

**Unconventional Resources Technology Advisory Committee
(URTAC)**

September 9, 2010

Thirteenth Meeting

Meeting Minutes

Unconventional Resources Technology Advisory Committee

I hereby certify that this transcript constitutes an accurate record of the Unconventional Resources Technology Advisory Committee meeting held on September 9, 2010.



Jeff Hall, Chair
Unconventional Resources Technology
Advisory Committee

OCT 19 2011

Date

**Unconventional Resources Technology Advisory Committee (URTAC) Meeting
September 9, 2010, Marriott Town Square, Sugar Land, Texas**

The meeting opened at 8:10 a.m., and Chris Smith, the DOE Deputy Assistant Secretary for Oil and Natural Gas, and the Designated Federal Officer (DFO), administered the Oath of Office for special Government employees. He then appointed Jeffrey D. Hall and James P. Dwyer to serve as the Chair and Vice-Chair, respectively, of the URTAC for the two year term of 2010-2012. (Attachment 1)

Elena Melchert, DOE Program Manager for Oil and Gas Production Research, and URTAC Committee Manager, presented background information highlighting historical milestones in the life of the URTAC (Attachment 2).

Jeff Hall, URTAC Chair, identified this meeting as the first of three meetings focused on the DOE Draft *2011 Annual Plan*. He outlined the tasks for the day: 1) review the *RPSEA 2011 Draft Annual Plan*, 2) establish *ad hoc* subcommittees to review specific aspects of the documents, and 3) develop a strategy for providing DOE with written comments and recommendations. He reminded the members of the planned dates for the remaining two meetings at which the recommendations were to be finalized on October 13-14, 2010 in New Orleans, and approved October 21, 2010 (via Webex).

He then called for introductions, and introduced, in turn, each presenter according to the agenda (Attachment 3). The Chair reported that 18 of 23 URTAC members were present and that two would be calling in via teleconference (Attachment 4).

Presentation by Chris Smith (Attachment 5)

“Natural Gas and the Clean Energy Economy” key points included:

- Unlike oil, there is some capability to affect natural gas price ... R&D can increase environmentally safe gas supply and thus help to reduce price to consumer and price volatility ...
- The size of the shale gas resources base is large enough to impact price ... R&D can have an impact on supply
- Natural gas is needed to support solar and wind power goals (as fuel for turbine backup) ... and that makes it environmentally acceptable, even though it is a fossil fuel
- Remaining shale gas challenges are largely environmental ... especially concerns related to water
- DOE should invest in fossil energy research to reduce the environmental impact of unconventional (primarily shale) gas development, and as development of the resource proceeds there will be a benefit of lower (and less volatile) domestic natural gas prices and sufficient lower cost natural gas for backup power generation capacity that can enable wind and solar power ... the ultimate goal

Discussion between Deputy Assistant Smith and the URTAC then ensued.

Presentation by Roy Long, Technology Manager, National Energy Technology Laboratory
(Attachment 6)

Mr. Long summarized the traditional DOE oil and gas program, including the Stripper Well Consortium. He presented an overview of overall program accomplishments of the “Section 999” research program, including response to previous advisory committee recommendations, and efforts being made with regard to technology transfer, including the Knowledge Management Database. This was followed by Committee discussion.

E. Melchert then outlined, for the new Committee members in particular, specific deliverables from the Committee: develop a document of Findings and Recommendations as written comments on the DOE *2011 Annual Plan*. Discussion regarding the process for fulfilling this requirement then followed during which old members described lessons learned for the benefit of the new members.

Presentation by Bob Siegfried, Gas Technology Institute (GTI), a Research Partnership to Secure Energy for America (RPSEA) subcontractor (Attachment 7)

After lunch, Mr. Siegfried presented an overview of the RPSEA *2011 Draft Annual Plan*. In particular, he described how changes going forward would fit into the existing research portfolio. He described the RPSEA organization, its membership, structure/organization, how its advisory committees work, and the RPSEA process flow for development of the RPSEA draft annual plan. This was followed by a discussion and question/answer session.

DFO Chris Smith then appointed Elena Melchert to be acting DFO for the remainder of the meeting.

After a short break, there was general discussion during which a list of comments was generated for use by the review subcommittees (Attachment 8). Following this discussion the Chair led the group in establishing *ad hoc* review subcommittees and membership. The five review subcommittees were:

Technology Transfer/Public Outreach: **Lewis**, C. Hall, J. Hall, Martin, Mason, Dwyer, Nilson, Rodgers

Environmental & Regulatory: **Arthur**, Martin, Kleinberg, Brown, Mall, Mason, Hardage, Dwyer, Cavens, Bromfield

Policy: Whitney, **C. Hall**, Oglesby, Daugherty, Arthur, Mason, Brown

Research Program: Sparks, Oglesby, Lewis, Camp, Harju, Nilson, **Dwyer, Mohaghegh**, Mall, Brown, Rodgers

Editing/ Executive Summary: **J. Hall**, C. Hall, Dwyer, Mason, Whitney

***Chairs in bold**

Following the establishment of the subcommittees, Elena Melchert discussed some administrative topics related to the next meeting (Attachment 9).

No members of the public made requests for public comments.

The meeting was adjourned at 5 pm.

Attachments

	Presenter	Topic
1	For the Record	Chair and Vice-Chair Appointment Letter
2	Ms. Elena Melchert	URTAC Historical Milestones
3	For the Record	Meeting Agenda
4	For the Record	Committee Members and Meeting Participant Attendance
5	Mr. Chris Smith	Natural Gas and the Clean Energy Economy
6	Mr. Roy Long	Oil and Gas Program Overview
7	Mr. Bob Siegfried	Unconventional and Small Producer Project Portfolio Overviews
8	For the Record	Comments from URTAC Members
9	Ms. Elena Melchert	URTAC Calendar and Next Steps

Attachment 1



Department of Energy

Washington, DC 20585

MEMORANDUM FOR THE RECORD

FROM: CHRISTOPHER A. SMITH *CAZ 9-2-10*
DEPUTY ASSISTANT SECRETARY
OFFICE OF OIL AND NATURAL GAS

SUBJECT: **Appointment of Committee Chair and Vice-Chair**
Unconventional Resources Technology Advisory Committee

Whereas, article 12 of the committee charter states that the Secretary shall designate a chair and vice-chair, and article 1.23 of the Department of Energy Delegation Order No. 00-002.00G and article 1.5 of the Department of Energy Redesignation Order No. 00-002.04C transfer this authority of the Secretary to the Assistant Secretary for Fossil Energy, the Assistant Secretary has designated Mr. Jeffrey D. Hall and Mr. James P. Dwyer to serve as the Chair and Vice-Chair, respectively, of the Unconventional Resources Technology Advisory Committee for the two year term of 2010-2012.



