

# Unconventional Resources Technology Advisory Committee

Advisory Committee to The Secretary of Energy

March 13, 2008

The Honorable Samuel W. Bodman  
Secretary of Energy  
U. S. Department of Energy  
Washington, DC 20585

Dear Mr. Secretary:

On behalf of the Unconventional Resources Technology Advisory Committee (URTAC), it is my pleasure to submit our unanimous findings and recommendations based on our review of the unconventional resources technology and small producers portion of the Draft Ultra-Deepwater & Unconventional Gas 2008 Research and Development Plan.

The committee finds that:

The Federal government has the opportunity and responsibility to provide leadership in helping coordinate, develop and disseminate the results of research and development programs in the area of Unconventional Resources and related to Small Producers for public benefit and National security. The Unconventional Resources R&D program provides the Nation with an opportunity to develop oil and gas resources to meet its current and future energy demands by providing a sustainable bridge as other energy sources are developed.

The URTAC provides the following recommendations:

- The program receive full annual funding, with increases as proposed by HR 4156 and rising to a total of \$150 million based on continuing Program success and its duration be extended to 2030 based on continued Program success.
- That OMB and Congress should respect the technical expertise of industry contributions to the plan and proactively strive to provide funding in a timely manner.
- That the findings of the National Petroleum Council 2007 study be taken into consideration when preparing the FY2009 Annual Plans.
- The 2008 Plan should focus on areas that were under addressed in the 2007 program solicitation with a project solicitation process designed to encourage oil and gas producers to submit proposals by linking them with partners such as universities and service companies who are familiar with the process.

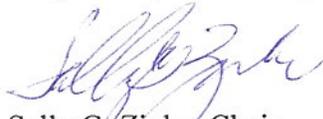
# Unconventional Resources Technology Advisory Committee

Advisory Committee to The Secretary of Energy

- RPSEA, NETL and DOE headquarters should assess what improvements could be made from greater flexibility in solicitation and contract negotiation, thereby increasing potential program dividends.
- The Program should include solicitation of projects to develop innovative models for technology transfer.
- The 2008 Plan should include a strong, timely, proactive technology transfer framework using existing technology transfer mechanisms (such as the PTTC) should be used whenever possible.
- By providing additional support from the Section 999 NETL Complimentary program and the DOE traditional R&D programs, funding for the technology transfer should be increased so that it can be expanded.
- The results of the projects must be captured and preserved as part of a national information database available to everyone.
- Best Practices (including in critical areas such as environmental protection) identified during the projects should be incorporated into the technology transfer program.
- Research project guidelines should specify that the final report format must be useable by small producers; that it needs to be “pushed” to the end users; and that success of the project depends upon successful completion of an effective technology transfer component.
- For the 2009 Section 999 plan, the DOE should assess “other petroleum” domestic onshore resources and identify an initial set of technology gaps which need to be addressed. This should include pure upstream plays that are economically and environmentally challenged.
- The DOE needs to become actively involved in Federal, State and regional decision-making processes that might impact future oil and gas resource development.

The URTAC recommends proceeding with implementation of the R&D Plan consistent with the guidelines outlined in our report.

Respectfully submitted,



Sally G. Zinke, Chair  
(303)-645-9837

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**Unconventional Resources Technology  
Advisory Committee**

**Comments and Recommendations  
2008 Unconventional Gas  
Research and Development Plan**

**March, 2008**

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## 1.0 INTRODUCTION

The Unconventional Resources Technology Advisory Committee (URTAC) was formed in accordance with provisions of Section 999D(a) of the 2005 Energy Policy Act (EPACT)

The Committee consists of:

- A majority of members who are employees or representatives of Independent producers of natural gas and other petroleum, including small producers;
- Individuals with extensive research experience or operational knowledge or unconventional natural gas and other petroleum resource exploration and production;
- Individuals 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;
- Individuals with expertise in the various geographic areas of potential supply of unconventional onshore natural gas and other petroleum in the United States.

The provisions of EPACT excluded from eligibility to participate in URTAC, Federal employees and board members, officers and employees of Research Partnership to Secure Energy for America (RPSEA).

The duties of the URTAC under EPACT Section 999 are to advise the Secretary on the development and implementation of programs related to unconventional natural gas and other petroleum resources and to review the draft annual research plan.

The Committee members were appointed by letters from the Secretary on May 11, 2007. Key milestones for the Committee included:

- Committee members received the draft annual plan on January 9, 2008.
  - Committee members participated in a joint meeting with DOE and RPSEA representatives on January 29, 2008 in Houston, Texas. Committee members provided initial comments regarding the Unconventional Resources and Small Producers portion of the draft 2008 annual plan at this meeting.
  - During the period from January 29<sup>th</sup> through March 3<sup>rd</sup>, Committee members conducted several teleconference calls to develop and consolidate recommendations regarding the draft annual plan.
  - The Committee met on March 4, 2008 in Washington, D.C. to develop a draft of and agree on final recommendations by the Committee.
  - The Committee met via teleconference on March 13, 2008 in Washington, D.C. to complete final approval of the committee report in accordance with the deadline set by the Secretary and the Designated Federal Officer.
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Section 999 sets the funding for the overall program at a level of \$50-million-per-year over 10 years, provided from Federal lease royalties, rents, and bonuses paid by oil and gas companies. After allocations for program management by NETL and consortium research and development (R &D) administration by RPSEA, the amounts to be distributed for R&D total \$42.56 million (\$32.06 million per year for consortium R&D and \$12.5 million per year for complementary R&D). It is anticipated that there will be \$13.89 million available for funding the Unconventional Resources program element during each fiscal year beginning with 2007 and \$3.21 million for funding the Small Producer Program.

