Ultra-Deepwater Advisory Committee (UDAC)
September 9-10, 2008
Sixth Meeting

Meeting Minutes

A Federal Advisory Committee to the U.S. Secretary of Energy

Ultra-Deepwater Advisory Committee

I hereby certify that this transcript constitutes an accurate record of the Sixth Ultra-Deepwater Advisory Committee Meeting held on September 9-10, 2008 at the Alexandria Hilton in Alexandria, Virginia.

Kent Abadie, Chair
Ultra-Deepwater Advisory Committee

9/10/09

Date

A Federal Advisory Committee to the U.S. Secretary of Energy

Ultra-Deepwater Advisory Committee
Sixth Meeting
September 9–10, 2008
Alexandria Hilton, Alexandria, Virginia

September 9, 2008

Welcome

The Designated Federal Officer (DFO), Mr. Guido DeHoratiis, convened the Sixth Meeting at 8:00 a.m. He opened by welcoming the 2008–2010 Ultra-Deepwater Advisory Committee (the Committee) members, acknowledging the returning members, and offering a special welcome to the new members. Attachment 1 lists all members of the 2008–2010 Committee.

Mr. DeHoratiis introduced the Chair, Kent Abadie and the Vice Chair, Arnis Judzis. Mr. DeHoratiis then reviewed the safety guidelines for the meeting. For the record, Attachment 2 contains the appointment documents for Messrs. Abadie and Judzis, signed by Assistant Secretary for Fossil Energy, James Slutz, and Attachment 3 contains the approved meeting agenda.

Ethics Training

At 8:10 a.m., Ms. Christina Hymer, Department of Energy (DOE) Office of General Counsel, conducted the ethics training required annually for special Government employees (SGE). She highlighted the role of the SGEs and the circumstances under which they are obligated to recuse themselves from Committee discussions. She noted that SGEs are appointed by the Secretary for their expert opinion while representative members represent the point of view of particular groups. Ms. Hymer's handouts are included as Attachment 4, and Attachment 5 lists the point of view each member was appointed to represent.

Introductions

At 8:20 a.m., Mr. DeHoratiis invited general introductions of the Committee members, DOE staff, and contractors supporting the meeting. Attachment 6 contains names of all present.

Committee Instructions

At 8:30 a.m., Mr. DeHoratiis discussed the role of the Committee, stressing their responsibilities as advisors to the Secretary of Energy. His presentation materials are

included in Attachment 7. He also reviewed meeting objectives and presented strategic questions to guide the Committee.

Committee Orientation

At 8:40 a.m., Ms. Elena Melchert, the Committee Manager, provided an orientation included as Attachment 8, focusing on the evolution of Subtitle J activities and accomplishments from the time of enactment of the Energy Policy Act of 2005 in August of 2005 through the expected date of delivery of the Committee's final recommendations in October 2008.

Presentations

DOE Oil and Natural Gas Research, Development, and Demonstration (RD&D) Program and Status of the Ultra-Deepwater and Unconventional and Other Petroleum Resources Research Program

At 8:45 a.m., Mr. John Duda, Director, National Energy Technology Laboratory (NETL) Strategic Center for Natural Gas and Oil presented an overview of the Oil and Gas Research Program as detailed in Attachment 9. He provided some background on DOE's role in support of the Nation's energy security. He also highlighted the funding of the Department's oil and gas research and development program to show how the Energy Policy Act of 2005 (EPAct 2005), Title IX, Subtitle J, Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Research (Subtitle J) program relates to DOE's traditional oil & gas research programs.

The Committee broke for coffee at 10:00 a.m. and reconvened at 10:30 a.m.

Upon reconvening, Ms. Melchert reviewed the Committee attendance, noting absentee members and confirming the presence of a quorum.[1] She also reiterated the importance of each member's contribution to the work of the Committee, and of the particular points of view they must bring to Committee discussions as representative members or as SGEs.

Mr. Duda then provided background on the Section 999 oil and gas research program and the role of the competitively selected program consortium, Research Partnership to Secure Energy for America (RPSEA), and on the specific responsibilities that NETL bears in the execution of the overall program (Attachment 10). NETL has two key roles: 1) to manage the RPSEA contract, and 2) to conduct complementary research in support of the Subtitle J goals. He explained the requirements associated with the annual plan, and how transmitting the annual plan to Congress is essential to making funds available for the program.

[1] A quorum was defined as one half of the full time appointed members plus one. In this case, as there were 14 full time members on the Committee, 8 members were required for a quorum.

Next, he reviewed the key milestone dates associated with the *2008 Annual Plan* in terms of transmittal to Congress, availability of funds, and schedule for release of solicitations. He noted that the *2008 Annual Plan* had been transmitted to Congress and that the Fiscal Year 2008 funds had been made available during August 2008.

When Mr. Duda received questions regarding project schedules, the Committee's attention was drawn to the meeting packet that contained the list of the 2007-funded projects that have been selected and awarded to date. Attachment 11 includes all the items provided to the Committee members and the public in the meeting packet.

A total of 18 subcontracts had been awarded. The Unconventional Resources program had awarded 10 subcontracts, the Small Producer program had 7 subcontract awards, and the Ultra-Deepwater (UDW) program had 1 subcontract award. Then, Mr. Duda updated that information by stating that two additional subcontracts had been approved for award in the UDW area.

Mr. Duda discussed that the Technical Committee[2] had been organized by NETL to review the NETL Complementary Research Program. He noted that the Complementary Research Program was judged to be non-duplicative and that the Technical Committee determined that sufficient communication channels are in place to ensure this continues. The Technical Committee's report is appended to these minutes as Attachment 12.

Also discussed was that the Government Accountability Office (GAO) will be reviewing an independent audit[3] of the Program Consortium, and that results are expected in 6–8 weeks. The Secretary of Energy is required to transmit the final audit to Congress. The Committee requested a copy of the final audit when it becomes available.

Mr. Duda then discussed the highlights of the collaborative process between NETL and RPSEA involved in executing various requirements of the Subtitle J program. Highlights included: the development of a streamlined subcontract approval process, the active role that NETL was undertaking in coordinating the analysis[4] of program benefits, the overall responsibility assumed by NETL in coordinating the technology transfer program[5], and

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[2] Energy Policy Act of 2005, Title IX, Subtitle J, Section 999H(d) (4) *the establishment and operation of a technical committee to ensure that in-house research activities funded under section 999A(b)(4) are technically complementary to, and not duplicative of, research conducted under paragraphs (1), (2), and (3) of section 999A(b).*

[3] Energy Policy Act of 2005, Title IX, Subtitle J, Section 999B(h) *Audit- The Secretary shall retain an independent auditor, which shall include a review by the GAO, to determine the extent to which funds provided to the program consortium, and funds provided under awards made under subsection (f), have been expended in a manner consistent with the purposes and requirements of this subtitle. The auditor shall transmit a report (including any review by the GAO) annually to the Secretary, who shall transmit the report to Congress, along with a plan to remedy any deficiencies cited in the report.*

[4] Energy Policy Act of 2005, Title IX, Subtitle J, Section 999B(e)(5) *ESTIMATES OF INCREASED ROYALTY RECEIPTS- The Secretary, in consultation with the Secretary of the Interior, shall provide an annual report to Congress … on the estimated cumulative increase in Federal royalty receipts (if any) resulting from the implementation of this subtitle.*

[5] See Attachment 10 for the NETL Technology Transfer overview

finally, the role of NETL in approving RPSEA research subcontracts. Mr. Duda concluded his presentation with a review of the improvements to the subcontract award cycle times for the 2007 program that resulted from enhanced coordination between RPSEA and NETL.

Due to the Committee's concern that only one subcontract had been awarded by RPSEA in the UDW program element, the Committee requested that analysis be provided that illustrated cycle times involved from solicitation through award.

The Committee Manager then asked the Chair to consider the future structure of the Committee. Recognizing that each year more information will be available for Committee review and comment (e.g., progress on the numerous R&D programs including results, schedules, cost performance, technology transfer of results, audits, etc.), it was suggested that the Committee consider its options for conducting business, perhaps establishing standing committees.

In response to questions from the Committee, the DFO responded that the funding for the Section 999 program is independent of normal government appropriation cycles and that unspent funds are carried forward from year to year. Therefore, funding that is unspent at the end of the year is available for expenditure in following years.

Discussion on Annual Plan: Subcommittee Structure/Organization

The Chair asked the Committee to consider alternatives for structuring itself in order to conduct its assessment of the *Draft 2009 Annual Plan* and to prepare its recommendations. He then reviewed the subcommittee structure that was used during prior year sessions.

Regarding the structure of possible standing subcommittees, the Committee Manager reminded the Committee that the full Advisory Committee must always meet in a public forum. Subcommittees may operate less publicly but care must be taken to ensure that the subcommittees do not operate in such a fashion as to bypass the transparency of operations associated with meetings of the full Committee.

The Committee broke for lunch at 11:50 a.m. and reconvened at 12:45 p.m.

2009 Annual Plan Overview Presentation

The Chair introduced Mr. Mike Ming, President, RPSEA, at 12:45 p.m. He presented an update of RPSEA activity (Attachment 13). He shared that a total of 43 projects had been selected by RPSEA for subcontract negotiation, and that 26 subcontracts had been awarded. He noted that the first phase of awards focused on the Unconventional Resources and Small Producer program elements.

The format of the first RPSEA subcontract had originally been developed as the universal subcontract template for all other research organizations. However, after award of the

original contract, it was decided to develop four distinct subcontract templates for universities, not-for-profit organizations, for-profit organizations, and National Laboratories. All contract templates have been in place since July 2008 except for the not-for-profit subcontract template, which is still under development.

It was noted that although, originally, Intellectual Property (IP) rights had been thought to be an issue, a general waiver has been granted by DOE, and now IP issues are more manageable.

Mr. Ming continued with a discussion that focused on the nature of the prime contract between NETL as the Secretary's contractual representative and RPSEA as the program consortium, and the impact of this contractual relationship on the execution of subcontracts by RPSEA.

Overview of the 2009 Draft Annual Plan: Ultra-Deepwater Program

At 1:20 p.m., Mr. Ming introduced Mr. Chris Haver, who presented an overview of the *2009 Draft Annual Plan* related to the Ultra-Deepwater Program element. His presentation is included as Attachment 14.

Mr. Haver began his presentation by reviewing an analysis produced by the Mineral Management Services (MMS) that showed the lag between discovery and development, pointing out that major operators are now contemplating releasing leases with high profile discoveries because they cannot be developed prior to lease expiration.

Mr. Haver then elaborated on several specific issues related to subcontracting complexities associated with the UDW. Among other factors, the Government contracting procedures require companies to adopt their models of cost accounting. As a result, RPSEA has hired accounting professionals to work with the private entities to guide them in adapting their accounting systems to conform to Government requirements.

He noted that a major milestone was realized when Fiscal Year 2008 funds became available during August 2008. Pending is the release of 10 solicitations, and evaluation of proposals is scheduled for November/December 2008, followed by subcontract awards in early Calendar Year 2009. The details of these pending solicitations were not reviewed as they are detailed in the *Draft 2009 Annual Plan* which was made publicly available during August 2008[6].

He reviewed the status of the 2008 program, and in response to some of the discussion, Ms. Melchert reminded the Committee that the legislation prohibits the Committee from

[6] The *Draft 2009 Annual Plan* was posted to various DOE websites during August 2008 and is available at: http://www.fossil.energy.gov/programs/oilgas/ultra_and_unconventional/2009_Annual_Plan/2009_Annual_Plan_Section_999_DOE_August_.pdf

making recommendations on specific projects[7], and that the Committee's duties are related to higher level programmatic issues.

Mr. Haver then discussed an improvement to the process whereby the technical evaluation of the proposal will be conducted separately from other evaluations of the proposal, where applicable, in an effort to attract more players and improve the subcontract negotiation process.

He noted improvements to the 2009 UDW program structure in response to prior Committee recommendation including that the 2009 UDW activities integrate with prior year activities; delay in the availability of Fiscal Year 2009 funding is assumed, so some flexibility is built into the timing of various activities; there will be fewer and more general, thematic RFPs as contrasted with prior years; and, the 2009 UDW plan has a more focused environmental strategy.

Prior year plans had been based on the major field types and development themes related to the Walker Ridge, Keathley Canyon, Alaminos Canyon and the Independence Hub, and the associated solution required to develop those field types. The strategic direction for the 2009 program was restructured, and the RPSEA Policy Advisory Committee developed the program based on pursuing the following six generalized higher level needs:

- Drilling, completion, and intervention breakthroughs
- Appraisal and development geoscience and reservoir engineering
- Significantly extend tieback distances and surface host elimination
- Dry trees/direct well intervention and risers in 10,000 ft. water depth
- Continuous improvement/optimize field development
- Associated safety and environmental trade offs

Mr. Haver then showed how the 2007 and 2008 projects related to these needs and the generation of new initiatives for 2009.

The 2009 UDW program involves 4 to 7 broad initiative-based RFPs with the intention that 5 to 10 projects can be selected, as an effort to attract multiple proposals to a single RFP.

Mr. Haver cautioned that availability of Fiscal Year 2009 funds may impact the schedule for release of the RFPs.

He noted that the 2009 environmental program will likely result from an upcoming RPSEA-led environmental stakeholder's conference, involving industry, academia,

[7] Energy Policy Act of 2005, Title IX, Subtitle J, Section 999D(c) *Prohibition- No advisory committee established under this section shall make recommendations on funding awards to particular consortia or other entities, or for specific projects.*

vendors, and other interested parties in a joint conference on October 2, 2008[8] in Galveston.

Mr. Haver also characterized the funding strategy for the 2009 UDW program as a range of funding for the six key needs areas. The strategy is designed to allow a shift of funds from one needs area to another based on evaluation of actual proposals received. This strategy has a lot more flexibility built into the process in response with prior Committee recommendations. The funding strategy will be used by the Technical Advisory Committee in developing their roadmaps for finalizing solicitations.

A question was raised about the initiative dealing with subsea power as to whether the initiatives were adequately focused on ultra-deepwater. Mr. Haver responded that not only did this initiative seek to explore options for delivering power at various water depths, but also to explore the feasibility of generating power on the ocean floor instead of introducing additional infrastructure into the subsea environment. So indeed, this initiative was focused on ultra-deepwater.

A question was raised regarding the funding levels in the UDW program because some of the projects could quickly exceed the funds available due to the high costs associated with the UDW environment. In response, Mr. Haver confirmed that there is a lot of interest in exploring international collaboration opportunities for cost sharing. He also plans to check on the potential for duplication with international programs. Toward that end, RPSEA is participating in a 2 ½ day international technology summit in October in Scotland to explore this interest with key international technology developers.

Another question was asked related to funding level, specifically about how the program would change if more funds were made available. Mr. Haver responded that if more funding were available he would likely not generate more seed projects, but would instead dedicate additional funds to the demonstration phase of the projects where the costs can be prohibitive and are expected to be a limiting factor in some cases.

Mr. Haver then moved to an overview of the RPSEA technology transfer program which features a phased approach whereby 1.5% of the allocated funds are to be spent by the research provider in developing the necessary outreach communications packages, and the remaining 1% is to be spent by RPSEA in coordinating the overall program, such as setting up workshops, conferences, websites, and other broad initiatives.

In the discussion of technology transfer, the Committee raised a question regarding the need to attract new people to the industry and to enhance training opportunities. The Committee asked the DOE to provide a listing of all the various DOE-sponsored student support programs so that the Committee can make informed recommendations.

[8] The Long-Term Environmental Vision for Ultra-Deepwater Exploration and Production Research Forum and Reception has been postponed due to Hurricane Ike. RPSEA plans to reschedule both events the week of November 9 either in The Woodlands or College Station (TX).

Mr. Haver's presentation concluded at 2:40 p.m. The Committee took a break and reconvened at 3:00 p.m.

Discussion: Subcommittee Structure

The Chair next opened the discussion on the structure of the subcommittees and on preparing a plan for how to accomplish the work of the Committee.

He asked the facilitator to help the Committee identify the major issues. As a result of the group discussions, a theme-based subcommittee structure was established as follows:

- The **Program Focus** Subcommittee was to take a high level view of the full scope of the program to date now that three annual plans have been documented and to consider whether duplication is an issue and whether there are sufficient safeguards in place to avoid duplication. Also, the group is charged with the objective of assessing whether a sufficient level of effort is placed on the exploration function, specifically in the geosciences area.

- The **Program Scope** Subcommittee is charged with the responsibility of reviewing the possible international interactions coupled with considering whether the UDW initiative is applicable to other harsh environments like the promising Chuckchi Sea area in northwestern Alaska.

- The **Process** Subcommittee was concerned with the slow pace of contract awards in the UDW. It appeared to the Subcommittee that the rate of progress was less than desirable and that attention should be focused on this area to ensure that corrective actions steps are taken in a timely manner. A number of techniques were discussed for how best to address these issues, including the use of process scorecards and process flow charts to allow identification of the critical path elements and to consider what can be done to speed up the process. It appeared that contracting was part of the issue and timing of funds release could also be limiting progress. Finally, the solicitations process was to be reviewed in conjunction with the other activities leading to contract award.

- The **Societal Impacts** Subcommittee was to focus on environmental issues. The Committee pointed out that there was no reason to think that the environmental concerns were not receiving sufficient attention, but the Committee felt that a special focus group should be held, considering the high level of attention given to this area. Additionally, this group would also consider other societal factors including assessing future petroleum resource limitations and related environmental and safety concerns.

- Finally, a Subcommittee focused on **Program Progress and Value** was established to consider the value and benefits of the program, adequacy of related program metrics, and consideration for extension of the time horizon and allotted funds for the Section 999 program. The Committee felt that it would be

advantageous to consider what mechanism could be used to solicit additional funding for the program, considering that up to an additional $100 million had been authorized in the original enabling legislation.

Each group was composed of primary members and secondary members. Primary members had the responsibility of developing the specific recommendations for that theme. Secondary members designate those members that do not have a direct role in the working of the subcommittee, but are interested in participating in the development of the recommendations for informational purposes.

Finally, the Editing Subcommittee was established and given the responsibility of taking the final recommendations developed by the Committee and communicating those points in a succinct and polished document to the Secretary of Energy. The Editing Subcommittee only had the authority to edit the wording of the final document but not to alter any of the substance of the full Committee recommendations. This Editing Subcommittee was established based on the successful application of this process in prior years. This ensures that the full Committee can focus on the substance of their recommendations without the burden of having to develop the final wording in the document.

The schedule of the activities for the subcommittees was discussed, including organizing the subcommittees, timing of teleconference meetings, preparation of draft reports, allowing for time to incorporate feedback, finalization of the draft recommendations and release of the draft recommendations to the full Committee in time for the next meeting in Houston (Oct 15). After the Oct. 15 meeting, the Editing Subcommittee would prepare the final document for the full Committee vote via teleconference on Oct. 23.

Details of the subcommittee structure, assignments, and schedule of activities are included in Attachment 15.

The Chair committed to develop a common format for the subcommittees to document their findings and recommendations so that the final reports would be as consistent as possible (Attachment 16)[9].

The Committee concluded its deliberations for the day at 4:50 p.m.

September 10, 2008

Welcome

The Chair called the meeting to order at 8:00 a.m. and asked the Committee Manager to discuss several administrative items and the agenda for the day. She reminded the Committee that the Chair had agreed to hear more about RPSEA's subcontracting

[9] This information was provided to the members via e-mail from the Chair dated 9-23-08. It is included here for the record.

experience associated with the 2007 program. Also, Ms. Melchert confirmed that a quorum was present with nine members in attendance (Attachment 6)[10].

Discussion on Contracting Issues

Information was presented by both NETL and RPSEA that focused on the nature of the prime contract between NETL as the Secretary's contractual representative and RPSEA as the program consortium, and the impact of this contractual relationship on the negotiation of subcontracts by RPSEA. The Committee chose to focus on the process used by RPSEA in getting from solicitation through award.

The Chair suggested that it would be helpful to have a process flow diagram of the RPSEA subcontracting process from the point of solicitation through award, and to identify the time duration of the various process steps during the execution of the *2007 Annual Plan*. This type of analysis would help focus attention on the critical factors. The Chair wanted the Committee to determine if the process is discouraging participation of key performers in the UDW.

Presentations

NETL Complementary Program: NETL Systems Analysis and Planning Activity Overview

At 8:45 a.m., Mr. Duda presented an overview of the Systems Analysis and Planning activity to be followed by David Wildman discussing the details of NETL's Complementary Program. His presentation materials are included in Attachment 18.

NETL Complementary Program: NETL Office of Research and Development

At 9:00 a.m., Mr. Duda introduced David Wildman, who had prepared a detailed overview of the NETL Complementary Research Program. His presentation is provided in Attachment 19.

Mr. Wildman's discussion focused on the key areas in the NETL's Complementary Program, including drilling under extreme conditions, environmental impacts of oil and gas, enhanced and unconventional oil recovery, and resource assessment.

Mr. Wildman's presentation concluded at 9:35 a.m. and the Committee took a short break and reconvened at 9:55 a.m.

Subcommittee Support Activities

Ms. Nateena Dobson then presented the coordination procedures for the subcommittee activities (Attachment 20). She advised that the DOE was prepared to assist the

[10] The list of attending members forming the quorum for the day.

subcommittee chairs in arranging for teleconferences and handling subcommittee communications, interactions with RPSEA, and to help the subcommittees abide by the terms of reference established for the work of the subcommittee.

Ms. Dobson concluded at 10:05 a.m.

General Discussion

While awaiting the arrival of the MMS discussion leader, the Committee discussed administrative items, follow-up items, plans for the next meeting, and subcommittee activities.

The following action items were detailed by the Committee Manager for follow-up from this meeting[11]:

1. Preparing a flow chart to document the flow of funds to the research providers.
2. Developing process score cards for activities leading to contract award.
3 Distributing the final audit of the RPSEA/NETL interface aimed at avoiding duplication of effort.
4. Documenting the process curves for the 2007 contract awards.
5. Documenting the issues that exist between RPSEA and NETL regarding contract templates, including listing of specific issues previously communicated by RPSEA and NETL's response to those items.
6. Preparing a flow chart to document the activities from solicitation to contractor award including noting time lines, milestone dates, progress report 'S' curves, Gantt Charts, funds availability from MMS and appropriate benchmarks, and summary of lessons learned.
7. Listing project selections under NETL's Traditional Oil and Gas R&D Program
8. Listing programs that DOE is involved in to stimulate interest in and attract high school and college students to the petroleum curricula.

Mr. DeHoratiis explained that a presentation had been prepared by the MMS on the moratoria area, but they have been delayed in getting to the meeting. Therefore, the package of presentation slides was distributed to the Committee, as shown in Attachment 21.

The floor was not opened for public comments and as none had registered to speak before the Committee. The meeting adjourned at 10:45 a.m.

[11] Attachment 20 Follow On Information Pursuant to the Sixth Meeting of the Ultra-Deepwater Advisory Committee on September 9-10, 2008

Attachments

	Presenter	Topic
1	For the Record	2008–2010 Ultra-Deepwater Advisory Committee (UDAC) Member Roster
2	For the Record	Letter appointing the Committee Chair and Vice Char
3	For the Record	Meeting Agenda
4	Ms. Tina Hymer	Ethics Briefing
5	For the Record	UDAC Member Point of View Represented
6	For the Record	Sign-In Sheets
7	Mr. Guido DeHoratiis,	Committee Instructions
8	Ms. Elena Melchert	Committee Orientation
9	Mr. John Duda	DOE Oil and Natural Gas Research, Development, and Demonstration Program
10		Status of the Ultra-Deepwater and Unconventional and Other Petroleum Resources Research Program
11	For the Record	Meeting Packet of Information
12	For the Record	Technical Committee Report (July 2008)
13	Mr. Mike Ming	RPSEA Overview
14	Mr. Chris Haver	Overview of the 2009 Draft Annual Plan: Ultra-Deepwater Program
15	For the Record	Subcommittee Structure, Assignments and Schedule
16	Mr. Kent Abadie	Subcommittee Report Format
17	Mr. John Duda	NETL Complementary Program: NETL Systems Analysis and Planning Activity Overview
18	Mr. Dave Wildman	NETL Complementary Program: NETL Office of Research and Development
19	Ms. Natenna Dobson	Subcommittee Support Activities
20	MMS	Offshore Update
21	For the Record	Follow On Information Pursuant to the Sixth Meeting of the Ultra-Deepwater Advisory Committee on September 9-10, 2008

Attachment 1

Ultra-Deepwater Advisory Committee
2008-2010

Mr. Kent F. Abadie Manager, Development and Production Shell Exploration & Production Company New Orleans, LA	Dr. Joe R. Fowler* President Stress Engineering Services, Inc. Houston , TX	Mr. Stephen Sears* Department Chair, Dept. of Petroleum Engineering Louisiana State University Baton Rouge, LA
Mr. Raymond G. Charles Area Exploration & Geoscience Manager ExxonMobil Exploration Company Houston, TX	Dr. Luc T. Ikelle* Robert R. Berg Professor Texas A&M University College Station, TX	Mr. Paul T. Tranter Vice President, Asset Management, Floating Rigs Transocean, Inc. Houston , TX
Mr. Paul N. Cicio President Industrial Energy Consumers of America Washington, DC	Mr. Arnis Judzis Vice President, TerraTek Schlumberger Salt Lake City, UT	Mr. Paul M. Wiencke Director Research Council of Norway Oslo, Norway
Mr. Daniel J. Daulton U.S. Technical Marketing Manager BJ Services Company Houston, Texas	Mr. Richard K. Mitchell Vice President, Worldwide Drilling & E&P Services Devon Energy Corporation Houston, TX	Ms. Mary Jane Wilson* President and CEO WZI Inc. Bakersfield, CA
Dr. Quenton R. Dokken Executive Director Gulf of Mexico Foundation Corpus Christi, TX	Mr. Daniel T. Seamount, Jr. Chair Alaska Oil & Gas Conservation Commission Anchorage, AK	

* special Government employee

Attachment 2

Department of Energy
Washington, DC 20585

MEMORANDUM FOR THE RECORD

FROM: **JAMES A. SLUTZ**
ASSISTANT SECRETARY (ACTING)
OFFICE OF FOSSIL ENERGY

SUBJECT: **Appointment of Committee Chair and Vice-Chair**
Ultra-Deepwater Advisory Committee

Whereas, article 12 of the committee charter states that the Secretary shall designate a chair and vice-chair, and article 1.23 of the Department of Energy Delegation Order No. 00-002.00G and article 1.5 of the Department of Energy Redelegation Order No. 00-002.04C transfer this authority of the Secretary to the Assistant Secretary for Fossil Energy, I hereby designate Mr. Kent F. Abadie and Mr. Arnis Judzis to serve as the Chair and Vice-Chair, respectively, of the Ultra-Deepwater Advisory Committee for the two year term of 2008-2010.

Attachment 3

Ultra-Deepwater Advisory Committee
September 9-10, 2008
The Hilton Alexandria Old Town, Alexandria, VA
Meeting Room: Washington/Jefferson

September 9, 2008

7AM	Member Breakfast / Open Registration SGE Oath of Office	
8:00	Call to Order/ Welcome / Introductions	Guido DeHoratiis Designated Federal Officer
8:10	FACA Overview / Ethics Briefing	Christina Hymer, DOE Office of General Counsel
9:10	Committee Instructions	Guido DeHoratiis
9:30	Committee Orientation Committee questions/discussion	Elena Melchert Committee Manager
10:00	BREAK	
10:15	DOE Oil & Gas Program Committee questions/discussion	Guido DeHoratiis, Acting Deputy Assistant Secretary for Oil and Natural Gas
10:30	DOE Oil & Gas Research & Development Program; Committee questions/discussion Status of the Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Program 2007 – 2008	John R. Duda, Director, Strategic Center for Natural Gas and Oil National Energy Technology Laboratory (NETL)
11:30	Committee questions/discussion	
Noon	(Working) LUNCH 1 HOUR BREAK	
1:00	Overview of the *2009 Draft Annual Plan: Ultra-Deepwater Program*	Christopher Haver Michael Ming Research Partnership to Secure Energy for America (RPSEA)
2:00	Committee questions/discussion	
2:30	BREAK	
2:45	Committee discussion	Kent Abadie, UDAC Chair
5PM	Adjourn	Guido DeHoratiis

Ultra-Deepwater Advisory Committee
September 9-10, 2008
The Hilton Alexandria Old Town, Alexandria, VA
Meeting Room: Washington/Jefferson

September 10, 2008

7AM	Member Breakfast / Open Registration	
8:00	Call to Order Continue Committee Discussion/Questions re: *2009 Annual Plan*	Kent Abadie
9:00	Overview of NETL Complementary Research Program	John R. Duda Dave Wildman, NETL Office of Research and Development
9:30	Committee Discussion	Kent Abadie
10:00	Next Steps: Subcommittees	Natenna Dobson, UDAC Subcommittee Coordinator
10:30	Offshore Update	Renee Orr, Chief, Leasing Division, Offshore Energy and Minerals Management Program, Minerals Management Service
11:30	Summarize open action items	Elena Melchert
Noon	Adjourn	Kent Abadie

Attachment 4

DEPARTMENT OF ENERGY

Advisory Committee Ethics Law Summary

As a "special" Government employee (SGE), most Federal ethics laws and regulations apply to you. Given they apply to all Federal employees carrying out a wide variety of Government tasks some rules will inevitably be less relevant to your duties than others. Even so, your careful adherence to the rules should foster public confidence that DOE's decision-making processes are not tainted by improper influences. That is why Executive Order 12674 further cautions all employees to "endeavor to avoid any action creating the appearance that they are violating the law or the ethical standards." Some SGEs may have conflicts of interests; however, in most instances a waiver can be issued to cure the conflict and permit participation on the advisory committee.

