# Ultra-Deepwater Advisory Committee (UDAC) Meeting
# January 30, 2008

## Meeting Minutes

July 2, 2008

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

I hereby certify that this transcript constitutes an accurate record of the Ultra-Deepwater Advisory Committee Meeting held on January 30, 2008 at the Crowne Plaza Houston North Greenspoint, Houston Texas.

Philip J. Grossweiler, Chair
Ultra-Deepwater Advisory
Committee

7/29/2008
Date

# Ultra-Deepwater Advisory Committee

# January 30, 2008 Meeting Minutes

**Crowne Plaza Houston North Greenspoint, Houston, Texas**

## Introduction and DOE Oil and Natural Gas Programs

At 8:00 a.m., Mr. Guido DeHoratiis called the Ultra-Deepwater Advisory Committee (the Committee) meeting to order.

Mr. DeHoratiis summarized some of the key personnel changes in DOE that have taken place since the last meeting. Specifically, James Slutz is now the Acting Principal Deputy Assistant Secretary for the Office of Fossil Energy and Mr. DeHoratiis is acting on Mr. Slutz's behalf as the Acting Deputy Assistant Secretary for the Office of Oil and Natural Gas. Mr. Slutz extended his apologies for not being able to attend the meeting and in his stead, Mr. DeHoratiis was appointed as the acting Designated Federal Officer for the meeting. Attachment 1 contains the pertinent delegation of authority documents. Attachment 2 contains the meeting agenda.

After introductions, Mr. DeHoratiis presented an overview of the EPAct 2005 Section 999 Program to set the stage for the day's discussions. He also reviewed the responsibilities of the Committee members including special government employees (SGEs).

He then reviewed the departmental funding that had been recently authorized as part of the FYF 2008 Omnibus Budget Bill.

Mr. DeHoratiis noted that the Committee charge was to review and comment on the Draft 2008 Annual Plan for the Ultra-Deepwater Research and Development Program and present recommendations to the Secretary of Energy as deemed appropriate. This effort must be finalized by the next meeting, which is scheduled for March 4 in Washington, D.C.

Mr. DeHoratiis' presentation and talking points are included on Attachment 3.

## 2007 Advisory Committee Recommendations

At 8:15 a.m., Mr. DeHoratiis introduced Mr. Brad Tomer who reviewed the status of the 2007 Advisory Committee Recommendations and the 2007 and 2008 Traditional Program. Mr. Tomer also noted that he had recently taken on additional responsibilities overseeing the coal program and that Mr. John Duda will become the primary contact for the Section 999 activity. Mr. Tomer's presentation and talking points are included on Attachment 4.

## Overview of HQ Activities

At 8:45 a.m., Mr. DeHoratiis introduced Mr. Bill Hochheiser who presented additional background on the Section 999 activities including a recap of the overall program schedule since its inception in 2005. Mr. Hochheiser's presentation and talking points are included on Attachment 5.

Followup Discussion:

Recently, another important issue came to light. Regarding the time span of Section 999 it was revealed that there are three separate critical dates that can be interpreted from the legislation; namely 2017, 2016, and 2014. DOE had operated under the understanding that the Section 999 program would extend through 2017, which is the last year that funding is provided under this section of EPACT. However, the Section 999 sunset provision clause in the EPAct 2005 legislation extends authorization for the program only through 2014. It was believed that this date was established as a "placeholder" in the original 2004 draft legislation (being 10 years from the date of inception) and upon updating the drafts of the legislation as it progressed through congressional reviews, that date was never updated or changed when the act was finally signed on August 8, 2005. Recent legal interpretation by the DOE General Counsel concluded that the 2014 authorization sunset is binding and therefore DOE is obligated to prepare plans on that basis for research and development (R&D) work and funding, plan metrics, goals, and project schedules, etc.

The Committee asked whether DOE could develop contingency funding mechanisms to avoid the delays and questions regarding the contradictory Section 999 sunset provisions. Mr. Hochheiser responded that this issue will continue to be worked within DOE. It was also suggested that this item should be brought up in the discussion of the Committee's review and comments on the 2008 Annual Plan Draft.

## National Energy Technology Laboratory (NETL) Complementary Program

At 9:00 a.m., Mr. DeHoratiis re-introduced Mr. Tomer, who presented the agenda item on the status of the Complementary NETL 2007 Program and the Draft 2008 Plan. Mr. Tomer noted that he was making the 2008 presentation on behalf of Jamie Brown who was not in attendance due to illness. Mr. Tomer's presentations and talking points are included on Attachment 6.

Followup Discussion:

The Committee observed that EPACT 2005 was signed into law in August of 2005 but as of January 2008, the R&D programs are only now just getting started, suggesting some program inefficiencies. Accordingly, Mr. Hochheiser was asked to quantify the expenditure of funds to this point. In response, it was noted that the Research

Partnership to Secure Energy for America (RPSEA) expended approximately $3.5 million since funding was originally authorized in Jan 2007. Additionally, internal staff effort was expended in NETL and in DOE during the same time period.

NETL and RPSEA were requested to make available the presentation slides so that the Committee could study them in more detail in preparing their recommendations. The Chair stated that the information would be made available soon after the meeting concluded.

Regarding the ultra-deepwater environmental program, a question was raised regarding the involvement of the Environmental Protection Agency (EPA). In response, it was noted that NETL continues to be actively involved with the EPA regarding oil and gas matters. For example, most recently NETL had been involved in a joint program with the EPA in assessing the environmental issues involved with coal bed methane production.

The Committee questioned the level of independent oversight of NETL activities. It was noted that NETL has a separate Technical Advisory Committee (TAC) and furthermore it was noted that in fact some members of this Committee also participated in the TAC in assessing NETL performance.

## 2007 Annual Plan (Consortium Program)

At 9:10 a.m., Mr. DeHoratiis introduced Mr. Mike Ming who presented an overview of RPSEA. Mr. Ming's presentation and talking points are included on Attachment 7.

At 9:20 a.m., Mr. Ming introduced Mr. Chris Haver. Mr. Ming's and Haver's presentation and talking points are included on Attachment 8.

Followup Discussion:

In response to questions about RPSEA's industry activities, Mr. Ming responded that RPSEA participates not only in the high visibility annual Offshore Technology Conference (OTC) but also the Colorado School of Mines Oil and Gas Conferences. RPSEA personnel and volunteers had contributed thousands of man-hours in RPSEA activities, including participation in workshops and conferences.

Regarding RPSEA membership it was noted that small independent producers could join for an annual fee of $1,000 and that the fee for larger companies was $10,000. It was also noted that the Interstate Oil and Gas Compact Commission (IOGCC) was a general member and additionally was a member of RPSEA's Strategic Advisory Committee. As highlighted on RPSEA's website, aside from the fees, members were required to abide by its bylaws.

Clarification on the cost range of proposals was sought and Mr. Haver responded that solicitations involved project costs from a low of $250,000 to a high involving several millions of dollars.

The Committee questioned the status of projects that had not been selected for award by RPSEA. These projects either were funded by other research consortiums or individual companies, and many were not funded at all. Some are internally earmarked for consideration next year by RPSEA.

Committee members asked for more information on those proposals that were not selected. In response, RPSEA stated that in order not to discourage future proposals, they do not release specific information on rejected proposals but followup meetings with proposers are offered to clarify the reasons proposals were not selected in hopes of motivating future proposals. Because any business that comes to the attention of the Committee was by its nature a matter of public record, RPSEA and DOE judged that it was not prudent to discuss details on this topic. On the other hand, information was freely available on the RPSEA website on those solicitations that had been awarded. Another consideration related to intellectual property rights issues. Specifically, as some of the rejected proposals involved proprietary technologies, it would not be appropriate to publicize details of the proposals or solicitations.

A question was raised regarding solicitation statistics. In response, RPSEA stated that:

- Of the first five RFP's originally issued in October 2007, four had been awarded. Nine responses were received; six from academia and three from industry. One RFP did not receive any response and that RFP is being rewritten and will likely be reissued in February 2008.

- The next five RFPs were issued in late November 2007 resulting in 13 responses from industry and none from academia.

- Five additional RFPs are currently being reviewed by NETL and will be released soon with a 60-day response time period. The time had been extended based on the feedback received during the first solicitation period.

## 2008 Annual Plan Draft

At 10:10 a.m. the meeting broke for coffee and resumed at 10:30 a.m. with Mr. DeHoratiis introducing Mr. John Duda who presented an overview of the 2008 Annual Plan Draft for discussion. Mr. Duda noted that he recently took over Mr. Tomer's activities. Mr. Duda's presentation and talking points are included on Attachment 9.

## Organization of Committee to Review the 2008 Annual Plan Draft (Facilitated Discussions)

At 10:45 a.m., Mr. DeHoratiis introduced Ms. Sabine Brueske who reviewed the objectives and ground rules for the afternoon facilitated discussions. Ms. Brueske's presentation and talking points are included on Attachment 10.

The Committee broke for lunch at 12:10 p.m. and resumed discussions at 1:10 p.m.

During the first afternoon session, Ms. Brueske led the Committee through facilitated discussions designed to identify the key issues involved with the Annual Plan Draft, as summarized below.

- A question was raised whether RPSEA had an appropriate program for long-term R&D. The NETL Complementary program clearly had a long-term approach as a fundamental element of their program but that aspect was not evident in the RPSEA program. In response, it was noted that many of the projects are 4-5 year programs. According to the legislation, a 10-year time span is maximum unless the program is extended, which requires Congressional action. It may be premature at this stage to make assumptions in that regard.

- Regarding the adequacy of R&D funds, one project in Norway that involved subsea separation facilities was highlighted for comparison. It involved an investment of well over $100 million, the implication being that the annual RPSEA program at $37.5 million may be limited in light of the extraordinary costs involved with ultra-deepwater projects and R&D needs. Therefore, the suggestion was made that cost sharing is of paramount importance in many cases to be able to achieve measurable results. In response, it was noted that while a minimum of 20 percent cost share is required for any general R&D project, a 50 percent cost share is required for demonstration projects. One Committee member observed that the annual funding for the RPSEA activity equated to only 45 minutes worth of oil imports into the United States. That helped to put the cost element into perspective and should support arguments for increasing RPSEA's future funding.

- Regarding the ultra-deepwater operating environment, it was noted that the industry is data poor on the geoscience aspects of the resources at water depths of 10,000 feet or more. In most cases, ultra-deepwater geoscience data are considered trade secrets. Therefore, it was suggested that the focus of the RPSEA program should be on broad, industry-wide needs and to avoid R&D topics that are too specific or limited in scope.

- The Committee noted that one RFP that did not attract any proposals or responses. RPSEA indicated that in today's high priced crude oil environment, the

R&D community is overloaded with promising and attractive opportunities. This creates competition for in-development resources, which should be taken into account in the solicitation process. Each solicitation is viewed as an investment of resource time and effort which has to be compared with other attractive ventures or opportunities.

- Concern was also expressed why the second round of solicitations did not draw any interest from academia. Efforts need to be made to draw universities back into the program as they are vital not only for the immediate R&D needs but also for future human resource development.

- In response to questions concerning the funding strategy, project awards are based on available funds from 2007 and 2008 budget year allocated funds. For multiyear projects that went beyond that time scale, the projects were broken into phases to provide a basis for future decisions, using a stage-gate approach.

The next topic involved the solicitation of ideas for followup recommendations.

- The Committee should ensure that the tone of the annual report emphasizes the critical nature of the Section 999 activity to ensure its longevity. Access restrictions need to be addressed as well as they can have a dramatic impact on the overall availability of oil and gas resources.

- It was recommended that attention should be drawn to ways to mitigate the wasted time and effort involved with relevant budgetary procedures.

- Questions arose regarding the coordination between NETL and RPSEA programs. In response, it was noted that NETL in fact manages the RPSEA program and is involved in approving each solicitation and project award. Therefore, there is close coordination between RPSEA and NETL that is purposely built into the organizational structure and management processes.

- Regarding R&D program content, Committee members were satisfied with the approach toward drilling and completion, and the emphasis on basic science themes was judged to be appropriate based on reading the descriptions of the 2008 project titles. On the other hand, it was felt that the objectives related to seeking breakthrough technologies, integrated solutions to ultra-deepwater production challenges and environmental issues were not given sufficient priority. Also, clarification was sought on the subject of converting oil and gas resources to proved reserves. In response to the latter item, it was noted that the pertinent definitions follow the long established guidelines set by the Securities and Exchange Commission, which require an active resource development and investment program before a resource can be classified as a proven reserve.

Further discussion followed on the subject of converting resources to reserves as noted below:

- In order to heighten awareness to the goals of the program, it was suggested that the 2 percent goal for transition from resources to reserves was too conservative and that a higher level should be adopted, perhaps as high as 5 percent. But it was not clear how to map specific projects to these general goals. In defense of the current system, it was noted that there must be a rigorous process for accounting for achievement of goals as they will be subjected to a federal internal audit process. The RPSEA program is not unique as the audit process applies to any federal government program.

- Also, it was questioned why the NETL program of measuring program progress in achieving the 2 percent increased reserves goal was funded from the R&D activity instead of the base administrative funding. It was noted that this RPSEA program assessment effort is unique and that an off-the-shelf process does not exist for measuring its progress. Therefore, development work had to be pursued to establish an air tight metric process to defend the achievement of goals, otherwise the program integrity could be called into question.

- The issue of technology adoption by industry is a complicated matter that involves a number of assumptions. On the other hand, it was noted that there are many systematic and analytical techniques that have been developed in the past to measure the contribution of R&D programs. For example, conclusions can be drawn from comparing extended well life estimates, decline curves, cost tracking, sweep efficiencies, and ultimate recovery factors. But, most importantly these judgments need to be made by recognized experts to ensure the integrity of the process.

- It was pointed out that it was difficult for the Committee to assess the effectiveness of the program given the insufficient level of detailed project definition offered by RPSEA. In response, RPSEA agreed to provide additional details of the 2008 program on its website. It was also noted that details of the 2007 project awards were already available on the website and could be accessed by Committee members.

- It was also noted that the 2008 program included some demonstrations. However, it was argued that the RPSEA program should ideally focus on high risk R&D and not on demonstrations. In response, RPSEA noted their program on valve leakage testing is a form of demonstration. The valve integrity testing program is an onerous process for industry due to the high costs and lost production involved with the valve testing process. It was argued that if technology could be developed to find innovative ways of testing valves without

having to shut down production wells during testing periods, then it was a good example of how the R&D program could be used to benefit industry.

- Industry is keenly aware of the risks involved with offshore platforms. Furthermore, the damage suffered during the 2005 hurricane season indicates that the key environmental design parameters need to be re-evaluated. It also suggests that perhaps a R&D topic should relate to those design issues as they were not adequate to deal with the realities of the Gulf of Mexico environment.

- An example of a successful long-term R&D program relates to the goal of extending the distance from shore for subsea facilities. For example, in Norway today gas lines can reach 500 km off the shore and somewhat less for oil. This achievement was based on innovative R&D projects developed 10-20 years ago. R&D Planning should be in the works today to develop the novel techniques that can be used to significantly extend those distances in the future.

- In the safety area, because most of the incidents relate to human error issues, a key operational area that deserves focus relates to the human element — particularly training. This impacts not only safety but also environmental matters aside from business driven objectives.

- It was observed that one of the road blocks to progress relates to cross communications among federal agencies. It was suggested that DOE should promote an educational program with sister agencies to increase the dialogue and understanding of key energy-related matters among those agencies that can have a permitting or funding role with energy-related projects.

- The handling of intellectual property rights issues should be clarified and streamlined to ensure that promising R&D projects are not delayed due to misunderstanding in this area. It was suggested that NETL should consider preparing a communication package to address these matters.

- As the oil and gas industry is resource limited in the current high oil price environment, it was suggested that the solicitation process should be made as transparent as possible to ensure that barriers to progress are minimized.

- Due to limited funds availability for the Section 999 activity, it was suggested that the focus of the program should be to concentrate the available funds in a smaller number of projects rather than diluting the already limited funds.

- It was pointed out that it was difficult for the Committee to comment on the direction of the program given the very limited information available in the generic R&D project titles. Additional information should be made available so

that the Committee can better assess the thrust of the programs. It was pointed out that the RPSEA website contains additional information on project awards.

After a discussion of the key issues, the Committee also agreed that it was best to organize into subcommittees (similar to the last meeting) to prepare draft recommendations on the key Annual Plan Draft issues. The issues would be consolidated and reviewed by the full Committee at the next meeting in early March.

At the conclusion of this session, Ms. Brueske summarized the issues in a topical format. She also outlined the structure of the subcommittees that are designed to evaluate the issues in detail and suggest appropriate recommendations for the full Committee review at the next meeting in March. Ms. Brueske's summary is presented on Attachment 11.

## New Business: Plans for 2008 - 2010 Committee Cycle

At 2:40 p.m., the Committee broke for coffee and reconvened at 3:00 p.m. when Mr. DeHoratiis introduced Ms. Elena Melchert who reviewed the plan of activities for the balance of the year. Ms. Melchert's presentation and talking points are included in Attachment 12.

## Public Comments and Adjournment

At 3:15 p.m., Mr. DeHoratiis called for public comments and as none were submitted he formally adjourned the meeting. The Committee members broke into their respective Subcommittee groups for further discussions on Annual Plan Draft recommendations.

A record of Committee members in attendance are detailed in Attachment 13.

List of Attachments


| Item | | Page |
|---|---|---|
| Attachment 1 | Delegation of Authorities | 13 |
| Attachment 2 | Meeting Agenda | 14 |
| Attachment 3 | DOE Oil and Natural Gas Programs | 16 |
| Attachment 4A | NETL 2007 and 2008 Traditional Program | 22 |
| Attachment 4B | 2007 Advisory Committee Recommendations | 59 |
| Attachment 5 | Overview of HQ Activities | 68 |
| Attachment 6 | 2007 NETL Activities and Draft 2008 Plan | 69 |
| Attachment 7 | Consortium Overview and 2007 Annual Plan (Consortium Program) | 83 |
| Attachment 8 | 2008 Annual Plan Draft | 93 |
| Attachment 9 | Objectives and Ground Rules for Facilitated Discussions | 100 |
| Attachment 10 | Facilitated Discussion Comments Plan Response Subcommittees | 106 |
| Attachment 11 | Plans for 2008-2010 Committee Cycle | 108 |
| Attachment 12 | Attendance Record | 110 |
| Attachment 13 | Walk-in Participants | 112 |

Attachment 1

**Department of Energy**
Washington, DC 20585

**MEMORANDUM FOR FILE**

**TO:** ULTRA-DEEPWATER ADVISORY COMMITTEE

**FROM:** JAMES A. SLUTZ
DESIGNATED FEDERAL OFFICER
ULTRA-DEEPWATER ADVISORY COMMITTEE

**SUBJECT:** **Acting Designated Federal Officer**

I hereby designate Guido DeHoratiis, Acting Deputy Assistant Secretary of Oil and Natural Gas, to act as the Designated Federal Officer for the meeting of the Ultra-Deepwater Advisory Committee on January 30, 2008, in Houston, Texas.

# Attachment 2

**Agenda**
**Ultra-Deepwater Advisory Committee**
**January 30, 2008**
**Crowne Plaza Houston North Greenspoint, Houston, TX**

| | | |
|---|---|---|
| **8:00 AM** | **Call to Order: Morning Session;** | [DeHoratiis] |
| | Welcome & Introductions; Responsibilities of Members under FACA; Instructions from the Designated Federal Officer; Objectives of the Meeting; DOE Oil and Natural Gas Programs | |
| | Committee Q/A and Discussion | |
| **8:20 AM** | 2007 Advisory Committee Recommendations | [NETL] |
| | Committee Q/A and Discussion | |

**DOE Oil and Natural Gas Programs**

| | | |
|---|---|---|
| **8:45 – 9:00** | **2007 and 2008 Traditional Program** | [NETL] |
| **9:00 – 12:00** | **Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Research and Development Program** | |
| **9:00 AM** | Overview of HQ Activities<br>-- Budget & Planning; Section 999 Requirements | [Hochheiser] |
| | Committee Q/A and Discussion | |
| **9:20 AM** | *NETL Complementary Program*<br>-- 2007 Activities and Draft 2008 Plan | [NETL] |
| | Committee Q/A and Discussion | |
| **9:40 AM** | *2007 Annual Plan* (Consortium Program)<br>-- Solicitations, Selections, Awards | [RPSEA] |
| | Committee Q/A and Discussion | |
| **10:00 AM** | **BREAK** | |
| **10:15 AM** | *2008 Annual Plan Draft* (Consortium Program) | [NETL] |
| | Committee Q/A and Discussion | [Facilitated Discussions] |
| **12:00 PM** | **Adjourn: Morning Session [LUNCH BREAK]** | |

**Agenda**
**Ultra-Deepwater Advisory Committee**
**January 30, 2008**
**Crowne Plaza Houston North Greenspoint, Houston, TX**

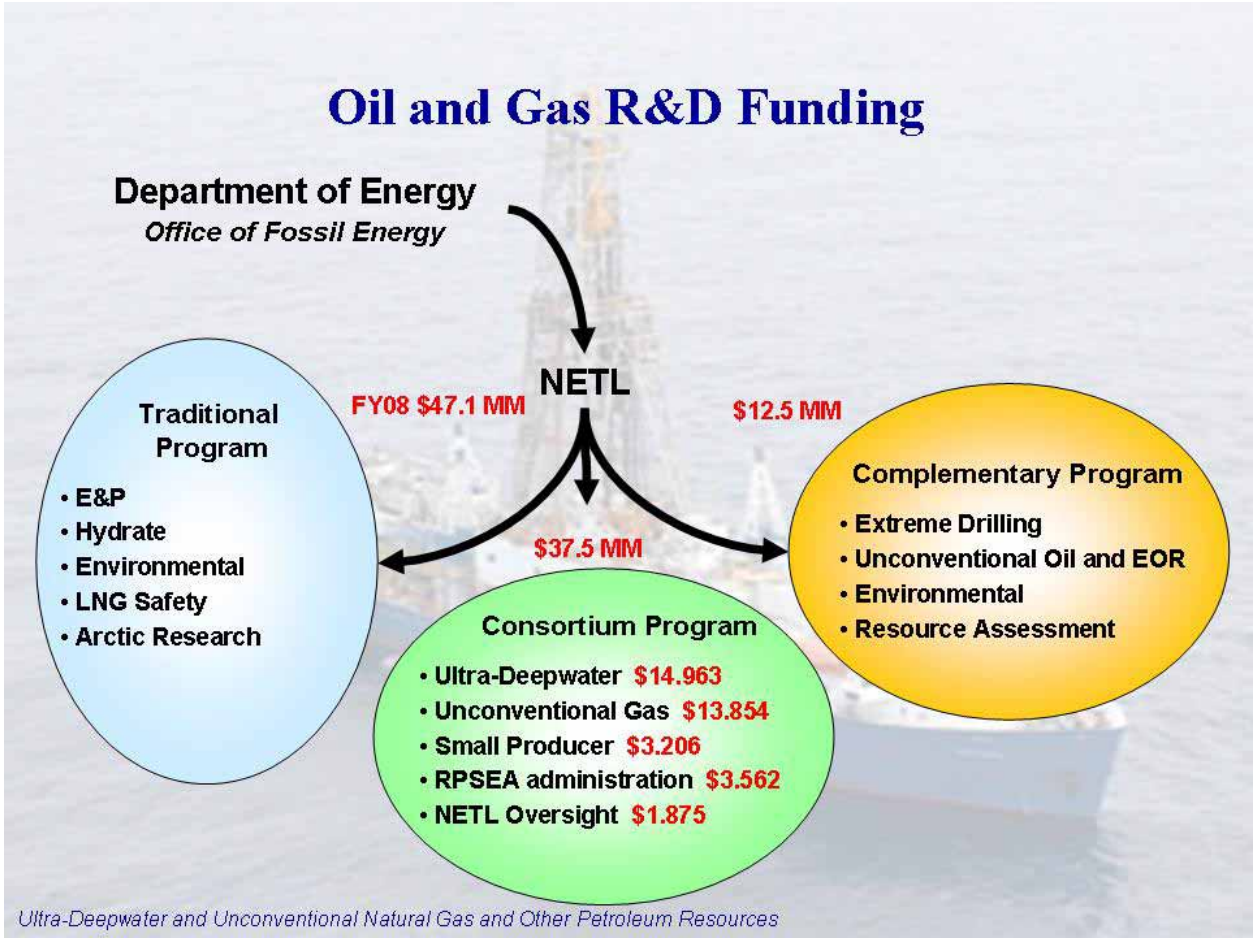
| | | |
|---|---|---|
| **1:00 PM** | **Call to Order: Afternoon Session** | [Committee Chair] |
| | Organization of Committee to review *2008 Annual Plan* Draft<br>-- Priority areas<br>-- Subgroups<br>-- Deliverables<br>-- Schedule | [Facilitated Discussions] |
| **4:15 PM** | **NEW BUSINESS**: Plans for 2008-2010 Committee cycle<br>-- Charters<br>-- Membership<br>-- Schedule | [Melchert] |
| **4:30 – 5:00** | **Public Comments** (prior request required) | [DeHoratiis] |
| **5:00** | **Adjourn** | [DeHoratiis] |

**APPROVED:** _____ 01/25/08
James A. Slutz, Designated Federal Officer — Date

Attachment 3

# Member Responsibilities

- **SGE [special Government employees]**
  - Federal ethics laws and regulations
  - avoid any action creating the appearance that they are violating the law or the ethical standards
  - provide expert opinion
- **Representative members**
  - represent the particular point of view associated with their appointment.
  - particular point of view stated in appointment letter from the Secretary of Energy.
- **Conflict of interest**
  - avoid conflict of interest and the appearance of conflict of interest.
  - GC test: direct and predictable benefit


Oil and Gas R&D Funding
Department of Energy
Office of Fossil Energy
NETL
FY08 $47.1 MM
$12.5 MM
$37.5 MM
Traditional Program
• E&P
• Hydrate
• Environmental
• LNG Safety
• Arctic Research
Complementary Program
• Extreme Drilling
• Unconventional Oil and EOR
• Environmental
• Resource Assessment
Consortium Program
• Ultra-Deepwater $14.963
• Unconventional Gas $13.854
• Small Producer $3.206
• RPSEA administration $3.562
• NETL Oversight $1.875
Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources

# Traditional and Section 999 Natural Gas and Oil Technology Programs

*Budget ($ million)*

| | FY05 | FY06 | FY07 | FY08 |
|---|---|---|---|---|
| NATURAL GAS | 43.6 | 32.7 | 12.0 | 19.8 |
| OIL TECHNOLOGY | 33.0 | 31.7 | 2.7 | 5.0 |
| OTHER OIL AND GAS | — | — | — | 22.3 |
| SECTION 999-ULTRA DEEP | 0 | 0 | 50.0 | 50.0 |
| GRAND TOTAL | 76.6 | 64.4 | 64.7 | 97.1 |

# 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 program
  - 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.