To date, RPSEA has selected 26 of the 67 proposals it has received<sup>1</sup>. In fashioning proposed plans, solicitations, and selections, RPSEA has drawn on a broad range of professional expertise and diverse practical insights, establishing technical advisory committees and selection committees with hundreds of volunteer members, largely drawn from industry. Additional committees include a high level Strategic Advisory Committee, two Program Advisory Committees and a small Producer Advisory Group. RPSEA committees have met many times, with NETL participating. RPSEA has sponsored 14 member forums open to all interested parties and scheduled five more.<sup>2</sup> RPSEA now has 130 members in 27 states spanning all resources, constituencies (*i.e.*, industry segments, academia, associations, state agencies, environmental, and other stakeholders), and geography. The approved FY 2007 Plan, solicitations to date, and the FY 2008 Annual Plan (Draft) rest on these bases.

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<sup>1</sup> Information supplied to URTAC by RPSEA and DOE includes:

Appendix A, three slides summarizing statistics for 47 Onshore Unconventional and 13 Small Producer proposals as of January 25, 2008, and selections made (but not yet approved by NETL and prior to contract negotiation) of 19 and 7, respectively.

Appendix B, RPSEA Release of 20-Feb-08 announcing seven approved (but not yet negotiated) Small Producer proposals.

Appendix C, Unconventional Onshore proposals categorized by funding levels.

Appendix D, Organizations (by category) Participating in [the 19] Selected Research Projects.

<sup>2</sup> See [www.fe.doe.gov/programs/oilgas/ultra\\_and\\_unconventional/index.html](http://www.fe.doe.gov/programs/oilgas/ultra_and_unconventional/index.html) (with its link to NETL) and [www.rpsea.org](http://www.rpsea.org) for more information.

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## **2.0 EXECUTIVE SUMMARY AND RECOMMENDATIONS**

These findings and recommendations are at a strategic level and address the overall quality of the plan and provide general guidance regarding setting priorities and execution of the plan through the projected 10 year horizon. The Committee reviewed and discussed the Draft Plan and identified major areas of concern. Subgroups were formed to analyze and compose comments and recommendations for these areas. Subgroup reports were distributed to the entire Committee and each was discussed by the Committee as a whole. Following this discussion, the entire committee agreed on and drafted the comments and recommendations included in this report.

### **Findings:**

The general public and many elected leaders are apparently unaware of the importance of domestic oil and gas production in supplying the country's energy needs; without it we will not be able to provide sufficient energy to satisfy the increasing demand during the next ten years or longer. It will take at least that long for some of the alternate renewable resources to come on line in meaningful quantities. We believe that anything that can be done to ensure the responsible development of our domestic petroleum resources is essential to help bridge this gap.

Successful execution of this research and development (R&D) program will materially contribute to U.S. supply of oil and gas both today and beyond the 10 year R&D horizon. It is the consensus of this Committee that the resource potential impacted by this technology program is significant and of major importance to the Nation. There is a critical need for a sustainable and consistent approach to the technology challenges facing unconventional resource development.

The Committee believes the Plan and the procedures followed in its development to be professional and inclusive, with a significant infusion of industry knowledge. The combined Management Team (DOE, RPSEA and its extended network of industry resources) is highly qualified to plan and execute this complex 10 year R&D undertaking.

The Committee has confidence that the program consortium, Research Partnership to Secure Energy for America (RPSEA), will continue to implement the program consistent with our recommendations.

The Federal government has the opportunity and responsibility to provide leadership in helping coordinate, develop and disseminate the results of research and development programs in the area of Unconventional Resources and related to Small Producers for public benefit and National security. The Unconventional Resources R&D program provides the Nation with an opportunity to develop oil and gas resources to meet its current and future energy demands by providing a sustainable bridge as other energy sources are developed.

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## **Recommendations:**

The committee recommends:

1) Policy:

- a) The program receive full annual funding, with increases as proposed by HR 4156 and rising to a total of \$150 million based on continuing Program success.
- b) The program duration be extended to 2030 based on continued Program success.
- c) The program extend to all producing regions of the United States.
- d) That OMB and Congress should respect the technical expertise of industry contributions to the plan and proactively strive to provide funding in a timely manner.
- e) That the findings of the National Petroleum Council 2007 study be taken into consideration when preparing the FY2009 Annual Plans.

