Unconventional Resources Technology Advisory Committee (URTAC) Meeting January 29, 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 Unconventional Resources Technology Advisory Committee Meeting held on January 29, 2008 at the Crowne Plaza Houston North Greenspoint, Houston Texas.

Sally G. Zinke, Chair
Unconventional Resources Technology
Advisory Committee

7/27/08
Date

Unconventional Resources Technology Advisory Committee
January 29, 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 Unconventional Resources Technology 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 (or SGEs).

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

Mr. DeHoratiis noted that the Committee charge was to review and comment on the Draft 2008 Annual Plan for the Unconventional Resources 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 8:25 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 4A and 4B.

Followup Discussion:

- A question was raised regarding the interaction of the Section 999 R&D program dealing with CO2 sequestration and enhanced oil recovery and how it relates to the ongoing DOE carbon sequestration program. In response, Mr. Tomer indicated that significant synergies exist between the Section 999 and the carbon sequestration program, and assured the Committee that an active cross communication program will be maintained between both activities.

- A Committee member asked whether it was possible to get access to additional information on National Energy Technology Laboratory's (NETL) solicitation process. Mr. Tomer responded that NETL's Section 999 Complementary Program is being implemented "in house" and does not involve competitive solicitations. . However, the "in house" program also involves ongoing, previously established relationships with major research universities.

- Regarding FutureGen, the relationship between FutureGen and the carbon sequestration program was questioned and specifically how the funding is related. Mr. Tomer clarified that there is no direct relationship between FutureGen and the carbon sequestration program funding; i.e. the funding of those activities are independent. The FutureGen funding questions should have no impact on the implementation of the carbon sequestration program, which is of interest to the Committee due to the interaction with enhanced oil recovery.

- During the discussions, Mr. Tomer reiterated the point that although the FY 2007Section 999 funding had been a released in September 2007, funding had only recently been received at NETL for in-house research. This was due to the idiosyncrasies of the federal budget process whereby release of funds had been delayed due to the required return of unspent fiscal 2007 funds in October 2007 and reauthorization and rollover of those funds into fiscal 2008 coupled with the year end holiday period. Research Partnership to Secure Energy for America (RPSEA) did not experience a similar delay because fiscal year end funding considerations do not impact their funding.

- In response to questions about the unconventional resources produced water issues, Mr. Tomer noted that NETL's traditional oil and gas R&D program funding included $5 million of funding for produced water management in FY 2008. This will be used to complement the RPSEA program.

Overview of HQ Activities

At 9:05 a.m., Mr. DeHoratiis introduced Mr. Bill Hochheiser who presented further 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 are enacted in 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 for which funding is provided under this section of the act. . However, the 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. Legal interpretation by the DOE General Counsel concludes that the 2014 authorization sunset is binding and therefore DOE is obligated to prepare plans on that basis for R&D development 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 the 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.

NETL Complementary Program

At 9:25 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:

- A question was raised regarding the NETL's perceived emphasis on oil shale program development and whether that is being funded under the Section 999 activities. Specifically, the Committee understood and agreed that a key guiding concept for the NETL Complementary Program is that it should not be duplicative of the RPSEA program but that is should be complementary to the RPSEA program. However a concern was raised that this guidance did not give license for NETL to pursue an oil shale program using Section 999 funds in the initial stages of the Unconventional Program activities. It was argued that later, if sufficient funds were available and priorities deemed to be sufficient, then oil shale could

become an area of further R&D activities under the umbrella of the Section 999 Program. But, to pursue oil shale R&D with Section 999 funds at this stage seemed to be premature. In response, Mr. Tomer noted that the interest in oil shale is from an environmental perspective and not from an exploration or production perspective. It was also noted that the scope of the activities described in Section 999 includes other petroleum resources, and not just natural gas.

2007 Annual Plan (Consortium Program)

At 10:00 a.m. the meeting broke for coffee and resumed at 10:20 a.m. with Mr. DeHoratiis introducing Mr. Mike Ming of RPSEA. Mr. Ming's presentation and talking points are included on Attachment 7.

At 10:30 a.m., Mr. Ming introduced Mr. Bob Siegfried. Mr. Siegfried's presentation and talking points are also included on Attachment 7.

Followup Discussion:

- The Committee questioned why selected projects exceeded available funding for 2007 and required advance commitment from 2008 funds. In response, Mr. Ming pointed out that some of the projects involve multiyear programs and hence it was necessary to select them upfront and possibly commit future years funding. Furthermore, a stage-gate review process will be used to re-evaluate those programs in 2008 as part of the 2008 budget review. Mr. Ming noted that if specific multi year projects did not meet expectations then they could be cancelled or scaled back in order to meet budgetary requirements. Approximately 30 percent of the FY 2008 funds were committed in advance to the selected projects.

- The Committee was concerned about the responsiveness of the R&D community. Specifically, some felt that because the RPSEA program is new, there was an expectation that time was needed for researchers to respond to the RFPs and that many new innovative R&D topics would surface in 2008 or subsequent years. Therefore if current funding commitments require mortgaging funds from future year budgets, it might block funds for promising, new innovative future programs. Mr. Ming argued that the RPSEA program has been in the works for nearly two years and that the high level of multi year awards is reflective of the pent up supply of promising R&D projects. After extensive discussion, it was agreed that the approach taken by RPSEA was not unreasonable.

- Referring to Mr. Siegfried's slide on page 7, regarding the 13 proposals made by industry in the unconventional segment and 3 in the small producer segment, it was questioned why only 1 proposal from industry was selected. Discussion focused on the perceived root causes of this performance. RPSEA noted that the quality of many of those industry proposals was insufficient to justify selection. It

was pointed out that in general the small producer element does not have the resources available to prepare the effective proposals in light of the 45-day time period allowed for preparation. Also it was noted that the procedures are somewhat cumbersome and that industry lacks familiarity with these procedures. On the other hand, universities are more familiar with the solicitation processes and thus are better positioned to produce timely and high quality proposals. Other discussion points on this subject are noted below:

1. In followup, RPSEA indicated that they are building on lessons learned from this process including giving consideration to proactive steps to address this issue. For example, they plan to use workshops to better communicate the background behind the solicitations and to discuss the expectations of the process so that industry can better understand what is required. It was also noted that the small producers are required to enter in consortium arrangements to prepare proposals and that perhaps the ideal solution is to team up with universities that are better staffed to respond to the request for proposal (RFP) processes. RPSEA also noted that the slide in question listed only the prime proposing organization for each proposal. Many proposals included producers as team members.

2. It was noted that the Petroleum Technology Transfer Council (PTTC) experience also echoed RPSEA's observations that small producers generally are limited in their ability to effectively participate in the solicitation process.

3. Furthermore, RPSEA observed that there are a number of examples where universities have successfully teamed with small producers to prepare proposals. This was viewed as a win-win situation for the universities and industry because it allowed academia to develop their resources and get exposure to real world issues and for small producers to receive valuable assistance in addressing their real challenges.

4. It was also suggested that RPSEA/DOE should consider using a two step process to screen promising projects without obligating a full blown proposal at the initial stages. The first step would be a technical discussion to help identify good projects and then if the technical criteria proved promising, then a second step would involve the more time consuming mechanics of the solicitation procedures. In response, it was argued that neither DOE nor RPSEA had the authority to deviate from federal contracting procedures. Past experience has shown that in most cases, when exceptions are sought the new procedures are more time consuming than to follow established procedures initially. It was felt that the long-term solution to the problem involves extending the proposal preparation period, encouraging more reliance on joint industry/university teaming

programs and training including conducting proposal preparation workshops to heighten process awareness.

5. Finally, involvement of trade associations could useful to help supplement the resource requirements for preparing solicitations by enhanced training and/or other forms of assistance to the small producers.

- In response to questions on the range of proposal costs, RPSEA indicated that the range of costs were from a low of $79,000 up to a high of $4.5 million RPSEA share, with an average of $1 million. In some cases, further negotiations will be conducted to modify the scope of the proposals to include the more promising items and defer lower priority items and to establish revised cost proposals. Additionally, it was agreed that further information would be provided after the meeting. On February 6, a tabulation detailing the pertinent statistics on the solicitations was emailed to the Committee members and is included in Attachment 8A as a matter of public record.

- The Committee also questioned the makeup of the review process because it appeared that universities had a high level of awards compared to industry. RPSEA responded that most of the selection decisions reflected strong input from industry, and that members from academia did not have inordinate weight in the decision making process. Also, to further ensure the integrity of the process, every proposal selection has to be approved by NETL.

- RPSEA offers debriefing sessions to explain why proposals were not accepted to make the process as transparent as possible and not to discourage future proposal submissions.

2008 Annual Plan Draft

At 11:30 a.m., Mr. DeHoratiis introduced Mr. John Duda who presented an overview of the 2008 Annual Plan Draft. Mr. Duda noted that he recently took over Mr. Tomer's activities. Mr. Duda's presentation and talking points are included on Attachment 8.

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

At 11:45 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 9.

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

The Committee continued their discussions on the key issues. The major points discussed included:

- It was suggested that the Committee should table the need for additional funds beyond the $50 million annual funds allocation and beyond the 2014 date to reinforce the need for the program in the long-term. Anticipating an administration change, it should be clear that higher levels of funding are being sought and that the Committee felt that additional funds were justified.

- It was recommended that due to the concern over green house gas (GHG) issues, the Sect 999 program should not include heavy oil or oil shale programs due to the significant GHG implications of those programs. It was argued that these issues should be handled only after a nationwide GHG program is adopted including carbon tax implications. It was felt that is premature to proceed at this time due to the level of financial uncertainties involved.

- The program goal metrics should be updated in line with the most recent EIA resource assessments similar to the resource discussions in NPC's "Facing the Hard Truths About Energy" report. It was also suggested that Alaska should be included in the scope of the resource assessments.

Following the discussion and with guidance from Ms. Brueske, the Committee designed an action plan to prepare the Committee recommendations on the Annual Plan Draft. Specifically, it was agreed that the Committee would break into five subcommittees with each subcommittee responsible to study its specific issues in detail and prepare a draft recommendation for final full Committee review at the next meeting in March.

At 2:40 p.m., the Committee broke into the subcommittees and prepared an outline for the major issues that each group was going to address in preparing the Committee's recommendations on the Annual Plan Draft.

At 3:30 p.m., the Committee broke for coffee and reconvened at 3:45p.m.

Ms. Brueske then summarized the Subcommittee organization structure and issues in a topical format that is 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 in Attachment 10.

New Business: Plans for 2008-2010 Committee Cycle

At 4:15 p.m., 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 on Attachment 11.

Public Comments and Adjournment

At 4:35 p.m., Mr. DeHoratiis called for public comments and as none were submitted, he adjourned the meeting.

A record of Committee members in attendance are detailed in Attachment 12.

List of Attachments

Attachment 1

Department of Energy
Washington, DC 20585

JAN 25 2008

MEMORANDUM FOR FILE

TO: UNCONVENTIONAL RESOURCES TECHNOLOGY ADVISORY COMMITTEE

FROM: JAMES A. SLUTZ
DESIGNATED FEDERAL OFFICER
UNCONVENTIONAL RESOURCES TECHNOLOGY ADVISORY COMMITTEE

SUBJECT: **Acting Designated Federal Officer**

I hereby designate Guido DeIIoratiis, Acting Deputy Assistant Secretary of Oil and Natural Gas, to act as the Designated Federal Officer for the meeting of the Unconventional Resources Technology Advisory Committee on January 29, 2008, in Houston, Texas.

Attachment 2

Agenda
Unconventional Resources Technology Advisory Committee
January 29, 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 -- Budget & Planning; Section 999 Requirements	[Hochheiser]
	Committee Q/A and Discussion	
9:20 AM	*NETL Complementary Program* -- 2007 Activities and Draft 2008 Plan	[NETL]
	Committee Q/A and Discussion	
9:40 AM	*2007 Annual Plan* (Consortium Program) -- 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
Unconventional Resources Technology Advisory Committee
January 29, 2008
Crowne Plaza Houston North Greenspoint, Houston, TX

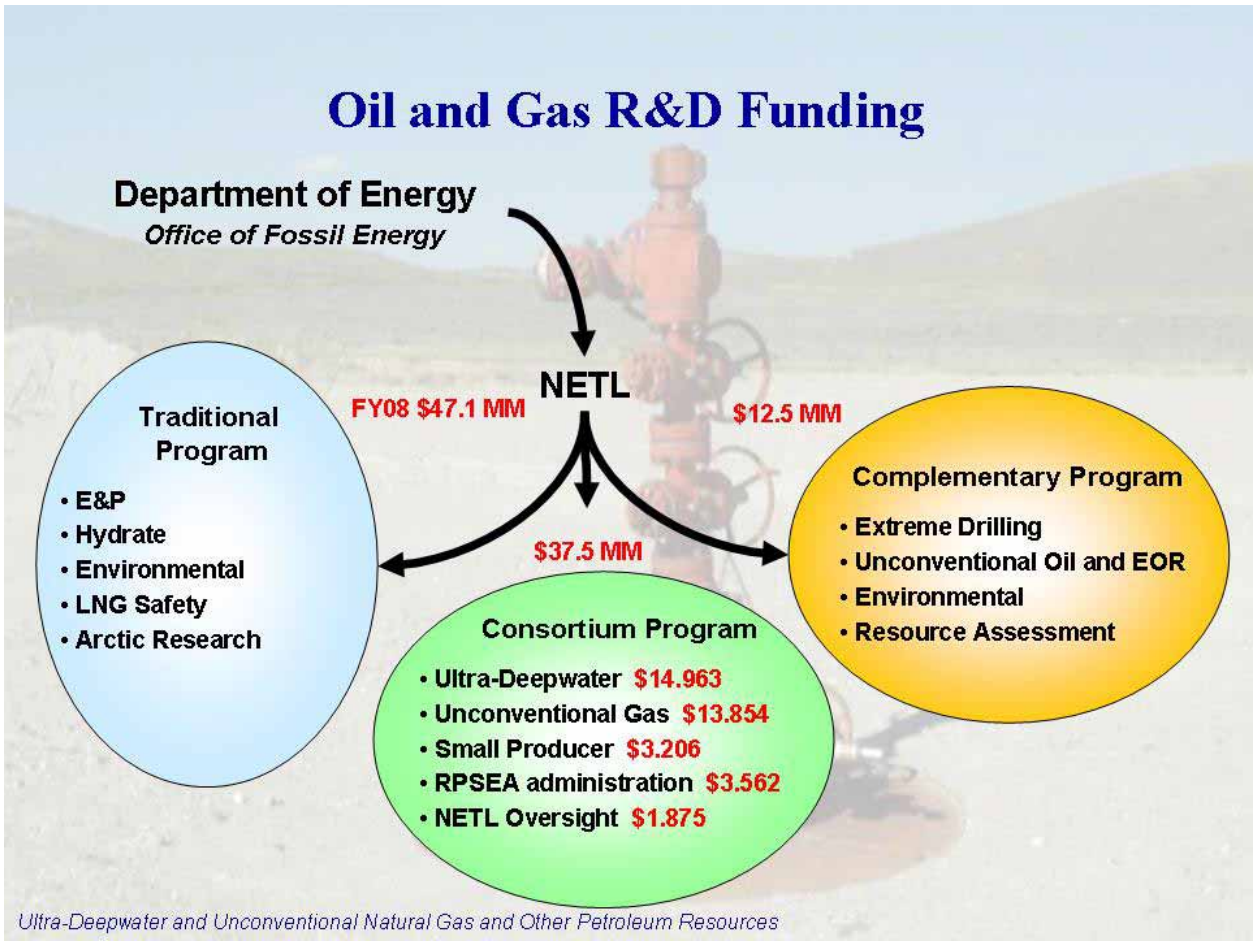
1:00 PM	**Call to Order: Afternoon Session**	[Committee Chair]
	Organization of Committee to review *2008 Annual Plan* Draft -- Priority areas -- Subgroups -- Deliverables -- Schedule	[Facilitated Discussions]
4:15 PM	**NEW BUSINESS**: Plans for 2008-2010 Committee cycle -- Charters -- Membership -- 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.

Meeting Objectives

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

Strategic Questions for the Committee

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

Attachment 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.

