interior regulates all aspects of the offshore oil and gas industry on the Federal Outer Continental Shelf, including spill prevention.

- BOEMRE issues/enforces regulations under 30 Code of Federal Regulations part 250:
  - Governs oil, gas, and sulphur exploration, development, and production operations on the OCS

- New regulations and Notices to Lessees after Deepwater Horizon
  - On October 14, 2010, BOEMRE published an interim final rule implementing certain safety measures recommended in the report entitled, *Increased Safety Measures for Energy Development on the Outer Continental Shelf* (Safety Measures Report, May 27, 2010)
  - Identifies specific measures designed to ensure reliability of blowout preventers (BOPs), to promote well integrity, to enhance well control, and to facilitate a culture of safety through operational and personnel management.

Spill Prevention Regulations

- New regulations and Notices to Lessees after Deepwater Horizon:
  - BOEMRE NTL 2010-N06 on Worst Case Discharge Planning & NTL 2010-N10 on regulatory compliance and containment
  - BOEMRE anticipates adding more oversight and regulations in the future.
  - No new Federal Legislation has passed

- In addition to BOEMRE requirements many American Petroleum Institute (API) recommended practices and standards for exploration and production are incorporated into regulations.
  - RP 65 – Cementing and Barriers
  - RP 53 - BOPs

Conclusions

- The long history of Federal regulations governing spill prevention, as well as new efforts to clarify, and strengthen these standards, will aid industry as E&P continues into deeper and more challenging environments.
- The Federal Government continues R&D programs in spill prevention technologies and operating practices.
- The industry also has considerable R&D underway on spill prevention.
  - Some of this is done case-by-case and remains proprietary
- Room for increased collaborative efforts and information sharing among industry, academia and government.
- Spill prevention in the Arctic presents human factor, weather & other challenges.
- Spill prevention - work in progress.

Ocean Energy Safety Advisory Committee
July 13-14th, 2011
New Orleans

Containment Subcommittee Presentation

Table of Contents

Subcommittee Scope

The Subcommittee addresses opportunities and gaps in technology, operating practices, and standards related to containing a well after a blowout has occurred.

Current Subcommittee Members

- Chris Smith
- Stephen Hickman
- Walter Cruickshank
- Patrick Little
- Rich Sears
- Charlie Williams

Subcommittee Work

For each agreed topic area/question:

- Determine the state of existing operations & technology area
- Determine the state of the current R&D undertaken by government, industry & academia
- Determine & prioritize gaps based on the above
- Scope & recommend projects & to close the gaps
- Recommend parties/methods to execute the work

Subcommittee Areas of Work

Questions the Subcom intends to address:

1. **What are various scenarios that could lead to loss of well control?**
2. **What evidence and diagnostics are currently in place to indicate and quantify data *after loss of well control*?**
3. **What safety technology is in place to protect workers?**
4. **What technology is in place to clear debris or bring the well to a controllable state?**
5. **How can the *secondary functioning* of critical safety components be assured?**
6. **How will well integrity throughout the well depth be assessed and assured?**
7. **What equipment needs to be maintained in readiness?**
8. **What is status of current effort to provide containment response?**
9. **What technology is being developed for containment response?**
10. **What technology should be developed for containment response?**
11. **What criteria or goals should be in place for containment response?**
12. **What personnel and organizational readiness systems should be in place?**
13. **How can or should technology development be accomplished?**

1. What are various scenarios that could lead to loss of well control?

- **(Note: Circumstances, events, and conditions that could lead to loss of well control should be addressed in the prevention sub-comm)**

Scenarios MODU

- **Emergency Disconnect Sequence successful, LMRP disconnects and rig drifts off location with riser hanging**
- **Rig sinks with displacement**
- **Rig sinks on top of well**

Scenarios Spar/TLP

- **Spar sinks with displacement**
- **Spar remains on location for significant amount of time (1 week or greater)**

Gap

- **Explore scenarios where existing/planned equipment may not be effective in order to identify gaps in containment planning and should assess current methods and identify gaps in ascertaining geologic well integrity.**
- **Scenarios for underground blowouts**
  - **Formation capacity**
  - **Underground flow**
  - **Other**

2. What evidence and diagnostics are currently in place to indicate and quantify data *after loss of well control*?

- Extent of damage to the well
- Flow quantification from the well
- Status of critical well equipment and components
- (Note: Indications and data monitoring to sense well inflow events and critical well conditions that could lead to loss of well control should be addressed by the prevention sub-comm)
- GAPS
  - Enhanced flow characterization
    - Onboard BOP
    - Apply lessons learned from Macondo flow rate technical team
  - BOP status indicators
    - Rams open/closed?
  - Additional pressure information at subsea hardware
  - Improved geophysical imaging and reservoir modeling to diagnose loss of fluids into formation

4. What technology is in place to clear debris or bring the well to a controllable state?

- Debris removal in DW must be done by ROV systems.
- ROV's use shear, saw, and water jet devices to cut up debris, all of which currently exist
- Operating multiple ROV's in close proximity is difficult and they can be damaged by collision.
- Use of multiple large ROV's in DW requires considerable power. In these cases the power should be made available via "ocean bottom power units".

Gap - Determine if a sufficient total capacity of debris removal equipment and power units available in the industry to address a large debris field. Determine if there is any technical need to increase the size and capability of the ROV's and/or the power units.

6. How will well integrity throughout the well depth be assessed and assured?

- Knowledge of well integrity is key to designing an effective containment strategy. Well integrity is combination of factors:
  1 - Well tubulars (steel pipe) which is usually the casing and liners in a drilling mode
  2 - Threaded connections on the tubulars (steel pipe)
  3 - External and internal cement that is installed
  4 - Mechanical sealing devices inside and outside the well tubulars
  5 - A shut-in device at the sea floor
  6 – Integrity of wellhead foundation.
- Well integrity is ensured by:
  A - the proper design and qualification testing and quality assurance of the individual components of the system.
  B- the proper installation and testing/evaluation of the individual components.
  C- the proper operation of the components over the life of the well
  D- the proper system design for the components to work together

Gap – Determine if any part of the integrity system needs to be improved based on risk assessment, industry performance, and look-back analysis of past events. Determine if current well design criteria optimally reduces risk. Assure that cement evaluation and testing tools are applied optimally and delivering the desired results.

6. How will well integrity throughout the well depth be assessed and assured? The formation

- If the well is flowing subsurface into other subsurface formations and intervals, how can fracturing, fracture growth rate, and fracture dimensions be predicted and determined. Can current technology and techniques adequately predict fracture growth to allow assurance of no subsea venting well emergency situations?
- How can mudline break-out be monitored?

- This process can occur through upward hydraulic fracture propagation, fault reactivation and/or soft sediment erosion
- Risk evaluation requires analysis of 3D seismic surveys, geophysical well logs, in-situ stress (e.g., leak-off) tests, drilling records, reservoir tests, and engineering data on wellbore completion
- Once a loss of well control has occurred, then wellbore integrity below the mud line can be assessed and continuously monitored using a variety of geophysical, wellhead pressure, and oceanographic monitoring and analysis techniques.

OUTSTANDING RESEARCH QUESTIONS

- Improve methods for monitoring oil/gas leakage and upward migration in marine sediments:
- Better understand processes by which fluid flow pathways to the sea floor are generated and maintained during an underground blowout:
- Develop better models for hydrologic, poroelastic and geomechanical reservoir response during blowouts, to guide deep-water hazard assessments in addition to hydrocarbon containment, well kill and cementing operations

9. What technology is being developed for containment response?

MWCC plans an appropriate R&D / technology development plan but this is still under development.

Current known projects:

1- Lighter/smaller capping stacks for more rapid deployment and ease of handling

2- Flow systems with more capacity, more ease of deployment, wider operational envelope, and faster deployment

3- Methods to connect containment flow systems to the well

4- OGP is running a JIP to determine the optimum solution considering risk, well, geologic, and operational circumstances and situations. The solutions range from rapid deployment capping stacks only to containment and flow systems.

Gap – A risk/condition based study similar to OGP should be done to determine the optimum way forward that yields the performance desired. Future development should be guided by a thoughtful analysis of what type of system is best for the circumstance and best addresses the risks. In all cases speed of deployment and low operational complexity should be the focus of future systems.

11. What criteria or goals should be in place for containment response?

- Subcommittee members identified 2 levels of goals for containment response: (1) general goals about what containment capabilities should be; (2) intermediate goals of how to get to the desired level of containment capabilities.

- Individual members to consider #1
  - further develop at next subcom meeting

- #2 Deferred for later subcom mtgs

12. What personnel and organizational readiness systems should be in place?

Question considered after subcomm face-to-face

12 A. What personnel and organizational readiness systems should be in place?

12 B. a. What is the appropriate and necessary "proof of readiness" and practice drills that Should done? Recommendations of what is appropriate and necessary should be developed with consideration given to full scale exercises, partial deployment exercises, component demonstrations, and individual component qualification testing?

b. What is the involvement/role of the government with industry in these exercises?

c. Who has authority to require such exercises/tests?

d. What are the criteria for success? What are the technical standards that should be applied?

e. How will this cost intensive work be funded and what are the risk/liability considerations?

12 C. - How should capability and capacity for containment be split between the Government and Industry? Both equipment and staff capability should be considered.

12 D. – How can the Industry and Government establish and maintain both the capability and process for an optimally effective technical advisory team. This team would be a resource to both the industry and government during any well blowout incident?

12 E. – Although authority and responsibility is well established in "incident command" that is responding to a environmental and surface clean-up event – this might not be an optimum structure for making decisions related to wells, well equipment, and well intervention related to controlling a blowout. The decision making structure and responsibilities need to be reviewed and recommendations made to optimize effectiveness and timely results.

13. How can or should technology development be accomplished?

Question addressed to be considered at subcom face-to-face

- In what priority order should they be addressed?
- How can or should these be addressed and by whom?

14. (New Item) – Applies to Full Committee: Technical Standards and Recommended Practices

Technical Standards and Recommended Practices have been an important part of regulations and the regulatory process.

The forum, process, and mechanism for creating future standards should be reviewed.

If the review indicates enhancement opportunities - an optimum method for allowing participation in this process by all key stakeholders – including the Government – should be recommended.

The potential for enhancements to existing forums for developing standards should be fully considered before new organizations are recommended.

Deliverables & Timeline

- Timeframe is end of CY 2011
- Milestones to be determined

Ocean Energy Safety Advisory Committee
July 13-14, 2011
New Orleans

Response Subcommittee Presentation

Scope

- Look for gaps & inadequacies in BOEMRE's offshore response construct, especially with respect to planning, preparedness, cleanup effectiveness, and coordination with other agencies.
- Avoid duplication of other work or constructs
- Gaps and inadequacies may inform other efforts

Members

- Walter Cruickshank, Government
- Lois Epstein, Non Government Organization
- Stephen Hickman, Government
- Patrick Little, Government
- Mathy Stanislaus, Government
- David Westerholm, Government
- Charlie Williams, Industry

Activities to Date

- June 7: kick off discussions via teleconference
- June 29: meeting with briefs from BOEMRE & ICCOPR
- July 13: Presentation preparation & scope refinement

Planned Action Items

- Gain understanding of BOEMRE activities and processes wrt E&P plans, exercise preparedness and R&D
- Gain understanding of response activities among different agencies
- Assess how BOEMRE is incorporating work from other agencies into their requirements (i.e. EPA Sub J, monitoring)
- Identify gaps & seams in BOEMRE response construct

Planned Action Items Cont'd

- Gain understanding of industry activities wrt response planning, capacity and implementation
- Identify unique issues with Arctic and other frontier areas
- Identify gaps & seams between gov't plans and industry actions
- Identify and catalog long term science &/or ecosystem issues
- Conduct stakeholder outreach to vet issues identified during process
- Draft report

Ocean Energy Safety Advisory Committee
July 13 and 14, 2011
New Orleans

Safety Management Systems
Subcommittee Presentation

Table of Contents

Current Subcommittee Members

- **Lois N. Epstein, Non-Government**
- **Joe Gebara, Industry**
- **Nancy Leveson, Academia**
- **Patrick Little, Government**
- **Tad Patzek, Academia**
- **Charlie Williams, Industry, Lead**
- **Walter Cruickshank, Government**

Subcommittee Scope

The Scope of Subcommittee can be summarized as review and recommendation of Enhancements to Safety Management Systems, Industry Practices and Associated Government and non-Governmental entities Roles and Responsibilities.

Subcommittee Scope

Elements of the Subcommittee Scope can be summarized as follows:

I. Evaluate and Recommend Enhancements in Safety Management

II. Provide Input to SEMS management program elements

1. Information Management
2. Risk Management Analysis
3. Management of Change
4. Operating Procedures
5. Safe work practices
6. Training and Workforce Development
7. Assurance of quality and mechanical integrity of critical equipment
8. Pre-startup review
9. Emergency response and control
10. Investigation of incidents
11. Audit of safety and environmental management program elements

I. EVALUATE AND RECOMMEND ENHANCEMENTS IN SAFETY MANAGEMENT

I. Evaluate and Recommend Enhancements in Safety Management

- **Subcommittee will evaluate the framework of safety management, organizational structure and safety culture.**
  - **Importance of implementing process safety (Safety of processes)**
  - **Importance of recognizing the human factor element of safety**
  - **Addressing Leadership, Accountability and Communication**
  - **Addressing continual improvement and best practices**
- **Subcommittee members discussed the importance of creating mechanisms to incentivize information sharing that can enhance safety and operational effectiveness without fear of increased liabilities.**
- **Subcommittee members also discussed the importance of having a strong and common safety standard that is used in the operation of facilities.**
- **Subcommittee members will address enforcement, transparency and performance measurement.**
- **Contractor Safety Systems vs. Oil Company Safety Systems**

II. PROVIDE INPUT TO SEMS MANAGEMENT PROGRAM ELEMENTS

2. Information Management

- **Subcommittee agreed to review the following elements of the Information Management System**
  - **What events need to be reported, how to report, what is relevant.**
  - **Focus on process safety, as compared to occupational safety**
  - **Need to consider Information Sharing**
    - **Within Companies (operators, Contractors, etc.)**
    - **Between Companies**
    - **Between Companies and Government**
  - **Need to Encourage Sharing of Lessons Learned and Pre-Cursor events**
    - **Leading Indicators**
    - **Near-misses**
    - **Safety / Environmental / Quality Observations**
- **Subcommittee members agreed to review how other countries automate their information management systems.**

3. Risk Management and Analysis

- **Agreed that risk should be identified at System level and not only at subcomponent or component level utilizing risk recognized management tools such as HAZIDs, HAZOPs, FMECAs, etc.**
- **Need to ensure we address:**
  - **Management of High Consequence / Low probability risks**
  - **Methodology for Cumulative risks**
- **Agreed that current systems for quantifying risks need further development and should preferably be based on objective risk assessment that can be measured or tested.**
  - **When is Quantitative risk assessment really required.**

4. Management of Change

- **Subcommittee members agreed that tools and processes need to be identified and guidelines for the implementation of such tools and processes should be prepared.**
- **Subcommittee members also discussed how Authority Matrices need to be utilized to ensure change is approved at the right management level.**
  - **Better understanding at all levels of what constitutes a change**
- **The tools and processes should address risk associated cumulative change effect**

5. Operating Procedures

- **Subcommittee members agreed to focus on:**
  - **Key decision points and decision makers as well as how knowledge should be shared as the decision-making process is transferring hands;**
    - **Decisions are made throughout an organization starting with the drilling rig superintendant.**
  - **Need for instrumentation to provide better feedback to operators and regulators to increase the quality of the checks and balances.**

6. Safe Work Practices

- **Key here is auditing the application of safe work practices, See Element 12**

7. Training and Workforce Development

- **Members agreed that workforce development needs to address training and follow-up on training.**
  - **Training is necessary by not sufficient for having competent workforce**
- **Subcommittee will evaluate Solutions for Human Systems such as looking at what Certifications and qualifications currently exist, and what should be required for industry and government to properly apply SEMS. The recommendations from this work will include:**
  - **Identifying critical jobs and their competency requirements**
  - **Identifying the minimum required training and experience for critical jobs**
  - **Identifying key triggers that would require change in training requirements, or job requirements. Such as new technology.**

8. Assurance of Quality and Mechanical Integrity of Critical Equipment

- **Items under this subject that the subcommittee plan on discussing are:**
  - **Need for assessing integrity on a real time basis**
  - **Need for setting new or updating existing quality and mechanical integrity acceptance criteria**

9. Pre-Startup Review

- **Items under this subject that the subcommittee plan on discussing are:**
  - **Required documentation to assure successful execution**
    - **Check lists**
    - **Approval processes**

10. Emergency Response and Control

- **In case of incident the subcommittee will review what command and control is or should be in place, and how they would be deployed.**
  - **Majors as well as independent operators will be considered**
- **The subcommittee will also discuss planning for disaster response.**

11. Investigation of Incidents

- **Items under this subject that the subcommittee plan on discussing are:**
  - **The need and advantages for an Offshore Operations Safety Investigation Board with knowledge of the industry practices, and processes**

12. Audit of Safety and Environmental Management Program Elements

- **The subcommittee plans on addressing and providing recommendations on the**
  - **Role and Level of Government Oversight and Regulation**
    - **Best Place for government oversight and regulation**
    - **What should regulation focus on**
    - **Strengths and weaknesses of current regulation**
  - **Role of Center for Offshore Safety**

Overview – COS (Center for Offshore Safety)

- For the industry by the industry new organization focused entirely on Safety and SEMS
- API Executive Committee & Board Approval March 2011
- Membership open to all companies (operators & contractors) that work in deepwater (1000 ft or more) (RP75 auditing applicable to full GOM)
- Organized in association with API to leverage resources & capabilities of API Certification, Auditing, & Standards
- Features aligned with recommendations of Presidential Commission
- Located in Houston, Texas included Exec Director and full-time staff
- Start-up 3rd quarter 2011 with first Board Mtg Aug 2011 (Diverse board with API/non-API, operators, contractors, service companies, drilling contractors, manufacturers, all size operators, and industry organizations (IADC))
- Work of COS:
  - Stakeholder Engagement – Govt, Academia, and Communities including Advisory Comm to the COS Board
  - Independent Auditing & Certification (to RP 75 via certified 3rd party auditors. Full set of auditing tools reviewed with BOEMRE)
  - Information Sharing (Best practices regarding safety & SEMS plus incident reviews & safety statistics)
  - Continuous Improvement in Safety Mgt (including industry workshops, forums & conferences)

Goals/Projected Deliverables

- **Timeframe is end of CY 2011**
- **List of goals/deliverables**
  - **Have a scope of work document prepared to address each of the elements (I and II) discussed above.**

Activities to Date

- **Meetings**
  - **Phone conference – May 23, 2011**
  - **July 13th – New Orleans**
- **Outreach**
  - **Reached out to BOEMRE to request information on their activities related to SEMS**
  - **Input from the Center of Offshore Safety on their activities**
  - **Reviewing process by which we can reach out to industry through Committee Industry Representatives for continuous feedback**
- **Refining Subcommittee Scope**

