

**ULTRA-DEEPWATER ADVISORY COMMITTEE  
(UDAC)**

DECEMBER 9, 2013  
TWENTY-FOURTH MEETING

**MEETING MINUTES**

ULTRA-DEEPWATER ADVISORY COMMITTEE  
24<sup>TH</sup> MEETING; DECEMBER 9, 2013; WEB MEETING

I hereby certify that this transcript constitutes an accurate record of the Ultra-Deepwater Advisory Committee meeting held on December 9, 2013.



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Elena Melchert  
Acting Designated Federal Officer

12-16-13

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Date

**ULTRA-DEEPWATER ADVISORY COMMITTEE  
24<sup>TH</sup> MEETING; DECEMBER 9, 2013; WEB MEETING**

**ATTENDEES:**

**UDAC Members**

Mary Jane Wilson, Chair  
Doug Foster, Vice Chair  
George Cooper  
Quenton Dokken  
Hartley Downs  
Stephen Pye  
Lesli Wood

**U.S. Department of Energy**

Elena Melchert,  
Acting Designated Federal Officer  
Erica Folio, Committee Manager  
Roy Long, Technology Manager,  
National Energy Technology Laboratory  
Michelle Rathbun, Meeting Recorder, IBM

**DISCUSSION:**

**Committee Business**

- The meeting was called to order by the Committee Chair, Mary Jane Wilson, at 11:41 a.m. EST.
- Acting Designated Federal Officer, Elena Melchert, took roll call and announced a quorum present.
- Ms. Wilson opened the meeting with an overview of the agenda.
- Ms. Melchert, Ms. Folio, and Mr. Long went through the history of past UDAC recommendations and status of outcomes (Attachment 3).

**Subcommittee Reports**

- Dr. Foster presented the Program Subcommittee report (Attachment 4).
- Dr. Cooper presented the Sunset Subcommittee report (Attachment 5).
- The full committee voted to approve the drafts at 12:50.

**Committee Business**

- The Editing Subcommittee was formed, consisting of: Mary Jane Wilson, Quenton Dokken, and Stephen Pye. Editing Subcommittee will meet on December 10.
- The next full committee meeting will be on December 16 to vote on the Editing Subcommittee Report.
- There were no public comments.
- The meeting concluded at 1:25 p.m.

**ATTACHMENTS:**

Number	Description
Attachment 1	Delegation of Acting Designated Federal Officer
Attachment 2	Meeting Agenda
Attachment 3	History of UDAC recommendations
Attachment 4	Program Subcommittee Draft Report
Attachment 5	Sunset Subcommittee Draft Report


**Attachment 1**



**Department of Energy**  
Washington, DC 20585

**MEMORANDUM FOR FILE**

**TO:** ULTRA-DEEPWATER ADVISORY COMMITTEE

**FROM:** GUIDO DEHORATIIS   
DESIGNATED FEDERAL OFFICER  
UNCONVENTIONAL RESOURCES TECHNOLOGY ADVISORY  
COMMITTEE

**SUBJECT: Acting Designated Federal Officer**

I hereby designate Elena Melchert, Division Director, Oil and Gas Safety and Environmental Sustainability, to serve as the Acting Designated Federal Officer for all remaining meetings of the Ultra-Deepwater Advisory Committee.



## Attachment 2



## Department of Energy

Washington, DC 20585

### 24<sup>th</sup> Meeting of the Ultra-Deepwater Advisory Committee

Monday, December 9, 2013

1000 Independence Avenue, SW

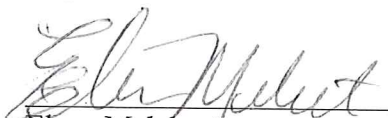
Washington, DC 20585

Online Member Access: <https://usdoe.webex.com/usdoe/mc>  
Meeting Number: 999 979 135 Meeting Password: password  
Call-in toll-free number: 1-888-426-6840 Participant code: 1837498