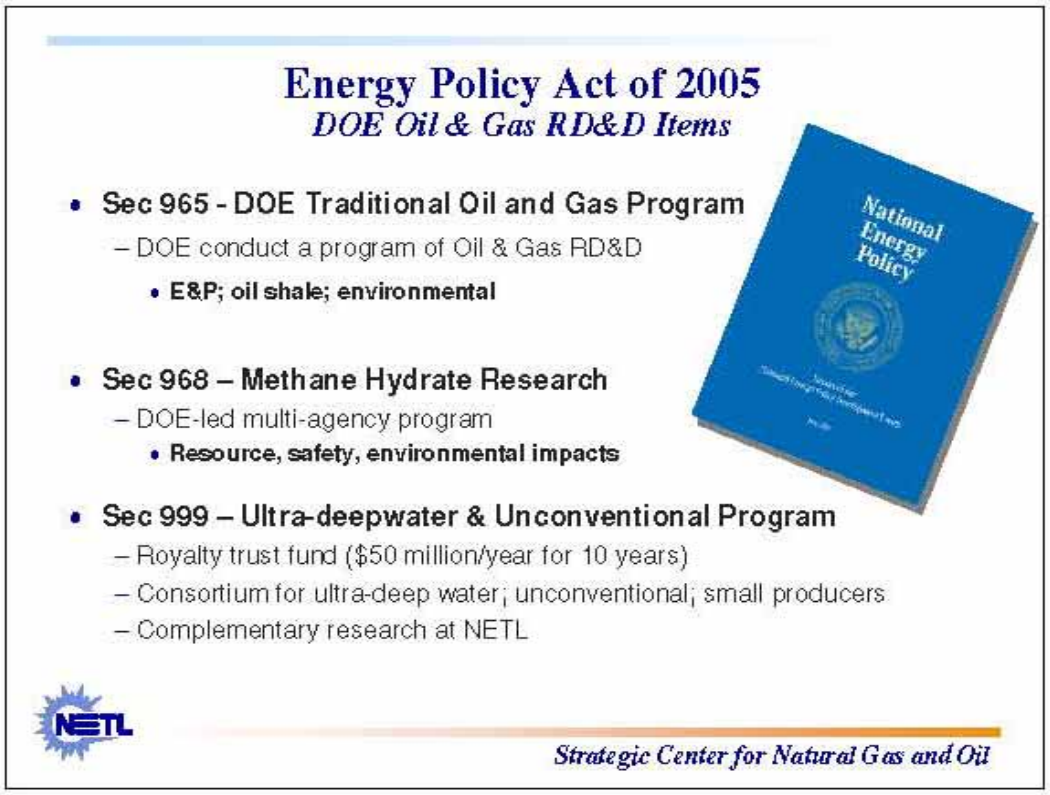
NETL Program Implementation
Partnership Approach

- **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

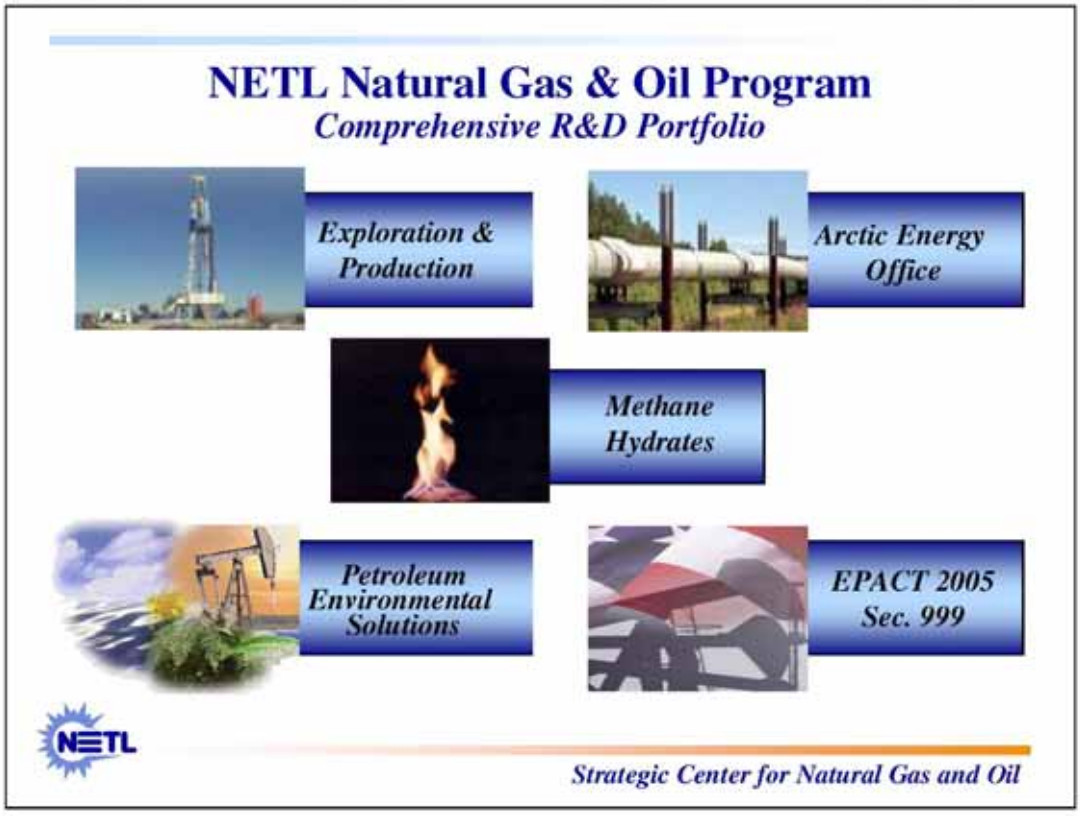
NETL

Strategic Center for Natural Gas and Oil

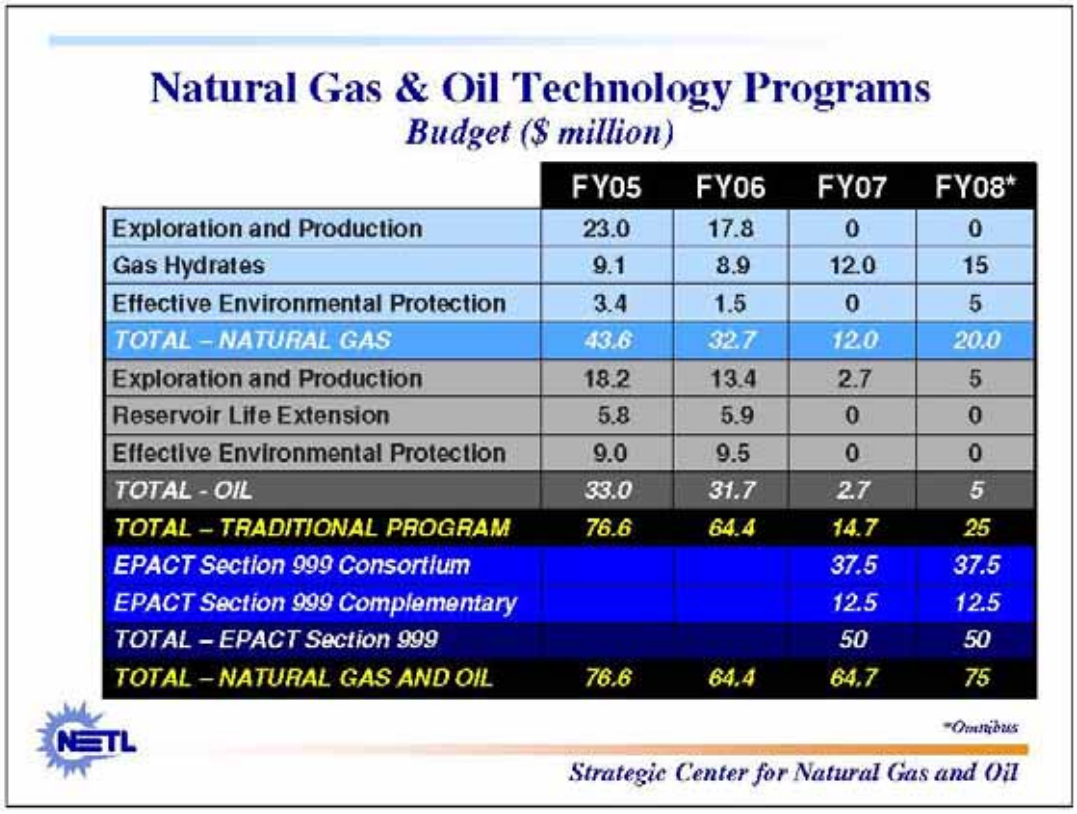
NETL's primary goal is to carry out research that is focused on practical, achievable objectives by working closely with its partners. DOE/NETL implements its R&D programs by first gathering considerable industry input, through public meetings and workshops, on exactly what types of R&D will have the 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

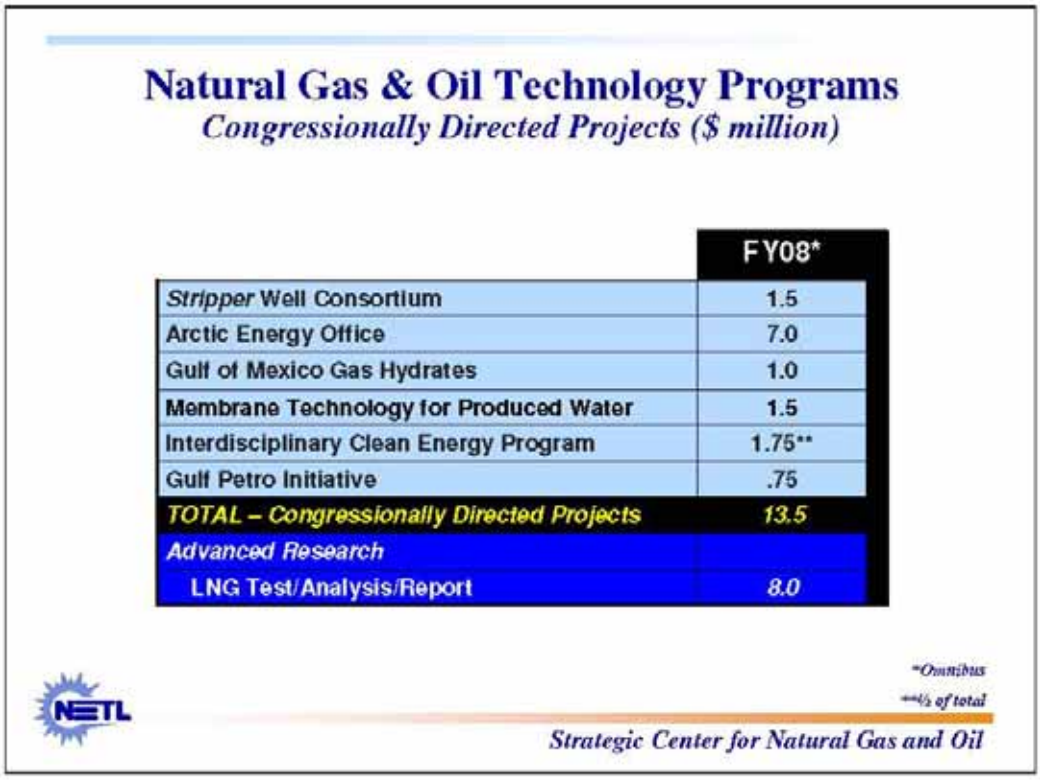
Budget ($ million)

	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*

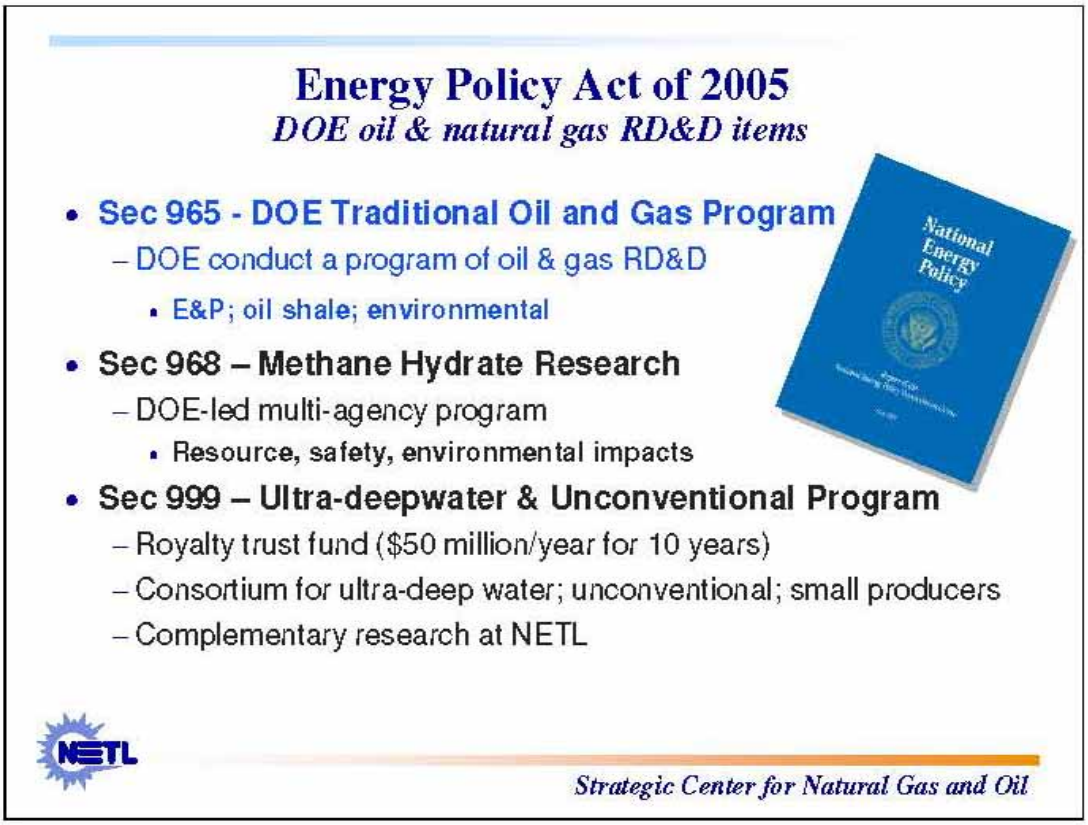
*Omnibus

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.

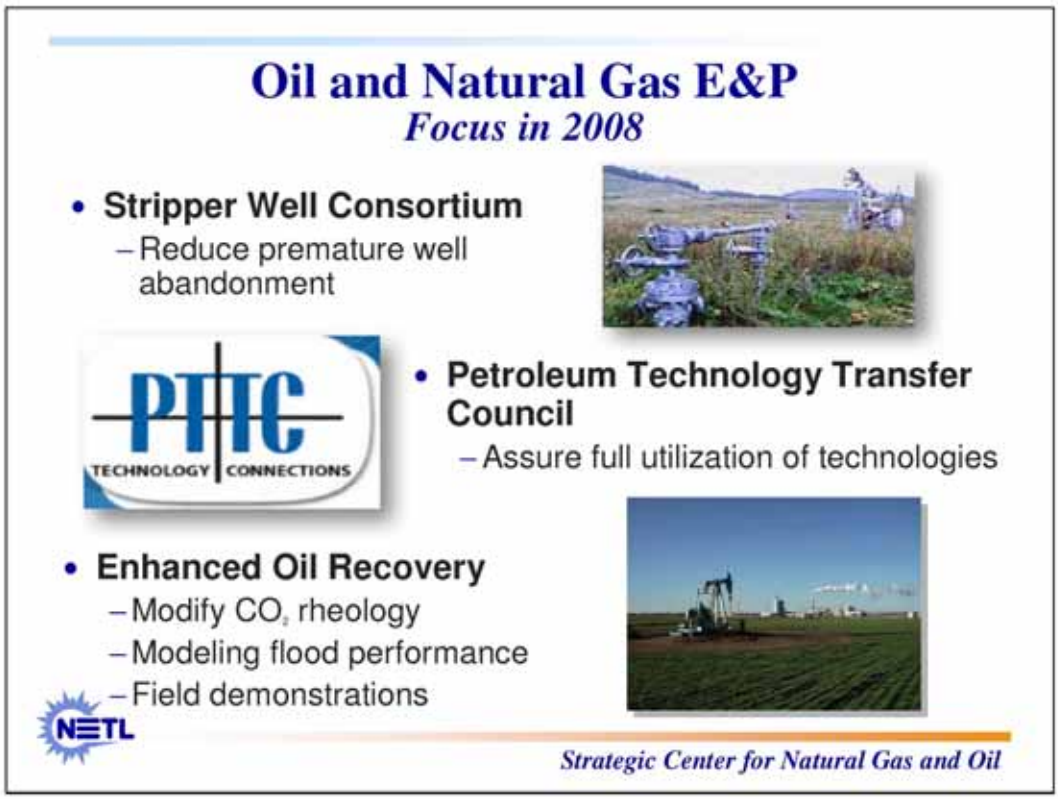


In addition to the appropriated oil and gas funds, there are a number of Congressionally-directed projects. For fiscal year 2008 there are six such projects related to oil and gas, including directed funding of work in Pennsylvania, Alaska, Mississippi, New Mexico, Utah, and Louisiana. These projects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

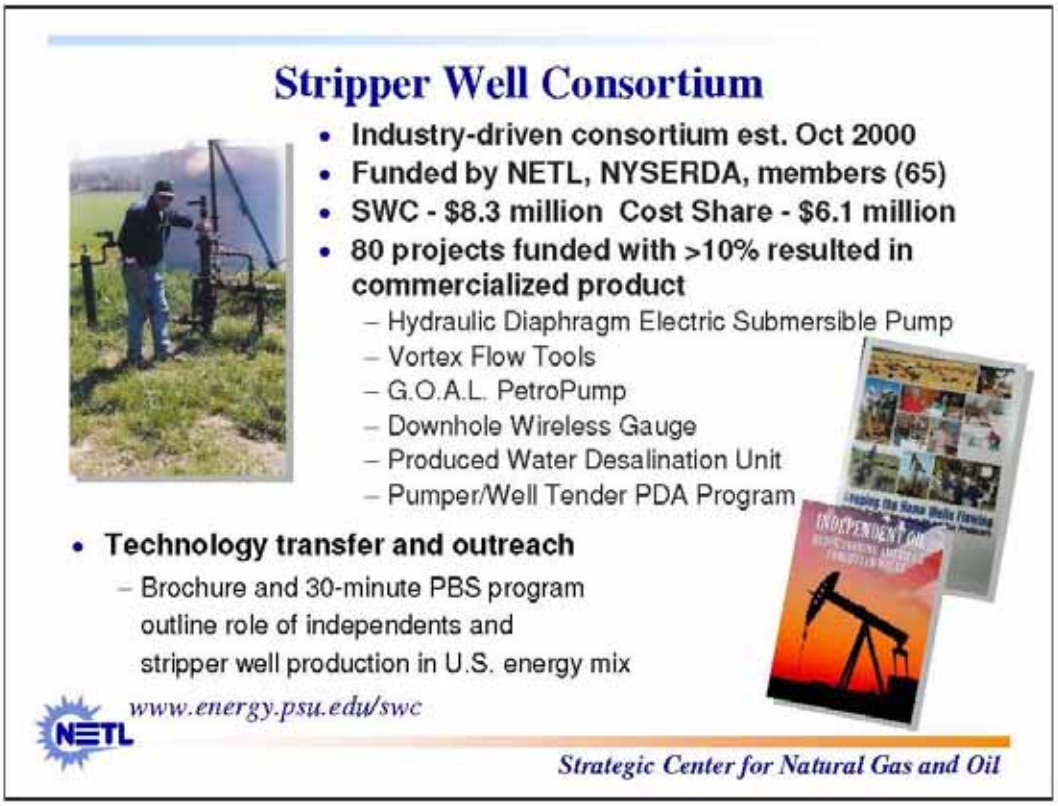


The FY08 Oil and Gas Program provides support for independent operators.