Activities to date

- **Data Gathering – Action Plan**
  - **Review BOEMRE activities related to safety management**
  - **Review industry activities related to safety management, including how industry is implementing SEMS, through discussions with operators and contractors**
  - **Review how other countries are using information systems to share lessons learned, near misses and Quality Health Safety and Environment (QHSE) observation**
  - **Review BOEMRE and industry's workforce development, qualification and competency plans**

Next Steps

- **Finalize recommendations per element (I and II).**
- **Assign responsibility of the different elements to subcommittee members to prepare recommended scope of work document.**
- **Identify consultants, institutes, academia and/or other entities to perform the required work for each element (I and II).**
- **Manage the work and ensure consistency in the final recommendations.**

NOAA and Spill Response

Dave Westerholm

Director, Office of Response and Restoration

National Oceanic and Atmospheric Administration | NOAA

July 14, 2011

NOAA "Spill Response" Focus Areas

Providing **science support** to decision makers

Keeping **seafood** safe

Protecting **wildlife** & **habitats**

Assessing natural resource **damage**

Restoring the natural resources that were injured

OESAC Topic Areas: NOAA's Role

Prevention
- Science Support for decision makers during drills and exercises
- Research to address critical gaps
- Development of innovative tools to enhance spill preparedness

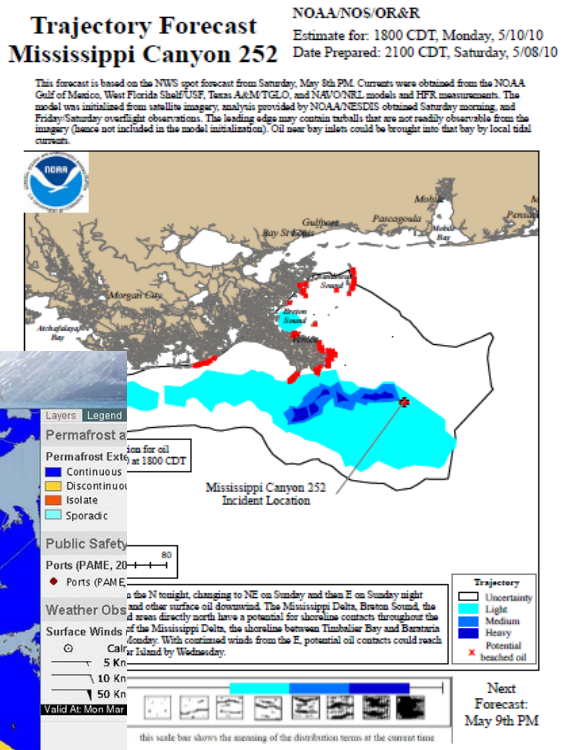
Spill Response
- Spill trajectory and weather forecasts;
- Ocean and atmospheric observation
- Science informed decision making

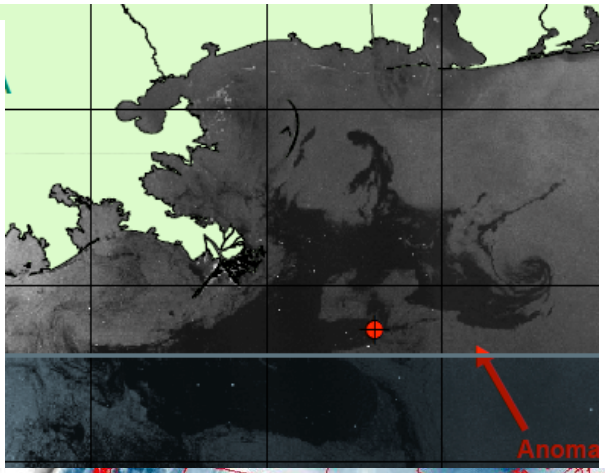
Containment
- Oil Flow Rate – how much is leaking
- Oil Budget – fate of released oil
- Underwater countermeasures

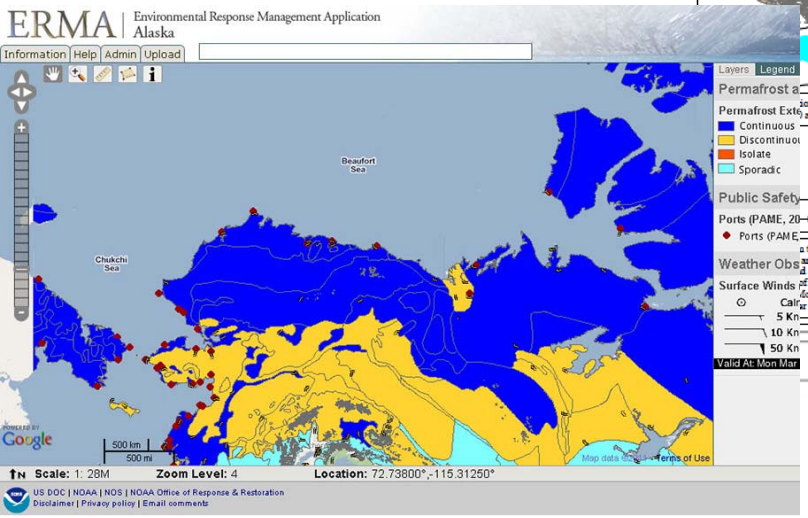
Safety
- Review oil spill contingency plans
- Satellite data to assist in SAR
- Incident specific weather and oceanographic information

Science Support

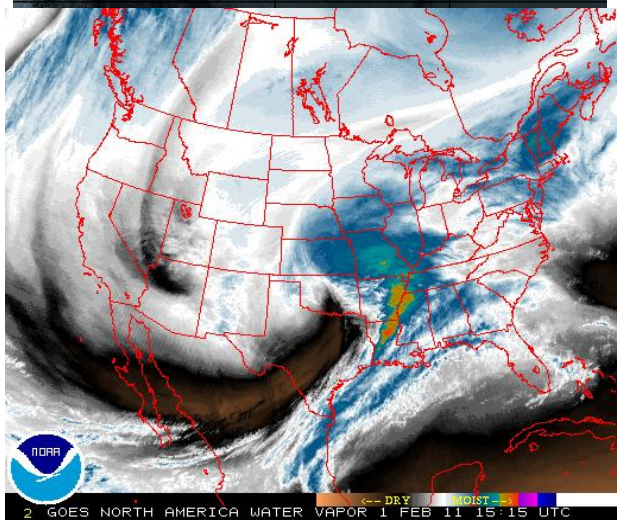
Trajectory Forecasts







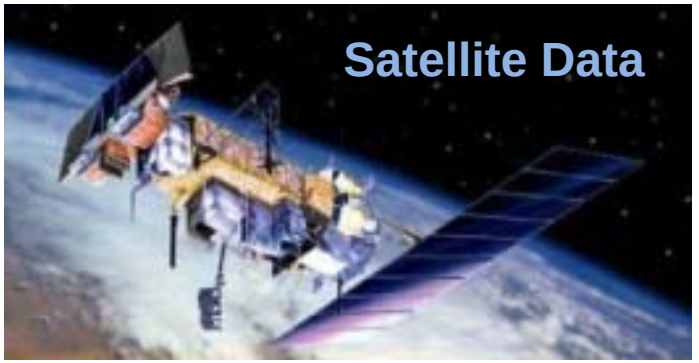
Environmental Response Management Application (ERMA)

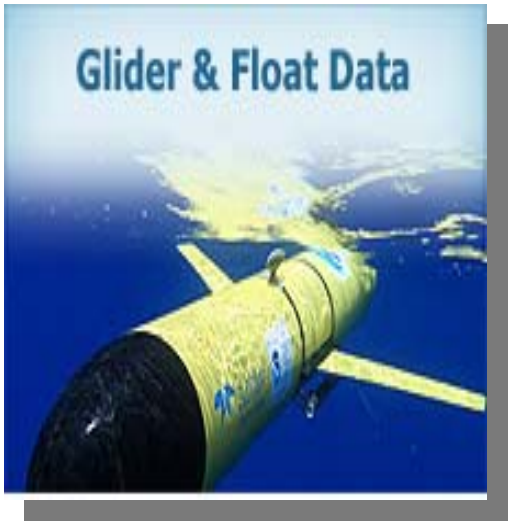


Weather Forecasts

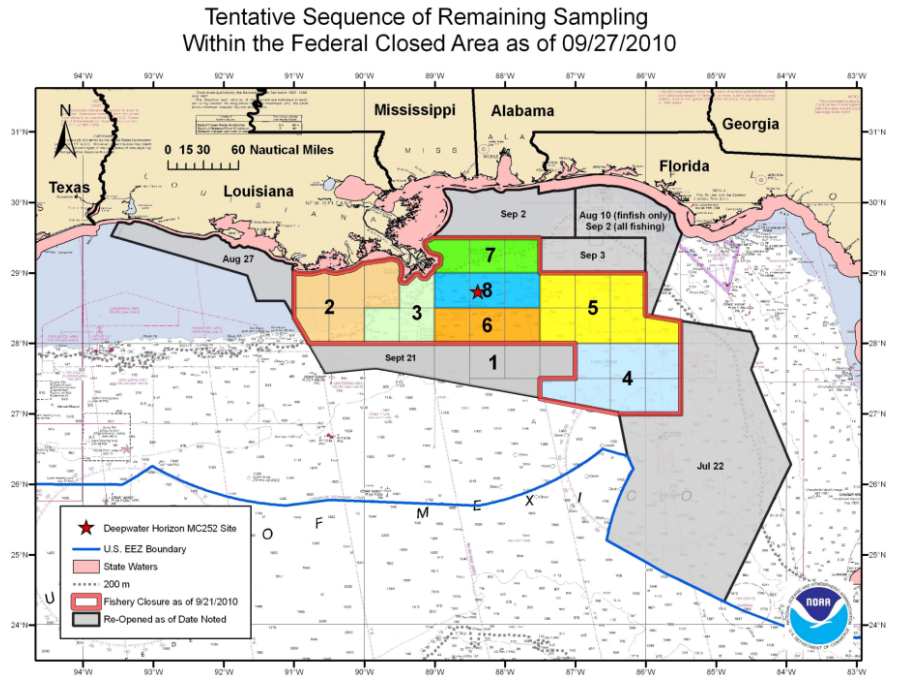
Science Support

Analysis of Earth & Oceanographic Data

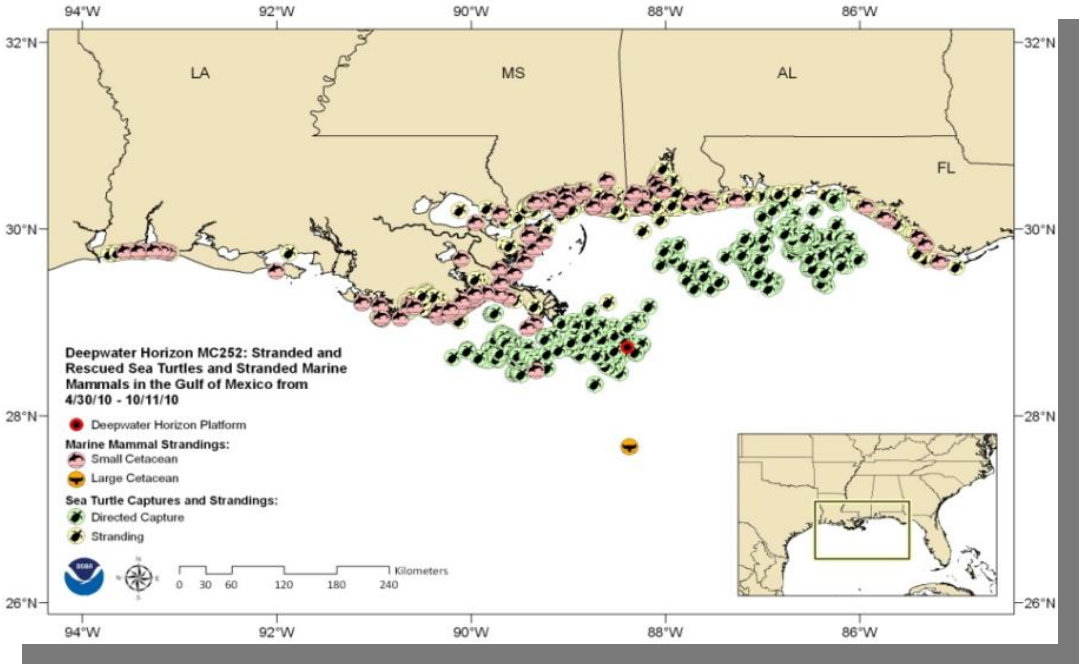




Sampling and Monitoring to Keep Seafood Safe



Protecting Wildlife and Habitat



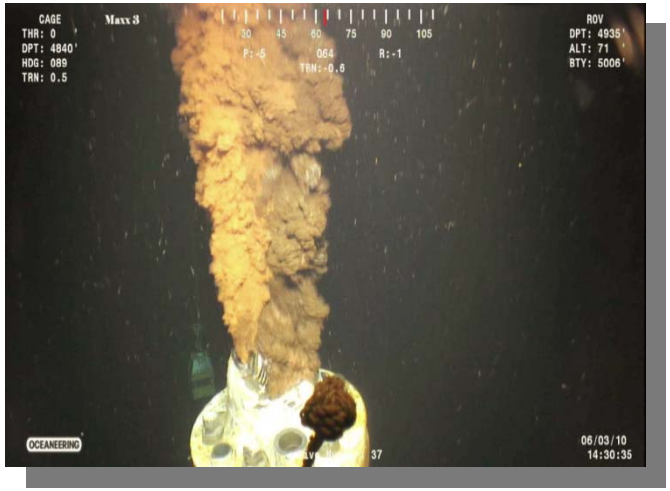
Assessing natural resource damage

Determining the ecosystem impact of oil

Restoring the natural resources that were damaged

DWH Challenges and Public Concerns Subsurface

- Flow Rate
- Use Subsurface dispersants
- Fate and Effect of oil rising up from the bottom
- Potential biological impacts of subsurface oil



DWH Challenges and Public Concerns Surface

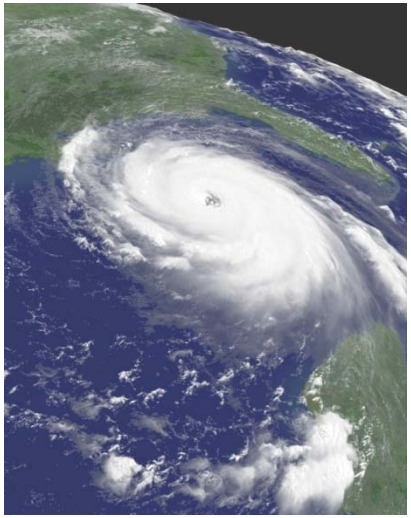
Movement of oil by wind and current

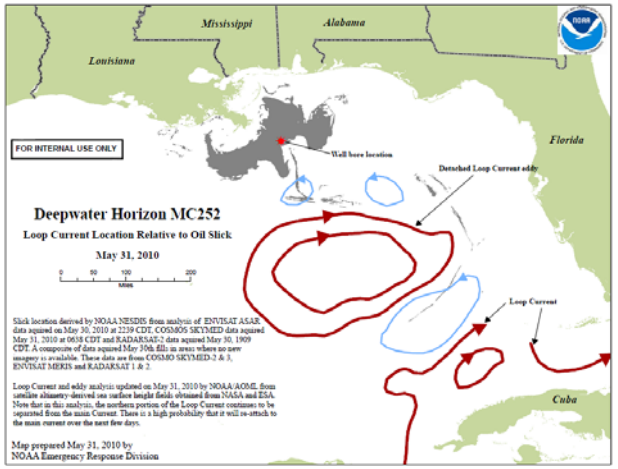
LOOP Current

Hurricanes

Response methods

- Mechanical
- In Situ burns
- Surface Dispersants





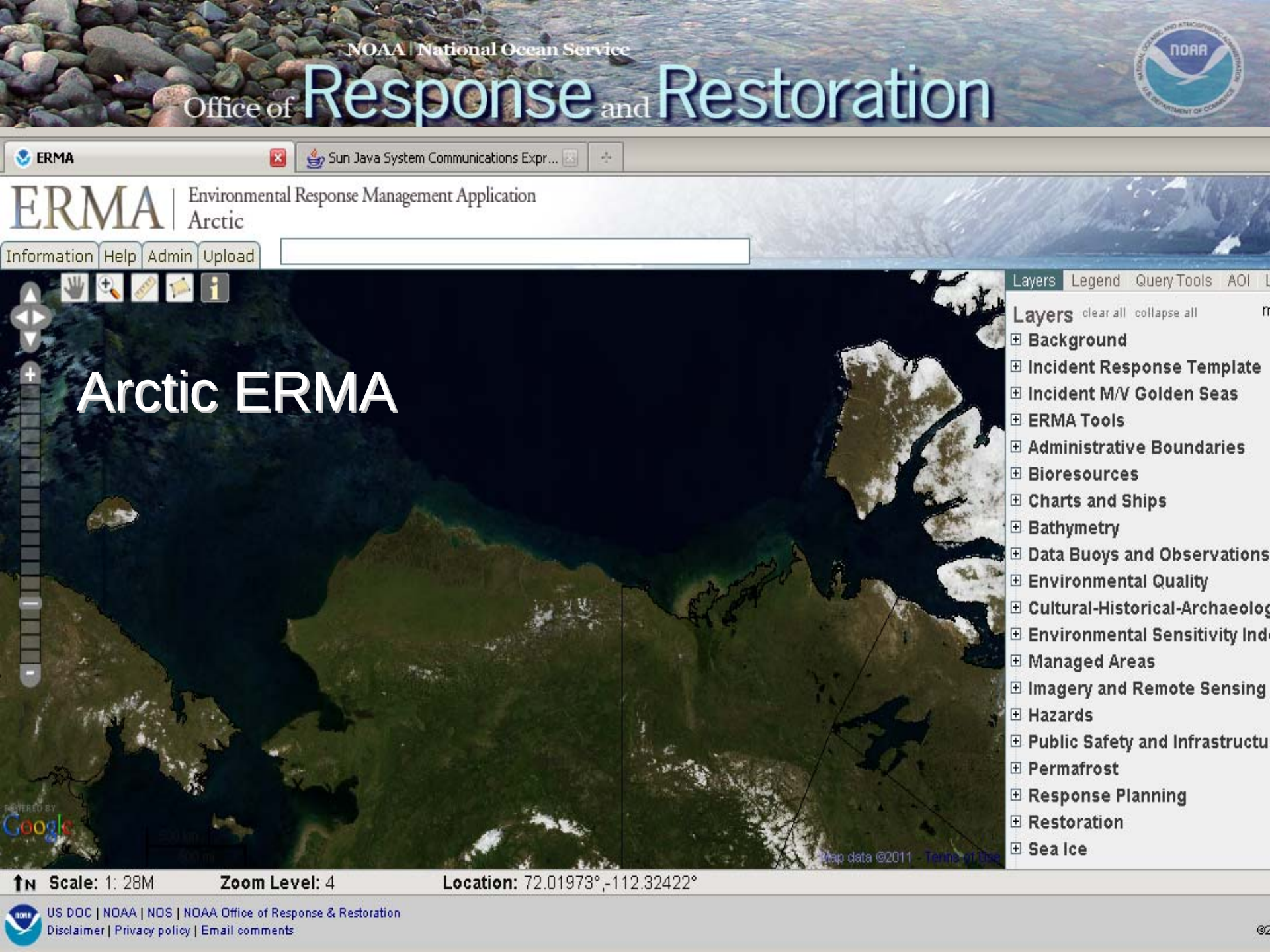
DWH Challenges and Public Concerns
Shoreline

Protection strategies

Different types of
Shoreline Clean Up

Looking Ahead

1. Seafood Safety/Fisheries Closures
2. Partnerships and Joint Studies
    a. BOEMRE MOU
    b. Agencies, Academia and NGO's
3. Preserving and Managing Data
4. Dedicated R&D funding
    a. 3-D Oil Transport
    b. Response Countermeasures
5. Communications
    a. Common Operating Picture
    b. Social Media


NOAA | National Ocean Service
Office of Response and Restoration
ERMA
Sun Java System Communications Expr...
ERMA | Environmental Response Management Application
Arctic
Information
Help
Admin
Upload
Arctic ERMA
Layers
Legend
Query Tools
AOI
Layers clear all collapse all
Background
Incident Response Template
Incident M/V Golden Seas
ERMA Tools
Administrative Boundaries
Bioresources
Charts and Ships
Bathymetry
Data Buoys and Observations
Environmental Quality
Cultural-Historical-Archaeolog
Environmental Sensitivity Ind
Managed Areas
Imagery and Remote Sensing
Hazards
Public Safety and Infrastructu
Permafrost
Response Planning
Restoration
Sea Ice
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Scale: 1: 28M
Zoom Level: 4
Location: 72.01973°,-112.32422°
US DOC | NOAA | NOS | NOAA Office of Response & Restoration
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Questions?