2) Solicitations:

- a) The 2008 Plan should focus on areas that were under addressed in the 2007 program solicitation.
- b) The project solicitation process should be designed to encourage oil and gas producers to submit proposals by linking them with partners such as universities and service companies who are familiar with the process.
- c) RPSEA, NETL and DOE headquarters should assess what improvements could be made from greater flexibility in solicitation and contract negotiation, thereby increasing potential program dividends.
- d) The Program should include solicitation of projects to develop innovative models for technology transfer.

3) Technology Transfer:

- a) The 2008 Plan should include a strong, timely, proactive technology transfer framework.
  - b) Existing technology transfer mechanisms (such as the PTTC) should be used whenever possible.
  - c) By providing additional support from the Section 999 NETL Complementary program and the DOE traditional R&D programs, funding for the technology transfer should be increased so that it can be expanded.
  - d) The results of the projects must be captured and preserved as part of a national information database available to everyone.
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- e) Best Practices (including in critical areas such as environmental protection) identified during the projects should be incorporated into the technology transfer program.
  - f) Research project guidelines should specify that the final report format must be useable by small producers; that it needs to be “pushed” to the end users; and that success of the project depends upon successful completion of an effective technology transfer component.

4) Other Petroleum Resources:

- a) For the 2009 Section 999 plan, the DOE should assess “other petroleum” domestic onshore resources and identify an initial set of technology gaps which need to be addressed. This should include pure upstream plays that are economically and environmentally challenged.
  - b) The DOE needs to become actively involved in Federal, State and regional decision-making processes that might impact future oil and gas resource development.
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## **3.0 TOPICAL REPORTS**

The USA is blessed with large onshore resources of natural gas and oil that are not economically accessible today but could become accessible on meaningful timetables, if government and industry make adequate investments in R&D and technology transfer. Developing reserves in the USA will meet high environmental standards and provide leadership for other countries on how to develop resources most benignly. National oil companies are committing more of their national resources to their own development plans rather than export. The USA needs to develop its own resources.

Proving up USA onshore resources and bringing them into production more rapidly could yield enormous public benefits – worth hundreds of billions of dollars a year – in terms of national security, reduced imports, and more favorable balance of payments, less dependence on foreign nationally-owned oil companies, high-quality science and technology jobs in the USA and research opportunities for faculty and students at American universities, income to workers and royalty owners (private, state and local royalty owners, as well as Federal royalty owners), and consequently tax revenues.

If the Federal government provides this leadership, it can make sure that the research our country needs will happen, knowing that industry and academia will join in response to opportunities and challenges government sponsorship will offer.

At the January 29th meeting the following Subgroups and schedule were established for developing the Subgroup analyses and reports. Following the Subgroup conference calls, the Content Technology Gaps subgroup incorporated its recommendations into the Solicitations and Technology Transfer reports and did not file a separate subgroup report.

### **Five Recommendation Areas:**

- Policy
- Solicitations
- Technology Transfer
- Other Petroleum Resources
- Content Technology Gaps

### **Schedule**

2/12 – Recommendations to leaders  
2/13-18 – Subgroup conference calls  
2/25- Subgroup reports to Chair  
2/26- Subgroup reports distributed to Committee  
3/4 – Meeting in Washington, D.C.  
3/13- Teleconference and formal vote on final URTAC Report

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### **Treatment of Non-Consensus**

In situations where members were divided, the following categorization was used:

*Majority Agreement* – 50% or greater of Committee members were in agreement with the statement

*Minority Opinion* – fewer than 50% of Committee members were in agreement with the statement

## **3.1 POLICY**

Oil and natural gas will remain indispensable for meeting the projected domestic energy demand. The U.S. is blessed with large unconventional onshore resources of natural gas and oil, which when developed in a sustainable fashion will enhance domestic energy security. Independent oil and gas producers drill 90 percent of the Nation's oil and gas wells and produce 82 percent of the natural gas and 68 percent of the oil. These Independents are faced with unique and ever more difficult technical challenges in developing new unconventional resources, yet they often lack the means to undertake R&D programs. Therefore, the Federal government has a responsibility to provide leadership and to help fund and disseminate the results of R&D programs for public benefit. The Section 999 Program can contribute substantially to the U.S. supply of oil and gas and improve the capabilities of the technical workforce both today and beyond the current Energy Policy Act 10 year R&D horizon. The resource potential of this technology program is significant and of major importance to the Nation; exportable technologies stimulated by this program could help other countries. There is a critical need for a sustainable and consistent approach to the technology challenges facing unconventional resource development. If the Federal government will lead, industry and academia will respond, and much more research will happen (see Appendix E for more details).

### **Program Recommendations:**

1. The Committee recommends the following for annual funding levels:
    - full funding of the Section 999 program at the \$50 million annual level now set by the 2005 Energy Policy Act, plus
    - a one-year addition of a second \$50 million (as proposed by H.R. 4156) and
    - ultimate amendment of Section 999 to raise annual funding to a total of \$150 million from royalties, based on continuing Program success.
  