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.

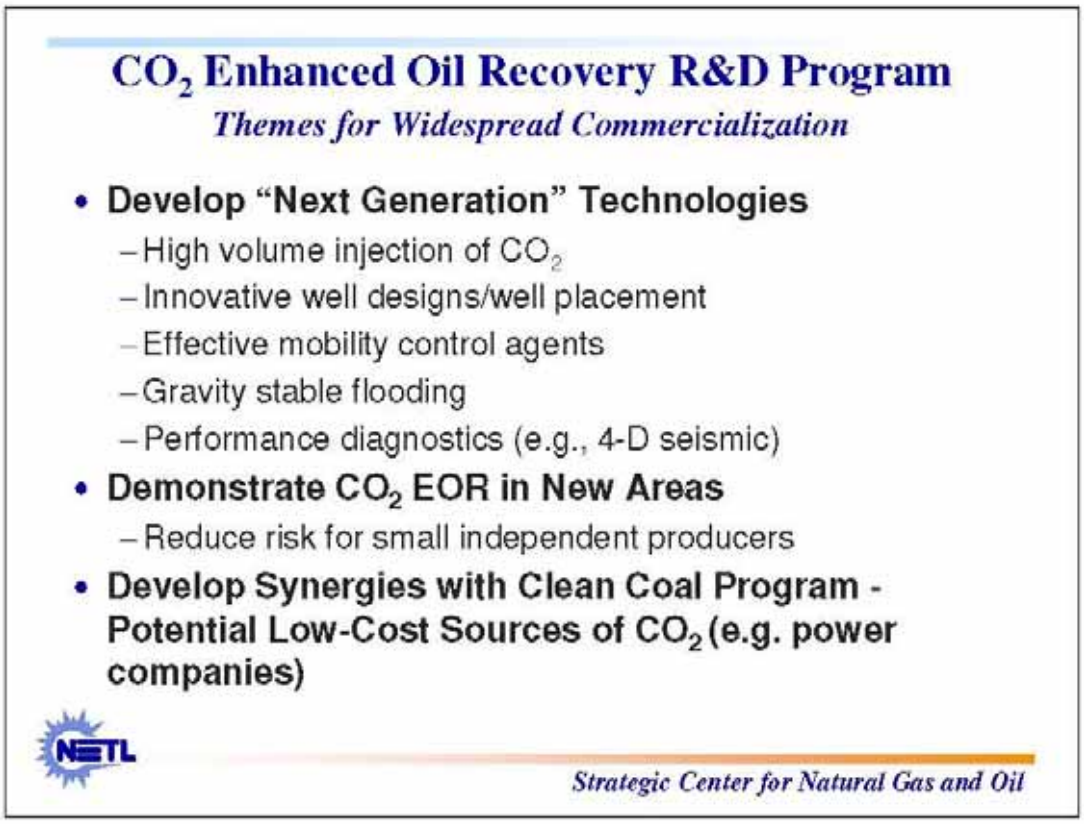
3) Enhanced Oil Recovery focuses on teaming university based technology development efforts with independent operators to accelerate the process of implementing EOR technologies in the field.



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.

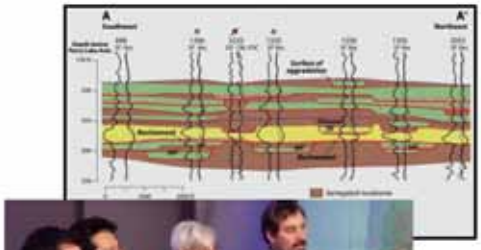
SCNGO also recognizes the importance of demonstrating carbon dioxide EOR in areas where operators are not familiar with it. Such demonstration projects will be critical to efforts to simultaneously sequester carbon dioxide and produce incremental oil in areas where coal-fired power plants and mature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

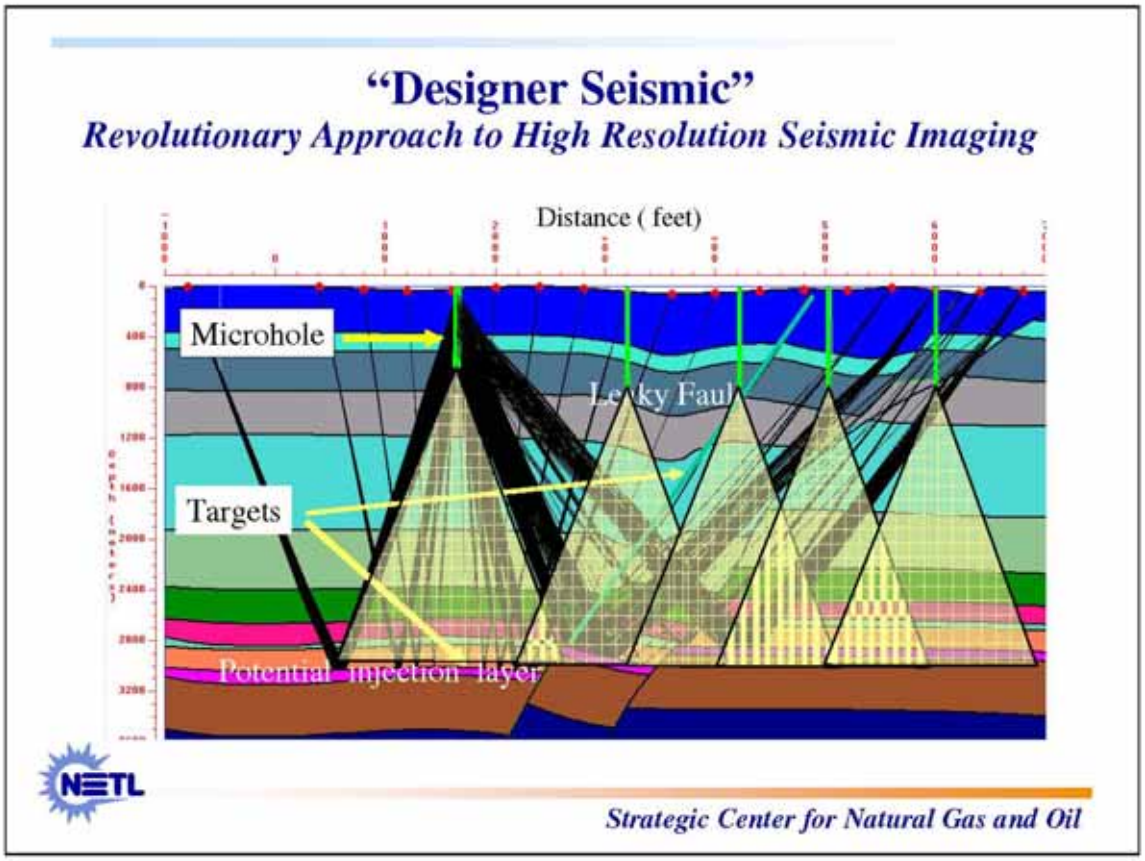
If successful, this demonstration of state-of-art CO_2 EOR will facilitate expansion of CO_2 EOR operations in Mississippi into new reservoirs in Alabama, and provide a demonstration of CO_2 sequestration potential

NETL

Strategic Center for Natural Gas and Oil

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.

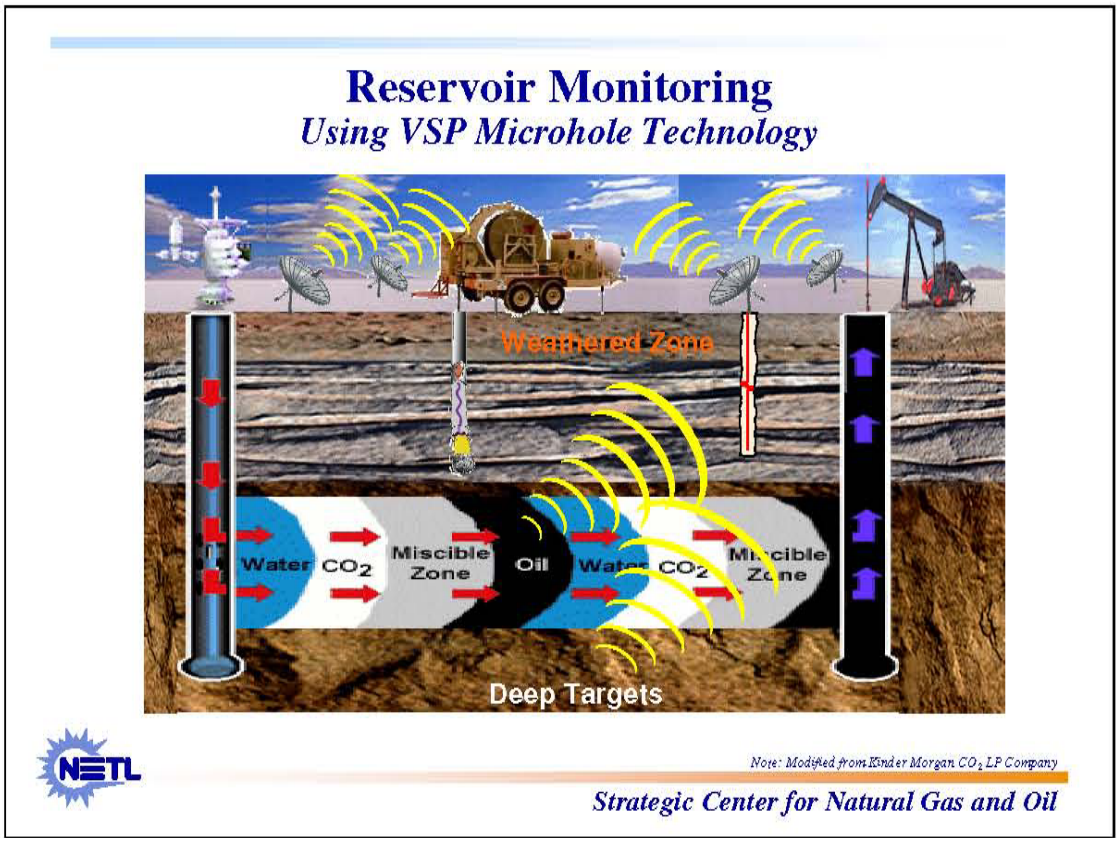
NETL's Microhole program, launched in 2004, has been very successful. The effort focused on a systems approach, developing rigs, downhole tools, electronics and drilling equipment that would make drilling small diameter holes using coiled tubing practical. A key element of this approach was the application 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.

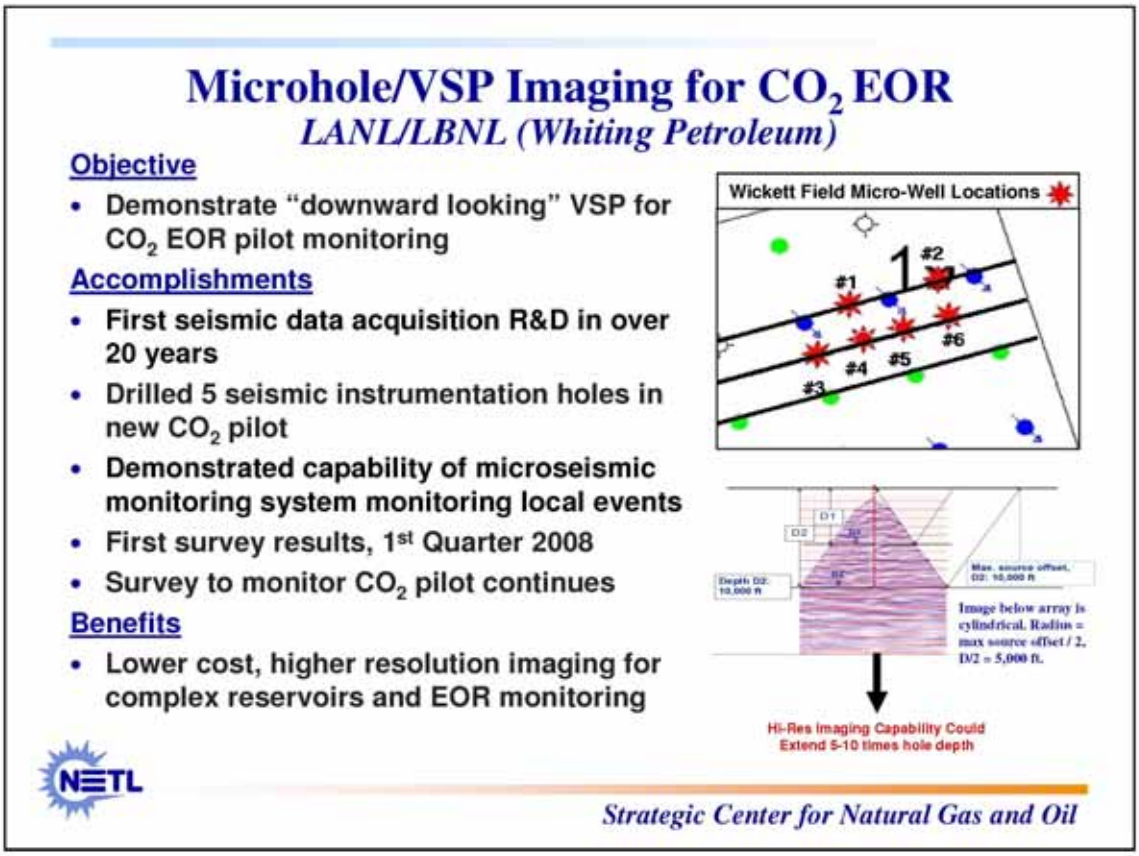
This approach represents a paradigm shift in how high resolution reservoir information is acquired based on more "real time" hi-res data with less cost.

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

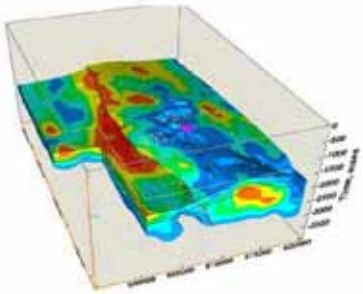
NETL

Strategic Center for Natural Gas and Oil

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

NETL

Strategic Center for Natural Gas and Oil

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**

NETL

Strategic Center for Natural Gas and Oil

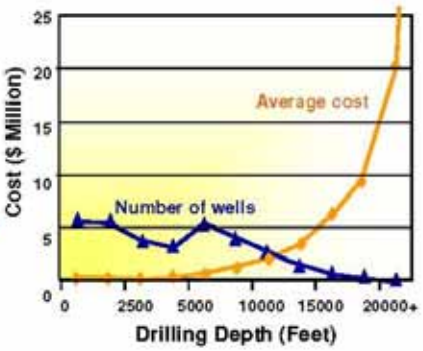
For example, characterizing the actual shape and location of hydraulic fractures has been a goal of NETL research in studies as far back as the 1980's. These efforts have provided important scientific insights that led to the development of technologies such as fracture mapping, a method that has been 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