U.S. DEPARTMENT OF ENERGY

Oil and Natural Gas

Department of Energy Offshore Research and Development

Presentation to Ocean Energy Safety Advisory Committee

Christopher Smith
Deputy Assistant Secretary
Office of Oil and Natural Gas

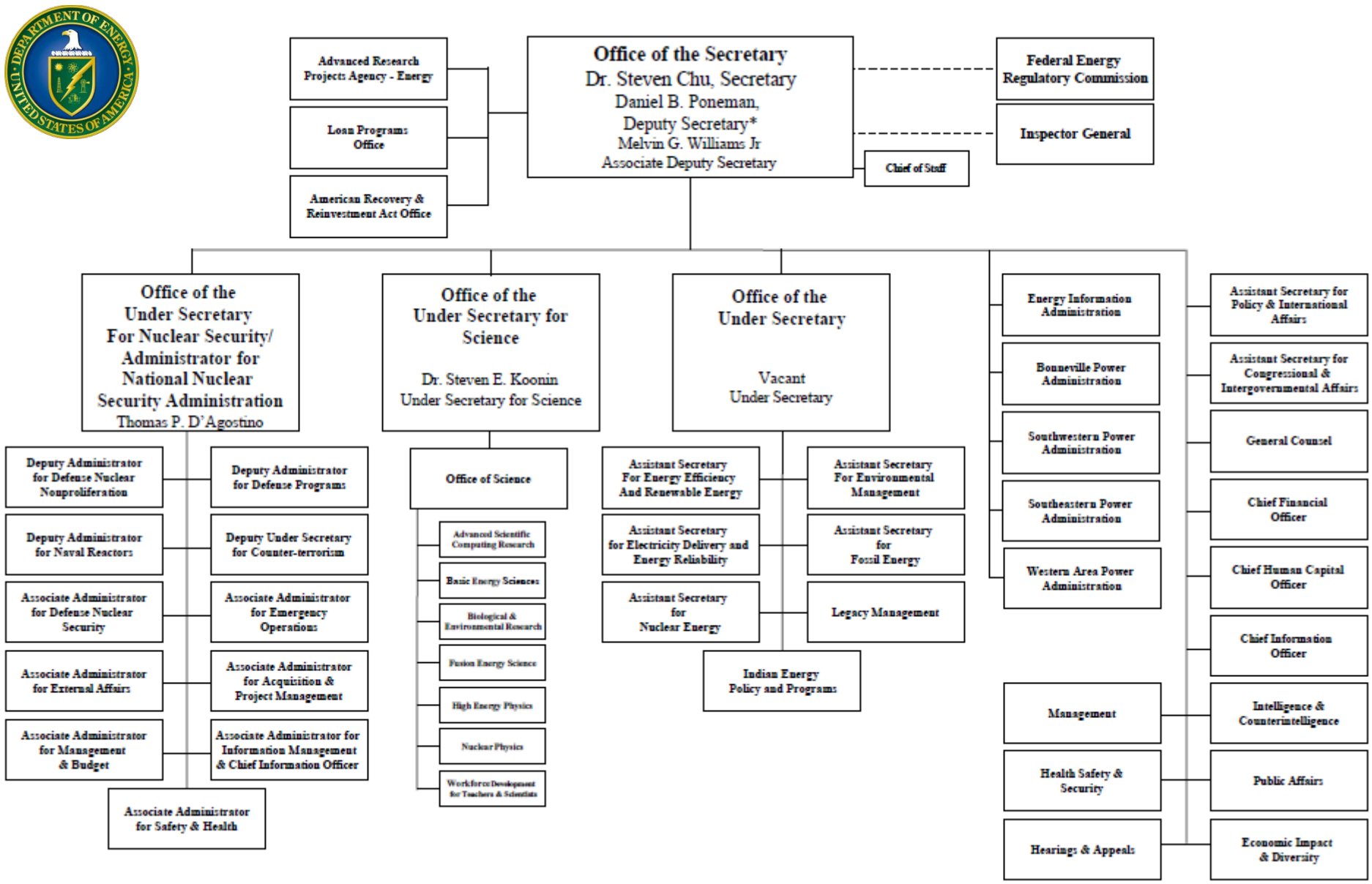
July 14 2011

Discussion Topics

- Oil and natural gas and the American economy
- Challenges
- Department of Energy Research Program
- The road ahead

United States Department of Energy

Oil and Natural Gas



Oil and Natural Gas in America's Energy Future

Oil and Natural Gas

I continue to believe that domestic oil production is an important part of our overall strategy for energy security, but I've always said it must be done responsibly for the safety of our workers and our environment

PRESIDENT OBAMA, APRIL 30, 2010

We've got, I think, broad agreement that we've got terrific natural gas resources in this country. Are we doing everything we can to develop those?"

PRESIDENT OBAMA, November 3, 2010

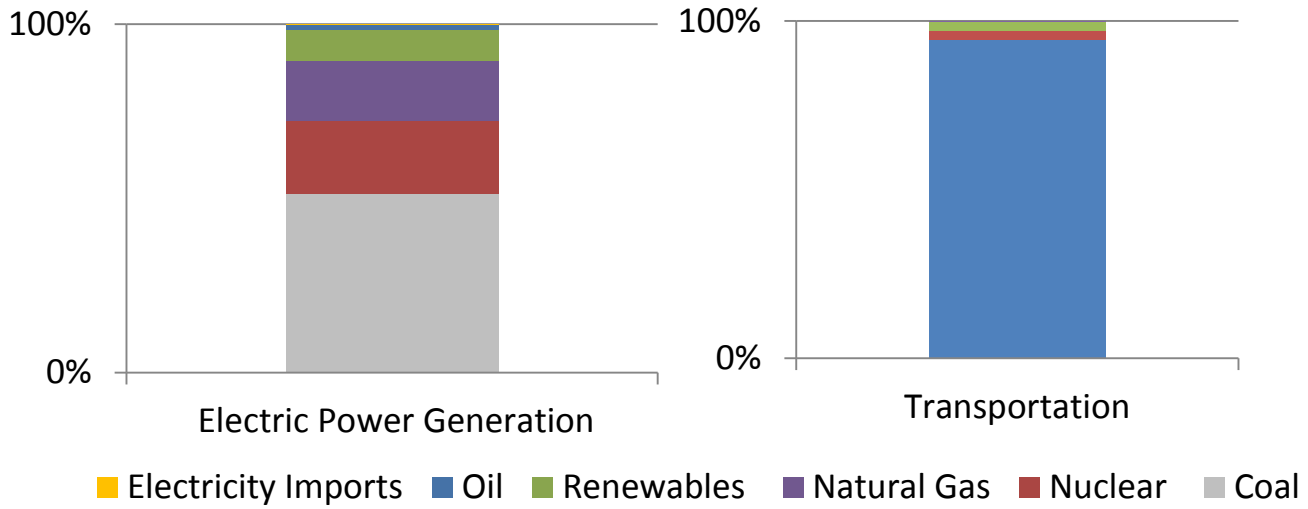
When I was elected to this office, America imported 11 million barrels of oil a day. By a little more than a decade from now, we will have cut that by one-third. That is something that we can achieve.

PRESIDENT OBAMA, March 30, 2011

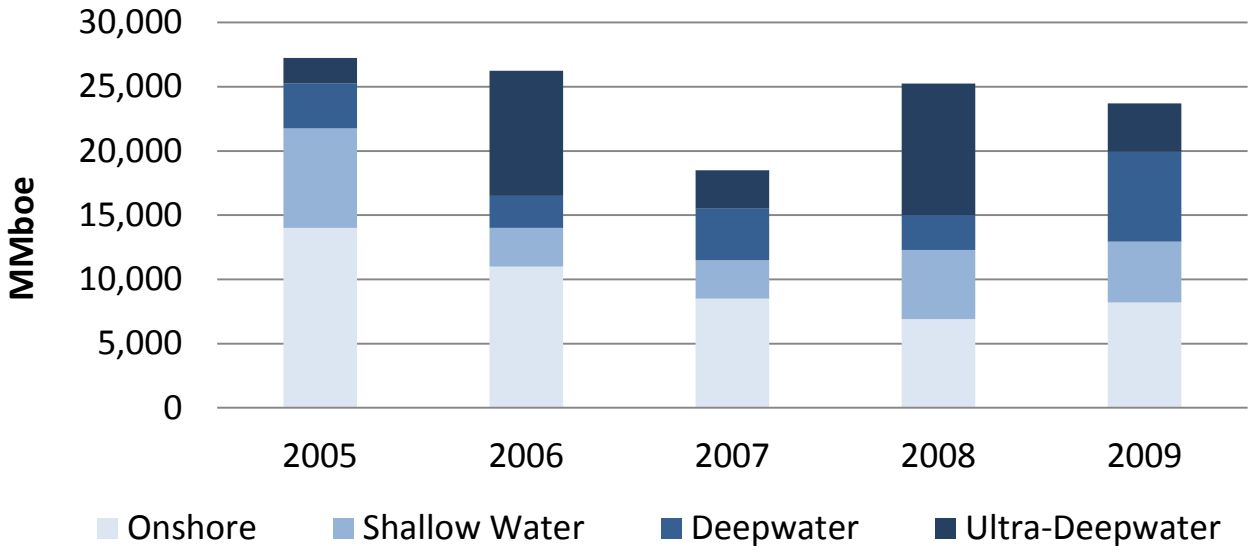
Image from the Oil Spill Commission's Report to the President
Benjamin Lowy/VII Network/Associated Press

Our Economy Relies on Fossil Fuel

Oil dominates the transportation sector. Natural gas is an increasing important part of electric power generation.

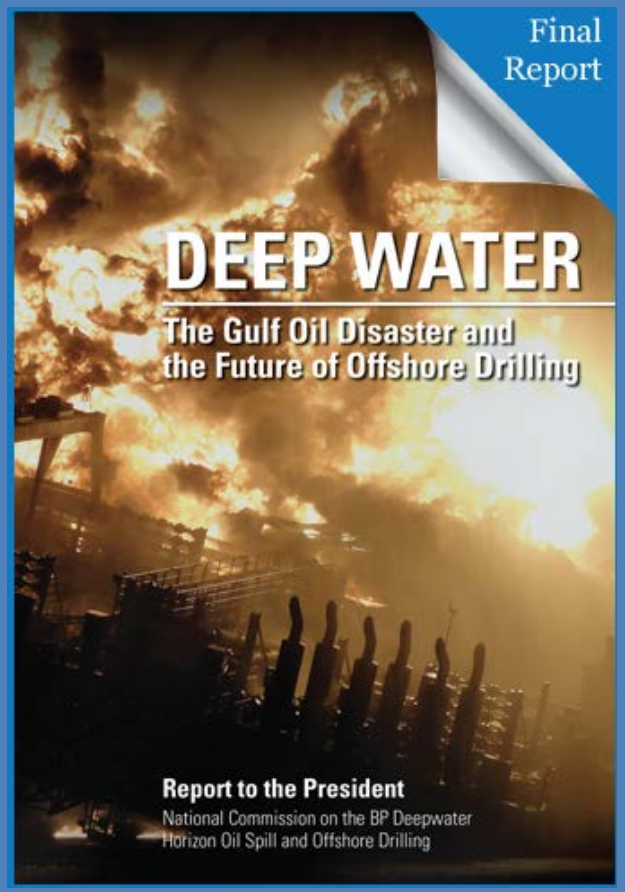


Increasingly, domestic reserves are being replaced by finds in the deep- and ultra-deep waters



Source: EIA, Annual Energy Outlook, 2010

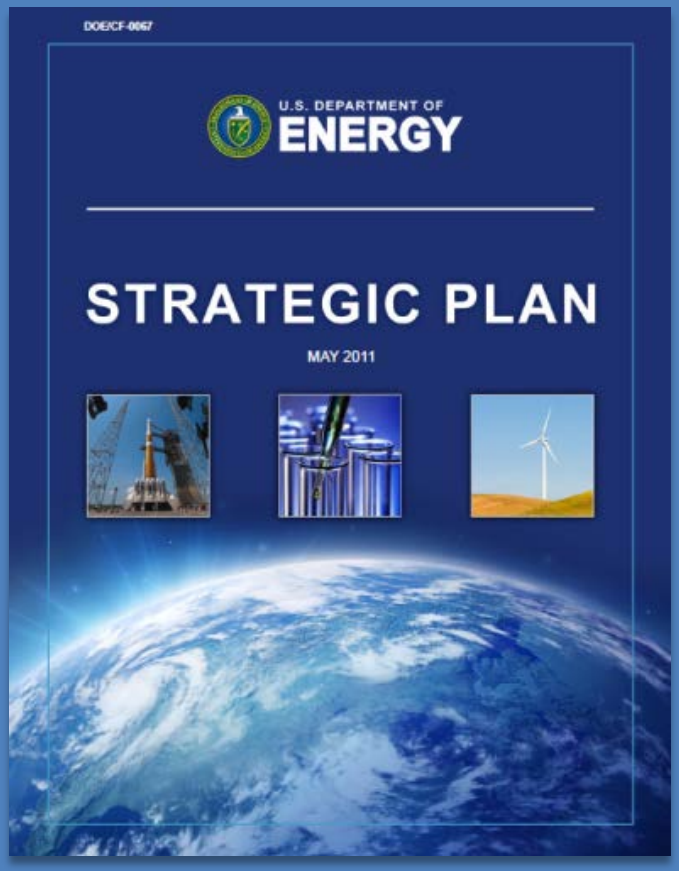
Oil Spill Commission Recommendations



The Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Program, an existing research and development program created by statute and managed by the Secretary of Energy, should be refocused toward mitigating the risks of offshore operations

National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, January 2011

Department of Energy Strategic Plan



As the nation transitions to the clean energy economy of the future, we must also ensure that we effectively mitigate the risks of our current energy portfolio.

The oil and gas industry will continue to meet our economy's immediate needs by pushing into increasingly difficult frontiers, including deepwater operations offshore and unconventional gas onshore.

The Department will ensure that the federal government's understanding of the risks associated with these operations keeps pace. This will be accomplished through scientific assessment of the risks, potential impacts, and adequacy of current response and mitigation technologies.

DEPARTMENT OF ENERGY STRATEGIC PLAN, MAY 2011

DOE resources, experience and capabilities

Capabilities

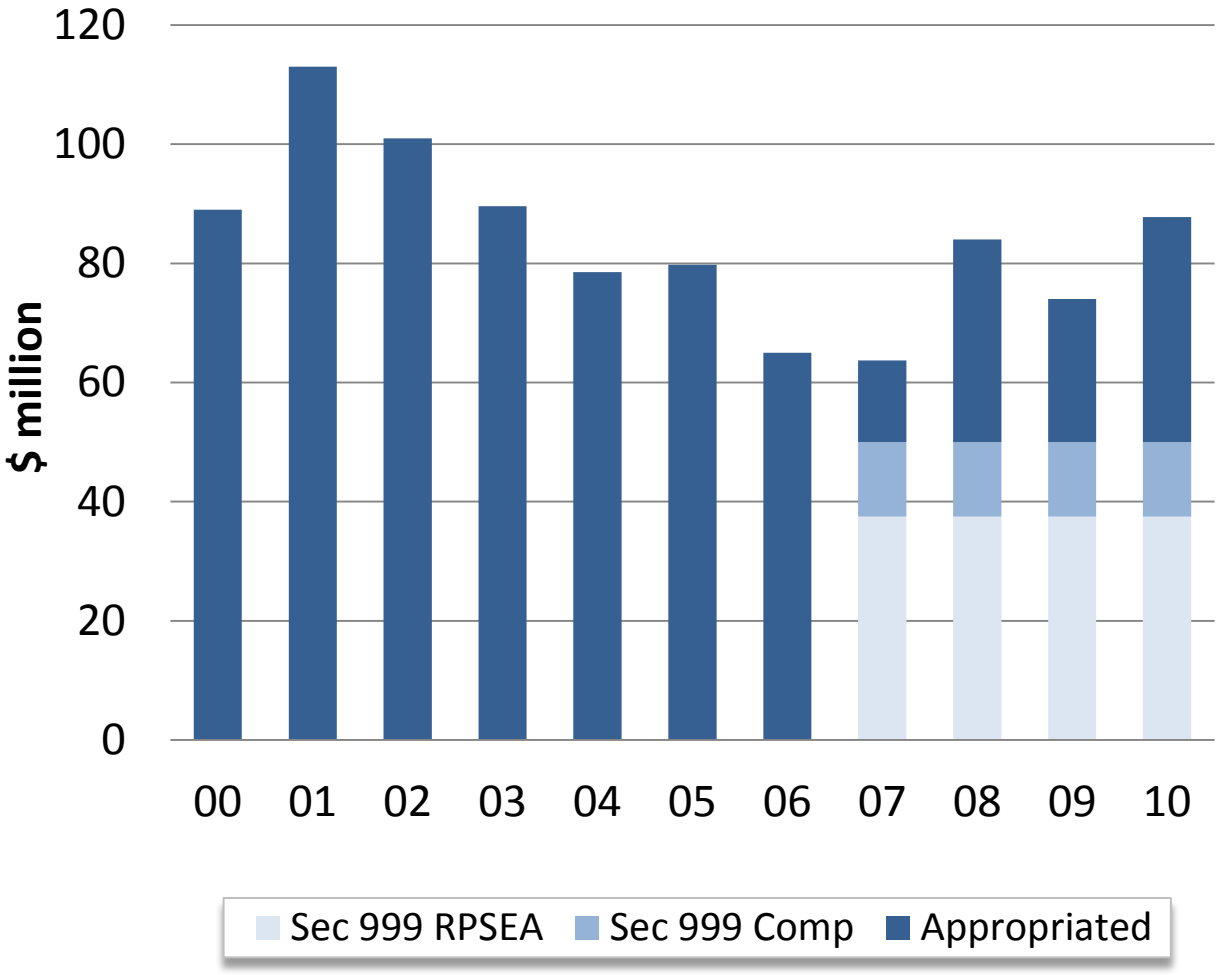
- Geospatial engineering and modeling
- Underground containment in engineered natural systems
- High performance computing
- Fluid flow in porous media
- Image processing
- Mechanical/structural stress analysis
- Complex fluid flow simulations
- Systems analysis and human factors engineering

DOE Oil and Gas Research Programs

1) Appropriated base program: Research and development funded via the annual congressional appropriation cycle

2) Section 999 Consortium program. EPAct 2005 created a public-private partnership to sponsor oil and gas R&D, funded by royalties paid by producers.