  2. The Committee recommends the following for Section 999 program duration:
    - Congressional clarification that the “sunset” provision will last through at least 2017 (rather than being cut off in 2014) and
    - ultimate amendment of Section 999 to extend the program funding and “sunset” provisions to 2030, based on continued Program success.
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3. The Committee strongly recommends that the program reach out broadly to all oil and gas producing regions of the United States.

### **Plan Recommendations:**

1. OMB should respect the technical expertise of the industry and academic contributions that are reflected in the Plan and limit its reviews to policy issues. OMB should proactively help DOE, NETL, and RPSEA get the Section 999 program on a timetable matched to the *start* of each fiscal year. Furthermore, Congress should streamline procedures so that the Section 999 program can realize more of its potential for government, industry, academia cooperation in a timely fashion, as the 2005 Energy Policy Act undoubtedly intended.
2. RPSEA, NETL, and DOE headquarters should weigh the findings, analyses, timetables, and recommendations of National Petroleum Council in their report FACING THE HARD TRUTHS ABOUT ENERGY: A Comprehensive View to 2030 of Global Oil and Natural Gas, 2007, (posted at [www.npchar truthsreport.org](http://www.npchar truthsreport.org)), particularly its Technology Chapter (Chapter 3), as they complete and implement the FY2008 Annual Plans for both RPSEA and NETL's Complementary Program, and in preparing their FY2009 Annual Plans.

## **3.2 SOLICITATIONS**

Unlike traditional DOE programs, the Unconventional Resource and Small Producer plan will be reaching out to many new potential oil and natural gas research and development participants, including oil and gas producers, academics, non-profits and other groups who are unfamiliar with DOE/NETL contracting and accounting requirements. It is important that domestic oil and gas producers have opportunities to seek technological solutions to address problems and increase production. A benefit from research and development is the opportunity to engage researchers, students, academics and producers in projects that further our Nation's oil and natural gas research and development capabilities.

### **Recommendations:**

1. The 2007 solicitation for the Unconventional Resources and Small Producers projects was extremely broad. The 2008 plan should increase its solicitation focus on the areas which may have been under-addressed in the response to the 2007 solicitation, including but not limited to water management, drilling, stimulation and completion practices. Creating a balanced portfolio of projects is critical. The solicitation should
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provide information that guides prospective respondents in an effective way. Consideration should be given to coordinating the solicitation with other solicitations within the traditional DOE program and other Federally funded programs.

2. It is important to encourage collaborative efforts between producers and partners (e.g., universities, service companies) at the outset of writing the proposals, especially proposals that address opportunities for creating value for producers. National organizations such as PTTC, AAPG, SPE, SEG, IPAA, API and others should be enlisted to provide marketing and support for the solicitation process including establishing a clearinghouse (e.g., website) to match potential researchers with technology providers and producers.
3. The 2008 plan needs to ensure that all potential solicitations are considered and consortia are encouraged by the application process. Either through workshops, pre-solicitation advice, proposal writing seminars or other means, applicants need to be encouraged to respond and be assisted with proposal preparation in order to ensure potentially worthwhile proposals are not disqualified for technicalities.
4. RPSEA, NETL, and DOE headquarters should objectively assess what dividends the Section 999 program might reap from greater flexibility in solicitation and contract negotiation. They should consider in some of their awards seeking DOE exceptional approval outside the conventional practice under regulations to include fixed price contracts, as well as considering applying instruments for the purpose of encouraging innovative research that would not fit within the current framework (such as the “Other Transactions Authority” of the Energy Policy Act Section 1007 if appropriate).
5. The Program should include solicitation of research projects to develop innovative models for technology transfer.

### **3.3 TECHNOLOGY TRANSFER**

Technology transfer (TT) must be designed as a fundamental part of any Research and Development (R & D) program; all too often it is left as an afterthought to be dealt with at the end of the program. The TT requirements must be planned before any R&D grants are awarded; if the TT component is not addressed until the end of projects there will be little effective dissemination of information, resulting in overall marginal benefit at best.

The primary focus of the Small Producer component of the plan are R&D project grants with only 2.5% of the funding being allocated for TT; this is probably sufficient for reporting the status and results of the individual projects. However, this level of funding is woefully inadequate for conducting a successful and effective Technology Transfer program which

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should incorporate best practices, case histories and other information that is pertinent to field applications by oil and gas producers.