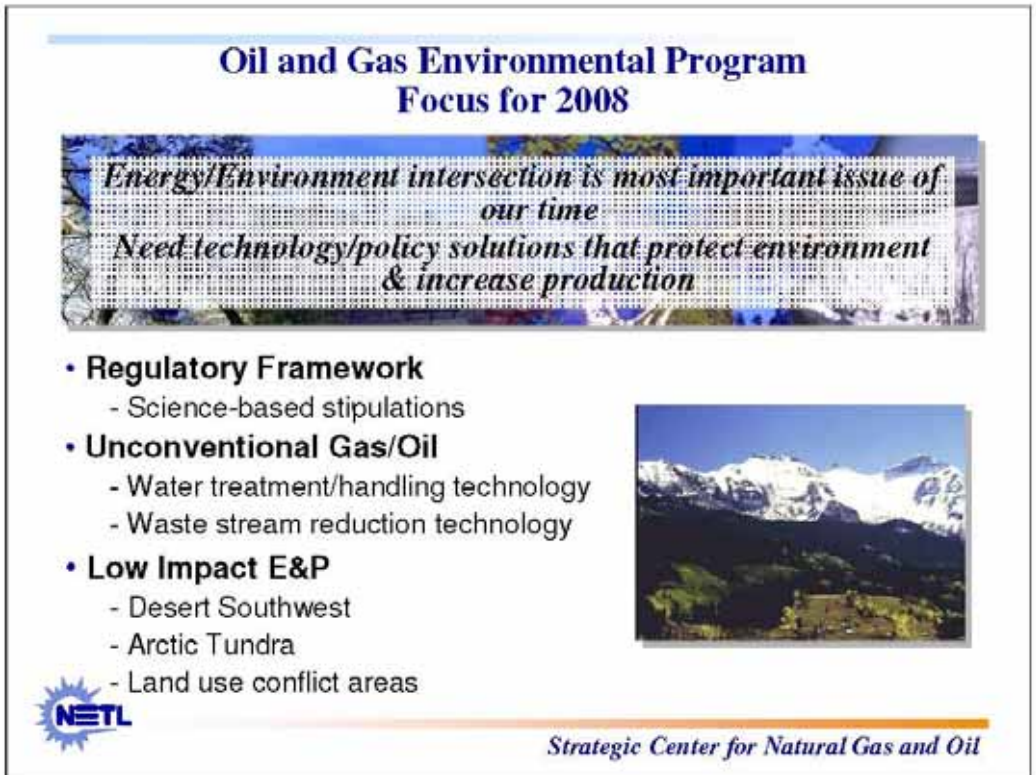
NETL

Strategic Center for Natural Gas and Oil

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

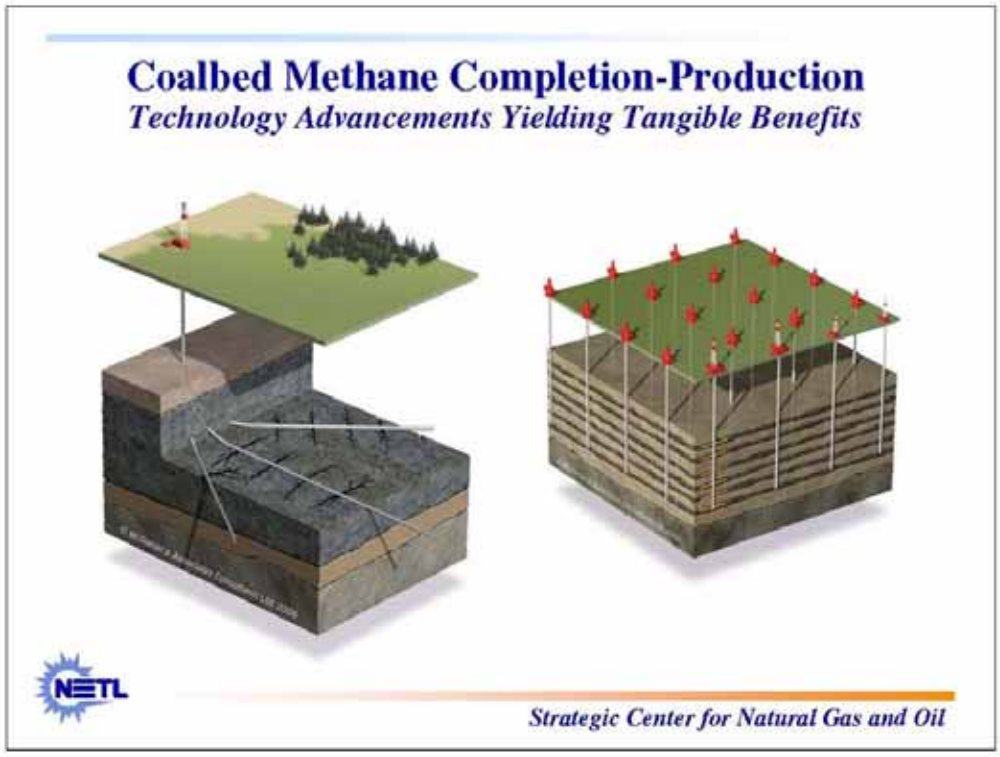
Benefits

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

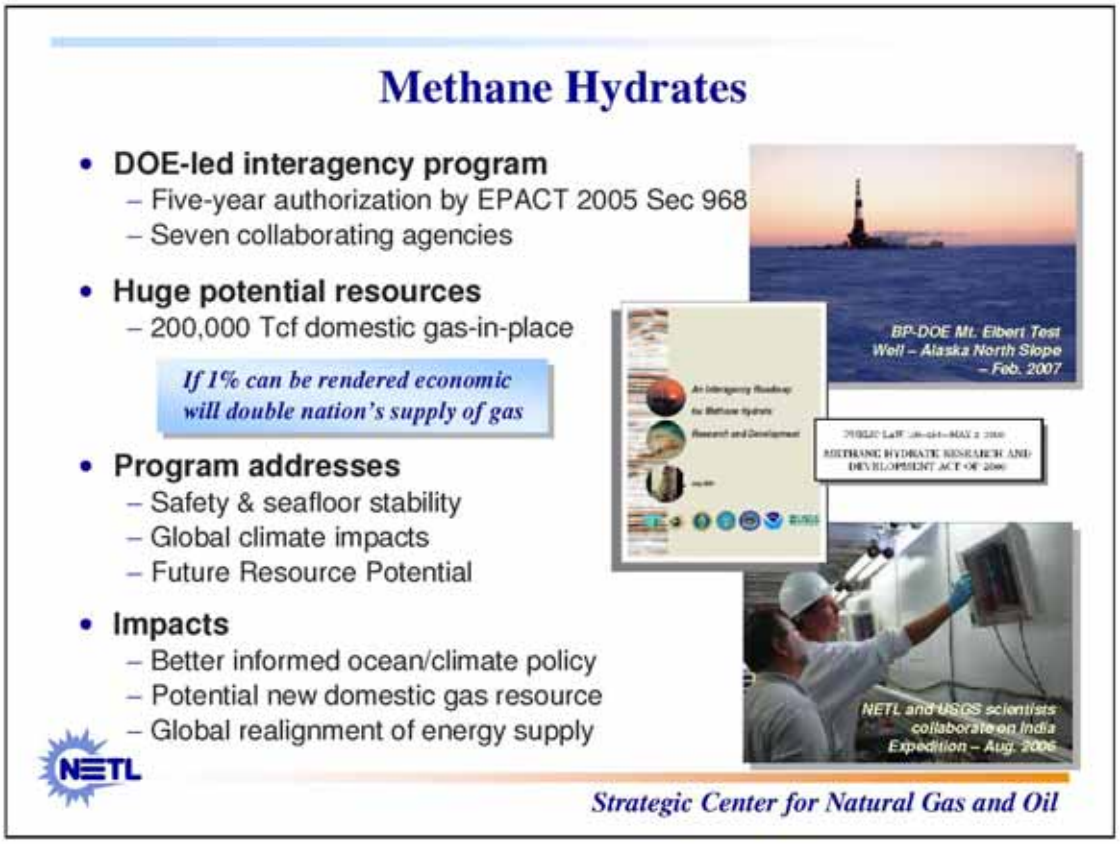
NETL

Strategic Center for Natural Gas and Oil

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.

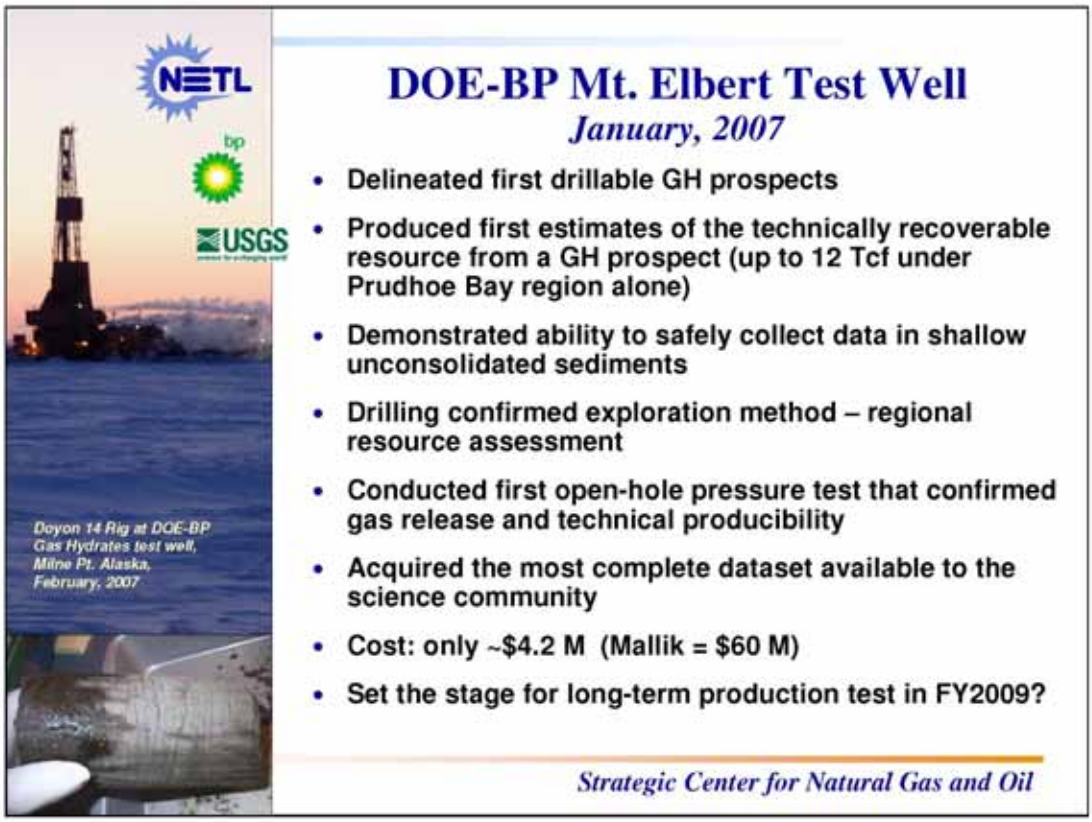
The current hydrate program includes major field programs in both arctic and marine (Gulf of Mexico) environments with concurrent pushes toward long term production testing in the arctic and enhanced resource assessment and hydrate detection/characterization methodologies in the Gulf of Mexico.

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.

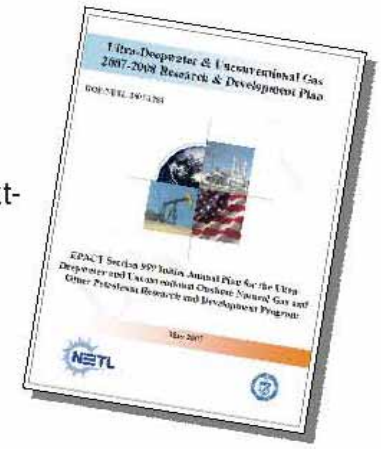
NETL and RPSEA have been very busy since the last Federal Advisory Committee meetings held during July 2007 in Washington, DC and Houston, TX. NETL and RPSEA worked closely together to complete the accomplishments listed. The first 2 accomplishments were significant as they were requirements of the RPSEA 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

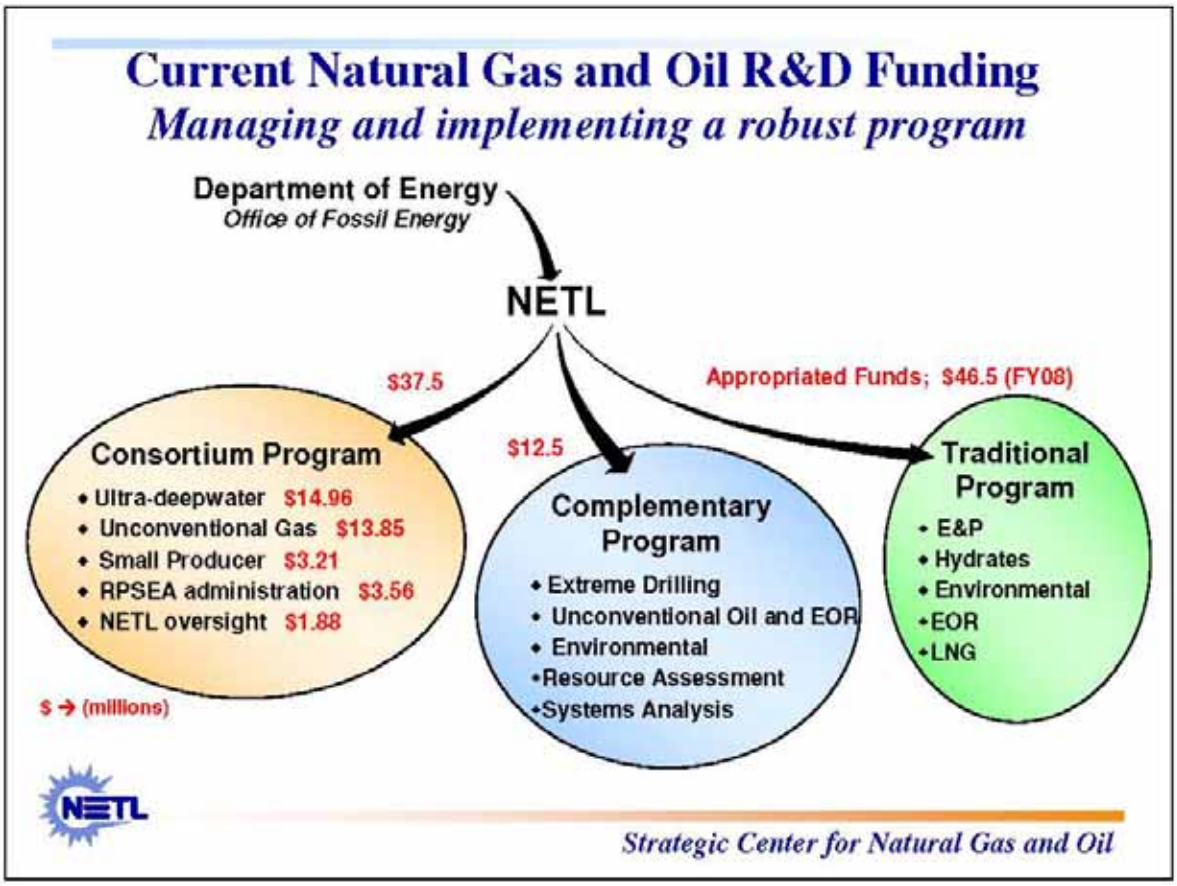
Program Philosophy

- **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**



Strategic Center for Natural Gas and Oil

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

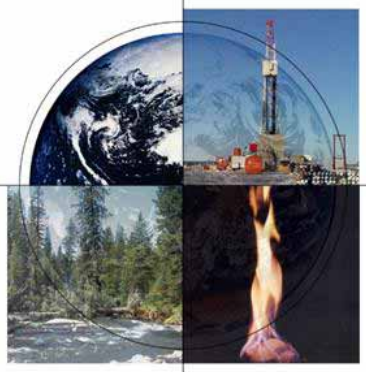
Strategic Center for Natural Gas and Oil

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



Unconventional Resources Technology Advisory Committee Recommendations - 2007 Annual Plan

Brad Tomer, Director

Strategic Center for Natural Gas & Oil

January 29, 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.

Unconventional Resources Technology Advisory Committee Sub-Groups

- Technology Transfer
- Regulations
- Water and Environmental Management
- Production Research Themes
- Exploration Research Themes
- Metrics and Funding
- Inter-Agency and Other Stakeholder Coordination

URTAC Recommendations for 2007 Plan

- **Technology Transfer**
  - Better formalize technology transfer component of plan (An entire technology transfer section has been added in the 2008 Plan)
  - Establish and maintain a Knowledge Management Database (Centralized activity to be funded by DOE; evaluation of alternatives to be carried out during 2008)
  - Tech transfer funding should effectively leverage all aspects of program (Centralized activity to be funded by DOE)
  - Given limited funds, Small Producer component should increase focus on technology transfer (All project results will be widely disseminated. DOE has funded PTTC and SWC.)

URTAC Recommendations for 2007 Plan

- **Regulations**
  - Regulatory barriers should themselves be subject for research as well as considerations in process (NETL's Center for Environmental Impacts will focus on this area)
  - Organize key stakeholders for brainstorming to identify regulatory barriers/issues (Will be conducted by RPSEA's Environmental Advisory Group)
  - Catalogue regulatory barriers/issues relating to unconventional gas development (NETL's Center for Environmental Impacts will review existing studies.)
  - Identify and recommend regulatory "best practices" to serve as flexible models for development of regulations (Will be included as part of NETL's Center for Environmental Impacts focus)
  - Suggest additional research to address regulatory barriers, including research related to unconventional petroleum resources (Addressed in Complementary Plan)

URTAC Recommendations for 2007 Plan

- **Water and Environmental Mgmt.**
  - Include minimization of environmental impacts and sustainability of biodiversity as considerations in project selection criteria (Included in the RPSEA RFP evaluation criteria)
  - Focus on technologies to minimize fresh water usage and encourage recycle of fluids (Included in 2007 Solicitations and addressed under traditional DOE R&D plan)
  - Catalogue existing technology solutions for treating produced waters (Being addressed by NETL's Center for Environmental Impacts)
  - Develop new or improved technologies to treat and reuse produced water (Included in 2007 Solicitations and under traditional DOE R&D plan)
  - Develop fracturing and drilling fluids capable of tolerating treated produced water/recycled fracturing fluids as a base fluid (Included in 2007 Solicitations)

URTAC Recommendations for 2007 Plan

- **Production Research Themes**
  - Focus on extending life of existing wellbores (Included in 2007 Solicitations)
  - Focus on advanced cementing practices and technology (Covered under "Extending life of commercial wells" in 2007 Solicitations)
  - Focus on integration of CO_2 sequestration/EOR (Currently addressed under other DOE R&D programs and in traditional oil and gas program)
  - Develop plans for future activities regarding unconventional oil (To be addressed in future annual plans and in traditional oil and gas program)
  - Emphasize solicitations for comprehensive characterization of the geological, geophysical and geochemical framework of unconventional resource plays (Included in 2007 Solicitations)

URTAC Recommendations for 2007 Plan

- **Exploration Research Themes**
  - Focus on technology to more effectively explore in emerging and or frontier basins, with emphasis on characterization of shale gas reservoir systems (Included in 2007 Solicitation)
  - Focus on improving the strategic planning process for exploration R&D (Will be addressed in future planning processes)
  - Focus on minimizing the exploration footprint (All projects will be evaluated based on minimizing environmental footprint)

URTAC Recommendations for 2007 Plan

- **Metrics and Funding**
  - Establish metrics to measure the success of the program; establish a committee of industry and other stakeholders to implement (NETL and RPSEA will work together; committee will be considered in future)
  - Extend program to all oil and gas producing regions of the U.S. (Priorities given to specific basins due to limits on available funds, however all regions are given consideration in 2007 Plan. Will also be addressed in future plans)
  - Full $50 MM per year funding of program must continue (Addressed in 2007 Plan)
  - Increase future funding (This is an inherent Federal role and will be considered by DOE-FE HQ. Existing program can be expanded to incorporate additional funding)