I. DISQUALIFICATIONS

A. Absent a specific written waiver or a regulatory exemption, a criminal statute bars your participation, in your Government capacity, in any particular matter, if you or any of the following individuals or entities whose interests are imputed to you, have financial interests in the outcome:

- Your spouse or minor child
- A business partner
- An organization with which you are employed or affiliated as an officer, director, trustee, or general partner.
- An organization with which you are negotiating for employment or have an arrangement for future employment.

B. Regulations also restrict your participation in matters affecting specific identified parties involving:

- Relatives or members of your household
- Individuals or entities with whom you have (or seek) business or financial relationships
- Entities your spouse, parents, or dependent children work for (or seek to work for) as employees, officers, directors, trustees, consultants, etc.
- Entities you have served as an employee, officer, director, trustee, consultant, etc. within the past 12 months
- Organizations in which you are an active participant -- *e.g.*, committee chair or spokesperson.

C. Your financial disclosure report will be reviewed and you will be given specific guidance and a waiver, if appropriate. Questions about potential waivers of the criminal restrictions should be addressed to the Office of the Assistant General Counsel for General Law.

II. MISUSE OF POSITION

A. Do not use or disclose non-public Government information.

B. Do not use your public office for private gain (whether your own or another's).

C. Do not use your official position or advisory committee title for any purpose other than in connection with your advisory duties.

III. REPRESENTATION

A. A criminal statute provides that:

- You must not represent someone else before the Government, including DOE, on any specific party matter in which you have participated as a Government employee. This law also bars you from accepting fees from such representation done by others.

- Additional restrictions apply if an SGE works for more than 60 days during a 365-day period. The Department does not anticipate that any advisory committee members will approach this 60-day limit.

B. Another law bars you from serving as an agent of a foreign principal, as defined in the Foreign Agents Registration Act.

IV. RECEIPT OF GIFTS

A. Basic Rule: Do not solicit or accept gifts and favors from any "prohibited source" or if the gift is given because of your official DOE position. A “prohibited source” is any individual or organization who:

- Seeks official action from DOE;
- Does, or seeks to do, business with DOE;
- Conducts activities regulated by DOE;
- Has interests that may be substantially affected by the performance of your official duties; or
- Is an organization the majority of whose members are described above

B. Commonly invoked exceptions include permission to accept:

- Benefits resulting from your non-DOE business or employment activities (or those of your spouse), when it is clear that the benefits have not been offered or enhanced because of your Government status
- Gifts clearly motivated by family relationship or personal friendship
- Items worth $20 or less per occasion -- up to $50 a year from anyone source.

Exceptions should not be abused.

Please call your Designated Federal Officer at _____ or Susan Beard or Sue Wadel, Office of the Assistant General Counsel for General Law at 202-586-1522.

THE WHITE HOUSE

WASHINGTON

January 20, 2001

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

SUBJECT: Standards of Official Conduct

Everyone who enters into public service for the United States has a duty to the American people to maintain the highest standards of integrity in Government. I ask you to ensure that all personnel within your departments and agencies are familiar with, and faithfully observe, applicable ethics laws and regulations, including the following general principles from the Standards of Ethical Conduct for Employees of the Executive Branch:

(1) Public service is a public trust, requiring employees to place loyalty to the Constitution, the laws, and ethical principles above private gain.

(2) Employees shall not hold financial interests that conflict with the conscientious performance of duty.

(3) Employees shall not engage in financial transactions using nonpublic Government information or allow the improper use of such information to further any private interest.

(4) An employee shall not, except as permitted by applicable law or regulation, solicit or accept any gift or other item of monetary value from any person or entity seeking official action from, doing business with, or conducting activities regulated by the employee's agency, or whose interests may be substantially affected by the performance or nonperformance of the employee's duties.

(5) Employees shall put forth honest effort in the performance of their duties.

(6) Employees shall not knowingly make unauthorized commitments or promises of any kind purporting to bind the Government.

(7) Employees shall not use public office for private gain.

(8) Employees shall act impartially and not give preferential treatment to any private organization or individual.

(9) Employees shall protect and conserve Federal property and shall not use it for other than authorized activities.

(10) Employees shall not engage in outside employment or activities, including seeking or negotiating for employment, that conflict with official Government duties and responsibilities.

(11) Employees shall disclose waste, fraud, abuse, and corruption to appropriate authorities.

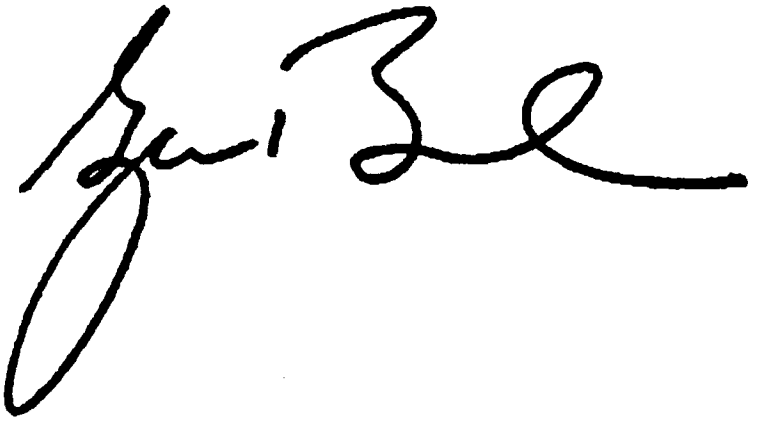
(12) Employees shall satisfy in good faith their obligations as citizens, including all just financial obligations, especially those -- such as Federal, State, or local taxes -- that are imposed by law.

(13) Employees shall adhere to all laws and regulations that provide equal opportunity for all Americans regardless of race, color, religion, sex, national origin, age, or handicap.

(14) Employees shall endeavor to avoid any actions creating the appearance that they are violating applicable law or the ethical standards in applicable regulations.

Executive branch employees should also be fully aware that their post-employment activities with respect to lobbying and other forms of representation will be bound by the restrictions of 18 U.S.C. 207.

Please thank the personnel of your departments and agencies for their commitment to maintain the highest standards of integrity in Government as we serve the American people.



Attachment 5

Ultra-Deepwater Advisory Committee
Member Point of View Represented
2008-2010

Committee Member	**Point of View Represented**
Kent Abadie	Major Oil
Raymond Charles	Major Oil
Paul Cicio	Consumers
Daniel Daulton	Service Sector
Quenton Dokken	Environmental Interests
Joe Fowler	SGE
Luc Ikelle	SGE
Arnis Judzis	Service Sector
Richard Mitchell	Large Independent
Daniel Seamount	States
Stephen Sears	SGE
Paul Tranter	Major Offshore Drilling
Morten Wiencke	Foreign Government
Mary Jane Wilson	SGE

Attachment 6

Ultra-Deepwater Advisory Committee Meeting
Sign-In Sheet - September 9, 2008

Last Name	First Name	Organization	Sign
Abadie	Kent F.	Shell Exploration & Production Company	
Charles	Raymond G.	ExxonMobil Exploration Company	**UNABLE TO ATTEND**
Cicio	Paul N.	Industrial Energy Consumers of America	
Daulton	Daniel J.	BJ Services Company	
Dokken	Quenton R.	Gulf of Mexico Foundation	
Fowler*	Joe R.	Stress Engineering Services, Inc.	
Ikelle*	Luc T.	Texas A&M University	
Judzis	Arnis	Schlumberger, Inc.	
Mitchell	Richard K.	Devon Energy Corporation	
Seamount, Jr.	Daniel T.	Alaska Oil & Gas Conservation Commission	
Sears*	Stephen	Louisiana State University	
Tranter	Paul T.	Transocean, Inc.	
Wiencke	Paul M.	Research Council of Norway	
Wilson*	Mary Jane	WZI Inc.	

* Special Government Employee

Ultra-Deepwater Advisory Committee Meeting
Quorum of Members
Sign-In Sheet - September 10, 2008

Last Name	First Name	Organization	Sign
Abadie	Kent F.	Shell Exploration & Production Company	**PRESENT**
Charles	Raymond G.	ExxonMobil Exploration Company	**ABSENT**
Cicio	Paul N.	Industrial Energy Consumers of America	**ABSENT**
Daulton	Daniel J.	BJ Services Company	**PRESENT**
Dokken	Quenton R.	Gulf of Mexico Foundation	**ABSENT**
Fowler*	Joe R.	Stress Engineering Services, Inc.	**PRESENT**
Ikelle*	Luc T.	Texas A&M University	**ABSENT**
Judzis	Arnis	Schlumberger, Inc.	**PRESENT**
Mitchell	Richard K.	Devon Energy Corporation	**ABSENT**
Seamount, Jr.	Daniel T.	Alaska Oil & Gas Conservation Commission	**PRESENT**
Sears*	Stephen	Louisiana State University	**PRESENT**
Tranter	Paul T.	Transocean, Inc.	**PRESENT**
Wiencke	Paul M.	Research Council of Norway	**PRESENT**
Wilson*	Mary Jane	WZI Inc.	**PRESENT**

* Special Government Employee

Ultra-Deepwater Advisory Committee Meeting
September 9-10, 2008

Staff Roster

U.S. Department of Energy – Office of Oil and Natural Gas

Guido DeHoratiis Acting Deputy Assistant Secretary	Acting Designated Federal Officer
Elena Melchert	Committee Manager
Natenna Dobson	Office of Oil & Natural Gas, Section 999 Team
Trudy Transtrum	Communications Coordinator, Office of Oil & Natural Gas

National Energy Technology Laboratory

John R. Duda	Director, Strategic Center for Natural Gas & Oil
Al Yost	Ultra-Deepwater & Unconventional Natural Gas and other Petroleum Resources Technology Manager (Acting)
Gary Covatch	Strategic Center for Natural Gas & Oil
Phil Dipietro	Office of Systems Analysis & Planning
David Wildman	Office of Research & Development

Technology & Management Services, Inc.

Mauri Lappinen	Committee Recorder
Karl Lang	Facilitator Support
Rob Matey	Committee General Support
Dominique Wells	Committee Registration Support

Attachment 7

Ultra-Deepwater Technology Advisory Committee

September 9-10, 2008

Guide DeHoratiis
Acting Deputy Assistant Secretary
Office of Oil and Natural Gas
Designated Federal Officer

Committee Instructions

- **Role: Provide advice to DOE**
  - Provide recommendations on the development and priorities of the research program
  - Look at objectives of the annual plan within the context of the overall plan
  - Focus on Consortium-administered portion of the Plan, and also comment on NETL research and potential for duplication between NETL and Consortium portions
- **Guidance**
  - Focus on big picture. Don't rewrite plan but advise on strengths and weaknesses.
  - Consensus is good, but should not be forced.
  - Majority opinion with minority viewpoint is fine.

Meeting Objectives

- **Finalize Committee advice by October 2008**
  - During Today's meeting
    - Speakers provide background presentations
      - Committee asks clarifying questions
    - Facilitated Committee Discussions
      - Initiate discussion on Plan
      - Develop process to complete Committee work
  - October meeting in Houston
    - Draft final recommendations
    - Appoint editing subcommittee
  - Conference call on October 23, 2008
    - Approval of final recommendations that will be presented to DOE

Strategic Questions for the Committee

- **Does the plan, as a whole, represent the best approach for utilizing the R&D funds available?**
  - Does it fit well within the overall oil and gas program?
- **Are the plan's goals & objectives appropriate?**
  - Do they comply with the intent of EPACT 999?
  - Are they achievable yet challenging?
  - Do annual activities work toward longer-term goals?
- **Are the proposed R&D themes appropriate?**
  - Do number of themes fit the expected budget?
  - Do they allow flexibility given the uncertainty of response?
- **Is the solicitation process appropriate?**
  - Fair and open, competitive, transparent?

Attachment 8

Ultra-Deepwater Advisory Committee

September 9-10, 2008

Elena Melchert
Office of Oil and Natural Gas
Committee Manager

2008 - 2010 Ultra-Deepwater Advisory Committee Member Appointment Process

August 2005	Energy Policy Act of 2005 signed into law [P.L. 109-58, 119 Stat. 922]
November 2005	National Energy Technology Laboratory (NETL) released solicitation for a consortium to administer 3 program elements under Section 999A
February 2006	Proposals received for program consortium solicitations
May 2006	*Ultra-Deepwater Advisory Committee* (UDAC) and *Unconventional Resources Technology Advisory Committee* (URTAC) chartered (Section 999D)
June 2006	Program consortium selected
January 2007	Contract with Research to Secure Energy for America (RPSEA) as the Program consortium goes into effect (calendar year contract)

2008 - 2010 Ultra-Deepwater Advisory Committee Member Appointment Process

May 2007	UDAC and URTAC members appointed for 2007-2008
June-July 2007	Advisory Committees meet to review 2007 Annual Plan and deliver written recommendations to the Secretary of Energy
August 2007	2007 Annual Plan published; DOE/Fossil Energy (FE) receives FY07 funds; RPSEA receives initial research funding
October 2007	Program consortium releases initial request for proposals for the Small Producer Program Element and for the Unconventional Natural Gas and Other Petroleum Resources Program Element
November 2007	NETL Complementary Research Program receives initial funding
November 2007	Program consortium releases initial request for proposals for the Ultra-Deepwater Program Element

2008 - 2010 Ultra-Deepwater Advisory Committee Member Appointment Process

January 2008	Advisory Committees meet to review 2008 Annual Plan
February 2008	2007 Annual Plan transmitted to Congress
February 2008	Program consortium selects 7 projects for Small Producer Program Element
March 2008	Advisory Committees meet to complete review of 2008 Annual Plan and provide written recommendations; final report delivered to the Secretary
March 2008	Program consortium selects 19 projects for the Unconventional Natural Gas and Other Petroleum Resources Program Element
June 2008	Technical Committee [Section 999H(d)(4)] determines that the NETL Complementary Research Program is not duplicative of the consortium-administered program
June 2008	Fieldwork for audit completed

2008 - 2010 Ultra-Deepwater Advisory Committee Member Appointment Process

July 2008	Advisory Committees renewal charters signed
July 2008	Program consortium announces additional selections of 9 projects for Ultra-Deepwater Program Element
August 2008	2008 Annual Plan transmitted to Congress and published in the Federal Register
August 2008	DOE/FE receives FY08 funds
August 2008	Audit report received by DOE & GAO
August 2008	UDAC & URTAC members appointed for 2008-2010
September 2008	UDAC & URTAC meet to begin draft review of Draft 2009 Annual Plan
October 2008	UDAC & URTAC meet to hear and discuss Subcommittee reports, determine final recommendations, and adjourn work on the Draft 2009 Annual Plan

Attachment 9

Oil and Natural Gas RD&D Program
UDW Federal Advisory Committee

John R. Duda, Director, SCNGO

September 9, 2008

Outline

- **Introduction to NETL**
- **Unconventional resources**
- **R&D portfolio**
- **Status of Title IX, Subtitle J, Section 999**

National Energy Technology Laboratory

- Only DOE national lab dedicated to fossil energy
  - Fossil fuels provide 85% of U.S. energy supply
- One lab, three research campuses
- 1,200 Federal and support-contractor employees
- Research encompasses fundamental science through technology demonstration

Pennsylvania

West Virginia

Oregon

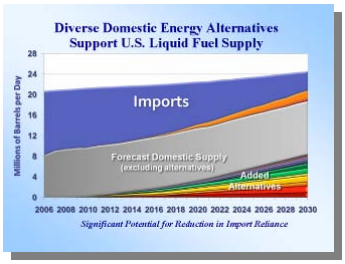
NETL Mission

Implement research, development, and demonstration programs to resolve the environmental, supply, and reliability constraints of producing and using fossil resources

NETL Applies Basic Science to Technology Development, Demonstration, and Transfer

Onsite Research and Development

Systems, Analysis, and Planning



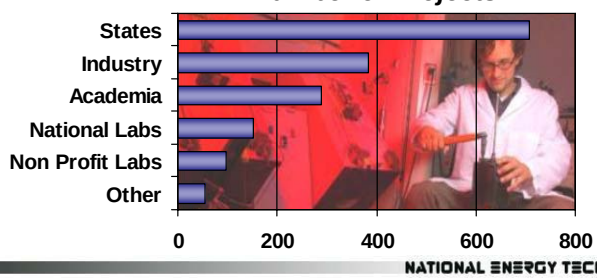
Extramural Research and Collaboration

More Than 1,800 Activities in the United States and 40+ Other Countries

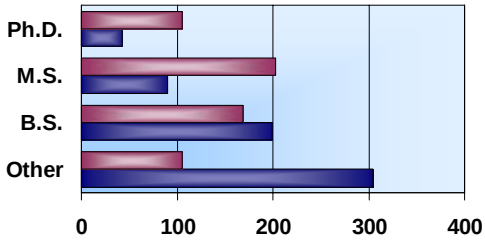
NETL Implements & Manages Extramural RD&D

- **Over 1,800 research and deployment activities in U.S. and more than 40 foreign countries**
- **Total award value over $9 billion**
- **Private sector cost-sharing over $5 billion**
  - Leverages DOE funding
  - Ensures relevance
  - Accomplishes mission through commercialization

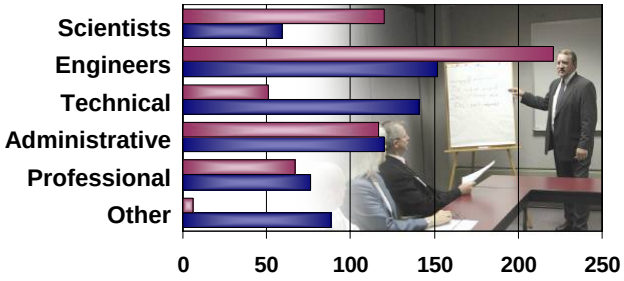
Number of Projects



A Well-Trained Workforce



582 Federal Employees
636 Onsite Contractors



Contractor statistics as of 03/15/2008; Federal statistics as of 05/16/2008

Outcomes from NETL's Programs

Technology
- Assist in providing U.S. with clean, secure, and abundant energy in mid- to longer-term

Policy
- Positively impact development of sound energy policies

Competitiveness
- Help maintain technology competitiveness of U.S. energy industry

Stability
- Appropriately transfer technology to developing countries to improve geopolitical stability / global climate

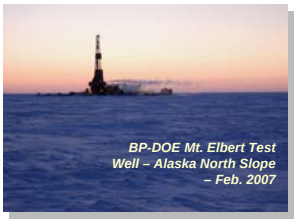
Workforce
- Provide trained energy workforce through university research programs

Region
- Contribute to regional economic development

R. Boyle, 02/08/2008

"Unconventional" and *Frontier* Resources

- **Methane Hydrates**
  - 200,000 Tcf domestic GIP
- ***Conventional Oil* in Unconventional Formations**
  - 3.7 Billion bbls (Bakken Shale)
- **Heavy Oil**
  - 35.3 Billion bbls (NA)
- **Circum-Arctic Resources**
  - 412 Billion BOE
- **Enhance Oil Recovery**
  - 89 Billion bbls

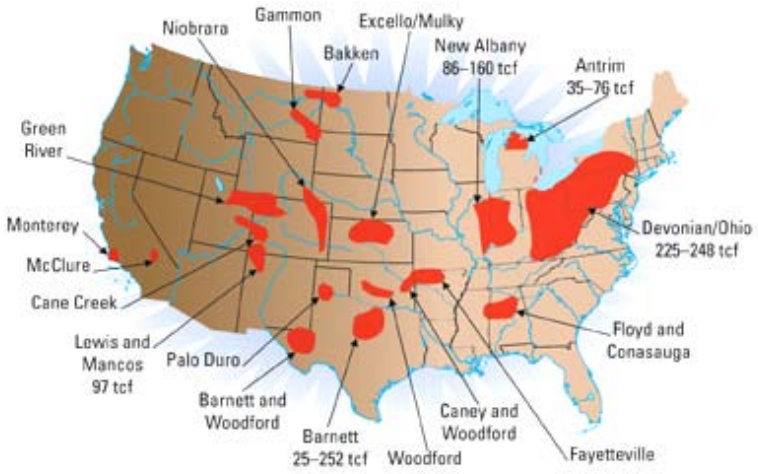


BP-DOE Mt. Elbert Test Well – Alaska North Slope – Feb. 2007

NETL and USGS scientists collaborate on India Expedition – Aug. 2006

Updated 02/25/2008

Major U.S. Shale Basins



Current estimates put the North American shale gas resource at 1,200 trillion cubic feet total gas in place

Source: E&P Oil and Gas Investor; Hart Energy Publishing.

Updated 02/25/2008

NETL Natural Gas & Oil R&D Program

Comprehensive R&D Portfolio

Exploration & Production

Arctic Energy Office

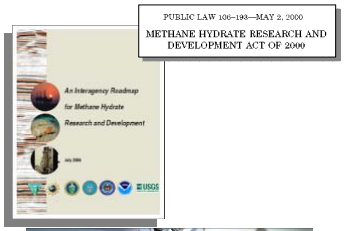
Methane Hydrates

Environmental Solutions

EPACT 2005 Title IX, Subtitle J

Methane Hydrate

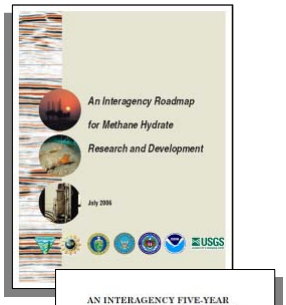
- **DOE-led interagency program**
  - Five-year authorization by EPACT 2005 Sec 968
  - Seven collaborating agencies
- **Program addresses**
  - Safety & seafloor stability
  - Global climate impacts
  - Future Resource Potential
- **Impacts**
  - Better informed ocean/climate policy
  - Potential new domestic gas resource
  - Global realignment of energy supply

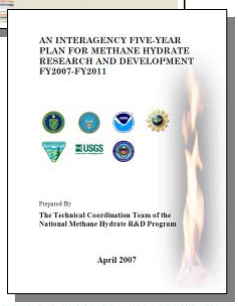


NETL and USGS scientists collaborate on India Expedition – Aug. 2006

R&D Priorities

- **Better understand controls on gas hydrate occurrence**
- **Better understand key remaining properties of hydrate-sediment mixtures**
- **Understand causes, fluxes, and fates of methane between GH systems, the ocean, and the atmosphere**
- **Create a validated numerical simulation capability**
- **Develop a validated exploration capability**
- **Conduct a series of multi-well marine exploration expeditions**
- **Conduct a series of long-term production tests leading to viable production technology**





The Program

NETL's Gas Hydrate R&D effort

- **Marine: Multi-site drilling and coring program**
  - Logging and coring
  - Test alternative exploration concepts/technologies
  - Data: assessment of potentially recoverable gas
- **Arctic: Long-term production testing with environmental monitoring**
  - Prudhoe Bay project (BP)
  - North Slope Borough
- **Technology Development/Modeling**
  - Field sampling and analysis tools
  - Numerical models (molecular to field scale)
  - Exploration & production systems
- **International Collaboration**
  - Japan recent proposal for extensive collaboration
  - India, China & Korea: NETL ORD personnel direct support

Methane Hydrates
2008 Funding Opportunity Announcement

- Gas Hydrate Resource Assessment and Field Testing on the Alaska North Slope
- Hydrate Production Systems Research
- Hydrate Detection and Characterization via Remote Sensing Tools
- Hydrate in the Global Environment
- Nine Selections for Negotiation (to Award)

Methane Hydrates
2008 FOA Selections

- Gas Hydrate Resource Assessment and Field Testing on the Alaska North Slope
  - Two selections
- Hydrate Production Systems Research
  - No selections
- Hydrate Detection and Characterization via Remote Sensing Tools
  - Two selections
- Hydrate in the Global Environment
  - Five selections

Environmental and Unconventional Oil/EOR

2008 Funding Opportunity Announcement

- Produced Water, and Other Natural Gas and Oil Environmental Issues
- Water Management Solutions to Enable Oil Shale Resource Development
- Alaska Environmental Issues
- Unconventional Resources/EOR
- Alaska North Slope Heavy Oil
- 16 Selections for Negotiation (to Award)

Environmental and Unconventional Oil/EOR

2008 FOA Selections

- Produced Water, and Other Natural Gas and Oil Environmental Issues
- Water Management Solutions to Enable Oil Shale Resource Development
- Alaska Environmental Issues

  Seven selections (environmental areas)
- Unconventional Resources/EOR
- Alaska North Slope Heavy Oil

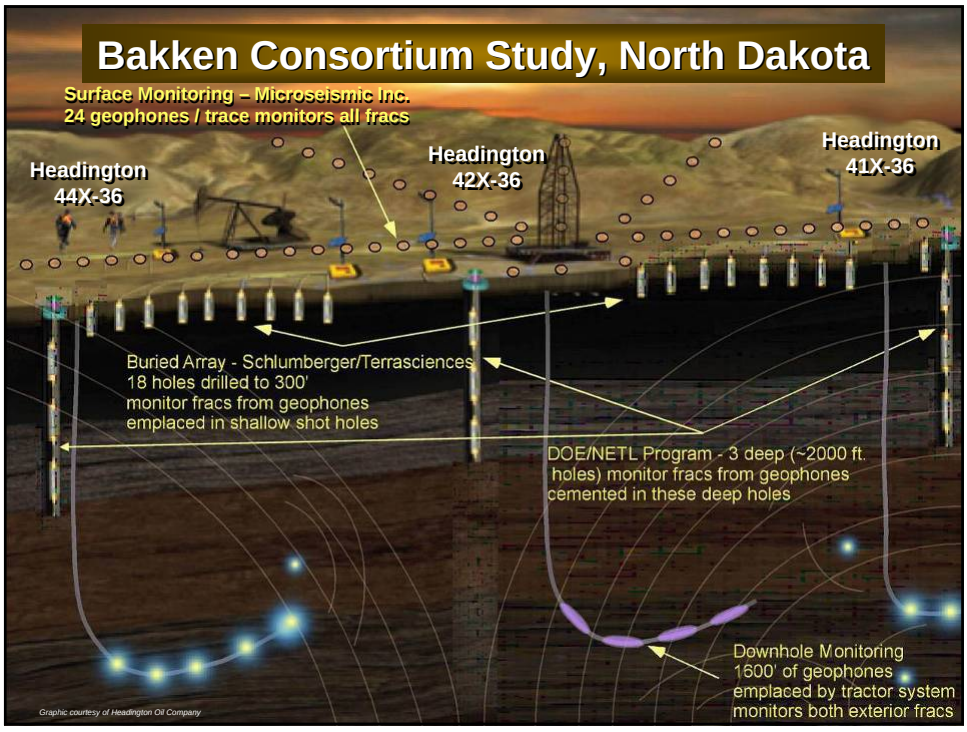
  Nine selections (petroleum areas)

Arctic Energy Office Mission

(Public Law 106-398)

- **Fossil Energy:**
  - Promote research, development and deployment of oil recovery, gas-to-liquids and natural gas production & transportation

- **Remote Power:**
  - Promote research, development and deployment of electric power in arctic climates, including fossil, wind, geothermal, fuel cells, and small hydroelectric facilities



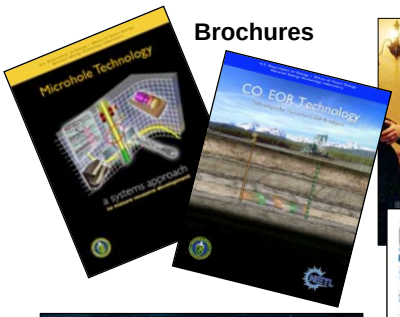
FY2009 Budget Summary
($ million)

			Request	*House*	*Senate*
	FY07	**FY08***	**FY09**	**FY09**	**FY09**
Exploration and Production	**0**	**0**	**--**	**--**	**--**
Gas Hydrates	**12**	**15**	**--**	**25**	**15**
Effective Environmental Protection	**0**	**5**	**--**	**--**	**5**
TOTAL – NATURAL GAS	***12***	***20***	***0***	***25***	***20***
Exploration and Production	**2.7**	**5**	**--**	**--**	**5**
TOTAL - OIL	***2.7***	***5***	***0***	***3***	***5***
TOTAL *TRADITIONAL* PROGRAM	**14.7**	**25**	**0**	**28**	**25**
EPACT Title 9, Subtitle J Consortium	***37.5***	***37.5***	***--***	***37.5*****	***37.5*****
EPACT Title 9, S. J Complementary	***12.5***	***12.5***	***--***	***12.5*****	***12.5*****
TOTAL EPACT Title 9, Subtitle J	***50***	***50***	***0***	***50*****	***50*****
TOTAL – NATURAL GAS AND OIL	***64.7***	***75***	***0***	***78***	***75***

*Omnibus ** "Silent"

Note: Excludes Congressionally Directed Projects Funding

Comprehensive Technology Transfer



Brochures

Conference Exhibits

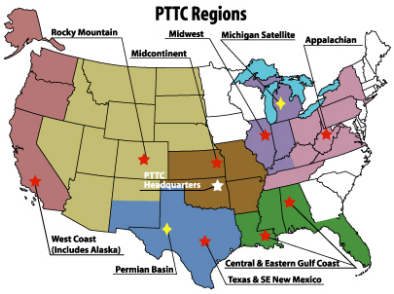
Presentations

Newsletters and Journals

NETL Website

Petroleum Technology Transfer Council Overview

- **Established in 1994 by producers, state organizations and the DOE**
- **Organized into 10 regional producer advisory groups**
- **150 workshops/year**
- **18,000 industry contacts subscribed to newsletter**
- **9,000 "Tech Alert" emails mainly to independent producers in the E&P sector**
- **Provides strong augmentation to NETL's core technology transfer efforts as well as other industry technologies**



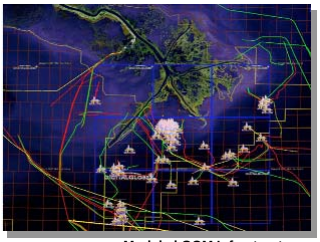
General Accountability Office Review

- **GAO report published December 2007; considered favorable**
- **Congressional request for follow up inquiry/Phase II effort**
- **SCNGO staff presentations on selected topics July 10, 2008**
  - *Decision Making*
  - Methane Hydrates
  - Carbon Dioxide/EOR
  - Environmental Technologies
  - Technology Transfer
- **SCNGO continues dialogue; providing backup details**
  - September 17th discussion
- **Final report due out in December 2008**

Visualization, Simulation, Modeling and Analysis Support

- **Gulf of Mexico (GOM) Infrastructure**
  - In 2005, DOE commissioned the Hurricane Recovery Team to monitor the recovery of natural gas from the Gulf of Mexico
  - Leveraging existing capability, NETL developed:
    - Real-time analysis of natural gas flow from the GOM to predict shut-in and recovery, and monitor restoration
    - A statistical correlation to predict shut-in and recovery of oil flow from the GOM

Hurricane Katrina



Modeled GOM Infrastructure

Our Websites

Office of Fossil Energy
www.fe.doe.gov

NETL
www.netl.doe.gov

QUESTIONS?