Attachment 2



Unconventional Resources Technology Advisory Committee

September 9, 2010

Elena Melchert
Office of Oil and Natural Gas
Committee Manager

Program Milestones

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

Program Milestones

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

Program Milestones

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

Program Milestones

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

Program Milestones

- November 2008** ➤ DOE/FE receives FY09 funds
- January 2009** ➤ 2009 Annual Plan transmitted to Congress and published in the Federal Register
- January 2009** ➤ Unconventional Natural Gas and Other Petroleum Resources program element solicitation for 2008 closed: 9 projects selected; 3 awarded as of 8-1-09
- January 2009** ➤ Small Producer program element solicitation for 2008 closed; 6 projects selected; 2 awarded as of 8-1-09
- March 2009** ➤ Peer Review of Methodology for Unconventional Natural Gas and Other Petroleum Resources Program and Small Producer Program Benefits Assessment
- April 2009** ➤ Ultra-Deepwater program element solicitation for 2008 closed: 14 projects selected
- July 2009** ➤ UDAC & URTAC meet to review Program status to date

Program Milestones

- July 2009** ➤ Merit Review of the NETL Complementary Research Program
- August 2009** ➤ Technical Committee [Section 999H(d)(4)] determines that the NETL Complementary Research Program is not duplicative of the consortium-administered program
- September 2009** ➤ Peer Review of Methodology for the Ultra-Deepwater Program Benefits Assessment
- September 2009** ➤ UDAC & URTAC meet to review Draft 2010 Annual Plan
- October 2009** ➤ UDAC & URTAC meet to hear and discuss Subcommittee reports, determine final recommendations, and adjourn work on the Draft 2010 Annual Plan
- October 2009** ➤ Ultra-Deepwater program element solicitation for 2009 opened
- October 2009** ➤ Unconventional Natural Gas and Other Petroleum Resources program element solicitation for 2009 opened

Program Milestones

- October 2009** ➤ Small Producer program element solicitation for 2009 opened
- November 2009** ➤ DOE/FE receives FY10 funds
- December 2009** ➤ All solicitations for 2009 closed
- February 2010** ➤ 2010 Annual Plan transmitted to Congress and published in the Federal Register
- April 2010** ➤ Public review of all projects in the Unconventional and Small Producers Research Portfolio
- May 2010** ➤ Peer review of benefits assessed for the 2007 Research Portfolio of the Ultra-Deepwater, Unconventional and Small Producers programs
- May 2010** ➤ Announce projects selected in response to the 2009 solicitations
- May 2010** ➤ Ultra-Deepwater program element solicitation for 2010 opened

Program Milestones

- May 2010** ➤ Merit Review of the NETL Complementary Research Program
- June 2010** ➤ Public review of all projects in the Ultra-Deepwater research portfolio
- July 2010** ➤ Meeting of the NETL Complementary Research Program Technical Committee
- July 2010** ➤ UDAC Charter and URTAC Charter renewed
- September 2010** ➤ Unconventional Natural Gas and Other Petroleum Resources program elements solicitation for 2010 opened
- September 2010** ➤ Small Producer program element solicitation for 2010 opened

Attachment 3

13th Meeting
Unconventional Resources Technology Advisory Committee
September 9, 2010
Marriott Town Square, 16090 City Walk, Sugar Land, Texas

AGENDA

7:30 am	<i>Registration</i>	
7:30 am	<i>Ethics Briefing for SGEs</i>	<i>DOE/GC</i>
8:00	Call to Order, Welcome, Introductions	Chair
8:15	Administrative Topics	Committee Manager (CM)
8:20	Opening Remarks	Designated Federal Officer (DFO)
8:30	Role of Oil and Gas in the Administration's Energy Policy	Deputy Assistant Secretary (DAS)
9:00	Committee Discussion with the DAS	Chair
10:00	BREAK	
10:15	Overview of the Oil and Gas Research Program	NETL
12:00 pm	WORKING LUNCH	
1:15	Overview of the Program Consortium's <i>2011 Draft Annual Plan</i>	RPSEA
2:15	BREAK	
2:30	Establishment of ad hoc Review Subcommittees	Chair
	Appointment of Subcommittee Chairs	
4:00	Administrative Topics	CM
4:45	Public Comment	DFO
5:00 pm	Adjourn	Chair

APPROVED:



Christopher A. Smith, Designated Federal Officer

9-2-2010
Date

Attachment 4

**Unconventional Resources Technology Advisory Committee Meeting
Sign-In Sheet - September 9, 2010**

Last Name	First Name	Organization	Initial
Arthur	Dan J.	ALL Consulting, LLC	DA
Botkin	Daniel B.	The Center for the Study of the Environment	DECLINING MEMBERSHIP
Bromfield	Kenneth	Dow Hydrocarbons and Resources, LLC	UNABLE TO ATTEND
Brown*	Nancy J.	Lawrence Berkeley National Laboratory	TELECONFERENCE
Camp	Wayne K.	Anadarko Petroleum Corporation	WC
Cavens	Jessica J.	EnCana Oil & Gas (USA)	TELECONFERENCE
Daugherty	William S.	NGAS Resources, Inc.	WD
Dwyer	James P.	Baker Hughes	DP
Hall	Jeffrey D.	Devon Energy Corporation	JH
Hall	J. Chris	Drilling & Production Co.	CH
Hardage*	Bob	University of Texas at Austin	UNABLE TO ATTEND
Harju*	John A.	University of North Dakota	JH
Kleinberg	Robert L.	Schlumberger-Doll Research	RL
Lewis	Fletcher S.	Rainmaker Oil & Gas	FL
Mall	Amy	Natural Resources Defense Council	UNABLE TO ATTEND
Martin*	John P.	New York Energy Research & Development Authority	JM
Mason	Gregory	The Energy Cooperative	GM
Mohaghegh*	Shahab D.	West Virginia University	SM
Nilson	Gary J.	Pioneer Natural Resources USA, Inc.	GN
Oglesby	Kenneth D.	Oak Resources, Inc.	KO
Rodgers	Brady D.	New Frontier Energy, Inc.	BR
Sparks	Don L.	Discovery Operating, Inc.	DS
Whitney	Sam W.	Shell E&P Company	SW