# 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 4A


Good Morning. My name is Brad Tomer and the purpose of my presentation is to provide an overview of DOE's Oil and Gas R&D programs and how those programs are integrated.

## Strategic Center for Natural Gas & Oil

*Implement science and technology programs that resolve the environmental, supply and reliability constraints of oil and natural gas resources and enhance our energy security*

- **Create public benefits by investing in research that industry would not take on itself**
- **Deliver a balanced portfolio of technology to:**
  - Enable Independents to efficiently produce discovered resources
  - Conduct long-term/high risk R&D - develop entirely new sources of supply
  - Minimize environmental impact

*A multi-discipline, long-term, high-risk, and high-reward endeavor that will only occur through Federal involvement.*

NETL

*Strategic Center for Natural Gas and Oil*

SCNGO research is generally not the sort that industry does on its own, either because it is high-risk and long term (e.g., hydrates), the players do not have the funds or skills (e.g., problems of small independent producers), or the market is not yet powerful enough (e.g., environmental problems). These are the places where public investments can result in public benefits.

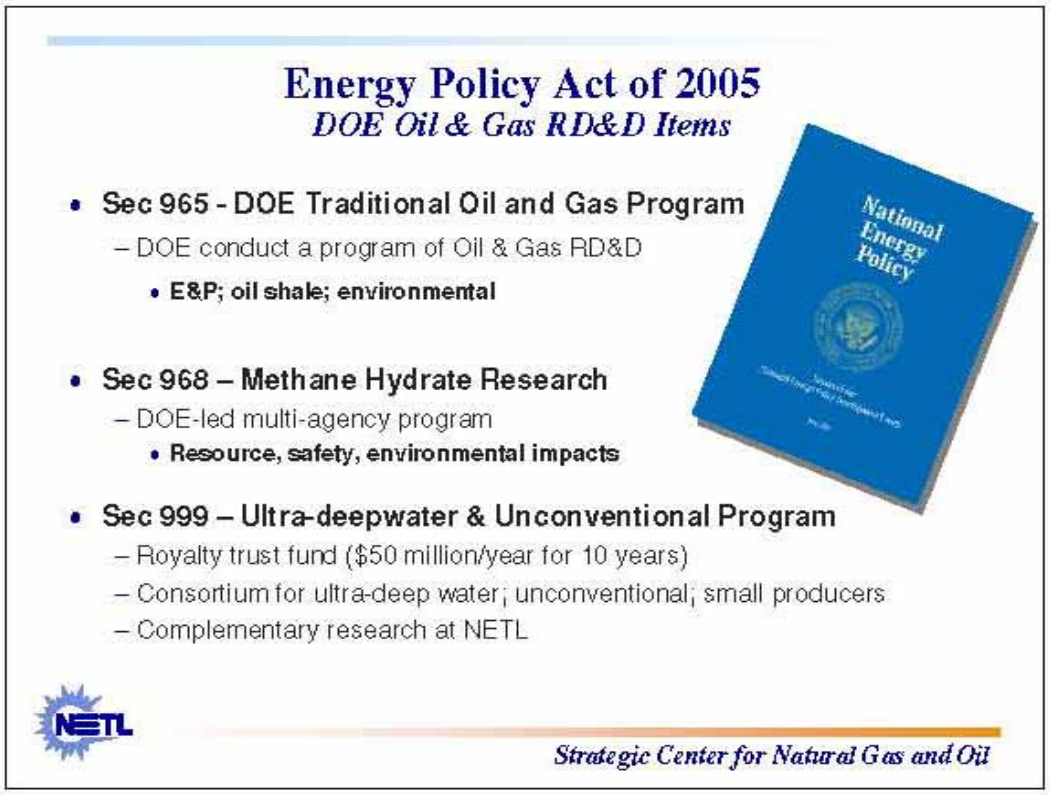
## NETL Program Implementation
### *Partnership Approach*

- **Careful planning with significant industry input**
  - Technology roadmaps, advisory committees, consortiums, peer reviews
- **Cost-shared R&D conducted with partners**
  - Industry, federal agencies, national labs, universities
- **On-site research subjected to annual merit review**
- **Robust technology transfer**
  - Successful field demonstrations, PTTC, website, workshops, GasTIPS

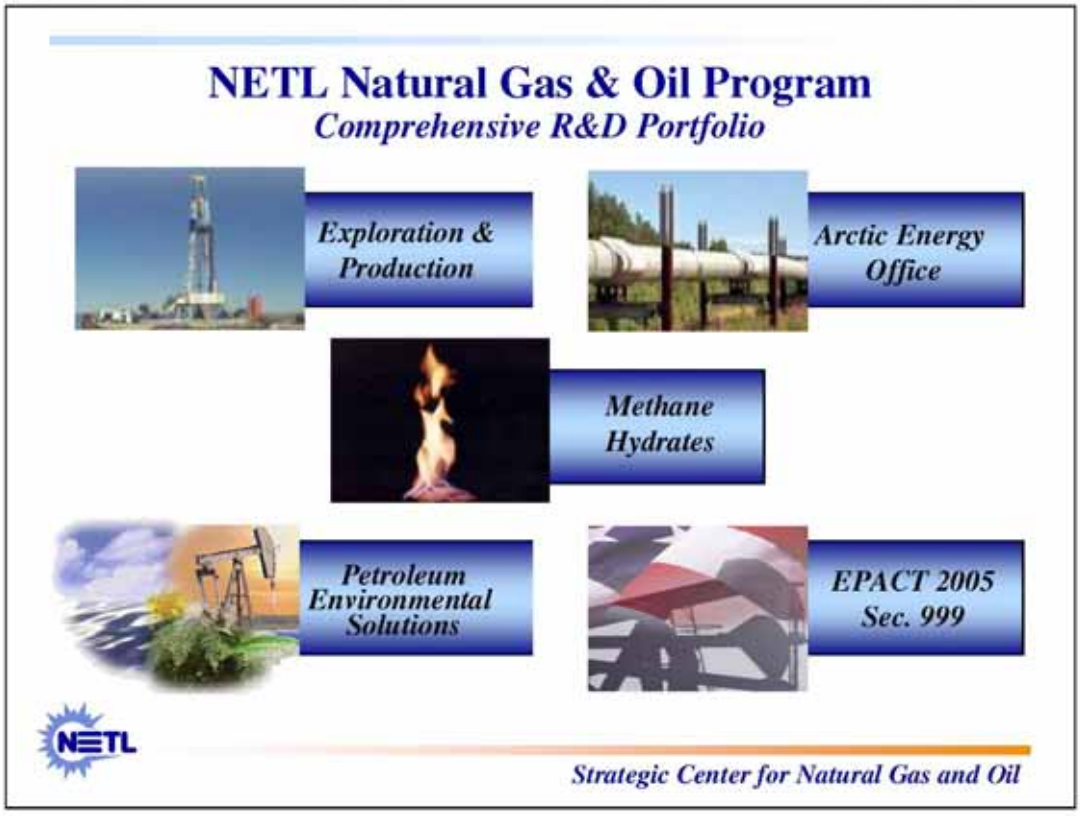
NETL

*Strategic Center for Natural Gas and Oil*

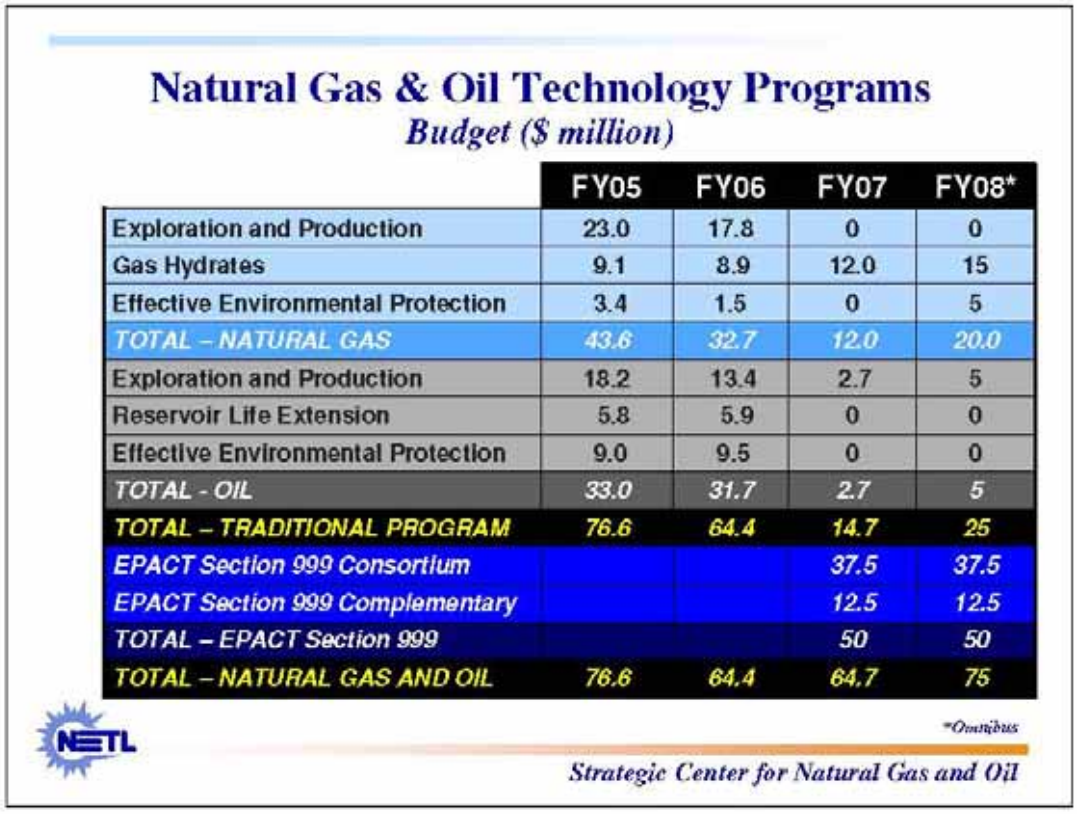
NETL's primary goal is to carry out research that is focused on practical, achievable objectives by working closely with its partners. DOE/NETL implements its R&D programs by first gathering considerable industry input, through public meetings and workshops, on exactly what types of R&D will have the greatest impacts. It designs its resulting R&D solicitations to guarantee industry support of practical objectives by requiring cost sharing with research partners. Research that is done in-house is subjected to outside expert reviews to make certain that it stays focused and results-oriented. Finally, NETL uses a wide range of vehicles to disseminate the results of its research in ways that target specific audiences (e.g., small producers, international hydrate scientists, independent producers focused on natural gas, etc.).




DOE's oil and gas related R&D was addressed in the Energy Policy Act of 2005 (EPACT 2005) in three Sections. These included the oil and gas R&D efforts that are funded via appropriated funds (the traditional oil and gas program which is continuing as it has historically), the methane hydrates R&D program (also appropriated funds), and the new Subtitle J, Section 999 oil and gas R&D program which is funded via federal royalty receipts. All three of these efforts are progressing simultaneously and are integrated and managed through DOE office of fossil energy and NETL.




The NETL-SCNGO R&D portfolio now has five main focus areas. The traditional program is split between E&P and environmental, the EPACT 2005 Sections 999 (deepwater and unconventional resources) and 968 (hydrates) are two other focus areas, and the Arctic Energy Office remains focused on issues related to energy supplies, environmental issues, etc. that link to the arctic region (Alaska).



## Natural Gas & Oil Technology Programs

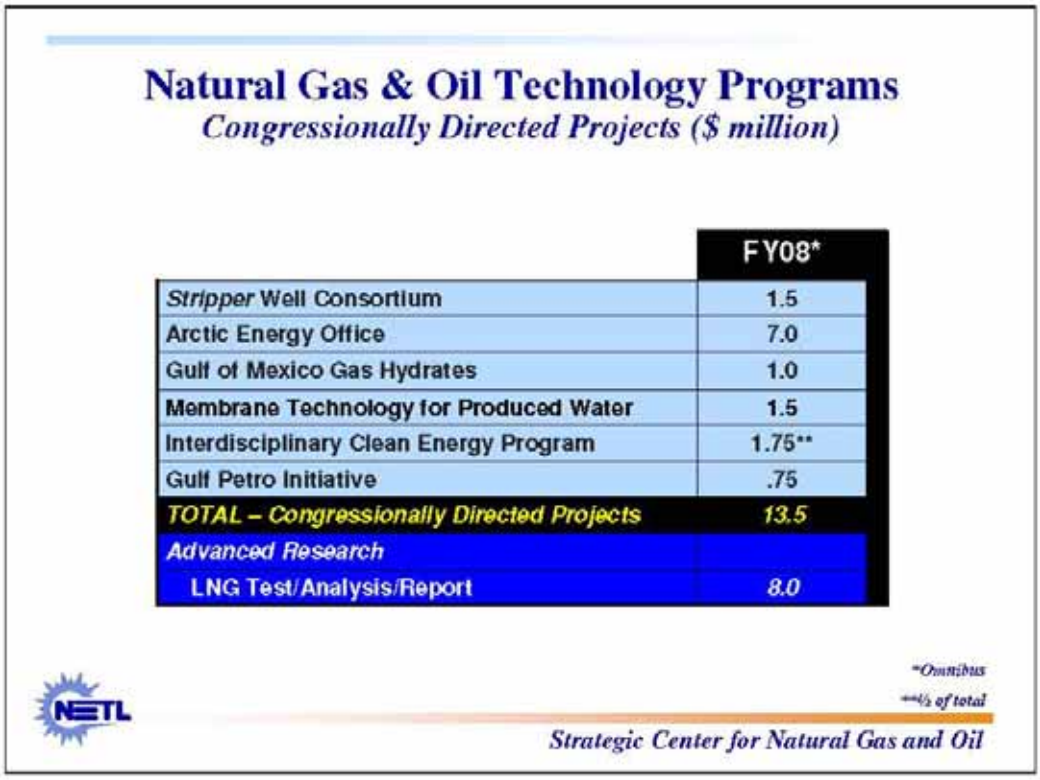
*Budget ($ million)*

| | FY05 | FY06 | FY07 | FY08* |
|---|---|---|---|---|
| Exploration and Production | 23.0 | 17.8 | 0 | 0 |
| Gas Hydrates | 9.1 | 8.9 | 12.0 | 15 |
| Effective Environmental Protection | 3.4 | 1.5 | 0 | 5 |
| *TOTAL – NATURAL GAS* | *43.6* | *32.7* | *12.0* | *20.0* |
| Exploration and Production | 18.2 | 13.4 | 2.7 | 5 |
| Reservoir Life Extension | 5.8 | 5.9 | 0 | 0 |
| Effective Environmental Protection | 9.0 | 9.5 | 0 | 0 |
| *TOTAL - OIL* | *33.0* | *31.7* | *2.7* | *5* |
| *TOTAL – TRADITIONAL PROGRAM* | *76.6* | *64.4* | *14.7* | *25* |
| *EPACT Section 999 Consortium* | | | *37.5* | *37.5* |
| *EPACT Section 999 Complementary* | | | *12.5* | *12.5* |
| *TOTAL – EPACT Section 999* | | | *50* | *50* |
| *TOTAL – NATURAL GAS AND OIL* | *76.6* | *64.4* | *64.7* | *75* |

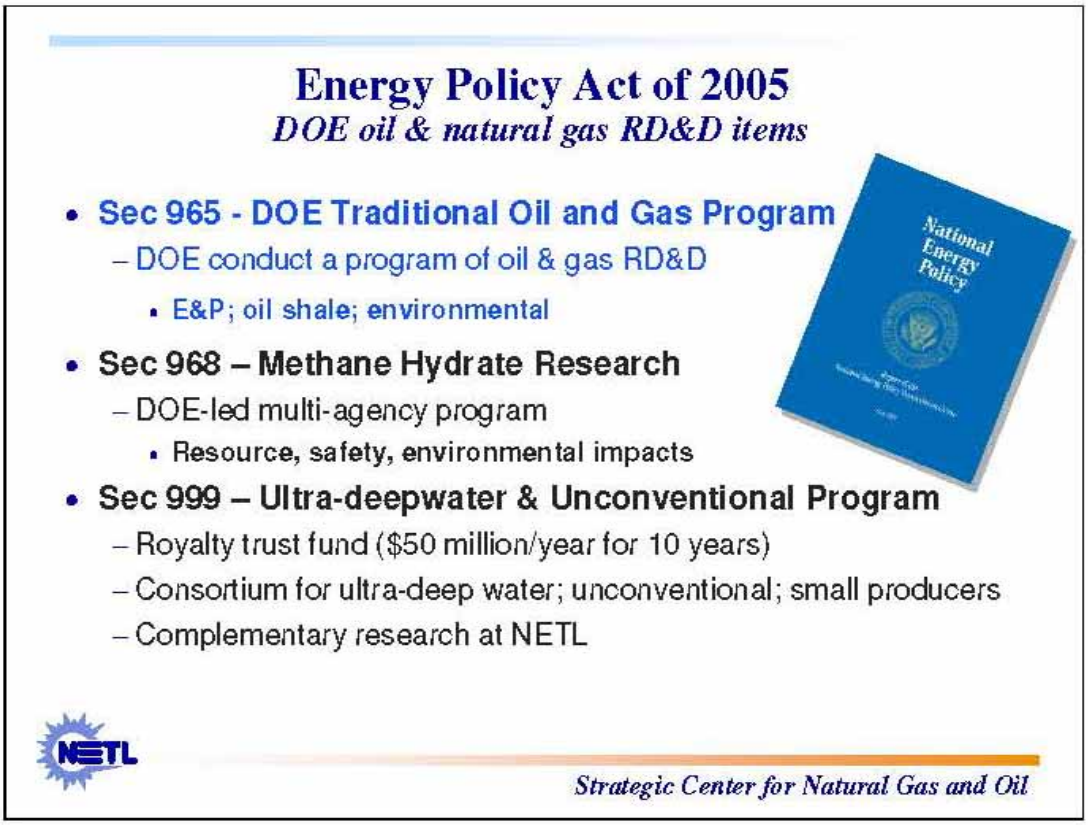
*Omnibus

*Strategic Center for Natural Gas and Oil*

While annual oil and gas R&D funding has remained in the 65 to 77 million dollar range over the past four years, there have been some shifts. Methane hydrate R&D funding has grown.

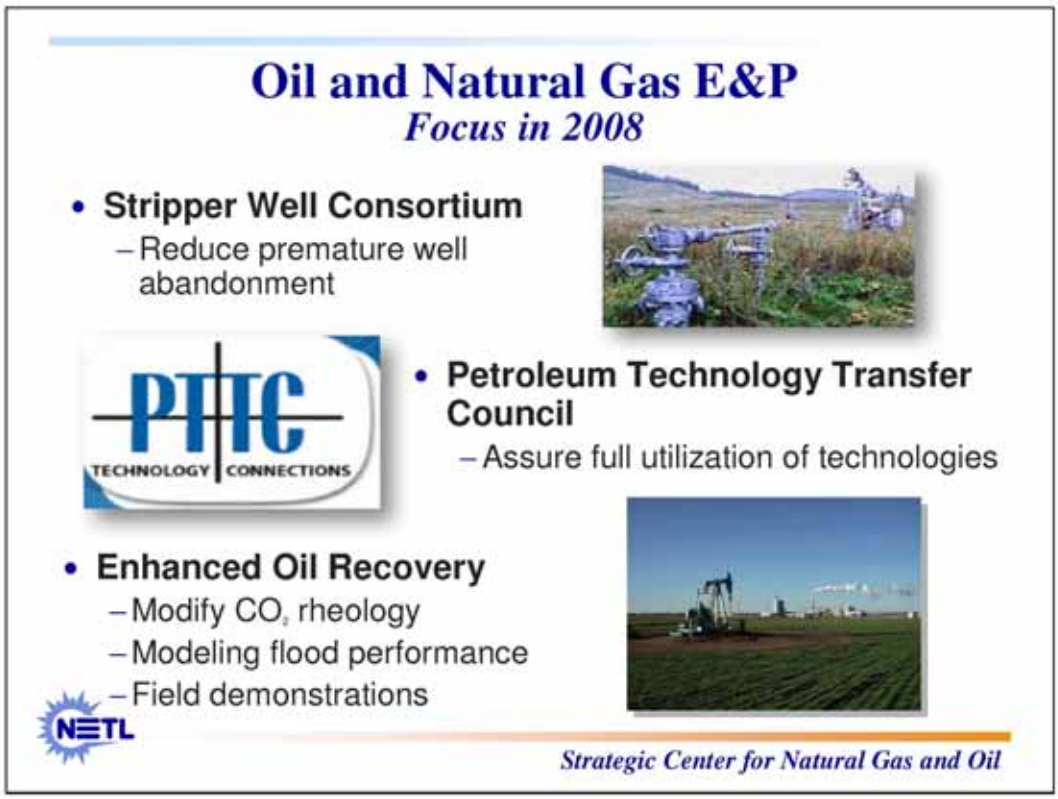



In addition to the appropriated oil and gas funds, there are a number of Congressionally-directed projects. For fiscal year 2008 there are six such projects related to oil and gas, including directed funding of work in Pennsylvania, Alaska, Mississippi, New Mexico, Utah, and Louisiana. These projects total more than $13 million.




The traditional Oil and Gas Program research is supported by language in Section 965 of the Energy Policy Act of 2005.

The following is a description of elements and successes from that Program.