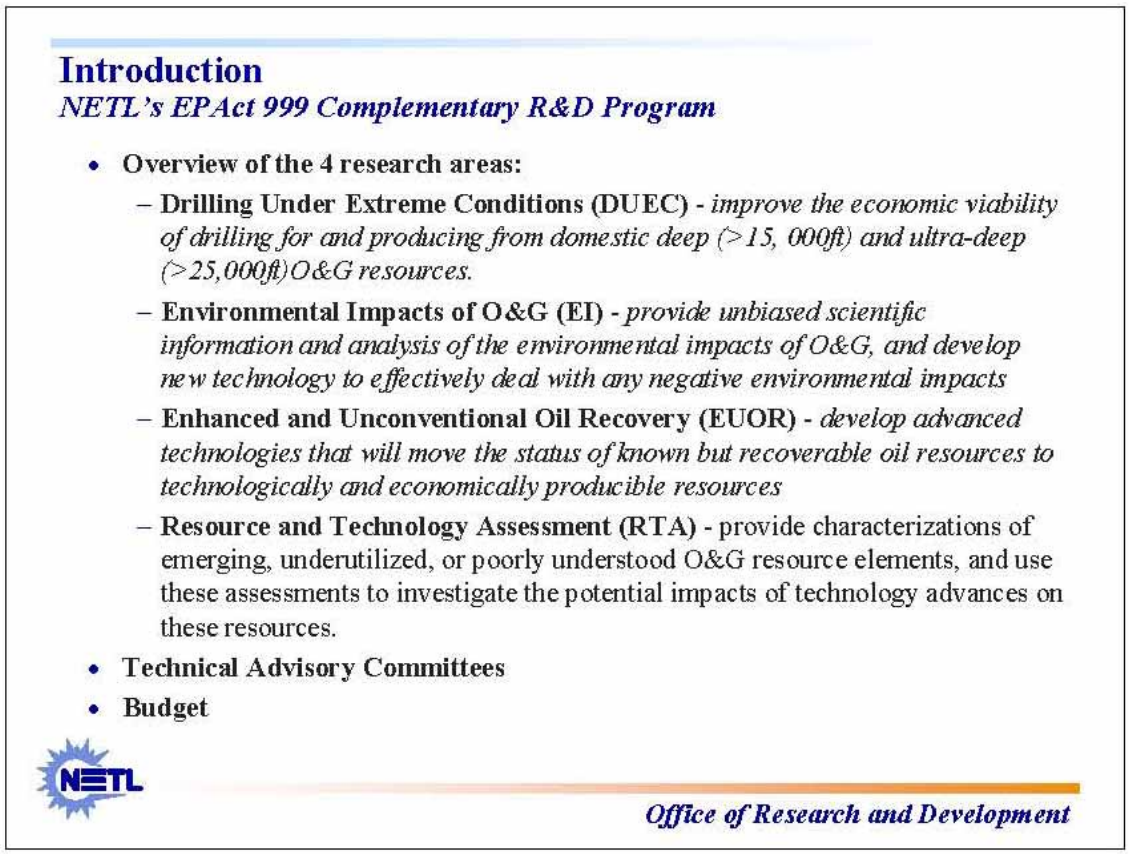
URTAC Recommendations for 2007 Plan

- **Inter-Agency and Other Stakeholder Coordination**
  - Coordinate with Federal and State resource entities such as U.S. Fish and Wildlife Service, BLM, U.S. Forest Service, State environmental agencies, and State resource agencies (This is an inherent Federal role and will be pursued by DOE-FE HQ)

Attachment 5

Attachment 6

Jamie Brown was unexpectedly unable to be with us today.

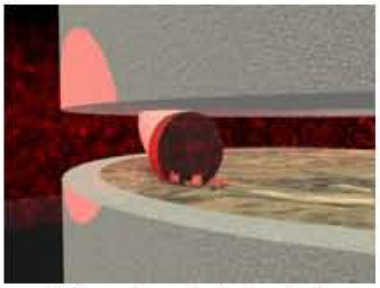


•The complementary program focuses on the fundamental science and engineering building blocks to advance the exploration and production technologies necessary to aid in the transition of the vast and currently uneconomic resources to commercially viable supply sources.

•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



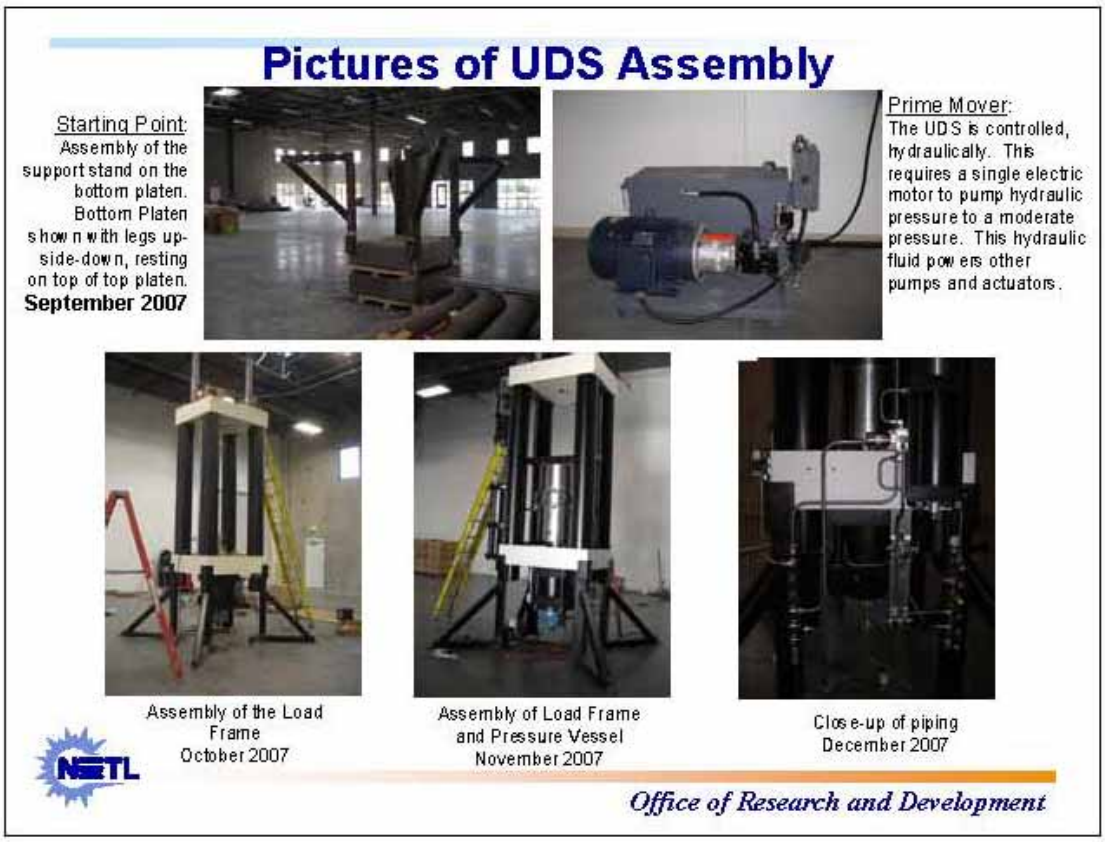
- **Numerical Modeling**
  - Modeling rock and drill cutter behavior under HPHT conditions to explain/predict rock response to various drilling modes
    - rock strain during cutting
    - formation of shear bands
    - influence of fluids in rock pores
  - Input to UDS test plans as well as back-analysis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

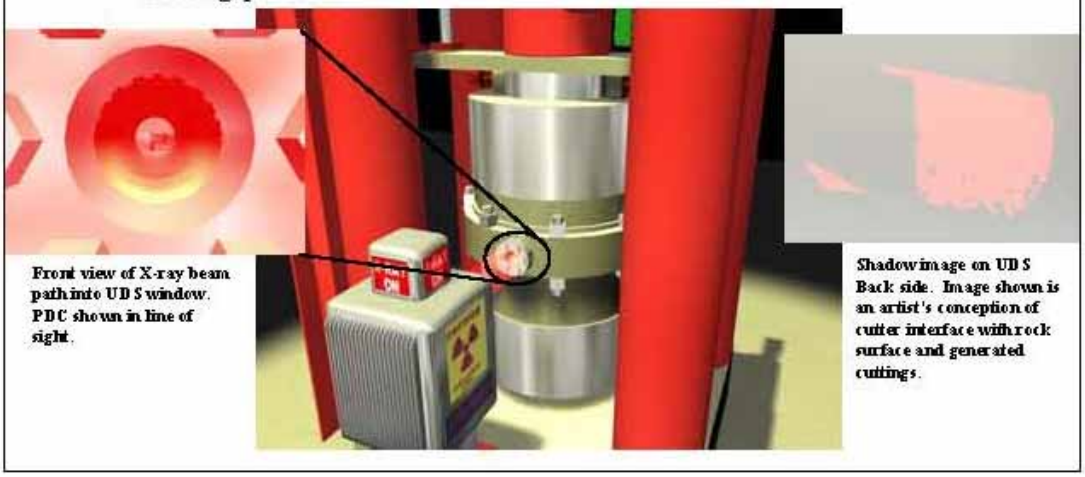
Bottom Center: The UDS Pressure Vessel is shown in the center of the load frame. A reaction column (not shown) will be installed on hinges and will transmit load to the top platen.

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

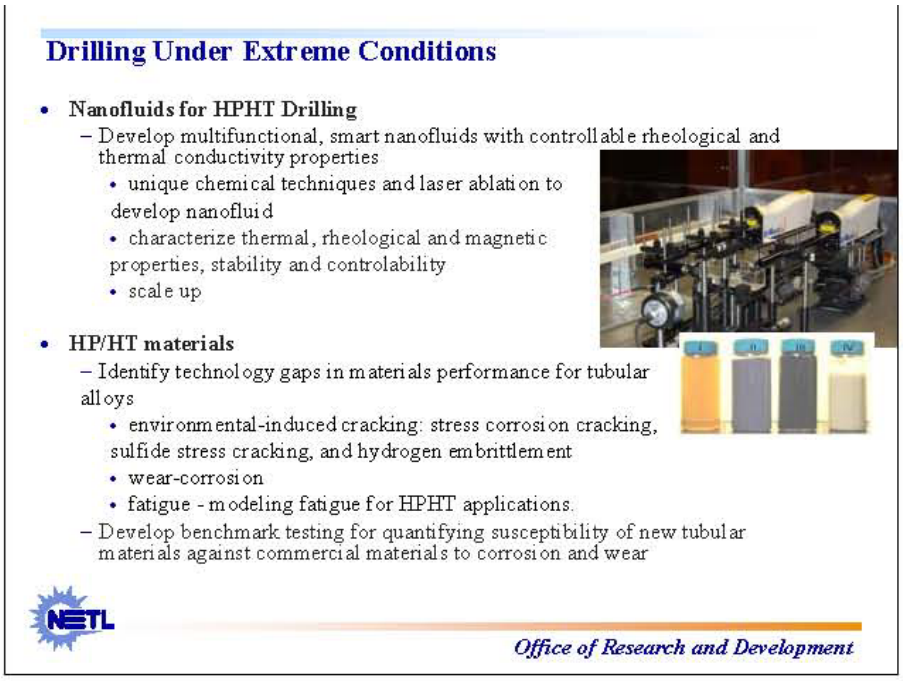
- **Visualization provides**
  - Specifics on rock deformation & strain as cuttings form
  - Shape of rock cutting as it forms
  - Evidence of how test parameters (e.g. fluid properties) change cutting process



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

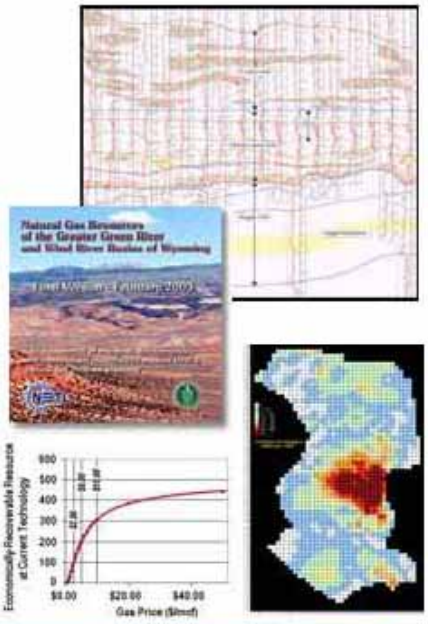
- There are a number of sites that will be accessed that have reports, maps, digital data and GIS files that are related to the oil shale and tar sand resources in the Piceance and Uinta basins of the western US. The USGS and BLM have a number of references that can be accessed online. It is intended 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.



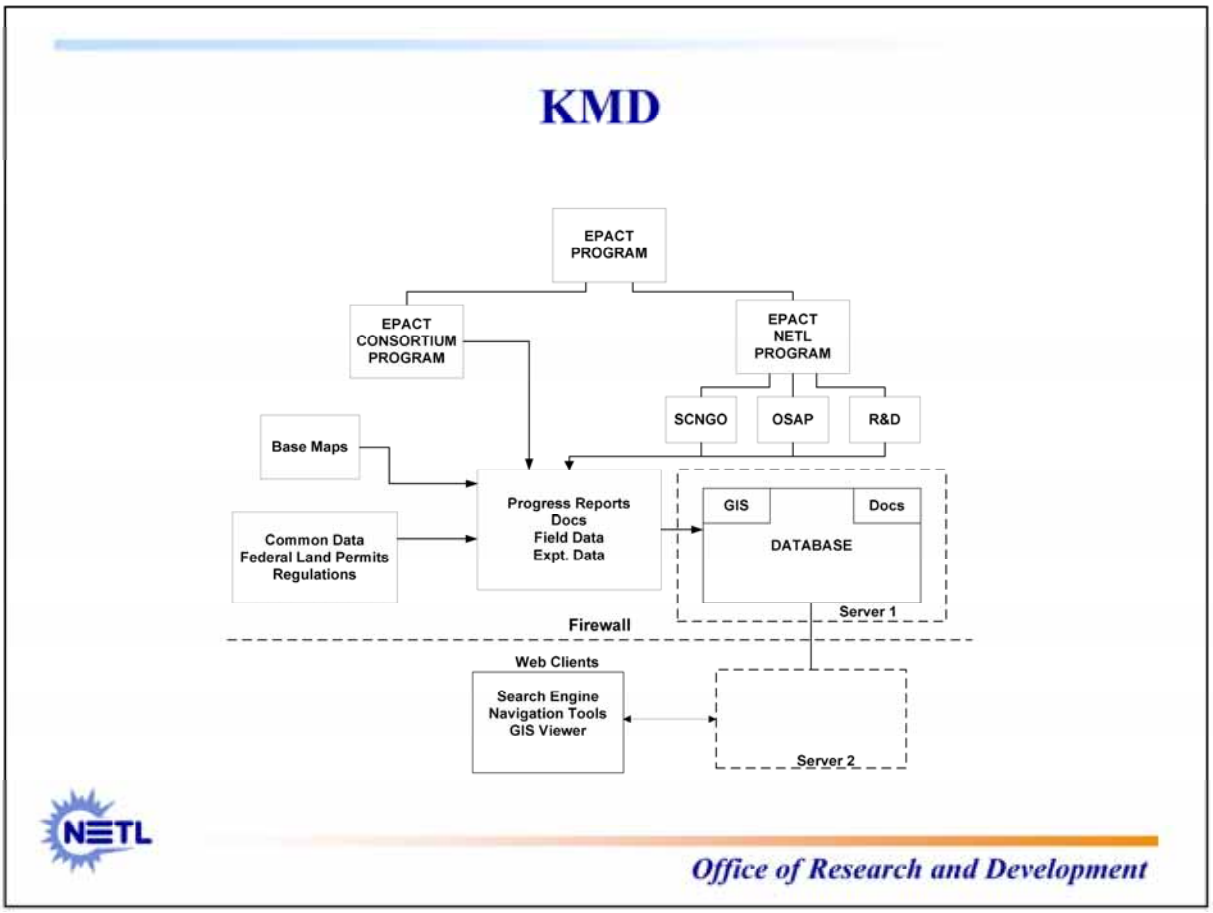
Resource and Technology Assessments

- Knowledge Management Database (KMD)
  - Recommended by the Federal Advisory Committee
  - Central repository for output generated from the Consortium, NETL Complementary R&D Programs, and other ongoing DOE O&G programs
  - Current effort is the design phase of the KMD
  - Example of data/dataset to be housed: project reports, test results, and spatial data
  - End user web interface
    - search engine
    - interactive map viewing of spatial data
    - expert systems

Office of Research and Development

•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.