### Agenda

- 11:15 am Registration  
Member Login; Speaker Login
- 11:30 am Call to Order, Welcome, Meeting Objectives  
Mary Jane Wilson, Chair
- Opening Remarks, Confirmation of Quorum  
Discussion of History of UDAC Recommendations  
Elena Melchert, Designated Federal Officer
- 12:00 pm Subcommittee Reports
- Program Subcommittee,  
Doug Foster, Subcommittee Chair
  - Sunset Subcommittee,  
George Cooper, Subcommittee Chair
- 1:00 pm Break
- 1:15 pm Full Committee Discussion
- 2:45 pm Establishment of Editing Subcommittee and Chair
- 3:15 pm Public Comments, if any  
Next Steps
- 3:30 pm Adjourn

Approved:

  
Elena Melchert

Acting Designated Federal Officer

11-8-13  
Date



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## Ultra-Deepwater Advisory Committee

**Elena Melchert**

Acting Designated Federal Officer

Ultra-Deepwater Advisory Committee

December 9, 2013

A complete history of recommendations by the Ultra-Deepwater Advisory Committee can be found at:

<http://energy.gov/fe/services/advisory-committees/ultra-deepwater-advisory-committee>

# Research Focus

## Recommendation:

### **Focus on Health, Safety and Environmental Issues**

Greater attention should be devoted to environmental issues including how the environment affects infrastructure, and how infrastructure affects the environment.

### ➤ Response:

This strong focus is communicated in RFPs, and the current portfolio of projects has a wealth of projects which will improve the safety and decrease the environmental impact of ultra-deepwater drilling.

In all RFPs from 3/9/2011 through 8/14/13 (RFP years 2010-2012):  
“Permeating all categories is a focus on improving environmental performance, reducing environmental risk, and enhancing safety”



# Research Focus

## Recommendation:

### **Focus on Hazards, Risk Assessment and Smart Systems**

- Determine the present scope of expert (case-based) systems that alert operating personnel to potential drilling hazards, including the human factors related to these systems, and continue work on hazards and risk analysis.
- Addition of and/or improvement to instrumentation at the wellhead and in the well to measure key parameters.

### ➤ Response:

These research areas were included in subsequent RFPs, and the current portfolio includes a project on the human-machine interface (near-miss database) and sensing instrumentation projects.

Technical Areas of Interest that fall within this topic were included in RFPs released in 2010, 2011, and 2012 RFPS

# Research Focus

## Focus on Hazards, Risk Assessment and Smart Systems

### ➤ Response:

Example Projects include:

- Gulf of Mexico Ultra Deepwater Drilling Risk Management Study
- Human Factors Evaluation of Deepwater Drilling including Literature Review
- High Resolution, 3D Laser Imaging for Inspection, Maintenance, Repair, Operations
- Intelligent BOP RAM Actuator Sensor System
- Smart Cementing Materials and Drilling Muds for Real Time Monitoring of Deepwater Wellbore Enhancement
- Intelligent Casing-Intelligent Formation Telemetry (ICIFT) System

# Research Focus

## Gulf of Mexico Ultra Deepwater Drilling Risk Management Study

This study provided a ranked order of risk-important technologies:

1. Real-time data transfer (testing and deployment stage with limited band-width)
2. VSP Look ahead with PAB in the target region (early deployment stage; mixed industry buy-in)
3. Automated Early kick detection system (in use, but not mandated with QA and surveillance requirements and standards). Following additional capability will improve performance
  - MWD with “Positive” HC detection
  - Sensors for flow, temperature and pressure in the well at different locations
  - Direct pore pressure measurement
4. Improved operator training & controls assisted by automated MWD systems (in use, but not mandated with QA and surveillance requirements and standards)
  - Connection, hole cleaning and lost-circulation repair
  - Casing run and Cementing (location of casing pipe versus BOP)
  - Tripping/Swabbing (along with PBL drill-pipe bypass tool & improved procedures and controls)
5. Reliable multiple drill-pipe blowout preventers (in addition to modern Kelly stab-safety valve)
6. “Emergency containment and production” infrastructure (Reliable LMRP disconnect, etc.)
7. Robust BOP with double annular preventer, minimum 3 pipe rams and shear ram. Improved closure reliability and operability
8. 3-D/4-D Seismic & Improved pore pressure prediction during planning and after salt region
9. Improved well control and response modeling to aid reliability based well design