Attachment 10

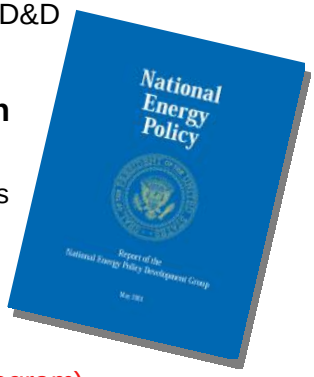
Status of the Ultra-Deepwater and Unconventional and Other Petroleum Resources Research Program

John R. Duda, Director, SCNGO

September 9, 2008

Energy Policy Act of 2005
Title IX, Subtitle J

- **Sec 965 - DOE Traditional Oil and Gas Program**
  - DOE conduct a program of Oil & Gas RD&D
    - E&P; oil shale; environmental
- **Sec 968 – Methane Hydrate Research**
  - DOE-led multi-agency program
    - Resource, safety, environmental impacts
- **Sec 999 – Ultra-deepwater & Unconventional Program**
  - Royalty trust fund ($50 million/year)
  - Research at NETL (*Complementary Program*)
  - Consortium-administered R&D



EPACT 2005, Subtitle J, Section 999

- **Contract awarded January 4, 2007**
- **Consortium-administered ($37.5 Million)**
  - Ultra-deepwater
  - Unconventional gas
    - Low permeability sands
    - Gas-filled shales
    - Coalbed Methane
  - Technologies for small producers
  - NETL review and oversight

EPACT 2005, Subtitle J, Section 999

- **NETL Complementary R&D ($12.5 Million)**
  - Extreme Drilling (HT/HP)
  - Unconventional Oil and EOR
  - Environmental Impacts
  - Resource Assessment
  - Planning and Analysis

2008 Annual Plan

- **Transmitted to Congress (August 2008)**
- **Funding for 2008 cycle released (Aug 12)**
- **Funds obligated to RPSEA (Aug 26)**
- **Solicitations to be implemented (fall 2008)**

2009 Annual Plan

- **2009 *draft* Annual Plan completed (August)**
- **Federal Advisory Committees reviewing in "real time'**
- **Federal Advisory Committees final input to Annual Plan (October 23, 2008)**
- **Final plan to be submitted to HQ to begin concurrence process (November 7, 2008)**
  - Goal: Obtain funding coincident with RPSEA contract year

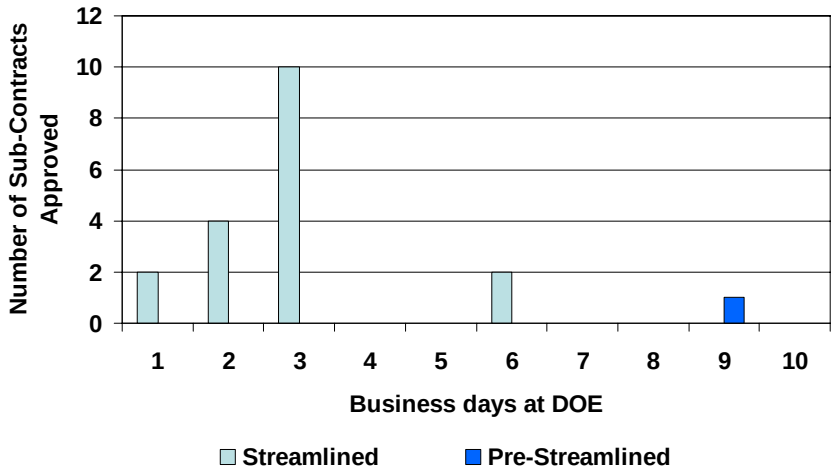
Program Requirements
Title IX, Subtitle J, Section 999

- **Technical Committee**
  - Convened on June 11, 2008
  - The committee determined that the…
    - are not duplicative of the consortium-based program elements and in fact, are complementary in nature.
  - Several members of the committee noted the potential for duplication
  - The committee recommended that NETL and the program consortium continue routine and effective communications
- **Independent audit of Program Consortium**
  - GAO review of audit

NETL/RPSEA Collaborative Successes

- **NETL has developed *Streamlined Approval Process* to minimize the time required to approve sub-contracts**
- **Reduced resource burden on RPSEA by having NETL assume major role in benefits assessment**
- **Reduced resource burden on RPSEA by having SCNGO assume an overarching role with respect to tech transfer**
- **NETL has [and continues to] provide extensive day-to-day *counsel* on R&D subcontracts**

Streamlined Approval Process



Continuous Improvement

- **[Continue to] enhance communication**

QUESTIONS?

Attachment 11

- Technology Transfer and Outreach Presentation
- 2007 RPSEA Subcontracting Awards (As of 9/3/08)
- Benefits Assessment Letter
- 2008 Solicitation Descriptions
- 2007-2008 Consortium Research Areas and NETL Complementary Research Areas

Natural Gas & Oil Program

Technology Transfer and Outreach
Jim Ammer

Outline

- **Importance of technology transfer**
- **Levels of technology transfer in the Natural Gas & Oil Program**
- **Vehicles for technology transfer**
- **Current implementation – Reaching independents and other stakeholders**
- **Summary**

Importance of Technology Transfer

- **Deliver research results to people who can use the information …**
  - –To make better E&P decisions
  - –To reduce costs or improve performance
  - –To develop and commercialize new tools or services
- **Avoid duplication of effort by other researchers**
- **Catalyze new R&D ideas and directions**
- **Enhance understanding of oil and gas technology issues among policymakers and general citizens**

Levels of Technology Transfer

- **Program Level: Communicate the reasons and strategies for research in a particular area (e.g., Methane Hydrates) to a broad audience; receive feedback on industry needs and priorities**
- **Subprogram or Key Activity Level: Identify the main elements of a program, why they are important and how technologies developed will move resources to reserves**
- **Major Project Level: Highlight high-profile efforts that are of major public interest (e.g., DOE/BP hydrate test well in Alaska)**
- **Project Level: Provide detailed, up-to-date information on each project funded**

Vehicles for Technology Transfer

- **Contractor presentations and publications**
  - Professional society papers and presentations, articles in scientific journals and trade press, company website postings
- **NETL outreach**
  - NETL website (contractor reports, project summaries, important findings)
  - Publications (newsletters, *Techlines, Factsheets,* DVD archives, meeting proceedings, atlases)
  - Participation in conferences (sponsorships, paper presentations, exhibits with handout materials)
  - NETL-authored articles in trade press (invited or proposed)
  - Petroleum Technology Transfer Council (PTTC) workshops and newsletters

Program Level Technology Transfer

Brochures

Conference Exhibits

Presentations

Newsletters and Journals

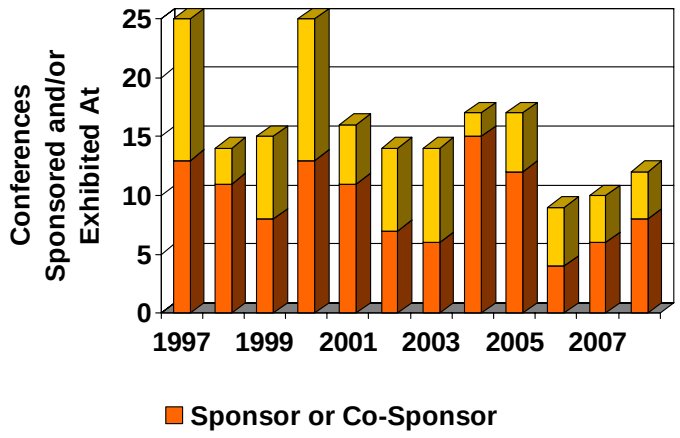
NETL Website

"Core" Conferences 1997-2008

- **Improved Recovery Conference (800)***
- **Offshore Technology Conference (>60,000)**
- **Society of Petroleum Engineers Annual Conference (8-9,000)**
- **International Petroleum Environmental Conference (5-600)**
- **American Association of Petroleum Geologists (>5,000)**
- **International Conference on Gas Hydrates (3-400)**

* Conference Attendance

Conferences Sponsored/Exhibited by NETL



Conference Trends 1997-2008

	Regional Events	"Core" Conferences	International Events	Hydrates	Environmental Themes
1997	4	7	2	0	5
2008	2	4	4	3	0

- **Reduced number of "core" conferences**
- **Reduced number of regional conferences**

Participation as Speakers and Committee Members

- **Invited Talks***
  - OTC – Hydrates Program overview
  - Specialized/Focused Workshops
    - **SRI – Unconventional Gas R&D**
    - **Unconventional East – Past R&D on Devonian shales**
    - **Hedberg Conference – Unconventional Gas & Hydrates**
    - **Back to the Shelf – Deep Trek**
    - **SPE Forums – Unconventional Gas R&D, Hydrates**
- **Committees***
  - Conference Chairs (IOR, SPE, ICGH, AGU)
  - Local SPE Chapters,
  - Drilling Engineering Association

****Not all inclusive***

CD/DVD Distribution (2007-08)

- **24 titles in publication**
- **> 1,200 copies distributed via website/library**
- **1000 (est.) distributed via conferences**
- **Average 190 copies per month**
- **Most popular titles during 2007-08**
  - Unconventional Natural Gas Program Archive (540)
  - Trenton-Black River Appalachian Basin Playbook (150)
  - Oil and Gas Industry Software (80)
  - Rome Trough Consortium Report (71)

Newsletters

- ***Fire in the Ice*: (Methane Hydrates)**
  - 1,250 subscribers in 17 countries, July 2008 was 25th quarterly issue
- ***GasTIPS*: (Gas E&P)**
  - Quarterly joint-venture with Gas Technology Institute and Hart Publications; 21 issues from 2002 to 2007, >10,000 subscribers
- ***Eye on the Environment*: (Environmental R&D)**
  - 22 issues from 1996 to 2006
- ***E&P Focus*: (E&P R&D projects)**
  - 6 issues from 2005 to 2007
- ***Class Act*: (EOR Class Program)**
  - 9 issues from 2000 to 2004

Providing Independents with Relevant Information for E&P

- **Stripper Well Consortium**
  - Executive Council
  - Annual Technology Transfer Meetings
  - Products
- **Petroleum Technology Transfer Council**
  - Workshops
  - Newsletters
  - E-Mail Alerts
- **GasTIPS**

Stripper Well Consortium

- **Industry-driven consortium est. Oct 2000**
- **Funded by NETL, NYSERDA, members (75)**
- **Operated by The Pennsylvania State University**
- **88 projects funded; SWC - $9.1 million Cost Share – $6.5 million**
- **Target: small independents**
- **Executive Council – Majority independent operators (Bylaws)**
- **Two Annual Technology Transfer Meetings (NE/SW)**

- **Low-cost innovative technology to:**
  - Increase production
  - Reduce operating costs
  - Reduce environmental footprint

www.energy.psu.edu/swc

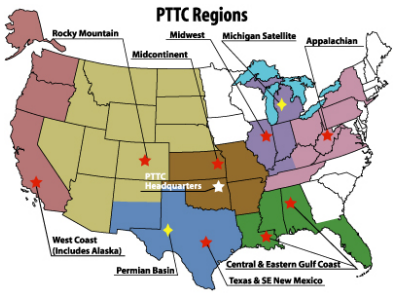
SWC Technology Transfer

- **Developed brochure "Keeping the Home Wells Flowing: Helping Small Independent Oil and Gas Producers Develop New Technology Solutions"**
- **Completed "Independent Oil: Rediscovering America's Forgotten Wells" DVD. DVD includes:**
  - 30 minutes: importance of stripper wells
  - 20 minutes: technologies developed
  - > 4,000 distributed; Won Telly Award
- **Developing technology section for IOGCC annual "Marginal Well" Report**

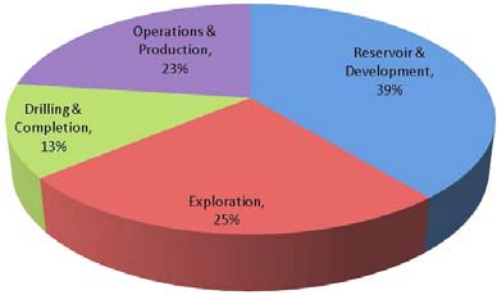
Petroleum Technology Transfer Council Overview

- **Established in 1994 by producers, state organizations and the DOE**
- **Organized into 10 regional producer advisory groups**
- **150 workshops/year**
- **18,000 industry contacts**
- **Provides strong augmentation to NETL's core technology transfer efforts as well as other industry technologies**

PTTC
TECHNOLOGY CONNECTIONS

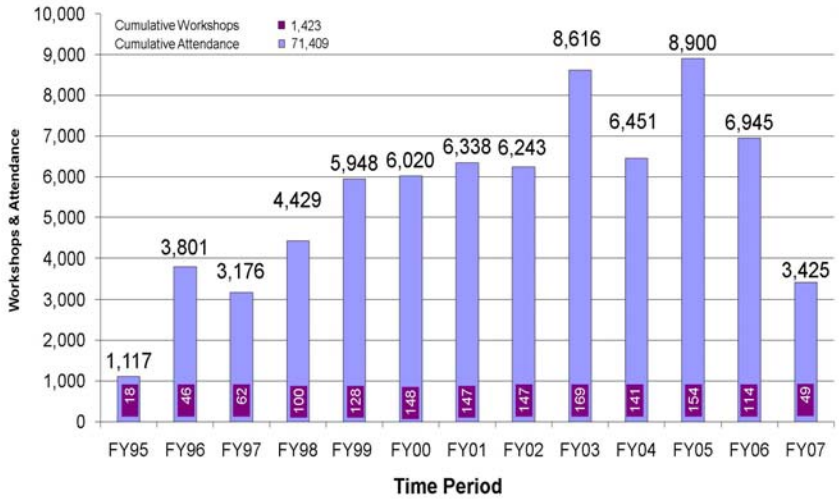


PTTC Workshop Topics

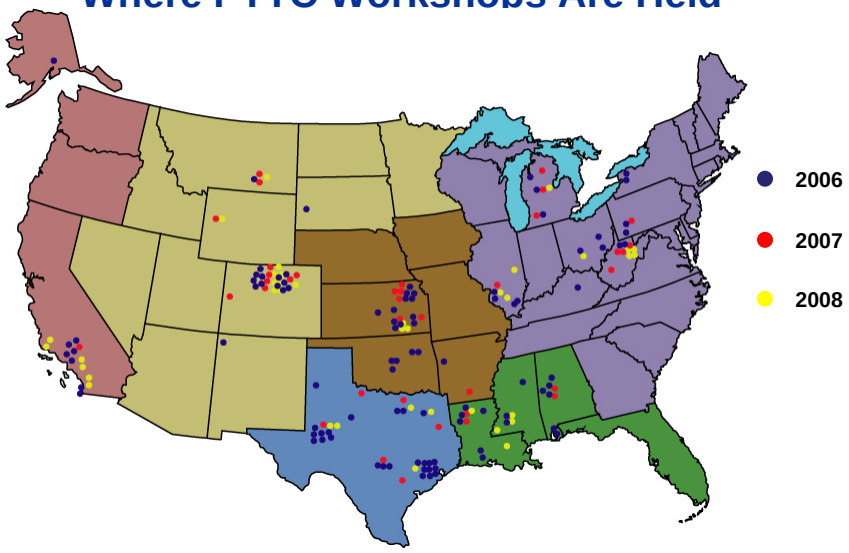


- **Reservoir & Development (includes logging, EOR, exploitation)**
- **Exploration (gas shales, play studies, geological concepts)**
- **Drilling & Completion (horizontal drilling, microhole drilling, hydraulic fracturing)**

History of PTTC Workshops



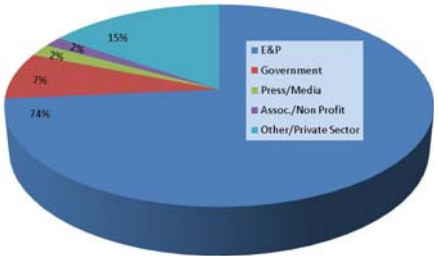
Where PTTC Workshops Are Held



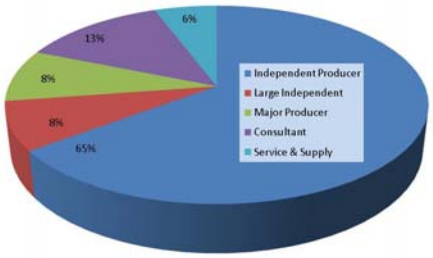
PTTC Newsletter Demographics

(Nearly 18,000)

Overall

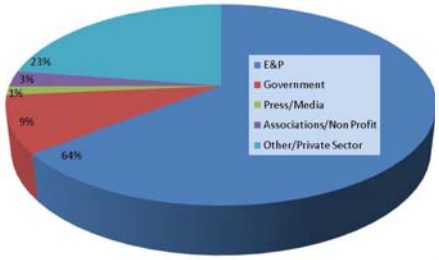


E&P Sector

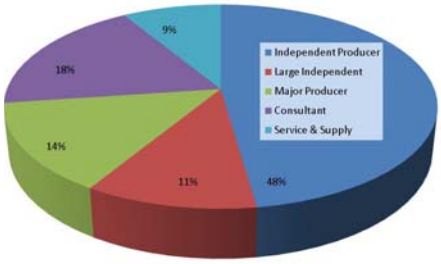


PTTC Email Tech Alert Demographics
(Nearly 9,000)

Overall



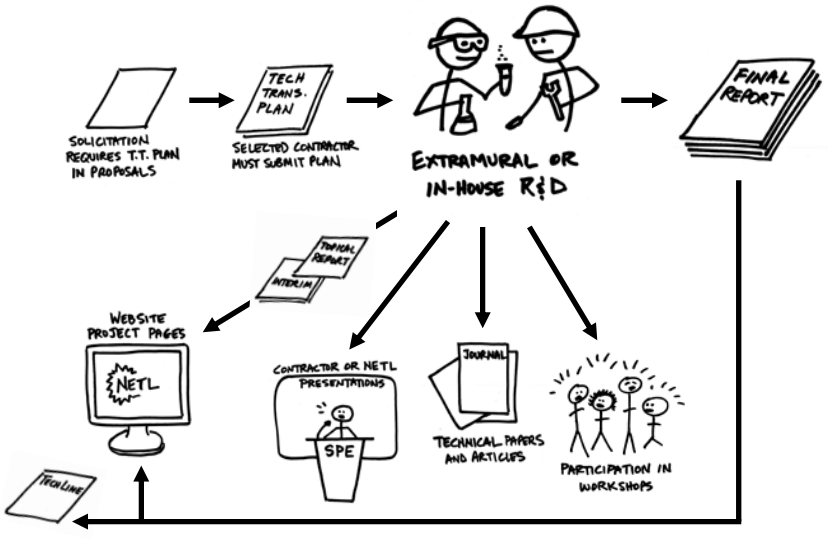
E&P Sector



GasTIPS

- **Quarterly publication**
  - Typically 6-7 articles on technology development or studies
  - Distributed free of charge to over 10,000 subscribers
  - Many inquiries of products or studies by industry Example:
    - **Grand Resources read about composite pipe**
    - **NETL provided contact info for ACPT (developer)**
    - **Resulted in field test in a horizontal well**
    - **Led to first commercial order of composite pipe by Integrated Drilling Services**

Project Level Technology Transfer



Technology Transfer

A Critical Element of Every Project

- **Outreach or technology transfer is a significant overarching strategy of NETL's Oil & Natural Gas Program and a critical element of every project awarded by NETL**
- **Evaluation criteria used for project selection in the Funding Opportunity Announcement (a.k.a. *request for proposals*) includes the following, "Adequacy of the proposed technology transfer plan including any plans for commercialization or utilization of the proposed technology."**
- **The ultimate goal of every research project is for the technology to be commercialized and widely deployed by industry**

Resource Assessment Example

- **1999 NPC Study recommended "improved knowledge of the size and nature of the resource base and an accurate inventory of resources in the Rocky Mountain region**

- Independents often do not own enough of the resource to conduct large-scale basin analysis

➢ **Forecasts of the nation's untapped oil and gas resources provide:**
  - More detailed and accurate maps of resources for high-grading exploration efforts
  - More reliable predictions of bypassed oil and gas, which will lead to more efficient infill drilling plans

Detailed Assessments of Unconventional Gas Basins

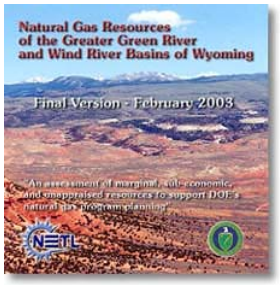
Accomplishments

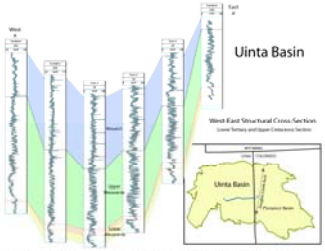
- **Completed detailed formation-based assessments of the Greater Green River, Wind River, Deep Anadarko, and Uinta Basins**

- **Distributed over 5000 CD's so far, which include archived maps, cross-sections, & well data**

Benefits

- **Provide industry with detailed, basin-wide reservoir information, to guide their exploration and development efforts**





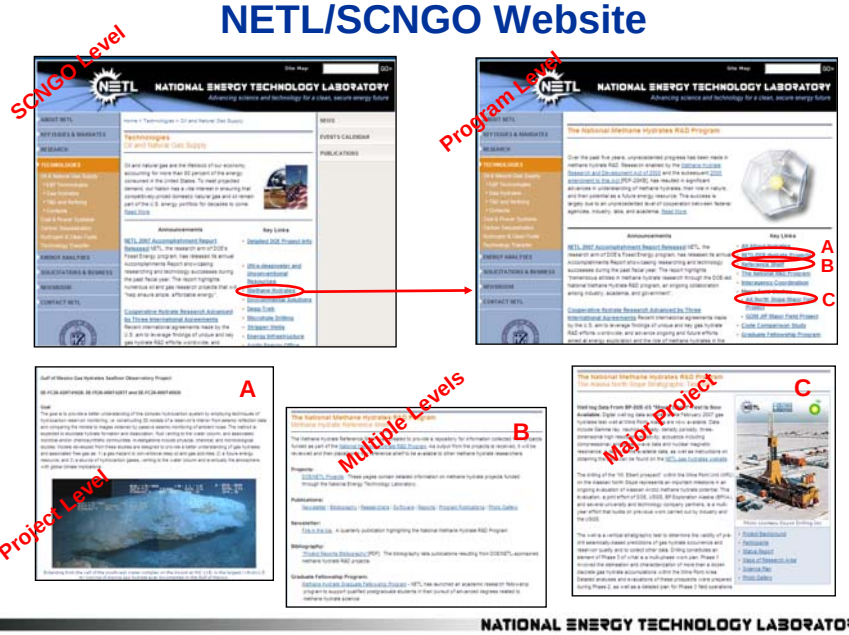
An Independent's View

" … as a principal in a very small domestic oil company, I requested copies of several NETL CDs that will be important in our efforts to explore for and exploit US resources that would be considered below the target horizon of "big oil" and major independents…without NETL data and research products, this task would be far more daunting. "

Lee Krystinik, Ph.D., PGeol

Fossil Creek Resources, LLC

NETL/SCNGO Website



Produced Water Management Info System

Summary

- **Multi-faceted, disciplined approach matches most effective technology transfer vehicle to specific stakeholders**
- **“Cradle-to-grave” emphasis on technology transfer engages industry throughout process**
- **Two-way communication helps refine program to meet industry needs**
- **Very effective – reaching intended audience, especially independents**

2007 RPSEA SubContracting Awards (as of 9/3/08)

		Lead Performer	Project Cost	RPSEA Cost	Cost Share	RPSEA Award Date
Unconventional Program						
7	Novel Concepts for Unconventional Gas Development in Shales, Tight Sands and Coalbeds	Carter Technology Co.	$114,600.00	$91,680.00	$22,920.00	7/28/2008
9	Application Of Natural Gas Composition To Modeling Communication Within And Filling Of Large Tight-Gas-Sand Reservoirs, Rocky Mountains	Colorado School of Mines	$1,016,417.00	$640,417.00	$376,000.00	8/25/2008
16	New Albany shale Gas	Gas Technology Institute	$4,502,723.00	$3,445,159.00	$1,057,564.00	7/28/2008
17	Geological Foundation for Production of Natural Gas from Diverse Shale Formations	Geological Survey of Alabama	$844,052.00	$497,459.00	$346,593.00	8/19/2008
33	"Advanced Hydraulic Fracturing Technology For Unconventional Tight Gas Reservoirs"	TEES	$1,306,939.00	$1,045,551.00	$261,388.00	8/29/2008
35	Optimizing Development Strategies To Increase Reserves In Unconventional Gas Reservoirs"	Texas Engineering Experiment Station/Texas A&M University System	$394,606.00	$314,606.00	$80,000.00	8/26/2008
36	Novel Fluids for Gas Productivity Enhancement in Tight Formations	The University of Tulsa	$439,510.00	$219,920.00	$219,590.00	9/2/2008
43	Optimization Of Infill Well Locations In Wamsutter Field	University of Tulsa	$2,930,695.00	$443,563.00	$2,487,132.00	9/2/2008
44	Gas Production Forecasting From Tight Gas Reservoirs: Integrating Natural Fracture Networks and Hydraulic Fractures	University of Utah	$1,336,079.00	$1,068,863.00	$267,216.00	9/2/2008
45	Paleozoic Shale-Gas Resources of the Colorado Plateau and Eastern Great Basin, Utah: Multiple Frontier Exploration Opportunities	Utah Geological Survey	$640,613.00	$428,491.00	$212,122.00	8/9/2008
		UR TOTAL	**$13,526,234.00**	**$8,195,709.00**	**$5,330,525.00**	

Ultra-Deepwater Program						
1201	Wax Control	University of Utah	$500,000.00	$400,000.00	$100,000.00	9/2/2008
		UDW Total	**$500,000.00**	**$400,000.00**	**$100,000.00**	
Small Producers Program						
1	Field Site Testing of Low Impact Oil Field Access Roads: Reducing the Environmental Footprint in Desert Ecosystems	TEES	$444,839.00	$284,839.00	$160,000.00	8/29/2008
2	Preformed Particle Gel for Conformance Control	University of Missouri, Rolla	$786,716.00	$520,212.00	$266,504.00	8/19/2008
3	Near Miscible CO2 Application to Imiprove Oil Recovery for Small Producers	University of Kansas	$342,714.00	$274,171.00	$68,543.00	5/21/2008
4	Enhancing Oil Recovery from Mature Reservoirs Using Radial-jetted Laterals and High-volume Progressive Cavity Pumps	University of Kansas	$519,441.00	$248,385.00	$271,056.00	8/25/2008
5	“Cost-Effective Treatment Of Produced Water Using Co-Produced Energy Sources For Small Producers”	New Mexico Tech (NMIMT)	$1,164,888.00	$457,253.00	$707,635.00	8/9/2008
6	Seismic Stimulation to Enhance Oil Recovery	Lawrence Berkeley National Laboratory	$1,373,373.00	$723,373.00	$650,000.00	7/29/2008
7	Reducing Impacts of New PIT Rules on Small Producers	New Mexico Tech (NMIMT)	$839,675.00	$560,063.00	$279,612.00	8/19/2008
		SP Total	**$5,471,646.00**	**$3,068,296.00**	**$2,403,350.00**	
		Program Total	**$18,997,880.00**	**$11,264,005.00**	**$7,733,875.00**	

Department of Energy
Washington, DC 20585

April 9, 2008

MEMORANDUM

TO: STEVEN J. ISAKOWITZ
CHIEF FINANCIAL OFFICER

FROM: JAMES A. SLUTZ
ACTING PRINCIPAL DEPUTY ASSISTANT SECRETARY
OFFICE OF FOSSIL ENERGY

SUBJECT: Benefits Assessment Plan for the EPAct Section 999, Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Consortium-Administered R&D Program

The *2007 Annual Plan* for the above program included discussion and comments on the benefits associated with the program. Attached is the plan for assessing the benefits resulting from the Consortium-administered elements of the Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Research & Development Program.