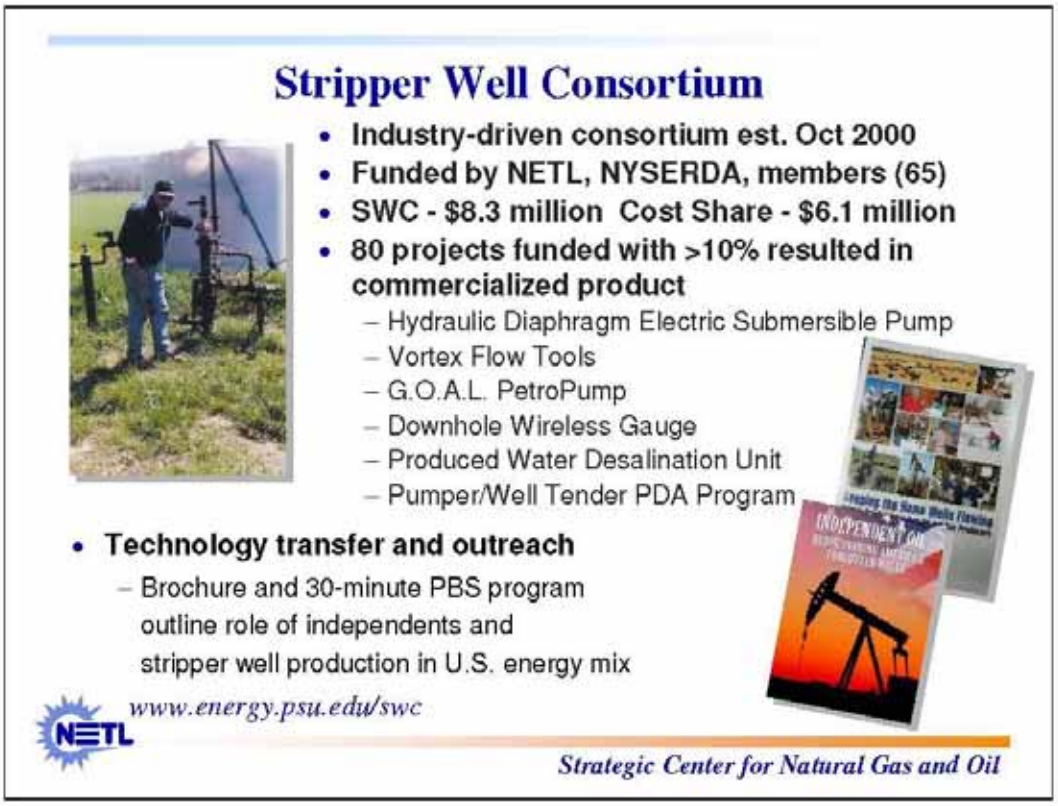



The FY08 Oil and Gas Program provides support for independent operators.

1) The Stripper Well Consortium supports technology development aimed at reducing premature abandonment of domestic producing wells and provides small companies an opportunity to participate in R&D selection, development, and results

2) The Petroleum Technology Transfer Council, now a partnership with the American Association of Petroleum Geologists, is a direct outreach to independent operators. Workshops and case study reports on emerging technologies have reached thousands of participants.

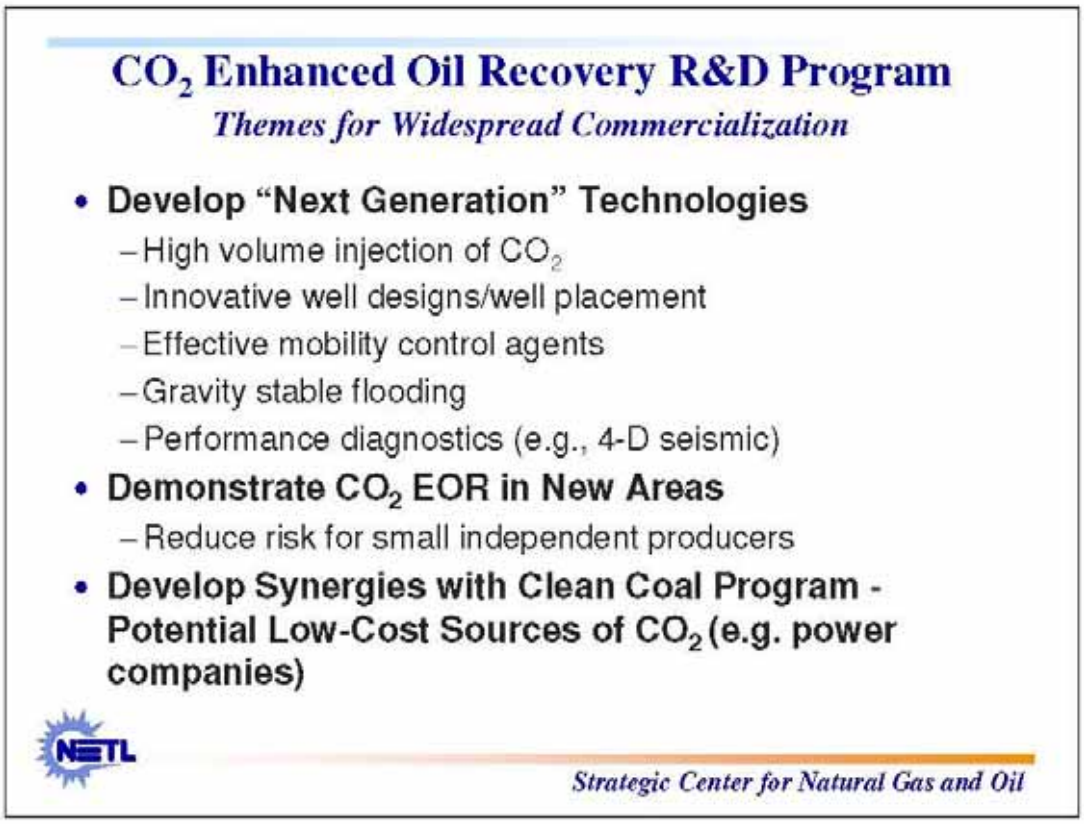
3) Enhanced Oil Recovery focuses on teaming university based technology development efforts with independent operators to accelerate the process of implementing EOR technologies in the field.




The Stripper Well Program has been very successful as approximately 10% of the projects funded have resulted in commercial products and there has been a significant amount of industry cost share, one measure of the perceived value of the research. R&D in this program focuses on the problems that small operators have identified as being critical issues in their day-to-day operations: reservoir remediation, wellbore clean-up and surface system optimization. The projects are selected by an elected Executive Council, comprised of consortium members.

The Consortium has also produced a number of well-received outreach products, including a 30-minute video program about the important role of independent operators and stripper wells in domestic energy production, that has been featured on the Public Broadcasting System.

For more information visit the SWC website at www.energy.psu.edu/swc




Another important area of research includes carbon dioxide enhanced oil recovery. While carbon dioxide injection is well established in West Texas, the potential for improving its effectiveness and expanding its application across other basins and in a wider variety of formations will require the development of a "next generation" of technologies. Chief among these are ways to improve the coverage of the reservoir, both vertically and horizontally, as well as enhanced methods for tracking the progress of injected fluids.

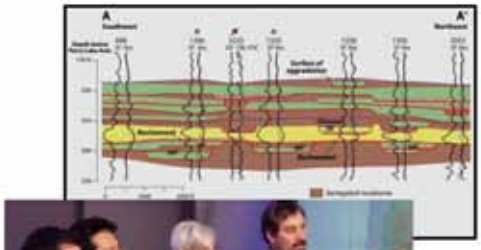
SCNGO also recognizes the importance of demonstrating carbon dioxide EOR in areas where operators are not familiar with it. Such demonstration projects will be critical to efforts to simultaneously sequester carbon dioxide and produce incremental oil in areas where coal-fired power plants and mature reservoirs amenable to carbon dioxide EOR coexist.

## $CO_2$ EOR Demonstration at Citronelle Field

*University of Alabama at Birmingham*

**Objective:**

Conduct reservoir simulation and other testing at the Citronelle Field to enable implementation of state-of-art $CO_2$ EOR project by independent producer



**Accomplishments:**

Geologic characterization has been initiated and supplier has committed to supplying $CO_2$ for planned pilot

**Benefits:**

If successful, this demonstration of state-of-art $CO_2$ EOR will facilitate expansion of $CO_2$ EOR operations in Mississippi into new reservoirs in Alabama, and provide a demonstration of $CO_2$ sequestration potential

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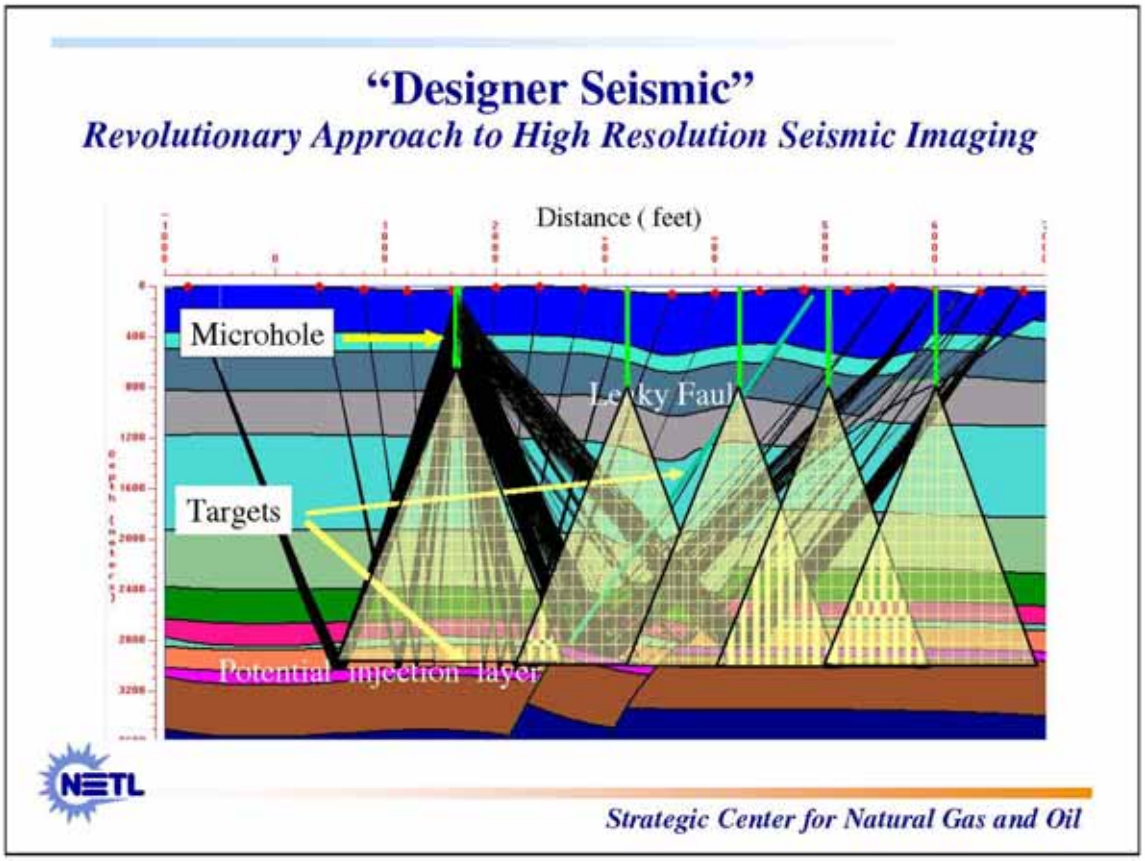
For example, the University of Alabama and their partner Denbury Resources are investigating the application of "state-of-art" CO2 EOR technologies for expanding $CO_2$ EOR from fields in Mississippi to new, similar reservoirs in Alabama. This project represents the latest award from the $CO_2$ EOR Program; the project was awarded in 2006.

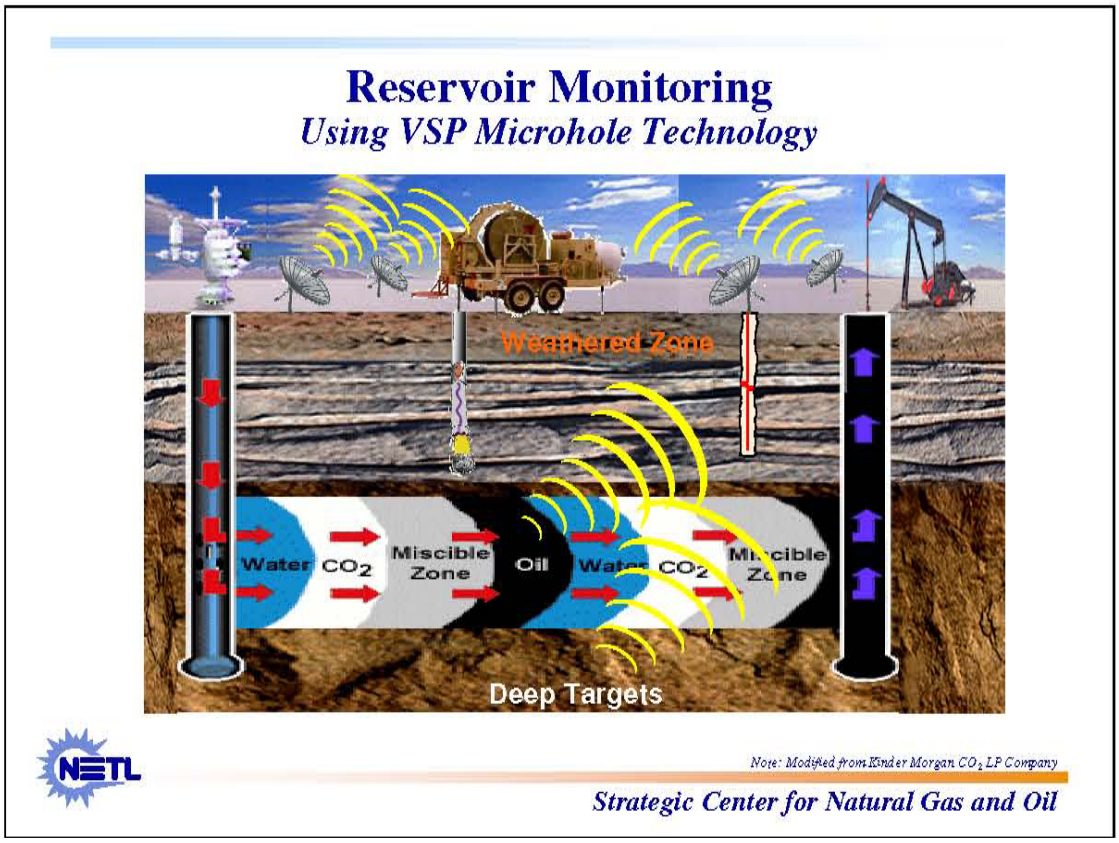

NETL's Microhole program, launched in 2004, has been very successful. The effort focused on a systems approach, developing rigs, downhole tools, electronics and drilling equipment that would make drilling small diameter holes using coiled tubing practical. A key element of this approach was the application of highly efficient "hybrid" coil tubing drilling rigs that can significantly reduce the environmental footprint when compared to conventional rigs. Field demonstrations show that such coiled tubing drilling systems are capable of drilling and completing 3,000 ft. wells in as little as 19 hours total time from "headlights moving in to tail lights moving out." Such efficiencies have resulted in the commercialization of approximately 1 TCF of shallow, bypassed gas in the Niobrara formation of western Kansas and eastern Colorado.




The concept of "designer seismic" came from the Microhole Roadmapping Workshop held in April, 2003. The focus of the effort is to investigate the potential for using small microhole rigs to drill dedicated instrument boreholes for "downward looking" Vertical Seismic Profiling (VSP) methods. Using state-of-the-art equipment, it might be possible to provide cost effective 24/7 high resolution monitoring of reservoir hydrologic processes and geologic features.

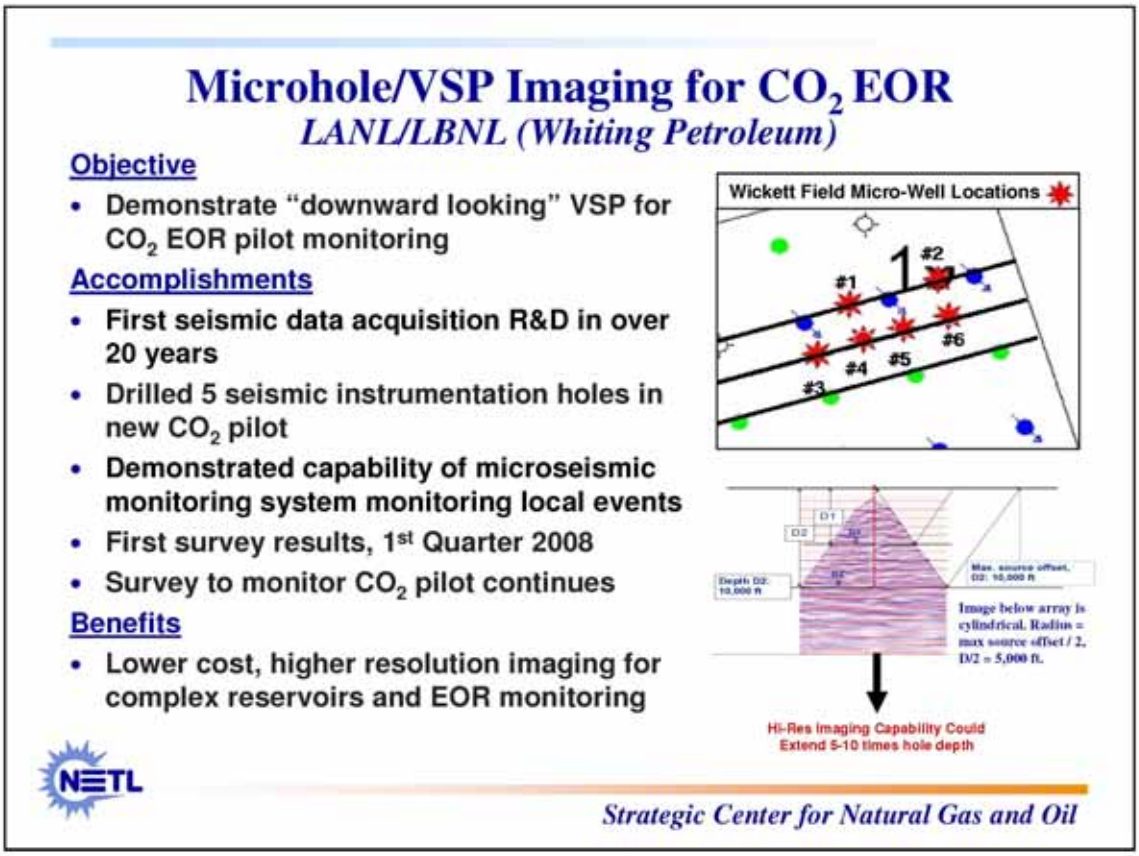
This approach represents a paradigm shift in how high resolution reservoir information is acquired based on more "real time" hi-res data with less cost.

This slide illustrates successful imaging results achieved by implementation of the concept at RMOTC's Teapot Dome field where complex faulting limited the use of conventional seismic techniques.




One of the key advantages of VSP versus conventional seismic arrays is the ability to get below what is termed the "weathered zone." This typically comprises at least the first 300 feet of overburden, where 80% of the seismic signal is lost going from the surface to the target zone and 80% of the reflected signal is lost in the return to conventional surface receivers. This results in the high-frequency components of the reflected wave that are essential to high-resolution being absent in conventional surface receivers. It now appears possible that getting below the weathered zone with microhole sourced VSP will result in an order-of-magnitude improvement in high-frequency response.

Another goal of "designer seismic" is to investigate the full potential of "purpose-built" seismic boreholes. By using plastic and other sound-deadening materials for casing (now possible in the shallow boreholes), it might be possible to further develop capabilities for continuous, real-time, passive-seismic monitoring. This has the potential to further reduce the cost of imaging by utilizing computer automation to analyze seismic responses resulting from a multitude of natural and undirected manmade sources and provide a continuously updated image of the reservoir for only the cost of the installed monitoring and computing equipment.




Following the feasibility demonstration of designer seismic at RMOTC's Teapot Dome field, the system was deployed at Whiting Petroleum's CO2 EOR pilot flood in their Wickett Field, near Odessa, Texas, where a 5-well monitoring program was put in place. The project, still underway, has demonstrated the capability of a microseismic monitoring system for imaging an EOR pilot.

## Coiled Tubing (CT) Drilling

- **Objective: Develop coiled tubing drilling technologies to extend application, lower costs & decrease impact**
- **Significant accomplishments:**
  - Hybrid CT rig drilled 25 Niobrara wells; 25-38% cost savings; 1 Tcf now economic (GTI)
  - Developed CT tractor that extends horizontal capability by 50%; field tests in Alaska underway (Western Well Tool)
  - Developed "smart" CT steering and logging system; commercialized, to be applied in Kuparuk (Baker Hughes INTEQ)

- Developed faster CT rig; now active in Barnett Shale helping to add 45 Tcf of unconventional gas reserves (Schlumberger)
- Potential for using CT drilled shallow wells to apply vertical seismic profiles to monitor EOR

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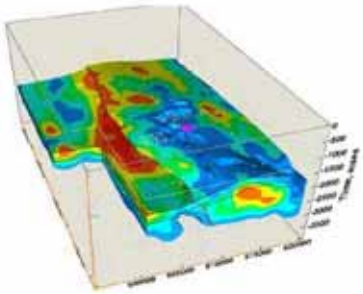
The field demonstration of the first U.S. built and operated hybrid (coil plus rotary capability) coiled tubing drilling system was one of the first major successes of the Microhole Program. The rig shown in this slide was able to drill and complete 3,000' gas wells in a total of 19 hours for a 25 to 38 % average cost savings. As a result, a coiled tubing drilling "boom" began in Colorado with a Canadian service provider providing similar coiled tubing equipment for deep (12-14,000') drilling for tight gas. Other coiled tubing tools have been tested and commercialized as a result of NETL research.

## Oil and Gas Exploration & Production Drawing to a Successful Close

- **Advanced Diagnostics & Imaging**
  - Improved characterization
  - Advanced seismic for natural fracture detection and EOR (4D)



- **Drilling, Completion & Stimulation**
  - Increase rate of penetration
  - More durable tools
  - Innovative concepts
  - DeepTrek

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Elements of DOE's Oil and Gas E&P R&D program that are drawing to a close include projects related to advanced diagnostics and imaging, as well as drilling, completion and stimulation. Some notable successes were in the areas of Advanced Seismic Imaging and NETL's Deep Trek Program that focused on technologies to improve drilling capabilities in deep, harsh environments.

## Hydraulic Fracture Mapping

*Pinnacle Technologies*

- **Objective: Develop and test an advanced hydraulic fracture mapping system with improved instrumentation that combines seismic sensors and tiltmeters in one tool**
- **Accomplishments include:**
  - Completed field test of combined microseismic mapping (geophone)/tiltmeter
  - Good data sets gathered and tool survived hydraulic frac treatment while placed in treatment well.
  - Performed long term test in San Andreas Fault Observatory at Depth (SAFOD) well
  - Technology commercialized (2007)
- **Single observation well reduces costs**
- **Extends capability of the most advanced technology for optimizing hydraulic fractures**
- **Will help optimize recovery from unconventional resources critical to meeting gas demand**

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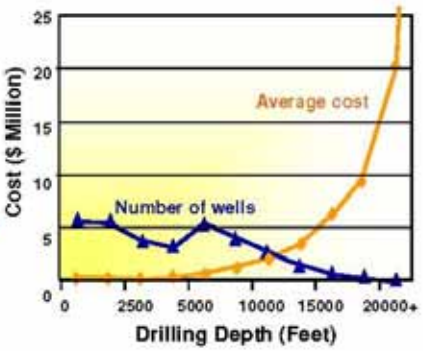
For example, characterizing the actual shape and location of hydraulic fractures has been a goal of NETL research in studies as far back as the 1980's. These efforts have provided important scientific insights that led to the development of technologies such as fracture mapping, a method that has been commercialized by Pinnacle Technologies. This technology records the microseismic events that take place during a hydraulic fracture treatment and maps the shape and orientation of the created fracture – critical information for optimizing stimulation treatments and maximizing gas recovery.

More recently, DOE and Pinnacle have successfully teamed to improve on this technology by testing a tool that combines both seismic sensors and tiltmeters, another approach for detecting how an hydraulic fracture is developing, using a single observation well. Because fracturing is a critical component of unconventional gas well success, technologies like this will be key to increasing the domestic unconventional gas contribution to U.S. gas supply, particularly gas from tight formations.