# Research Focus

## Recommendation:

### **Focus on Spill Prevention**

Mitigate leakage in and around boreholes, investigate long-term borehole stability, plugging and abandoning technology, and long-term monitoring systems

### ➤ Response:

DOE has a unique capability in spill prevention, while other government agencies and stakeholders focus on spill response. The current portfolio will continue to reflect that expertise.

# Research Results

Recommendation:

## **Improve Technology Transfer and Communicative Strategies**

Sunset: Research should continue to be archived, searchable, and accessible. A compendium of research ideas by RPSEA should be distributed to a wide variety of universities and made available to industry and public. DOE should review research results and how they advance overall system of drilling and production, as well as progress made and remaining gaps.

General: Appoint a technology transfer officer at NETL, publicize portfolio of projects and make sure complete project summaries are widely available for each project, foster collaborations with broad stakeholder group, and explore synergies between UDW and UCR.

### ➤ Response:

The historical and current project information, including summaries, is currently available to the stakeholders and the public through the DOE and NETL websites, the RPSEA website, and within the Annual Plan.

- NETL Integrated Technology Transfer Program
  - Structure
  - Publications
  - Knowledge Management Database (KMD)
  - Energy Data eXchange (EDX)



## NETL Integrated Technology Transfer Program Structure

	Program Consortium	NETL	Contractors	DOE-HQ	
Information to be Delivered	Project Reports	Complementary program	Interim and final reports		
	Project Data Sets	Complementary program	Spreadsheets, GIS, other		
	Project Software		Models and online tools		
	Presentations/papers	Program and project level	Program and project level	Project level	High Level Program
	Program Information	RFPs, deliverables, metrics, feedback	Program updates, benefit assessments		Program activity, FAC reports, mandated info.
Delivery Vehicle	Project websites		Selected projects have websites		
	Program websites	RPSEA site with links	<b>KMD Portal</b> on NETL site with links	Pages on DOE site	
	Publications	Newsletter, articles in trade press	Newsletter, Techlines, articles in trade press	Technical papers, articles	Press releases, Techlines
	Forums/Workshops	Forums/Workshops	<b>PTTC Workshops</b>		
	Public meetings	SPE papers, other technical meetings	SPE papers, other technical meetings	SPE papers, other technical meetings	



# Research Results

## Technology Transfer Program-Publications Currently Available



## KMD: What is it?

FE's First  
"One Stop Shopping" for all  
Current and Historical DOE  
Oil & Gas R&D

More than 30,000 records  
and reports of R&D in  
upstream oil and gas

the ENERGY lab  
Where energy challenges converge and energy solutions emerge

Site Map  GO>

NETL

ABOUT NETL  
KEY ISSUES & MANDATES  
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KMD Portal

### Knowledge Management Database (KMD) Portal

The KMD was initially created to provide access to project information related to the Energy Policy Act of 2005, Title IX, Subtitle J, Section 999. The KMD has now been expanded to also provide access to current and historical project information relating to Research and Development (R&D) sponsored by the NETL Strategic Center for Natural Gas and Oil (SCNGO).

[Section 999 Project Information:](#) Information specifically related to projects developed in support of the Energy Policy Act of 2005, Title IX, Subtitle J, Section 999 R&D Program, including general project information (abstracts, performers, costs, project summaries), reports and data.