2) Section 999 NETL complementary program. Section 999 also mandates that NETL sponsor complementary research on oil and gas.



Section 999 of EPAct 2005

- Section 999 of the Energy Policy Act of 2005 created an oil and gas R&D program funded by royalties paid to DOI by companies producing on public lands.
- $50 million per year
- Administered by NETL and RPSEA

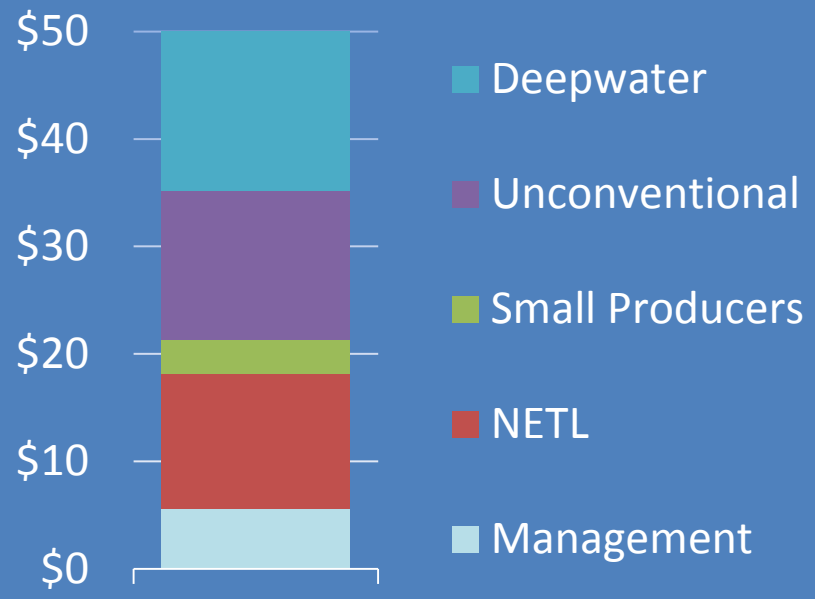
National Energy Technology Laboratory

Research Partnership to Secure Energy for America

Over 150 active companies

Programs:

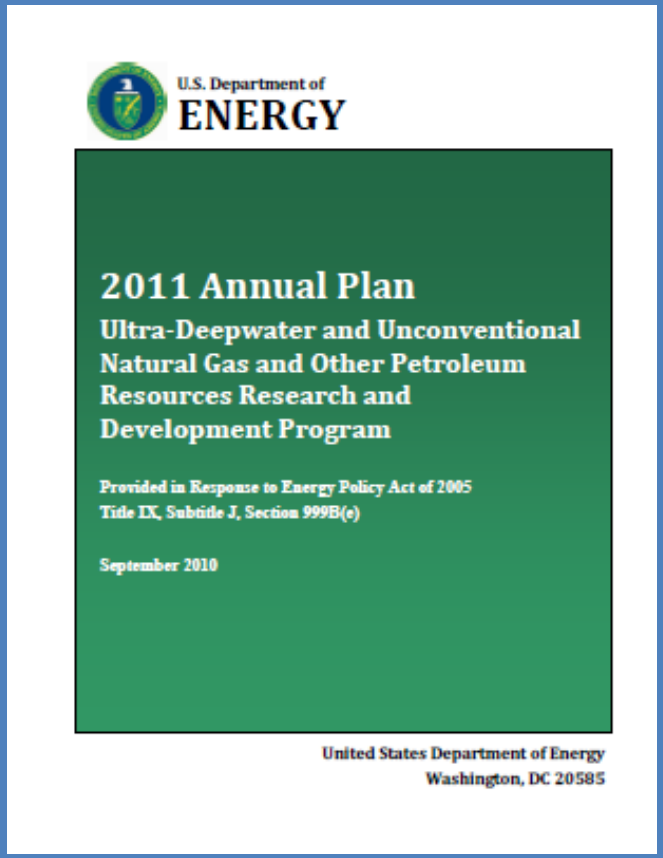
- Deepwater
- Unconventional
- Small Producers
- Complementary (NETL)
- Program Administration



Section 999 of EPAct 2005 :: Research Areas

1. Drilling, Completion and Intervention Breakthroughs
2. Appraisal and Development Geoscience and Reservoir Engineering
3. Significantly Extend Satellite Well Tieback / Surface Host Elimination
4. Dry Trees and Risers in 10,000 Feet Water Depth
5. Continuous Improvement and Innovation
6. Health, Safety and Environment Concerns

Winning the Future :: American Energy



This 2011 Annual Plan, the fifth such plan to be produced since the launch of the Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Research Program, reflects an important shift in priorities for the Program.

…While previous Annual Plans have focused primarily (although not entirely) on technologies focused on efficiency and cost, this plan focuses on quantifying potential environmental impacts and developing technologies to counter them.

2011 Draft Section 999 Annual Plan, MAY 2011

Research Topics

1. Improved intervention techniques for regaining loss of well control in deepwater
2. Improved casing and cementing design for deepwater and ultra-deepwater wells
3. Improved measurement and monitoring instrumentation for subsea operations in deepwater and ultra-deepwater
4. Improvement of flow assurance, expediting the completion of well control efforts, and reducing the risk of environmental impacts from hydrate plugging related ruptures during producing operations.
5. Increase understanding of complex fluid phase behaviors that occur under conditions of extreme pressure and temperature, and develop advanced models of hydrocarbon behavior under these conditions
6. Evaluation of the range of failure states under which BOPs must perform
7. Research on sensors, instrumentation, command electronics, and advanced data interpretation technologies
8. Improve understanding of the potential for environmental impacts in frontier offshore areas where a well-established infrastructure for spill containment does not exist (e.g., the Alaskan Arctic offshore and the Eastern Gulf of Mexico (near Cuba).
9. Assess and quantify the risks of environmental impacts from deepwater oil and gas drilling and production activity, to include modeling and evaluation of industry containment systems to develop scenario estimates of timetoregainwell control, based on newly developed technologies.

Challenges for the Department of Energy

Above: Dr. Tom Hunter, Secretary Steven Chu and Secretary Ken Salazar

Below: Secretary Steven Chu and Secretary Ken Salazar

- DOI, NOAA, USCG, EPA and DOE all have strategic roles in preventing accidents offshore.
- The Macondo disaster illustrates the need for closer alignment with federal agencies.

Questions for the Department of Energy

1. *Is the offshore research mission as articulated in the Department's strategic plan relevant and appropriate?*
2. *Is the Department best using its scientific core competence in offshore R&D?*
3. *How can the Department more effectively collaborate with other state and federal agencies?*

USGS
science for a changing world

The Role of USGS Science in Offshore Oil and Gas Safety

Ocean Energy Safety Advisory Committee, July 13-14, 2011, New Orleans

Stephen Hickman, Research Scientist

U.S. Geological Survey, Menlo Park, CA

With thanks to: Marcia McNutt, David Applegate, Ione Taylor, Anne Kinsinger, Martha Garcia, Donna Meyers, Brenda Pierce, Sonya Jones, Dawn Lavoie, John Haines, Jon Kolak, Herb Buxton, Gary Machlis, Tim Collett, Carolyn Ruppel, Susan Finger, Homa Lee, Uri ten Brink, Jamie Conrad, Jennifer Miselis, Abby Sallenger, Nathanial Plant, Robert Rosenbauer, Lisa Osterman, Paul Hsieh, Walter Mooney, Phil Nelson, Cathy Enomoto and Mark Sogge

Talk Outline

- The Nature of USGS Science
- USGS Response to the Deepwater Horizon Spill
- Other USGS Activities and Assessments
- Conclusions

USGS

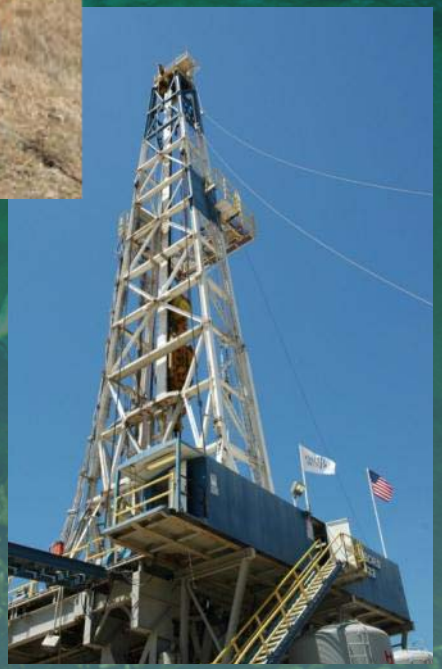
The Nature of USGS Science

USGS serves the Nation as an independent research agency, providing scientific understanding of earth, water and biological resource conditions, issues and hazards.

USGS supports the science needs of all other bureaus of Department of the Interior, as well as other Federal, State and Local agencies.

With no regulatory or land-management responsibilities, the USGS has developed a reputation for objective, unbiased science.

USGS leverages its resources and expertise in partnership with more than 2,000 government and tribal agencies, the academic community, NGOs and the private sector.



USGS

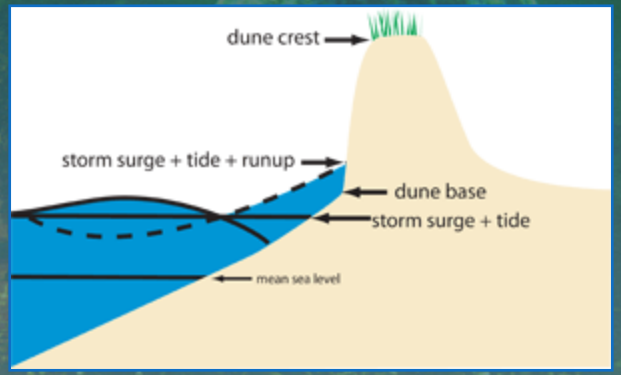
Talk Outline

- The Nature of USGS Science
- **USGS Response to the Deepwater Horizon Spill**
- Other USGS Activities and Assessments
- Conclusions

USGS

USGS Efforts Related to Gulf Oil Spill

- Flow Rate Technical Group
- Well Integrity Team
- Well Kill and Cementing Team
- Residual Oil Assessment Team
- Environmental Incident Science Team
- Geospatial Information Response Team
- Natural Resources Damage Assessment Team

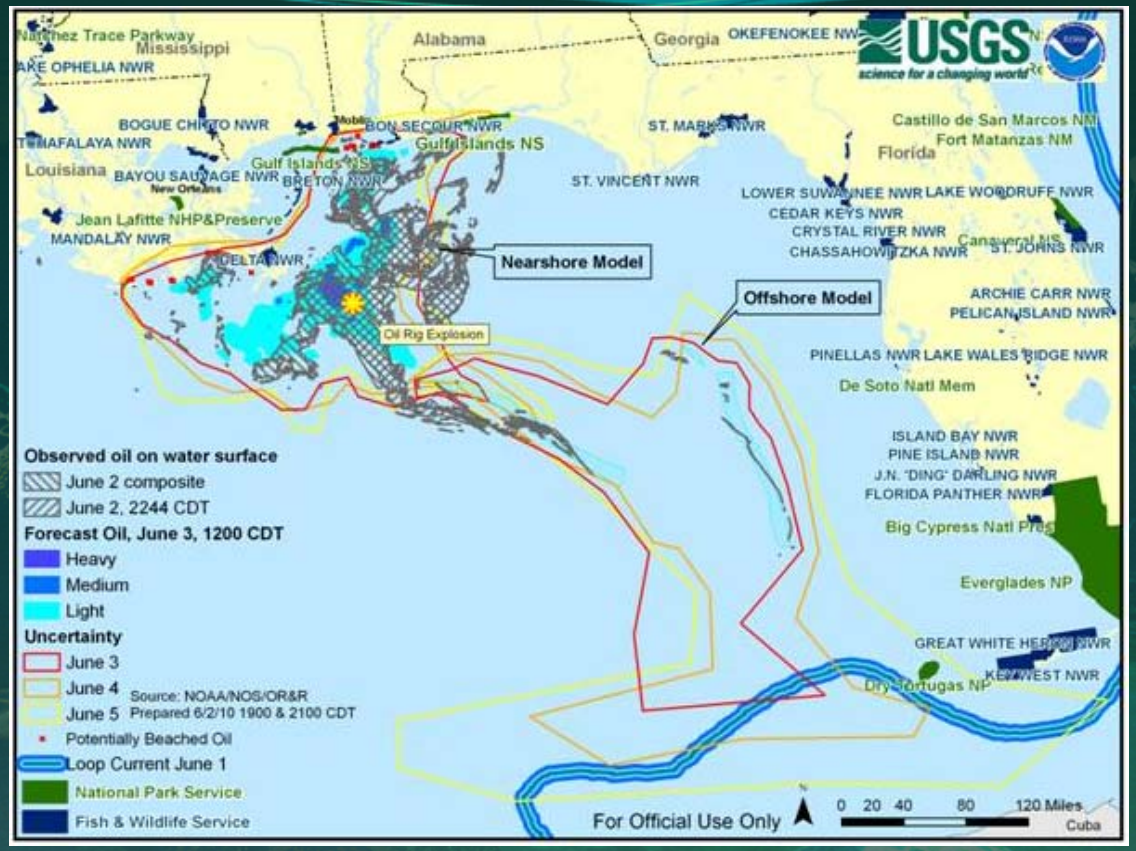


Geospatial Information Response Team

DOI had a huge stake:

- Responsible for managing land and resources on the OCS, where incident occurred.
- ~45 parks and refuges along the coastline.
- DOI manages ~27% of the land along Gulf coast
- Natural laboratories for ecosystem impact.

Oil came close to being carried by Gulf Loop current past Florida Keys.



June 3: Three-Day Projected Oil Movement Forecast

Other GIRT Contributions Included:

- Coordinated distribution of remote sensing imagery, for first response community, NRDA and FRTG.
- Developed database of sampling sites accessed by wide community of users through the Internet.

USGS

Lessons Learned from the 1989 Exxon Valdez Oil Spill

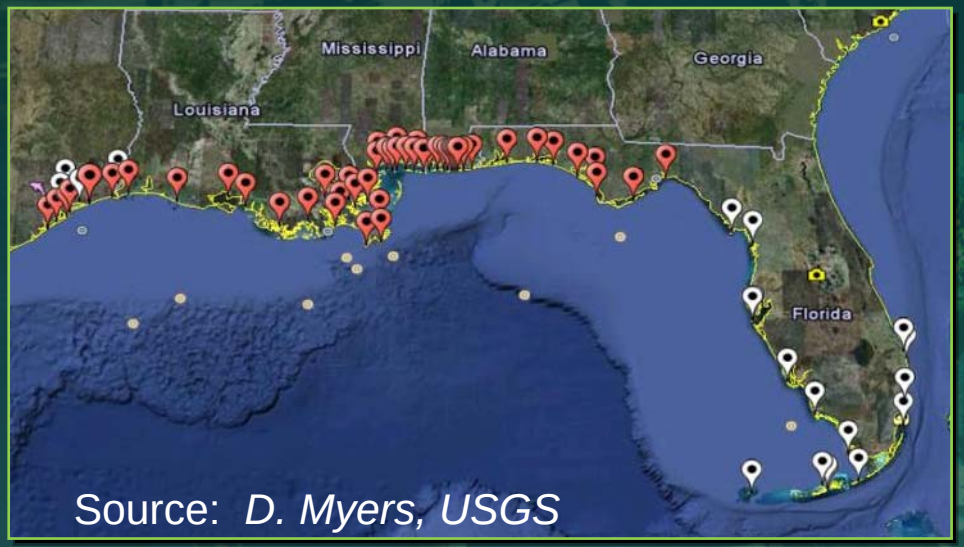
- Think long term regarding impacts and recovery *(1-2 decades)*
- Consider both offshore marine and coastal ecosystems and multiple levels of the food chain
- **Pre-spill data critical for assessing injury to resources and recovery**
- Natural variation in marine and coastal ecosystems will confound understanding of recovery

See USGS Circular 1370, Appendix D: *The Exxon Valdez Oil Spill Experience: Lessons Learned from a Cold-Water Spill in Sub-Arctic Waters*, http://pubs.usgs.gov/circ/1370/

USGS

Residual Oil Assessment

USGS assisted Coast Guard during ***Operation Clean Sweep*** by determining residual oil and contaminants remaining after initial clean-up of beaches and marshes, plus effects on water/sediment chemistry, microbes, sediment-dwelling invertebrates and aquatic organisms (*see OSAT reports at http://RestoreTheGulf.gov*).