## Deep Trek Program
### *Tools for Extreme Environments*

- **Objective: Develop tools and technologies to enable drilling in hard rock and extreme (HT/HP) environments**
- **Program launched with Workshop in March 2001 and project awards followed in 2002-03-05-06**
- **Significant accomplishments:**
  - HT electronics (Honeywell, OSU)
  - HT/HP MWD (Schlumberger)
  - Super cement* (CSI Technologies)
  - Downhole vibration monitoring & control (APS Technology)
  - Deep EM telemetry (E-Spectrum) **
  - Other technologies underway:
    HT Battery and downhole turbine generator

*Meritorious Engineering Award at 2007 OTC
**Commercialized in 2007

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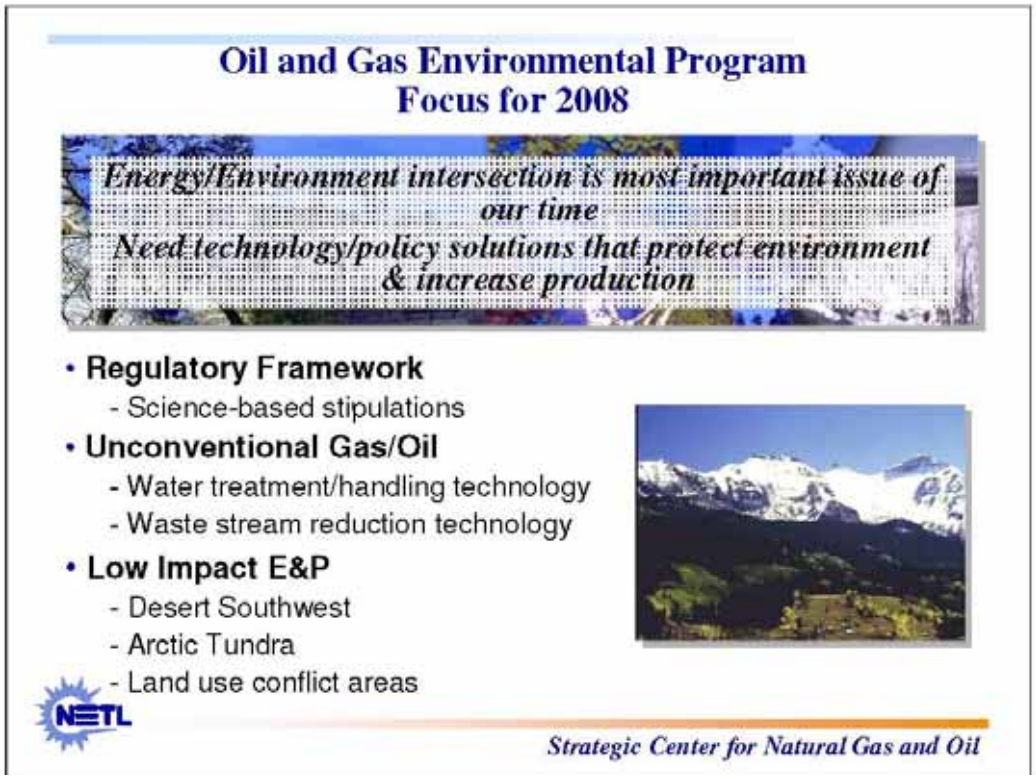
The Deep Trek Program resulted in development of some of the first leading edge systems for improving drilling efficiency in high pressure, high temperature (HT/HP), hard rock environments. Deep wells are expensive, with costs rising exponentially as wells go below 15,000 feet.

The Program's success is reflected in CSI's Super Cement receiving a Meritorious Engineering Award at the 2007 Offshore Technology Conference; and in the successful commercialization of E-Spectrum's Deep EM Telemetry system in 2007.

A major focus of this program has been the development of high temperature electronics. Many of the projects awarded have either been completed or will be completed in 2008. These include a series of prototype high-temperature tolerant electronic components that were identified by industry as being critical to cost-effective deep drilling. These include a re-configurable processor for data acquisition (RPDA) compiled of a field-programmable gate array (FPGA), a high-temperature electrically erasable programmable read-only memory (EEPROM), and other high-temperature tolerant components. Other projects focused on improving the performance of downhole batteries operating under high temperatures




DOE/NETL's Oil and Gas Environmental Program provides technology and policy solutions for the environmental issues that limit domestic production. It is one element of the traditional R&D program that will continue to be a focus of effort during 2008.

DOE/NETL is working with BLM to speed access to leased sites and to remove any unnecessary environmental restrictions by applying sound science during the development of regulations. DOE/NETL has established a formal Technology Partnership with BLM and the Secretary of the Interior has appointed an NETL scientist to the National Petroleum Reserve – Alaska Research and Monitoring Team.

Increasing amounts of unconventional natural gas will be needed to meet the Nation's energy demands and much of this resource is found on Federal lands. Some of the major barriers to fully developing these resources are environmental issues. For example, two significant obstacles for coalbed natural gas (CBNG) development are dealing with the large volumes of produced water and overcoming inaccurate public perceptions about the environmental effects of CBNG. NETL is pursuing low cost water treatment options and evaluating the environmental effects of surface discharge.

The push for development of domestic resources, particularly unconventional gas that requires close spacing, has resulted in an unprecedented number of wells being drilled. It is currently estimated that over 24,000 gas wells per year will need to be drilled to maintain the current level of production decline. NETL technologies such as coiled tubing drilling and environmentally friendly drilling systems have the potential to minimize the environmental footprint of domestic resource development.

## DOE Success: Membrane Filtration Technology for Treatment of Produced Water

*Texas Engineering Experiment Station*

**Goal**

- Develop portable reverse osmosis membrane filtration technology for produced water

**Accomplishments**

- The desalination technology has been commercialized through GeoPure Water Technologies.
- System will process 20 gallons per minute of feed water

**Benefits**

- Reduces disposal costs by 75%
- Provides fresh water for beneficial use

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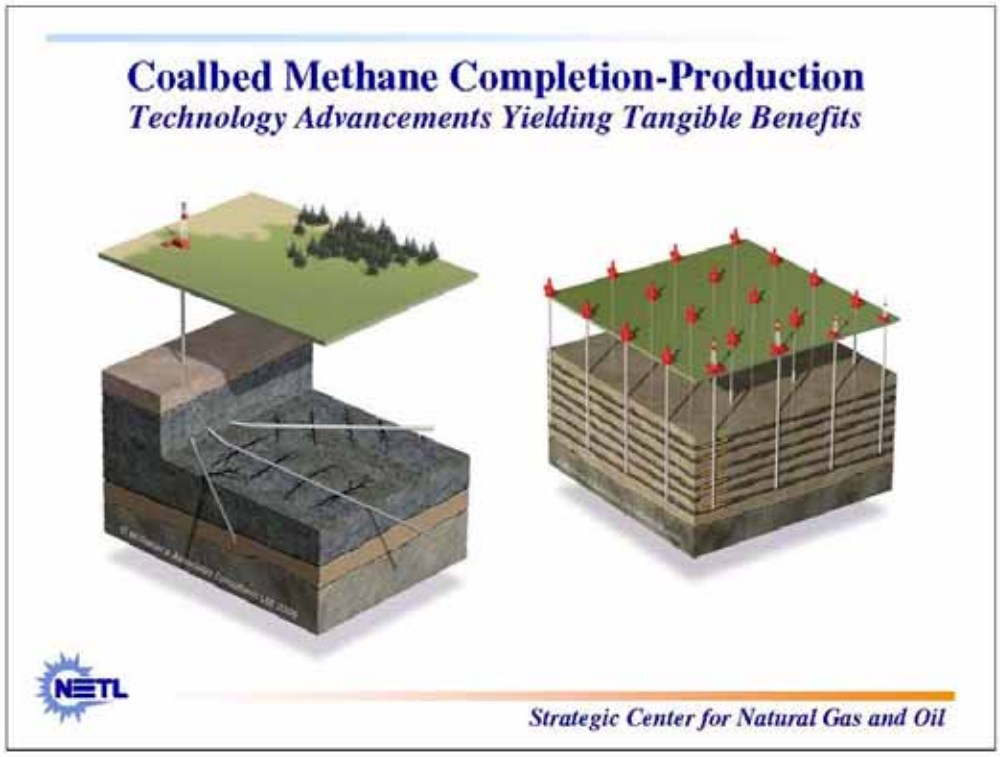
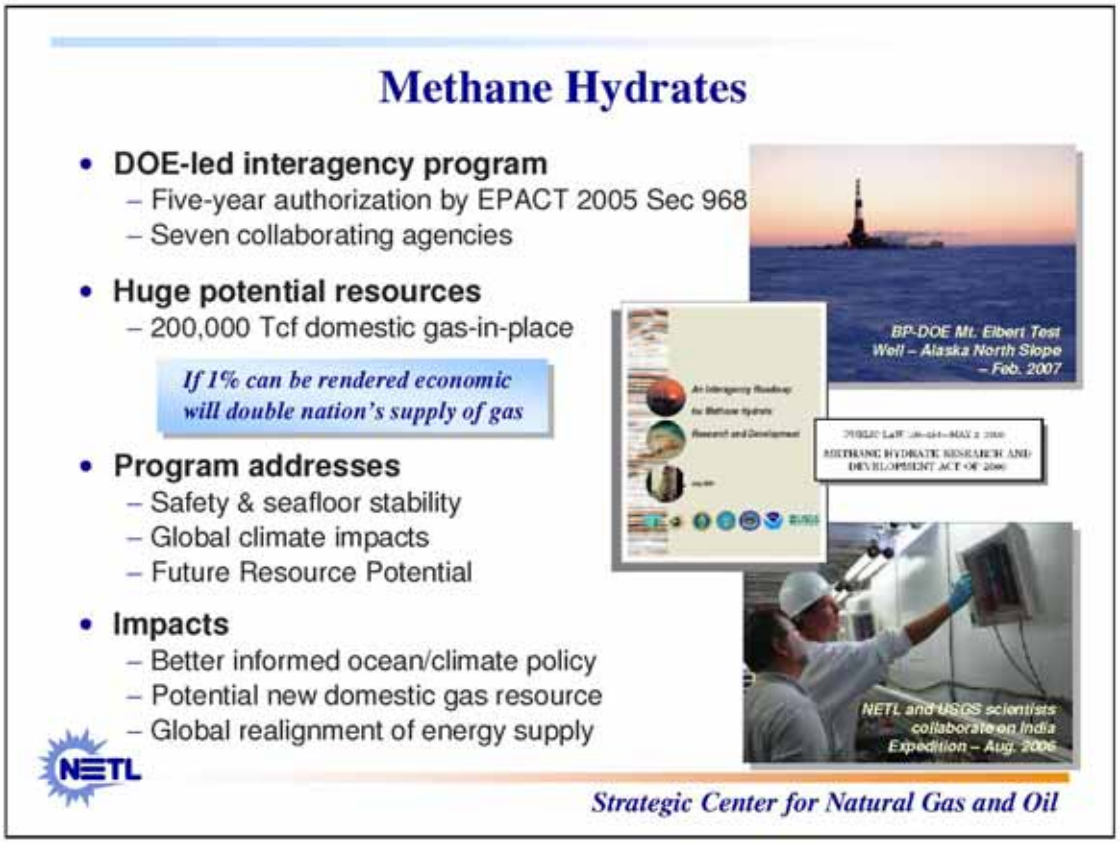
In one example, DOE has been working with the Texas Engineering Experiment Station (TEES) at Texas A&M University to develop an improved reverse osmosis (RO) membrane filtration technology for treating produced water. The desalination technology developed through the project has been licensed to GeoPure Water Technologies, LLC. GeoPure has commissioned a larger-scale mobile unit designed for delivery of 20 gallons per minute (gpm), or approximately 450 barrels per day, to be used in field operations. This technology represents some of the latest, leading edge research in desalination and beneficial reuse of produced water.




Two approaches to increasing the productivity of coalbed natural gas include the drilling of multiple horizontal laterals from a single vertical wellbore (with multiple fracture treatments), and multiple completions of stacked thin coal seams in a single well. Such technologies can help to increase the recovery of natural gas per well bore, reducing the overall surface impact that results. Technologies developed during previous DOE programs (e.g., directional drilling tools, improved fracture treatment technologies, etc.) will continue to provide solutions to environmental challenges as the U.S. continues into the unconventional era of domestic resource development.




The methane hydrates R&D program is receiving increased amounts of attention as the potential for hydrates as a future source of methane and their role in global climate becomes better known. DOE serves as the lead agency in implementing an interagency (DOE, USGS, MMS, BLM, NRL, NOAA and NSF) national Methane Hydrate Research and Development Program.

The tremendous resource potential of natural gas occurring in hydrate form makes it an extremely attractive potential contributor to the US energy portfolio. Even if only 1% of the estimate volume of gas in place in domestic hydrates were to be economically recoverable, it would double the nation's gas supply.

The methane hydrate program addresses a variety of issues associated with hydrates, and offers the potential for significant impacts to global energy supply and understanding of global climate.


The program has evolved as the R&D undertaken has added to the knowledge base regarding methane hydrates. Early efforts under the hydrate program sought to develop a fundamental understanding of the nature and character of hydrates and the sediments in which they are found, including the potential hazards associated with drilling through hydrates. This foundation helped to carry the science forward into the current major field efforts aimed at evaluating resource potential.

At this point in time, some key successes include the development and successful application of a methodology for using seismic data to identify a hydrate prospect in the Arctic, development of a suite of tools for acquiring hydrate samples, robust numerical models for simulating the behavior of hydrates in sediments, and the establishment of an extensive network of international scientific collaborators.

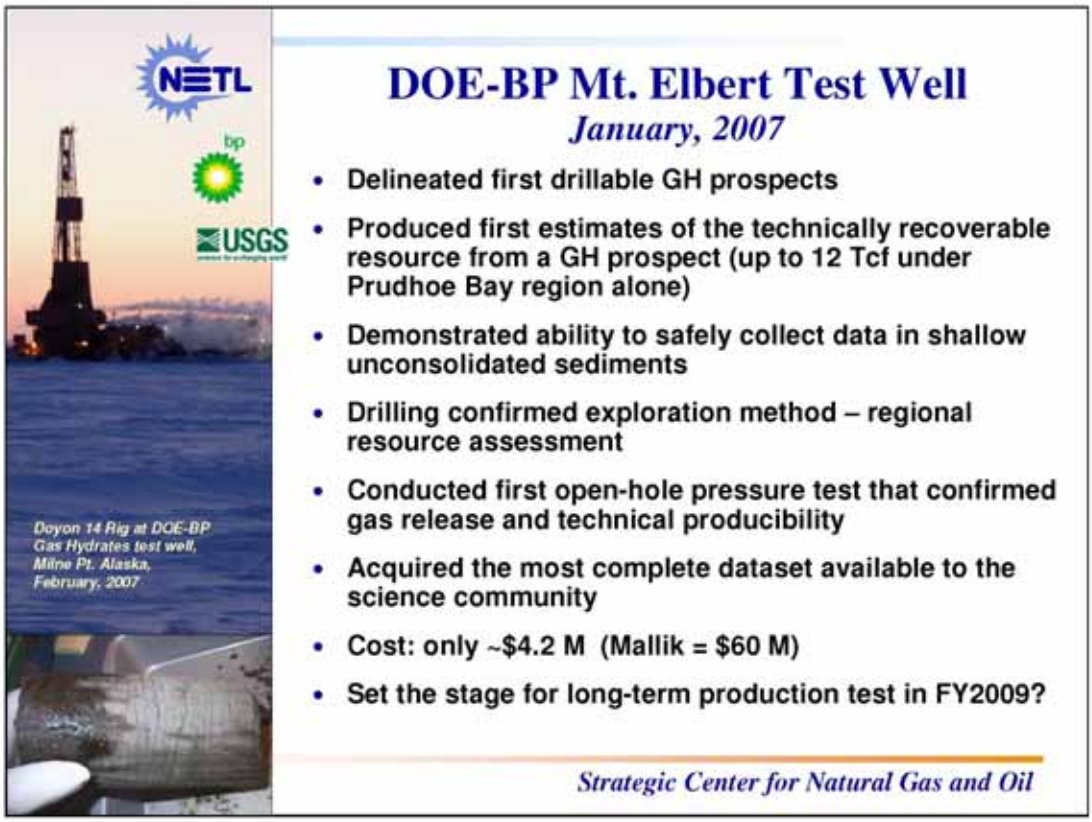

The current hydrate program includes major field programs in both arctic and marine (Gulf of Mexico) environments with concurrent pushes toward long term production testing in the arctic and enhanced resource assessment and hydrate detection/characterization methodologies in the Gulf of Mexico.

In addition to these field activities the current program continues to develop tools and modeling capabilities necessary to support continued advancement on program goals as well as fostering and participating in key international hydrate research collaborations.


The major field effort in the marine environment is being carried out via a broad industry / academia / government consortium operated under the DOE-Chevron Joint Industry Project (JIP).

Past JIP efforts have made important advancements in hydrate technology and have been able to characterize the risks to traditional O&G exploration in a typical GOM hydrate environment as being manageable.

The current field program is aimed at characterization of hydrates in coarse grained sediments through planned logging and coring efforts in the GOM with the intent of testing hydrate exploration techniques and tools as well as providing additional information for the estimation of the recoverable resource potential of marine hydrate. This program includes a 2008 expedition.




The major field effort in the Arctic is being carried out via a cooperative agreement between BP Exploration Alaska and DOE with supporting activity by industry, government and academia.

Efforts in past years resulted in development of a multidisciplinary approach to hydrate characterization (geology / geophysics) which allowed an estimate of technically recoverable hydrates on the Alaskan North Slope (ANS) and the high grading of potential occurrences of methane hydrate deposits in higher quality reservoirs.

Recent efforts built on that characterization led to the drilling of a stratigraphic hydrate test well (the Mt. Elbert Prospect) within the Milne Point Unit, ANS. The successful test confirmed both the exploration methodology and the regional hydrate assessment. The open hole pressure test confirmed the potential for hydrate produceability and the well generated the most complete arctic hydrate data set currently available to the international hydrate research community.

Perhaps most importantly, the test has set the stage for a potential longer term arctic hydrate production test in the near future.


Section 999 of EPACT 2005 established the Ultra-deewater & Unconventional program. The $50 million comes from the Royalty trust fund and not from appropriated funds. 75% of the money is allocated for the consortium work and the remaining 25% is for complementary research at NETL.


The contract for the entity selected to administer the consortium-based portion of the program, the Research Partnership to Secure Energy for America (RPSEA), was awarded at the beginning of last year. The annual plan developed by NETL, based on the inputs from RPSEA, was approved August 1, 2007 and the funds for the first year were received in the fall of 2007.

The RPSEA administered R&D will be focused on three areas: Ultra-deepwater, unconventional gas, and technologies for small producers. The complementary R&D plan carried out at NETL will focus on four areas: extreme drilling, unconventional oil and EOR, environmental issues, and resource assessment. NETL is also tasked with analysis of the public benefits that can be expected to accrue from the R&D investment under this program, a role that will be filled by the Office of Systems Analysis and Planning.


The first solicitations released by RPSEA for the 2007 program, for the Small Producer and Unconventional Resources elements, were published in October 2007 and closed in December 2007. The proposals received from these RFPs were reviewed in January and project selections are being made.

The first Ultra-Deepwater solicitations were published in November 2007 in two sets, and closed in December 2007 and January 2008. Not shown here are an additional 5 Ultra-Deepwater RFPs which will be released within the next month.

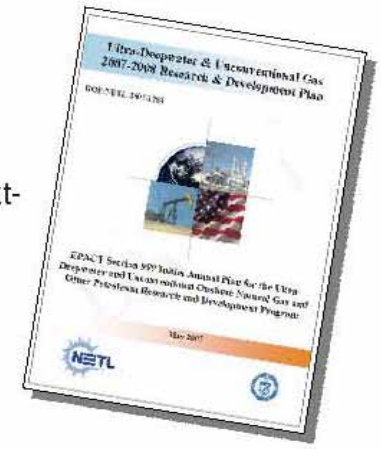

NETL and RPSEA have been very busy since the last Federal Advisory Committee meetings held during July 2007 in Washington, DC and Houston, TX. NETL and RPSEA worked closely together to complete the accomplishments listed. The first 2 accomplishments were significant as they were requirements of the RPSEA contract with DOE and needed to be completed prior to RPSEA releasing solicitations and making awards.


In early 2008, RPSEA will be focusing on completing the project selection process based on the responses to the 2007 and early 2008 solicitations, and negotiating and awarding contracts with the selected performers. Following this, RPSEA will carry out new solicitations for Small Producer and Unconventional Resources program elements, in an effort to fill in R&D gaps and meet the overall program objectives stated in the Annual Plan. RPSEA will also continue on the track set by the 2007 Plan and restated in the 2008 Plan.

## NETL Complementary R&D

### *Program Philosophy*

- **Conduct unique, high-value, non-duplicative work under EPACT Section 999**
- **Coordinate with RPSEA & traditional program**
- **Focus:**
  - Fundamental science
  - Long-term research providing basis for next-generation technologies
  - Unbiased environmental science
- **Technical areas:**
  - Drilling under extreme conditions
  - Environmental impacts of oil & gas development
  - Enhanced & unconventional oil recovery
  - Oil & gas resource & technology assessment
- **Conduct annual merit review**

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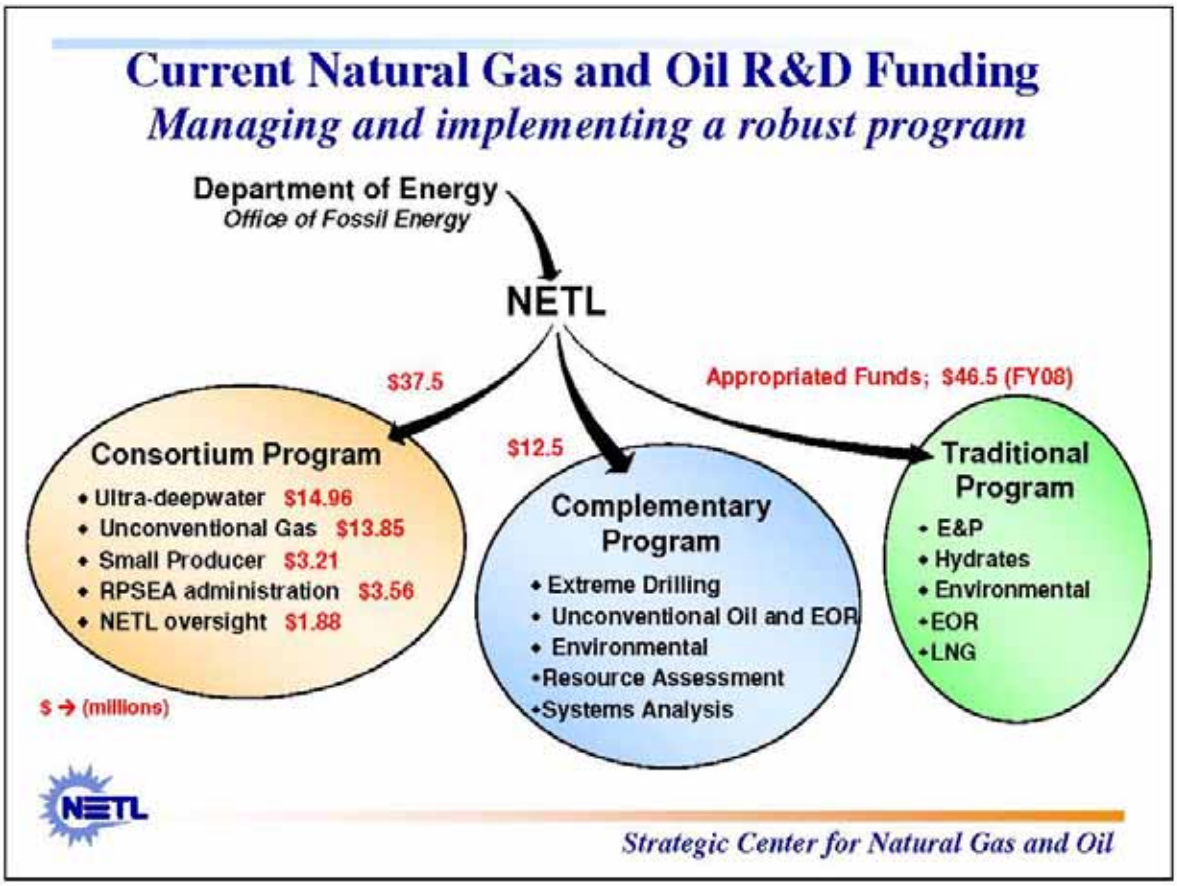
The NETL Complementary Program receives 25% of the funding provided under Section 999. The program has 4 technical areas and will generally have a more long-term focus than the Consortium-administered R&D.