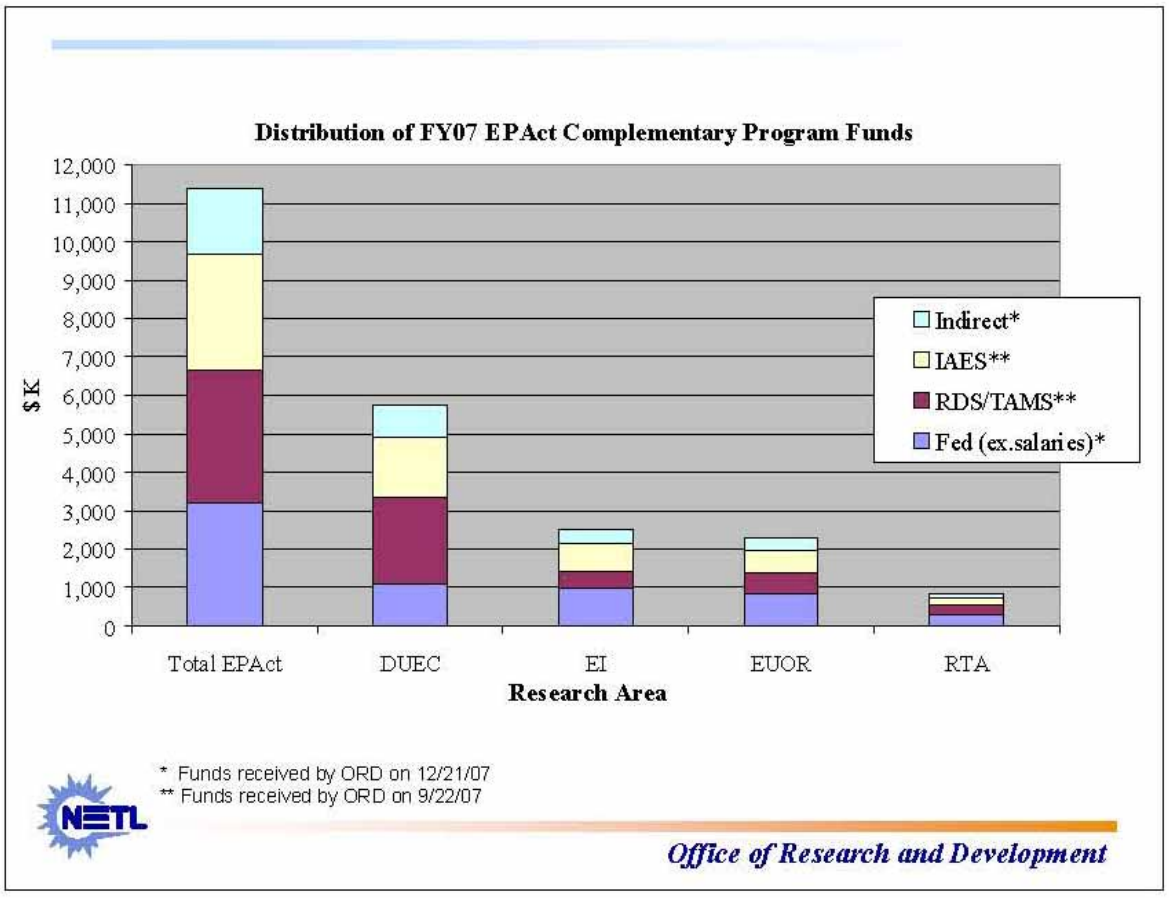
•The KMD will be delivered to registered users and the public via the internet. The initial design envisions a system which will provide the end user with navigation tools to help visualize the structure of the content, a search engine tool, interactive maps for viewing spatial data, and expert system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



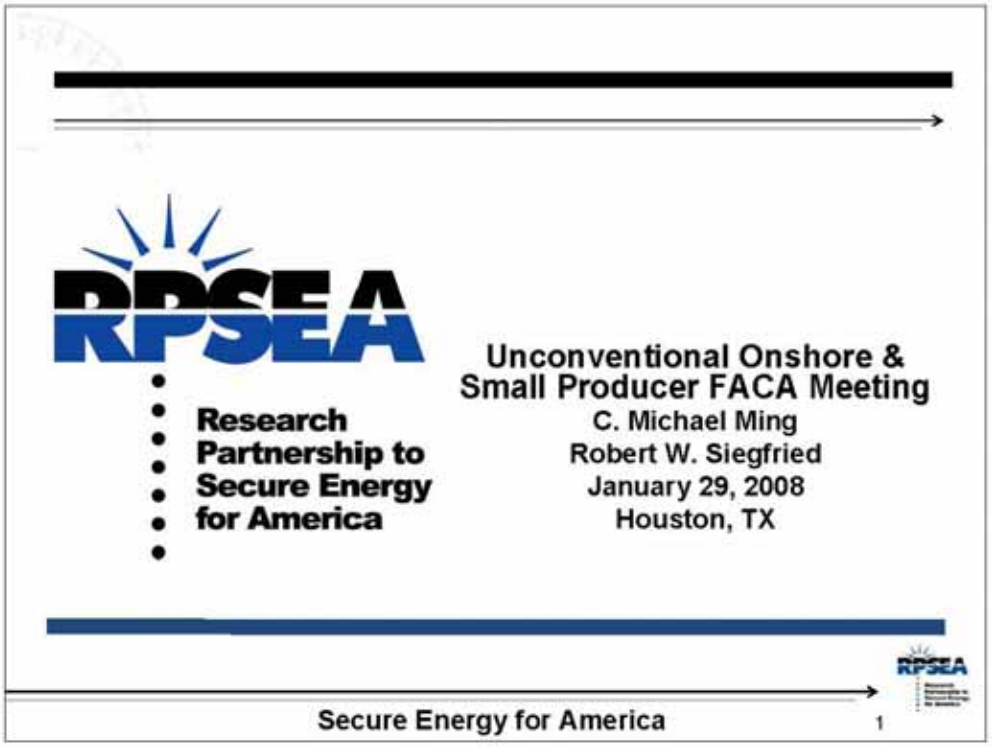
•The KMD task will collect information from the EPACT projects and design databases to hold the information. We will add support data, such as maps and relevant regulatory information. The initial design calls for 2 high performance servers, one located inside NETL's firewall and the other located outside 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.

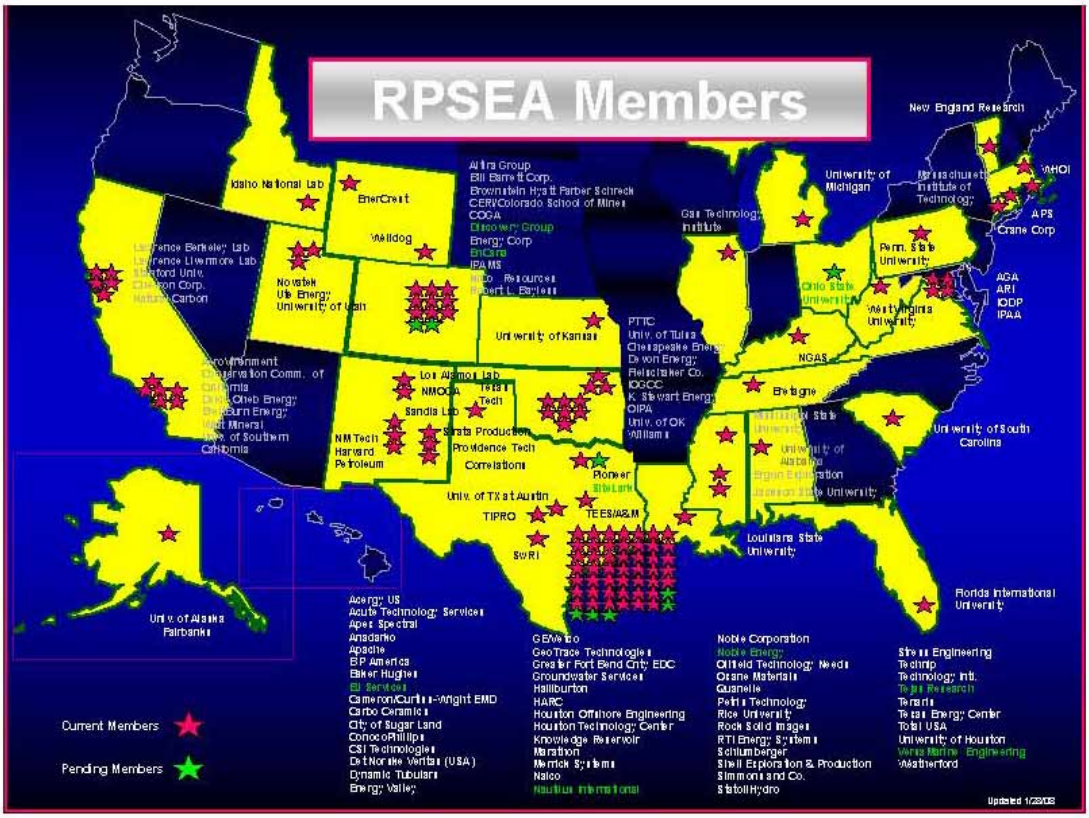
Technical Advisory Committee

- 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
12,000
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
$ K
Indirect*
IAES**
RDS/TAMS**
Fed (ex.salaries)*
Total EPAct
DUEC
EI
EUOR
RTA
Research Area
* Funds received by ORD on 12/21/07
** Funds received by ORD on 9/22/07
NETL
Office of Research and Development

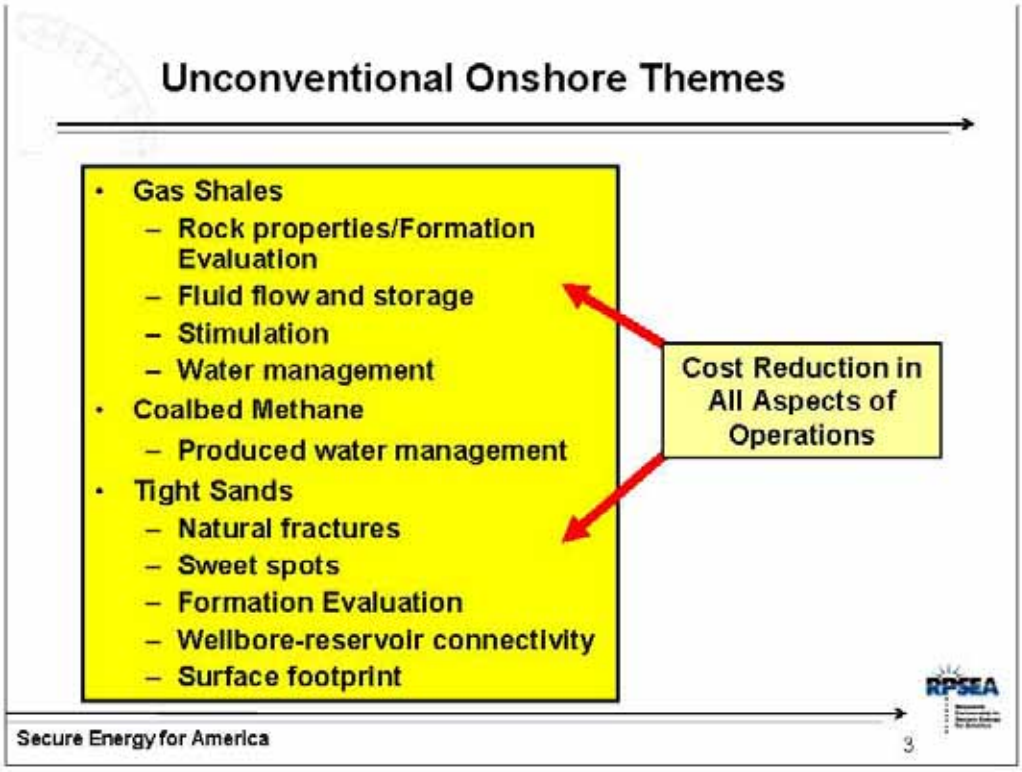
Attachment 7





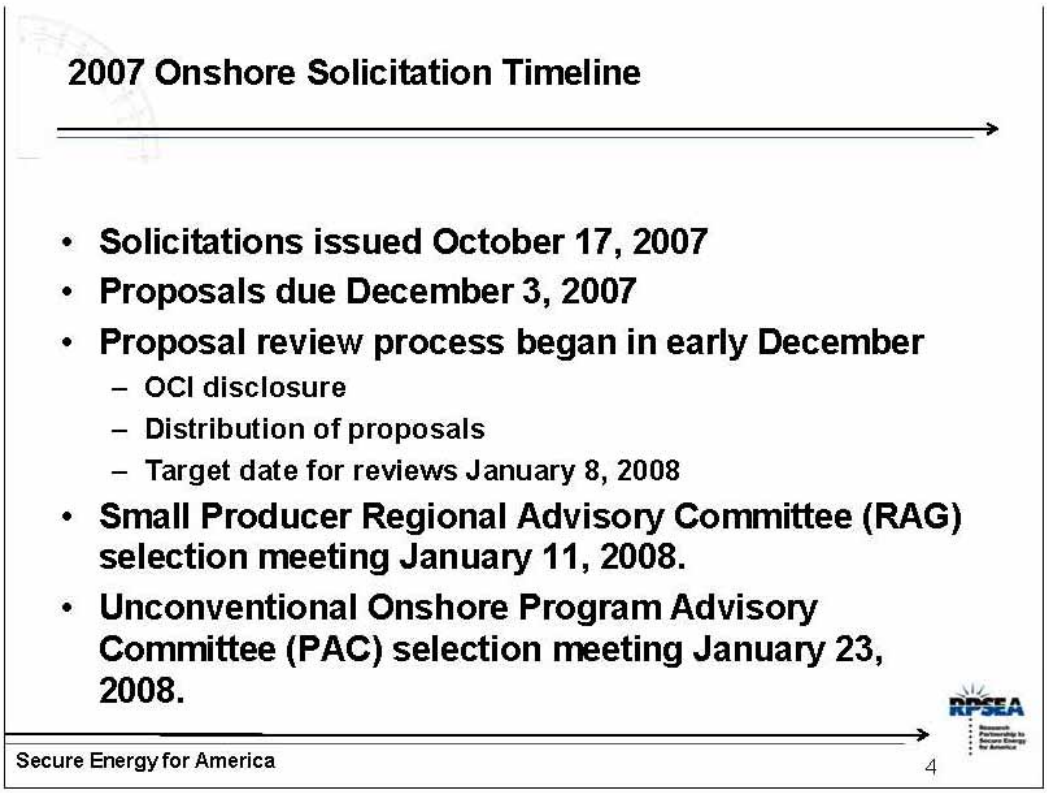
There has been significant activity since the last FACA meeting. RPSEA developed the initial RFP's based on the 2007 Annual Plan and issued them in early fall with review and selection ongoing as will be discussed in further slides. From a membership standpoint RPSEA has grown 30% since last summer with now over 130 members. RPSEA has now held a total of 14 member forums with approximately 1,000 attendees devoting thousands of man-hours at no cost to help develop priority research areas. 5 additional member forums are planned for this spring to continue this effort. In addition RPSEA has been building support of the public/private collaborative model to maximize leverage on the public funding in multiple venues around the country such as COGA, OTC, and other smaller gatherings enlisting voluntary support for the effort and encouraging research proposals. These efforts, as detailed in subsequent slides, have paid off in the quantity and quality of proposals. The robust advisory committee structure, with several thousand man-hours of voluntary contribution, is now enhancing the value of this impressive portfolio by integrating the proposals to make the total value greater than the sum of the individual parts.

While the first year has had a steep learning curve, the first pass thru any cycle is the most difficult and RPSEA, in partnership with NETL, has made significant progress in efficiently and effectively implementing Section 999. It is exciting now to be talking about what RPSEA is doing rather than what it is going to be doing as RPSEA moves into the actual performance phase of research to address the nations' critical energy challenges.



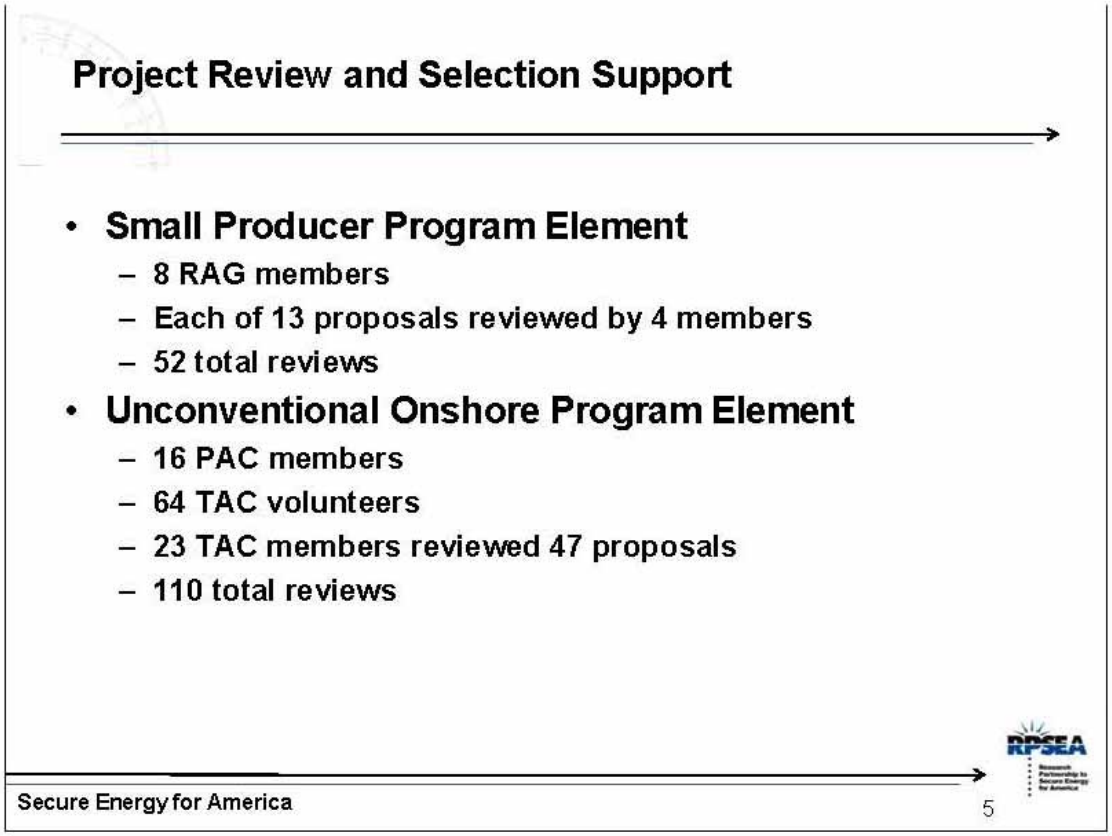
•The solicitation was designed to be very open to a range of ideas with the potential to impact the economic and environmentally sensible development of the targeted resources.

•The intent of the solicitation was to identify problems, but not to specify solutions.



These dates illustrate the timing of the Small Producers and Unconventional Onshore solicitation and project selection process.