Source: *D. Myers, USGS*

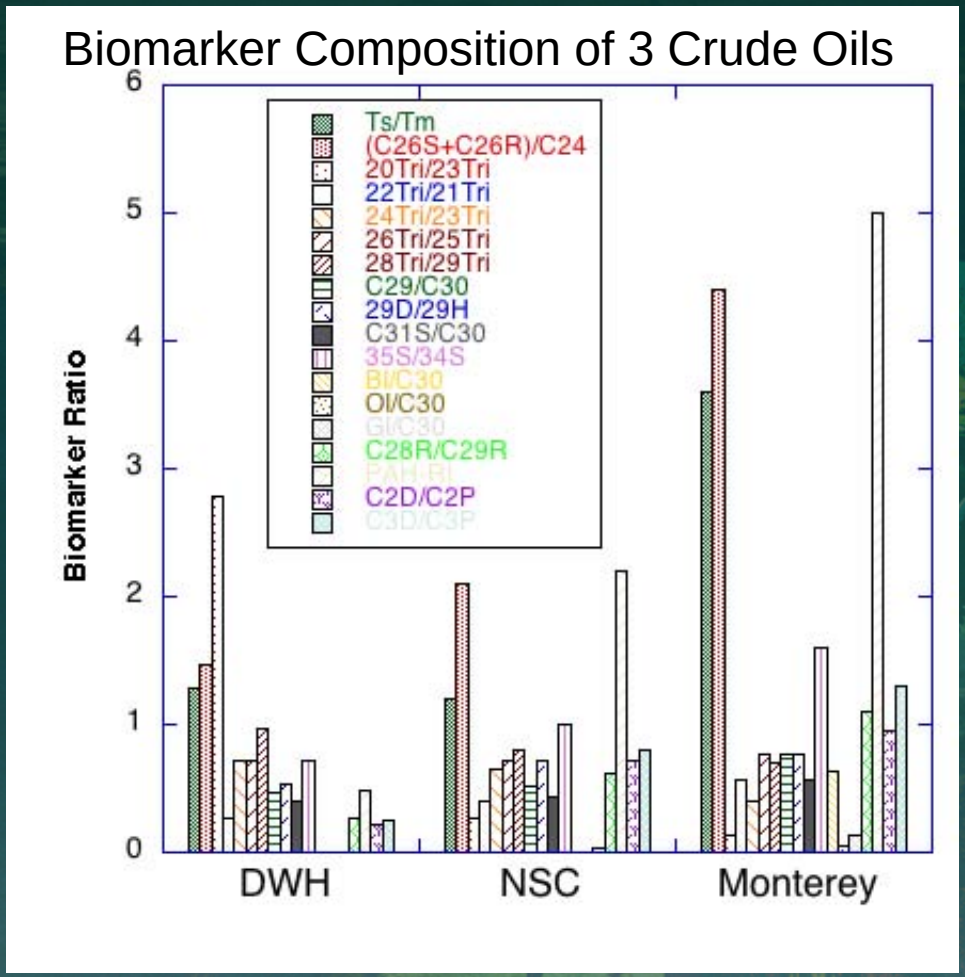
USGS collected & analyzed water, tar-ball and sediment samples at or near Fish and Wildlife Service refuges, National Seashores or State Parks.

- Locations sampled before *and* after oil made landfall (49)
- Locations sampled before oil made landfall (70)

- USGS also provided coastal vegetation photo surveys before landfall, and
- Oversaw remote sensing and production of maps and GIS overlays showing Trust Resources, coastal ecosystems and shoreline conditions.

USGS data and analyses at http://www.usgs.gov/oilspill

USGS Oil Fingerprinting



DWH – Deep Water Horizon
NSC – North Slope Crude
Monterey – Monterey Formation

Source: *R. Rosenbauer, USGS Open-File Report 2010-1290*

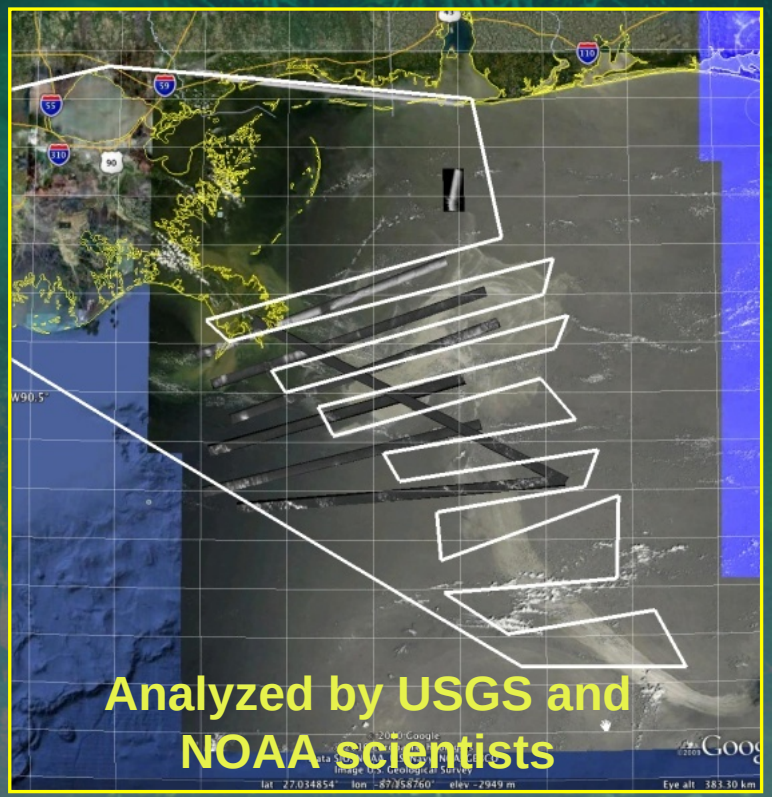
Actions:

- Used bio-chemical signature of DWH oil so that oil found in marine and terrestrial environments could be genetically linked to or excluded from DWH oil today and in the future.
- Used organic/petroleum analyses of pre- and post-spill sediment, oil and water samples to determine presence, source and state of degradation of oil.
- Used organic analyses to link oil composition to airborne (hyper-spectral) imaging results.
- Also, USGS developed a new chemical test for the major surfactant used in Corexit dispersants by BP, allowing government to assess long-term impacts of dispersant use.

Flow Rate Technical Group

- Led by USGS Director Marcia McNutt, involved scientists and engineers from USGS, NOAA, WHOI, DOE, BOEMRE, NASA, NIST, independent experts and university scientists.
- Five teams developed methods to estimate oil flow rates from Macondo welll:
  - Mass Balance (surface observations)
  - Acoustic/Sonar Analysis (ROVs)
  - Particle Image Velocimetry (ROVs)
  - Reservoir and Well Modeling (2 teams)
  - Benchmarked against flow rate determined by DOE from closure of capping stack.

Airborne Visible InfraRed Imaging Spectrometer (NASA)



USGS

Source: restorethegulf.gov
Press Release, Aug 2, 2010

Well Integrity Team (USGS, DOE)

Capping Stack Closed July 15

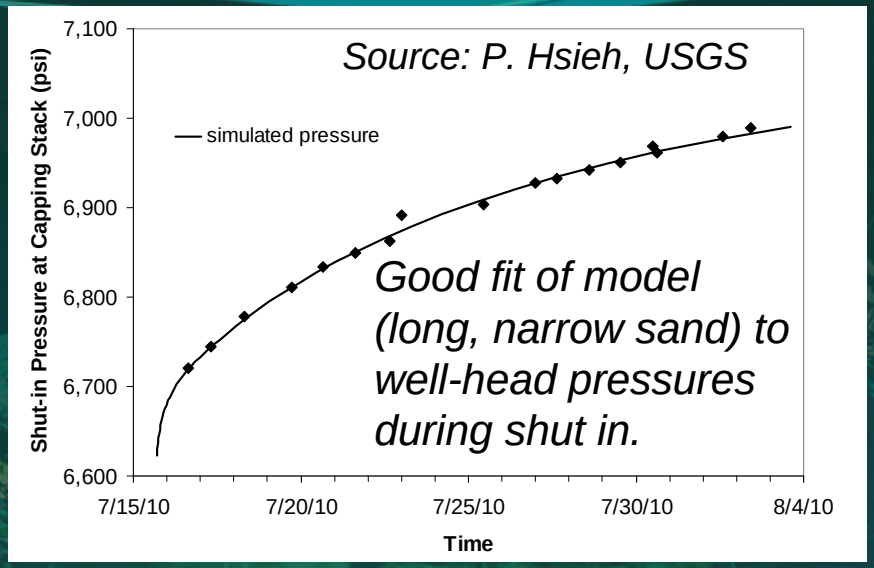
- Analysis of shut-in pressure was consistent with no-leak, high-reservoir-depletion scenario.
- Extensive monitoring (pressure, reflection seismic, sea-surface and sea-floor sonar, ROV visual) continuously analyzed to test for well leakage below sea floor.

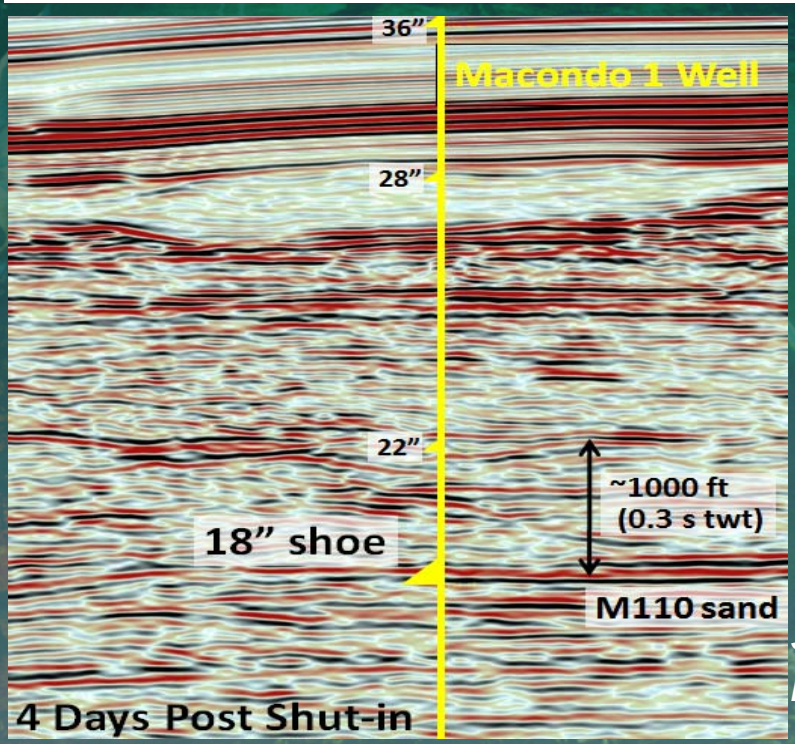
Observations During Shut In:

- No anomalies in seismic images.
- No deeply sourced gas bubbles, either in the water column or at wellhead (*NOAA & Univ. NH, BP*).

Recommendation:

- Well could safely remain shut in from July 15 until final well kill and cementing ops. began August 3.

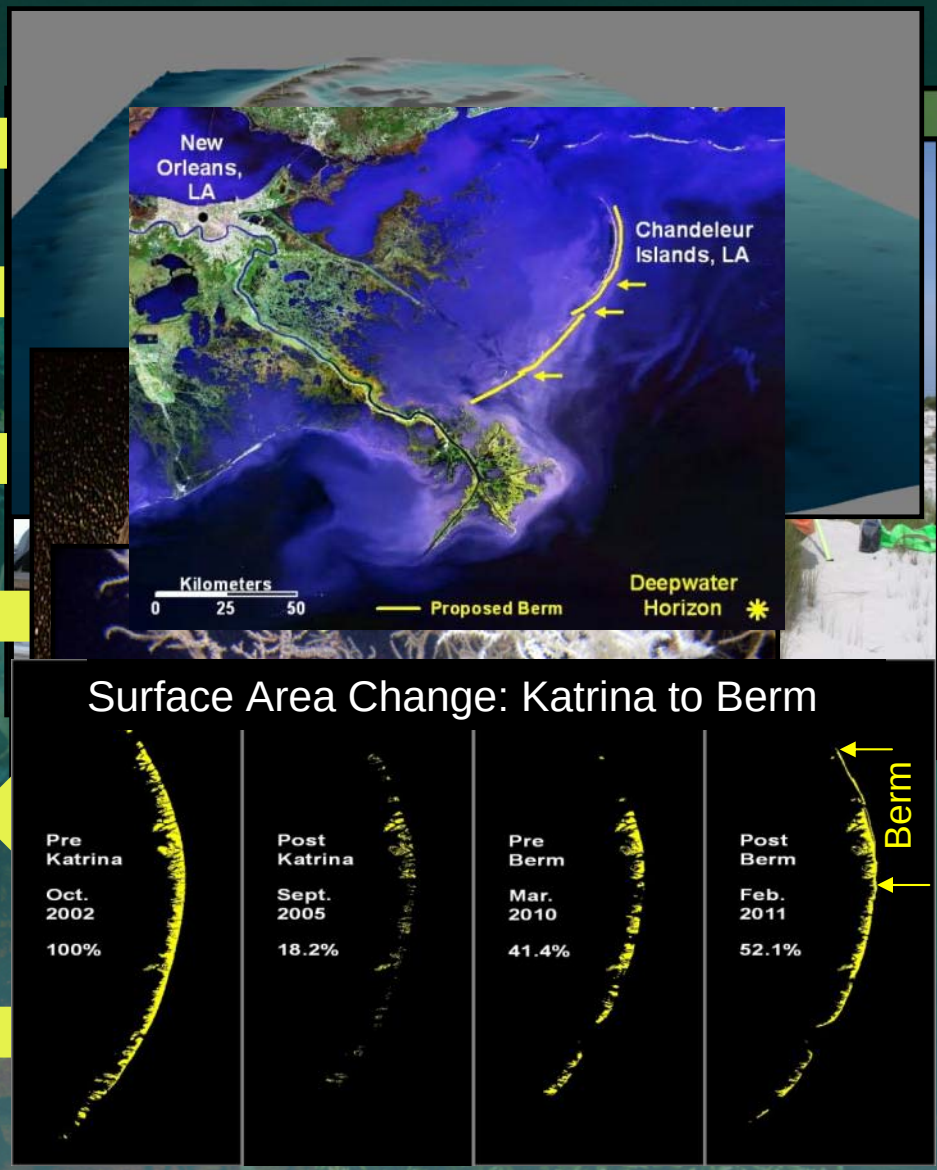




Source: BP

Other Examples of USGS Research in Support of DWH Spill Response and Restoration

- Provided data and mapping products to identify sand resources and impacts
- Identified risk of oil deposition on barrier islands and back-barrier bays/marshes
- Documented baseline conditions in seagrass habitats in MS prior to impact
- Investigated factors controlling bacterial degradation of oil in coastal ecosystems
- Obtained baseline information on ecology and diversity of deep (>370 m) coral reefs to assess possible effects of oil/dispersant
- Studied impacts of constructing a sand-barrier berm on Chandeleur Islands morphology and local waves/currents.



See http://www.usgs.gov/oilspill/

Source: J. MISELIS, A. SALLENGER, N. PLANT, USG

Continuing USGS Response to DWH Oil Spill

- *USGS Long-Term Science Strategy in Response to the Deepwater Horizon Oil Spill* (Final report from the *USGS Environmental Incident Science Team*, Nov. 2010).
- Discusses core USGS capabilities and how they can be brought to bear to assist resource managers and policy-makers, falling under four themes:
  - Transport and Fate of Oil and Oil Spill Contaminants
  - Impacts of Oil Spill and Response Activities on Fish and Wildlife
  - Impacts on Human Communities
  - Tools to Aid Long-Term Recovery and Assess Future Threats and Risks
- This *USGS Science Strategy* is now being used by the USGS to help with science planning for the *Gulf Coast Ecosystems Restoration Taskforce (GCERTF):*
- Multiagency initiative led by EPA, involving 5 Gulf states and 11 Federal agencies (see http://www.epa.gov/gulfcoasttaskforce/)
- GCERTF is developing a restoration strategy for Gulf Coast ecosystem, including identifying new research/monitoring data and policy actions needed.

USGS

Continuing USGS Response to DWH Oil Spill

Long-Term DWH Science Strategy also guiding USGS *Ecosystems* researchers in evaluating long-term effectiveness of two mitigation strategies tried after DWH spill: 1) construction of sand berms in the near shore areas, and 2) release of additional fresh water from the Mississippi River into coastal marshes (oil flushing).

This USGS research effort involves the following new activities:

- Comparing elevation change and sediment redistribution in surface and submerged habitats between the Chandeleur Islands and artificial sand berms, using marine-based LiDAR.
- Identifying factors controlling sediment redistribution around the Chandeleur Islands and the berm, using computer modeling of wave energy and currents.
- Determining impact of oiling and sediment redistribution on vegetation and corresponding impact on sediment mobility/stability of Chandeleur Islands.
- Establishing chemical and microbial baselines and hydrocarbon degradation processes using sediment cores (and pore fluids) from oiled and non-oiled marsh sites in comparison with sea-floor samples from open-water sites.
- Comparing above with distribution of contaminants across the food chain (micro-organisms to predatory fish) to determine if release of fresh water had an impact on the current state of restoration in Louisiana.

USGS

Natural Resource Damage Assessment (NRDA

Goal: Determine injury to natural resources (water, soil, sediment, air, biota and their associated habitat) resulting from the release of a hazardous substance and to insure that those resources are restored at no cost to the public.

USGS Role in NRDAR (*ongoing*):

•Providing support in Scientific Design, Review and Study Implementation, including helping set up Technical Work Groups (e.g., Birds, Sea Turtles, Marine Mammals, Water Chemistry, Offshore & Nearshore Fisheries, . . .).

•Leading all aerial imagery work.

•Conducting laboratory and field studies to evaluate adverse effects of oil on birds, gulf sturgeon and sea turtles, and their habitat.

•Conducting field assessments on deepwater corals, manatees, and the health of marsh vegetation .

Talk Outline

- The Nature of USGS Science
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- **Other USGS Activities and Assessments**
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USGS

USGS Gas Hydrate Research

Source: T. Collett, USGS

Extensive gas hydrate program, with following goals:

- Document geologic parameters controlling occurrence and stability of gas hydrates.
- Assess volume of natural gas stored in various gas hydrate accumulations:
- USGS conducted first systematic assessment of in-place U.S. gas hydrate resources (1995) and *first-ever assessment of technically recoverable gas hydrates (2008).*
- Analyze the production response and characteristics of gas hydrates.
- Predict natural and induced environmental impacts of natural gas hydrates.
- Analyze effects of gas hydrate on drilling safety.

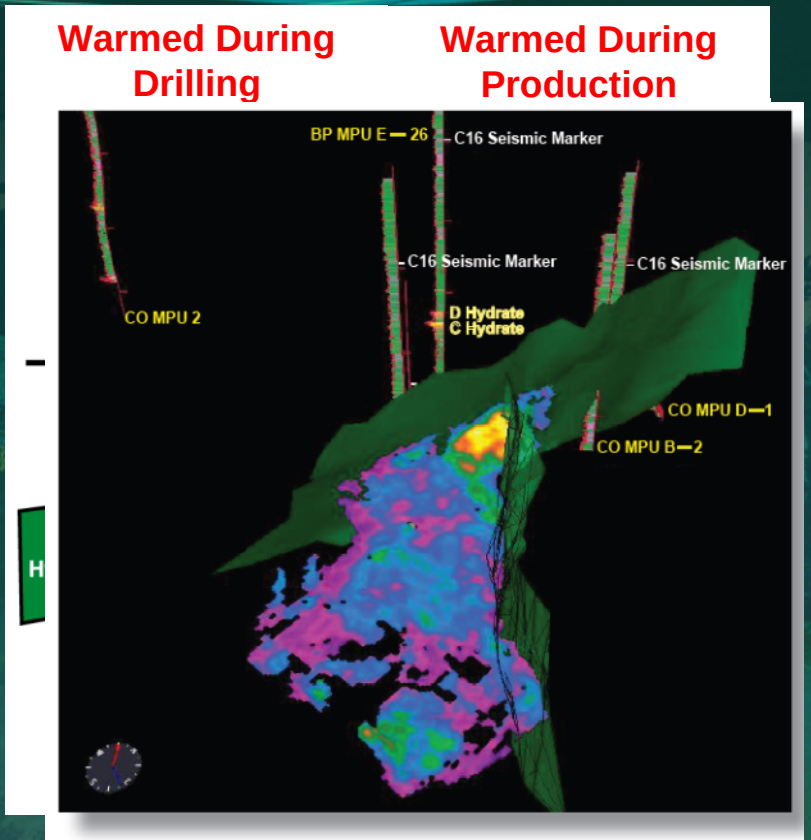


Figure 2. Milne Point-Mount Elbert gas hydrate prospect. Three-dimensional image of a fault-bounded, high amplitude feature (in a pallet of colors ranging from yellow to magenta; the yellow-imaged portion of the structure contains the thickest and most concentrated gas hydrate). Also shown are the bounding faults (in green) and gas hydrate occurrences in nearby well penetrations. The well penetrations show downhole-measured geophysical data indicative of gas hydrate occurrence (in yellow).