**Recommendations:**

The Technology Transfer component of the program should have the following elements:

1. For any R&D program to be successful, its TT component must be implemented early, coordinated and used often. The 2008 Plan should include a strong, timely, proactive TT framework.
  2. Partnerships with existing TT mechanisms (i.e.: especially recognized programs such as the Petroleum Technology Transfer Council (PTTC)) should be encouraged, thereby ensuring that they are in place to carry out the TT needs of the program.
  3. Consideration should be given to coordination of TT between the Consortium program and DOE traditional R&D programs. A principal need of Small Producers is TT in the form of workshops, seminars and demonstrations. Funding needs to be specifically allocated for TT independent of the specific projects or else it will not be done in an effective manner. The current Plan does not provide for this. A strong recommendation is to supplement funding from other sources such as the NETL Complementary Program, so that at least \$750,000 is set aside for overall TT dissemination.
  4. The results of any research projects must be captured and preserved as part of a national database available to everyone. This will maximize the benefit of the R&D program funds invested.
  5. The Program needs to identify, capture and document Best Practices identified during the R&D projects so that they can be incorporated into the TT program. Special emphasis should be placed on identifying Best Practices in critical areas such as environmental protection (including minimizing footprint and conserving or mitigating for biodiversity impacts) and reduction of wastes.
  6. Researchers need to provide results in an understandable format that is useful to small operators who do not have research or large professional staffs.
  7. Research project guidelines need to clearly define how TT is to be accomplished; TT efforts should not be limited to published papers in highly technical journals and websites. It needs to be “pushed” to producers who will benefit from its implementation.
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8. Researchers need to have a clear understanding that TT needs to be at least partially funded by their research contract; and that the effective accomplishment of this component determines whether or not their project was a success.

### **3.4 OTHER PETROLEUM RESOURCES**

The Committee reviewed other petroleum resources that may have a significant future benefit to the U. S. domestic energy supply. Studies identify the potential for over 75 billion barrels of oil resources from heavy oil and tar sands that could be produced with minimal surface impact. Furthermore, a significant increase in the activity and production associated with the Bakken shale in North Dakota and Montana is an example of new exploration where there are potentially large resources of high quality oil in unconventional settings. These facts are often overlooked because of attention focused on similar major known resources outside the U.S. (e.g., Canada) or less mature resource types (e.g., shale oil and gas hydrates).

Heavy and unconventional oil resources might be developed sooner than shale oil because the deposits are shallow and production methods are not as technologically challenging. Recent announcements by small Independents regarding both heavy oil and fractured shale oil ventures support this premise. Accelerated and sustainable development of these resources is in the U.S. national interest.

#### **Recommendations:**

1. As part of the planning process for the 2009 Section 999 plans (both RPSEA and Complementary Programs), the DOE planning team should continue to review assessments of the domestic onshore “other petroleum” resource base (inclusive of but not necessarily limited to heavy oil, tar sands and fractured oil shales) and identify an initial set of technology gaps that would advance activities in this area.
  2. The DOE planning team should include activities designed to address these technology gaps in the 2009 RPSEA solicitation and/or the 2009 Complementary program.
  3. The DOE study should identify those considerations that make a pure upstream play (i.e., plays being developed by Independents that do not have pipelines or refineries) economically hampered (such as the heavy oil price differential and the additional environmental burden of heavy oil because of the carbon penalty and water usage) and propose future R & D topics to address those issues.
  4. The DOE needs to be actively involved in Federal, state and regional decision-making processes that may result in regulations that impact development of oil and gas resources, to ensure that larger national energy needs are taken into account.
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## 4.0 COMMITTEE MEMBERS

<b>Title</b>	<b>Last Name</b>	<b>First Name</b>	<b>Employer</b>	<b>City</b>	<b>State</b>
Mr.	Ames III	Eugene L.	Nordan Trust	San Antonio	TX
Dr.	Aminzadeh	Fred	dGB-USA	Sugar Land	TX
Mr.	Ancell	Kenneth L.	Ancell Energy Consulting, Inc.	Houston	TX
Mr.	Bardin	David J.	Arent Fox LLP Of Counsel (retired member)	Washington	DC
Commissioner	Carrillo	Victor G.	Railroad Commission of Texas	Austin	TX
Ms.	Cavens	Jessica J.	EnCana Oil and Gas (USA)	Denver	CO
Mr.	Conser	Russell J.	Shell	Houston	TX
Mr.	Daugherty	William S.	NGAS Resources, Inc	Lexington	KY
Mr.	Dwyer	James P.	Baker Hughes	Houston	TX
Mr.	Hall	Jeffrey D.	Devon Energy Corporation	Edmond	OK
Mr.	Hall	J. Chris	Drilling & Production Co.	Torrance	CA
Dr.	Tew	Berry(Nick)	State Oil and Gas Board of Alabama	Tuscaloosa	AL
Mr.	Julander	Fred C.	Julander Energy Company	Englewood	CO
Mr.	Lewis	Fletcher S.	Fletcher S. Lewis Engineering, Inc.	Oklahoma City	OK
Mr.	Frantz	Joe	Unbridled Energy Corporation	Pittsburgh	PA
Dr.	Levey	Raymond A.	University of Utah	Salt Lake City	UT
Dr.	O'Bryan	Patrick L.	BP America, Inc.	Houston	TX
Dr.	Rao	Vikram	Halliburton	Houston	TX
Mr.	Sparks	Don L.		Midland	TX
Dr.	Tinker	Scott W.	University of Texas at Austin	Austin	TX
Ms.	Zinke	Sally G.	Ultra Petroleum	Englewood	CO
<b>Alternates:</b>					
Ms.	Weiss	Janet	BP America	Houston	TX