The plan describes our efforts to: develop the methodology, set up an independent panel to review and vet the methodology, test and validate the methodology, conduct the initial analyses, subject the analyses to independent merit review, and present the first set of program benefits.

If you have any questions, please call Ms. Elena Melchert or Mr. Bill Hochheiser of my staff at 202/586-5095.

Assessing Benefits of the 2005 EPACT, Subtitle J, Section 999 Consortium R&D Program

1. Introduction

DOE will undertake a comprehensive benefits analysis that evaluates a full range of impacts stemming from the program over the next few decades. This comprehensive effort, including integration of the estimated increase in royalty payments, if any, is the focus of this document.

2. Benefits Identification

The methodology to be developed for assessing benefits should account for key impacts that can be measured, estimated or inferred from historical data and models of future performance. The various types and categories of benefits can be characterized by a *benefits matrix* and the methodology should reflect these types of information.

In 2001, a National Research Council (NRC) committee conducted a retrospective study[1] of the benefits of some of the energy efficiency and fossil energy programs in the U.S. Department of Energy (DOE). As part of its study, the NRC committee developed a methodological framework for estimating these benefits. Following the NRC report, a conference was organized by Oak Ridge National Laboratory to discuss ways of adapting and refining the NRC framework for possible use by DOE offices to help plan and manage their R&D.[2] This matrix below defines this general framework.

Benefits Matrix

	Past	Future	
	Realized	Projected	Option Cases
Economic			
Environmental			
Security			
Knowledge			

The rows reflect the Section 999 R&D program's strategic objective: to provide direct economic, environmental, and security benefits, or to provide knowledge that can indirectly lead to these benefits. The columns reflect *when* the benefits occur (past in the sense that once R&D results begin to have an impact, measured benefits will be realized) and future in that expected benefits will need to be estimated. Initially of course, all benefits will be estimated future benefits. Given the range of future scenarios in terms of the parameters that directly impact measured benefits (e.g., oil and natural gas prices, or the rate of commercialization of a new technology), a number of option cases or scenarios will need to be constructed reflecting varying degrees of certainty.

Many participants in the Oak Ridge conference suggested that *knowledge* is a core mission of both basic science and applied science R&D programs managed by DOE, as well as of some of the energy resource programs. Also, many participants thought that various types of knowledge are enablers of innovation. They suggested that knowledge could be viewed as a third dimension

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[1] National Research Council's Committee on Benefits of DOE R&D on Energy Efficiency and Fossil Energy, 2001, Energy Research at DOE: Was It Worth It?, Washington, DC: National Academy Press, July.

[2] Lee, R., et al., 2003,"Estimating the Benefits of Government-Sponsored Energy R&D: Synthesis of Conference Discussions," Oak Ridge National Laboratory, March.

of the matrix to convey the idea that various types of knowledge contribute to other types of benefits.

The notion that knowledge is a benefit that needs to be accounted for has been supported by recommendations made by the Federal Advisory Committees formed to advise the Secretary on this program. They have specifically called for DOE to create a "knowledge management database" that will archive all of the data and analytical products that are created by the various research efforts during the course of the research and to implement a process to push this knowledge out to end users as soon as possible.

While it will be difficult to quantify benefits that accrue as the result of knowledge being made available to other researchers (e.g., when EPACT Section 999 research data provides knowledge that eliminates the need for another researcher to perform a similar experiment, provides an insight that leads that person to redirect their work in a more fruitful direction, or provides evidence that certain alternatives do not work, etc.), an effort to track the use of this knowledge and determine its benefit to individual end users will be considered as the overall methodology is being developed.

3. Validation Process

A method for validating the estimated benefits associated with the application of specific Program-developed technologies will be incorporated into the overall process. This may include "before-and-after" estimates from the operators involved with demonstrating a technology, market penetration estimates and "case histories" from service companies involved in commercializing a Program-developed technology, or via inputs from RPSEA Consortium members and other operators that apply the technology in the field.

Depending on the specific R&D project and the nature of the technology being developed, this validation process may involve actual measured data or best-available estimates. It will be important to make every effort to include operators/companies that are not directly involved in the project in this validation process, although the level of detail such companies can supply may be hindered by the proprietary nature of some of the data involved.

This portion of the methodology may draw from models for estimating such long-term benefits that have been employed in the past by DOE as well as models used in other industries where assessments of long-term R&D benefits are needed to justify near-term R&D investments.

The methodology will need to be well-grounded in an understanding of the nature and speed of technological innovation and uptake within the domestic U.S. oil and gas industry. Part of this understanding may-come from consultations with technology experts within the RPSEA advisory committee and Federal Advisory Committee membership.

4. Independent Review

An independent critical review of the benefits assessment *methodology* and data requirements is planned prior to the methodology being finalized. This independent review will include a panel of experts, the members of which are not associated with the R&D performers yet collectively are well-recognized for their knowledge in the following areas:

- Assessment of benefits from R&D investments
- Economic evaluation of oil and gas investments
- Technology trends in oil and gas exploration and development
- Methods for assessing the impact of industrial activity on national economies

5. **2008 Milestones for Methodology Development**
   Includes regular discussions/briefings with RPSEA staff and HQ staff

April

- Discuss options and planned approaches to benefits analysis, including data requirements from R&D contractors, with RPSEA staff and HQ staff.
- Initiate identification of the models, methods, approaches, and data requirements available for completing the assessment

May

- Complete evaluation of strengths/weaknesses of various approaches to benefits assessment including their applicability to the Section 999 R&D program
- Select a preferred approach for conducting the benefits assessment

June

- Begin process of identifying and contacting prospective members of an independent panel of reviewers (for September merit review)
- Vet preferred methodology and data requirements [informal process]

July

- Conduct initial *validation testing* of the preferred benefits assessment methodology
- Continue planning for a merit review

August

- Modify assessment methodology based on earlier *validation testing* and [informal] review comments
- Complete materials for September merit review of the benefits assessment methodology

September

- Subject the benefits analysis methodology and data requirements, including those related to estimating increases in royalty collections to an independent merit review

October

- Revise/finalize benefits analysis methodology plan based on results of the formal merit review
- Begin to develop baseline resource/technology information for each benefit category
- Begin purchase or acquisition of data and other model inputs as needed, based on final reviewed methodology

November

- Finalize and submit the benefits assessment methodology to HQ
- Complete draft Royalties Report to Congress (2nd baseline report)

December

- Deliver a final *Royalties Report to Congress* to HQ

REFERENCES

- Lee, R., G. Jordan, P. Leiby, B. Owens, J. Wolf, 2003,"Estimating the Benefits of Government-Sponsored Energy R&D: Synthesis of Conference Discussions" (a summary of discussions at a conference held on March 4 and 5, 2002 in Arlington, Virginia, organized by Oak Ridge National Laboratory and sponsored by the Office of Energy Efficiency and Renewable Energy; Office of Fossil Energy; Office of Nuclear Energy, Science and Technology; and Office of Science of the U.S. Department of Energy), March.

- National Research Council's Committee on Benefits of DOE R&D on Energy Efficiency and Fossil Energy, 2001, "Energy Research at DOE: Was It Worth It?," Washington, DC: National Academy Press, July.

UDW Number	Name	2008 RPSEA Max Share	**Abstract**
DW 2101	New Safety Barrier Testing Methods	$ 128,000	The project will investigate alternative (subsea) methods for assessing the capability of a safety barrier (valve or possibly a BOP) to hold pressure with only a minimum (acceptable) leakage rate in the closed position. The most viable verification method(s) will be investigated in greater detail to develop a repeatable and reliable safety barrier alternative qualification test (if feasible).
DW 1202	EOS improvement for xHPHT	$1,600,000	Current Equations of State (EOS) are known to give poor predictions for some deepwater reservoir fluids and conditions where pressures can exceed 20,000 psi, temperatures exceed 350°F, and the fluids are complex. This project will generate lab data at xHPHT conditions to validate, and if necessary, develop a new EOS to better predict Pressure, Volume and Temperature (PVT) information and transport properties.
DW 2201	Viscous Oil PVT	$460,000	Heavy Viscous Oils (HVO) present new Pressure, Volume and Temperature (PVT) relationships and technical challenges for deepwater conditions. This project will further our understanding of the fluid system physical properties. It will develop new laboratory procedures to characterize such fluids and will validate the predictive models for such fluids.
DW 2301	Deepwater Riserless Light Well Intervention	$3,411,500	The project will develop a certified ready-to-fabricate Riserless Intervention System (RIS) design for 10 ksi wireline and electric line service in up to 10,000 ft water depths.
DW 1502	Coil Tubing Drilling and Intervention System Using Cost Effective Vessels	$820,000	This project will establish the conceptual design, operational performance and system feasibility for an ultra-deepwater coiled tubing subsea well intervention system.
DW 2501	Early Reservoir Appraisal, Utilizing a Low Cost Well Testing System - Phase 1	$880,000	The project will evaluate cost-effective systems for testing deep water reservoirs without the need of high-cost MODUs and related test equipment. The work includes; (1) evaluation of the various Gulf of Mexico deepwater reservoirs to identify what facility capabilities are required to achieve a successful test and (2) to evaluate alternative deepwater well testing system configurations and insure they adequately handle the range of reservoir conditions defined in (1), optimize the hardware and equipment configurations, identify their Technology Readiness Levels and technical gaps, and define their well test economics to show such test programs are cost effective and justified.

DW 2502	Modeling and Simulation of Managed Pressure Drilling for Improved Design, Risk Assessment, Training and Operations	$384,000	The project goal is to expand existing capabilities for analysis and simulation of Managed Pressure Drilling (MPD) well design and operations. The objective is to create an integrated capability for the modeling of fluid circulation in MPD wells including the effects of multiple flow paths, formation influx, lost returns, pressure and temperature effects, multi-phase flow and transient effects.
DW 2701	Resources to Reserves Development and Acceleration through Appraisal	$400,000	Reservoir appraisal is required to provide information to reduce the range of uncertainty and therefore reduce the risk of the subsequent development phase. Currently, appraisal is mostly comprised of seismic interpretation and data from drilling wells. The vast majority of this data is static data, and does not help define reservoir continuity. The high cost of drilling in deepwater limits the amount of data from wells to no more than a handful. The extreme costs and regulatory/environmental concerns all but eliminate early production testing for dynamic data on reservoir continuity. Therefore, operators are forced to make decisions on developments with ranges in in-place hydrocarbons of 3-4 fold without understanding reservoir continuity. The result is a potential loss of resources in undeveloped deepwater and ultra-deepwater discoveries. Phase 1 of this multi-phase project focuses on the technical Gap Assessment & Concepts Identification to help accelerate reserve development through more effective appraisal.
DW 2801	Gulf 3-D Operational Current Model Pilot	$1,248,000	Goal of this Pilot is to improve the ability of numerical models to forecast the Loop Current and its associated eddies. The project calls for a well-validated operational model that produces timely, accurate forecasts which are summarized by Web-based products that provide substantial benefits to knowlegible users
DW 2901	Reliable deepwater power distribution & components (Component Qualification - performed in steps.)	$4,811,000	This project will leverage existing industry experience to improve subsea electrical power system reliability at a reduced cost. The project will first establish baseline power system designs and requirements. Analysis and trade-offs will be performed to optimize and improve over-all system reliability through identification of components which would benefit from redesign and component improvements. Protoypes of selected high-impact redesigned components will be built and tested to capture this electrical power distribution and transmission improvement.
	Totals	$14,142,500	

2008 Small Producer Solicitation Description

The overarching theme expressed by small producer representatives attending Forums and other events has been the need for technology which allows small producers to maximize the value of the assets they currently hold, primarily in mature fields.

Accordingly, the solicitation under this program element has been aimed toward developing and proving the application of technologies that will increase the value of mature fields by reducing operating costs, decreasing the cost and environmental impact of additional development, and improving oil and gas recovery. Reducing risk is seen as key to reducing costs and improving margins. Improved field management, best practices, and lower cost tools (including software) are all within the scope of this effort.

In order to ensure that technologies developed under this program are applied to increase production in a timely fashion, each proposal has been required to outline a path and timeline to an initial application. A specific target field for an initial test of the proposed development must be identified, and ideally the field operator will be a partner in the proposal.

In compliance with Section 999B(d)(7)(C) of EPAct, all awards resulting from this solicitation "shall be made to consortia consisting of small producers or organized primarily for the benefit of small producers." For the purposes of the solicitation, a consortium shall consist of two or more entities participating in a proposal through prime contractor-subcontractor or other formalized relationship that ensures joint participation in the execution of the scope of work associated with an award. The participation in the consortium of the producer that operates the asset that is identified as the initial target for the proposed work will be highly encouraged.

The 2008 solicitation will request proposals addressing the following technology challenges:

- Development of approaches and methods for water management, including produced water shutoff or minimization, treatment and disposal of produced water, fluid recovery, chemical treatments, and minimizing water use for drilling and stimulation operations.
- Development of methods for improving oil and gas recovery and/or extending the economic life of reservoirs.
- Development of methods to reduce field operating costs, including reducing production related costs as well as costs associated with plugging and abandoning wells and well site remediation. Consideration will be given to those efforts directed at minimizing the environmental impact of future development activities.

- Development of cost-effective intelligent well monitoring and reservoir modeling methods that will provide operators with the information required for efficient field operations.
- Development of improved methods for well completions and recompletions, including methods of identifying bypassed pay behind pipe, deepening existing wells, and innovative methods for enhancing the volume of reservoir drained per well through fracturing, cost-effective multilaterals, in-fill drilling, or other approaches.
- Implementation and documentation of field tests of emerging technology that will provide operators with the information required to make sound investment decisions regarding the application of that technology.
- Collection and organization of existing well and field data from multiple sources into a readily accessible and usable format that attracts additional investment.
- Creative capture and reuse of industrial waste products (produced water, excess heat) to reduce operating costs or improve recovery.

It is anticipated that $3.21 million will be available for the Small Producer Program Element during fiscal year 2008. Approximately 8 to 12 awards are anticipated to be awarded as a result of the 2008 solicitation.

The typical award is expected to have duration of one to three years, although shorter or longer awards may be considered if warranted by the nature of the proposed project.

All projects will be fully funded to the completion of the appropriate decision point identified in each contract, which may include multiple stages. If a decision is made to move to the next stage or decision point or to gather additional data, additional funding will be provided from available funds.

2008 Unconventional Onshore Solicitation Description

The 2007 solicitation was broad in scope, in order to allow consideration of a broad range of research topics addressing key issues. Solicitations for the 2008 program will continue to seek a broad range of technical solutions, but will place particular emphasis on addressing key technical or resource gaps within the current portfolio of projects. Two areas that have been identified as requiring additional emphasis are the integrated management of water usage and production in shales and coalbed methane resources, as well as advanced completion and stimulation technologies for complex shale and tight sand reservoirs. In addition, the Evaluation Criteria for the 2008 Solicitations will be written to encourage proposals that integrate the results of projects across disciplines to address the technical needs associated with a specific resource. The solicitation will also reflect the desirability of improving the geographic balance of the program by encouraging proposals that target Appalachian shales.

This program encourages partnerships between oil and gas producers and research organizations. Partnerships are encouraged in order to facilitate the transition from research to application. In addition, the program encourages oil and gas producers who are not familiar or have expertise in proposal submissions to partner with universities and service companies who are familiar with this process.

Topic areas planned to be included in solicitations during the 2008 program year are summarized below.

Area of Interest 1: Gas Shales

Solicitation(s) will request ideas and projects for development of tools, techniques, and methods that may be applied to substantially increase, in an environmentally sound manner, commercial production and ultimate recovery from established gas shale formations and accelerate development of gas from emerging and frontier gas shale plays. The concepts may include but are not limited to the areas listed below. Solicitations will particularly encourage proposals that integrate multiple technologies to address the challenges associated with a particular shale resource.

- Develop multi-zone completion and stimulation methods applicable to complex shale reservoirs.
- Characterization of geologic, geochemical, geophysical, and operational parameters that differentiate high performing wells.
- Comprehensive characterization of the geological, geochemical and geophysical framework of gas shale resource plays, particularly emerging plays.

- Development of methods to accurately assess the potential of shale for gas production from common industry petrophysical measurements.
- Development of methods to plan, model, and predict the results of gas production operations.
- Accurate delineation of the natural fracture system for guiding horizontal wells to intersect a large number of open fractures.
- Development of extra-extended single and multi-lateral drilling techniques.
- Development of steerable hydraulic fractures.
- Development of suitable low-cost fracturing fluids and proppants; e.g., non-damaging fluids and/or high strength low density proppants.
- Develop advanced drilling, completion, and/or stimulation methods that allow a greater volume of reservoir to be accessed from a single surface location; and decrease the environmental impact.
- Develop stimulation methods that require less water and other fluids to be injected into the subsurface.
- Develop stimulation methods that result in a lower volume of treatment fluids produced to the surface.
- Develop approaches for improved treatment, handling, re-use, and disposal of fluids produced and/or used in field operations.
- Extending the commercial life of a producing well through reduction of the initial drilling and completion costs, elimination of workovers and recompletions, as well as reduction of production costs, particularly those associated with water disposal and management.
- Conduct preliminary studies of novel concepts for unconventional gas development in gas shale resources, and for the initial assessment of the potential of frontier gas shale resources.
- Develop improved drilling methods that lower cost, reduce time on location, use less materials or otherwise increase the efficiency and effectiveness of well construction.

Area of Interest 2: Water Management Associated with Coalbed Methane and Gas Shale Production

Solicitations will request proposals for development of tools, techniques, and methods that may be applied to substantially decrease the cost and environmental impact of coalbed methane and gas shale development through more effective management of water used and produced in drilling, completion, stimulation and production operations. The concepts may include but are not limited to the areas listed below. Solicitations will particularly encourage proposals that consider an integrated, life-cycle approach to water management in the development of a particular resource.

- Develop water management approaches that minimize the impact of drilling, completion, stimulation and production operations on natural water resources.
- Develop methods for the treatment of produced water.
- Develop methods for sustainable beneficial use of produced water.
- Develop methods to control fines production.
- Develop techniques to minimize the volume of water produced to the surface.

Area of Interest 3: Tight Sands

Solicitations will request proposals for development of tools, techniques, and methods to increase commercial production and ultimate recovery from established tight gas sand formations, and accelerate development of emerging and frontier tight gas plays. The concepts may include but are not limited to the areas listed below. Solicitations will particularly encourage proposals that integrate multiple technologies to address the challenges associated with a particular tight sand resource.

- Develop multi-zone completion and stimulation methods applicable to complex tight sand reservoirs.
- Characterization of geologic, geochemical, geophysical, and operational parameters that differentiate high performing wells.
- Comprehensive characterization of the geological, geochemical and geophysical framework of tight sand resource plays, particularly emerging plays.
- Accurate delineation of the natural fracture system for guiding horizontal wells to intersect a large number of open fractures.
- Development of extra-extended single and multi-lateral drilling techniques.
- Development of steerable hydraulic fractures.
- Development of suitable low-cost fracturing fluids and proppants; e.g., non-damaging fluids and/or high strength low density proppants.
- Develop advanced drilling, completion and/or stimulation methods that allow a greater volume of reservoir to be accessed from a single surface location and decrease the environmental impact.
- Development of efficient and safe water management schemes.
- Extending the commercial life of a producing well through reduction of the initial drilling and completion costs, elimination of workovers and recompletions, as well as reduction of production costs, particularly those associated with water disposal and management.

- Conduct preliminary studies of novel concepts for unconventional gas development in tight sands, and for the initial assessment of the potential of frontier tight sand resources.
- Develop improved drilling methods that lower cost, reduce time on location, use less materials or otherwise increase the efficiency and effectiveness of well construction.

It is anticipated that there will be $13.89 million available for funding the Unconventional Resources Program Element during each fiscal year. Approximately 5 to 15 awards are anticipated to be awarded in 2008.

The typical award is expected to have duration of one to three years, although shorter or longer awards may be considered, if warranted by the nature of the proposed project.

2007-2008 Consortium Research Areas

http://www.fe.doe.gov/programs/oilgas/ultra_and_unconventional/2008_Annual_Plan/2007_-_2008_Project_Abstracts_and_Overvi/UDW_Abstracts_2007-2008.pdf

http://www.fe.doe.gov/programs/oilgas/ultra_and_unconventional/2008_Annual_Plan/2007_-_2008_Project_Abstracts_and_Overvi/2007_Unconventional_Resources_Selected_P.pdf

http://www.fe.doe.gov/programs/oilgas/ultra_and_unconventional/2008_Annual_Plan/2007_-_2008_Project_Abstracts_and_Overvi/2007_Small_Producer_Selected_Project_Abs.pdf

NETL Complementary Research Areas

http://www.fe.doe.gov/programs/oilgas/ultra_and_unconventional/2008_Annual_Plan/2007_-_2008_Project_Abstracts_and_Overvi/UDS_ExDriling_Abstract_31July2008.pdf

http://www.fe.doe.gov/programs/oilgas/ultra_and_unconventional/2008_Annual_Plan/2007_-_2008_Project_Abstracts_and_Overvi/Environmental_Impact_Projects.pdf

http://www.fe.doe.gov/programs/oilgas/ultra_and_unconventional/2008_Annual_Plan/2007_-_2008_Project_Abstracts_and_Overvi/Enhanced_Unconventional_Oil_Recovery_Pro.pdf

http://www.fe.doe.gov/programs/oilgas/ultra_and_unconventional/2008_Annual_Plan/2007_-_2008_Project_Abstracts_and_Overvi/Resource_Assessment_Projects.pdf

Attachment 12

EPACT (2005), SUBTITLE J, SECTION 999
NETL COMPLEMENTARY RESEARCH TECHNICAL COMMITTEE

Assessment of Consortium-Administered Research and NETL In-House Research In Regards To Their Complementary and Non-Duplicative Nature

Executive Summary

The Energy Policy Act of 2005 (EPAct), Subtitle J, Section 999 calls for the establishment and operation of a technical committee to ensure that in-house research activities —research carried out under the National Energy Technology Laboratory's (NETL) complementary R&D program elements—is technically complementary to, and not duplicative of, research conducted under the consortium-administered R&D program elements. NETL assembled this committee (the Complementary Research Technical Committee or CRTC) to review the elements of the Section 999 program and to make this determination, as required by the statute. Ten industry professionals were selected to serve on the CRTC based on their qualifications and experience.

The CRTC had its first meeting on June 11, 2008 where it reviewed both the NETL and consortium-administered R&D program elements. **The committee determined that the complementary R&D program elements being carried out by NETL are not duplicative of the consortium-based program elements and in fact, are complementary in nature.**

Several members of the committee noted the potential for duplication between consortium - administered projects and NETL complementary projects in areas related to:

- materials testing and development,
- produced water management,
- enhanced oil recovery (EOR) and unconventional resources, and
- resource assessment.

To this end, the committee recommended that NETL and the program consortium continue routine and effective communications in order to avoid any potential future duplication of effort.

The responsibility for oversight and management of the program consortium lies with NETL. The Laboratory is fully committed to continuing – and enhancing – its communications with the program consortium to ensure that research conducted by NETL and R&D administered by the consortium remain complementary during the entire program life cycle.

In regards to the statements by two committee members regarding possible duplication of effort between NETL research and activities beyond those of the program consortium, the following response is provided.

> NETL recognizes that the comment goes beyond the *charge* to the CRTC however, NETL will continue to act diligently to ensure that research conducted by the Laboratory can clearly be differentiated from that being conducted by others and that it provides

value to myriad stakeholders. The two environmental projects mentioned in the context of possible overlap [beyond consortium sponsored research] will be further examined to assure uniqueness.

Background

The Energy Policy Act of 2005 (EPAct), Subtitle J, Section 999H(d)(4) calls for the establishment and operation of a technical committee to ensure that in-house research activities funded under section 999A(b)(4) --- *research performed under the National Energy Technology Laboratory's (NETL) Complementary Program* --- are technically complementary to, and not duplicative of, research conducted under paragraphs (1), (2), and (3) of section 999A(b) *[the consortium-administered R&D program*]. NETL formed this committee, the CRTC, to review the elements of the Section 999 program and to make this determination, as required by the statute.

The CRTC is functional in nature and distinct from the two Federal advisory committees specifically established by the Energy Policy Act of 2005 (EPAct) Subtitle J, Section 999D(a) and (b): the Ultra-Deepwater Advisory Committee (UDTAC) and the Unconventional Resources Technology Advisory Committee (URTAC). These two Federal advisory committees have been established to advise the Secretary on the development and implementation of programs under Subtitle J.

In terms of the CRTC, NETL sought participation by individuals who had the requisite qualifications to make such a determination and assembled a capable and experienced committee.

Date/Time/Location of the Meeting

The CRTC met on June 11, 2008 at NETL's facilities in Morgantown, WV. The meeting was called to order by John R. Duda, Acting Director, Strategic Center for Natural Gas and Oil (SCNGO). All of the committee members were in attendance (with the exception of Dr. Mukal Sharma, participated via teleconference).

Meeting Participants

The meeting participants included the following committee members and DOE staff:

Committee Members (see Appendix A for key qualifications and contact information)
Dr. David Curry – *Senior Technical Advisor, Hughes Christensen*

Ron Bland – *Mgr. of Product Development Management, Baker Hughes Drilling Fluids*

Sidney Green – *Business Development Mgr. for Schlumberger Data and Consulting Services*

Dr. Robert W. Siegfried, II – *Sr. Institute Scientist at GTI and Vice-President for Onshore Programs of the Research Partnership to Secure Energy for America (RPSEA)*

Tom Williams – *retired, VP, Research and Business Development, Noble Technology Services (Noble Drilling Corporation)*

Greg Wrightstone – *Geological Advisor, Texas Keystone, LLC*

Leo Schrider – retir*ed, former VP, Belden and Blake*

Christine Hansen – *attorney, past Executive Director of the Interstate Oil and Gas Compact Commission (IOGCC)*

Dr. Mukul Sharma – *Professor of Petroleum and Geosystems Engineering at the University of Texas at Austin*

Eric Potter – *Associate Director of the Bureau of Economic Geology, Jackson School of Geosciences, at The University of Texas at Austin*

NETL Staff
John R. Duda – *Acting Director, Strategic Center for Natural Gas and Oil*
Jamie Brown – *Director, Earth and Mineral Sciences Division, Office of Research and Development*
David Wildman– *Senior Management Technical Advisor, Office of Research and Development*

DOE Headquarters Staff
Elena Melchert – *Oil and Gas Resource Conservation, Office of Fossil Energy*
Bill Hochheiser – *Oil and Gas Resource Conservation, Office of Fossil Energy*

Most of the principle investigators responsible for the complementary research being carried out by NETL were also in attendance to provide details on individual projects as needed.

Meeting Agenda/Discussion Topics/Process

The meeting began at 10 AM. The facilitator presented the agenda and explained the purpose of the meeting and the process that would be followed. This was followed by an opening presentation by John R. Duda, who explained in detail the background behind the *charge* to the CRTC, including a discussion of the Section 999 legislation, the structure and operation of the consortium, the planning process, the consortium-administered research program elements and how the Section 999-mandated research fits within the overall SCNGO natural gas and oil R&D program.

This was followed by a second opening presentation by Jamie Brown, who discussed the structure and focus of the NETL complementary research and gave a brief overview of each of the projects in each program element.

After these opening presentations, the committee began a facilitated discussion related to each of the five NETL complementary research program elements, in order:

- Drilling Under Extreme Conditions
- Environmental Impacts of Oil and Natural Gas Development

- Enhanced and Unconventional Oil Recovery
- Resource Assessment
- Benefits Assessment and Program Planning

The committee members had received copies of the *2008 Report of NETL Complementary Research and Development Program Activities* as well as the *2008 Annual Plan for the Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Research and Development Program*[1] as background material to inform their assessment. Their meeting booklets included abstracts of the NETL complementary research projects and brief descriptions of the consortium-administered projects that had been selected for award to date. The complementary and consortium-administered research program elements were characterized for purposes of reference using the tables provided in Appendix B.

The committee members were afforded the opportunity to question the NETL staff responsible for the in-house research. In addition, three of the committee members were associated with the program consortium and as such, were well acquainted with the activities being carried out under the consortium-administered portion of the Section 999 program.