- I… a… s… w…
- D… w… can also affect subsea pipelines.

http://energy.usgs.gov/OilGas/UnconventionalOilGas/GasHydrates.aspx

USGS Fact Sheet 2008-3073

USGS Submarine Landslides Research

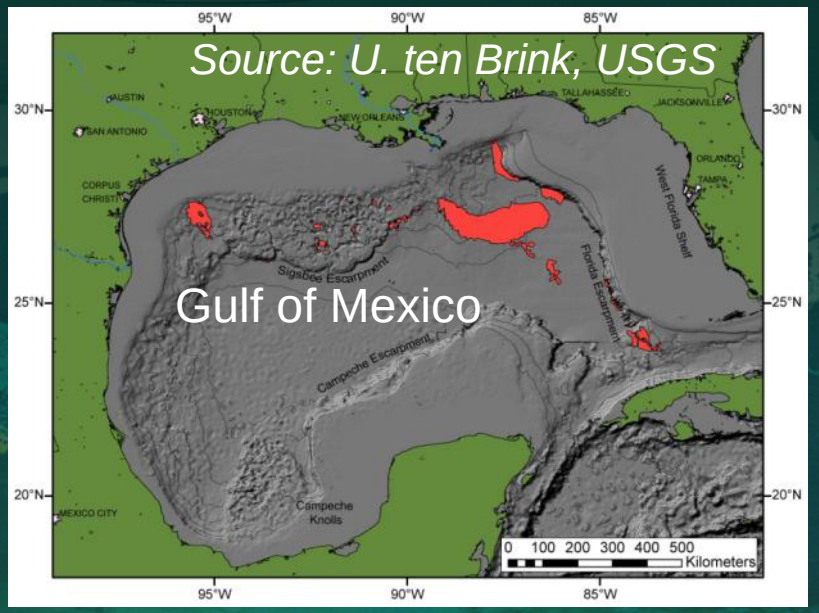
Coastal and Marine Geology Program has an active program studying the geologic setting, size distribution, timing and impact of submarine landslides.

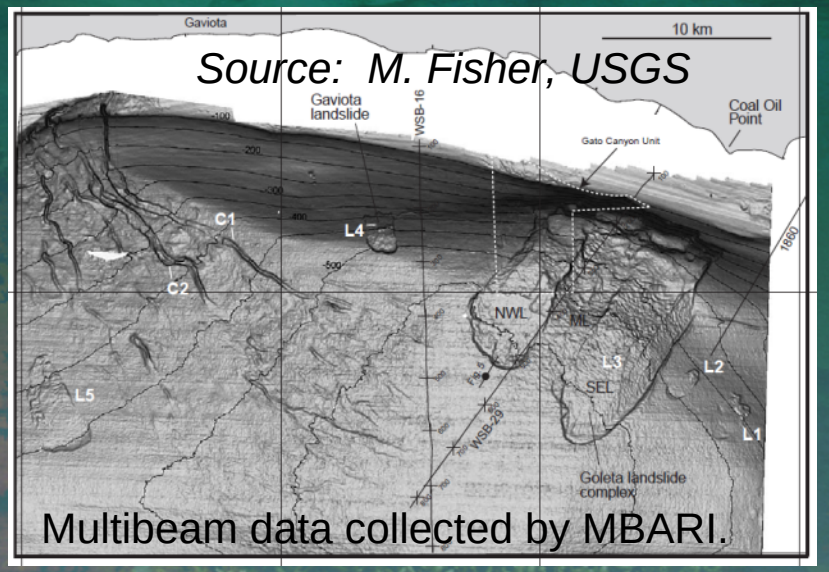
Implications of submarine landslides:

- Hazard to offshore and coastal infrastructure and human life
- Tsunami generators
- Major factor in canyon development, turbidity current generation and the development of continental margins.

Submarine landslides can be triggered by: Sediment loading, Erosion, Gas and gas hydrates, Groundwater seepage, Carbonate dissolution, Earthquakes, Volcanoes, Diapirism (salt), Human activity.

Sensitive to climate change



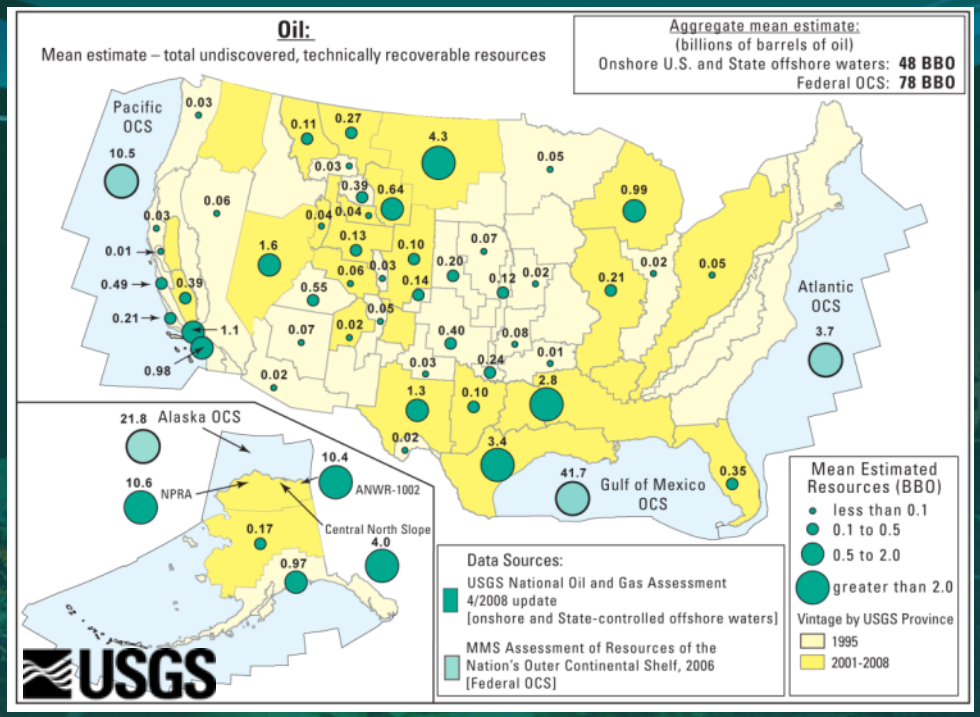


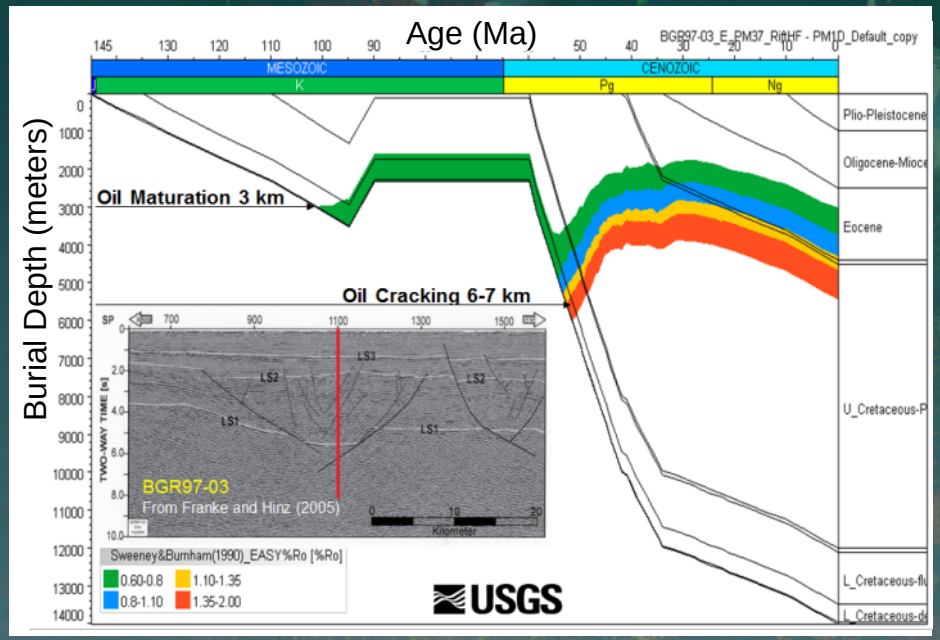
Santa Barbara Channel

USGS

USGS National Oil & Gas Resource Assessments

- **Scope:** Onshore U.S. and State offshore plus International.
- Employ consistent methodology and supporting scientific research: enables national, regional & global comparisons and methodological advances.

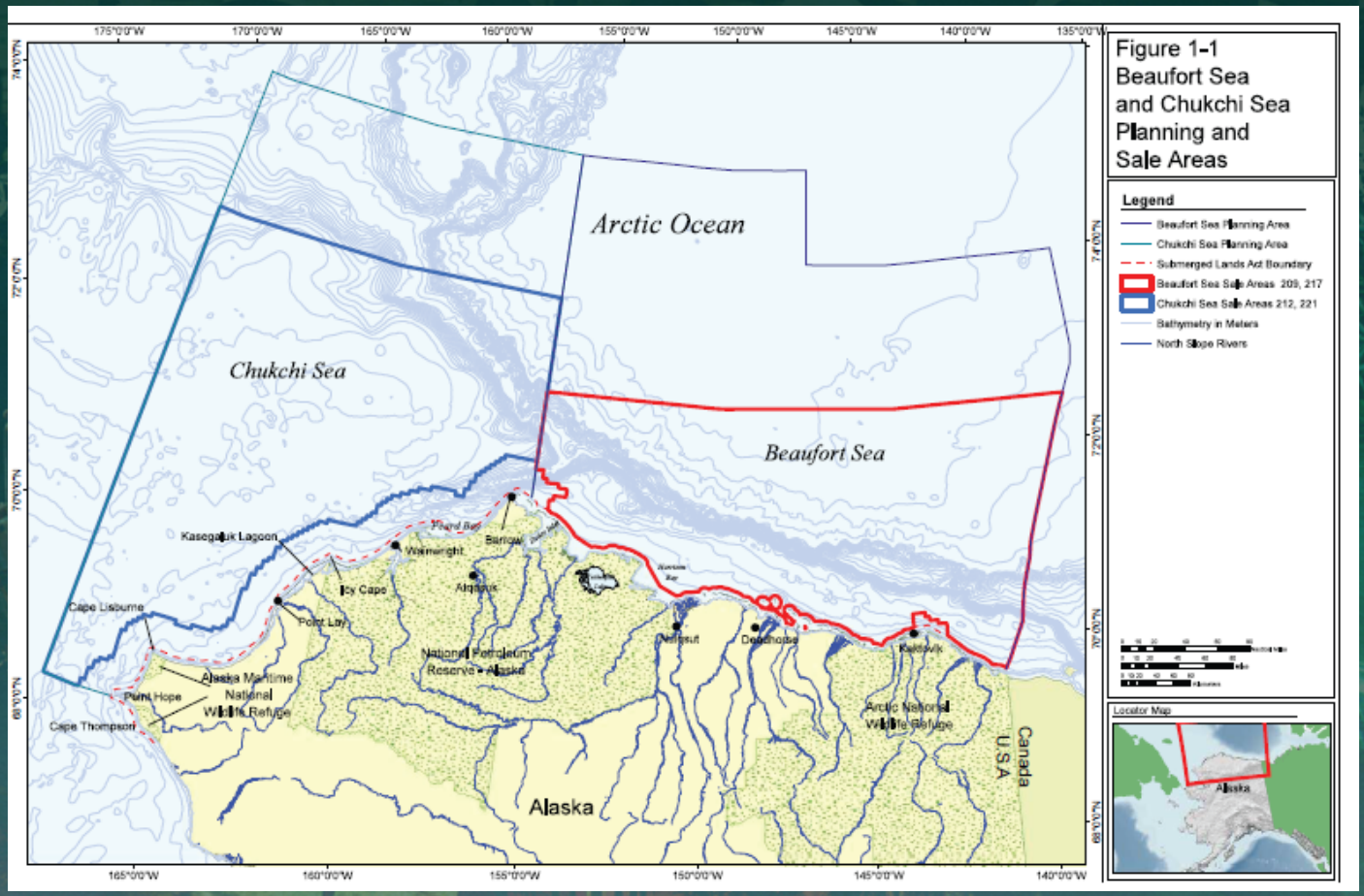




Expertise in geological framework studies, geophysical imaging, borehole geophysics, reservoir modeling, geomechanics and hazard assessments can help develop methods for off-shore pressure prediction, subsurface fluid migration modeling, geologic well integrity assessments and spill risk analyses.

http://energy.usgs.gov/OilGas/AssessmentsData/NationalOilGasAssessment.aspx

An Evaluation of the Science Needs to Inform Decisions on Outer Continental Shelf Energy Development in the Chukchi and Beaufort Seas, Alaska



U.S. Geological Survey Circular 1370, July 2011, 278 pages, edited by Leslie Holland-Bartels and Brenda Pierce

Full Report at http://pubs.usgs.gov/circ/1370/

Fact Sheet at http://pubs.usgs.gov/fs/2011/3048/

USGS

USGS Arctic OCS Study

Information for Effective Oil Spill Risk Assessment, Preparedness and Response advancing, but significant challenges remain

- **Significant advances: BOEMRE, Industry, USCG, NOAA, EPA and international Input to Risk, Preparedness and Response recognized:**
  - Critical inputs to spill scenarios (reservoir volume & pressure, oceanography, weather, ecology) would benefit from increased joint planning & data sharing.
  - Applicability of laboratory & mesoscale studies to full field conditions remains largely untested, but international efforts are improving the foundation.
  - **Although a lot is not known for various locations, times and species:**
  - Actions based on best available information. But, could be enhanced by application of *Structured Decision Making* tools, which allow action now, with transparency and incorporation of new science (with uncertainties).
- ***Exxon Valdez* and *Deepwater Horizon* oil spills demonstrate that a suite of spill countermeasures must be available and effective, and these change over the response period of a spill:**
  - Significant questions exist about Response Gap for the Arctic, particularly in ice-infested water. ***This is exacerbated by expected climate change.***

Recommendation: Critically assess data needs that will most effectively increase accuracy of Oil Spill Risk Analysis. Develop means to more quantitatively include ecological insights. Commission an authoritative assessment of "Response Gap".

USGS Arctic OCS Study

Climate change in the Arctic will have variable effects on key factors in oil and gas development and spill response

- **Climate models show pronounced warming:**
  - **Physical:** Clouds/fog reduce visibility; Icing conditions increase; Precipitation increases; Storms increase in frequency and intensity; Sea-level rises; Ocean circulation patterns change; Sea ice decreases
  - **Ecological:** Ocean acidification -- calcifying organisms, entire food chain; Sea Ice – ecosystem shift; Species responses -- fish, birds, marine mammals
- **International development of Global Climate Models a success. However, these lack sufficient regional "grain:"**
  - More refined regional understanding is essential to clarify what planning and engineering solutions must target in 50 year future.
- **Uncertainties exists on critical topics for which science focus is required:**
  - Physical: storm frequency and intensity, circulation patterns
  - Species' response to environmental changes; undertake periodic population and distributional surveys

Recommendation: Promote development of fully-integrated Atmosphere-Ocean-Land regional climate models. Address gaps in storm data as soon as possible.

USGS

Conclusions

- Science clearly made a difference in the course of the *Deepwater Horizon* spill, involving many scientists and technicians at the USGS working in concert with colleagues from other government agencies, industry and academic institutions.
- USGS science continues to support oil-spill restoration in the Gulf of Mexico, as part of *Operation Clean Sweep* (USCG), through research priorities being implemented in the *USGS Ecosystems* and *Water Mission Areas,* as part of the *Natural Resources Damage Assessment* process, and through science planning for the interagency *Gulf Coast Ecosystems Restoration Task Force.*
- Lessons learned from the *Deepwater Horizon* and *Exxon-Valdez* spills and ongoing USGS research on land and at sea are informing strategic scientific planning to facilitate safe and environmentally responsible offshore oil and gas development, not only for the *Gulf of Mexico*, but also for frontier areas like the *Arctic Ocean* and the *Atlantic Margin.*

USGS

Ocean Safety: Regulatory Initiatives & Technology Evaluation & Research

Ocean Energy Safety Advisory Committee

safe operations *environmental protection* *fair value*

Bureau of Ocean Energy Management, Regulation and Enforcement

July 14, 2011

Mission & Core Objectives

The Bureau of Ocean Energy Management, Regulation and Enforcement manages the ocean energy and mineral resources on the Outer Continental Shelf to enhance public and trust benefits, promote responsible use, and realize fair value.

- **Safe Offshore Operations**
  Promote incident free operations during exploration and development on Federal Offshore Lands.
- **Environmental Protection**
  Ensure that all activities on Federal Offshore lands are conducted with appropriate environmental safeguards.
- **Fair Market Value**
  Assure receipt of fair market value for the lands leased and the rights conveyed by the Federal Government.

Discussion Topics

- Regulatory Program Framework
- Safety System Initiatives
- Other Relevant Regulatory Initiatives
- BOEMRE-funded Research Program
- Ongoing Safety Research
- Ongoing Oil Spill Research
- Oil Spill Containment and Response Initiatives

BOEMRE's Regulatory Program

Comprehensive

Seismic

Drilling
Drilling Units

Production Systems
Platforms

Pipelines

Oil Spill Response
Financial Responsibility

Abandonment

Regulatory Initiatives

- Safety & Environmental Management Systems
- New Drilling Safety Rule
- Regulatory “Effects of Water Depth” Workshop

Safety and Environmental Management Systems (SEMS)

- API RP 75 dictates mandatory compliance
- Workshop held on March 15, 2011 to discuss the new regulatory requirements on operators
- SEMS plans must be developed, implemented and available by 11/15/2011
- Second SEMS rule being developed that will address stop work authority, ultimate work authority, and an employee participation program for reporting unsafe work conditions.