Funding for all three of these areas flows from DOE to NETL.

## FY08 Activities Summary

- Gas hydrates solicitation
- EOR & environmental solicitation
- Implement congressionally directed projects
- Management/oversight of program consortium
- Complementary program execution
- Completion of prior year(s) R&D

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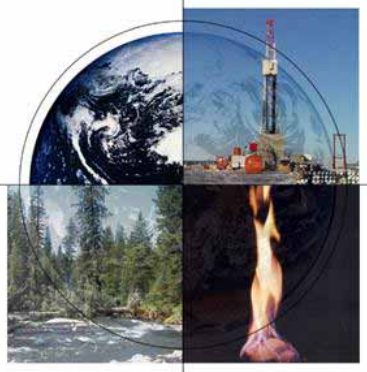
During FY08 NETL will carry out two solicitations: one for gas hydrates and one for EOR and environmental R&D. NETL will also implement the Congressionally directed projects, oversee the execution of the consortium-administered program, and carry out the complementary R&D described earlier. During 2008, NETL will also complete a number of projects from the traditional R&D program that remain from prior years.


For additional information please contact Brad Tomer or visit the NETL and Fossil Energy websites.

Attachment 4B

# US Dept of Energy Oil & Gas Research



*Ultra-Deepwater Advisory Committee Recommendations - 2007 Annual Plan*

*Brad Tomer, Director*

*Strategic Center for Natural Gas & Oil*

*January 30, 2008*

National Energy Technology Laboratory

Office of Fossil Energy

# Federal Advisory Committee Recommendations for 2007 Draft Plan

- All recommendations were accepted
  - Incorporated into the final 2007 Annual Plan
  - Addressed in an otherwise appropriate manner

- This review is designed to briefly re-state summarized recommendations and DOE's response. Detailed discussions should be deferred until later in the day.

# Ultra-Deepwater Advisory Committee Sub-Groups

- R&D Theme Content
- Solicitation Process
- Environmental
- Access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# UDAC Recommendations for 2007 Plan

- **R&D Theme Content**
  - Increase emphasis on Drilling and Completion; emphasize initiatives to reduce D&C risk and increase technology effectiveness (D&C topics were included in the 2007 solictations)
  - Emphasize R&D to achieve major breakthroughs, i.e., Grand Challenges (Three 2007 projects addressed Grand Challenge theme)
  - Consolidate number of themes (Identified projects have been categorized into 5 development and operation challenges in the 2008 Plan)
  - Increase emphasis on long-term versus short-term priorities (2007 Plan has a significant portion dedicated to long-term priorities, particularly the Complementary Plan. NETL has final approval of all awards and will make every effort to ensure this happens.)
  - Increase emphasis on applied science vs. product development (Several projects identified for 2007 and 2008 focus on applied science)
  - Prioritize on cross-cutting technologies vs. field-specific (13 of 17 projects identified for 2007 fall within the croscutting categories)
  - Select projects with broad industry support early in R&D process (All projects ideas selected required a majority vote of approval from the 11 operators in the RPSEA UDW PAC)

# UDAC Recommendations for 2007 Plan

- **R&D Theme Content (cont'd.)**
  - Under the met-ocean theme, structure initial projects to achieve broad support (One Met-ocean project has been identified in 2007 and 2008)
  - Under the resource potential characterization theme, develop projects that build on past studies with objective of documenting potential to add new resources not currently open for access (NETL Complementary work will include R&D that will focus on studies that are in the national interest)
  - Establish more aggressive targets for resource capture (Target was increased to 2% and could increase in future years based upon Complementary systems analysis work)
  - Define leveraging technologies applicable to regions currently under access restrictions and potential resources obtainable (Addressed in 2007 Plan; DOE will work with MMS, Industry and other organizations to identify regional impacts)

# UDAC Recommendations for 2007 Plan

- **Solicitation Process**
  - Target R&D projects likely to achieve significant increase in value through cost reduction and technology effectiveness; select less than ten projects (Majority of projects identified are focused on larger, high value projects)
  - Develop specific metrics for monitoring probability of project success (Stage/Gate process will be used to increase probability of project success)
  - Design solicitation process to direct project ideas toward development of technologies that will have highest impact (Included in RPSEA process, only highest priority project ideas included in RFPS for years 1 & 2)
  - Develop factors for proposal selection that include potential size of payout and probability of success (These factors are included in the RFPs evaluation critieria)
  - Only issue RFP's for projects where RPSEA intends to award a contract (All RFPs will have an award)

# UDAC Recommendations for 2007 Plan

- **Solicitation Process (cont'd.)**
  - Replace completed projects with pre-approved projects (Annual Plan will be updated and reviewed each year, project gaps will be identified and solicitations focused to fill the gaps)
  - For those R&D project proposals that are not selected, include them in public record for potential funding by other agencies (DOE will release information as allowed under procurement regulations)
  - Place more emphasis on R&D related to development of UDW discoveries (All projects identified are related directly ot indirectly to ultra-deepwater field development)
  - Clearly state intellectual property and technology rights in RFPs (Addressed in RPSEA solicitation documents)

# UDAC Recommendations for 2007 Plan

- **Environmental**
  - Update existing studies with benchmarks by industry to reduce risks due to blowouts; prepare a grassroots study of environmental impacts of GOM infrastructure losses due to recent hurricanes; prepare a peer-reviewed analysis that demonstrates that UDW development can be managed at acceptable risk levels (Will be addressed in future plans)
  - All funded proposals should include an assessment of potential benefits/impact of technology; both those related to the research itself and the wider application of the developed technology (Will be addressed as a task and deliverable for each selected project)
  - Expand knowledge base in the deepwater met-ocean area (Met-ocean is a high priority theme area in the 2007 Plan and a project is scheduled for both 2007 and 2008)

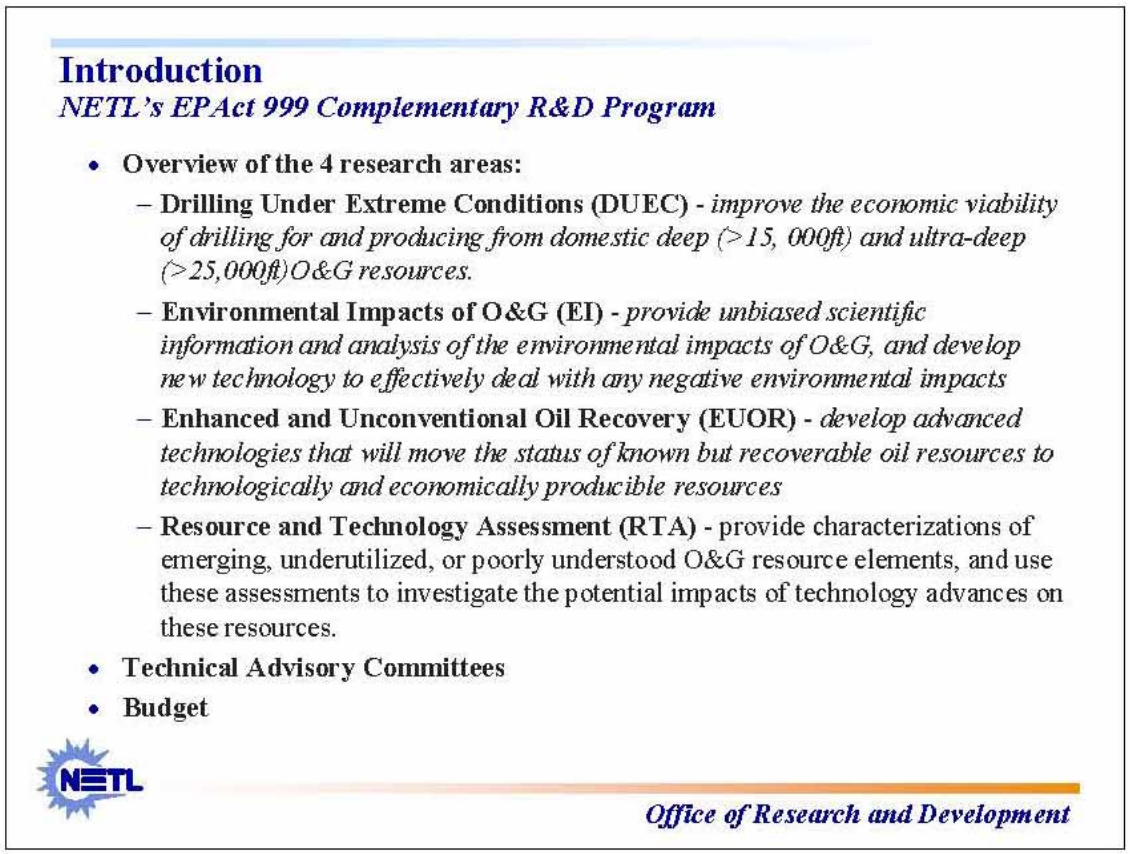
# UDAC Recommendations for 2007 Plan

- **Access**
  - Assess applicability of all developed technologies to areas of offshore that are currently restricted, with estimates of potential increases in reserves from those areas (Taken under advisement. DOE will work with MMS and other organizations upon this item)
  - (Minority Report) Initiate policy efforts that recognize growing need for domestic energy supplies and work to widen resource development in restricted areas; provide special expedited access for R&D demonstration projects in such areas; DOE to initiate an "Experimental memorandum of understanding" with DOI to implement expedited temporary access for R&D purposes (DOE-FE HQ to initiate discussions with DOI and other organizations on this item)

Attachment 5

Attachment 6


Jamie Brown was unexpectedly unable to be with us today.

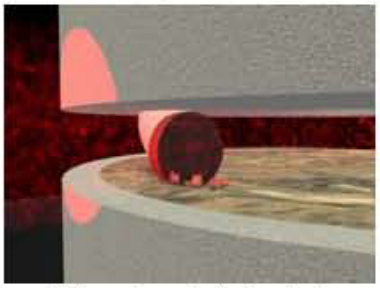



•The complementary program focuses on the fundamental science and engineering building blocks to advance the exploration and production technologies necessary to aid in the transition of the vast and currently uneconomic resources to commercially viable supply sources.

•The Earth and Minerals Sciences Division of NETL's Office of Research and Development has primary responsibility for the implementation this program's research. However, the effort is supported by 5 other ORD divisions.

## Drilling Under Extreme Conditions

- **Extreme Drilling Laboratory (EDL)**
  - One-of-a-kind research facility
  - Ultra-deep single cutter Drilling Simulator (UDS) via cooperative agreement with TerraTek
    - recreates bottom-hole drilling environments of ultra-deep wells, mud lab and rock lab
    - operation at up to 30 kpsi and 480 °F
    - operates with "real" drilling fluids
    - sophisticated X-Ray video system that takes images of cutting at down-hole conditions



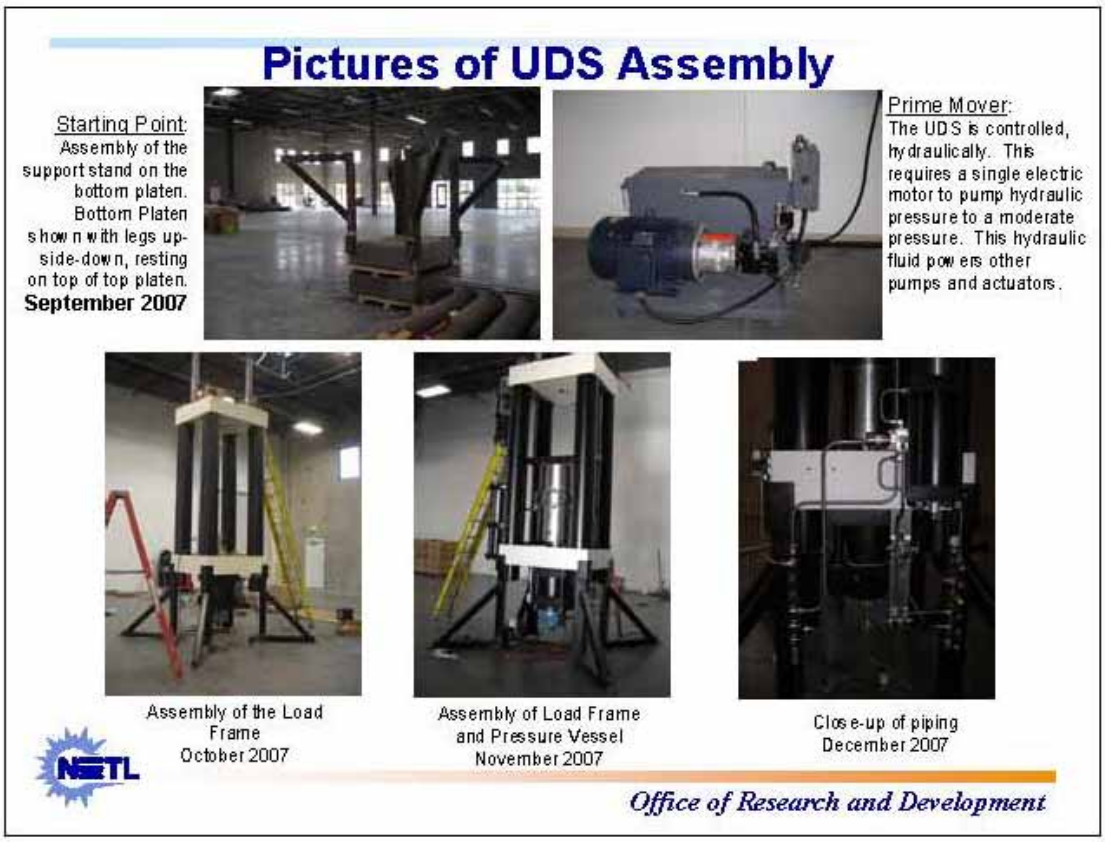
- **Numerical Modeling**
  - Modeling rock and drill cutter behavior under HPHT conditions to explain/predict rock response to various drilling modes
    - rock strain during cutting
    - formation of shear bands
    - influence of fluids in rock pores
  - Input to UDS test plans as well as back-analysis of UDS experiments

NETL

*Office of Research and Development*

EDL:

- UDS Assembly Milestones
  - Piping with hydraulic fluid flow circulation 1/29/08
  - HP Piping, Heaters, and instruments – 3/1/08
  - Proof (hydro) Tests of vessel and piping – 4/1/08
- Delivery of UDS to NETL
  - In Transit – July 1-14
  - Setup on NETL property – July 14-28
  - Pressurized Component Testing – Aug 1-10
  - Shakedown – Aug. 10 to Sept. 30
- Modeling – 2nd year of effort
  - Initial FLAC3D Model Runs:
    - Models a UDS Experiment simulating geometry, contact interface, axial load, tangential load, and mechanical loads at the cutter
  - Methods proposed to incorporate rock strength properties in FLAC3D as a function of pore pressure
  - New mathematical models are being developed to show rock material deformation that is sensitive to loading rates and material defects (expressed in terms of volume void fraction)
  - When modeling shear via continuum models, commercial models produce discontinuities in results that are grid-size dependent (meaning that results are not reliable predictors of reality – *This project seeks to improve this circumstance)*




Starting in top left-hand corner and moving counter-clockwise:

*Top Left*: Picture shows the starting point of the assembly. More specifically, the UDS support legs are attached to the bottom platen and sown up-side-down on top of the upper platen.

*Bottom Left*: The platens are now shown in beige and the Load Frame Columns (painted black) are now shown assembled. The load frame contains the thrust load generated at each head of the pressure vessel. (Fluid pressure multiplied by x-section area is approximately 2 million pounds, applied to each the top and bottom, resulting in 4 million pounds of tensile load. Since the load frame carries this entire load, the pressure vessel only needs to be subjected to fluid pressure containment.)

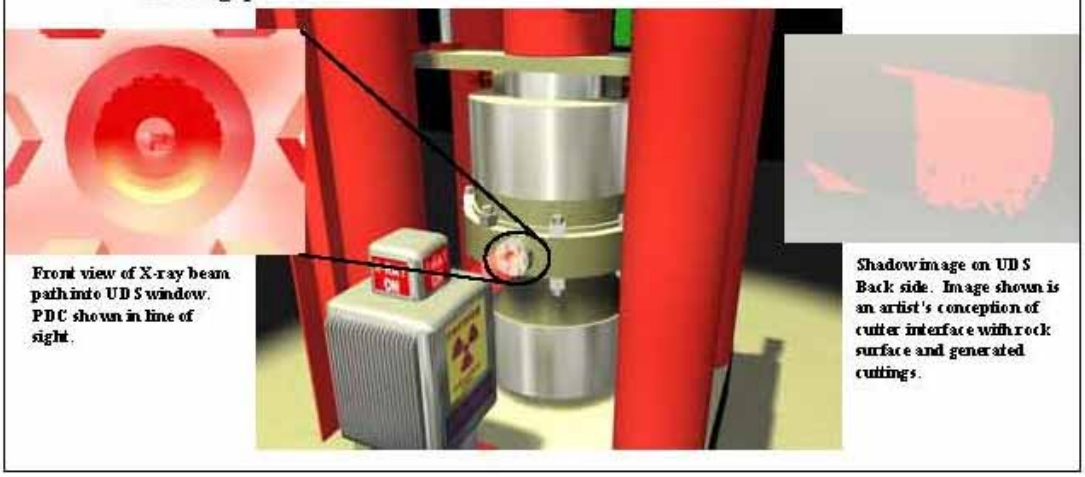
*Bottom Center*: The UDS Pressure Vessel is shown in the center of the load frame. A reaction column (not shown) will be installed on hinges and will transmit load to the top platen.

*Bottom Right*: Hydraulic fluid lines are shown that will power and control the charge pump (shown, painted black, in upper right of photo), circulation pump (not shown in photo), shaft motor (shown in photo, painted light blue) and actuator (painted black, directly above shaft motor).

*Top Right:* Hydraulic pump (nothing fancy about it) generates pressure in the hydraulic fluid system. These hydraulics provide all power and control to the Drilling Fluid system. Point out that these are two separate systems that do not mix. Hydraulic Fluid System operates near 3,000 psi whereas the HP System operates up to 30,000 psi.

## Role of X-Ray Visualization

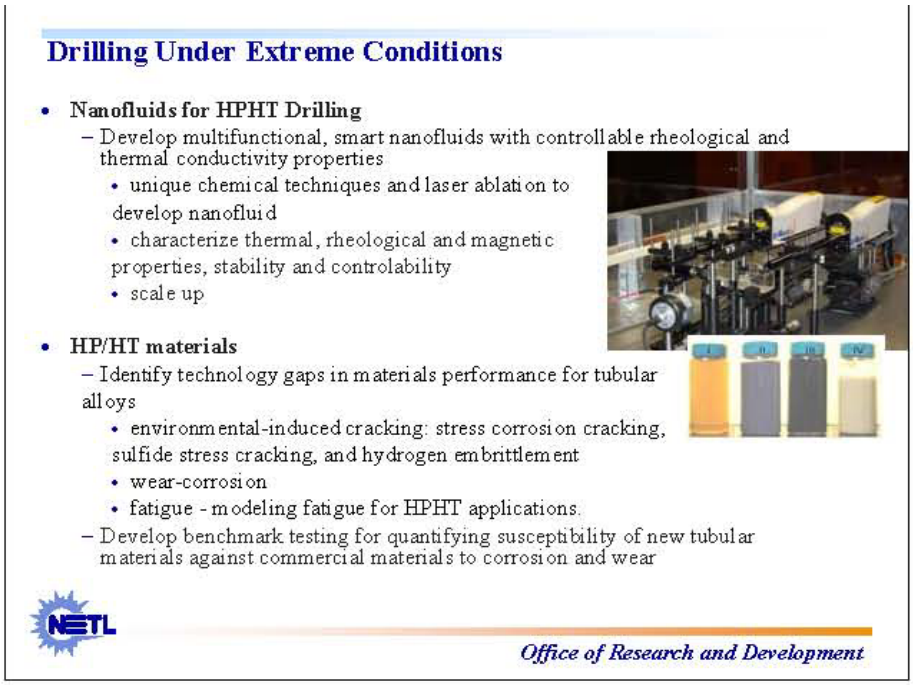
- **Visualization provides**
  - Specifics on rock deformation & strain as cuttings form
  - Shape of rock cutting as it forms
  - Evidence of how test parameters (e.g. fluid properties) change cutting process



Front view of X-ray beam path into UDS window. PDC shown in line of sight.

Shadow image on UDS Back side. Image shown is an artist's conception of cutter interface with rock surface and generated cuttings.

Visualization is accomplished by using X-Ray video. Separate project is funded via IAES for "3D Reconstruction and Image Enhancement" which may make this visualization more functional in future. The UDS will also have internal instruments to measure forces and strains of the test specimen.




Nanofluids for HPHT Drilling

The goal of this NETL research, is to create a new drilling fluid system with novel drag reduction, binders, weighting agents and components that are compatible with reservoir fluids, environmentally friendly, functional, and smart in that its thermal and rheological properties at any location can be controlled using an external field by the drill operator. The following activities are being conducted:

- Synthesis of multifunctional, smart nanofluids:

Magnetic nanofluids will be created using our existing laser ablation in liquid apparatus. Nanoparticles of magnesium, calcium, polymers such as polyvinylpyrrolidone (PVP), magnetic particles of ferromagnetic materials such as iron, nickel, and cobalt will be used for this task.

NETL studies on laser ablation nanofluids have shown that using multi-pulse laser ablation in liquid approach, we have generated various samples of silver-deionized water nanofluid with particles of sizes mainly in the range of 20 to 30 nm. These samples were stable for several months without the need of using dispersants or surfactants. Thus, multi-pulse laser ablation in liquid is a promising technique for generating stable nanofluids with enhanced transport properties. The technique, however, has a low production rate. Further studies on improving the production rate for scaling up production are necessary..

- Thermal, magnetic, and Rheology of multifunctional and smart nanofluids

The rheology of nanofluids that are multifunctional and smart will be investigated using stress controlled rheometry. In this task, we will investigate the shear thinning behavior of these complex nanoparticle based dispersions. We will also investigate the behavior of these materials with respect to the thixotropic behavior. We will also study the effect of applied magnetic fields on this behavior and the controllability of the fluid rheological property.

- Heat transfer characteristics

Drilling process generates heat from mechanical and hydraulic forces at bit and when drill-string rotate and rub against casing and wellbore. Cool and transfer heat away from source and lower to temperature than bottom hole prevent drillstring and mud rotors from being overheated. Poor lubrication causes high torque and drag and deforms drillstring and bottom hole assemblies design. The ability of a fluid to cool and lubricate the bit and drilling assembly depends on the fluid flow during the drilling process. The fluid flow depends on the fluid transport properties. This task, therefore, investigates transport properties, friction coefficient, effective thermal conductivity and heat transfer enhancement of nanofluids and nanofluid transport down hole and in the annulus. This task will focus on the ferrohydrodynamic heat transport properties of the synthesized magnetic nanofluids.

- Nanofluid stability studies

Experimental and theoretical work to determine the stability against both sedimentation and flocculation of well-characterized nanofluids. Inter-particle interactions will be examined as a function of particle type, suspending liquid nature, pH, ionic strength and additives such as surfactants. The practical goal is to come up with a nanofluid that can be pumped through a flow loop without change in particle size or particle concentration.

HP/HT materials

The main goals of this task are to:

- Identify technology gaps in materials performance for tubular alloys in sour gas environments at high pressures and temperatures for extreme drilling applications.
- Evaluate tubular materials for resistance to:
  - environmental-induced cracking that including stress corrosion cracking, sulfide stress cracking, and hydrogen embrittlement
  - wear-corrosion
  - fatigue - modeling fatigue for HPHT applications.

These forms of degradation have been reported in literature and by industry as major problems for some tubular components, such as casing (stress corrosion cracking/ hydrogen embrittlement, sulfide stress cracking) and drill pipes (wear, fatigue). Therefore, new HP/HT materials, which will be developed under this project, must be resistant to corrosion, wear and fatigue.

- Develop benchmark testing for quantifying susceptibility of new tubular materials against commercial materials to corrosion and wear.