Each program element was addressed with the objective of answering the following question: *Is the research being conducted or planned by NETL, and the research administered by the consortium, technically complementary and non-duplicative?*

At the end of each program element discussion period, the members of the committee completed a form that indicated their determination as to the appropriate answer to the above question. They were also encouraged to add any comments they wished to provide to accompany their entries with respect to the charge given to them. On occasion, an individual committee member felt that they were not technically qualified to comment on a specific technical area beyond their area of expertise, and did not complete the determination for that program element or project.

Following a final *wrap-up* discussion, the committee was adjourned by John R. Duda, the electronic forms were collected, and the committee members were thanked for their participation.

Technical Committee Assessments and Comments

Representative CRTC member comments related to the question of whether or not the NETL and consortium-administered program elements are complementary and non-duplicative are captured below. Some committee members did not comment on areas where they felt that they did not have sufficient technical expertise or information, but all program elements received comments. Two committee members commented that care should be taken to make certain that work was not duplicative with other efforts <u>beyond</u> those of the consortium.[2]

[1] The copy provided to the CRTC was that which was provided to DOE headquarters and may still be undergoing revision as part of the approval process.

[2] The technology focus areas referenced in this case do <u>not</u> have current projects and were defined only as areas where research might be undertaken in out years.

Drilling Under Extreme Conditions

The committee determined that the program elements were not duplicative and were complementary. Several members of the committee noted the potential for duplication between consortium projects focused on materials testing and development, and the extreme drilling research projects at NETL. A number of committee members recommended continued communication between NETL and the consortium to avoid duplication in this area. Comments included:

"The only area of potential conflict is RPSEA's SW1403: Fatigue Performance of High Strength Riser Materials. NETL needs to stay in close contact with the work to [continue to] ensure non-duplication of effort."

"There is clear potential for duplication between Extreme Drilling projects at NETL and Ultra-deepwater projects funded by RPSEA, since ultra-deepwater E&P activity will frequently involve drilling under extreme pressure and temperature conditions. Diligent overview should avoid duplication and ensure that projects are indeed complementary."

"There is no evidence of actual duplication at this stage, but I encourage close communication between NETL and Southwest Research Institute to avoid any future duplication and to achieve maximum benefit of potential synergies between the two projects."

"I do not see any duplication with other programs. The five topics all seem high priority and seem that these programs would clearly complement specific RPSEA Deepwater projects, or vise versa; the Deepwater projects would complement these five topics."

"There is the potential that HPHT materials development could be duplicative of efforts in the UDW program element. Coordination of efforts in both programs will be required to ensure that efforts remain complementary."

Environmental Impacts of Oil and Natural Gas Development

The committee determined that the program elements were not duplicative and were complementary. Several members of the committee noted the potential for duplication between consortium projects focused on produced water management and recommended continued coordination between NETL and the consortium to avoid duplication in this area. Comments included:

"[Two NETL focus areas "Managing Produced Water: Defining Environmental Barriers to Oil and Gas Development and Improving Industry Understanding of Regulatory Issues**]** require close coordination with RPSEA. [The topic of managing produced water is the topic of a recent RPSEA forum]"

"The water management efforts should be closely coordinated with RPSEA projects that deal with water management. The other environmental projects are clearly non-duplicative."

"Full information about some of these projects was not available in the materials provided, so it is difficult to give knowledgeable input."

"I do not see duplication with other projects; however, these are areas where I am not highly knowledgeable nor did I review these projects in detail. I note that for the first topic area, "Category Environmental Barriers," caution should be made with respect to certain RPSEA Unconventional Gas projects. The topic title suggests that there could be duplication, depending on the details of each project."

"There is potential for duplication between NETL work on Environmental Impact of Oil and Gas Development and RPSEA funded projects on Environmental aspects of Ultra-deepwater E&P."

Enhanced and Unconventional Oil Recovery

The committee determined that the program elements were not duplicative and were complementary. Several members of the committee noted the potential for duplication between specific consortium and NETL projects and recommended continued coordination between NETL and the consortium to avoid duplication in this area. Comments included:

"Tough to comment on sensor development as there is none listed by NETL or RPSEA. Caution should also be exercised on the project on use of microwave for EOR and RPSEA's "Enhancing Appalachian Coalbed Methane Extraction by Microwave-Induced Fractures" to avoid re-inventing the wheel."

"There is clear potential for duplication between NETL work on EOR and Unconventional Oil and RPSEA funded projects in the area of Unconventional and Other Resources. I do not have expertise in the areas of EOR and Unconventional Oil, nor did I hear presentations on any of the NETL project presentations. I am happy to accept the opinions of those committee members who do have expertise in this area and did hear the NETL project presentations. They indicated during discussion that they believe the projects to be complementary and non-duplicative."

"I do not see any duplication with other projects."

"I am not aware of any duplication with RPSEA in any of the EOR and Unconventional Oil projects listed above. RPSEA staff confirm that none of these projects duplicate current or planned RPSEA research, and in fact these general areas are not in RPSEA's portfolio … there are no duplicative elements, according to RPSEA staff and the written materials provided."

"The EOR and unconventional oil efforts are very complementary to the gas focus of the RPSEA onshore program."

"Oil shale is an area where there is no potential for overlap."

Resource Assessment

The committee determined that the program elements were not duplicative and were complementary. Several members of the committee noted that there is potential for overlap and that continued communication will be necessary to avoid any duplication of effort. One member noted that a lack of detail in areas of the program where projects have yet to be proposed made it difficult to make an assessment. Comments included:

"[The Marcellus Shale resource estimate, the first example of the Resource Assessment area] is complementary. [Other projects yet to be defined will] require coordination [to avoid overlap with RPSEA forums and to avoid] possible overlap in some areas, especially of the small producers program. Discussion highlights some of the communication gaps so far."

"I am not aware of any duplication of this work."

"The resource characterization work could clearly fall within the scope of the RPSEA program. Close communication and cooperation will be required to ensure that resource assessment efforts do not result in duplicative efforts."

"RPSEA and NETL will need to coordinate continuously to avoid possible duplication in such areas as the Marcellus shale project. RPSEA requests for proposals could quite plausibly generate duplicative proposals in the future (in the absence of coordination)."

"NETL and RPSEA need to monitor each other's programs carefully to ensure that they are complementary. Once is not sufficient."

"Many of these projects will rely on great coordination, as is obviously already contemplated by DOE and will be well handled. Both NETL and RPSEA are sensitive to these issues and will make needed effort to communicate openly."

"It is really difficult to make an assessment based on no information – i.e. "technology assessments" and "sensor development" and the "yes" vote here is voted on consensus, not belief that duplication will not happen or that any work in this area will actually be complementary of the RPSEA program."

"There could be duplication of programs for these topics; indeed both the NETL Complementary Research Programs and the RPSEA Programs may correctly pursue research generally in these topic areas. Therefore, it is important that good communication and cooperation be maintained in order for the specific programs in these general areas to not be duplicative and in order for the programs to be complementary. At the present, there does not seem to be duplication (and in fact the "Technology Assessment" topic has specific programs yet to be determined)."

"There is clear potential for duplication between NETL work in the area of Resource Assessment and RPSEA funded projects in the area of Unconventional and Other Resources. I do not have expertise in Resource Assessment. I did not detect any duplication of work in any RPSEA funded project but I am not confident that I would be able to detect such duplication. I understand from the other committee members who do have expertise in Resource Assessment that these projects are complementary and non-duplicative. I am happy to accept their opinions."

"Couldn't find any overlap between above NETL projects or interest and any of the RPSEA's projects but there is clearly a lot of RPSEA interest in shale gas in general and NETL's efforts appear to be complementary."

Benefits Analysis and Program Planning:

"Requires coordination with RPSEA – required by statute."

"Does not appear to be any projects by RPSEA on program planning and assessment but such an effort by NETL, besides being apparently mandated by law, complements RPSEA's overall program. RPSEA is working to assess the success of the program and NETL and RESEA need to work closely together or at least make sure both are aware of each other's efforts and approach to gain the most value from each others efforts."

"I am prepared to accept the NETL evaluation that their work in this area is well coordinated with RPSEA work on benefits assessments and program planning support, and is not directly duplicative of work being performed or funded by RPSEA."

"I would assume that both NETL Complementary Research Programs and the RPSEA Programs will do 'Benefits Assessment' and will do 'Program Planning and Assessment' for their individual programs. This would not be duplication, and would be complementary to each individual program."

"Many of these projects will rely on great coordination, as is obviously already contemplated by DOE and will be well handled. Both NETL and RPSEA are sensitive to these issues and will make needed effort to communicate openly."

"Economic benefits of research are so numerous that it has been traditionally difficult to capture all of them effectively and convincingly. Therefore it is a welcome and complementary situation that both RPSEA and NETL will conduct such studies. Ultimately a merged benefits model may emerge, but if both entities start by doing their own assessments, I see that as beneficial, provided that there is a concerted effort to compare the approaches and to adopt best practices of each."

Findings

The committee determined that the complementary R&D program elements being carried out by NETL are not duplicative of the consortium-based program elements and in fact, are complementary in nature.

Several members of the committee noted the potential for duplication between consortium - administered projects and NETL complementary projects in areas related to:

- materials testing and development,
- produced water management,
- enhanced oil recovery (EOR) and unconventional resources, and
- resource assessment.

The committee determined that while research being conducted by NETL and the consortium is complementary and not duplicative, there is potential for overlap and continued close communication will be necessary to avoid any duplication of effort.

APPENDIX A
FY08 TECHNICAL COMMITTEE CONTACT INFORMATION AND QUALIFICATIONS

Ron Bland
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gwrightstone@texaskeystone.com

TECHNICAL COMMITTEE QUALIFICATIONS

The search for members of the Technical Committee was focused on individuals who met the following key qualifications:

- Possess a comprehensive appreciation of the technical challenges currently facing U.S. oil and gas producers.

- Possess a broad understanding of the current capabilities and limitations of the types of technology targeted under the Section 999 R&D program areas of focus.

- Possess a familiarity with R&D functions and an ability to assess research plans and identify areas of duplication.

The following individuals were chosen to be asked to participate on the Technical Committee based on the match between their expertise and the required qualifications listed above. Together these ten individuals represent more than 300 years of combined experience in oil and gas exploration and production.

Ron Bland – *Mgr. of Product Development Management, Baker Hughes Drilling Fluids*

- Over 38 years experience in the drilling fluid business serving in a variety of technical and technical management positions
- Author/co-author of over 28 papers, 13 patents
- Served on SPE Technical Program Committees for both the Annual Technical Conference and Exhibition and currently the International Association of Drilling Contractors/Society of Petroleum Engineers Drilling Conference
- Chair of Task Group for API Standardization Subcommittee

Dr. David Curry – *Senior Technical Advisor, Hughes Christensen*

- Over 20 years experience related to drilling research and technology development.
- Experience with Hughes Christensen, TerraTek, the International Drilling and Downhole Technology Centre, and Schlumberger Cambridge Research.
- Chartered Engineer and a Fellow of the Institution of Mechanical Engineers
- Director of the SPE's R&D Technical Section.
- Past Executive Editor and Review Chairman of the SPE Drilling and Completions
- PhD in Fracture Mechanics from Cambridge University.

Sidney Green – *Business Development Mgr. for Schlumberger Data and Consulting Services*

- Co- founder and former CEO of TerraTek (acquired by Schlumberger)
- Research Professor in Mechanical Engineering and Civil and Environmental Engineering. at the University of Utah
- More than 40 years of experience in the area of geomechanics; well published holder of a number of patents
- Engineering degrees from the University of Pittsburgh and from Stanford University; a Member of the US National Academy of Engineers.

Dr. Robert W. Siegfried, II – *Sr. Institute Scientist at GTI and Vice-President for Onshore Programs of the Research Partnership to Secure Energy for America (RPSEA)*

- Fifteen-year career with ARCO working on formation evaluation and the integration of borehole measurements with geologic and geophysical data
- At GTI has worked with service companies, operating companies, universities, national labs, and joint industry groups on the development and commercialization of new technology in several E&P disciplines
- Has received 14 US Patents,
- Ph.D. in geophysics from Massachusetts Institute of Technology

Christine Hansen – *attorney, past Executive Director of the Interstate Oil and Gas Compact Commission (IOGCC)*

- 15 years as Executive Director of the Interstate Oil and Gas Compact Commission
- Energy company experience includes VP positions with two utilities
- Past commissioner for Iowa public service commission
- Member of the National Petroleum Council and a board member of the Research Partnership to Secure Energy for America (RPSEA).
- Has testified numerous times on energy matters before committees of the United States Senate and House of Representatives

Eric Potter – *Associate Director of the Bureau of Economic Geology, Jackson School of Geosciences, at The University of Texas at Austin*

- Responsible for coordinating the fossil energy research programs at the Bureau since 2001
- 25 years experience with Marathon Oil Company (1975 to 2000), including technical staff and management positions in most US basins
- Served as Manager of Geologic Technology and Associate Director at Marathon's Petroleum Technology Center
- Geology degrees from Dartmouth College and Oregon State University
- A registered professional geoscientist in the state of Texas.

Leo Schrider – Partner with FO Energy Development, LLC, former VP, Belden and Blake

- A petroleum engineer with 45 years experience in oil and gas development throughout the continental United States
- Senior Vice President for Belden & Blake Corporation where his responsibilities included all phases of E&P development; also worked for Shell Oil Company
- Previously employed by the Department of Energy, where he last served as the Deputy Director at the Morgantown Energy Technology Center (METC)
- Served on the National Board of Directors for the Society of Petroleum Engineers
- Past Chairman of the Petroleum Technology Transfer Council

Dr. Mukul Sharma – *Professor of Petroleum and Geosystems Engineering at the University of Texas at Austin*

- 20+ years of petroleum engineering academic experience; expertise in natural gas engineering, injection water management, hydraulic fracturing, formation damage and petrophysics
- Has more than 200 publications and 9 patents
- PhD in chemical and petroleum engineering from the University of Southern California
- Recipient of multiple SPE awards, including the 2004 SPE Faculty Distinguished Achievement Award
- Served as an SPE Distinguished Lecturer in 2002

Tom Williams – *retired, VP, Research and Business Development, Noble Technology Services (Noble Drilling Corporation)*

- Over 25 years experience in oil industry
- Owned and operated an oil and gas exploration, production, and consulting company
- Held Senior Executive Positions at both the Department of Energy and Department of Interior
- Business Development Director and later Vice President of Westport Technology Center in Houston, a leading oil and gas research, and technical services company
- Co-founder of Cementing Solutions, Inc. (CSI), a successful and innovative oil and gas cementing services and technology development company
- Currently serves on the Board of Directors of a publicly traded exploration and production company focused on coal bed methane exploration, drilling and production in China
- Currently serves as Managing Director of a company that develops low cost solutions for deep water drilling, completion and production
- Co-chair of the DeepStar Consortium Contributors Advisory Board, which represents over 60 service companies that focus on deep-water R&D, and also serves on the Board of DeepStar
- Serves on the board of Directors of the Petroleum Technology Transfer Council (PTTC)
- Has published over 100 publications and papers.

Greg Wrightstone – Director of Geology, Texas Keystone, Inc.

- Director of Geology for Texas Keystone, Inc. where he leads a staff of 5 geoscientists in oil and gas exploration and development, concentrating on the Appalachian Basin
- Current President of the Pittsburgh Association of Petroleum Geologists
- Officer of the Eastern Section of the American Association of Petroleum Geologists (AAPG)
- Advanced geology degree from West Virginia University

APPENDIX B
Summary of RPSEA-administered program elements

Program Element	Technology Focus Area	Technology Theme	Number of Projects Related to Themes
Ultra-Deepwater	Type Field Challenges	Low perm reservoirs	4
		High viscosity oil	4
		Small reserve fields	1
		XHPHT Sour service	5
	Crosscutting Challenges	Environmental	10
		Floating Facilities	4
		Flow Assurance	3
		Geo-Science	6
		Met-ocean	2
		Reservoir	8
		Subsea Facilities	8
		Systems Engineering and Architecture	15
Unconventional and Other Resources	Increase production and recovery	Gas shales	5
		Coal seams	4
		Tight gas	8
	Decrease impact of produced water	Coal seams	1
		Gas shales	1
	Improve E&P in emerging areas	Gas shales, coal seams and tight sands	5
	Improve E&P in frontier areas	Gas shales, coal seams and tight sands	2
Small Producers	Mature fields	Water mgmt.	1
		Improve recovery	4
		Reduce costs	4

Summary of NETL research program elements

Program Element	Technology Focus Area	Technology Theme	Projects
Extreme Drilling	Drill Bit-Rock-Fluid Fundamental Science		HPHT Drilling Lab
	Numerical Model Development for Rock Mechanics Systems		Modeling rock and cutter behavior
	Development of Novel Drilling Fluids		Novel drilling fluids for HPHT applications
	Development of Sensors and Electronics for HPHT		
	HPHT Materials Development		HPHT materials development and performance
Environmental Impacts of Oil and Gas Development	Managing Produced Water	Catalogue environmental barriers	Define environmental barriers to oil and gas development
		Evaluate subsurface drip irrigation	Evaluation of subsurface drip irrigation (SDI)
		Test electromagnetic induction for determining soil salinity	Assessment of watersheds (WY Section 20 discharges)
		Conduct channel morphology studies	Interactive model to predict erosion or flooding due to produced water discharges
		Develop strategies to protect air and groundwater at oil shale sites	Environmental assessment of oil shale technologies
	Develop Models of Air Emissions from E&P Activities		Develop models of impact of oil & gas activity on air quality
	Improve Understanding of Impact of E&P Activities on Sensitive Ecosystems		Assessment of ecological impact of oil and gas activities
	Improve Industry Understanding of Regulatory Issues		Add information to database (web site)

EOR and Unconv. Oil	Database Development for Unconventional Oil		Oil shale database development
	Basin/Reservoir Models; Algorithm Development		Enhanced Oil Recovery from Fractured Media
	Oil Shale: Additives and Catalysts; Spent Shale By-products		Additives and catalysts for oil shale development
	Sensor Development		
	Enabling Technologies for CO2 and Thermal EOR		Mobility Control
			Microwave (lit. review)
Resource Assessment	Resource characterizations		Resource estimate for the Marcellus shale in the Appalachian Basin
	Technology Assessments		
	Technology Transfer		Develop central repository (web site) for date related to Section 999 research
Program Planning and Assessment	Benefits Assessment		
	Program Planning Support		

Attachment 13

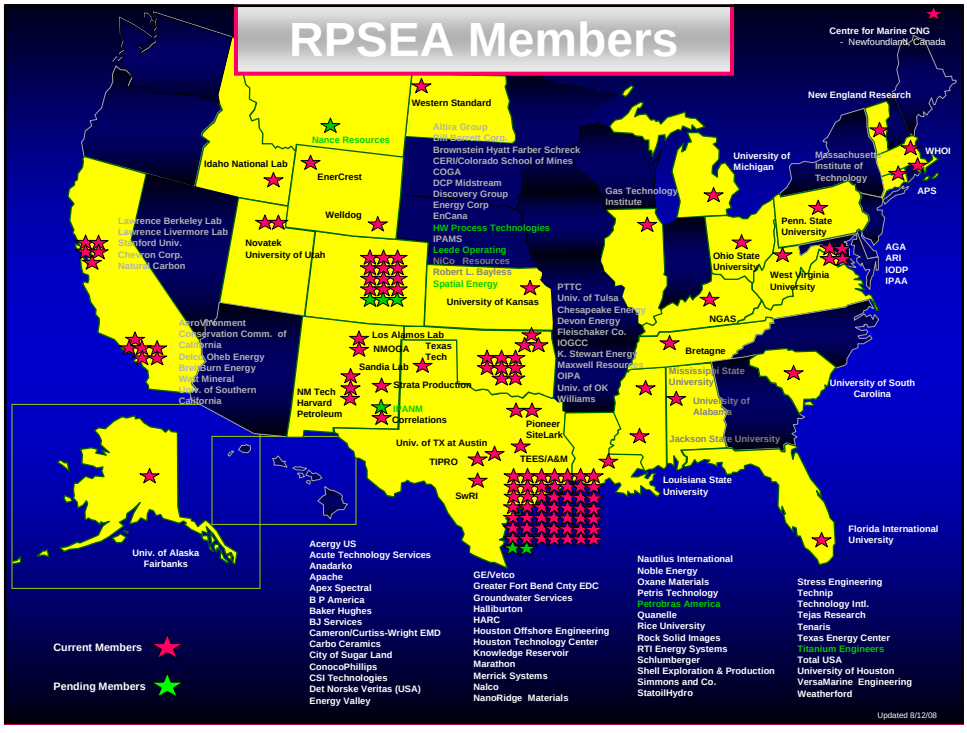
RPSEA

Research Partnership to Secure Energy for America

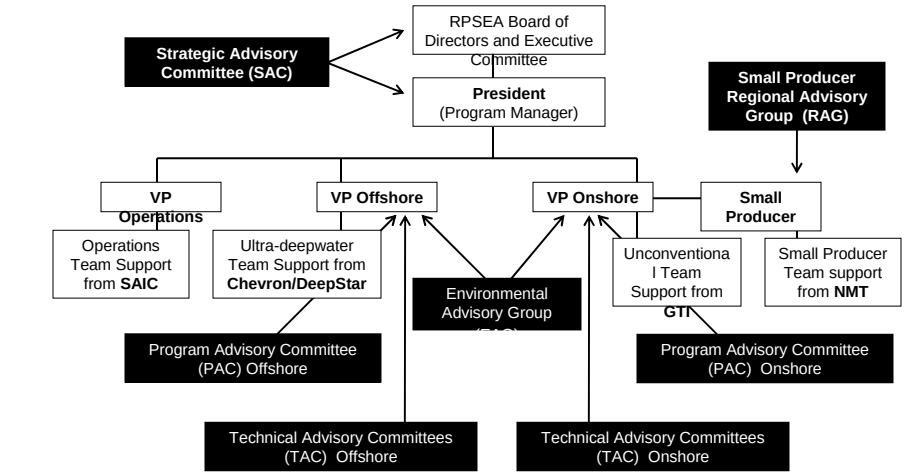
Ultra-Deepwater Program
FACA Meeting

Christopher Haver
C. Michael Ming
Washington, D.C.
September, 2008

Secure Energy for America



A Small Organization, A Large Network



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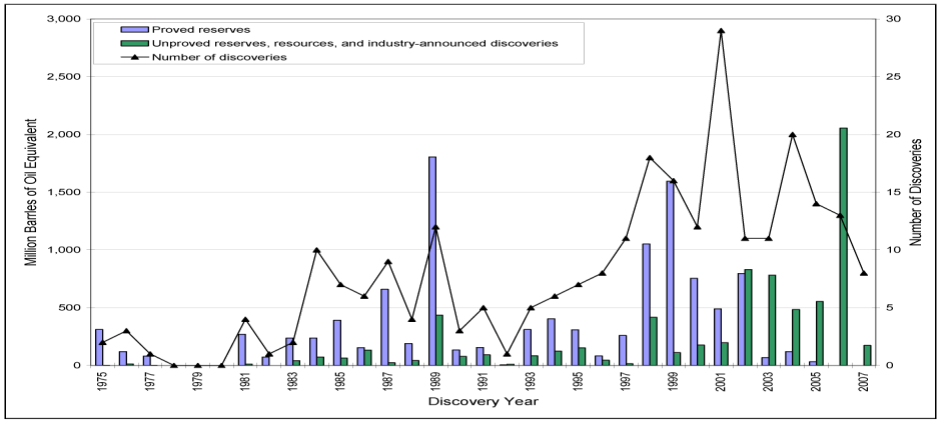

Number of deepwater field discoveries and new hydrocarbons found (MMS reserves, MMS resources, and industry-announced discoveries).

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Secure Energy for America

"Technology and Architecture Focus"

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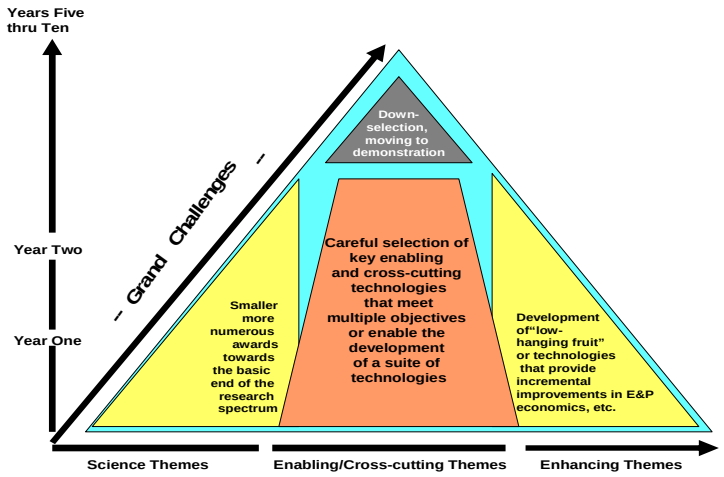
RPSEA Program Development Strategy



Significant Demand for UDW Technology Funding

April, 2007 — **120+ Project Ideas, $300 MM**

June, 2007 — **70 Project Ideas, $175 MM**

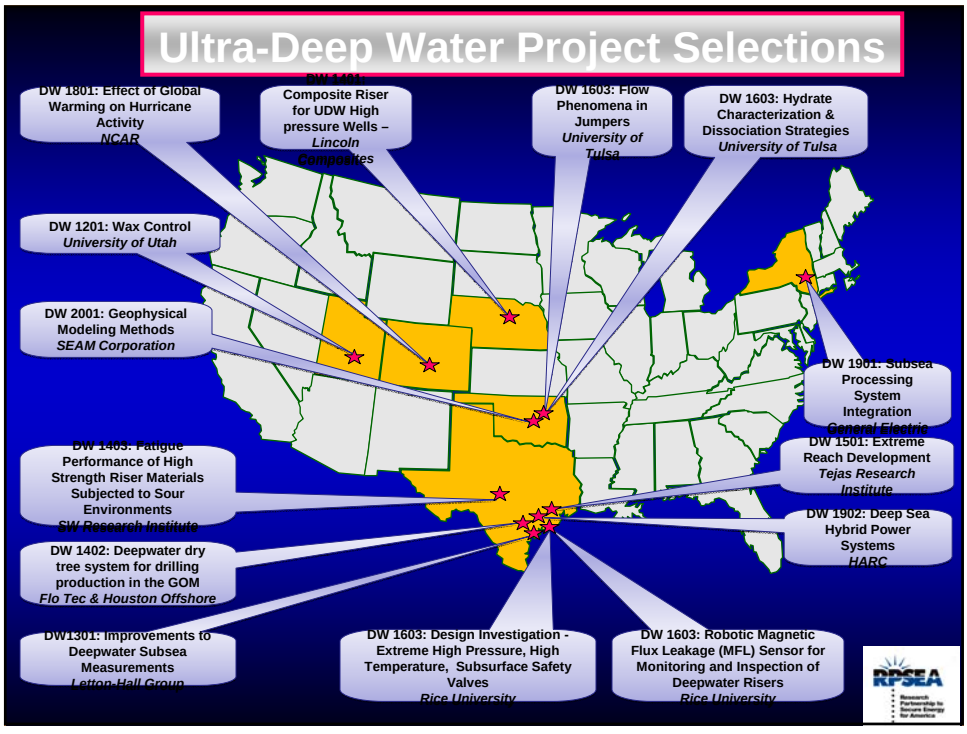
July, 2007 — **26 Project Ideas, $30 MM**

RPSEA 2007 & 2008 Projects

2007 UDW projects

Project	Project Title	Number of bids	Selected	Award (RPSEA max)
DW1201	Wax Control	3	University of Utah	$400,000
DW1301	Improvements to Deepwater subsea measurements	2	Letton Hall Group	$3,564,000
DW1302	High Conductivity Umbilicals	2	Technip	$448,000
DW1401	Composite Riser for UDW High Pressure Wells	3	Lincoln Composites	$1,680,000
DW1402	Deepwater dry tree system for drilling production	4	FloTec / Houston Offshore	$936,000
DW1403	Fatigue Performance of High Strength Riser Materials	2	SwRI	$800,000
DW1501	Extreme Reach Development	2	Tejas	$200,000
DW1603	Design investigation xHPHT, SSSV	6	Rice Univ.	$120,000
DW1603	Robotic MFL Sensor; monitoring & inspecting risers		Rice Univ.	$120,000
DW1603	Hydrate Plugging Risk		Tulsa Univ.	$120,000
DW1603	Hydrate Characterization & Dissociation Strategies		Tulsa Univ.	$120,000
DW1701	Improved Recovery	2	Knowledge Reservoir	$1,600,000
DW1801	Effect of Global Warming on Hurricane Activity	1	NCAR	$560,000
DW1901	Subsea processing System Integration	2	GE Research	$1,200,000
DW1902	Deep Sea Hybrid Power Systems:	1	HARC	$480,000
DW2001	Geophysical Modeling Methods	2	SEG	$2,000,000
summary		32		

Secure Energy for America



2007 Selected Proposals

Categories	UDW	Unconventional	Small Producers	Total
Universities	5	13	6	24
National Laboratories	-	2	1	3
Nonprofit Corporation	4	1	-	5
For Profit Corporation	8	1	-	9
Geological Science	-	2	-	2
	17	19	7	**43**

UDW 2007 RFPs

- 4 RFPs released November 5, 2007
  - 9 proposals received December 27, 2007
- 5 RFPs released November 28, 2007
  - 13 proposals received January 28, 2008
- 5 RFPs to be released February 11, 2008

  10 proposals received April 14, 2008

2008 UDW projects

TAC Number	Impact	2008 RPSEA Max Share
DW 2101	New Safety Barrier Testing Methods	$ 128,000
DW 1202	EOS improvement for xHPHT	$1,600,000
DW 2201	Viscous Oil PVT	$460,000
DW 2301	Deepwater Riserless Light Well Intervention	$3,411,500
DW 1502	Coil Tubing Drilling & Intervention	$820,000
DW 2501	Early Reservoir Appraisal, Utilizing a Low Cost Well Testing System - Phase 1	$880,000
DW 2502	Modeling and Simulation; MPD	$384,000
DW 2701	Resources to Reserves Development and Acceleration through Appraisal	$400,000
DW 2801	Gulf 3-D Operational Current Model Pilot	$1,248,000
DW 2901	power distribution & components (Component Qualification)	$4,811,000
10 Projects	Totals	$14,142,500

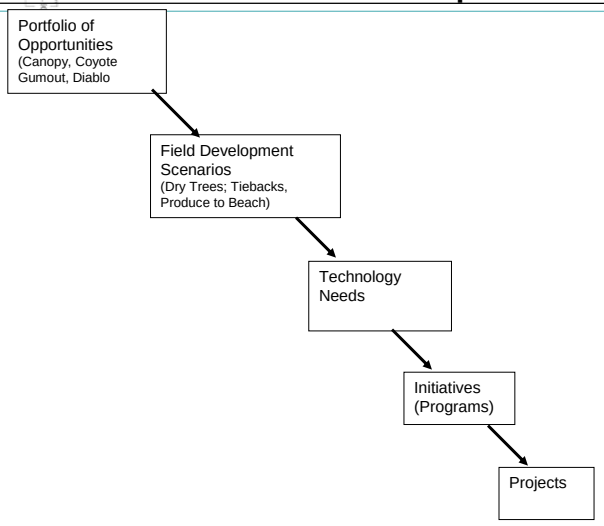
2008 RFP Release

- Modification of scope of work to reflect significant learnings from 2007 process – September 2008.
- Final review by Project Champions – October 2008.
- Final NETL review in late October.
- Approval by NETL to use multi-step contract and/or other contract form (?).
- Release of 2 to 3 RFP tranches.