API RP 75 Elements

BOEMRE-funded SEMS Study

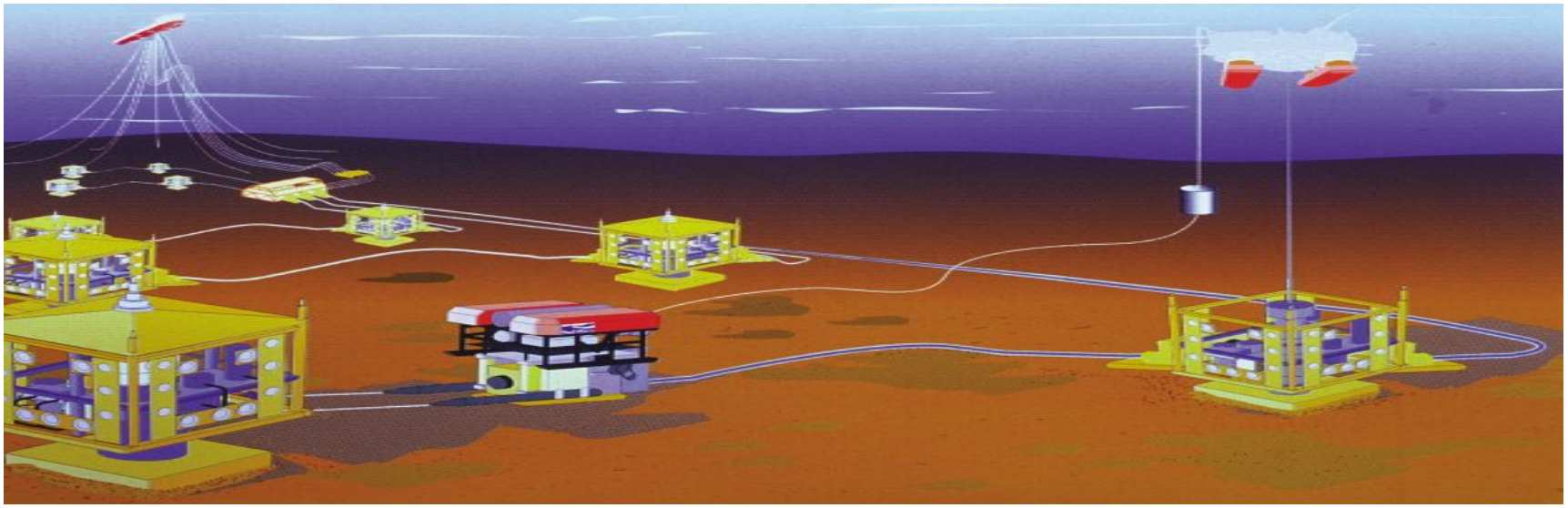
- Funded through the Transportation Research Board of the National Academies (the Marine Board)
  - Conducting a study on the “Effectiveness of Safety and Environmental Management Systems for Outer Continental Shelf Oil and Gas Operations”

New Drilling Safety Rule

- Published Interim final rule on Oct.10, 2010, based on critical recommendations in DOI Report to the President on Increased Safety Measures for Energy Development on the OCS
- The rule includes:
  - Tighter Primary Cementing Practices
  - Secondary Control System Requirements and Guidelines
    - New BOP Inspection and Testing Requirements
    - Autoshear and deadman systems for dynamically-positioned rigs
    - ROV capabilities
  - New Casing and Cement Design Requirements: Two Independent Barriers
  - New Fluid Displacement Procedures
  - Deepwater Well-Control Procedure Guidelines
- Will publish the final rule after the second public comment period closes and BSEE reviews and responds to the new comments

Effects of Water Depth Workshop

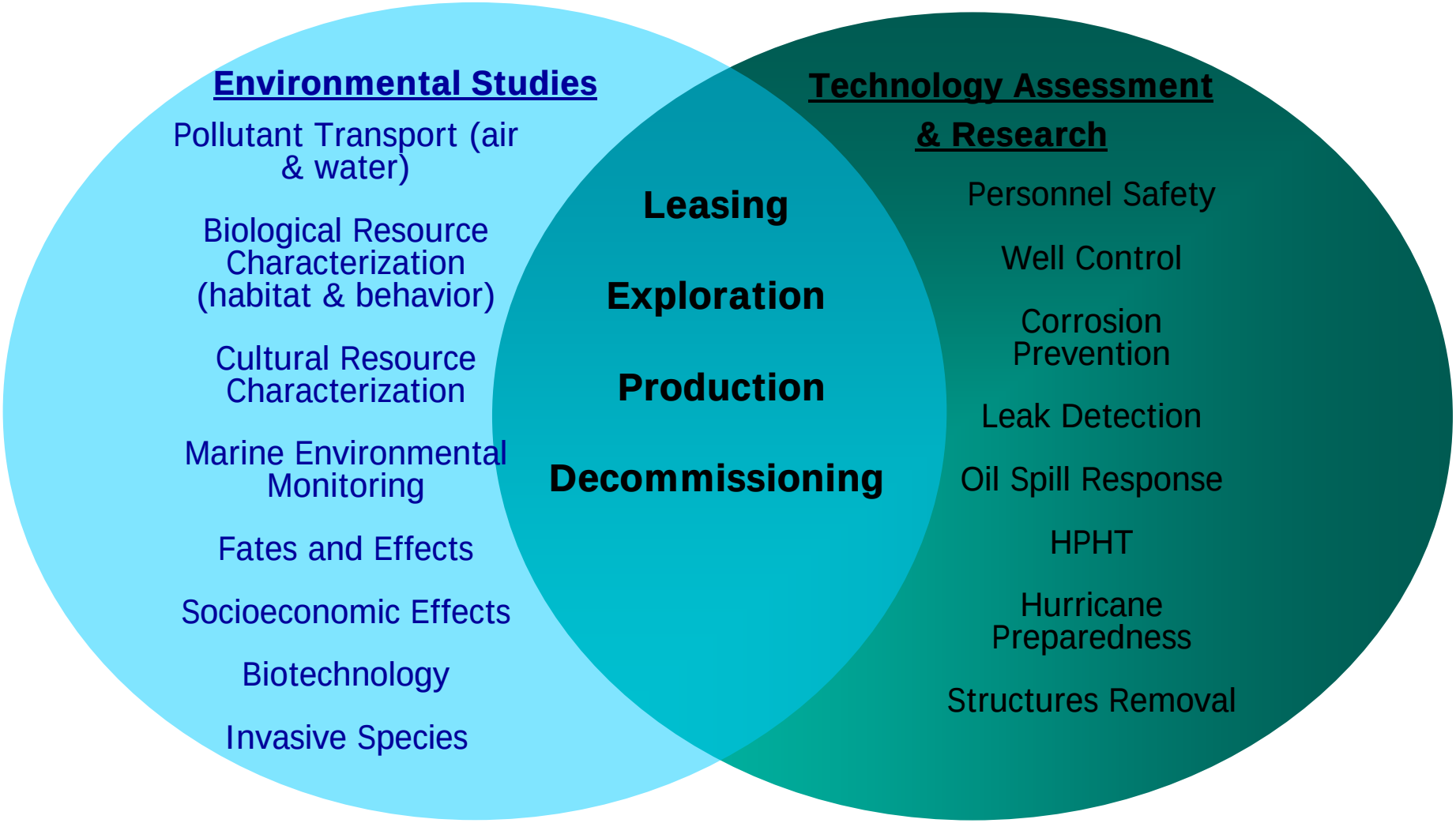
- Technical Workshop to be held November 2nd-3rd in Galveston, TX
- The workshop is expected to:
  - identify the critical issues and effects of water depth on equipment and operations; and
  - determine the adequacy of current regulations.



Oil Spill Response Planning and Preparedness Initiatives

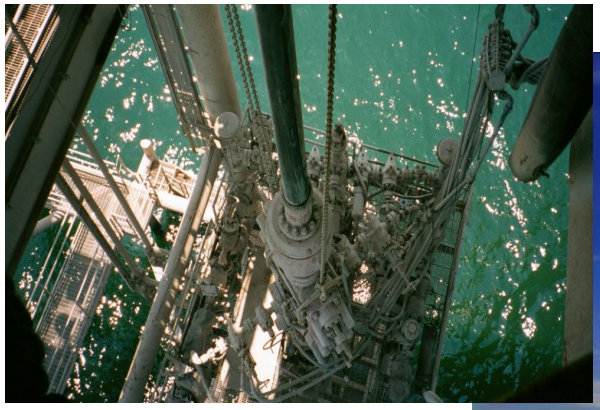
- Establishing Oil Spill Response office in BSEE
- Identifying Lessons Learned from Deepwater Horizon
- Coordination with U.S. Coast Guard
- Influencing Direction of Private Initiatives
  - Joint Industry Task Force and sub-committees
  - Oil spill removal organization equipment acquisitions
  - Subsea containment system designs and operating parameters

BOEMRE-Funded Research



Technology Assessment and Research (TA&R) Program

- 3 Research Components
  - Operational Safety and Engineering Research (OSER)
  - Renewable Energy Research (REnR)
  - Oil Spill Response Research (OSRR) – incl. OHMSETT
- Close to 50 active studies

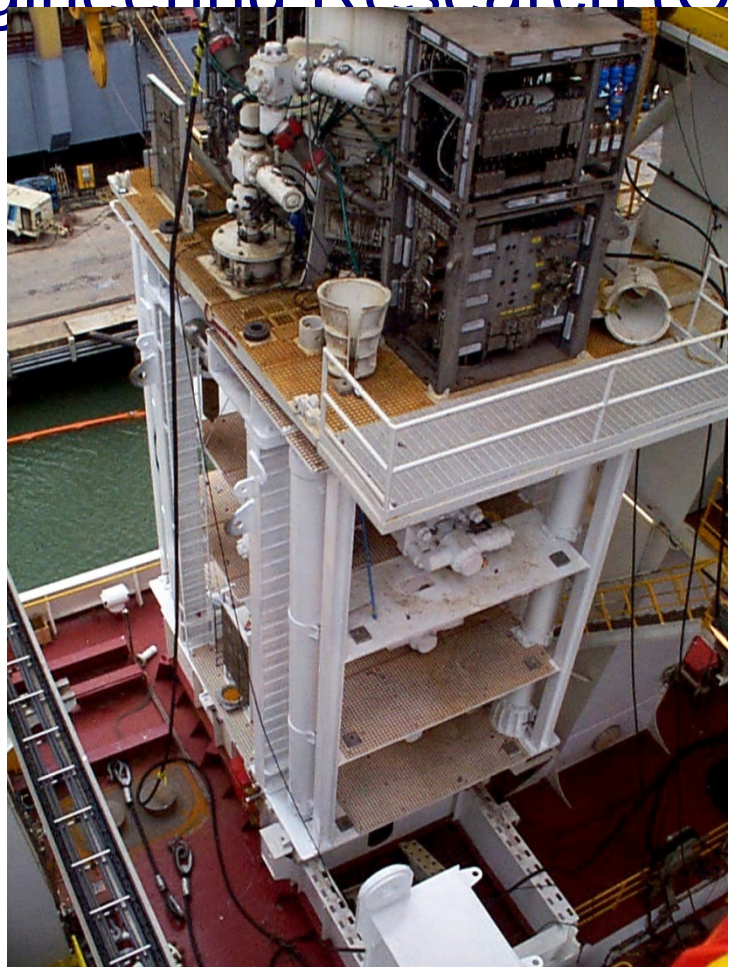


http://www.boemre.gov/tarphome/

TA&R Program Priorities & Initiatives

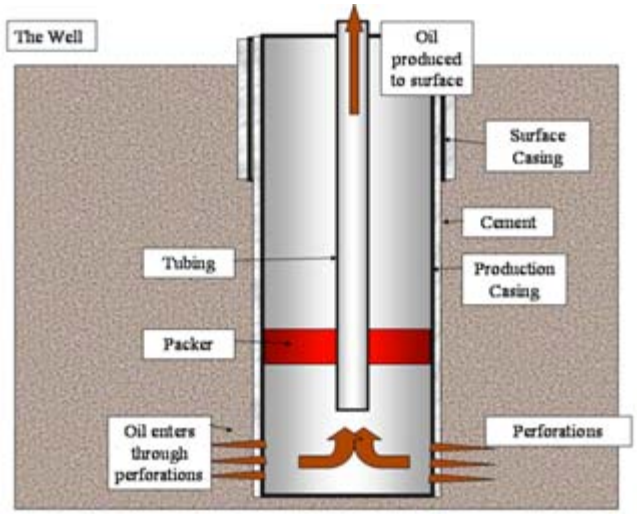
- Evaluation of New Technologies
  - Prevention, Containment, Spill-Response and Safety Systems
- State of current and planned R&D (see handout)
  - Active Projects
  - Future Projects from the 5 year strategic plan
  - Updating the strategic plan to include DWH lessons learned
- Technology Enhancement/Compliance Efforts
  - SEMS Study
  - Effects of Water Depth Workshop

Active/Upcoming TA&R Operational Safety and Engineering Research (OSER)



- After Deepwater Horizon, the TA&R Program initiated a series of studies focused on deepwater well control, including:
  - Deepwater Blowout Preventer (BOP) Reliability and Well Kicks
  - Cement Plug Testing: Weight vs. Pressure Testing to Assess Viability of a Wellbore Seal between Zones
  - Blowout Preventer Maintenance and Inspection in Deepwater Operations
  - Analysis of Current Cementing Procedures Employed in the OCS: Optimized Methods and Additional R&D Required

Planned TA&R OSER (Safety) Research

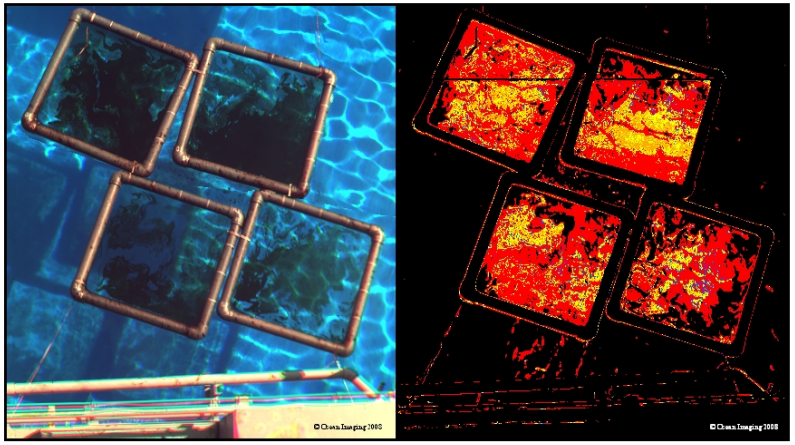


- Subsea Equipment Reliability
- Deepwater Wild Well Control Technology
- HP riser integrity and the need for Subsea Intervention Devices
- Real-Time Systems (RTS) Situational Awareness System Implementation

Current TA&R Oil Spill Response Research (OSRR)

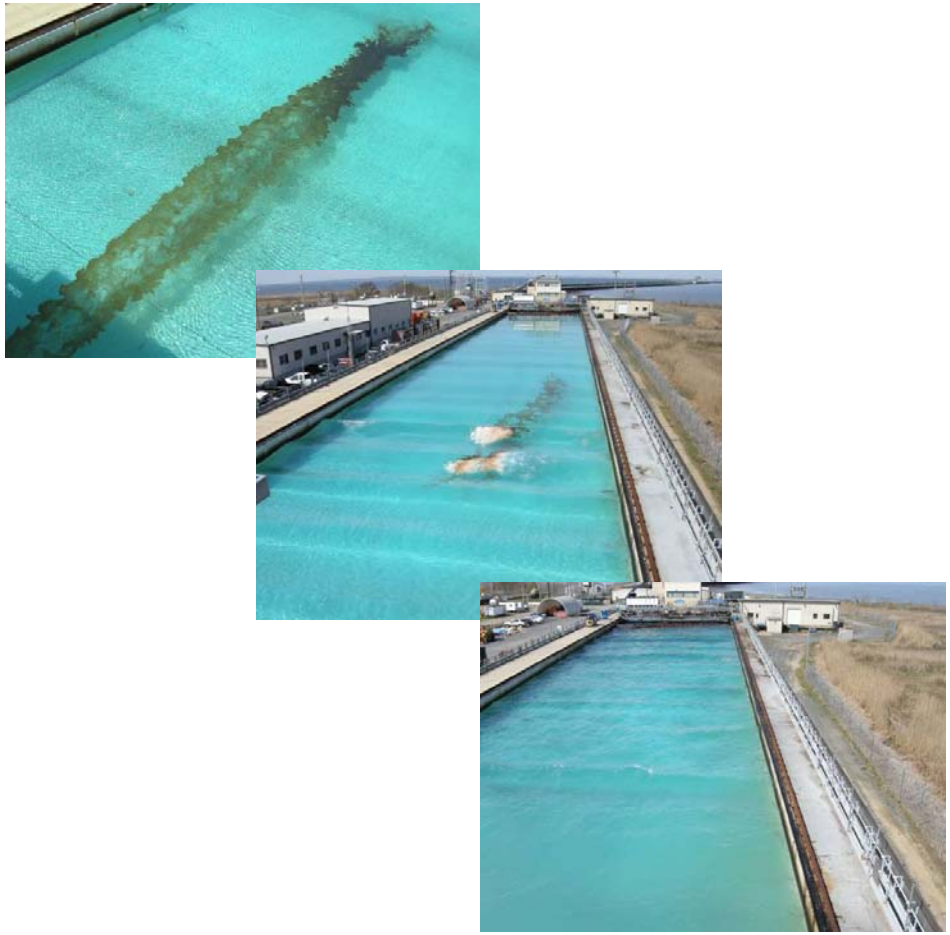
Portable Sensor & Recorder System

Aerial Remote Sensing Technology used during DW Horizon Clean-up Operations



Planned TA&R Oil Spill Response Research

- Effectiveness of Chemical Dispersants Applied to Deepwater Blowouts
- Review of International Oil Spill Response Technology and Systems
- Use of Unmanned Aerial Platforms to Improve Oil Spill Response
- Review and Assessment of Subsea Containment Systems

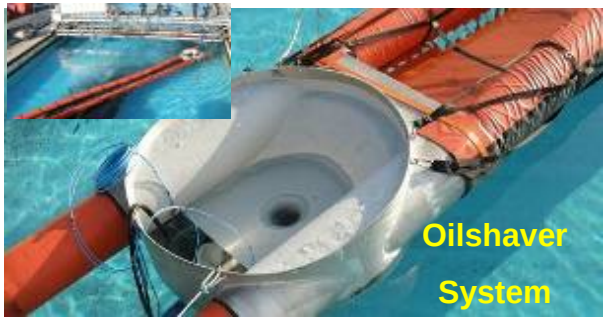


Wendy Schmidt Oil Cleanup X CHALLENGE

- A $1.4 million competition
- Designed to inspire innovative solutions that will speed the pace of cleaning up seawater surface oil resulting from spillage from ocean platforms, tankers, and other sources

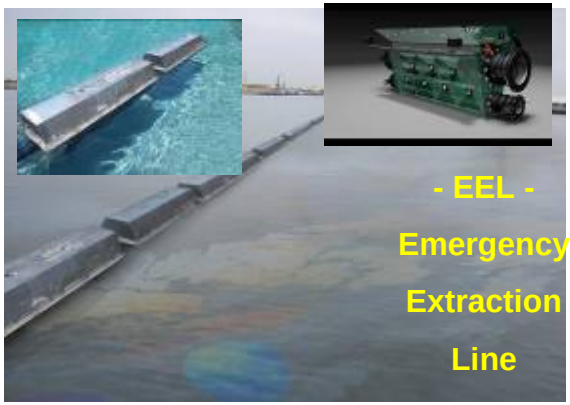
- This summer 10 finalists will demonstrate their technologies at OHMSETT, the National Oil Spill Response Research & Renewable Energy Test Facility.