[Oil & Natural Gas Document Repository:](#) Search SCNGO oil & natural gas documents related to current and archived R&D projects, including Section 999. The repository includes DOE/NETL oil & natural gas documents currently posted on the SCNGO internet site, reports stored in the DOE Office of Science and Technical Information (OSTI) library, and selected scanned documents from archived R&D projects. The search is based on keywords of titles and abstracts, and can be further refined by using the author field. [More information, including archived project reports and Program documents, is available through the CD/DVD Library link below.](#)

[CD/DVD Library:](#) This library contains a list of CD/DVDs of oil & natural gas research reports compiled from past R&D programs as well as currently available documents from the NETL webpage. The user can download the complete CD/DVD via zip files, or use the interactive webpages to review the content online. Users can also request mailed copies of the media using the NETL CD/DVD ordering system.

[SCNGO Project Summaries \(1990 - present\):](#) The summaries provide comprehensive information on SCNGO-sponsored E&P, environmental, gas hydrate, and transmission and distribution projects. The summaries include background information, accomplishments, the current status of the projects, reports, and links to performer websites.

[Subscribe to Oil and Natural Gas News Releases](#)

# Research Results

## How Do I Use the KMD?

### 1. Accessing SPE's One Petro Website Portal

([www.onepetro.org](http://www.onepetro.org))

- It is now possible to search all DOE oil and gas published papers via SPE's archival library

### 2. Or, just enter at the NETL Portal

([www.netl.doe.gov/kmd](http://www.netl.doe.gov/kmd))

- This allows access to papers in addition to all other publications, including CD's and DVD's

EDX is NETL's online system for accessing reliable information and data relevant to research within NETL portfolios.

The EDX can be accessed at :

<https://edx.netl.doe.gov/>

***RESEARCH & DEVELOPMENT PROGRAM  
SUBCOMMITTEE FINDINGS AND RECOMMENDATIONS***

**Subcommittee Roster**

- **Dr. Douglas J. Foster, Chair**
- **Mr. D. Stephen Pye**
- **Dr. Quenton R. Dokken**
- **Mr. James D. Litton**

**General Comments**

The R&D Program Subcommittee of the UDAC notes that the *2014 Annual Plan* has continued to take into account safety and environment in several aspects of the proposed program. This program is nearly complete and therefore the *2014 Annual Plan* represents a slight modification of the *2013 Annual Plan*. Acknowledging that it is late in the program, we still wish to stress the importance of the emphasis on safety into the future. Also, we feel it is important to highlight gaps in the current research program.

The Program Subcommittee is largely in agreement with the suggestions for research topics contained in the *2014 Annual Plan*. In the UDAC report on the *2012 and 2013 Annual Plans*, there was acknowledgement that there has been an overall redirection of research topics towards safety and accident prevention. The *2013 Annual Plan* reflects this redirection of research as well. In last year's recommendation, the Program Subcommittee stressed there should be more emphasis on the importance of human factors relating to safety and environmental issues. To date, there is one approved project, (RPSEA 11121-5101-01), analyzing the human factors related to safety. This positive effort by RPSEA is acknowledged and should be encouraged in the complementary research programs within the National Energy Technology Laboratory (NETL) and Los Alamos National Laboratory (LANL).

Traditionally, the research program has focused on technical issues, and the expert advice helping guide the program has come from physical scientists and engineers. We encourage input from experts on human behavior in hazardous operating conditions. The National Commission Report to the Presidential found:

- " ... *As a result of our investigation, we conclude:*
- *The explosive loss of the Macondo well could have been prevented;*
  - *The immediate causes of the Macondo well blowout can be traced to a series of identifiable mistakes made by BP, Halliburton, and Transocean that reveal such systematic failures in risk management that they place in doubt the safety culture of the entire industry."*



## Attachment 4

That is, the Macondo incident was primarily the result of human failure, requiring more emphasis on this factor by the research program.

A first action could be to establish an expert in the occupational behavioral sciences and have this person survey what is already known. Gaps could be identified and resources could be redirected to fill these gaps. This should be accomplished by the RPSEA 11121-5101-01 project, but there is no follow on work in the 2014 plan. This research effort could also include advanced decision support and backup systems.