2009 UDW Annual Plan

- Strategies:
  - Show integrated nature of 2007 & 2008 and future programs.
  - Provide overview of each 2007 & 2008 project.
  - High level view of 2009 program direction.
  - Fewer, more general and integrated RFPs.
  - Include Environmental Issues

Annual Plan Strategy Development

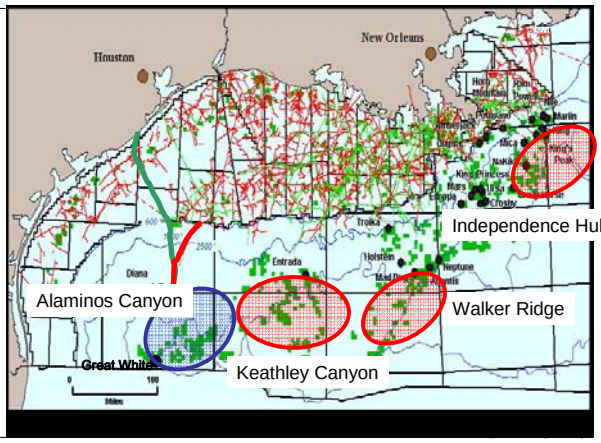


GOM Ultra-deepwater Activity

- **Walker Ridge /Keathley Canyon**
  - **Sub-salt**
  - **Deeper wells**
  - **Tight formations**
- **Alaminos Canyon**
  - **Viscous crude**
  - **Lacking infrastructure**
- **Eastern Gulf – Gas Independence Hub**
  - **Higher pressure**
  - **Higher Temperature**
  - **CO_2 / H_2S**

Higher Drilling Costs

Challenging Economics



Ultra Deepwater Needs

- Drilling, completion and intervention breakthroughs
- Appraisal & development geoscience and reservoir engineering
- Significantly extend subsea tieback distances & surface host elimination
- Dry trees/direct well intervention and risers in 10,000’ wd
- Continuous improvement / optimize field development
  - Per wellbore recovery
  - Cost reduction
  - Reliability improvements
  - Efficiency improvements
- Associated safety and environmental trade-offs

Ongoing Needs and Initiatives

- Need 1: Drilling, Completion and Intervention Breakthroughs
  - Initiative 1: Drilling and Completions
  - Initiative 2: Intervention (Downhole Services)
- Need 2: Appraisal and Development Geoscience and Reservoir Engineering
  - Initiative 1: Exploration and Appraisal
  - Initiative 2: Field Development
- Need 3: Significantly Extend Subsea Tieback Distances/Surface Host Elimination
  - Initiative 1: Stabilized Flow
  - Initiative 2: Subsea Power
  - Initiative 3: Subsea Processing

Ongoing Needs and Initiatives

- Need 4: Dry Trees/Direct Well Intervention and Risers in 10,000 foot Water Depths
  - Initiative 1: Dry Trees/Direct Well Intervention and Risers
- Need 5: Continuous Improvement/Optimize Field Development
  - Initiative 1: Improve Operating and Inspection Processes
  - Initiative 2: Graduate Student and Long Term Research and Development
- Need 6: Associated Safety and Environmental Concerns

2009 UDW Plan Strategy

- 4 to 7 Initiative-based RFPs (5 to 10 project awards)
- Unlike 2007 and 2008, however, the UDW TACs have not voted for individual projects. Rather, the TACs prioritized project ideas by initiatives.
- This input was evaluated by the PAC prior to decide the appropriate balance for the 2009 UDW program.
- UDW 2009 RFPs will consist of both specific projects (follow-on) and broader initiative-based requests. Anticipated 2009 RPSEA UDW initiatives and/or projects are listed below in the context of each UDW need.
- The actual 2009 RPSEA UDW may differ from the anticipated portfolio listed below. The actual 2009 UDW portfolio will be driven by further guidance from the UDW PAC and the timing associated with 2009 program funding.

2009 Anticipated Initiatives

Need 1: Drilling, Completion and Intervention Breakthroughs

- Proposals will be requested identifying novel ideas to reduce well construction and completion costs.

Need 2: Appraisal and Development Geoscience and Reservoir Engineering

- Proposals will be requested in the area of production and reservoir surveillance.

Need 3: Significantly Extend Subsea Tieback Distances/Surface Host Elimination

- Proposals may be requested in one or more of the following areas:
  - Ultra-deepwater flow assurance especially for the areas of solids (asphaltenes, hydrates, waxes, and scale) deposition and plug formation management
  - Pressure boosting
  - Autonomous underwater vehicles and intervention
  - Subsea processing/produced water treatment

2009 Anticipated Initiatives, cont'd

Need 4: Dry Trees/Direct Well Intervention and Risers in 10,000' Water Depth

- Proposals in this area to be determined.

Need 5: Continuous Improvement/Optimize Field Development

- Proposals in this need area may include:
  - Advancing industry understanding of phenomena impacting ultra-deepwater operations such as vortex-induced vibration
  - Improvements in integrity management and reliability
  - Additional graduate student project funding
  - High risk, high reward 'long-shot' R&D opportunities

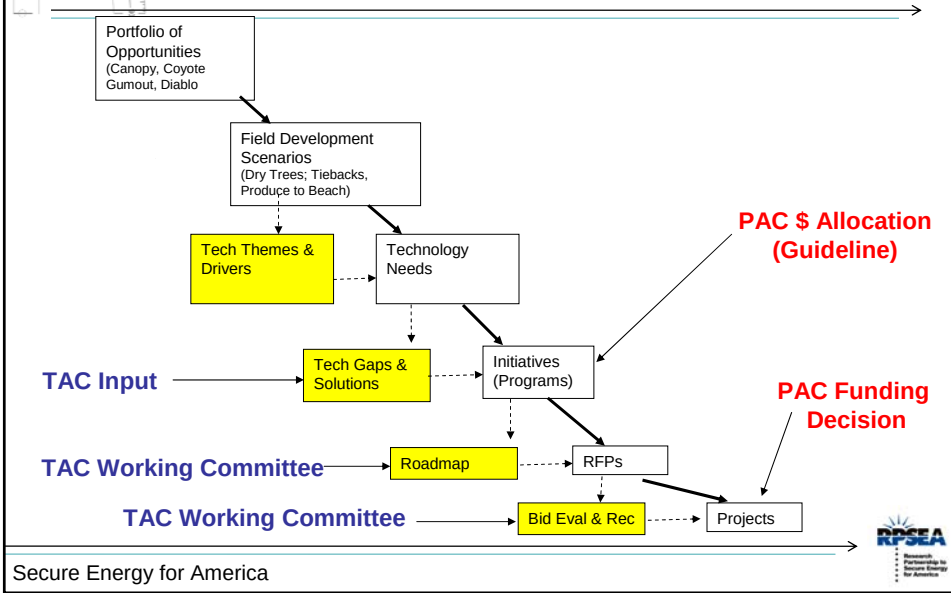
Need 6: Associated Safety and Environmental Concerns

- Ultra-deepwater efforts in this need area will involve the assessment of environmental and safety impact of RPSEA UDW funded technology development projects. This effort may take the form of individual solicitations or elements of more extensive project based solicitations. Areas of study may include:
  - Improved Metocean understanding
  - Discharge of produced water subsea – technology and regulatory aspects

2009 UDW PAC Recommended Funding

RPSEA YR3 Funding Allocation (2009)		Funding Distribution ($k)		
	Title / Description	Low	High	Average
Need #1	**Drilling Completion and Intervention Breakthroughs**			**6,250**
1	Drilling	2,000	5,000	3,500
2	Completions	1,000	3,000	2,000
3	Intervention (Downole Services)			-
4	Intervention (In-Water IMR)	500	1,000	750
5	Extended Well Testing			-
Need # 2	**Appraisal & development geosciences and reservoir engineering**			**1,500**
6	Reservoir Surveillance	1,000	2,000	1,500
Need #3	**Significantly extend subsea tieback distances / surface host elimination**			**3,625**
7	Stabilized Flow	750	1,500	1,125
8	Subsea Power			-
9	Subsea Processing, Pressure Boosting, Instrumentation and Controls	2,000	3,000	2,500
Need #4	**Dry trees / Direct well intervention and risers in 10,000' wd.**			**-**
10	Riser Systems			-
11	Dry Tree Structures			-
Need #5	**Continuous Improvement / Optimize field development**			**3,000**
12	Long Term Research and Development and Graduate Student Program	1,000	2,000	1,500
13	Sensors, tools and Inspection Processes	1,000	2,000	1,500
	Bridging and Contingency	500	750	625
Need #6	**Associated Safety and Environmental Concerns**			**500**
14	Environmental Issues	250	750	500
		10,000	**21,000**	**14,875**

2009 Annual Plan Process



Technology Transfer Plans

2.5% Set-aside for Tech Transfer in each subcontract

- **1.5% Project Level**
  - **Preparing publications**
  - **Participating in conferences & workshops**
- **1% Program Level**
  - **Support activities that impact multiple projects**
  - **Regional workshops, conferences**
  - **Topical conference**
  - **Directed publications**
  - **Newsletter**
  - **Website/Database creation & maintenance (Knowledge Database)**
  - **Technical support**
  - **Other novel approaches?**

What Questions Can I Answer?

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DeepStar Director, Chevron ETC
RPSEA Offshore VP
chaver@chevron.com
www.rpsea.org
www.deepstar.org

Attachment 14

RPSEA

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Christopher Haver
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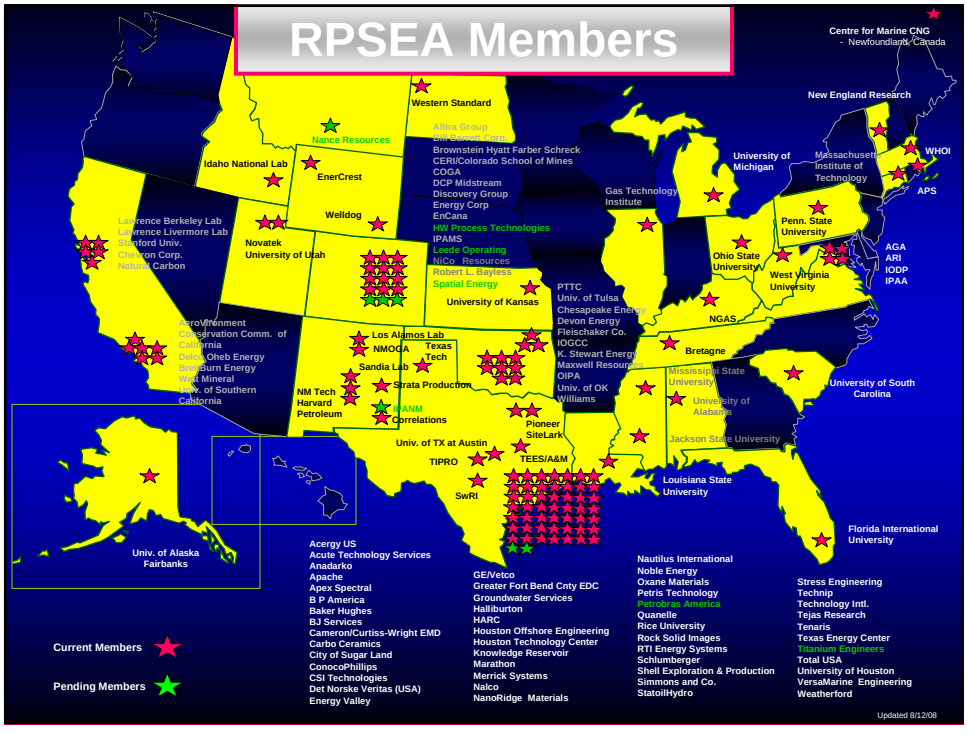
Secure Energy for America



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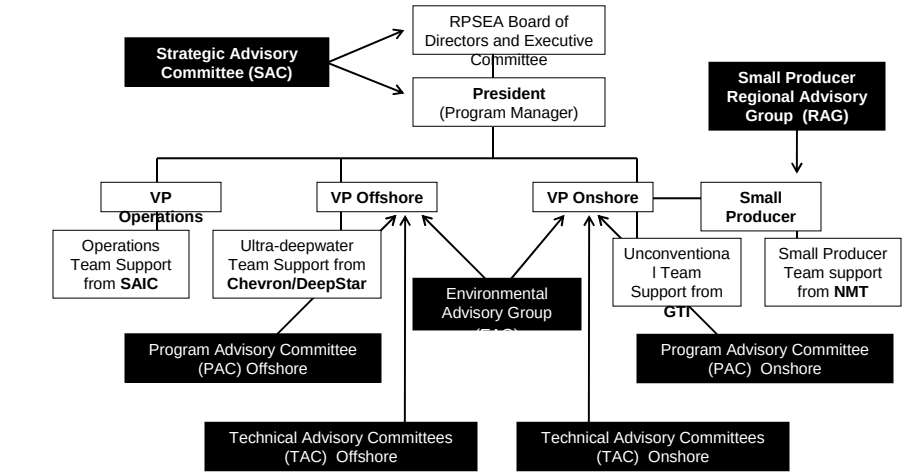

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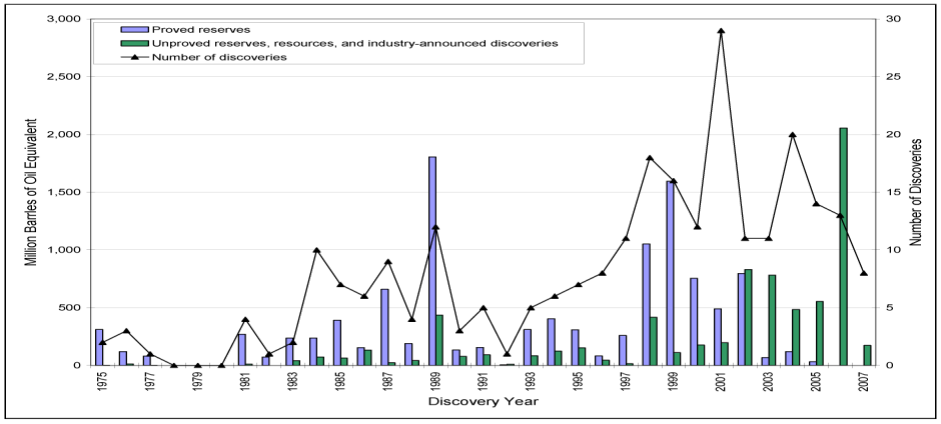

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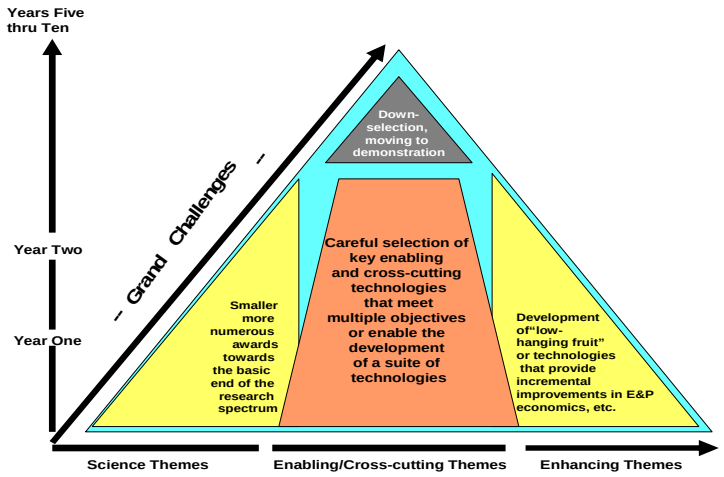

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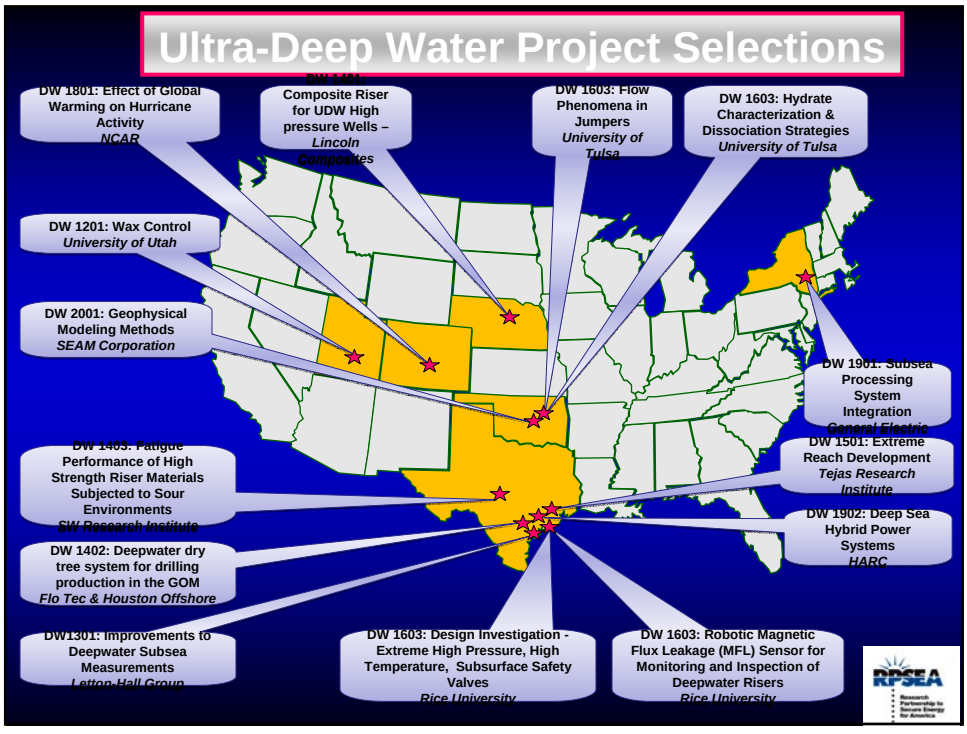
DW1201	Wax Control	3	University of Utah	$400,000
DW1301	Improvements to Deepwater subsea measurements	2	Letton Hall Group	$3,564,000
DW1302	High Conductivity Umbilicals	2	Technip	$448,000
DW1401	Composite Riser for UDW High Pressure Wells	3	Lincoln Composites	$1,680,000
DW1402	Deepwater dry tree system for drilling production	4	FloTec / Houston Offshore	$936,000
DW1403	Fatigue Performance of High Strength Riser Materials	2	SwRI	$800,000
DW1501	Extreme Reach Development	2	Tejas	$200,000
DW1603	Design investigation xHPHT, SSSV	6	Rice Univ.	$120,000
DW1603	Robotic MFL Sensor; monitoring & inspecting risers		Rice Univ.	$120,000
DW1603	Hydrate Plugging Risk		Tulsa Univ.	$120,000
DW1603	Hydrate Characterization & Dissociation Strategies		Tulsa Univ.	$120,000
DW1701	Improved Recovery	2	Knowledge Reservoir	$1,600,000
DW1801	Effect of Global Warming on Hurricane Activity	1	NCAR	$560,000
DW1901	Subsea processing System Integration	2	GE Research	$1,200,000
DW1902	Deep Sea Hybrid Power Systems:	1	HARC	$480,000
DW2001	Geophysical Modeling Methods	2	SEG	$2,000,000
summary		32		

Secure Energy for America



2007 Selected Proposals

Categories	UDW	Unconventional	Small Producers	Total
Universities	5	13	6	24
National Laboratories	-	2	1	3
Nonprofit Corporation	4	1	-	5
For Profit Corporation	8	1	-	9
Geological Science	-	2	-	2
	17	19	7	**43**

UDW 2007 RFPs

- 4 RFPs released November 5, 2007
  - 9 proposals received December 27, 2007
- 5 RFPs released November 28, 2007
  - 13 proposals received January 28, 2008
- 5 RFPs to be released February 11, 2008

  10 proposals received April 14, 2008

2008 UDW projects

TAC Number	Impact	2008 RPSEA Max Share
DW 2101	New Safety Barrier Testing Methods	$ 128,000
DW 1202	EOS improvement for xHPHT	$1,600,000
DW 2201	Viscous Oil PVT	$460,000
DW 2301	Deepwater Riserless Light Well Intervention	$3,411,500
DW 1502	Coil Tubing Drilling & Intervention	$820,000
DW 2501	Early Reservoir Appraisal, Utilizing a Low Cost Well Testing System - Phase 1	$880,000
DW 2502	Modeling and Simulation; MPD	$384,000
DW 2701	Resources to Reserves Development and Acceleration through Appraisal	$400,000
DW 2801	Gulf 3-D Operational Current Model Pilot	$1,248,000
DW 2901	power distribution & components (Component Qualification)	$4,811,000
10 Projects	Totals	$14,142,500

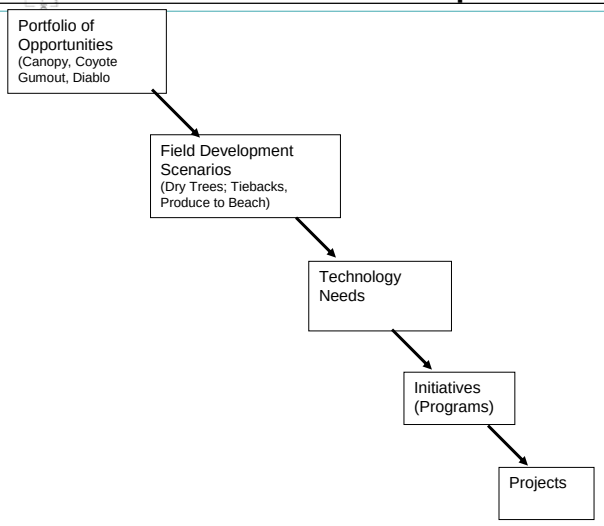
2008 RFP Release

- Modification of scope of work to reflect significant learnings from 2007 process – September 2008.
- Final review by Project Champions – October 2008.
- Final NETL review in late October.
- Approval by NETL to use multi-step contract and/or other contract form (?).
- Release of 2 to 3 RFP tranches.

2009 UDW Annual Plan

- Strategies:
  - Show integrated nature of 2007 & 2008 and future programs.
  - Provide overview of each 2007 & 2008 project.
  - High level view of 2009 program direction.
  - Fewer, more general and integrated RFPs.
  - Include Environmental Issues

Annual Plan Strategy Development

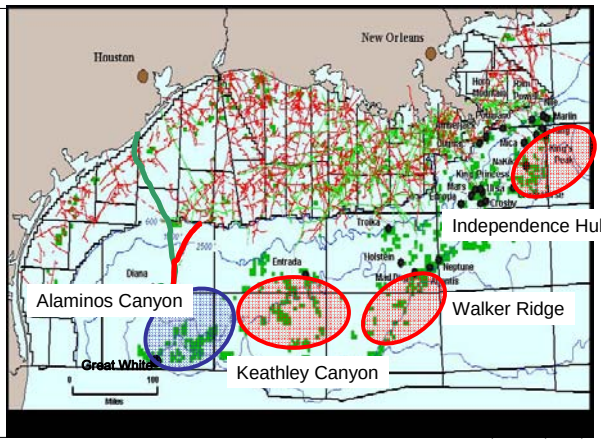


GOM Ultra-deepwater Activity

- **Walker Ridge /Keathley Canyon**
  - **Sub-salt**
  - **Deeper wells**
  - **Tight formations**
- **Alaminos Canyon**
  - **Viscous crude**
  - **Lacking infrastructure**
- **Eastern Gulf – Gas Independence Hub**
  - **Higher pressure**
  - **Higher Temperature**
  - **CO_2 / H_2S**

Higher Drilling Costs

Challenging Economics



Ultra Deepwater Needs

- Drilling, completion and intervention breakthroughs
- Appraisal & development geoscience and reservoir engineering
- Significantly extend subsea tieback distances & surface host elimination
- Dry trees/direct well intervention and risers in 10,000’ wd
- Continuous improvement / optimize field development
  - Per wellbore recovery
  - Cost reduction
  - Reliability improvements
  - Efficiency improvements
- Associated safety and environmental trade-offs

Ongoing Needs and Initiatives

- Need 1: Drilling, Completion and Intervention Breakthroughs
  - Initiative 1: Drilling and Completions
  - Initiative 2: Intervention (Downhole Services)
- Need 2: Appraisal and Development Geoscience and Reservoir Engineering
  - Initiative 1: Exploration and Appraisal
  - Initiative 2: Field Development
- Need 3: Significantly Extend Subsea Tieback Distances/Surface Host Elimination
  - Initiative 1: Stabilized Flow
  - Initiative 2: Subsea Power
  - Initiative 3: Subsea Processing

Ongoing Needs and Initiatives

- Need 4: Dry Trees/Direct Well Intervention and Risers in 10,000 foot Water Depths
  - Initiative 1: Dry Trees/Direct Well Intervention and Risers
- Need 5: Continuous Improvement/Optimize Field Development
  - Initiative 1: Improve Operating and Inspection Processes
  - Initiative 2: Graduate Student and Long Term Research and Development
- Need 6: Associated Safety and Environmental Concerns

2009 UDW Plan Strategy

- 4 to 7 Initiative-based RFPs (5 to 10 project awards)
- Unlike 2007 and 2008, however, the UDW TACs have not voted for individual projects. Rather, the TACs prioritized project ideas by initiatives.
- This input was evaluated by the PAC prior to decide the appropriate balance for the 2009 UDW program.
- UDW 2009 RFPs will consist of both specific projects (follow-on) and broader initiative-based requests. Anticipated 2009 RPSEA UDW initiatives and/or projects are listed below in the context of each UDW need.
- The actual 2009 RPSEA UDW may differ from the anticipated portfolio listed below. The actual 2009 UDW portfolio will be driven by further guidance from the UDW PAC and the timing associated with 2009 program funding.

2009 Anticipated Initiatives

Need 1: Drilling, Completion and Intervention Breakthroughs

- Proposals will be requested identifying novel ideas to reduce well construction and completion costs.

Need 2: Appraisal and Development Geoscience and Reservoir Engineering

- Proposals will be requested in the area of production and reservoir surveillance.

Need 3: Significantly Extend Subsea Tieback Distances/Surface Host Elimination

- Proposals may be requested in one or more of the following areas:
  - Ultra-deepwater flow assurance especially for the areas of solids (asphaltenes, hydrates, waxes, and scale) deposition and plug formation management
  - Pressure boosting
  - Autonomous underwater vehicles and intervention
  - Subsea processing/produced water treatment

2009 Anticipated Initiatives, cont'd

Need 4: Dry Trees/Direct Well Intervention and Risers in 10,000' Water Depth

- Proposals in this area to be determined.