Total Members = 23

QUORUM = 12

Confirmed attendees = 19

* Special Government Employee

Regrets = 4

*Unconventional Resources Technology Advisory Committee Meeting
September 9, 2010*

DOE Staff Roster

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

Christopher Smith Deputy Assistant Secretary	Designated Federal Officer
Elena Melchert Program Manager for Section 999	Committee Manager

National Energy Technology Laboratory

Roy Long	Ultra-Deepwater & Unconventional Natural Gas and other Petroleum Resources Technology Manager
Gary Covatch	Strategic Center for Natural Gas & Oil
Ginny Weyland	Strategic Center for Natural Gas & Oil
Chandra Nautiyal	Strategic Center for Natural Gas & Oil

IBM

Karl Lang	Meeting Minutes Recorder/Facilitator
Rob Matey	Meeting General Support
Jennifer Presley	Registration Support

Unconventional Resources Technology Advisory Committee Meeting

Public Walk-In List - September 9, 2010

Last Name	First Name	Organization
Grossweiler	Phil	M&H Energy Services
Pappas	James	RPSEA
Siegfried	Bob	RPSEA
Smistad	Eric	National Energy Technology Laboratory
Stasa	Camilla	M&H Energy Services
Vargas	Maria	National Energy Technology Laboratory

Attachment 5



Natural Gas and the Clean Energy Economy

Christopher Smith
Deputy Assistant Secretary
Office of Oil and Natural Gas

10 September 2010



U.S. DEPARTMENT OF ENERGY
Oil and Natural Gas

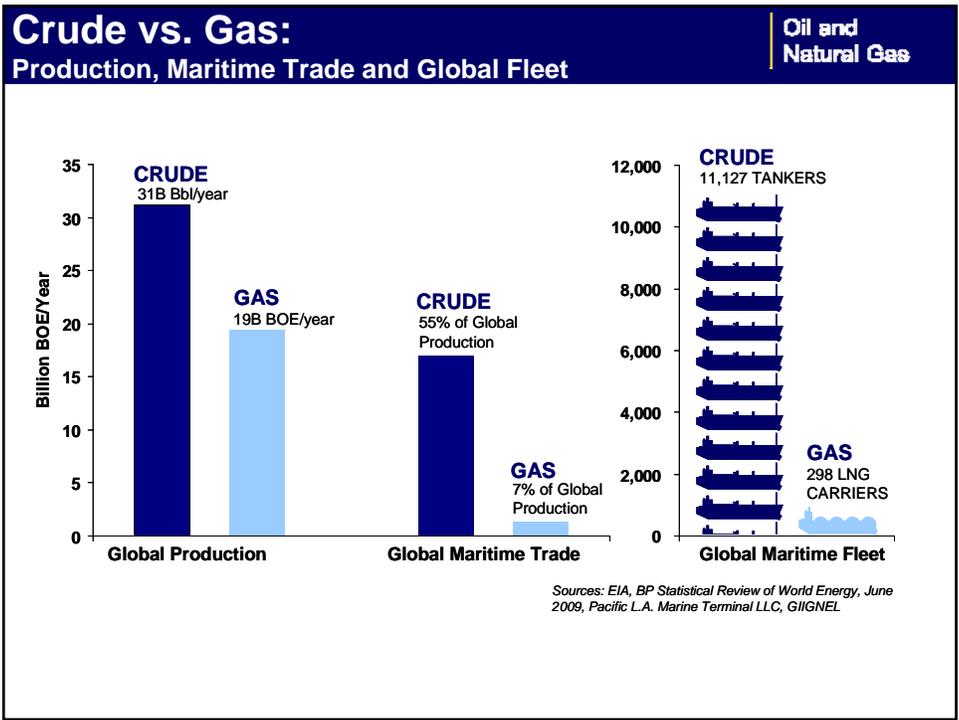
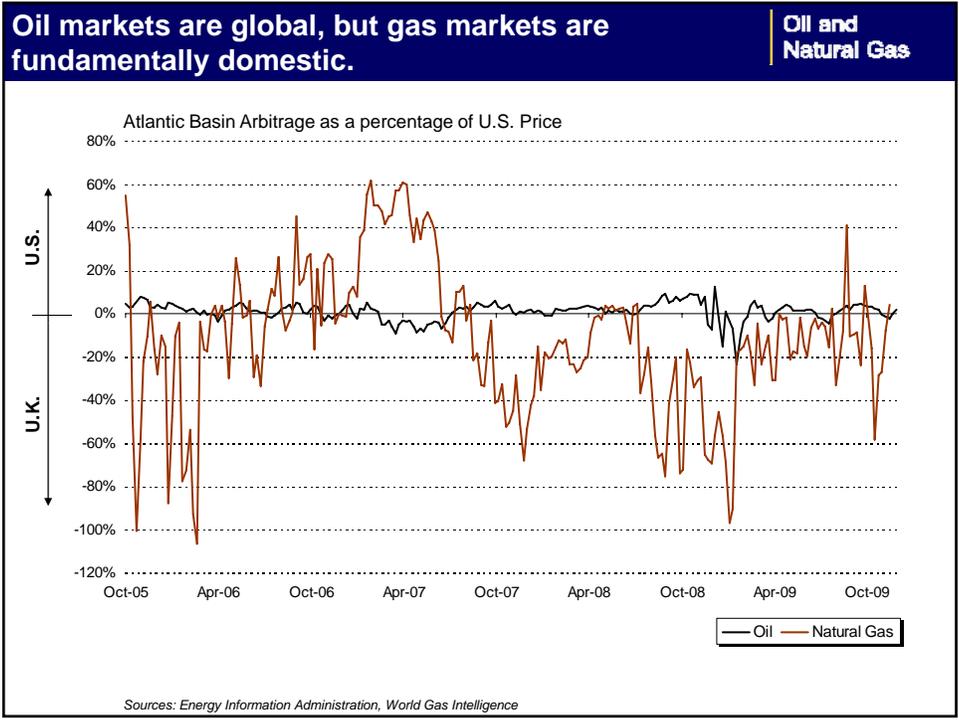
Oil and Natural Gas
Department of Energy's FY2011 Budget