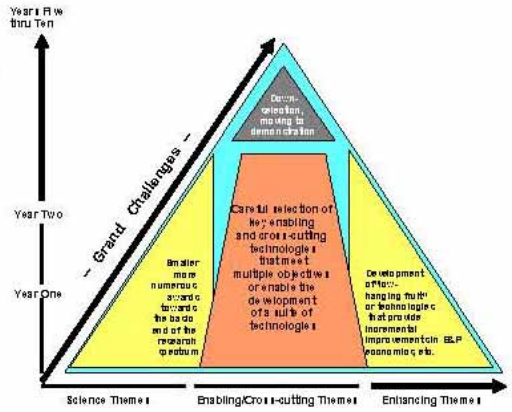
The process of determining whether potential reviewers had conflicts of interest and identifying reviewers free of such conflicts added one to two weeks to the time between receipt of proposals and their distribution to reviewers.



A significant number of volunteers who were not on the RPSEA or DOE staff participated in the selection process.

Onshore Review and Selection

- Technical Reviews
  - Grouped proposals by topic
  - Each group of 4 to 6 proposals given to a generally common set of reviewers
- Selection Meetings (PAC and RAG)
  - Set overall program priorities
  - Selected proposals for funding
    - Technical Reviews
    - Program priorities
    - Budget constraints
    - Potential contribution to an integrated, balanced program



A two-step process was used for project selection. Proposals in a given area were given technical reviews by reviewers with expertise in that area. For the final project selection, broad-based advisory committees set program priorities and added projects to the portfolio based on the technical reviews, alignment with program priorities, budget constraints and the potential for contribution to an integrated, balanced program. Program balance was sought with respect to time scale, technology area and resource target.

Onshore Program

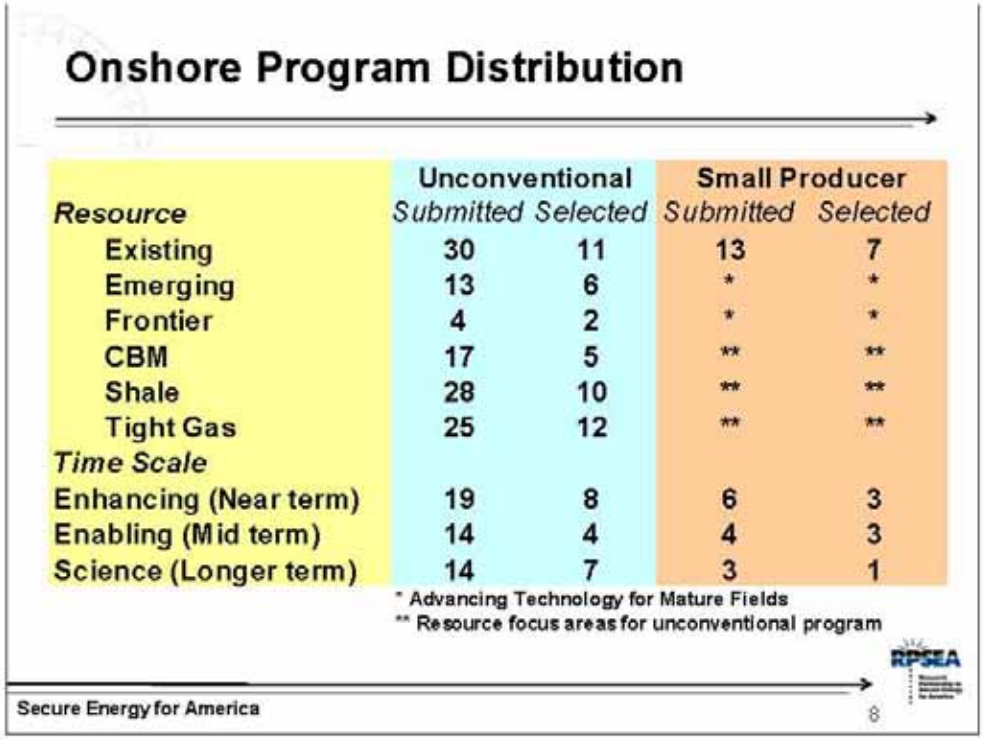
	Unconventional		Small Producer	
	Submitted	*Selected**	*Submitted*	*Selected**
Total Cost ($MM)	$102.0	$34.3	$12.6	$6.0
RPSEA Share ($MM)	$49.5	$19.6	$6.3	$3.2
Number of Proposals	47	19	13	7
University	25	13	7	6
Research Institution	2	1		
National Lab	3	2	2	1
Industry	13	1	3	
State Organization	4	2	1	

*Selections subject to approval and negotiation

Secure Energy for America

7

The profile of the selected projects, subject to DOE approval and negotiation, are shown in the next three slides. The preliminary selections were based on using the entire 2007 program budget, plus 35% of the 2008 program budget, as approved by DOE. Most of the industry proposals were submitted by technology providers, not by oil and gas producers. These results highlight a need to provide guidance to these companies that will encourage proposals that are more closely aligned with program goals and hopefully achieve a better success rate. However, it should be noted that most of the university proposals submitted and selected in both the Unconventional and Small Producer programs involve partnerships with producers. As universities have more experience with the accounting and management requirements of government-funded R&D than oil and gas producers, it is not surprising that the universities would tend to be the prime contractors in such partnerships.



The Small Producer program focus is on Advancing Technology for Mature Fields, so the targeted resources are by definition in the existing category. The categories CBM, shale and tight gas are not meaningful for the Small Producer program, as the program is not limited to these resources. The total number of proposals listed in the CBM, Shale and Tight Gas categories is greater than the number of proposals submitted, as some proposers identified multiple areas to which their proposed work could be applied, as permitted in the solicitation. While the number of "Science" proposals selected is almost as high as the number of proposals selected in the "Enhancing" category, the total funding for the "Science" projects is less, as befits earlier stage seed projects.

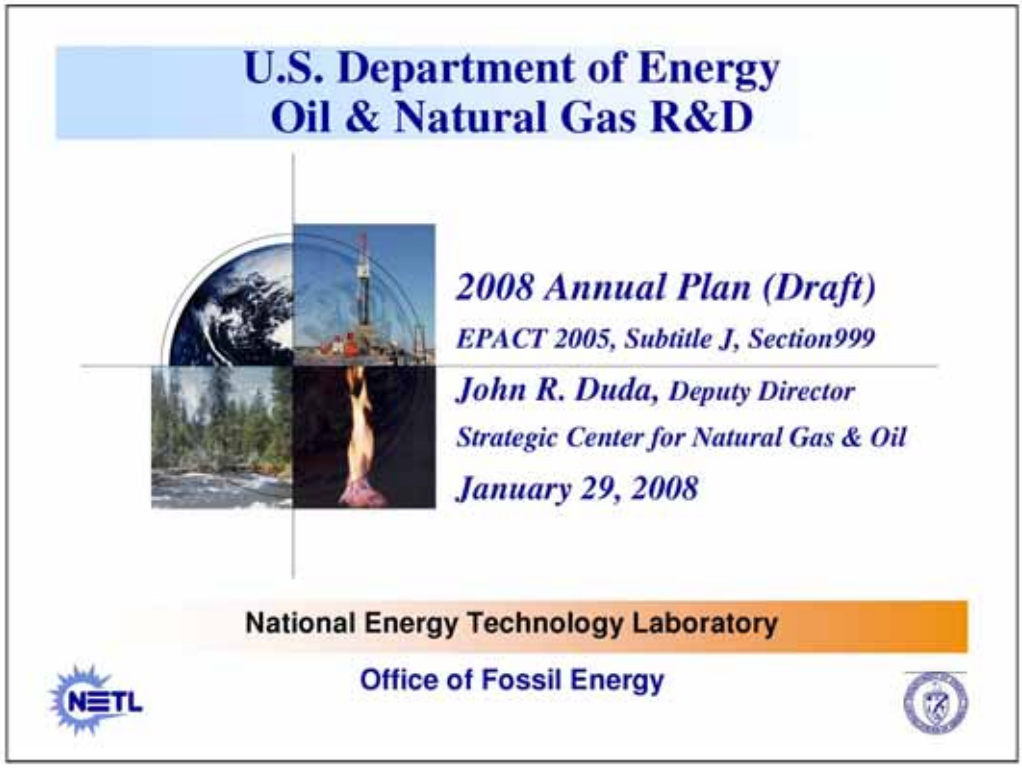
Onshore Program Distribution

Technology Areas	Unconventional		Small Producer	
	Submitted	*Selected*	*Submitted*	*Selected*
Produced Water Treatment	6	1	1	1
PW Use and Control	4			
Fracturing	6	5	1	
Drilling & Completion	6	1	4	3
Resource Assessment	6	3		
Basin Analysis	4	2		
Reservoir Engineering	6	4	1	1
Reservoir Description	6	2	3	
Miscellaneous	3	1	3	2

Water management was an area in which the submitted proposals were perceived to be less well aligned with program goals. This represents an opportunity to craft a future solicitation with more definition about the needs in water management in order to encourage more competitive proposals in this area. Not surprisingly, topics associated with fracturing and improving our understanding of unconventional resources did well in the selection process.

Questions?

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

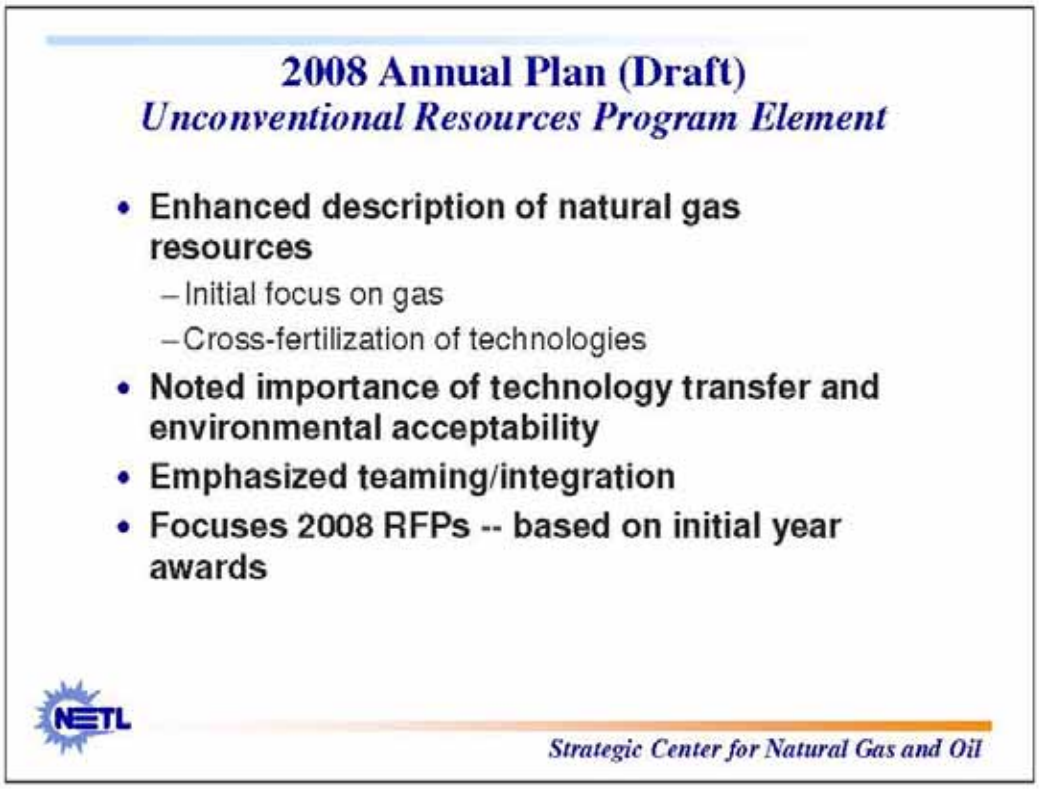
Strategic Center for Natural Gas and Oil

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

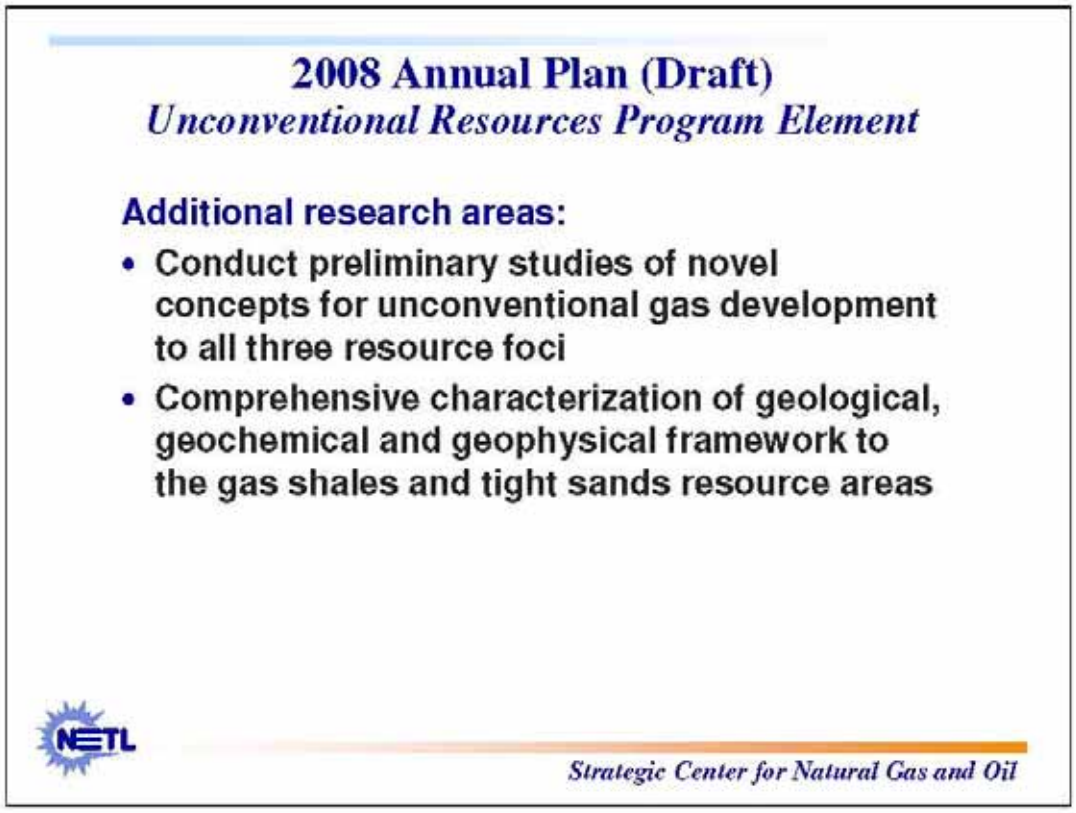
Note that the program consortium's Draft Annual Plan (DAP) input in included in the 2008 annual plan (draft) as Appendix C – "verbatim"

The six bullets listed in this slide highlight the main or *general* 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.

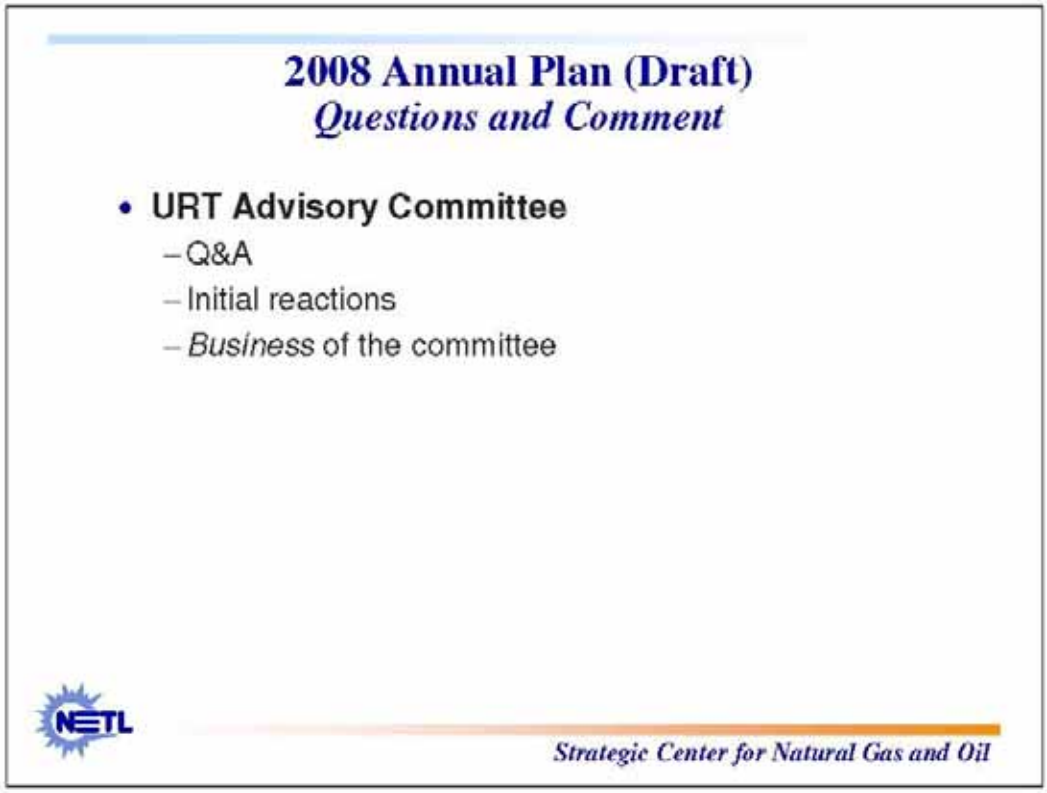


The information in this slide is specific to the Unconventional Resources program element. In the 2008 annual plan (draft) [as compared to the final 2007 annual plan], the description of natural gas resources is a bit more robust, the treatment of technology transfer is emphasized as is the requirement that all advanced technologies be environmentally benign, teaming arrangements are highly encouraged, and a general statement that 2008 RFPs will focus on technology areas or gaps that are not addressed in the 2007 round of program consortium solicitations.