- PWMIS Progress:

  Transfer of PWMIS from ANL to NETL; up and operating within NETL's firewall; available to external sources in near future

  Solicited and received proposal for PWMIS upgrade with expert system

  Solicited and received proposal for cataloging environmental barriers to oil and gas production

  - Air impacts- current models and most regulations treat O&G emissions as if they were a single point source. In reality, they are numerous, small, widely dispersed sources. We need models and regs specifically for O&G.
  - Sub-surface drip irrigation task- This was ranked number one in a list of research needs composed by Wyoming DEQ and sent to Carl Bauer in a research request. Beneficial use of produced water (irrigation for crops). Produced water introduced at the base of the root zone where there is adequate Ca and Mg to offset the Na in the PW. Research will determine if practice will ultimately have a negative impact on soil productivity and underlying aquifers.
  - Wyoming Section 20- 2nd on Wy DEQ list. Provision allows CBM operators to discharge PW to ephemeral or intermittent streams if they can prove that the discharge will not reduce agricultural productivity. Currently, the water quality determination for a non-flowing stream is made by taking soil samples from the floodplain, leaching the sample, and determining leachate quality. We propose that helicopter electromagnetic surveys can provide better information more quickly and inexpensively.
  - Lidar survey- we will input very accurate topographic stream cross-sections from airborne lidar survey into a watershed management system developed by WVU (Round 4). Ultimately, this will be available on the web and will allow operators or regulators to add discharges at different points along a watercourse and predict if flooding or erosion problems will result.


Shale Task

- Shale Plays are important to the future of the US energy portfolio. For example, the Bakken Shale Play in the Wiiliston Basin is currently a very large resource with 200 to 40 billion barrerls of oil in place with a very active drilling program by a number of companies. The shale reservoirs are fractured and bounded by siltstone and carbonate formations that are also naturally fractured. Current recovery of OOIP is only one percent.
    - Significant resource
    - Limited recovery
    - Complex geology; naturally fractured, high pressure.
    - High cost $4 to $5 M per well.
- FRACGEN uses field data to characterize statistics of fracture network
- NFFLOWTM is a flow simulator for highly fractured reservoirs

Mobility Control

- An inherent disadvantage during CO2 EOR process is the low viscosity of CO2 relative to the oil in the reservoir. This leads to an unfavorable mobility ratio. One method to overcome this is to increase the viscosity of CO2 via a thickener. Enick et al., (U of Pitt) developed a CO2 thickener, polyFAST(fluoroacrylate-styrene copolymer) that proved the concept. However PoltFAST has the cost and environmental issues.
- The scope of this research is to decrease the mobility of CO2 via increasing of the CO2 viscosity and/or reduction of the CO2 relative permeability with inexpensive, non-fluorous, environmentally benign surfactants (such as viscosity-enhancing micelles in dense CO2 or surfactant will form CO2 foams in-situ as they mix with brine in the reservoir.)

Microwave Conversion

- The applicability of microwave radiation for pyrolysis of oils shales, i.e. microwave accelerated diagenesis will be investigated
- Detailed literature review is being conducted to clarify current understanding of kerogen physical & thermodynamic properties
    - Previous investigations of kerogen, bitumen, and viscous oil heating/pyrolysis using electromagnetic radiation.
- Design criteria for the microwave heating equipment will be developed and availability of suitable commercial equipment determined. Key types of analyses required to characterize the kerogen and products will also be identified.
- Design of a proof-of-concept test unit will be prepared and cost information obtained for major components including the analytical services or instrumentation required for kerogen & pyrolysis product characterization.
- Kerogen characterization. Samples of oil shales (tar sands) with differing characteristics will be identified and obtained for testing.
    - Existing supercritical fluid extraction unit will be set up for CO2 extraction of shale samples
    - Work with researchers at Penn State, to characterize the kerogen samples by nuclear magnetic resonance (NMR) relaxation techniques
    - Other relevant methods identified in the literature survey.


Reservoir Characterization

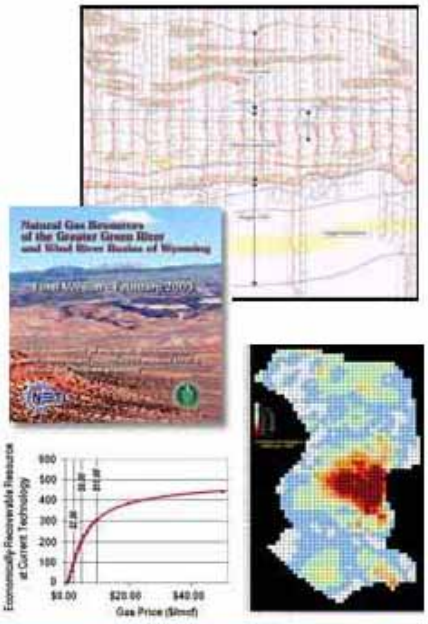
- There are a number of sites that will be accessed that have reports, maps, digital data and GIS files that are related to the oil shale and tar sand resources in the Piceance and Uinta basins of the western US. The USGS and BLM have a number of references that can be accessed online. It is intended to cross check the current bibliography with the industry reports stored at Colorado School of Mines to make sure a complete reference of historical research has been compiled on the current list. Further references may be available from the U of Wyoming and Utah as part of the studies DOE has funded through their research efforts on state specific sites.
- The database effort will compile the actual experimental data from the research reports to allow for a comparison of the various analytical methods utilized to evaluate the oil shale. This would include the methods for determination of oil/kerogen content and the results of pilot retort results including oil/kerogen products and spent shale analyses. Base lines for the several formations will be formulated and additional analyses are planned in the future to develop a better understanding of the distribution of elemental characteristics over the 200 to 300 feet of prime high content oil shale formation.
- It is further planned to create geological models of site specific research locations to allow for the quantification of kerogen in place and evaporites that may become an additional product from processing. The geological models will allow the evaluation of several well design geometries to determine if there are optimum horizontal and vertical well combinations that would benefit the in-situ retorting of the kerogen to produce shale oil.
- An integrated project is a goal that will utilize the results of the laboratory work from all of the UOEOR the tasks:
    - A major contribution to characterization of the oils shale deposits will come from the environmental task to characterize water issues related to oil shale resources.
    - Carbon dioxide foams, catalysts and thermal technologies to enhance the production of shale oil in these unconventional reservoirs and source rocks.
    - The GIS, Earthvision and reservoir modeling packages will contribute to the evaluation and design of production mechanisms and can crosscut to the other ORD projects that focus on the geological sequestration of carbon dioxide, and development of coal to liquids.
    - It is also anticipated that the laboratory expertise will be applied to the evaluation of oil bearing formations to improve the ultimate recovery of oil from tight fractured and sandstone formations where the heavy oils are trapped due to their high viscosity. The potential to produce large volumes of incremental oil with small increases in recovery make these efforts viable and they have a high probability of achieving success.

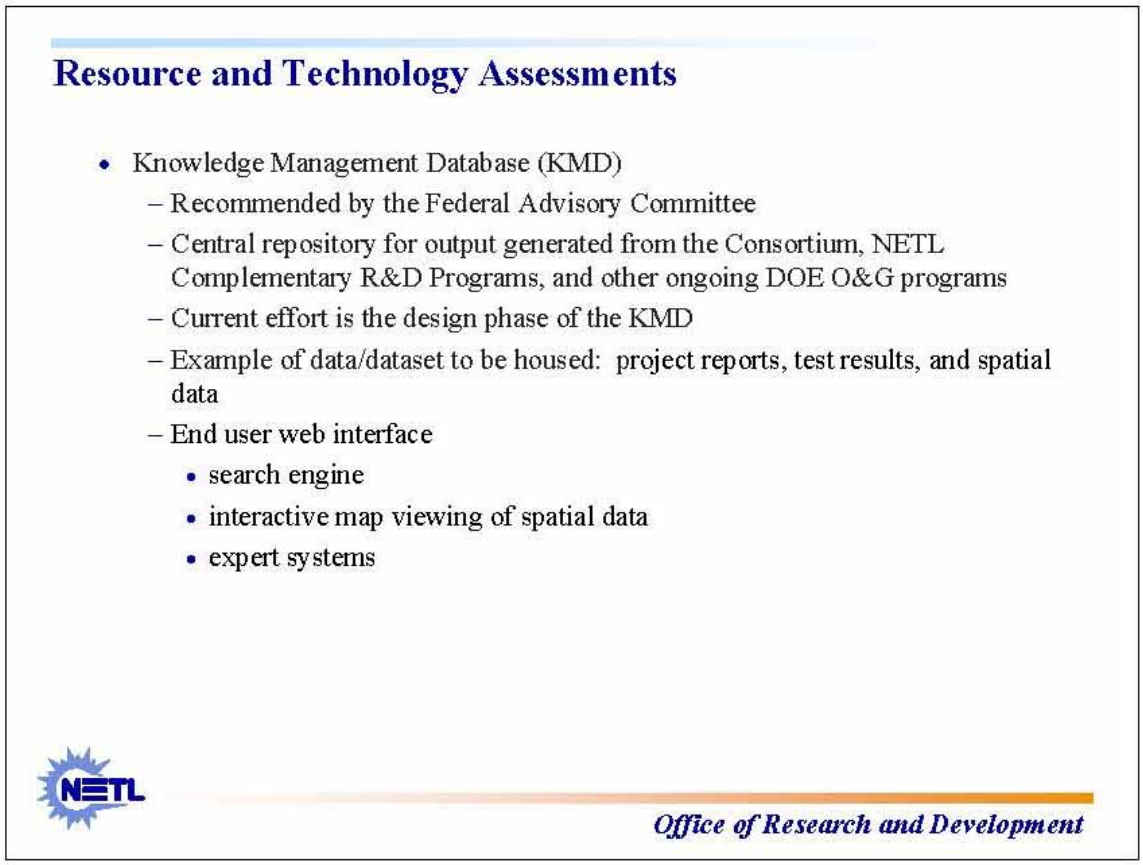
Catalyst Development

- The in situ production of oil from kerogen contained in oil shale followed by lifting the products to the surface is a very desirable process from an environmental point of view. The concept has been demonstrated, but significant yields generally require heating of the source rock for roughly 2 years before production is begun. However, it is of great benefit that the oil produced is of very high quality and needs only modest refining to obtain a useable fuel. This new project will explore means to reduce the time and energy required to achieve reasonable recovery of the resource. Dispersion of a catalytic agent within the low porosity oil shale is one of the major technical hurdles that must be overcome. This problem may not be solved, but a new approach now being developed in this project is to first allow porosity to be generated by the normal thermal production of oil. The residual and now coked kerogen is now a target for catalytic gasification. This method would recover additional carbon from the reservoir as methane, and take advantage of the heat remaining in the hot shale from the oil generation step. Process economics would then be improved.

## Resource and Technology Assessments

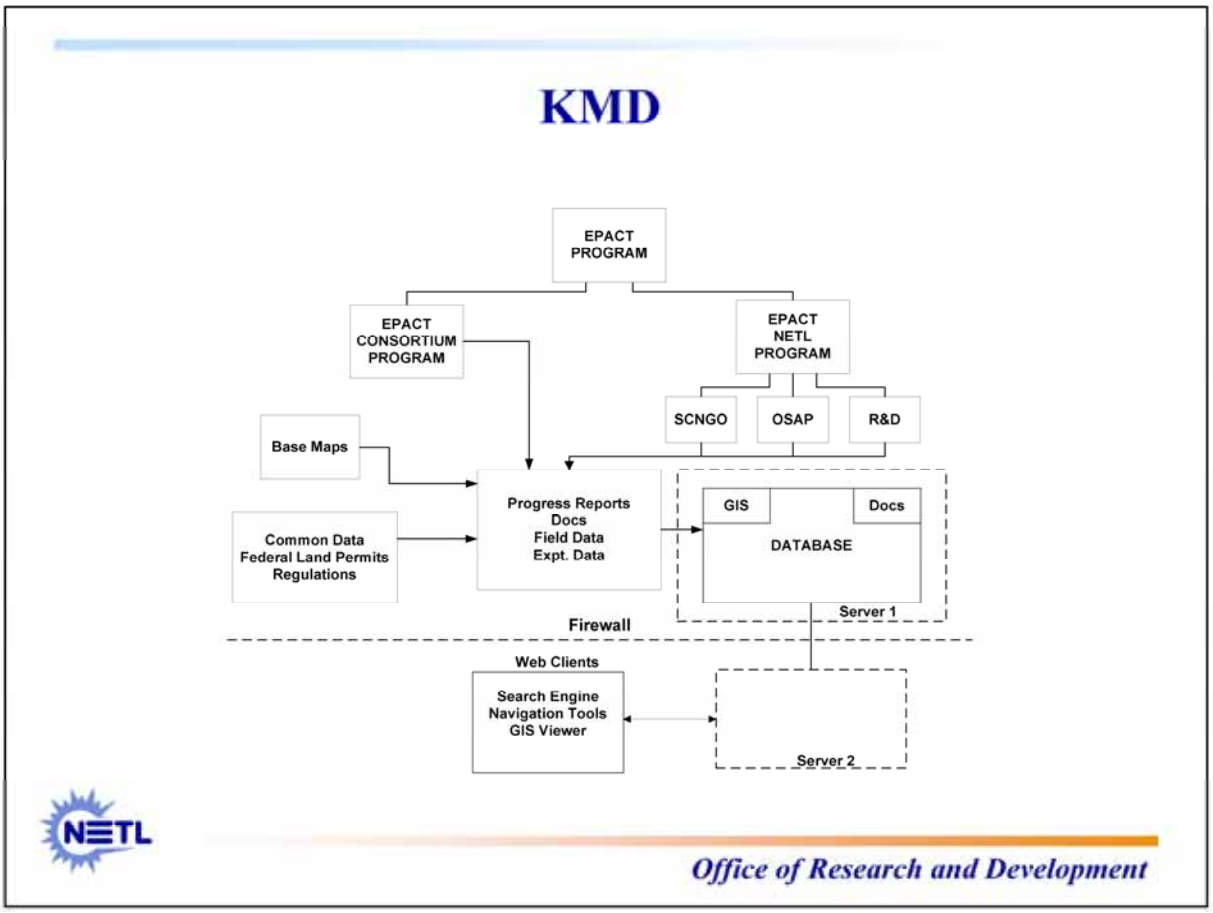
- Resource Assessment
  - Identify the most-promising resource elements for characterization within the Appalachian and/or other mature basins.
    - build on previous work that focused on Upper Devonian Reservoirs
  - Design and initiate a research effort in geologically-based resource assessments targeting the key plays identified above.
    - update USDOE 1992 Appalachian Assessment
    - final products (maps; cross-sections) will be available free on CD.






•The Knowledge Management Database (KMD) for the EPACT Program was conceived by the EPACT Federal Advisory Committee. The KMD will be a repository for the information generated from the EPACT Consortium, the NETL Complementary R&D Programs and other ongoing DOE Oil & Gas programs. Examples of relevant information include EPACT key personnel, project status, project milestones, project reports, test results, and spatial data.

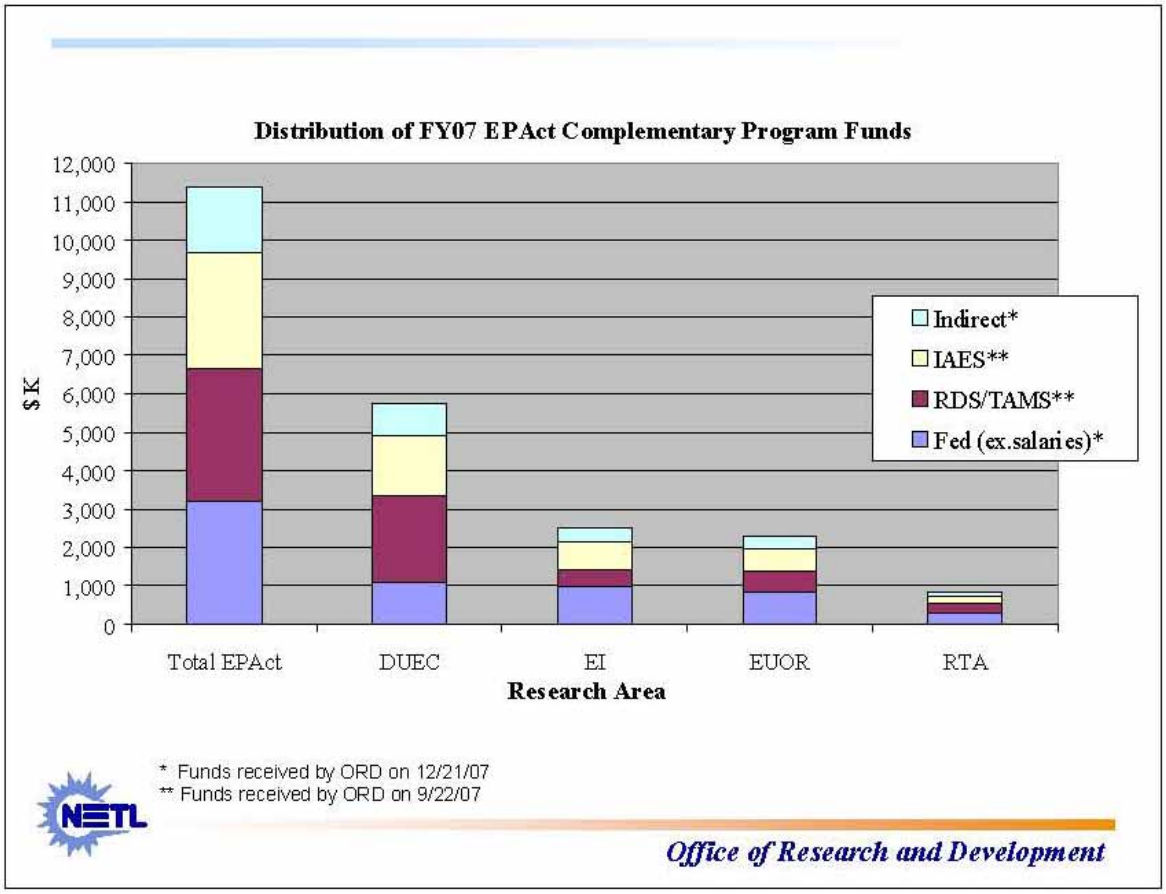
•The KMD will be delivered to registered users and the public via the internet. The initial design envisions a system which will provide the end user with navigation tools to help visualize the structure of the content, a search engine tool, interactive maps for viewing spatial data, and expert system tools for solving specific customer needs.




•The KMD task will collect information from the EPACT projects and design databases to hold the information. We will add support data, such as maps and relevant regulatory information. The initial design calls for 2 high performance servers, one located inside NETL's firewall and the other located outside NETL's firewall. The database will reside on the inside server. The outside server will deliver web content to the end users while communicating with the database on the inside server. This configuration will result in a more secure system.

## Technical Advisory Committee

- Assist NETL with planning and implementation of R&D program
  - Review progress, provide input to Annual Plan, and participate in annual merit reviews
  - Provide assessment of the complementary nature of the R&D program with the Consortium, the traditional program and OSAP
- Made up of four subcommittees
  - one for each research area
  - 3 to 4 members including industry and academia
  - The objectives of the subcommittees are to gather data, conduct analyses and develop recommendations for consideration by the full committee
- Status
  - Draft charter
  - Draft list of proposed members
  - Draft email to proposed members
- Cost
  - Estimated $100K/year


Distribution of FY07 EPAct Complementary Program Funds
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11,000
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Indirect*
IAES**
RDS/TAMS**
Fed (ex.salaries)*
Total EPAct
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EI
EUOR
RTA
Research Area
* Funds received by ORD on 12/21/07
** Funds received by ORD on 9/22/07
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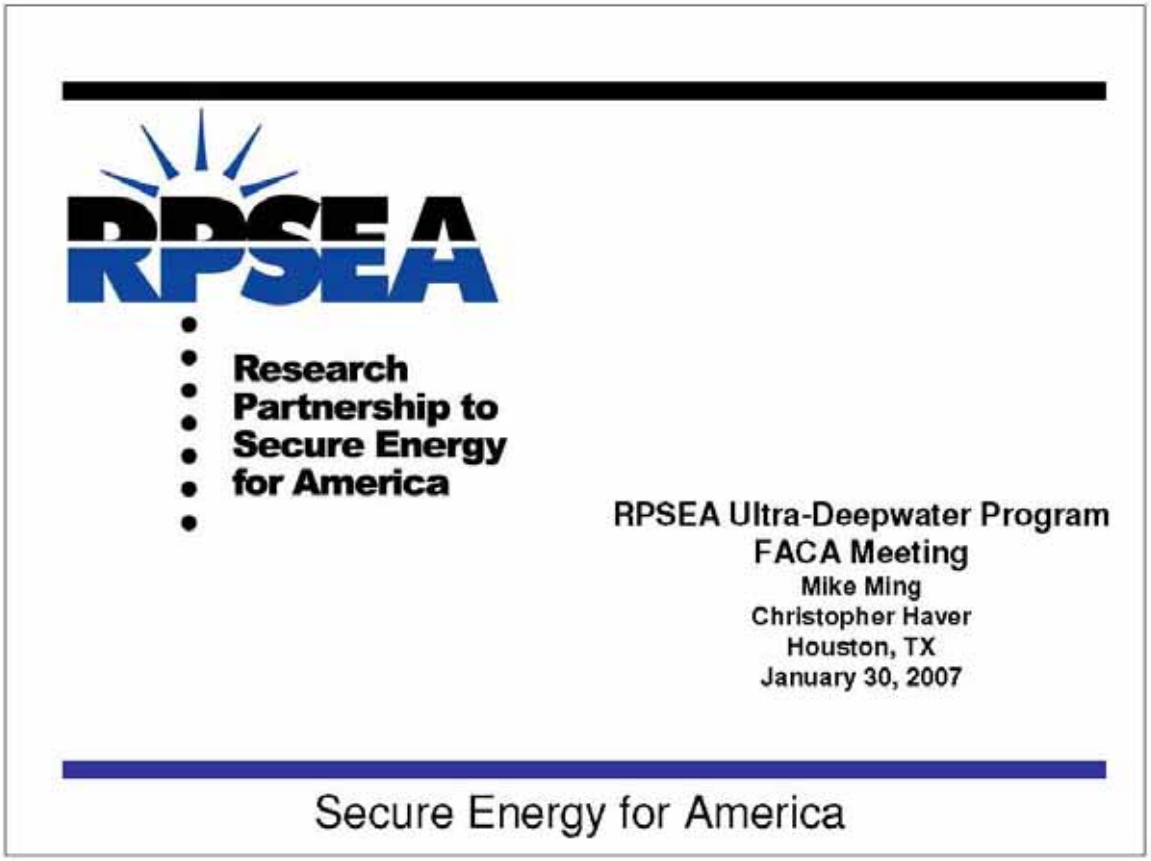
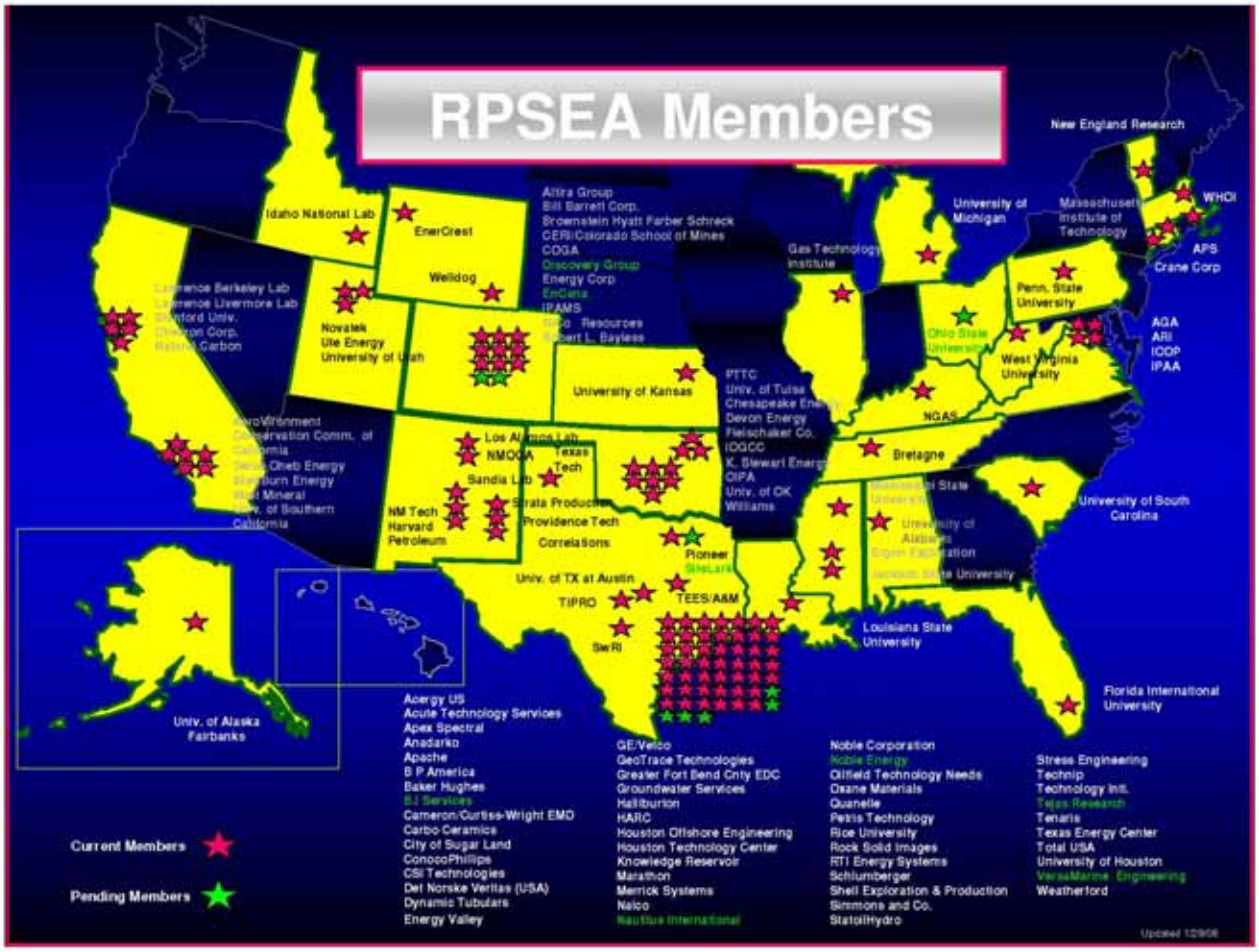
Attachment 7