Need 5: Continuous Improvement/Optimize Field Development

- Proposals in this need area may include:
  - Advancing industry understanding of phenomena impacting ultra-deepwater operations such as vortex-induced vibration
  - Improvements in integrity management and reliability
  - Additional graduate student project funding
  - High risk, high reward 'long-shot' R&D opportunities

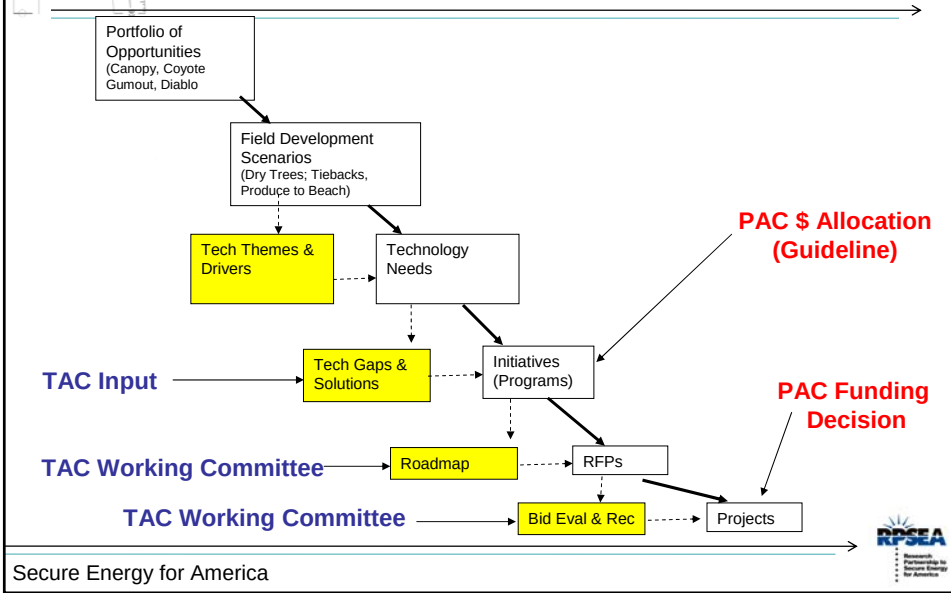
Need 6: Associated Safety and Environmental Concerns

- Ultra-deepwater efforts in this need area will involve the assessment of environmental and safety impact of RPSEA UDW funded technology development projects. This effort may take the form of individual solicitations or elements of more extensive project based solicitations. Areas of study may include:
  - Improved Metocean understanding
  - Discharge of produced water subsea – technology and regulatory aspects

2009 UDW PAC Recommended Funding

RPSEA YR3 Funding Allocation (2009)		Funding Distribution ($k)		
	Title / Description	Low	High	Average
Need #1	**Drilling Completion and Intervention Breakthroughs**			**6,250**
1	Drilling	2,000	5,000	3,500
2	Completions	1,000	3,000	2,000
3	Intervention (Downole Services)			-
4	Intervention (In-Water IMR)	500	1,000	750
5	Extended Well Testing			-
Need # 2	**Appraisal & development geosciences and reservoir engineering**			**1,500**
6	Reservoir Surveillance	1,000	2,000	1,500
Need #3	**Significantly extend subsea tieback distances / surface host elimination**			**3,625**
7	Stabilized Flow	750	1,500	1,125
8	Subsea Power			-
9	Subsea Processing, Pressure Boosting, Instrumentation and Controls	2,000	3,000	2,500
Need #4	**Dry trees / Direct well intervention and risers in 10,000' wd.**			**-**
10	Riser Systems			-
11	Dry Tree Structures			-
Need #5	**Continuous Improvement / Optimize field development**			**3,000**
12	Long Term Research and Development and Graduate Student Program	1,000	2,000	1,500
13	Sensors, tools and Inspection Processes	1,000	2,000	1,500
	Bridging and Contingency	500	750	625
Need #6	**Associated Safety and Environmental Concerns**			**500**
14	Environmental Issues	250	750	500
		10,000	**21,000**	**14,875**

2009 Annual Plan Process



Technology Transfer Plans

2.5% Set-aside for Tech Transfer in each subcontract

- **1.5% Project Level**
  - **Preparing publications**
  - **Participating in conferences & workshops**
- **1% Program Level**
  - **Support activities that impact multiple projects**
  - **Regional workshops, conferences**
  - **Topical conference**
  - **Directed publications**
  - **Newsletter**
  - **Website/Database creation & maintenance (Knowledge Database)**
  - **Technical support**
  - **Other novel approaches?**

What Questions Can I Answer?

Christopher Haver
DeepStar Director, Chevron ETC
RPSEA Offshore VP
chaver@chevron.com
www.rpsea.org
www.deepstar.org

Attachment 15

Subcommittee Structure, Assignments and Schedule

R&D Program Focus

- Assess redundancy w/Complementary Program
- More RFPs on geosciences
- Assess redundancy w/traditional program
- Look at integrated program [all 3 yrs]

Program Scope

- International program collaboration
- Expand into extremely remote areas; harsh areas
- Int'l efforts

Process

- How well is solicitation process working
- Process metrics (multiple member agreement with this)
- Process scorecards
- Contracts – issue of change in contract type (multiple member agreement with this)
- Timing of funding

Societal Impacts

- Environmental
- Training and Manpower
- Safety

Program Progress and Value

- Value and benefits of program
- Program metrics
- Make sure we have made progress on the program
- How program is run
- Ask for 2 yr extension
- Ask for increased funding

Subcommittee Members

* *Subcommittee Leader*

R&D Program Focus

1st Ray Charles*, Dan Daulton, Joe Fowler**backup

2nd Mary Jane Wilson

Program Scope

1st Arnis Judzis*, Morten Wiencke, Dan Seamount

2nd

Process

1st Luc Ikelle*, Kent Abadie, Paul Tranter, Joe Fowler,

2nd

Program Progress and Value

1st Richard Mitchell*, Paul Cicio, Quenton Dokken, Dan Daulton

2nd

Societal Impacts

1st Quenton Dokken*, Stephen Sears, Mary Jane Wilson, Paul Cicio

2nd

Editing Subcommittee

1st Kent Abadie*, Stephen Sears, Arnis Judzis, Dan Daulton

2nd

Schedule

Subcommittee Chairs to set schedule and advise Ms. Dobson of dates for tasks 1 through 5 by September 15.

1. Organize Subcommittee
2. Meet via teleconference
    - ID data needs; inform DOE

3. Prepare draft of subcommittee report
4. Get subcommittee feedback
5. Finalize draft subcommittee reports
6. Send draft of subcommittee reports to whole Committee (Oct. 10)

October 15 – Meeting in Houston to report on subcommittee sections and discuss compiled report
October 21 – Final edited report due to Committee
October 23 – Vote via teleconference

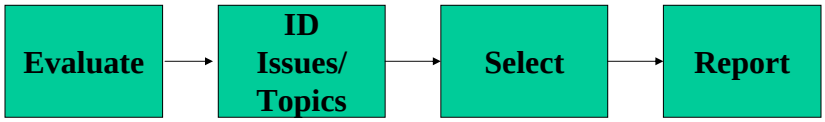
Editing Subcommittee: Abadie, Sears, Judzis, Daulton

Memo: Chair to issue format for findings and recommendations

Attachment 16

Ultradeepwater Advisory Committee

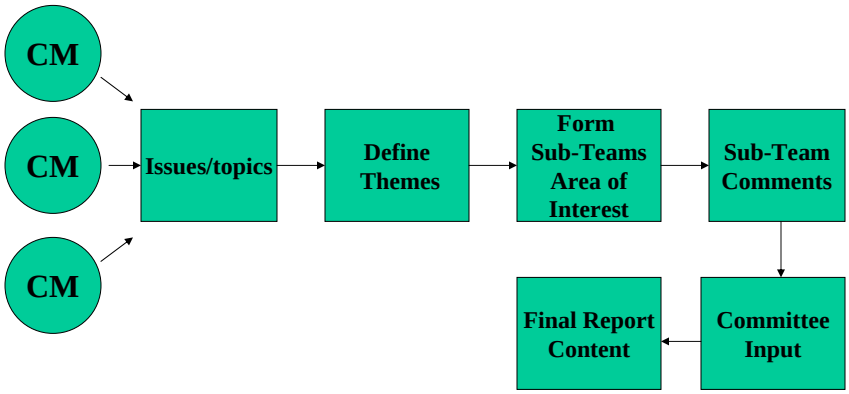
2009 Plan – Advisory Process



Ultradeepwater Advisory Committee

2009 Plan – Evaluation Process

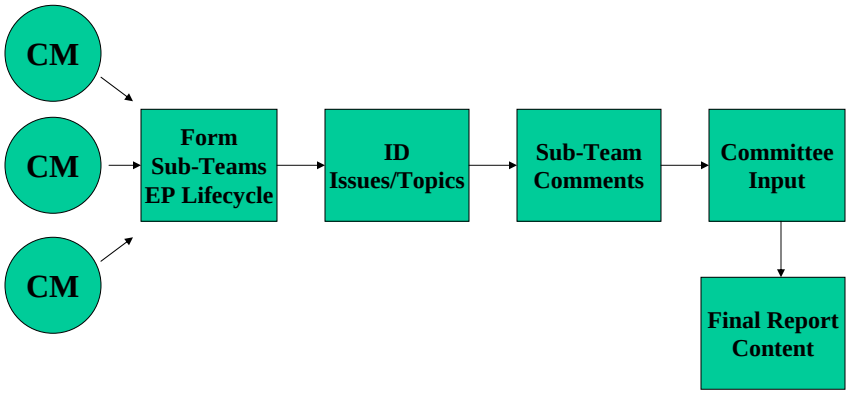
Option "A"



Ultradeepwater Advisory Committee

2009 Plan – Evaluation Process

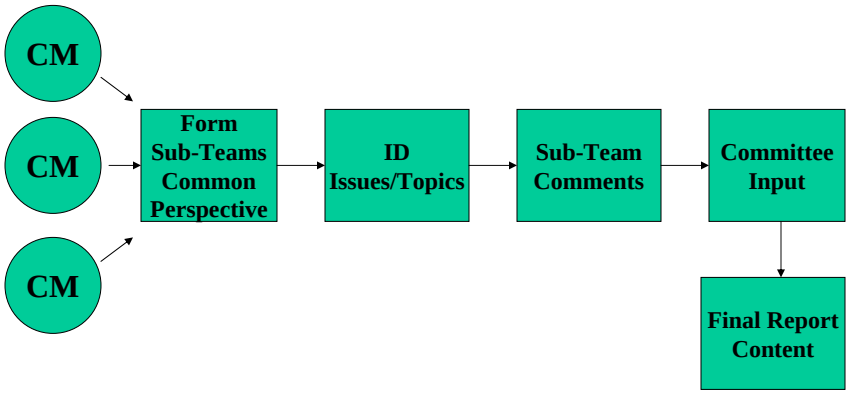
Option "B"



Ultradeepwater Advisory Committee

2009 Plan – Evaluation Process

Option "C"



Attachment 17

NATIONAL ENERGY TECHNOLOGY LABORATORY

Analysis & Planning/Complementary Pgm
UDW Federal Advisory Committee

John R. Duda, Director, SCNGO

September 10, 2008

Outline

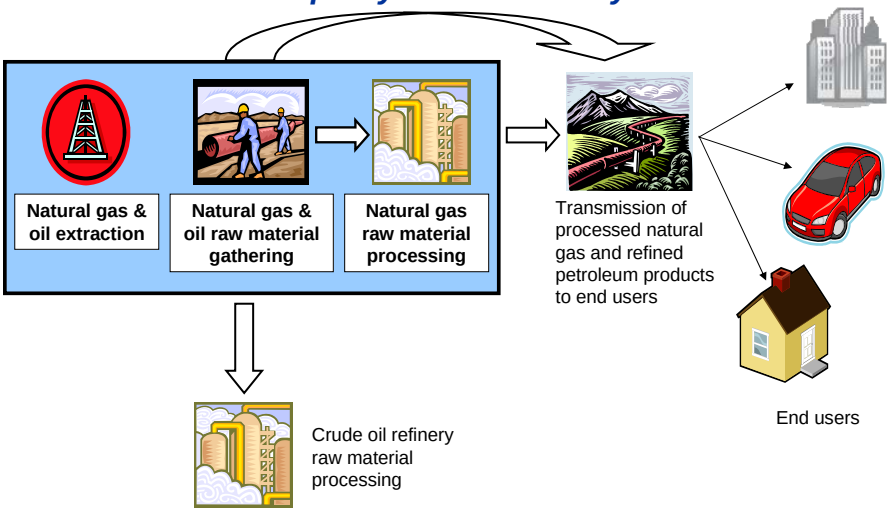
- **Systems Analysis and Planning**
- **Activities**
  - Valuing domestically produced oil and natural gas
  - Life Cycle Assessment of alternative transportation fuels
  - Benefits assessment

Systems Analysis and Planning

- **Analysis focusing on the future state of technologies, markets, and public benefits**
  - Evaluate attributes of energy technologies
  - Assess trends of energy production and use
  - Prospective and retrospective benefits analysis

Valuing Oil and Natural Gas

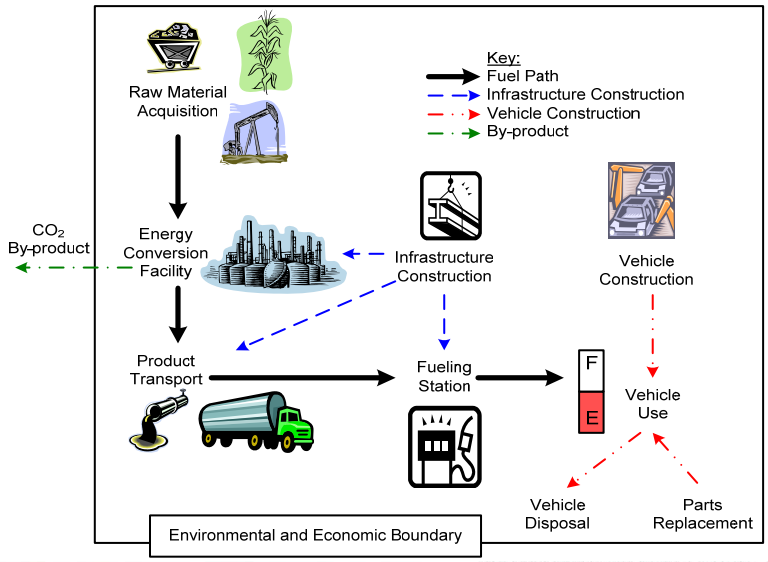
Scope/System Boundary



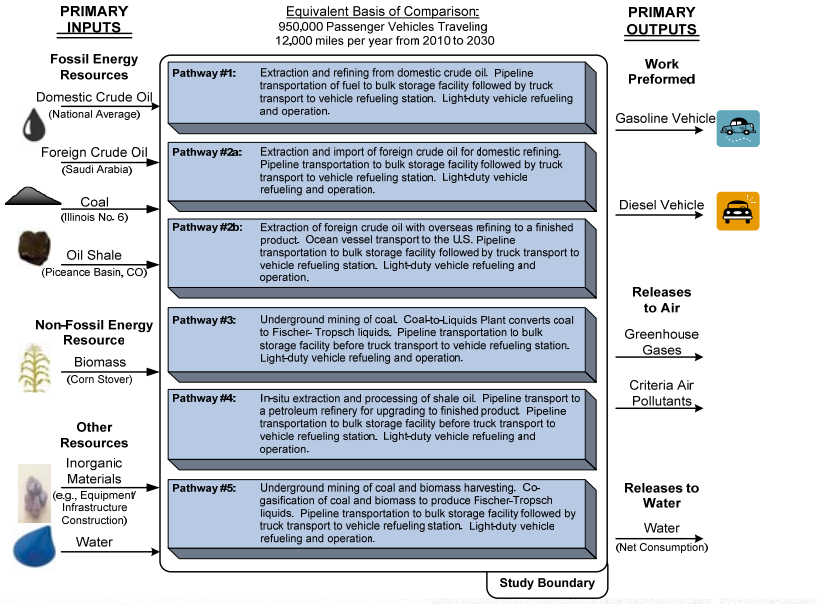
Valuing Oil and Natural Gas
Project Details

- **NETL and WVU**
  - Data analysis and model development
- **Project Schedule & Budget:**
  - Scheduled for completion: December 31, 2008
  - $131K
- **Merit Review (September 5, 2008)**
  - Review methodology and model operation
  - Obtain feedback to improve project before moving into scenario analysis phase
  - "9.1"

LCA Conceptual Boundary



LCA Study Boundary



Benefits Analysis

- **Develop project-level analyses**
  - Essentially develop a “business plan” for each project
  - Use existing methodology and data, as applicable
  - Embrace expert judgment where needed
  - Develop transparent calculations for market penetration forecasts and benefits
- **Once project level analyses are in hand, identify unifying themes, estimate aggregate benefits**
- **Collaborate with MMS to derive royalty impact estimates**
- **Benefits assessments will evolve with the projects**

Benefits Analysis

- **Assess portfolio of projects**
- **Evaluate applicability of models**
- ***Appreciate* data requirements**
- **Secure *global* data**
- **Select preferred methodology for approach**
- **Test model**
- **Merit review (planned for January 2009)**
- ***"Crunch the numbers"***

- **Questions?**
- **Recommendations**
- **David Wildman**
  – Office of Research and Development

Attachment 18

Title IX, Subtitle J (EPAct 2005) Complementary Program - Office of Research and Development

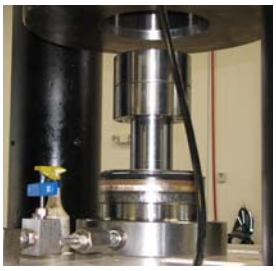
September 2008

Complementary Program NETL - ORD

- **Areas of research**
  - Drilling Under Extreme Conditions
  - Environmental Impacts of Oil and Gas
  - Enhanced and Unconventional Oil Recovery
  - Resource Assessment
- **Institute for Advanced Energy Solutions**
  - West Virginia University, Carnegie-Mellon University, and University of Pittsburgh
    - Penn State University and Oregon State University

Drilling Under Extreme Conditions

- **Ultra-deep single cutter drilling simulator**
  - Recreates bottom-hole drilling environment of ultra-deep wells (30,000 psi and 481°F)
  - Delivered to NETL later this year
  - Operates with real drilling fluids
  - X-ray video system images cuttings
  - Verify the results of the full bit simulator performance at 10 ksi performed by TerraTek
    - Extend their results by performing tests up to 30 ksi
  - Use discrete element modeling approach to incorporate loading on the drill bit generated by the rock cuttings



Fabrication at TerraTek

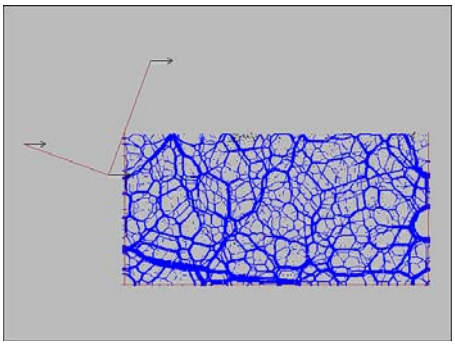
EDL Supporting Instrumentation

- **Integration of an Abrasive Water Jet Cutter into lab for optimal sample prep**
  - Prepares defect-free rock samples
  - Able to cut small samples from sample for microscopic examination

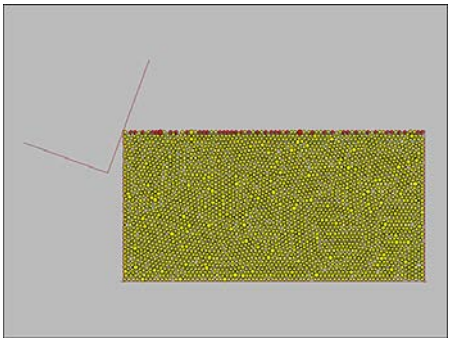
- **Integration of a Confocal Laser Scanning Microscope for pre-test & post-test rock analysis**
  - Optical resolution to 120 nm (xy plane)
  - Optical resolution to 10 nm (z axis)

- **Integration of Chandler Model 7600 viscometer for HPHT rheology measurements**
  - Quantify drilling fluid properties at UDS test conditions

Initial Discrete Element Method Modeling Result -Trial Run of PFC2D



Blue: compression force chain
Red: tension force chain
Initially in isotropic compression. As cutter moves in, more area is affected.



Particle movement as cutter advances. The segmentation pattern is a function of the stress level and bond characteristics.

DUEC – Materials/Sensors

•HPHT materials development and performance

- Obtain field samples that have failed under HPHT drilling conditions (primary source: RPSEA members)
- Determine HPHT failure mechanisms and develop a laboratory evaluation technique
- Improve resistance to corrosion, wear, corrosive wear and fatigue.
  - Cylinder-on-anvil apparatus for wear/corrosion testing
- Develop laboratory scale tests that accurately predict performance in HPHT conditions.
- Develop low cost coatings for Fe alloys used in drill pipe-casing systems
- Application of computational approaches for developing alloys resistant to fatigue under extreme drilling conditions (Jamie Kruzic, Oregon State University (OSU))
- **Ultimate goal: New alloys for drilling, completion, and production in HPHT environments**

Cylinder-on-anvil apparatus

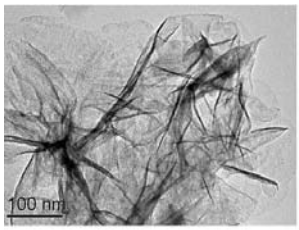
Sensor development (CMU)

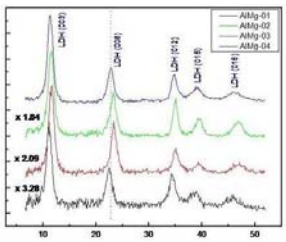
•Initiated SiC electronics for deep drilling

- Design a HT operational amplifier or oscillator prototype
- Fabricate via Cree SiC process

Nano-fluids for Oil and Gas Applications

- **Laser synthesis and characterization of (Mg-Al) layered double hydroxides (LDHs) nanostructures and other nano-materials (Al, Mg, Fe, Ni, Cobalt, ...)**
  - Determine ablation and laser conditions for morphology, structures, surface functionalization
  - Optimize ablation rate
- **Test for application as drag reduction, drilling fluids, fracturing fluids, or as a drilling fluid enhancer**





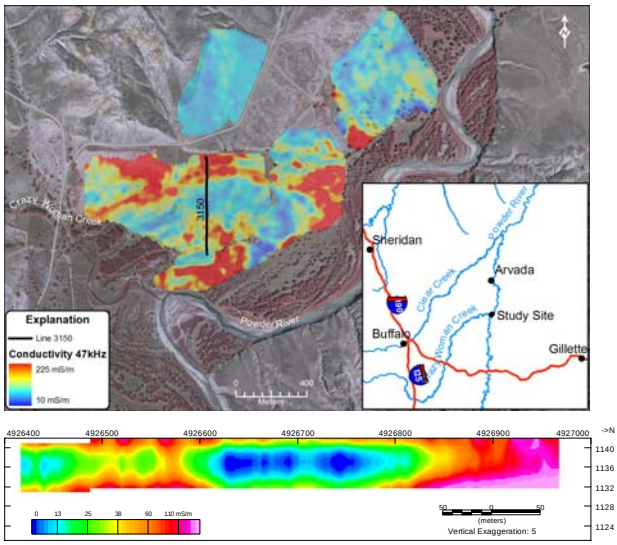
$Mg_6\ Al_2\ (OH)_{18}\ 4.5\ H_2O$ nano-structure

Environmental Impacts of Oil and Gas E&P

- **Produced water management efforts are a subset of the DOE HQ strategic O&G Water Initiative**
- **Evaluate Subsurface Drip Irrigation as a means of using CBNG produced water**
  - Long-term effect on soil productivity
  - Accumulation or mobilization of salts
  - Effect on native groundwater
  - Discharge to Powder River
  - Collaborating with Anadarko Petroleum at Headgate SDI Site - Operated by Beneterra, Inc.
- **Conduct a long-term, science-based assessment**
  - Electromagnetic surveys useful for SDI design
  - Monthly geophysical surveys to trace movement of SDI water
  - Monthly sampling of vadose and phreatic zone
  - Continuous monitoring of groundwater temperature, conductivity, and water table elevation

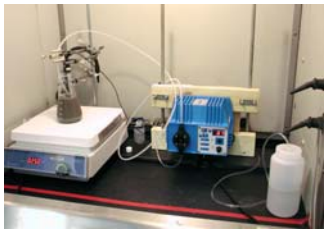
Electromagnetic surveys

Electromagnetic Induction Survey



Environmental Impacts of Oil and Gas E&P

- **Develop methods for determining suitability of ephemeral stream courses for CBNG produced water**
  - Airborne electromagnetic, and spectral surveys of Beaver Creek watershed (WY)
  - Evaluate results of stirred batch leaching tests
  - Protocol for estimating amount of produced water that can be discharged before flooding/erosion occurs
- **Environmental assessment of next generation oil shale retort technologies (WVU)**
  - Determine O&G E&P impacts on stream ecology in Allegheny National Forest
  - Work with PA Dirt and Gravel Road Program to develop O&G road construction protocol
- **Minimize environmental footprint of E&P from Marcellus Shale gas play**
  - Apply methods used elsewhere to minimize environmental impact (multiple wells from single pad, frac farms)



Environmental Impacts of Oil and Gas

- **Effects of oil and gas E&P on air**
  - Assess air quality based on measured data and modeling results for regulatory and permitting applications
  - Source-receptor/pollutant transport models
- **Challenges**
  - Estimates of air quality impacts of oil and gas production are generally based on models that treat all development in a state as a single point source
  - Emissions from oil and gas production activities vary by type of activity and there are a wide range of pollutants

•Allegheny National Forest
•512,998 acre forest in northwestern PA
•8,000 wells in 2005; currently 12,000
•Western site - TBD

Air Quality Model Selection

Source-Receptor Model:
Positive Matrix Factorization (PMF)

$$x_{ij} = \sum_{h=1}^{p} g_{ih} f_{hj} + e_{ij}$$

x = data matrix of *i* species and *j* days
g = compositions for *h* sources
f = contributions of *h* sources
e = error matrix
p = number of sources

Pollutant Transport Model: The Comprehensive Air quality Model with Extensions (CAMx)

- **Eulerian photochemical dispersion model**
- **Gaseous and particulate air pollutants (ozone, $PM_{2.5}$, PM_{10}, air toxics, etc.)**
- **Uses any meteorological model in combination with any emissions processor**

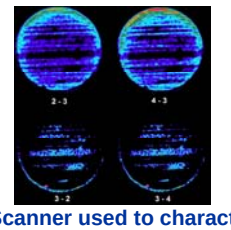
Enhanced and Unconventional Oil Recovery

- **Technical challenges**
  - Difficulty in characterizing fracture properties (e.g., orientations, lengths, apertures) that control flow
  - Two-phase transport properties of fractures themselves are not well-understood
  - As pressures in a reservoir change, fractures may open and close; this behavior is complex
  - Using an injectant in a fractured reservoir may be problematic because of the propensity for fast paths to be established; an understanding of the interaction between fluids in fractures and matrix rock should help the design of better recovery schemes

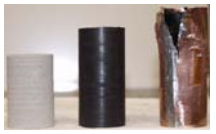
Microscopic Image of Fracture Surface

EUOR Simulations Methodology

- **Build on background research on fractured reservoir flow**
- **Integrate information from laboratory, field work, and simulations**
- **Collect information from geologic logs and other collected info to build model of Bakken**
- **Make measurements in CT lab of shale properties (geomechanical and flow)**
- **Simultaneously develop technique to use neural nets to describe fractured reservoirs**
  - FRACGEN/NFFLOW



CT Scanner used to characterize fractures and track fluid flow



Reservoir Rock Core Flow Unit

FRACGEN/NFFLOW

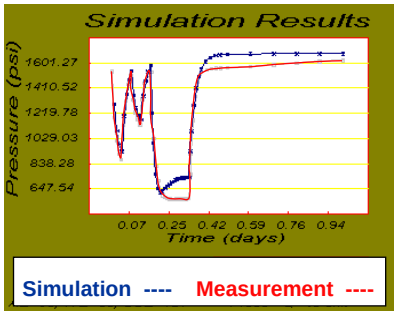
•FRACGEN uses field data to characterize statistics of fracture networks

- Well log
  - Fracture orientation, aperture, and density statistics
- Outcrops
  - Clustering and fracture length statistics

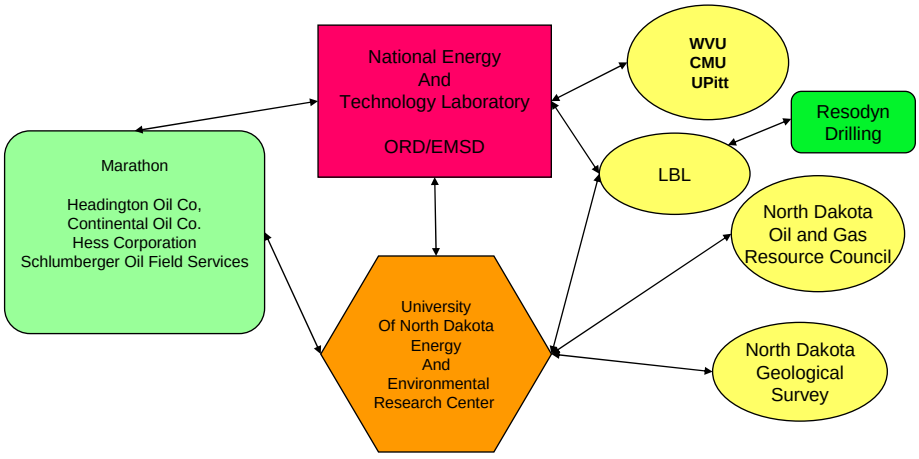
•NFFLOW is a flow simulator for highly fractured reservoirs