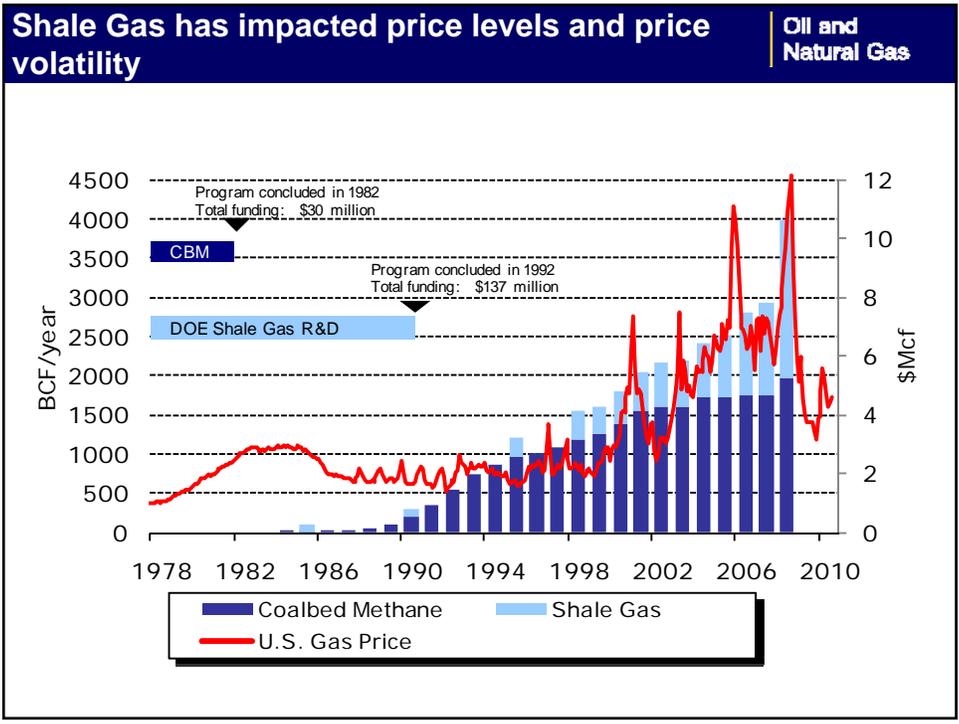
Supporting the President's goals

Energy	<p>"The nation that leads the clean energy economy will be the nation that leads the global economy. And America must be that nation."</p>
Innovation	<p>"We need to encourage innovation... And no area is more ripe for such innovation than energy."</p> 
Security	<p>"...a clear goal: securing all vulnerable nuclear materials around the world in four years, so that they never fall into the hands of terrorists."</p>

- *State of the Union, January 27, 2010*

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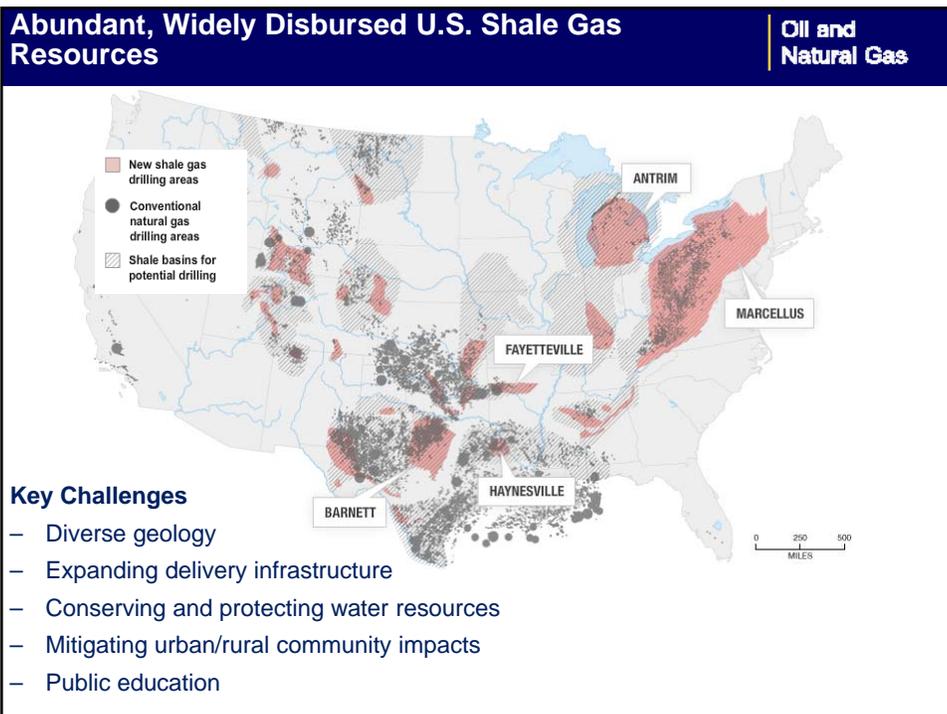
Natural Gas Will be Essential Component of Low-Carbon Power Supply System

Oil and Natural Gas

Intermittency is an issue for solar and wind

Low-carbon portfolio:

- Renewable power
- Natural gas power
- New storage technology
- Large balancing areas



Water has an important role in shale gas production

Oil and Natural Gas

Water issues can be divided into four broad categories:

1. **Access to water for fracturing**
Water is an increasingly scarce commodity. Regulations for managing the use of water often undervalue the resource.
2. **Ecologically sound completion of wells through groundwater zones**
Multiple layers of steel and concrete protect fresh water formations as wells pass through groundwater zones. Clear regulations must be developed to ensure consistent standards.
3. **Conduct of hydraulic fracturing operations in pay zone**
Water, a proppant (usually sand) and chemicals are used to fracture the rock which facilitates the flow of natural gas. This occurs thousands of feet below the surface, far beneath aquifers which supply drinking water.
4. **Handling, treatment, and re-use of water from operations**
Sustainable disposal and/or reuse of produced water – consisting of formation water and flowback from fracturing operations (including sand and chemicals)

Shale gas has global implications

Oil and Natural Gas



Gas supply from Russia, 2006 (EIA)	
Germany	36%
Italy	25%
France	20%
Czech Rep	79%
Poland	47%
Hungary	54%
Slovakia	100%
Austria	74%
Finland	100%
Romania	28%
Bulgaria	96%

Goals

Oil and Natural Gas

- Environmental sustainability
- Safety
- Economic stability
- National security

Questions?