# Contents

- RPSEA general comments
- UDW program overview
- UDW 2007 RFP status
- 2007 FACA report comments


RPSEA Members
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Welldog
Novatek
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University of Utah
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Bill Barrett Corp.
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OIPA
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Williams
Los Alamos Lab
NMOGA
Texas Tech
Sandia Lab
NM Tech
Harvard
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Correlations
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TIPRO
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West Virginia University
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ARI
IODP
IPAA
NGAS
Bretagne
University of South Carolina
Louisiana State University
Florida International University
Univ. of Alaska Fairbanks
Current Members
Pending Members
Acergy US
Acute Technology Services
Apex Spectral
Anadarko
Apache
B P America
Baker Hughes
BJ Services
Cameron/Curtiss-Wright EMD
Carbo Ceramics
City of Sugar Land
ConocoPhillips
CSI Technologies
Det Norske Veritas (USA)
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Energy Valley
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GeoTrace Technologies
Greater Fort Bend Cnty EDC
Groundwater Services
Halliburton
HARC
Houston Offshore Engineering
Houston Technology Center
Knowledge Reservoir
Marathon
Merrick Systems
Nalco
Nautilus International
Noble Corporation
Noble Energy
Oilfield Technology Needs
Oxane Materials
Quanelle
Petris Technology
Rice University
Rock Solid Images
RTI Energy Systems
Schlumberger
Shell Exploration & Production
Simmons and Co.
StatoilHydro
Stress Engineering
Technip
Technology Intl.
Texas Research
Tenaris
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Weatherford
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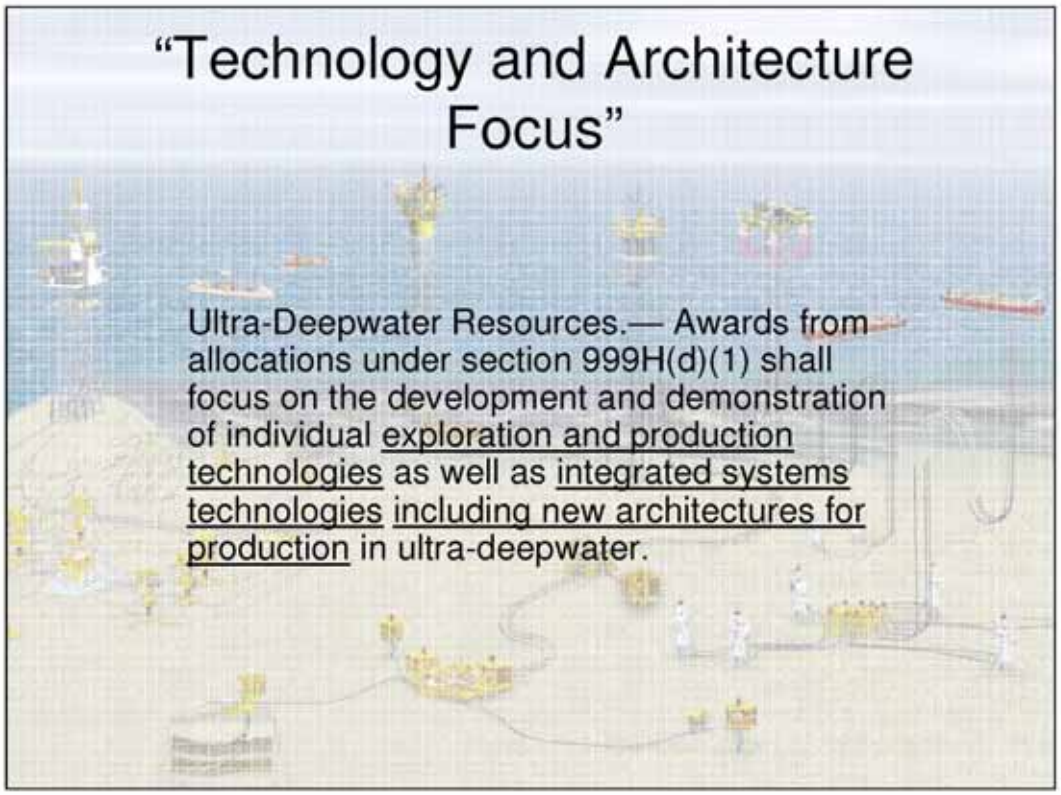
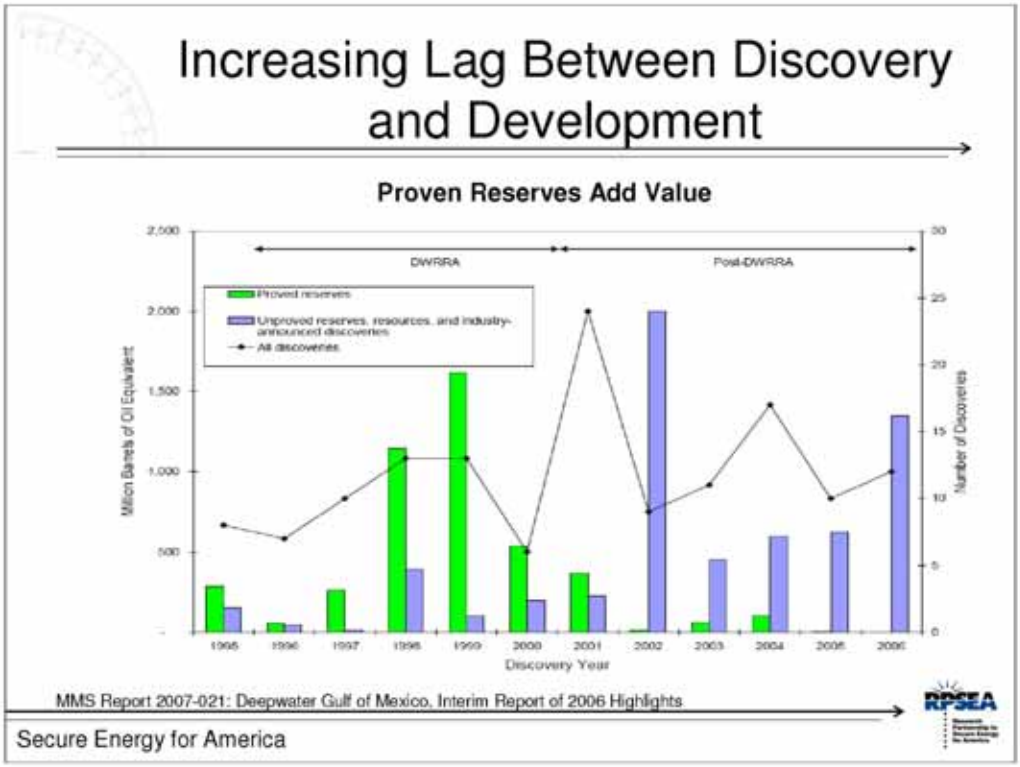
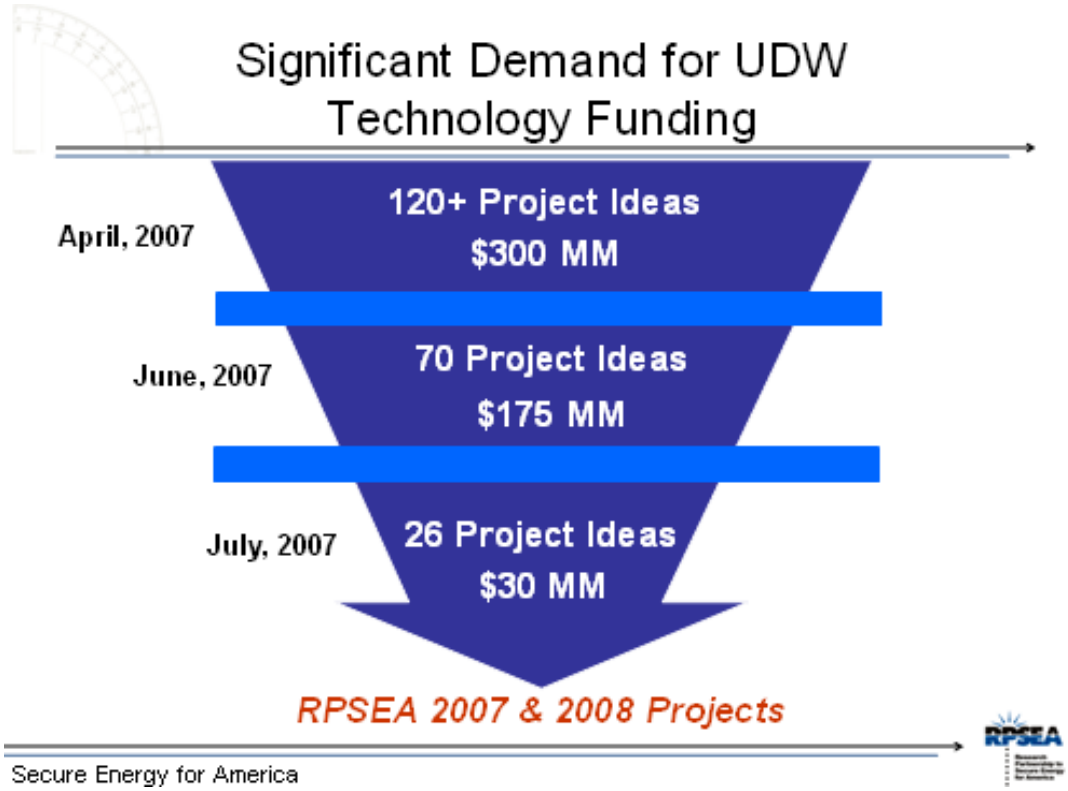



Focus of EPACT 2005 Section 999 ultra-deepwater funding is technology and architecture. Unconventional gas and small producers element focus is resource. Why is there a difference?




One possible explanation is illustrated by this slide. Since 2001, industry has been very successful booking unproven reserves (making ultra-deepwater discoveries). Industry has not been successful converting unproven reserves into proven reserves. Conversion of unproven reserves to proven reserves requires a funding commitment (sanction decision) for a deepwater project. Industry is having difficulty characterizing discovered reserves and drilling and development costs have skyrocketed.

Unproven reserves do not add value. They do not contribute to royalty funds, they do not provide fuel for automobiles or heat for homes and they do not contribute to industry bottom lines.




Ultra-deepwater reverse funnel process. We narrow list of potential projects up front, then release RFPs for specific needs. Typical DOE RFP is theme based and very general – typical process narrowing occurs after bids submitted.

# UDW 2007 RFPs

- 4 RFPs released October 29, 2007
  - 9 proposals received December 27, 2007
  - Proposals under evaluation
- 5 RFPs released November 28, 2007
  - 13 proposals received January 28, 2008
- 5 RFPs to be released February, 2008

# UDW Advisory Committee Comments

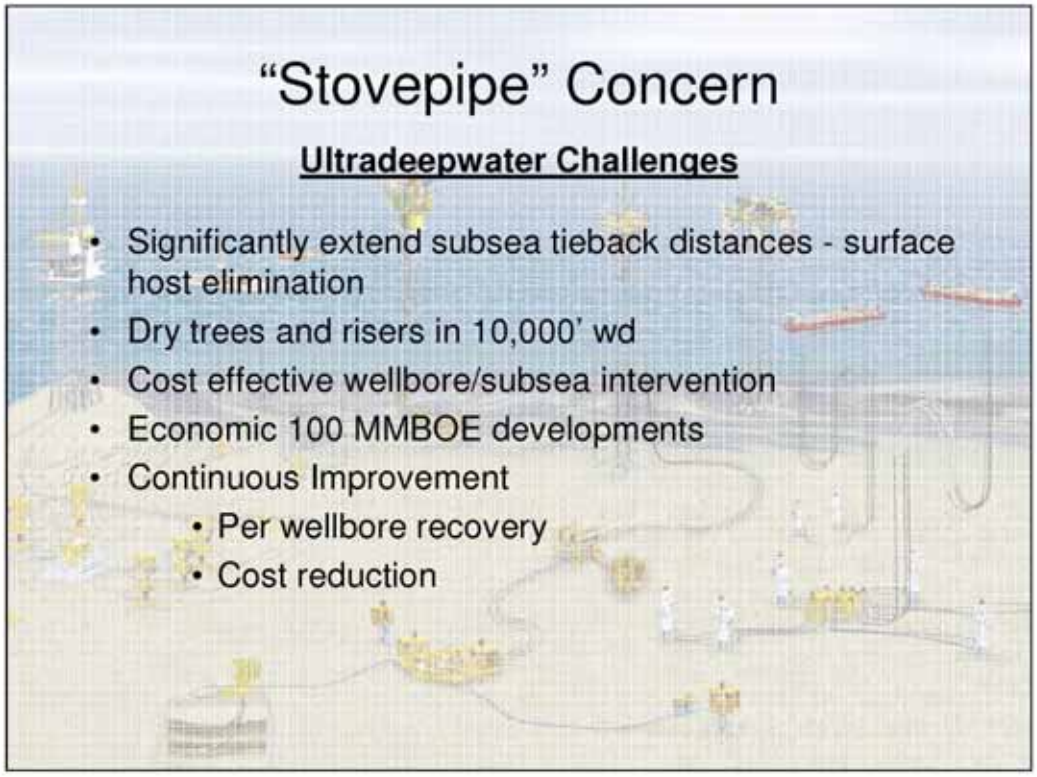
- "Enhance the focus on environmental issues"
  - DW 1801 - *Effect of Global Warming on Hurricane Activity and Severity*
  - DW 2101 - *New Safety Barrier Testing Methods*
  - DW 2801 - *Gulf Operational Current Model Pilot*
- "Increase emphasis on drilling and completions"
  - DW 1401 - *Carbon Fiber Wrapped High Pressure Drilling and Production Riser Qualification Program*
  - DW 1402 - *Ultra-deepwater Dry Tree System for Drilling and Production in GOM*
  - DW 1501 - *Extreme Reach Development*
  - DW 2301 - *Deepwater Riserless Light Well Intervention*
  - DW 1502 - *Coil Tubing Drilling and Intervention System*
  - DW 2502 - *Modeling and Simulation of Managed Pressure Drilling for Improved Design, Risk Assessment, Training and Operations*



Next slides address 2007 FACA annual plan comments.

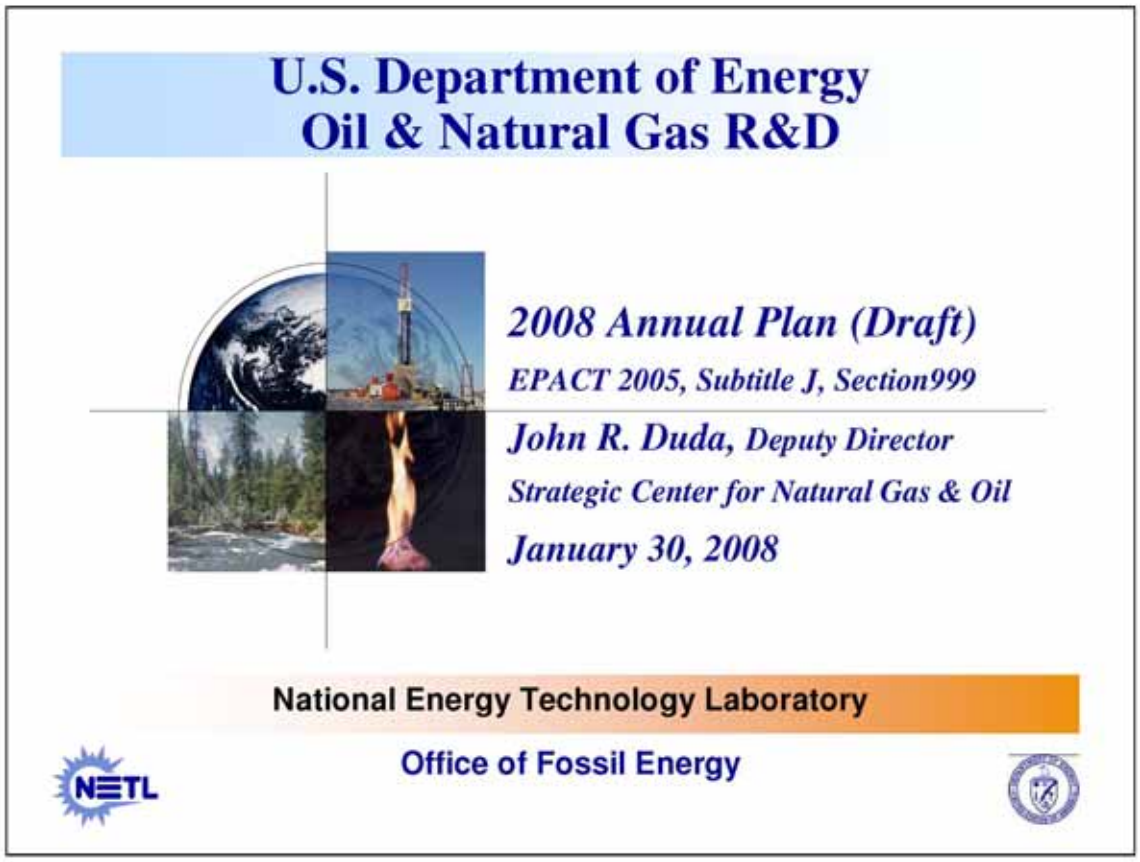
# UDW Advisory Committee Comments, cont'd

- "More emphasis on achieving grand challenge R&D breakthroughs"
  - DW 1201 – *Wax Control*
  - DW 1302 – *Ultrahigh Conductivity Umbilicals*
  - DW 1401 - *Carbon Fiber Wrapped High Pressure Drilling and Production Riser Qualification Program*
  - DW 1501 - *Extreme Reach Development*
  - DW 1902 - *Deep Sea Hybrid Power System*




All current ultra-deepwater challenges are being considered in the RPSEA 2007 and 2008 portfolios.

Attachment 8




Title page – The information on this title page is simply to convey the general theme (information to be covered) that will be presented to the committee members. In this case, a summary of the 2008 annual plan will be presented in the slides that follow. In general, the information on this title slide is self-explanatory.

End/

## 2008 Annual Plan (*Draft*) Development

- **RPSEA submitted Draft Annual Plan**
  - November 14, 2007
  - Modifications to 2007 plan
- **NETL developed the 2008 Annual Plan (Draft)**
  - Federal Advisory Committees' recommendations
  - Program status and requirements
  - Complementary research plan
- **Submitted to HQ**
  - December 11, 2007
  - Incorporated comments from FE, et al
- **Sent to Federal Advisory Committees**
  - January 9, 2008

*Strategic Center for Natural Gas and Oil*

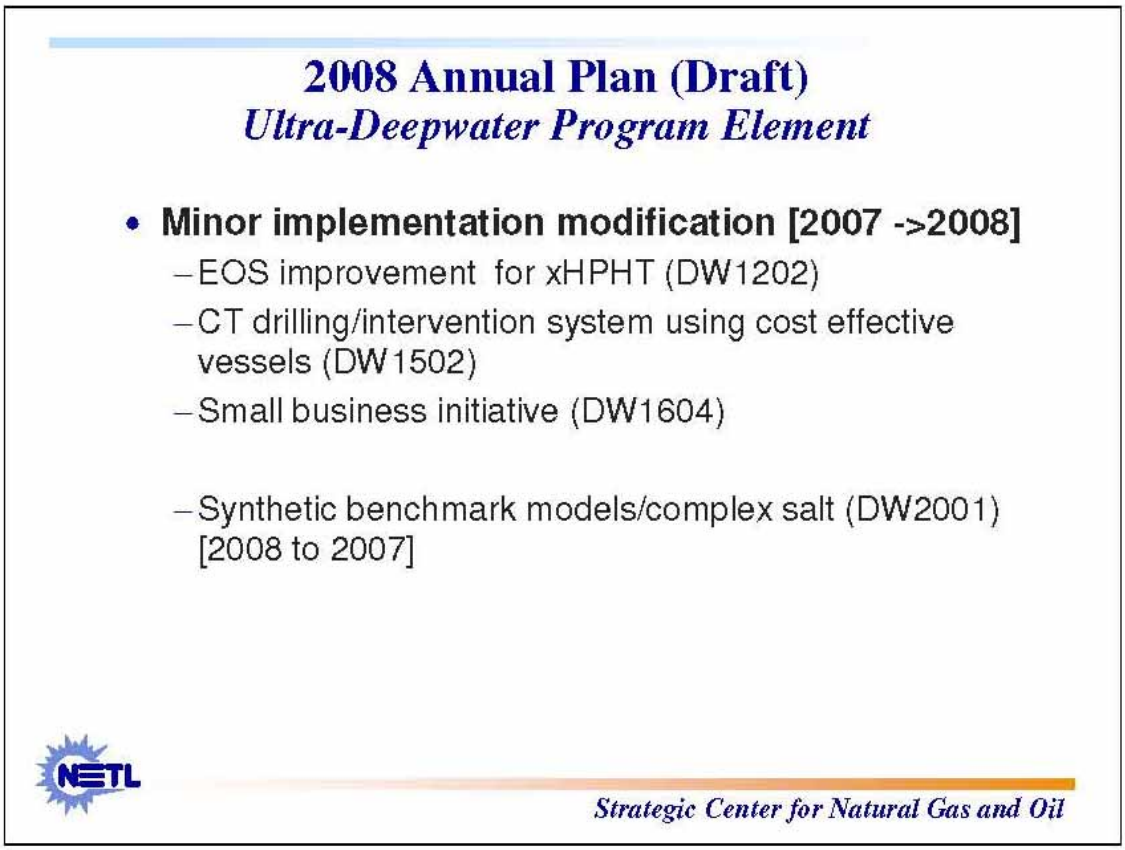
The information in this slide is basically a chronology of the 2008 annual plan (draft) – beginning with RPSEA's initial submission to the 2008 annual plan (draft) through the plan being sent out to the Federal Advisory Committees.

Note that the program consortium's Draft Annual Plan input in included in the 2008 annual plan (draft) as Appendix C – "verbatim"


The six bullets listed in this slide highlight the main modifications of the 2008 annual plan (draft) compared to the 2007 annual plan. The bullet phrases are self explanatory.

Regarding the funding cycle (bullet #6), projects will be fully funded to the completion of the appropriate decision point identified in each contract, which may include multiple stages. Once 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.


The information in this slide simple lists the four major and 1 minor technology challenge areas that the Ultra-Deepwater topics have been categorized into. The information in the slide is also reflected in Table 2.4b of the 2008 annual plan (draft). "CI" stands for continuous improvement. The minor technology development/operational area is *technology facilitation*.