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## SUBGROUP TOPICS AND MEMBERS

### **Five Recommendation Areas:**

#### ***Technology Transfer***

Lead – C. Hall

Members – Lewis, Faulkner, Daugherty, Anderson, Dwyer, Aminzadeh, J. Hall

#### ***Solicitations***

Lead – Zinke

Members-Ames, Cavens, Levey, Bardin, Julander, Sparks

#### ***Policy***

Lead – Julander

Members-Tew, Ancell, Bardin, Carrillo, Frantz

#### ***Other Petroleum Resources***

Lead – Rao

Members- C. Hall, Levey, Tew, Conser

#### ***Content Technology Gaps***

Lead – Dwyer

Members-Ancell

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**APPENDIX A. ONSHORE UNCONVENTIONAL AND  
SMALL PRODUCER PROPOSAL SUMMARY.**

## Onshore Program

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

\*Selections subject to approval and negotiation

## Onshore Program Distribution

	Unconventional		Small Producer	
	<i>Submitted</i>	<i>Selected</i>	<i>Submitted</i>	<i>Selected</i>
<b>Resource</b>				
<b>Existing</b>	<b>30</b>	<b>11</b>	<b>13</b>	<b>7</b>
<b>Emerging</b>	<b>13</b>	<b>6</b>	<b>*</b>	<b>*</b>
<b>Frontier</b>	<b>4</b>	<b>2</b>	<b>*</b>	<b>*</b>
<b>CBM</b>	<b>17</b>	<b>5</b>	<b>**</b>	<b>**</b>
<b>Shale</b>	<b>28</b>	<b>10</b>	<b>**</b>	<b>**</b>
<b>Tight Gas</b>	<b>25</b>	<b>12</b>	<b>**</b>	<b>**</b>
<b>Time Scale</b>				
<b>Enhancing (Near term)</b>	<b>19</b>	<b>8</b>	<b>6</b>	<b>3</b>
<b>Enabling (Mid term)</b>	<b>14</b>	<b>4</b>	<b>4</b>	<b>3</b>
<b>Science (Longer term)</b>	<b>14</b>	<b>7</b>	<b>3</b>	<b>1</b>

\*Advancing Technology for Mature Fields

\*\*Resource focus areas for unconventional program

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# Onshore Program Distribution

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

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## **APPENDIX B. RPSEA PRESS RELEASE ON SMALL PRODUCER PROPOSALS**

[February 20, 2008 01:44 PM Eastern Time](#)

### **RPSEA SELECTS PROJECTS FOR THE SMALL PRODUCER PROGRAM**

*New Research Will Help Meet U.S. Energy Demand and Lower Costs for Consumers*

SUGAR LAND, Texas--([BUSINESS WIRE](#))--The Research Partnership to Secure Energy for America (RPSEA) announced today that seven proposals have been selected for negotiations leading to an award under the \$3.2 million RPSEA Small Producer Program. This program, which focuses on the technology challenges of small producers, targets in its 2007 Annual Plan advancing technology for mature fields.

"The selected projects will provide the technology to enable small producers to extract the maximum amount of oil and natural gas out of their existing asset base and continue to make their important contribution to the nation's energy needs," said RPSEA President C. Michael Ming. The Small Producer Program is designed to bring the resources of America's leading universities, research institutions and technology innovators to bear on the problems facing small producers trying to enhance production from mature fields. In mature fields up to two thirds of the original oil in place is often left behind, making this program especially beneficial to extract additional resources from existing surface footprints.

All awards under the RPSEA Small Producer Program are made to consortia organized for the benefit of small producers, and each proposal must provide a minimum of 20% cost share, with up to 50% for field demonstration projects.

The selected projects are:

Cost-Effective Treatment of Produced Water Using Co-Produced Energy Sources for Small Producers

Project Leader: New Mexico Institute of Mining and Technology

Additional Project Participants : Robert L. Bayless, Producer LLC and Harvard Petroleum Company, LLC

Enhancing Oil Recovery from Mature Reservoirs Using Radial-Jetted Laterals and High-Volume Progressive Cavity Pumps

Project Leader: University of Kansas

Additional Project Participants: Kansas Geological Survey and American Energies Corporation

Field Site Testing of Low Impact Oil Field Access Roads: Reducing the Footprint in Desert

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## Ecosystems

Project Leader: Texas A&M University

Additional Project Participants: Rio Vista Bluff Ranch and Halliburton

## Near Miscible CO<sub>2</sub> Application to Improved Oil Recovery for Small Producers

Project Leader: University of Kansas

Additional Project Participants: Carmen Schmitt, Inc.