U.S. DEPARTMENT OF
ENERGY

Oil and
Natural Gas

Attachment 6



NATIONAL ENERGY TECHNOLOGY LABORATORY



Oil and Gas Program Overview

Roy Long, Technology Manager, NETL
 URTAC Meeting, September 9, 2010, Sugar Land, TX



September 9, 2010

Outline

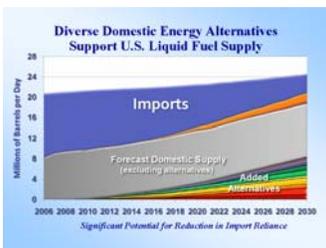
- **Introduction**
- **Traditional O&G Program Overview**
 - O&G Projects Summary
 - Stripper Well Consortium Highlight
- **EPAAct 2005, Sec. 999 Program Overview**
 - Consortium Program Overview
 - Key Milestones (Where we have come from)
 - Status
 - Complementary Program
 - Overall Program Accomplishments
 - Enhancements
 - 2009 FACA recommendations
 - Communication
 - Process/Program enhancements
- **Integrated Technology Transfer Program**
 - Structure
 - Publications
 - Knowledge Management Database (KMD)

NETL Applies Basic Science to Technology Development, Demonstration, & Deployment

Onsite Research & Development



Systems, Analyses, & Planning



Extramural Research & Collaboration



Developing the critical science and technology to discover and Commercialize advanced energy systems that efficiently utilize domestic Resources in an environmentally sustainable manner

NETL Natural Gas & Oil R&D Program Comprehensive R&D Portfolio

Advancing Technologies Supporting Development of Domestic Unconventional Resources



Unconventional FE Technologies

FOA Closed
7/29/10



Methane Hydrates



Environmental Solutions



Ultra-Deepwater & Unconventional Resources Program

EPA Act 2005
Title IX, Subtitle J

Outline

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NATIONAL ENERGY TECHNOLOGY LABORATORY

Traditional Program Overview

- **60 Projects (excludes Hydrates and Section 999 projects)**
- **\$111 MM Total Value (\$78 MM Gov't. Share, \$33 MM Cost-Share)**
- **Current projects from prior year funding:**
 - Fracture Flowback & Produced Water Treatment and Mgmt.
 - Environmental Impact Mitigation
 - Water Resources Management
 - Enhanced Oil Recovery
 - Unconventional Oil Production
 - Increasing Domestic Oil and Gas Production
 - Reservoir Characterization
 - Drilling/Completion/HPHT Downhole Tools
 - Seismic Technology
 - Oil and Gas Infrastructure-Related
 - Technology Transfer

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NATIONAL ENERGY TECHNOLOGY LABORATORY

Unconventional FE Technologies FOA

- Opened: June 4, 2010
- Closed: July 29, 2010
- Funding Available: \$9,700,000
- Topic Areas:
 - Advanced Simulation and Visualization
 - Next-Generation CO2-EOR
- Anticipated number of awards: 6-11

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NATIONAL ENERGY TECHNOLOGY LABORATORY

Stripper Well Consortium



- Industry-driven consortium est. Oct 2000
- Funded by NETL, NYSERDA, members (75)
- ~100 projects funded
- SWC - \$9.6 million Cost Share - \$7.6 million
- Target: small independents
- Excellent Cooperation amongst members
- Projects: 1 year duration
- Process very Operator friendly

- Low-cost innovative technology to:

- Increase production
- Reduce operating costs
- Reduce environmental footprint



www.energy.psu.edu/swc

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NATIONAL ENERGY TECHNOLOGY LABORATORY

Outline

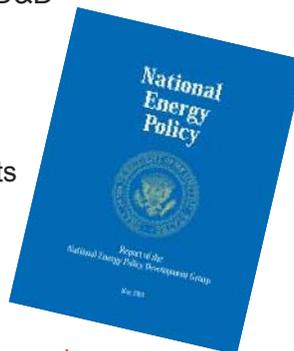
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NATIONAL ENERGY TECHNOLOGY LABORATORY

Energy Policy Act of 2005 Title IX, Subtitle J

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



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NATIONAL ENERGY TECHNOLOGY LABORATORY

Key Consortium Program Milestones

- EPOA signed Aug 8, 2005
- Program Consortium Solicitation released, Nov. 4, 2005
- RPSEA selected, May 5, 2006
- NETL submitted 2007 Draft Annual Plan (DAP) for review, May 11, 2007
- Received 2007 subcontracting funds, Aug 31, 2007
- RPSEA released first 2007 RFP, Oct 17, 2007
- NETL submitted 2008 DAP for review, Jan 8, 2008
- NETL submitted 2009 DAP for review, Aug 1, 2008
- Received 2008 subcontracting funds, Aug 12, 2008
- RPSEA released first 2008 RFP, Nov 11, 2008
- Received 2009 subcontracting funds, Feb 11, 2009
- RPSEA released first 2009 RFP, Oct 8, 2009
- NETL submitted 2010 DAP for review, Aug 4, 2009
- Received 2010 subcontracting funds, Dec 1, 2009
- RPSEA released first 2010 RFP, Jul 28, 2010
- NETL submitted RPSEA 2011 DAP for review July 14, 2010

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NATIONAL ENERGY TECHNOLOGY LABORATORY

Consortium Program Status *Solicitations & Awards*

- **2009 selections approved April/May 2010**
 - 11 Ultra-Deepwater projects
 - 11 Unconventional Resources projects
 - 6 Small Producers projects
- **28 2008 selections awarded**
- **6 projects completed as of May 31, 2010**
- **16 additional projects expected to be completed by Sept. 30, 2010**
- **Total of 97 projects expected to be active in 2010 representing a total award of over \$100 million invested in oil and gas research**
- **2010 solicitations : (two on the street, one in review)**
 - **Small Producers:** Opened Jul. 28th, closes Sep. 28th, 2010
 - **Unconventional Resources:** Opened Sep. 2nd, closes Nov. 4th, 2010
 - **Ultra-Deepwater:** TBD, open for 60 days