Although it may be late in the research program, some future consideration should be given to issues related to the containment of hydrocarbons throughout the entire lifecycle of an oil or gas field. The flow of hydrocarbons should be exclusively confined to the reservoir, production tubing, and surface facilities. Not only should hydrocarbon flow be controlled, but also any injected fluids or gas. There is funded research on the metallurgy of pipes and on cements; however, there appears to be little attention paid to other potential avenues of leakage, such as long term borehole stability and fracturing through the overburden formations. Also, there is funded research in reservoir characterization, but little to no attention paid to characterizing the overburden for potential paths of leakage and areas of abnormal pressure. In the *2014 Annual Plan* there is a solicitation for reservoir and overburden characterization and we encourage this effort. Technology is lacking for adequate monitoring of hydrocarbon production and this is particularly true in UDW environments. There is project solicitation on advanced pore pressure prediction but very little on long term containment monitoring.

We feel it is important to include a general comment not exclusive to UDW but applicable to other marine operations. Information is limited regarding methods to prevent and respond to catastrophic events, and mitigate the negative impacts of spills in remote, harsh and sensitive environments. Environmental protection and personnel health and safety working in harsh, unique and sensitive marine habitats requires additional focus. Characterization of the risks to unique and sensitive marine habitats associated with drilling, completion and production activities demands more research.

The R&D Program subcommittee offers the following findings and recommendations. We are not requesting a change of direction of the program, but wish to point out significant areas of research for UDW that should warrant further attention.

### **Findings and Recommendations**

#### **Finding 1**

The *2014 Annual Plan* does not adequately address human factors related to accident prevention. The following recommendations would enhance the program:

## Attachment 4

### Recommendation 1

Increase the emphasis in areas of human interaction. Models can be found in training or simulator programs utilized by nuclear and aviation industries. Effective implementation will require that the *2014 Annual Plan* be modified to give this area higher priority.

Possible areas of focus might include:

- Prepare a survey of studies on human behavior in hazardous operating environments, (while this may be included in RPSEA 11121-5101-01, we encourage the follow on of this project);
- Continued work on instruments and data analysis (expert systems) to improve decision making capability, and;
- Expand work on hazards and risk analysis from a human perspective. Training methods such as those used in nuclear submarine and nuclear materials handling in the USN and DOE National labs might be adaptable for UDW operations.

### Finding 2

The *2014 Annual Plan* lacks content regarding expert (case based) systems that alert operating personnel to potential hazards before they occur, which provide recommendations to mitigate potential risk. There appears to be a gap in developing a systematic way to integrate and analyze diverse measurements related to the overall safety of deepwater operations.

### Recommendation 2

Determine the present scope of expert (case based) systems, and then identify benefits and limitations as well as other applications (such as cementing, completions, wellbore design, etc.) that would reduce the risk when operating in deepwater. The development of synthesis and analysis systems that integrate different types of data can be useful for insuring safe operations.

### Finding 3

The safe and environmentally responsible operation of oil and gas production throughout the entire life of a field requires the containment of hydrocarbons to the reservoir, production casing and surface facilities. Barriers in both the wellbore vicinity and the subsurface should be identified, and facilities should be designed accordingly. Also, adequate monitoring systems need to be developed so that out of zone flow can be detected early and mitigated. There are elements of containment (pipe metallurgy and cements) but no comprehensive program in the *2013 Annual Plan* for addressing this issue.

### Recommendation 3

Possible areas of focus might include:

- Mitigate leakage in and around the boreholes from reservoir fluids and gas as well as any injected liquids and materials;
- Long term borehole stability;
- Establish plugging and abandoning technology for long term containment of hydrocarbons, and;

## Attachment 4

- Long term monitoring systems (i.e. down hole and well head pressure sensors, time lapse seismic surveying, sea bed monitoring, etc.);
- Expand the NETL complementary research program to include larger range of issues of borehole integrity.