- Explicitly treats fracture networks with < 50,000 fractures
- Couples fracture flow with recharge from surrounding rock
- Handles gas or liquid

Well test data from gas field



Bakken Shale Team

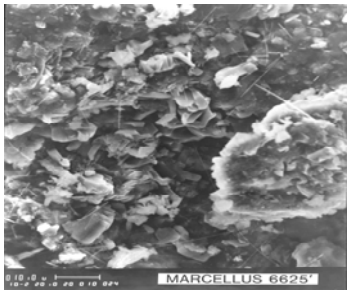


Enhancing Oil Mobility

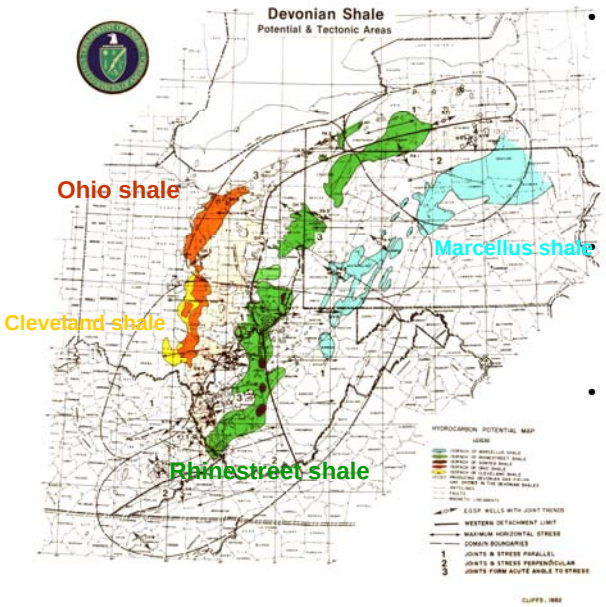
- **Strategies for employing novel surfactants**
  - Design CO_2-soluble surfactants that form foams or viscosity-enhancing micelles
  - Design water-soluble surfactants that form high CO_2 volume microemulsions
- **FY09 effort focuses on surfactants that increase CO_2 viscosity (Pitt)**
  - Promote formation of helical micelles that induce large increases in viscosity

Resource Assessment

- **Create a database of oil shale and tar sand documents for future use**
  - 18000 reports on microfiche
- **Resource characterization of the potential gas-in-place in Marcellus Shale (PSU/WVU)**
  - Initiated core, well log and geological data acquisition to characterize the shale formation
  - Characterization instrumentation is being upgraded
  - Collect info from previous studies on Devonian shale formation above Marcellus
  - Database being developed



Marcellus shale



- DOE and GRI characterized Devonian Shale over the last 30 years
  - -Marcellus Shale is the oldest and deepest of the formations
  - -Lack of well and reservoir characterization data
- Historic data is being gathered and cores retested to define the kerogen types and mineral components with modern microscopy
- Results will add to the understanding of gas generation and migration in the shale

Resource Assessment Planned Procurements

- **Microscopy enhancements including digital imaging software**
  - Acoustic microscope for shale porosity, permeability, and kerogen content
  - Digital upgrade of Etec SEM
  - Binocular high resolution UV microscope for analysis of cores and cuttings
  - Petrographic scope

Knowledge Management Database

- **Web site portal within NETL web site**
  - To provide a single location of the results and products of the Section 999 Program
    - Consortium and Complementary Research
  - Interactive problem solving features
    - Produced Water Management Information System (PWMIS)
    - SElf-Teaching Expert System (SETES) for gas production of fractured shale
- **FY09 will develop a work flow system with Consortium**
  - Includes reports, data, project status

Attachment 19

Ultra-Deepwater Technology Advisory Committee

September 9-10, 2008

Natenna Dobson
Office of Oil and Natural Gas
Section 999 Team

Sec. 999: Supporting the Subcommittees

As Subcommittee Coordinator, I will:

- Most of all, just ***Coordinate*** the work of the committee members.
  - *I do not **DO** the work for members.*
- Assist the Subcommittee leaders when needed while allowing the subcommittee to maintain ownership of the work
  - Coordinate emails, assist in the setup of teleconferences/meetings, etc.
- Serve as liaison between the DOE/FE, RPSEA and subcommittee chairs
- Ensure the work of the subcommittee is being accomplished to meet the goals of the committee
- Ensure standardize procedures are met for establishing/maintaining a subcommittee

Sec. 999: Supporting the Subcommittees

- Ensure the subcommittee are following the terms of reference outlined by the members for this committee work
- Assist in conflict resolution between subcommittee members should there not be enough resources to do the work, DOE/FE will actively try to address issues as they arise.
- When appropriate, attend local subcommittee meetings/teleconferences to increase the connection between DOE/FE to the subcommittee
- Ensuring open and timely communications with other Subcommittees
- Report to DOE/FE of Subcommittee activities and requests

Questions?

Attachment 20

DEVELOPMENT OF THE POSSIBLE NEW 5-YEAR OCS OIL AND GAS LEASING PROGRAM FOR 2010-2015

The 5-Year Program indicates the size, timing and location of oil and gas lease sales on the OCS for a 5-year period.

The OCS Lands Act at section 18 lists the factors to be considered--the economic, social, and environmental values of all of the resources of the OCS and the potential impact of oil and gas exploration on the environment.

Specific factors which must be analyzed and considered in deciding where and when include: (1) Existing information on the geographical, geological, and ecological characteristics of such regions; (2) Equitable sharing of developmental benefits and environmental risks among the various regions; (3) Location of such regions and regional and national energy markets; (4) Location with respect to other current and anticipated uses of the sea and seabed; (5) Expressed industry interest; (6) Laws, goals, and policies of affected States specifically identified by Governors; (7) Relative environmental sensitivity and marine productivity of different areas of the OCS; and (8) Environmental and predictive information for different areas of the OCS.

The Act requires the Secretary to obtain a proper balance between the potentials for environmental damage, the discovery of oil and gas, and adverse impact on the coastal zone, using cost-benefit analysis. The Act also requires receipt of fair market value. We set minimum bid levels and use a bid adequacy review procedure.

Program preparation is multistaged with three published drafts, each consisting of a secretarial issue document and decision memorandum, a summary of comments, and options for Secretarial decisions. A draft and final EIS are also prepared. We consult with all interested parties throughout the process.

An approved 5-year program must be reviewed annually. *Any significant revision during that timeframe must be formulated through the full process above.*

In light of the current domestic energy situation and in response to the President's calls for action, on August 1, 2008, MMS issued a Request for Comments on a preparation of the new 5-year program for 2010-2015, soliciting comments on all areas of the OCS regardless of whether they are under congressional restriction. For the first time, we specifically requested information from all 50 States, not just coastal States.

We intend to issue a Draft Proposed Program in January 2009, giving the next Administration the broadest opportunity and a 2-year head start in development of a new 5-year program, should they so choose.


Outer Continental Shelf
Oil & Gas Leasing Program
2007 - 2012
N
Washington/Oregon
Northern California
Central California
Southern California
79 Leases
400,506 acres
North Atlantic
Mid-Atlantic
South Atlantic
This area will only be offered if the Presidential Withdrawal is modified and the Congress discontinues the annual moratoria.
Straits Of Florida
Chukchi Sea
Beaufort Sea
261 leases
1,349,815 acres
Hope Basin
Norton Basin
Cook Inlet
2 leases
9,766 acres
Navarin Basin
St. Matthew-Hall
St. George Basin
Aleutian Basin
North Aleutian Basin
Bowers Basin
Aleutian Arc
Shumagin
Kodiak
Gulf of Alaska
Alaska Map 1:9,000,000
Western Gulf Of Mexico
2,045 leases
11,379,327 acres
Central Gulf Of Mexico
5,004 leases
25,931,170 acres
Eastern Gulf Of Mexico
92 leases
529,920 acres
National Total Leases and Acreage
7,483 Leases
39,600,504 Acres
Legend
OCS Planning Area
Existing Leases
Areas Withdrawn From Leasing Through 2022
Areas Withdrawn From Leasing Through June 30, 2012
Areas Available for Leasing in the 2007-2012 5 -Year Program
National Marine Sanctuary (NMS)
Areas Withdrawn From Leasing Through June 30, 2012 selection 4
Amount of acreage under lease and active lease as of October 15, 2007
(does not include results from August 2007 Sale 204)
State Leases are not depicted.
NAD 1983
Geographic
US Map 1:6,500,000
0 30 60 120 180 240 300
Nautical Miles
0 25 50 100 150 200 250
Statute Miles

Attachment 21

Department of Energy
Washington, DC 20585

September 23, 2008

Mr. Kent Abadie, Chair
Mr. Arnis Judzis, Vice-Chair
Ultra-Deepwater Advisory Committee

Via email: kent.abadie@shell.com
ajudzis@slb.com

REF: Follow On Information Pursuant to the Sixth Meeting of the Ultra-Deepwater Advisory Committee on September 9-10, 2008

Dear Gentlemen:

The following items were requested by the Committee:

1. RPSEA Solicitation Process Flow Chart
2. RPSEA 2007 Planned Time vs Performance Solicitation Schedule
3. RPSEA 2007 Actual Time vs Performance Solicitation Schedule
4. RPSEA 2008 Planned Time vs Performance Solicitation Schedule
5. RPSEA Requests of NETL Regarding Contracting Options
6. Copy of the final audit of RPSEA 2007 operations (compliance and financial)
7. Fiscal Year 2008 DOE Traditional Oil Program project selections
8. List of programs sponsored by DOE related to the oil and gas workforce issue

Attached please find the following items.

1. RPSEA Solicitation/Award Process Flow Chart
   The attached table, labeled "Attachment 1, RPSEA Procurement Process Flow Chart", is taken from the NETL-RPSEA contract document titled *RPSEA DE-AC26-07NT42677, Project Solicitation Process, April 2008 (Rev. 1)*, and is the official DOE-approved process used by RPSEA for getting from solicitation through award. The chart indicates that there are eight key milestone in this process, and two of those milestones also include DOE approval.

2. RPSEA 2007 Planned Time vs Performance Solicitation/Award Schedule
   The attached graphic titled "2007 Solicitation Process: Planned Time vs Accomplishment From Solicitation Through Award" is Table 2.5 in the *2007*

Annual Plan, January 2008, page 25. Note that the estimated time for the process from solicitation through award is 90 days of RPSEA activity, comprised of 45 days for the solicitation process and 45 days for the selection, negotiation, and award process plus 15 days of NETL activity totaling approximately 105 days. (The above estimate of 15 days for NETL activity is based on the average actual time encountered during the 2007 process described in Item #3 below.)

3. RPSEA 2007 Actual Time vs Performance Solicitation/Award Schedule

The attached graphic titled "Ultra-Deepwater Program Element, 2007 Solicitation Process: Actual Average Time vs Accomplishment From Solicitation Through Award" is based on data obtained from the NETL Strategic Center for Natural Gas and Oil. Thirteen solicitations were issued resulting in 17 project selections. The 'average' time is based on the number of days for the 17 projects to complete the cycle, noting that only one subcontract has completed the entire cycle.

The average number of days in the process from solicitation through award for 2007 was approximately 312 days. As of September 18, 2008, one project has been awarded, two have been approved by DOE for award by RPSEA, and 14 are currently being negotiated for award by RPSEA.

As of September 18th, the 2007 process involved 135 days for the selection process as compared to the estimate of 51 days, and 178 days for the selection, negotiation, and award process as compared to the estimate of 54 days. (The estimate of 15 days for NETL activity listed in Item #2 above was based on actual average days; therefore, the time estimate for NETL activity in Item #2 above is the same as the actual average listed here.)

As of September 18th, the average actual time from solicitation through award is based on the one project that has completed the cycle. The actual average time through the *RPSEA Award of Subcontract* milestone is based on only three subcontracts: the one awarded plus the two pending award. The actual average time through the *RPSEA Negotiation of Subcontract* milestone is based on all 17 subcontracts: the 14 currently being negotiated plus the 2 pending award plus the one already awarded.

The data for these milestones are listed in the table below.

MILESTONE	AVG. DAYS
RPSEA Issue Solicitation	64
RPSEA Compliance & Technical Reviews	71
RPSEA Selection of Subcontractor Proposal	31
DOE Approval of Selected Proposals	6
RPSEA Negotiation of Subcontract	115
DOE Subcontract Approval	9
RPSEA Award of Subcontract	17
TOTAL	312

4. RPSEA 2008 Planned Time vs Performance Solicitation Schedule
The attached graphic titled "2008 Solicitation Process: Planned Time vs Accomplishment From Solicitation Through Award" is taken from Table 2.7 in the *2008 Annual Plan*, August 2008, page 24. The table has been updated to reflect that the annual plan was approved August 2008. This schedule estimates that the time from solicitation through awards is approximately 165 days: 150 days estimated for RPSEA activity and 15 days estimated for NETL activity. The *2009 Annual Plan* does not include a table of time estimates for this process.

5. RPSEA Requests of NETL Regarding Contracting Options
Most of the information received by the Committee Manager (CM) from RPSEA on September 15, 2008 relates to the contractual relationship that exists between NETL and RPSEA. This relationship is a financial relationship between the two parties, and is outside of the scope of the duties of the Committee. However, the CM is seeking counsel to determine what information may be provided to the Committee in order to support the Committee's duties as prescribed in EPAct, Subtitle J, Section 999D(3)(A) and (B).

7. Fiscal Year 2008 DOE Traditional Oil Program project selections
This information can be found at the following websites: http://www.netl.doe.gov/technologies/oil-gas/EP_Technologies/NewProjects-090408.html and http://www.netl.doe.gov/technologies/oil-gas/FutureSupply/MethaneHydrates/NewProjects-090208.html

The following items will be sent under separate cover:

6. Copy of the final audit of RPSEA 2007 operations (compliance and financial)
Upon transmittal of this report to Congress, this report will be made public and will be posted on the DOE website.

8. List of programs sponsored by DOE related to the oil and gas workforce issue
This information is being assembled.

If you have any questions, please call me at 202/586-5095.

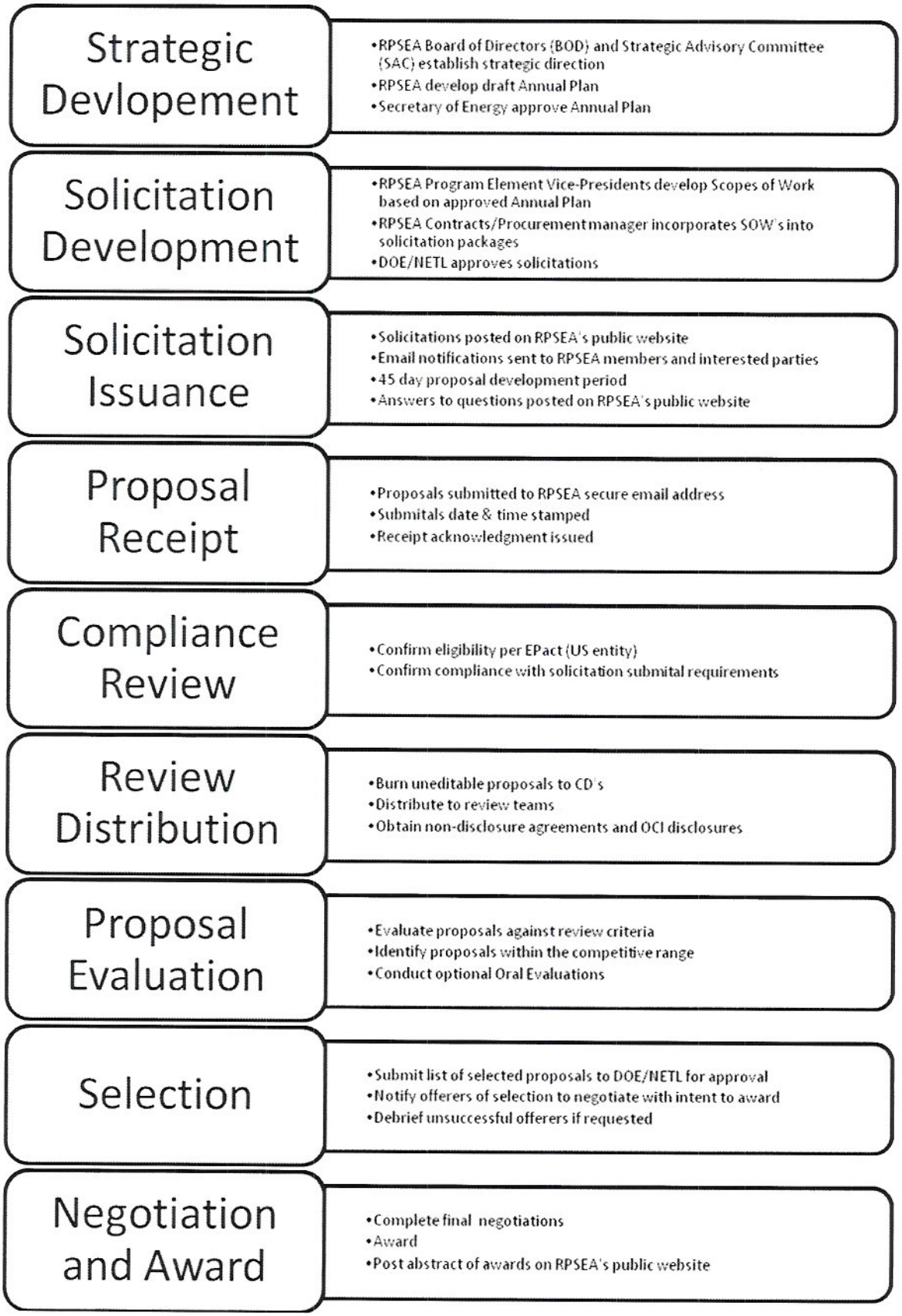
Sincerely,

Elena Melchert
Committee Manager
Ultra-Deepwater Advisory Committee

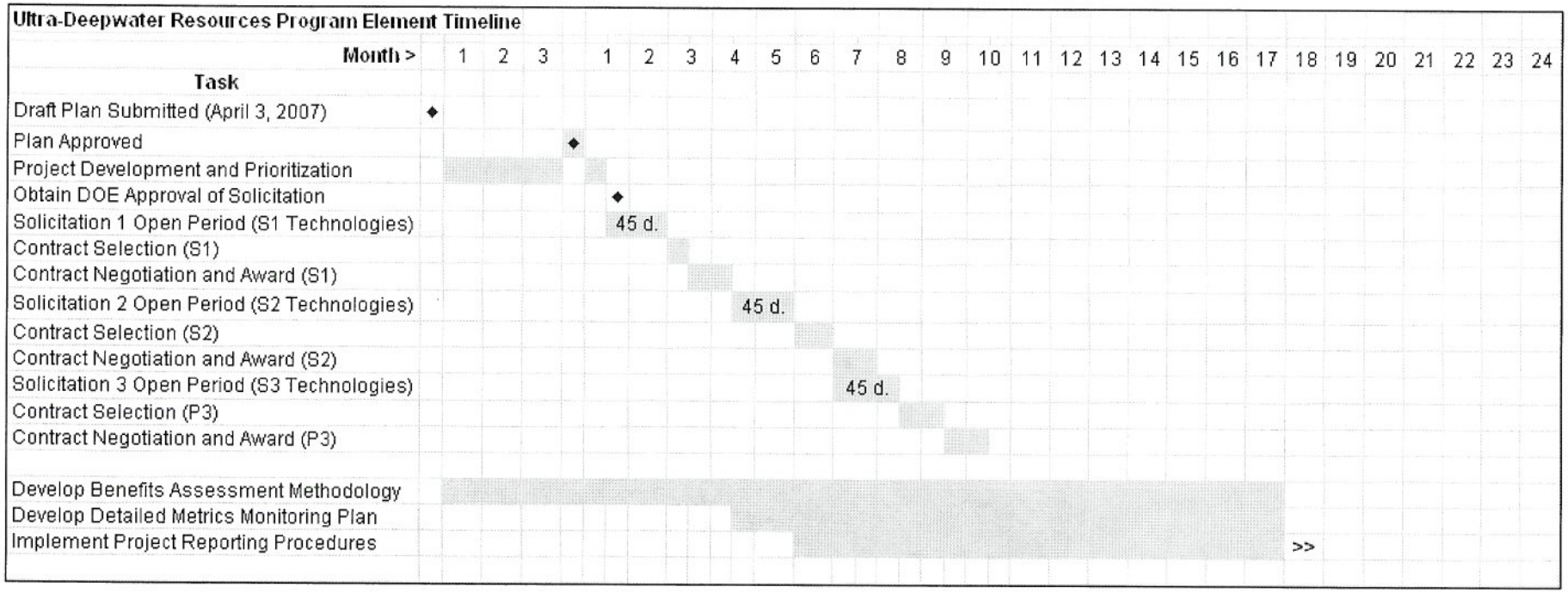
cc: Committee Record
Designated Federal Officer

Attachments:
RPSEA Solicitation Process Flow Chart
RPSEA 2007 Planned Time vs Performance Solicitation Schedule
RPSEA 2007 Actual Time vs Performance Solicitation Schedule
RPSEA 2008 Planned Time vs Performance Solicitation Schedule

Attachment 1 -- RPSEA Procurement Process Flow Chart

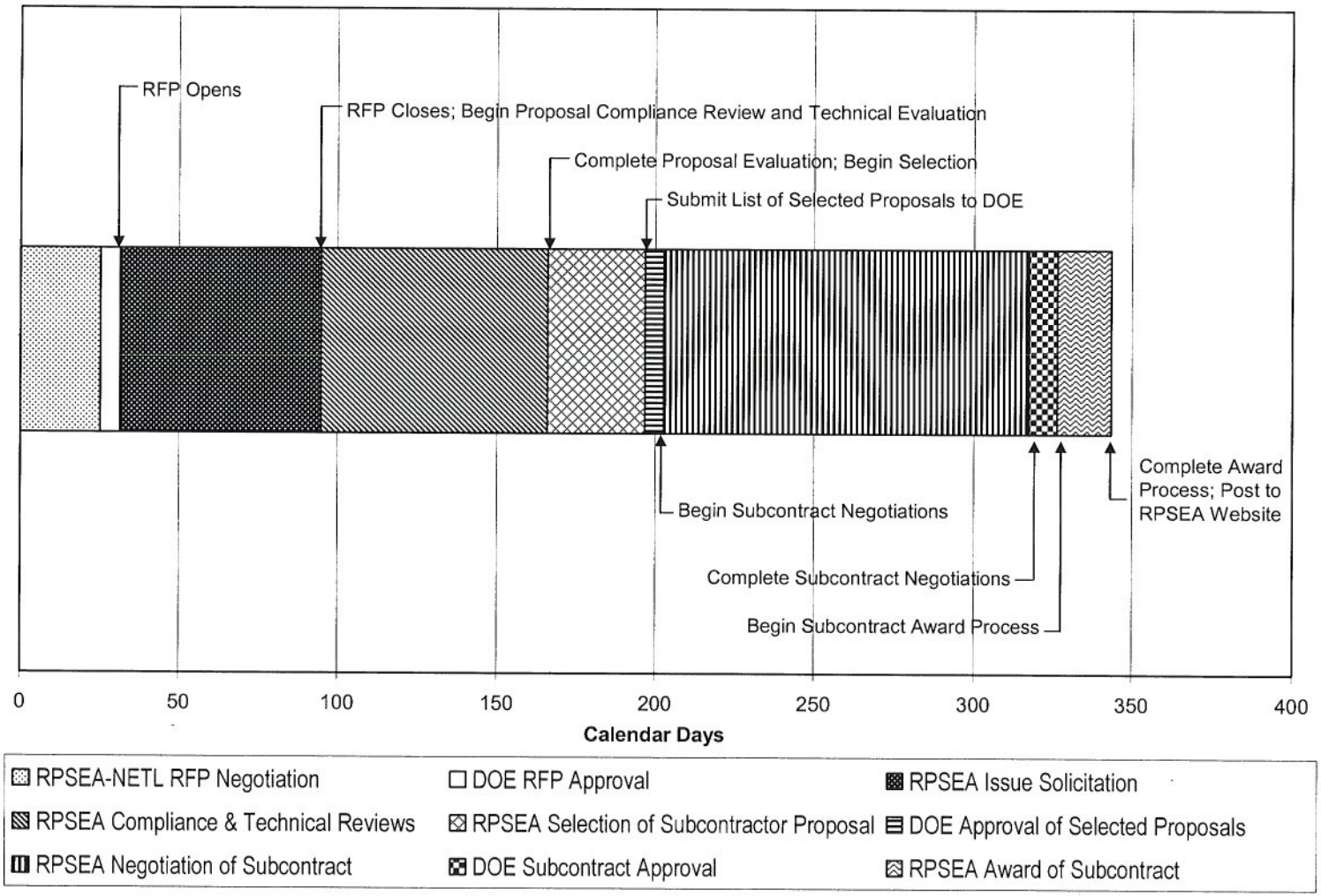


2007 Solicitation Process: Planned Time vs. Accomplishment From Solicitation Through Award

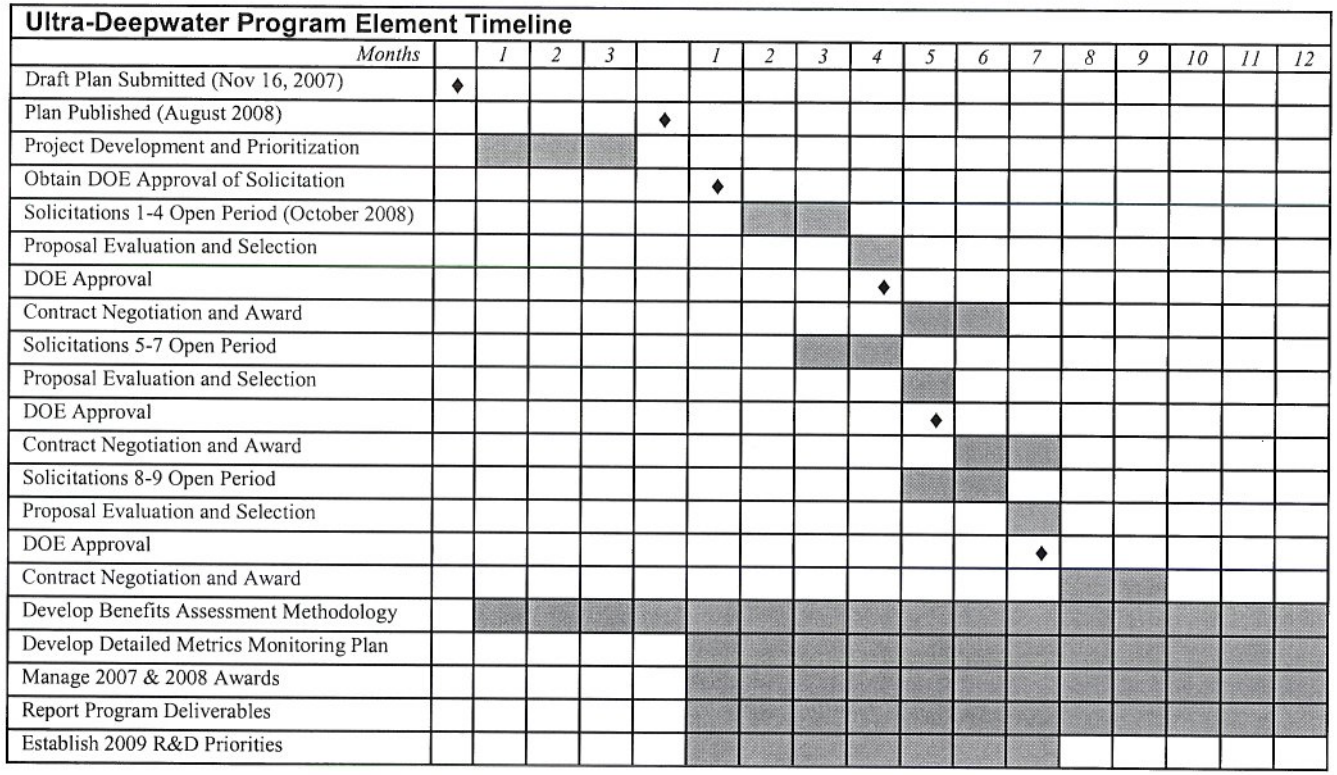


Source: Table 2.5: UDW Program Element Timeline, 2007, Annual Plan for the Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Research and Development Program, Page 25.

ULTRA-DEEPWATER PROGRAM ELEMENT
2007 Solicitation Process: Actual Average Time vs. Accomplishment From Solicitation Through Award
For 13 Solicitations Resulting in 17 Selections (as of September 18, 2008)



2008 Solicitation Process: Planned Time vs. Accomplishment From Solicitation Through Award



Source: Table 2.7: Ultra-Deepwater Program Element Timeline, 2008, Annual Plan for the Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Research and Development Program, Page 24.