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NATIONAL ENERGY TECHNOLOGY LABORATORY

Outline

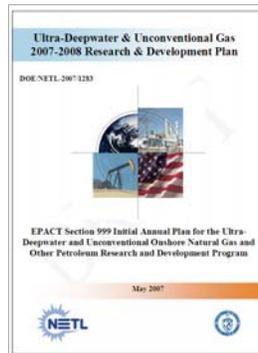
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NATIONAL ENERGY TECHNOLOGY LABORATORY

NETL Complementary R&D Program Philosophy

- Conduct unique, high-value research focused on key challenges to domestic fossil resources
- Coordinate with RPSEA and the other program elements
- **Focus:**
 - Fundamental science
 - Long-term research providing basis for next-generation technologies
 - Unbiased environmental science
 - Core competencies
- **Technical areas:**
 - Drilling under extreme conditions
 - Environmental challenges to fossil development
 - Enhanced & unconventional oil recovery
 - Oil & gas resource & technology assessment
- **Annual external reviews**
 - *Merit Review:* Assess scientific and technical quality of projects
 - *Technical Committee Review:* Assess complementary and non-duplicative nature

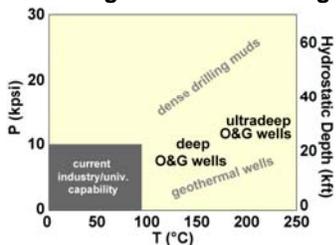


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NATIONAL ENERGY TECHNOLOGY LABORATORY

Drilling under Extreme Conditions

Goal: To provide the first understanding of drilling deep and ultra-deep wells to increase the rate of penetration and reduce drilling time for increased safety while drilling in extreme drilling environments



Four Elements to Research Focus

- > Experimental investigation of drilling dynamics
 - > Ultra-deep Drilling Simulator (UDS) and the Extreme Drilling Laboratory
- > Development of predictive models for drilling dynamics
- > Development of novel nanoparticle-based fluids for improved drilling ★
- > Improvement of materials behavior/performance in extreme environments

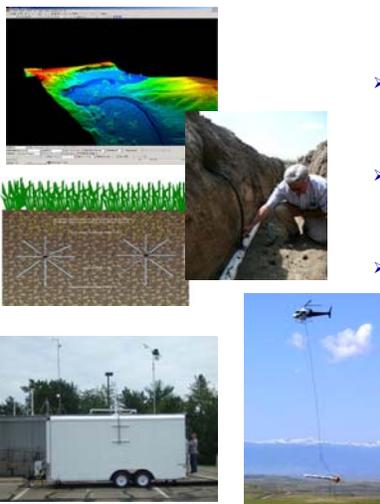
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NATIONAL ENERGY TECHNOLOGY LABORATORY

★ Coordinated with UNC Program Element

Environmental Impacts of Oil/Gas

Goal: To develop an improved, science-based understanding that leads to solutions for potential environmental challenges to oil/gas production



Major Elements to Research Focus

- > Evaluation of strategies for effective and environmentally sound disposition of produced waters ★
- > Fundamental inorganic and organic geochemistry of reservoir fluids—including natural background vs. production
- > More accurate assessment of air-quality impacts by detailed measurement and improved computational representations

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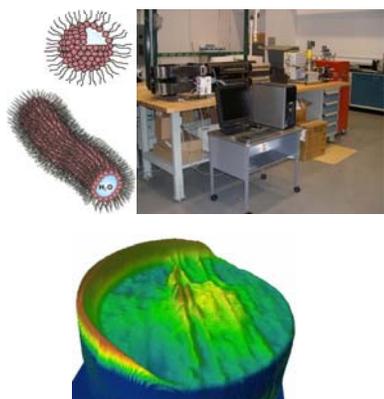
NATIONAL ENERGY TECHNOLOGY LABORATORY

★ Coordinated with UNC Program Element

Unconventional Oil & Enhanced Oil Recovery

Goal: To enable broader utilization of domestic fossil resources through improved efficiency and lowered environmental impact

Elements to Research Focus



- > CO₂-enhanced oil recovery: Improved flow control by increasing CO₂ viscosity (tailored surfactants)
- > Oil production in fractured media: Improve accuracy/reliability of predicting primary-tertiary oil recovery in shale
- > Equations of state for CO₂-brine-hydrocarbon at elevated PT ★
- > Catalog experience/knowledge from oil-shale and tar-sand activities

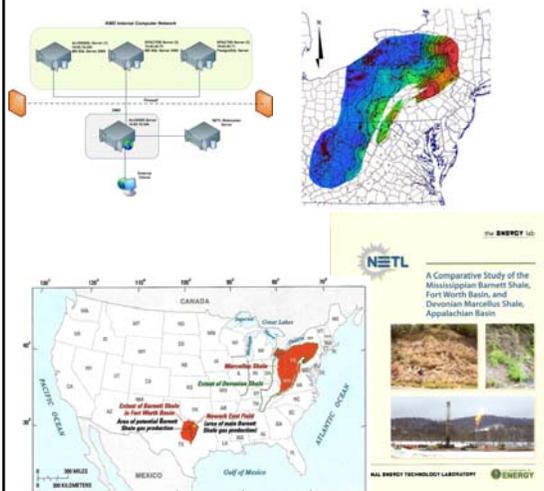
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★ Provides Direct Support to UDW Program Element

Resource Assessment

Goal: To enable better assessment of fossil resources by collection, management, and integration of high-resolution geospatial data



Elements to Research Focus

- > Knowledge management database development
- > Unconventional Oil and Gas Resource and Reserve Assessment ★

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★ Coordinated with UNC Program Element

Outline

- Introduction
- Traditional O&G Program Overview
 - O&G Projects Summary
 - Stripper Well Consortium Highlight
- **EPAAct 2005, Sec. 999 Program Overview**
 - Consortium Program Overview
 - Key Milestones (Where we have come from)
 - Status
 - Complementary Program
 - Overall Program Accomplishments
 - Enhancements
 - 2009 FACA recommendations
 - Communication
 - Process/Program enhancements
- **Integrated Technology Transfer Program**
 - Structure
 - Publications
 - Knowledge Management Database (KMD)

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Overall Program Accomplishments

Overall:

- 4 Annual Plans completed (maturing program)
- First Benefits Assessment Peer Review completed May 12, 2010 in support of Royalty Assessment

Program Consortium:

- **34 solicitations released**
- **100 projects selected; 70 projects awarded**
 - 42 Ultra-Deepwater projects (29 awarded, 4 completed)
 - 39 Unconventional Resources projects (28 awarded, 1 completed)
 - 19 Small Producers projects (13 awarded, 1 completed)

Complementary:

- **Development of 4 “evolving” focus areas**
 - Drilling under extreme conditions
 - Environmental impacts of oil/gas productions
 - Unconventional oil and enhanced oil recovery
 - Resource assessment; geospatial data management
- **Established Knowledge Management Database**
- **Completed Review of Program Benefits Assessment**

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FACA 2009 Recommendation Areas

UDAC

- Program Scope (**Int'l Collaboration - HQ**)
- Process (**Time to award & Comp.Pgm. Integration**)
- R&D Program Focus (**ES&H**)
- Societal Impact (**Env. Impact**)
- Program Progress & Value (**Tech. Transfer**)

URTAC

- Policy (**HQ issues**)
- Near Term Impacts (**Early successes & Metrics**)
- Research Focus (**Environmental**)
- **Technology Transfer**

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Program Communication

- **NETL-RPSEA Face-to-Face Meetings (plus daily discussion)**
 - Selection Meeting – 6/8/06
 - Formal Negotiations – 11/6/06
 - Kick-off Meeting – 1/25/07
 - Program Consortium Systems Approval discussions – 8/16/07
 - Subcontracting/Cost Price Discussions - 6/17/08
 - Process Improvements – 4/28/08 & 10/7-8/08
 - Purchasing System Review – 3/10-12/09 & 4/27-29/10
- **Quarterly UDW PAC-TAC and EFD Meetings**
- **Annual Plan development meetings**
- **R&D Project review meetings (Annually)**
- **NETL/RPSEA Bi-weekly meetings – Houston Office**

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Process / Program Enhancements

Process

- RFP and Subcontract templates developed
- Streamlined proposal submission process
- Hold Contracting Process Overview Meeting prior to solicitation release
- Use secure FTP site to distribute proposals to reviewers
- Streamlined Subcontract Approval Process
- Blanket waiver received for Intellectual Property
- Annual Plan Schedule developed for optimal program continuity, i.e., minimal delays in funding

Program

- Houston Area Office opened (April, 2009)
- Benefits methodology developed and results peer reviewed
- Solicitations address GAO recommendation to verify projects would not be done without government funding
- NETL's technology transfer program inclusive of Section 999 – Comprehensive Tech Transfer Program
 - Technology Transfer Program synergistic with benefits assessment

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2009 Recommendations: Key Response Indicators

- **Environmental**
 - Increased Focus on RPSEA Environmental Advisory Group (EAG) lead by Houston Adv. Research Center (HARC)
 - Award of Environmentally Friendly Drilling System
 - FY10 UNC RFP environmental focus and UDW redirection
- **Tech Transfer**
 - Establishment of NETL Integrated Technology Transfer Program
 - Development and debut of Knowledge Management Database (KMD at www.netl.doe.gov/kmd)

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Outline

- Introduction
- Traditional O&G Program Overview
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 - Communication
 - Process/Program enhancements
- **Integrated Technology Transfer Program**
 - Structure
 - Publications
 - Knowledge Management Database (KMD)

NETL Integrated Technology Transfer Program Structure

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

2009 Technology Transfer Program Publications Currently Available



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KMD: What is it?

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

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

**And rich geo-spatial
visualizations
showing the "size of
the prize"**

Knowledge Management Database (KMD) Portal

This portal provides four options for searching the variety of documents and data that NETL-managed oil and gas research has produced. The database of material includes R&D carried out under both historical and ongoing DOE oil and gas R&D programs funded through Congressional appropriations, as well as work that is currently underway as part of the Energy Policy Act of 2005, Title DC, Subtitle J, Section 999 R&D program.

Document Database: This search function allows the user to search all documents (e.g., final reports) from past and current R&D projects. This database includes oil and gas documents from the CD/DVD library, the NETL Internet site, the NETL Project Management Information System (PromIS), the Tulsa Project Office, and links to history documents currently available from the NETL library. Links to relevant external documents from the Office of Science and Technical Information (OSTI) are also included. The search is conducted by author or keyword search of titles and document abstracts.

CD/DVD Database: This search function allows the user to search all of the CDs and DVDs of oil and gas research reports compiled from past R&D programs as well as currently available documents from the NETL Internet site (i.e. SDND and Section 999, etc.). The user can download individual reports or order an entire CD or DVD.

Section 999 Database: This search function allows the user to search only project summaries related to the Energy Policy Act of 2005, Title DC, Subtitle J, Section 999 R&D program. Each of these project summaries, which are updated regularly, contains links to all of the research products related to that specific project.

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Data Visualizations: This search function allows the user to access a variety of spatial data related to the research projects found in the databases listed above. These GIS datasets include information gleaned from USGS, BMR, EIA and EPCRA data sets, as well as data produced by individual project performers. 130

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Information Included in Searches: Overview

Search five data repositories individually:

1. **The NETL Document Database**
 - Current/ongoing DOE sponsored R&D
 - Archival Files (All Prior DOE Oil & Gas R&D)
2. **The CD/DVD Database**
3. **The Section 999 Database**
4. **The Section 999 Tech Transfer Index**
 - Current and future products from research
5. **The NETL Visualization Database**

Or, search combinations in a single search

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Information Included in Searches: Continued

1. **Document Database – a “Large Search” Option**

- All Prior DOE Oil & Gas R&D
- **Content from:**
 - NETL Web site
 - NETL CD/DVD Database
 - NETL Library – hardcopies
 - Tulsa Project Office
 - Laramie Project Office,
 - OSTI Archives
- **Currently provides links to +13,000 files**

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Information Included in Searches: Continued

2. CD/DVD Database

- “Google” type search of 45 published disks
- Search for individual reports within CD/DVD’s
- Currently provides links to more than +15,000 files

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Information Included in Searches: Continued

- ### 3. Use EAct 2995 Section 999 Database – Use links to RPSEA project summaries

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Information Included in Searches: Continued

4. Section 999 Tech Transfer Index - Spreadsheet of project products (reports, publications, presentations, etc.)

- Searchable by Program, Project or Performer
- Future project and Program level activities in spreadsheet calendar
- Spreadsheet can be downloaded

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Information Included in Searches: Continued

5. Visualization Database

- A compilation of maps, visualizations and data that is available under the Oil and Gas program
 - Utilize readily available GIS shape files from USGS, MMS, EIA, EPCA Phase III study and others
 - Captures Exploration, Resources, Reserves, and Production using government compliance reporting sources

Major Tight Gas Plays, Lower 48 States



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Information Included in Searches: Continued

5. Visualization Database (continued)

- **Future focus: development of value-added products:**
 - Incorporate commercial data from Ventyx (Velocity Suite), ARI (Big Oil Field Database), Nehring Associates (Significant Oil and Gas Fields of the United States Database), and others
 - Capture additional Web map services



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How Do I Use the KMD?