X Challenge Finalists



Judges evaluate Finalists on:

- Technical approach and commercialization plan
- No negative environmental impact
- Scalability of and ability to deploy technology
- Cost and human labor of implementation
- Improved recovery over today's baseline systems



Current Containment and Recovery Research Initiatives

- Effective Daily Recovery Capacity
  - Joint project with USCG to fund independent review of EDRC and recommend new guidance for estimating efficiency of skimming systems
  - Goals: Develop planning standard that more accurately predicts recovery rates, and provides incentives to industry to conduct research on skimming system recovery efficiencies

- Subsea Containment Literature Review
  - Project to review and assess historical use of and research on equipment for the subsea capture of oil at a leak source
  - Goals: Through comprehensive review of international initiatives pursue most promising research or designs for additional work and potential application to OCS operations.

Planned Containment Research through TA&R Program

- Review and Assessment of Subsea Containment Systems
- Mechanical Technologies to Improve Subsurface Oil Spill Containment and Removal
- Oil Spill Containment and Removal Technology for Arctic Conditions

Technology Assessment and Research (TA&R) Program

- Home page: http://www.boemre.gov/tarphome/
- Studies: http://www.boemre.gov/tarprojects/

Appendix XVII

DEPARTMENT OF THE INTERIOR (DOI)
OCEAN ENERGY SAFETY ADVISORY COMMITTEE MEETING
NEW ORLEANS, LOUISIANA
JULY 14, 2011

PUBLIC COMMENTS BY
GABRIEL SCOTT
Public Citizen

MR. GABRIEL SCOTT (Public Citizen): Well, I was wishing that guy was there because I really appreciated his comments.

Well, first of all I do really sincerely all of you guys really impressed all weekend and I really appreciate the opportunity to sort of get into the weeds with you and watch you work. It's been really encouraging just to see -- you guys are really smart. You know what you're doing and you seem to be approaching this sincerely and at the bottom of my heart I really appreciate that. It really is important.

By way of introduction who I am, I come from Alaska. I live in Cordova. That's my initial interest in oil spills is -- I wasn't there for the Exxon Valdez but watching what that did to my neighbors, I mean, it's profound. It's an inescapable thing.

After the Supreme Court decision came down in the Exxon spill, I for a long time had been involved in sort of legal things, but after seeing that decision it became obvious that you need to actually be a lawyer before anyone in the oil industry is going to listen to you.

And leading up to that, we had been doing community effort, basic grass roots organizing with regard to safety on the Trans-Alaska Pipeline. And coming into this from -- I came from the Northwest and the timber wars and it's really contentious. I thought this would be a no brainer. I thought this is something everyone agrees on. No oil company wants to spill oil. You know all of these people here have seen what happens. So this is a no brainer; we all can agree that we want a safer pipeline.

And what I've run into is this really strange disconnect and I don't know where the disconnection is. But through the last few years, I've become convinced that's the source of the complacency that keeps leading us back to these big disasters over and over again.

If this group here was committed the way you are now, we wouldn't have Deepwater Horizons in the future if you stuck, you know. But the problem is five, ten years budget pressures, industry pressures, things happen, things change. It all gets watered down and it leads to complacency. And this is a recognized thing. It happens over and over and over.

You guys have an opportunity -- in the scale of a million factors go into this, but there is a unique opportunity now to really set the stage for the next generation of oil development that's a whole different species than it's been in the past.

And the key to that, I think, is involving the actual stakeholders, not only the industry and the government stakeholders, but the people who will have the oil dumped on them. Them involved from the get-go. And from the beginning all the way until the end so that now we have this weird situation where BOEMRE will spend years writing up a rule. Sitting in Alaska working for a non-profit group, I get 30 days to ready over this thing and try to comment. I mean it's not a real exchange of information.

And then the next opportunity I might have to comment on it is if there was a big disaster or a spill or something. And see there's this huge gap. But my point is and the thing I really want to get across to you is that there are a lot of people like me and more skilled, more talented than me that have things to offer and they're really anxious to offer them. And that needs to be incorporated throughout the process so that -- one obvious place, you were mentioning the ACPs and the RRTs. Huge problem with lack of participation in those. That's true. I've actually read those documents and it's kind of shameful.

That's one area where there are people just living in the towns who know things, who are anxious to help and they want nothing more than to do something to help. There is a place they could help. Right? These ACPs and RRTs, the contingency plans written ahead of time if people were involved in them ahead of time -- I mean really involved in them ahead of time, I think that we would have a much more robust system.

And this goes through to during the spill and this is especially -- most important during a spill. And this is -- I can't see your name. You had a few comments that I really liked. Trying a sort of social science or science out of other fields that can be applied to the energy industry. And I think social science is one of those things. And just the same way that we can determine what's the impact of certain number of barrels of oil on a certain habitat, we can determine the impact of, you know, certain amount of a spill on a community of people, the amount of suffering.

And the science tells you that a huge part of how bad that disaster is socially and culturally is whether it's something that like happened to the person. If you're stuck at home and there's nothing you can do and this is something that someone else did to you. You try to call and no one answers. You go out to help. They say they know better; you don't know anything. It changes everything. If you were to involve those people and I have practical suggestions of how, then that -- I don't know how this -- how you add this into dollars, but as to diminish the amount of damage that's done through even if we don't prevent any oil spills, it's going to decrease damage.

Specific ways people can be involved. This addresses some of the technology gaps.

I'll wrap up real quick. Thirty more seconds?

You have these huge problems of tracking and they are huge problems. Today we don't know -- have any idea how much oil is in the marshes. There are people who would be willing to walk out into the marsh and start counting that stuff. And if there were methodologies that were credible that the industry would buy into, you know, and if there were experts to teach the people, that's the way the people can help. It helps the people and it helps the industry and it makes everyone better.

So I just really want to light a fire under your butt to involve the public. We're not only here to sue you now and then or provide meaningless comments, we really want to make this thing better. We're all stuck with the same world whether we like it or not. So let's set up some permanent structures.

And thanks again for your work. I hope you get something done.

Appendix XVIII

DEPARTMENT OF THE INTERIOR (DOI)
OCEAN ENERGY SAFETY ADVISORY COMMITTEE MEETING
NEW ORLEANS, LOUISIANA
JULY 14, 2011

PUBLIC COMMENTS BY
PAUL SAWYER
Director of Federal Programs
Louisiana Department for Economic Development (LA DEC)

MR. PAUL SAWYER (LA DEC): My name is Paul Sawyer. I'm the Director of Federal Programs with the Louisiana Department of Economic Development. And I actually was not going to deliver any remarks until Brad said that you all wouldn't comment. So I feel a little braver now.

Actually what I want to do first and foremost is thank you for choosing Louisiana to have your first field visit. This is a really important subject for the state of Louisiana. The work that you do is very important to our state, to our economy, to our people. And we believe that ultimately what this committee produces will have great impact on the state of Louisiana, as well as the Gulf of Mexico and perhaps even the world.

And let me explain why this is so important for the state of Louisiana. We have the largest concentration of oil and gas fabrication, oil and gas services in the Gulf of Mexico. Oil and gas fabrication, we have the largest concentration of offshore development. More than 40,000 oil and gas wells, 5,000 miles of oil and gas pipelines and we produce 80 percent of American's offshore oil resources.

We have the largest port complex in the world. Believe it or not, Louisiana combined with all of our water resources has the largest port complex in the world and we produce some of the largest tonnage volume in the world.

We have the most productive fisheries in the lower 48 states. Twenty-one percent of the fish harvested by weight occur off the coast of Louisiana.

We have 400 miles of coastline, but when you really study the contours of the Louisiana coastline, we actually have more than 7,000 miles of shoreline.

The Deepwater Horizon incident proved that Louisiana's working coast is threatened by inadequate ocean energy safety.

I'd like to also point out that Louisiana is home to the largest Coast Guard district in the entire Coast Guard. We are home also to BOEMRE's largest regional office, regional location in the country. With 600 plus employees that continue to grow because of new inspectors and what I would characterize generally as scientists to support the new permitting regime in offshore development.

We have a strong presence of USGS and NOAA personnel in the state as well.

The world, we believe, will soon observe just important ocean energy safety is. Not just in the wake of the Deepwater Horizon incident, but also in perhaps decades to come with the Natural Resource Damage

Assessment as well as the utilization of Clean Water act finds to help restore the damage that was done.

We believe combined with Louisiana's efforts to preserve and sustain our coastline -- I think you're already familiar with our ongoing battle to preserve our coastline. We believe we will observe in these decades the intersection of ocean energy safety and our efforts for coastal preservation through BOEMRE's new permitting regime, through the products of this committee, through the NARDA (phonetic) and clean water activities -- Clean Water Act activities.

And so all of this is to say that what you're doing matters to us. It's very important to the state of Louisiana, to the Gulf of Mexico, to the country, and arguably to the world. We believe that the Committee's product, whatever it may be, the recommendations or new regulations, whatever you come up with. We believe Louisiana is ultimately going to be your laboratory. And it's also going to be your proving ground.

And so I just want to say one more time, thank you for choosing Louisiana for your first visit and please leave knowing just how important your work is to us. And please excuse the gully washer that just blew through. That was unplanned. Thank you.

Appendix XIX

DEPARTMENT OF THE INTERIOR (DOI)
OCEAN ENERGY SAFETY ADVISORY COMMITTEE MEETING
NEW ORLEANS, LOUISIANA
JULY 14, 2011

PUBLIC COMMENTS BY
MESSIAH DARRYL PAUL WARD
Public Citizen

MESSIAH DARRYL PAUL WARD (PUBLIC CITIZEN): I am Messiah Darryl Paul Ward with the Ocean Energy Futures of Our Salvation of Light to enter so we can see where we're going, what we doing, and how to handle it. And it's through the future and renewable energy that jobs and education through our universities, because I spoke to the universities and they gave me the right to hold the red stick of Baton Rouge, Louisiana. That means love for the elephant that eat plants. And then you got the animal which eats monkeys, which we do not come from monkeys.

So the first step is to understand we're not animals, we're plants of God and He created us from the earth. Now if we can take that step and realize that through death we can let loose of the animal and be reborn as a plant. Boom. Be reborn in the name of the Messiah, so now we are plants of God to understand His direction.

It is fine to be creative from a formal standpoint, but that creative activity has be informed by the underlining social and political context that we want jobs and education of clean fuel for our children. Air, water, gravity, geothermal, wind, waves and tides is millions and millions and millions and millions of jobs and we have to be the leaders in this.

Louisiana has more natural resources than any country in the world. And we have to capitalize on some of this. We have to have a leader of our ocean futures involved with this to lead us through this.

And as plants of God that produce seeds, we have the opportunity to step forward and be this leader in the industry of science and engineering and education. We can no longer hold back from everything that God has. God gave us the air, wind, water, geothermal. I can go on for hours saying how much God gave us, but we have to do something with this.

So I'm here talking to you all and I'm going to the universities and I'm going to hold my red stick and baptize as many people as I can from animal to plant life. So you can understand you are a hybrid. Now if you can't understand hybrid, you must stay at the animal and realize the animal eats the monkey. And the plant eats plant which produces seeds to give jobs and education to our children's future.

That's why I wanted to speak to scientists and engineers. Maybe we can understand what a hybrid and what a leader is and what all that we are creating here in Louisiana in the ocean. We're ocean people. I'm asking the ocean people to jump in the water and swim with me.

Everything that's gone on here, I've jumped down, swam down, and looked at the cement, looked at the strings, looked at the shoes, looked at the ocean pressure realizing -- went to Tulane University and they gave me this project and Celine Costul, she's an environmentalist and filmmaker. I asked her if she'll make a

movie on Mississippi River Gulf outflow.

Energy for it to operate is going to be ocean gravity and air turbo to turn the turbines. This is clean, but what you don't understand it can be put everywhere in the Atlantic Ocean. It can be put everywhere in the Pacific Ocean and we can incorporate it to jumpstart our new leadership and new awareness of being a plant because God Almighty gave me all the answers to step in here and talk to you all about it and see if a message can't be put out there. And I'm going to run for President of the United States and ask Sarah Palin if I can ride in the bus with her and she said, "Yes."

So I hope we can understand that we the plants because if you all keep thinking you're the animals, if you all keep believing that, you have no advancement. You have nowhere to go. You cannot be a hybrid. You cannot be a part of the new world. The new world is the ocean. We're going to build farms, houses out there. We're going to plant everything. The new world is the ocean. And if you all would just jump in and swim with me, we could be the fish.

If you want to plant something, you take the fish, put it in the hole with it and that seeds going to grow. And if we are going to grow with me and the leadership that it's going to take to turn this nation around and give jobs and education, we're going to have to use some of the natural resources that God Almighty has given us.

I just love being here today. God wants His people to use His treasure of clean air and water, gravity of the wave to allow for the tide to rise. And we will be on our way. God created earth to allow the plants to rise and then the seeds are called to produce life, reborn as a plant of God's treasures to do His will on earth. A plant will do His will on earth. A animal will not. Our vision for the future lies around natural resources of people, children, ocean species, water, air, current, gravity, electrical magnetic, ocean pressure, geothermal, wade to our tide of energy.

I love everybody here and I'm just glad that I had the right to speak and I hope something can happen to hybrid the situation to realize that you are the plants of God and you can produce the seeds, but animals do not produce seeds.

God bless you. Thank you very much.

Appendix XX

DEPARTMENT OF THE INTERIOR (DOI)
OCEAN ENERGY SAFETY ADVISORY COMMITTEE MEETING
NEW ORLEANS, LOUISIANA
JULY 14, 2011

PUBLIC COMMENTS BY
MR. PHIL C. NUGENT
Attorney at Law
Phil C. Nugent & Associates

MR. PHIL C. NUGENT (NUGENT & ASSOCIATES): Phil Nugent, fifth generation New Orleanian, third generation oil field industry.

It's most refreshing, positive, and action oriented to have this honorable OESI Advisory Committee all in the same room. Being in the same room in full integration have been the major theme of proactive solutions to the Macondo disaster since my first correspondence to Secretary Salazar in November of 2010.

I've provided all the board members of the council with this document. You should all have this, so I'll be making brief reference to this.

I know that Chairperson Hunter's reputation is for action, results in getting the job done. As a third generation Louisiana industry family, we have an ingrained belief in action and not just talking about the problems.

We have seen tremendous job losses and the job losses continue. Deepwater exploration in Cuban waters will soon commence and will pose new risks and potentially conflicts, political issues. And as Committee Member Williams knows, hurricane season in the Gulf is upon us. Time is of the essence.

Rather than reinventing the wheel, I urge this Committee to look strongly at two models that work, SERVS (phonetic) from Alaska and Sandia as a master facility model for the offshore E&P industry.

SERVS works and has been incident free in excess of 20 years. One main basis for its success is that all stakeholders are integrated in the operations process. In the information before you at Page 7, you will see the integration that is continuously required for success.

It is my understanding that Committee Member Dean Patzek is currently involved in research relating to social complexity, social interactions, inventiveness in R&D in relation to energy production. This work is vitally important in replicating the SERVS model for the Gulf of Mexico.

We cannot leave out our Gulf of Mexico fisherman from their integration into safety, preparedness, training, and response. These men and women know our coast and waters. They should be compensated to be trained, certified, drilled, and at the ready for all future events.

And on a final note, it's often asked of me and in this time of budget crisis, how is the bill to be paid? The answer per OPEC is that we go from a nickel to a quarter. I don't think a quarter a barrel is too much to assure that our environment and industries are optimally protected. Thank you.

Appendix XXI

DEPARTMENT OF THE INTERIOR (DOI)
OCEAN ENERGY SAFETY ADVISORY COMMITTEE MEETING
NEW ORLEANS, LOUISIANA
JULY 14, 2011

PUBLIC COMMENTS BY
MR. MATTHEW L. WELCH
Public Citizen

MR. MATTHEW L. WELCH (Public Citizen): Hello, my name is Matthew Welch and I'm with an organization named Love Us Now, okay.

Many people here have come up to the podium and said I want to thank you guys so much for being here and being so considerate as to be in Louisiana right now.

Guys, the reason you're here is because a major natural disaster happened miles from here. A major disaster. Oil spilled into the ocean for days and days and weeks and weeks and months and months and we could not stop it. Why not?

Because we had never drilled so deep before and we didn't know what to do if something went wrong. Something went terribly wrong. And here you are in Louisiana and people are thanking you for being so considerate as to be here, okay?

I want to thank you for being here, but I want to challenge you to move, okay? I don't want to see you guys sit back and drink your fancy waters, enjoy your glasses filled with beautiful ice that came from this earth and leave here thinking we're just going to do a tour of this entire country until we find out what the problem is. Because I'm not really sure of what it is and I don't know in what direction we should go and we're just going to get opinions from Americans everywhere and we'll go back and do the same thing. That can't happen anymore.

Okay, this is the United States of America. We're supposed to be a beacon of light to the rest of the world. We're supposed to set the example in energy. We're supposed to set the example in everything. We are a free country. We're supposed to be the example of democracy, okay. And here we are and people from Louisiana are standing up here and saying, "Thank you so much for coming and visiting."

It's time to move. And not just move in one direction or in the same direction. I'm talking about moving to the future. Our country was founded and built on the American dream. Does anyone remember that?

Okay, all right, then let me tell you what we're like right now. This is truth. I speak only truth and I will for the rest of my life speak only truth. We are like a homeless man and I know because I've been visiting with the homeless in Atlanta here very recently.

We're like a homeless man that hangs out on the street corner and says I use to have a plane, a private plane. I use to have a Porsche. I think a Ford is a better word. I use to have a Ford. I used to have the nicest car and the nicest plane. I use to have the nicest things. In fact, I built the plane and in fact, I built the car as well. Do you believe me?

Can I borrow 50 cents more? Can I borrow 50 cents more? And the rich business man from China looks at the homeless man and says, at some point in time he looks and says, "I own you." You guys realize that?

Do you guys realize that right now we're trying to raise the debt ceiling. I know I'm getting off subject from energy, but this is important, okay? We're trying to raise the debt ceiling one more time and if we don't do it by Friday, there's going to be a major catastrophe. And we're sitting in a room acting like nothing serious is happening in this world.

Our country is in danger. I love the United States of America and it's time for us to get back to the American dream. You guys are a Committee that can make something happen. You can make us move into the future. You can make a decision to say, no more drilling that deep. You can make a decision that says, we will, we will not, we will look into, but we will move into alternate alternative energy sources much like the Messiah was talking about, okay.

Do not be distracted by the things that he said that seemed farfetched. The things that he said were true. There are many other sources out there and it's time that we stop being so greedy as to look at just one.

Okay, and I'll finish with this right here. And I'm sorry that I had to come and be so bold, but I'm not going to sit back there in my chair and let people come up here and thank you like it's some kind of privilege that you've arrived in New Orleans, Louisiana.

There's been a major disaster. And it's still a disaster. And the news has stopped covering it, but that doesn't mean that it's not real and it's not right there.

Let's move, guys. Let's step into the future right now. Don't wait until you go to 18 other cities before you make decisions. Pass on this information now. It's time that we move forward in to alternative sources for energy right now. Love Us Now. Thank you, guys.