## Preformed Particle Gel for Conformance Control

Project Leader: University of Missouri, Rolla

Additional Project Participants: ChemEOR Company and BJ Services

## Reducing Impacts of New Pit Rules on Small Producers

Project Leader: New Mexico Institute of Mining and Technology

Additional Project Participants: Independent Petroleum Association of New Mexico and New Mexico Oil Conservation Division

## Seismic Stimulation to Enhance Oil Recovery

Project Leader: Lawrence Berkeley National Laboratory

Additional Project Participants: U.S. Oil & Gas Corporation and Berkeley Geolmaging Resources, LLC

Funding for the projects is provided through the “Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Research and Development Program” authorized by the Energy Policy Act of 2005. This program—funded from lease bonuses and royalties paid by industry to produce oil and gas on federal lands—is specifically designed to increase supply and reduce costs to consumers while enhancing the global leadership position of the United States in energy technology through the development of domestic intellectual capital. RPSEA is under contract with the U.S. Department of Energy’s National Energy Technology Laboratory to administer the program. RPSEA is a 501(c)3 not-for-profit consortium with over 130 members, including 25 of the nation's premier research universities, 5 national laboratories, other major research institutions, large and small energy producers and energy consumers. The mission of RPSEA, headquartered in Sugar Land, Texas, is to provide a stewardship role in ensuring the focused research, development and deployment of safe and environmentally responsible technology that can effectively deliver hydrocarbons from domestic resources to the citizens of the United States.

RPSEA, Sugar Land

C. Michael Ming 281-313-9555

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## APPENDIX D. ORGANIZATIONAL SUMMARY OF RESEARCH PROJECTS

### Organizations Participating in Selected Unconventional Resources Research Projects (by category)

PERFORMER	NUMBER
Oil and Gas Producers	26
Laboratories, Government Agencies, and Research Orgs.	7
Universities	19
Service and Consulting Companies	24
Total	76

*\* each organization is counted once, although some will participate in more than one project.*

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## APPENDIX E. SUPPORTING INFORMATION TO POLICY DISCUSSION

- 1) Public investment in oil and natural gas research and development can provide the USA high value returns for decades because:
    - a) Oil and gas will continue to supply much of our energy needs (as components of a sustainable energy portfolio) for a long time during this century's transition to alternative fuels and fuel use technologies. Without such R&D domestic production and delivery of oil and gas could diminish rapidly, leaving our economy and security increasingly dependent on oil and liquefied natural gas imports;
    - b) We must have a trained workforce in order to secure oil and gas supplies, and replenishing the U. S. technical oil and gas workforce (slashed 60 percent between 1986 and 2000 as reported by the Interstate Oil & Gas Compact Commission (Wall Street Journal, Feb. 21, 2008, page B1)) will continue to be a challenge. Robust R&D in exploration, development and production technologies relevant to USA oil and natural gas resources will provide important opportunities to train needed technical workforce to tap our resources.
    - c) Robust R&D into technologies for exploiting domestic *unconventional* resources of natural gas and other petroleum holds great promise and is particularly important to U.S. policy in light of the greater maturity and decline of petroleum industry activities here as compared to most other countries;
    - d) Such robust R&D can foster a better environmental footprint in connection with use of U. S. resources and lead the world to better environmental practices with technology transfer to industry in other countries;
    - e) R&D activities of national oil companies and the major investor-owned oil and gas companies are unlikely to focus on onshore, unconventional opportunities that could be turned into meaningful production over the next couple of decades;
    - f) Industry, in the case of onshore domestic resources, means primarily Independent oil and gas firms that drilled 90 percent of U.S. oil and gas wells and produced 82 percent of natural gas and 68 percent of oil in the U.S., as the Independent Petroleum Association of America testified before Congress on October 31, 2007;
    - g) Independents traditionally invest their cash flow in development of onshore reserves, yet they will respond to a government-initiated opportunity presented by the new EPAct Section 999 program (as current experience shows), to join with academia in government-sponsored research and development with technology transfer;
    - h) If the Federal government will lead, much more research will happen.
  
  - 2) A important report by the National Petroleum Council, FACING THE HARD TRUTHS ABOUT ENERGY: A Comprehensive View to 2030 of Global Oil and Natural Gas, 2007 (posted at [www.npchar truthsreport.org](http://www.npchar truthsreport.org) and hereinafter referred to as NPC2007) was prepared at the request of the Secretary of Energy with inputs from industry, government, and academia.
    - a) The report reinforces several key findings.
      - (1) It reviews energy risks and challenges in worldwide contexts;
      - (2) it relates Federally-sponsored oil and gas R&D to training of technical personnel;
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- (3) it stresses implications of the relative maturity of U.S. oil and gas resources;  
and
  - (4) it identifies opportunities to advance technology through 2030 -- onshore and offshore, domestic and international, in mature and frontier areas.