### **Finding 4**

The 2014 Annual Plan stresses the need for better reservoir characterization in the research program, but little attention is given overburden characterization. Possible abnormal pressure zones and leak paths can negatively affect the drilling and production activities. There is no effort to monitor the overburden changes throughout the complete lifecycle of a producing field.

### **Recommendation 4**

Expand the research on reservoir characterization to include overburden characterization as well. Technology and methods for geological and geomechanical characterization of the subsurface from sea bed to the reservoir should be emphasized. Develop systems to monitor overburden variations over time.

### **Finding 5**

In funded projects aimed at reducing risks in the UDW, there lacks a comprehensive understanding of how the individual components fit together. The risk and the consequences are addressed in the individual components of drilling and engineering design, but not of the overall system.

### **Recommendation 5**

The Engineering and Operational Practices (EOP) should be developed for overall logistics of UDW operations. The EOP should be designed to capture all risk elements, their interdependencies, and the associated consequences. We recommend that EOP be included in relevant projects funded by the research program.

# **SUNSET COMMITTEE FINDINGS AND RECOMMENDATIONS**

## **Subcommittee members**

**George Cooper, Chair  
Hartley Downs,  
Mary Jane Wilson,  
Leslie Wood**

## **Overview**

The research program designated under the Department of Energy Section 999 is to end on the 30th of September 2014. At present, it is understood that ongoing projects that have funding already allocated, will continue to be funded with the projects and funding to be administrated by the National Energy Technology Laboratory (NETL).

The task of the Sunset Subcommittee has thus been to review the activities of the projects completed so far or ongoing, and to look towards the further continuation of the work as the program comes to its end. An important aspect of the termination of any research program is to ensure that the work done is well documented, and that sufficient effort is devoted in the future to maintaining an archive of the results, to making sure that the archive is accessible, and to taking active steps to bring the work to the attention of the relevant audience.

## **Findings and Recommendations**

### **Finding No. 1: Current Projects**

Current projects that show promising results to date are underway.

### **Recommendation No. 1**

The current research program should be maintained, making sure that these projects are continued to completion even though the management of the research contracts is changed.

### **Finding No. 2: Documentation and Dissemination of Results**

The committee members recognize that such research takes many years to develop, with continuing adjustment to the research targets as time goes on. We note the good work being done by both RPSEA and NETL in collecting and archiving the results of past and current projects. This work is important.

## Attachment 5

### Recommendation No. 2-1

DOE should maintain documentation and dissemination of the results after the termination of active research when personnel previously associated with the program become engaged in new projects. Funding should be specifically allocated to this activity.

### Recommendation No. 2-2

Active steps should continue to be taken to bring the results of the program to the attention of possible beneficiaries. This should include *inter alia*, the maintenance of a web site and making presentations at conferences. These presentations should not only concern the results of particular projects, but also bring the attention of the public to the existence of the archive itself.

### Finding No. 3: Workings of the Advisory Committee

Members of the Subcommittee have enjoyed participating in UDAC activities with the diversity of the group providing interesting and stimulating discussions. We believe that forming the committee from a group that has expertise in many fields relating to petroleum engineering has been helpful in broadening the scope of projects that are being funded by the program. Since the current funding is aimed at a very broad target (to advance research in any aspect of ultra deepwater petroleum exploration and production) this was an ideal environment to address subjects that are not found in the more common, much more finely focused programs.

From time to time, we have requested that we be informed as to whether our recommendations have had an influence on the direction of the work, and this has generally been the case. The committee is interested in the research outcomes.

### Recommendation No. 3-1

If other research efforts require an Advisory Committee similar to this effort, the committee should include a wide array of experts (not necessarily only from the field of petroleum engineering) so as to be able to consider a very wide range of research topics.

### Recommendation No. 3-2

The committee recommends that the committee members continue to be informed as to the results from the research program and other related programs not only while the research is active, but also afterwards.