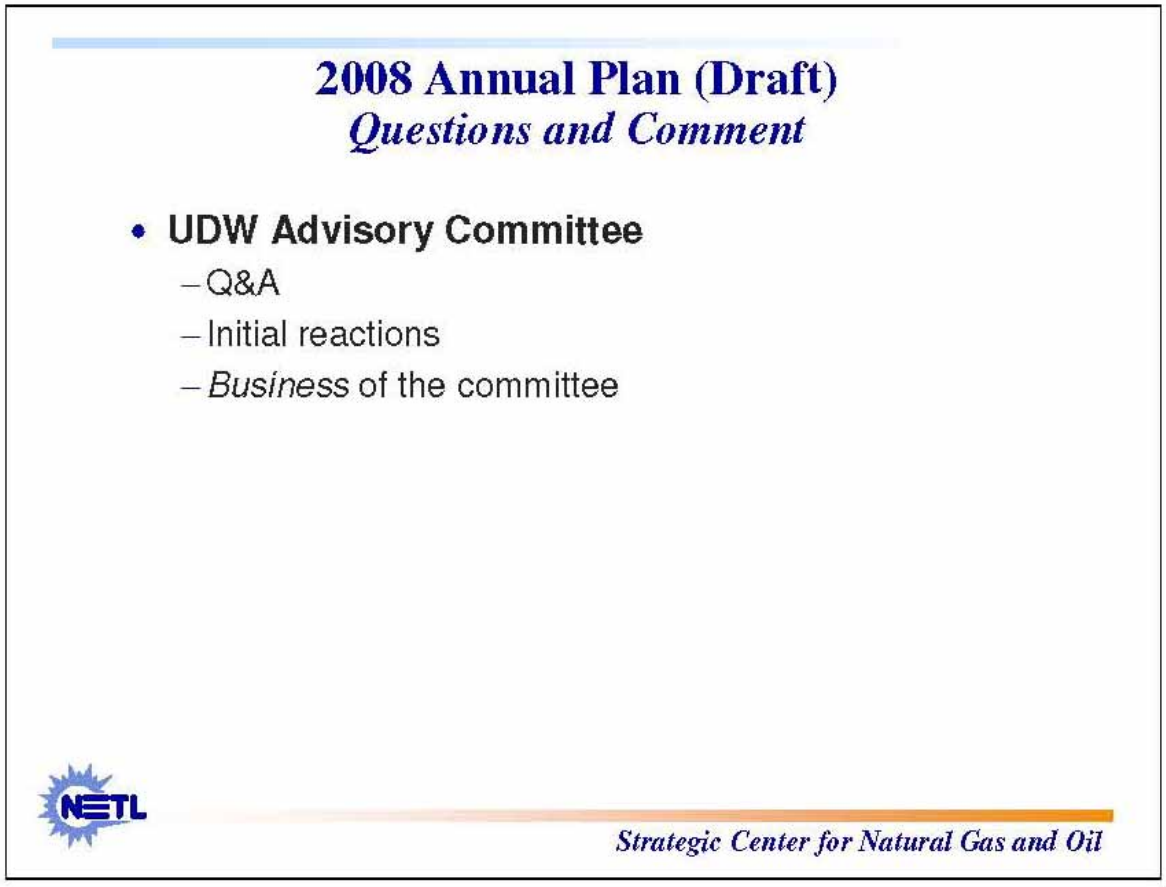

The info in this slide summarizes the minor changes to the implementation schedule (comparing what is happening in 2008 versus what was planned during 2007). Again, the schedule modifications are minor in nature. The Equation of State (EOS) effort, the Coiled Tubing (CT) system, and the small business initiative topical areas RFPs are being postponed to 2008. Also, one challenge area dealing with UDW development [synthetic bench mark models) is being addressed in an accelerated manner (moved to 2007).

## 2008 Annual Plan (Draft)
### *Ultra-Deepwater Program Element*

- **Minor implementation modification**
  - RPSEA *Base Case Design Criteria project* funded separately by DeepStar
  - Program benchmarks and metrics project to be done internally by RPSEA as part of program administration.

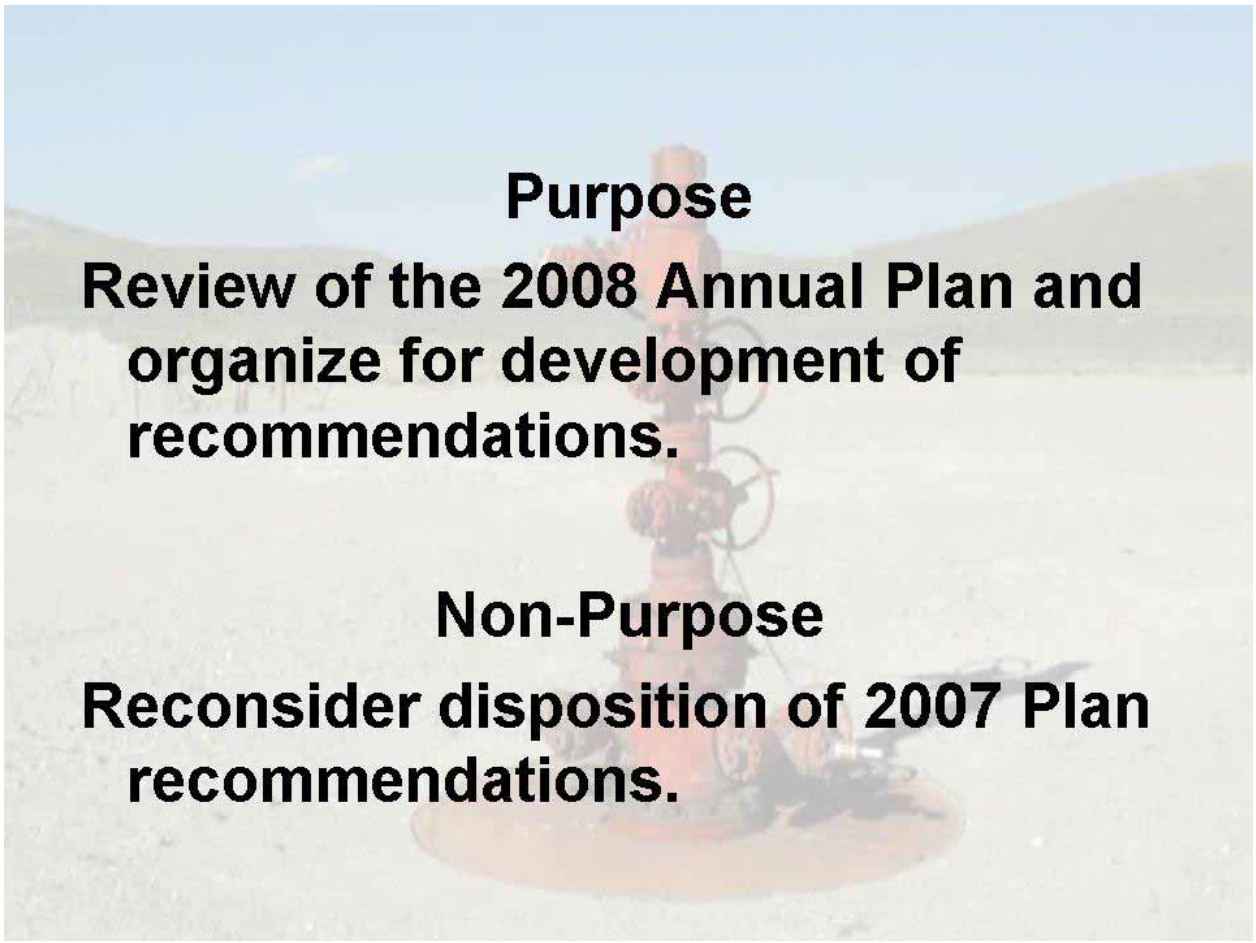

*Strategic Center for Natural Gas and Oil*

In order to be fully forthcoming with the Committee, this slide notes that a planned RFP (base case design problem set) is being funded separate – being funded by DeepSTAR - from the consortium program element [of Subtitle J, Section 999] and no longer needs to be issued by RPSEA. Also, a change from the 2007 annual plan is that the metrics evaluations/measurements will be done internally by RPSEA in coordination with NETL, hence a solicitation to address metrics is no longer required. Again, the material in this slide is to simply update the Committee on changes from 2007 to 2008.




This is simply a slide to close the summary presentation of the 2008 annual plan (draft) and set the stage for the committee's discussion/review of the 2008 plan. The bullets and sub-bullets are self explanatory.

Attachment 9


Purpose
Review of the 2008 Annual Plan and organize for development of recommendations.
Non-Purpose
Reconsider disposition of 2007 Plan recommendations.

# Focus Questions

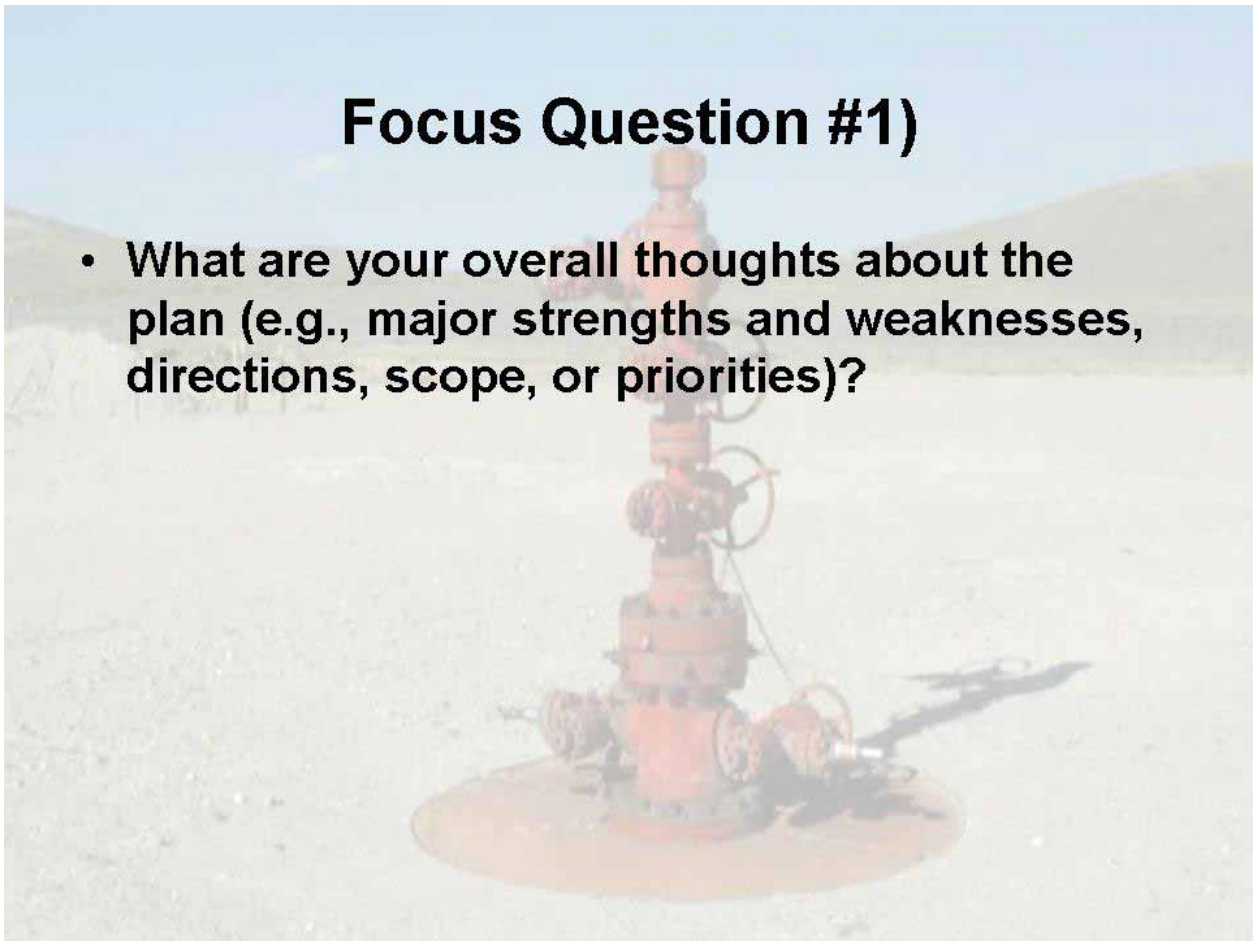
***Reactions to the Plan***

#1) What are your overall thoughts about the plan (e.g., major strengths and weaknesses, directions, scope, or priorities)?

***Process for Moving Forward and Preparing Recommendations***

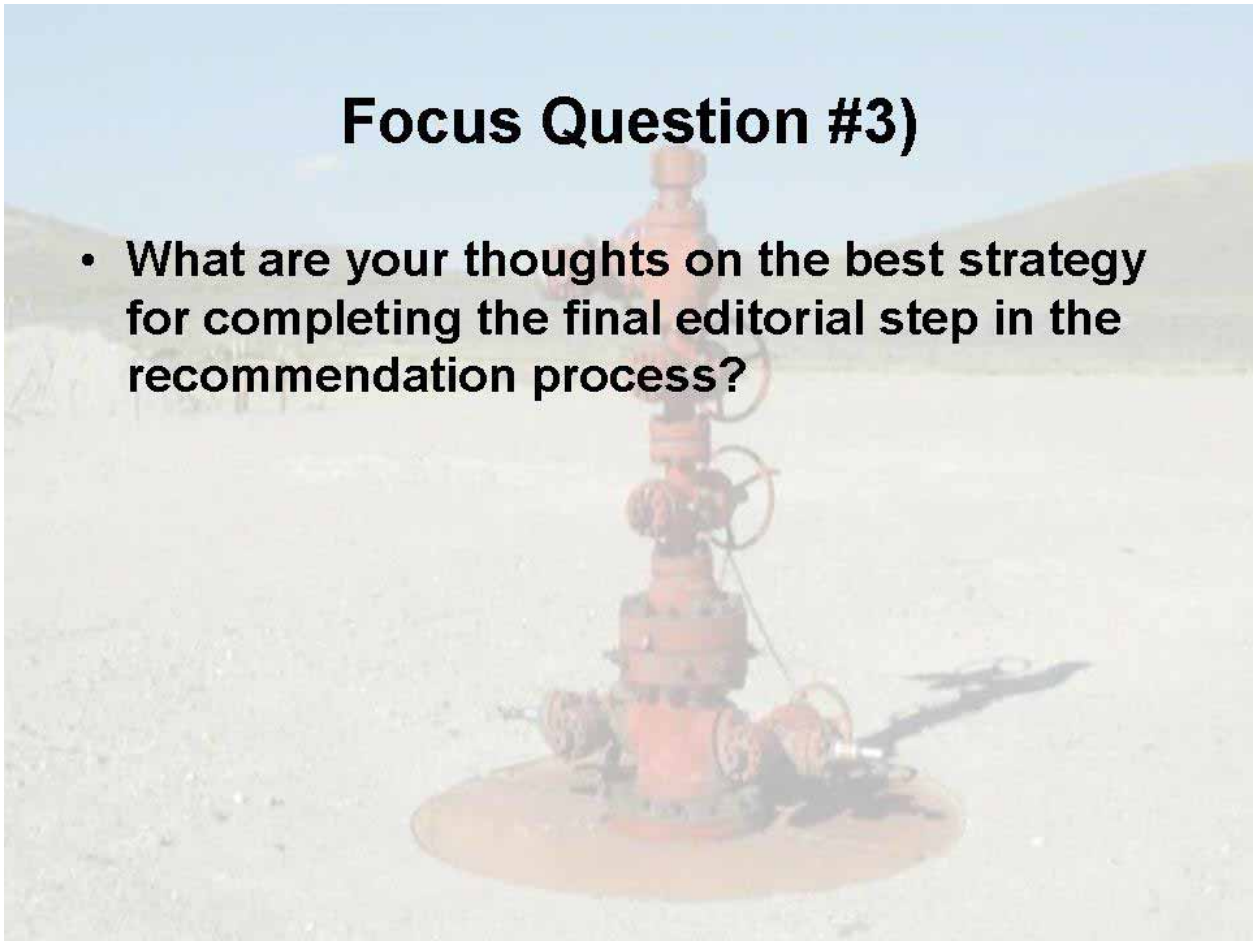
#2) What are your suggestions for how to organize your activities between now and the March meeting (recommendation focus groups, deliverables, schedules)?

#3) What are your ideas for completing the final editorial step in the recommendation process?


Focus Question #1)
• What are your overall thoughts about the plan (e.g., major strengths and weaknesses, directions, scope, or priorities)?

# Focus Question #2)

- What are your suggestions for how to organize your activities between now and the March meeting (subcommittees, deliverables, schedules)?


Focus Question #3)
• What are your thoughts on the best strategy for completing the final editorial step in the recommendation process?

# Attachment 10

## ULTRA-DEEPWATER ADVISORY COMMITTEE MEETING, FACILITATED DISCUSSION COMMENTS

| OVERALL COMMENTS ON PLAN CONTENT | | | |
|---|---|---|---|
| **SOLICITATIONS** | **PROGRAM FUNDING** | **METRICS** | **UDW PROGRAM FOCUS** |
| • Non-funded proposals should be public<br>• Not much academia involvement<br>• Consider ways to remove roadblocks in solicitation process<br>• Current plan is not clear on how intellectual property is addressed<br>• Identify program competition/ partnerships | • Consider outside funding; private sector<br>• How do we keep support for Sect 999 Program going, long-term outlook?<br>• There appears to be too many projects for the level of funding? | • Connect projects to specific recovery improvement<br>• Measure technology impact – talk to the technology users<br>• The resource target recovery goal is still low, 5% vs. 2% | • There is still confusion on what is a "Grand Challenge"<br>• Geoscience of "Ultra Deep" needs more emphasis<br>• More focus needed on high risk "step change"<br>• More emphasis needed on breakthrough technologies, integrated technologies, environmental impacts<br>• Need to identify what is "new" in solicitation topics<br>• Add more to plan on solicitation topics<br>• Reconsider overall balance of "Ultra Deep" vs. "Deep"<br>• More emphasis on subsea production<br>• More emphasis on geosciences |
| **ENVIRONMENTAL IMPACT** | **EDUCATION** | **SAFETY** | |
| • Greater environmental research content<br>• Analysis of environmental impact not reflected in 2007 or 2008 | • Education needed within government agencies to impact step change | • Need to ensure that technology is applied safely | |

| PLAN RESPONSE SUBCOMMITTEES | | | |
|---|---|---|---|
| **PROGRAM FOCUS** | **SOLICITATION PROCESS** | **PROGRAM FUNDING AND METRICS** | **SAFETY AND ENVIRONMENTAL IMPACT** |
| • Arnis J. – leader<br>• Yoram S.<br>• Morten W.<br>• Ray C.<br>• Joe F.<br>• Ron B. | • Ray C. – leader<br>• Paul T.<br>• Tom T.<br>• Morten W. | • Luc I. – leader<br>• Phil G.<br>• Mike I.<br>• Kent A. | • Quenton D. – leader<br>• Larry M.<br>• Yoram S.<br>• Mary Jane W.<br>• Dan S. |

**Editorial Committee –** Phil G., Joe F., Kent A

| SCHEDULE FOR DELIVERABLES * | |
|---|---|
| SUBCOMMITTEE INPUT TO LEADERS | 2/8<br>SAFETY AND ENV SUBCOMMITTEE<br>2/15<br>OTHER SUBCOMMITTEES |
| LEADERS SUBMIT FINAL RECOMMENDATIONS TO CHAIR, OPTION TO DISTRIBUTE TO ALL | 2/25 |
| COMBINED RECOMMENDATIONS DISTRIBUTED TO ALL BY CHAIR | 3/3 |
| 2ND MEETING IN DC | 3/5 |

* Remember to take advantage of subcommittee coordination assistance (e.g., scheduling conference calls, email distribution) provided by Natenna Dobson/DOE. Natenna.Dobson@hq.doe.gov, 202-586-8020

Attachment 11

# UDAC Membership

- **Energy Policy Act of 2005**
  - Subtitle J--Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources
  - SEC. 999D. ADVISORY COMMITTEES.
    - (a) Ultra-Deepwater Advisory Committee-
    - (2) MEMBERSHIP- The Advisory Committee under this subsection shall be composed of members appointed by the Secretary, including—
      - **(A) … extensive research experience or operational knowledge of offshore natural gas and other petroleum exploration and production;**
      - **(B) …broadly representative of the affected interests in ultra-deepwater natural gas and other petroleum production, including interests in environmental protection and safe operations;**
    - (3) DUTIES- The Advisory Committee under this subsection shall—
      - (A) advise the Secretary on the development and implementation of programs under this subtitle related to ultra-deepwater natural gas and other petroleum resources;
- **Federal Advisory Committee Act**
  - 5 U.S.C. App. 1
    - Public Law 92-463
    - Section 5.
      - 2) require the membership of the advisory committee to be fairly balanced in terms of the points of view represented …

Attachment 12

***Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources***

**Staff Roster**

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

| | |
|---|---|
| Guido DeHoratiis<br>*Acting Deputy Assistant Secretary* | Acting Designated Federal Officer |
| Bill Hochheiser | Committee Manager |
| Elena Melchert | Committee Manager |
| Natenna Dobson | Office of Oil and Natural Gas, Section 999 Team |

**National Energy Technology Laboratory**

| | |
|---|---|
| Brad Tomer | Director, Strategic Center for Natural Gas & Oil |
| John Duda | Deputy Director, Strategic Center for Natural Gas & Oil |
| ~~Jamie Brown~~ | Division Director, Earth & Mineral Sciences Division, Office of Research and Development |

**Technology & Management Services, Inc.**

| | |
|---|---|
| Mauri Lappinen | Committee Recorder |
| Rob Matey | Committee General Support |
| Dominique Wells | Committee Registration Support |

**Energetics Inc.**

| | |
|---|---|
| Sabine Brueske | Meeting Facilitator |

Rory Long NETL

Karl Long TMS

## Ultra-Deepwater Advisory Committee Meeting
## Sign-In Sheet - January 30, 2008

| Last Name | First Name | Organization | Sign |
|---|---|---|---|
| Abadie | Kent F. | Shell Exploration & Production Company | |
| Bland | Ronald G. | Baker Hughes Drilling Fluids | |
| Charles | Raymond G. | ExxonMobil Exploration Company | |
| Dokken | Quenton R. | Gulf of Mexico Foundation | |
| Fowler* | Joe R. | Stress Engineering Services, Inc. | |
| Grossweiler* | Phil | M&H Energy Services | |
| Idelchik | Michael | General Electric Company | |
| Ikelle* | Luc T. | Texas A&M University | |
| Judzis | Arnis | Schlumberger, Inc. | |
| McKinney | Larry D. | Texas Parks & Wildlife Department | |
| Modiano | Albert | U.S. Oil & Gas Association | |
| Morrison | Richard L. | BP America Inc. | |
| Seamount, Jr. | Daniel T. | Alaska Oil & Gas Conservation Commission | |
| Shoham* | Yoram | Society of Exploration Geophysicists | |
| Slatt* | Roger M. | University of Oklahoma | |
| Totten | Thomas N. | J. Ray McDermott | |
| Tranter | Paul M. | Transocean, Inc. | |
| Wiencke | Paul M. | Research Council of Norway | |
| Wilson* | Mary Jane | WZI Inc. | |

* Special Government Employee

Attachment 13

## Ultra-Deepwater Advisory Committee Meeting

### Public Walk-In List - January 30, 2008

| Last Name | First Name | Organization |
|---|---|---|
| Alleman | David | ALL Consulting |
| Allenson | Stephan J. | Nalco |
| Armaza | Felipe | RPSEA |
| Beach | Steve | RPSEA |
| Chitwood | Jim | RPSEA |
| Crouch | Joe | Southwest Research Institute |
| Fray | Russell | RPSEA |
| Furnace | Justin | Texas Railroad Commission |
| Hassan | Gamal | Baker Hughes |
| Johnston | Angela | Nalco |
| Pilko | Robert M. | Blade Energy Partners |
| Radtke | Bob | Technology International, Inc. |
| Schroeder | Art | RPSEA |
| Sheridan | Jim | Baker Hughes |
| Siegfried | Bob | RPSEA |
| Williams | Thomas | Consultant |