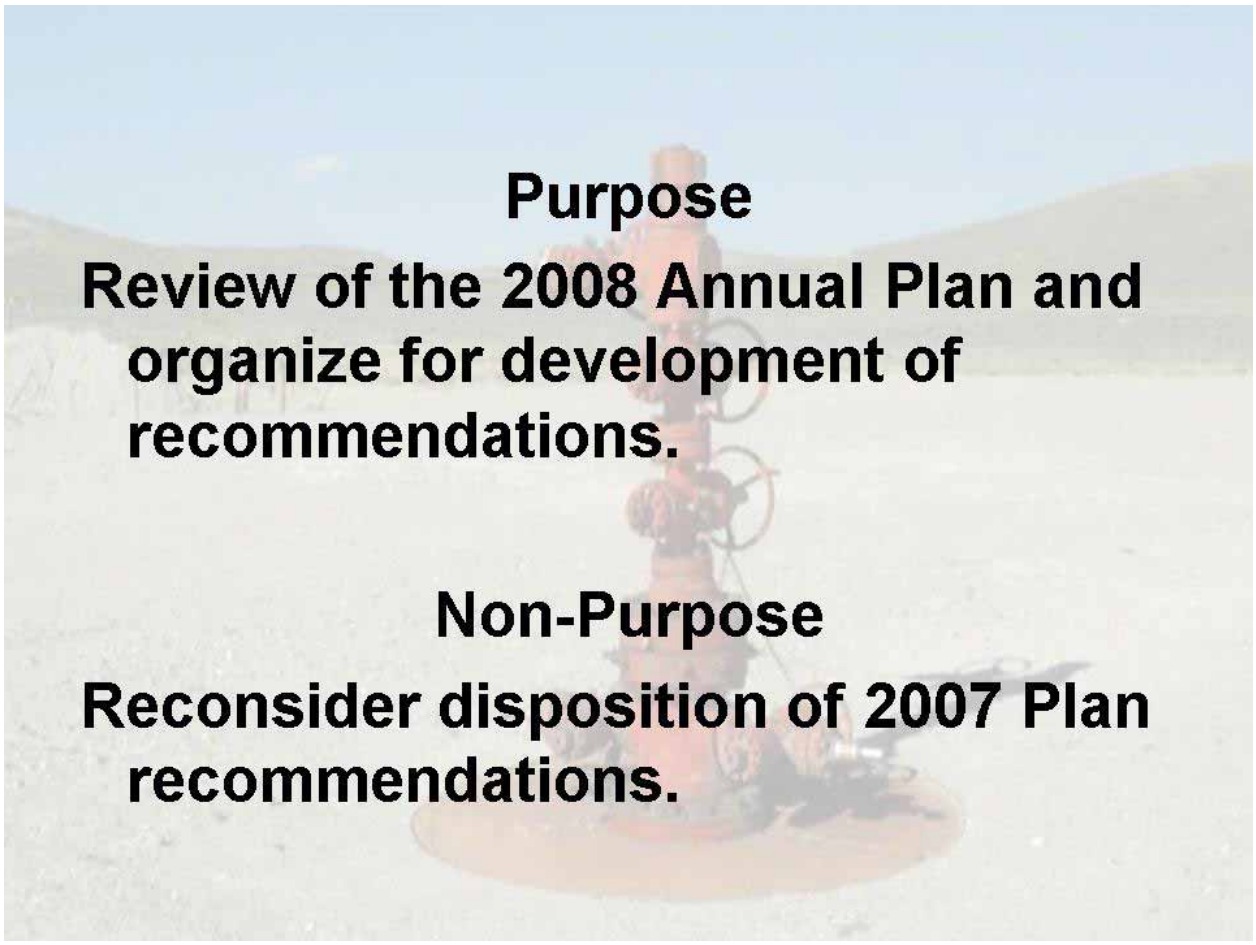
Two additional areas of research were included in the 2008 annual plan (draft). These two areas are summarized in the slide and should be self-explanatory.

The information on this slide lists the changes in the 2008 annual plan (Draft) compared to the 2007 plan with respect to the small producers element of the program consortium's area of responsibility. In short, additional discussion on encouraging technology developer-well operator/producer interface and more specific text related to technology transfer (noting that 2.5% of each award must go towards tech transfer) is included in 2008 plan (draft). Also, an additional technical area ("industrial waste" usage) is included in the 2008 annual plan (draft) which "speaks to" maximizing efficiencies and thus, profits.



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

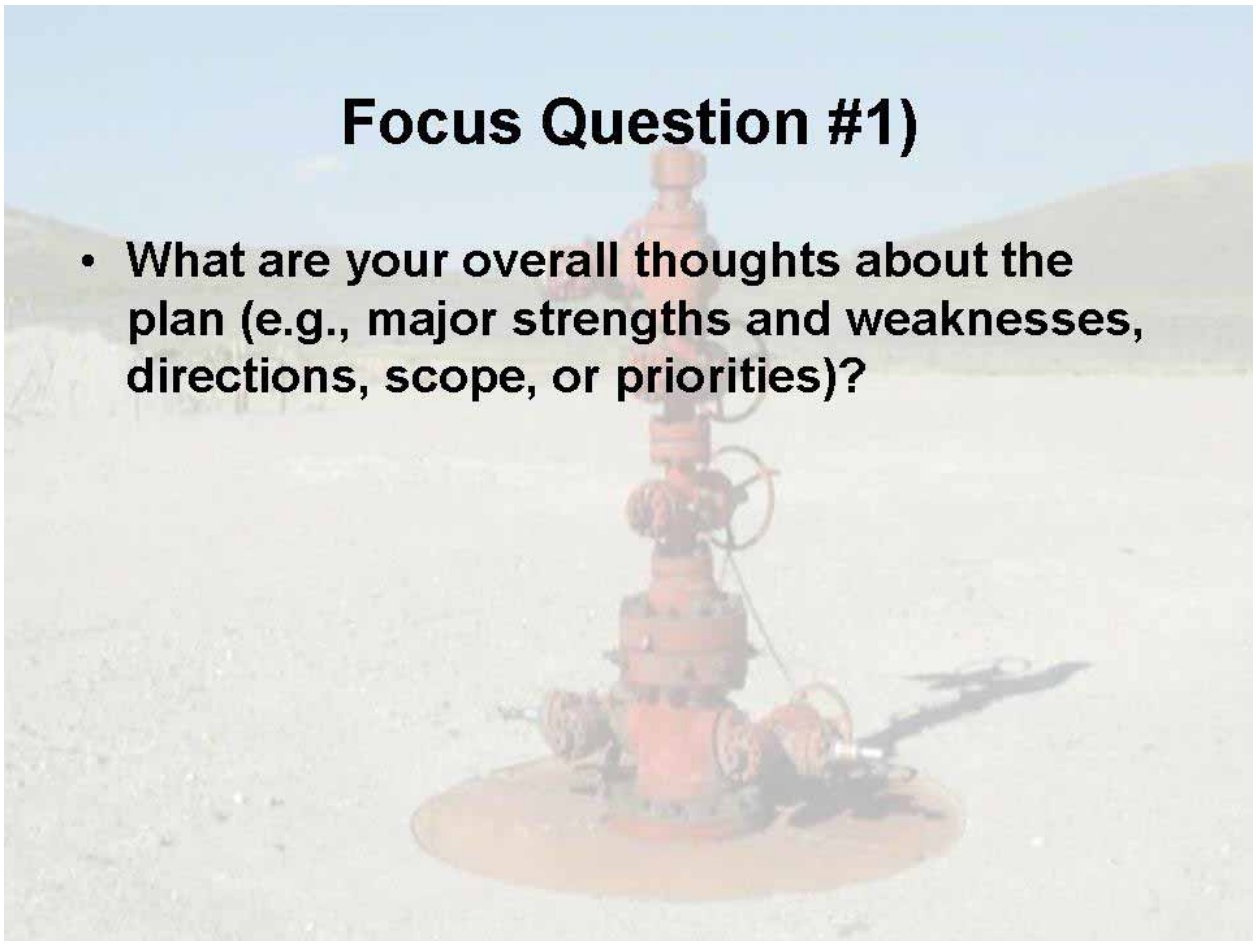
Reactions to the Plan

#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

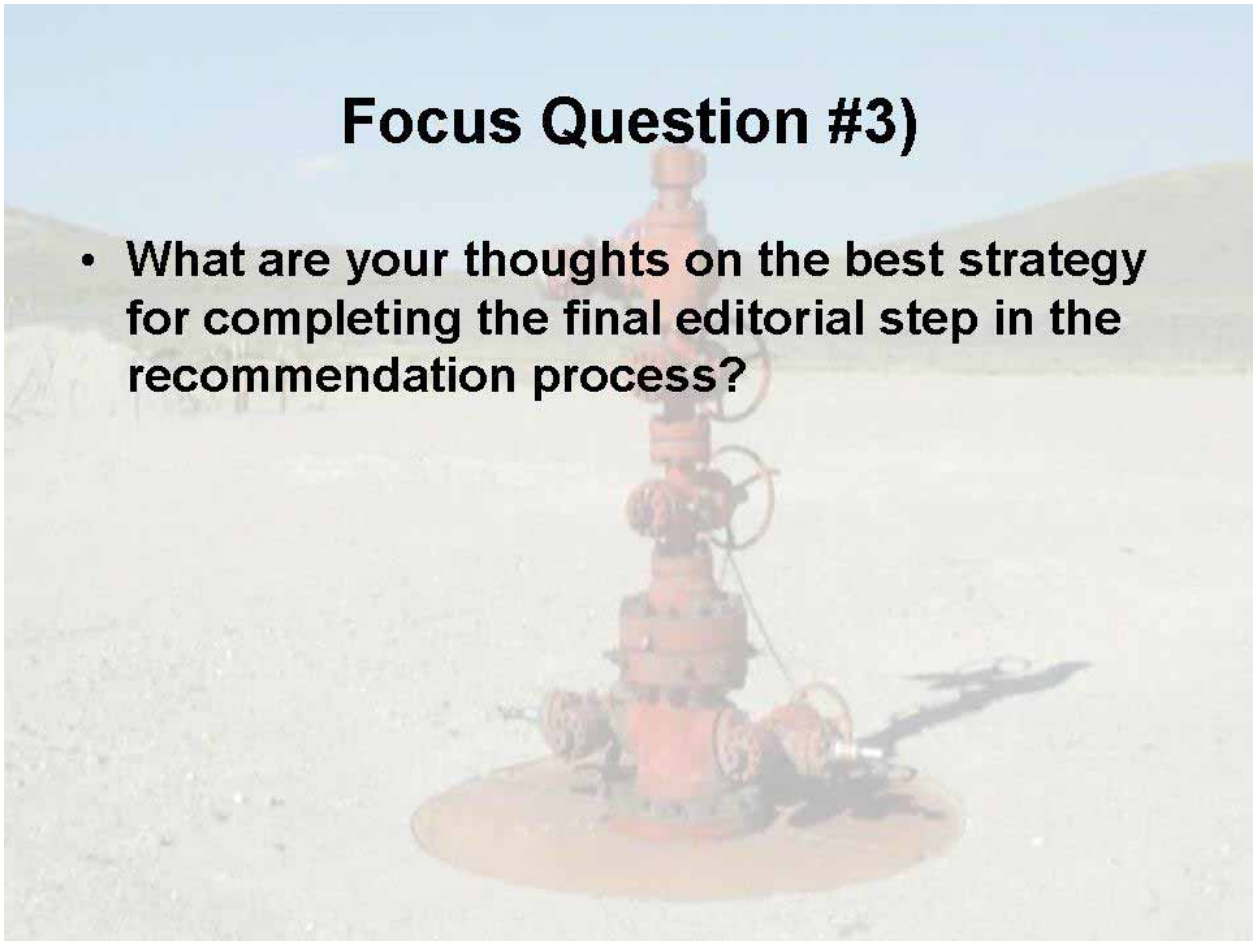
#2) What are your suggestions for how to organize your activities between now and the March meeting (recommendation focus groups, deliverables, schedules)?

#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

UNCONVENTIONAL RESOURCES TECHNOLOGY ADVISORY COMMITTEE MEETING,

FACILITATED DISCUSSION COMMENTS

OVERALL COMMENTS ON PLAN CONTENT				
METRICS	**FUNDING**	**COMPLEMENTARY PROGRAM**	**TECH TRANSFER**	**UNCONVENTIONAL RESOURCES (OTHER THAN GAS)**
• Follow up on implementation of 2007 recommendations • At the next meeting identify the "gaps", may need abstracts to identify	• Allocate funds for problems not addressed • Timeframe	• Need to examine treatment of other resources in the complimentary program	• Maintain focus on technology transfer • More specifics on technology transfer	• Don't forget oil shale, tar sands, heavy oil • Discussion needed about plans to meet CO_2 sequestration
SOLICITATIONS (INCL. COMMUNICATONS)	**TECHNOLOGY (INCL. COMMUNICATONS)**	**RPSEA FEEDBACK LOOP (INCL. COMMUNICATONS)**	**ITEMS BEYOND DOE**	**COMMUNICATIONS (TIED TO SOLICITATIONS, TECHNOLOGY, AND RPSEA FEEDBACK LOOP)**
• Give guidance to folks not accustomed to writing proposals • Workshops to generate better proposals • Program geared toward those who have business models designed for Federal funds – find ways to help others • More small producers	• Look at reservoir characterization again (e.g., tight sands) • Define "produced water", not just produced water			• Look into holding workshops on general issues, information sharing • Look into lessons learned, need more information from 2007-2008 • Try to emphasize areas that did not generate proposals • Maintain notion in public's eye that things are happening • Look at

PLAN RESPONSE SUBCOMMITTEES				
SOLICITATION	**TECHNOLOGY TRANSFER**	**POLICY**	**CONTENT TECHNOLOGY GAPS**	**OTHER PETROLEUM**
• Sally Z. – leader • Gene A. • Jessica C. • Don S. • Ray L. • David B. • Fred J.	• Chris H. – leader • James D. • Julie F. • Bill D. • Scott A. • Fletcher L. • Fred A. • Jeff H. • Gene A.	• Fred J. – leader • Nick T. • Ken A. • David B. • Victor C.	• James D. – leader • Ken A.	• Vikram R – leader • Chris H. • Ray L. • Nick T. • Russell C.

Editorial Committee – Gene A., Chris H., Sally Z., Fred J.

SCHEDULE FOR DELIVERABLES *	
SUBCOMMITTEE INPUT TO LEADERS	2/15
LEADERS SUBMIT FINAL RECOMMENDATIONS TO CHAIR	2/25
COMBINED RECOMMENDATIONS DISTRIBUTED TO ALL BY CHAIR	2/26
2ND MEETING IN DC; FINAL RECOMMENDATIONS (EDITORIAL COMMITTEE BEGINS WORK)	3/4
TELECONFERENCE; FORMAL VOTE ON FINAL URTAC REPORT	3/13 FROM 1-2PM

* 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

Membership

- **Energy Policy Act of 2005**
  - Subtitle J-- Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources
  - SEC. 999D. ADVISORY COMMITTEES.
    - (b) Unconventional Resources Technology Advisory Committee-
    - (2) MEMBERSHIP- The Secretary shall endeavor to have a balanced representation of members on the Advisory Committee to reflect the breadth of geographic areas of potential gas supply. The Advisory Committee under this subsection shall be composed of members appointed by the Secretary, including--
      - **(A) … employees or representatives of independent producers… including small producers;**
      - **(B) … extensive research experience or operational knowledge of unconventional natural gas …**
      - **(C) …broadly representative of the affected interests in unconventional natural gas and other petroleum resource exploration and production, including interests in environmental protection and safe operations;**
      - **(D) … expertise in the various geographic areas of potential supply …**
    - (3) DUTIES- The Advisory Committee under this subsection shall--
      - (A) advise the Secretary on the development and implementation of activities under this subtitle related to unconventional 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 *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

Unconventional Resources Technology Advisory Committee Meeting
Sign-In Sheet - January 29, 2008

Last Name	First Name	Organization	Sign
Ames	Eugene L.	Nordan Trust	
* Aminzadeh	Fred	Society of Exploration and Geophysicists	
Ancell*	Kenneth	Ancell Energy Consulting, Inc.	
Anderson	Scott	Environmental Defense Fund	
Bardin*	David J.	Arent Fox LLP	
Carrillo	Commissioner Victor G.	Railroad Commission of Texas	
Cavens	Jessica J.	EnCana Oil & Gas (USA)	
Conser	Russell J.	Shell International E&P Inc.	
Daugherty	William S.	NGAS Resources, Inc.	
Dwyer	James P.	Baker Hughes INTEQ	
Falkner	Julliette A.	The Nature Conservancy	
Frantz	Joe	Unbridled Energy Company	
Hall	Jeffrey D.	Devon Energy Corporation	
Hall	J. Chris	Drilling Production Co.	
Julander	Fred C.	Julander Energy Company	
Lewis	Fletcher S.	Fletcher Lewis Engineering, Inc.	
Levey*	Raymond	College of Engineering University of Utah	
Mosher	James A.	North American Grouse Partnership	
* O'Bryan	Patrick L.	BP America, Inc.	
Rao	Vikram	Halliburton	
Sparks	Don L.	Discovery Operating, Inc.	
Tew	Berry H. "Nick"	State Oil and Gas Board of Alabama	
Zinke	Sally G.	Ultra Petroleum	

* Special Government Employee

Attachment 13

Unconventional Resources Technology Advisory Committee Meeting

Public Walk-In List - January 29, 2008

Last Name	First Name	Organization
Alleman	David	ALL Consulting
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
Radtke	Bob	Technology International, Inc.
Schroeder	Art	RPSEA
Siegfried	Bob	RPSEA