Specific points of the report include:

- b) NPC 2007 documents a downward trend in Federal funding for oil and gas R&D (graphed at page 176, Fig. 3-5):

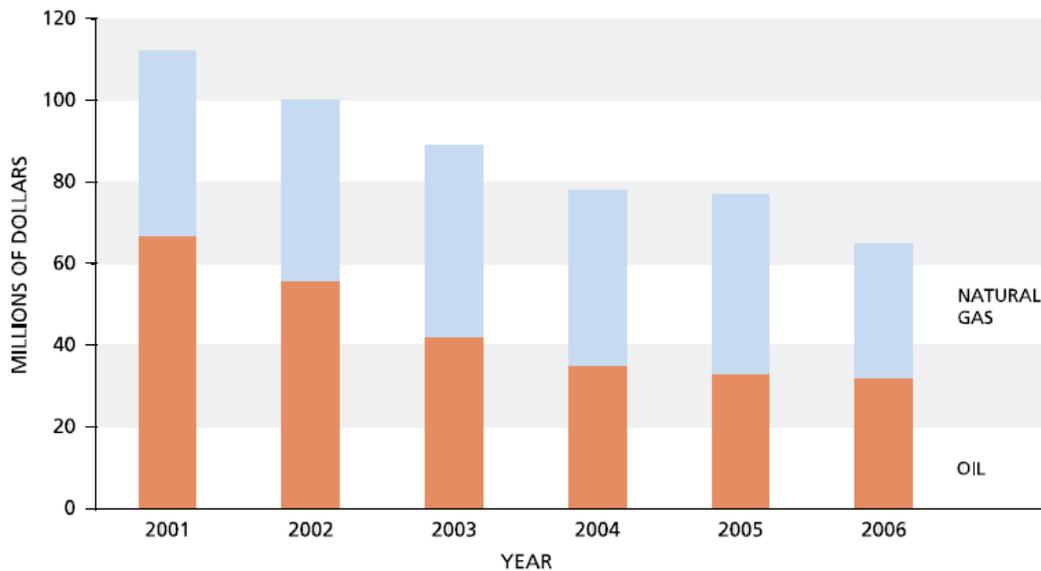


Figure T-III.1. Oil and natural gas R&D funds provided by the U.S. government.

- c) NPC 2007 explains workforce-related consequences of that trend:

*Department of Energy monies have been a significant funding source for U.S. universities and national laboratories. This funding is particularly important, as it enables students to pursue advanced degrees that are relevant and vital to our country's energy future. One of the most significant issues facing the U.S. energy industry is a critical shortage of engineers and scientists. This stems from the cyclical nature of the industry and by public perceptions, as well as reductions in the number of U.S. petroleum and geoscience degree departments, and industry demographics. More than 50 percent of the industry's current technical workforce is eligible for retirement within the next decade, creating an experience and skill shortage at a time when demand will be increasing. Solving this problem will require cooperation among federal and state governments, academia, and industry if the United States is to continue its historical leadership in oil and natural gas technology development. [NPC 2007, page 173]*

EPAct Section 999 can lead to such cooperation.

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d) NPC 2007 further explains intensified USA technology challenges:

*The sources of technology destined for the oil and natural gas markets have changed over time. Starting in the early 1980s, major oil and natural gas companies began to decrease their R&D spending, driven in large part by a decision to “buy versus build” new technology. Historically, independent oil and natural gas companies have spent little on R&D. Service companies have stepped in to partially fill the gap. As oil prices have risen ... so have R&D budgets, with the exception of U.S. government spending. The global industry will spend more than \$6 billion on R&D, much of it in areas outside the United States.*

*The major oil and natural gas companies follow the best investment opportunities, including R&D, which are increasingly found overseas. This pursuit leaves U.S. onshore production largely in the hands of independent oil and natural gas companies. In a global marketplace, the service companies continue to respond to the needs of their worldwide customer base.*

*Being one of the most mature oil and natural gas producing countries, the United States has specific technology requirements compared with much of the rest of the world ... [NPC 2007, page 175, “Technology Development and Deployment,” emphases added.]*

These technology requirements often relate to *unconventional* and quite challenging resources that are commonly addressed only after easier pickings. Such new technologies, once developed, lend themselves to export around the world.

e) NPC 2007 sets out particular technology challenges and time frames for addressing each of them between now and 2030.

- i) It specifically describes unconventional natural gas technology challenges over three time frames: 2010, 2020, and 2030. See pages 193-198, “Tight Gas, Coal Seams, Shales”.
- ii) It also describes other petroleum challenges, including CO<sub>2</sub>-EOR and Carbon Capture and Sequestration over multiple time frames: 2010, 2015, 2020, 2025, and 2030 (pages 178-186); Exploration Technology (pages 186-190); and Deepwater (pages 191-193).

3) Government-sponsored oil and gas research could prove invaluable at least to 2030.

4) The deposit of non-appropriated, no-year funds into the *Ultra-Deepwater and Unconventional Resources Fund* – and their timely deployment to and by RPSEA and NETL – must continue (in addition to annual Congressional appropriations for DOE’s traditional oil and gas R&D programs) and must be used solely for the purposes of the research program as provided under EAct both

- for the benefit of the USA and also, with technology transfer,
  - to the rest of the world – especially emerging economies that seek to electrify and could use expanded natural gas resources promptly as a superior way to achieve electrification consistently with environmental goals.
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5) If steadily implemented, Section 999 can provide a minimal certainty of funding that is an essential component for an efficient and effective long-term R&D program which the Committee strongly believes is in the national interest.

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