First - Enter at the Portal Page:

www.netl.doe.gov/kmd

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Site Map GO

Where energy challenges converge and energy solutions emerge

KMD Portal Page

- ABOUT NETL
- KEY ISSUES & MANDATES
- RESEARCH
- TECHNOLOGIES
- ENERGY ANALYSIS
- SOLICITATIONS & BUSINESS
- EDUCATION
- NEWSROOM
- CONTACT NETL

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CD/DVD Database: This search function allows the user to search all of the CDs and DVDs of oil and gas research reports compiled from past R&D programs as well as currently available documents from the NETL internet site (i.e. SCWGO and Section 999, etc.). The user can download individual reports or order an entire CD or DVD.

Section 999 Database: This search function allows the user to search only project summaries related to the Energy Policy Act of 2005, Title IX, Subtitle J, Section 999 R&D program. Each of these project summaries, which are updated regularly, contains links to all of the research products related to that specific project.

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GIS Visualization: This search function allows the user to access a variety of spatial data related to the research projects found in the databases listed above. These GIS datasets include information gleaned from USGS, MMS, EIA and EPCA data sets, as well as data produced by individual project performers. **NO**



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How Do I Use the KMD?

- **Searching the Document Database:**
 - Example Search: a search that combines several of the databases by key word for R&D on “produced water”



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KMD Portal Page

Click on the "Document Database" Icon

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Knowledge Management Database (KMD) Portal

Document Database: This search function allows the user to search all documents (e.g., final reports) from past and current R&D projects. This database includes oil and gas documents from the CD/DVD library, the NETL literature, the NETL Project Management Information System (ProlIMS), the Tulsa Project Office, and links to hardcopy documents currently available from the NETL library. Links to relevant offsite documents from the Office of Science and Technical Information (OSTI) are also included. The search is conducted by author or key-word search of titles and document abstracts.

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Link Visualization: This search function allows the user to access a variety of spatial data related to the research projects found in the databases listed above. These GIS datasets include information gleaned from USGS, MMS, EIA and EPCA data sets, as well as data produced by individual project performance. **NO**

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KMD Search Page

After the Document Database Search page comes up, type in "Produced Water"

Search the KMD Document Database

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KMD Portal - Document Database

Search the KMD Document Database

This search function allows the user to search all documents (e.g., final reports) from past and current R&D projects. This includes reports from the Office of Research and Development and those available via the Office of Science and Technical Information database. The search is conducted by author or key-word search of titles and document abstracts. See our [instructions](#) for additional information.

Keywords or Subject of Interest: **Produced water** And

AUTHOR:

Sort results most recent first

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[http://www.netl.doe.gov/KMD/FormattedSearchDemo.aspx\[4/26/2010 10:01:29 AM\]](http://www.netl.doe.gov/KMD/FormattedSearchDemo.aspx[4/26/2010 10:01:29 AM])

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KMD Search Results Page

See results and note number of entries returned

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Or, Search Only the CD/DVD Database by Keyword

Note same Key Word search format as before

Note that all CD/DVD's are listed On the first page - they can be:
 1) Ordered
 2) Downloaded in their entirety
 3) Searched for individual papers or reports

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You Can, of Course, Search DOE's Section 999 Program Document Database Only Using Key Words

Search the KMD-CD-DVD Database



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Site Map

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KEY ISSUES & MANDATES

RESEARCH

TECHNOLOGIES

ENERGY ANALYSIS

SOLICITATIONS & BUSINESS

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KMD Portal > Section 999 Database

Search the KMD Section 999 Database

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The Section 999 Technology Transfer Index can be Searched by Program, Projects or Performer



Section 999 Technology Transfer Index

71 Total Projects
13 Small Producer Projects
0 Performer Projects

Program Element

Small Producer

PROGRAM ELEMENT

PROJECTS

PERFORMER

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

Preformed Particle Gel for Conformance Control

Near Mobile CO2 Application to Improve Oil Recovery for Small Producers

Enhancing Oil Recovery from Mature Reservoirs Using Radial-jetted Laterals and High-volume Progressive Cavity Pumps

PROJECT SUMMARY

Program Element	Performer
Small Producer	Texas Engineering Experiment Station (TEES)

Project Title
Field Site Testing of Low Impact Oil Field Access Roads: Reducing the Environmental Footprint in Desert Ecosystems

Contacts	Planned Year	Start Date	End Date
PI David Burnett	2007	09/03/08	09/02/10
NETL Chandra Nautiyal	Project Cost	Federal Cost	Cost Share
CONSORTIUM Martha Cather	\$444,859	\$284,859	\$160,000

Contract # 07123-01

Open Project Factsheet/Information

Open All Outreach Activities

This application allows the user to filter for RPS&A projects by NAME, PERFORMER or PROGRAM ELEMENT. The information displayed shows the research summaries and outreach activities with hyperlinks to open supporting documents.

OUTREACH ACTIVITIES

Month-Year	Type	Abstract
Jun-2009	Presentation	This Disappearing Roads Competition
	Presentation	Reducing Impacts of Oil & Gas Development on Rangelands
	Presentation	Team Challenge: Environmentally Friendly Drilling Using Low
Mar-2009	Report	Technology Assessment Report

Click on Outreach Activity to view record details

Month-Year	Document Type	Status	Open Record
Mar-2009	Report	Complete	<input type="button" value="Open Record"/>

Abstract
Technology Assessment Report

Author	Organization
David Burnett	Texas A&M University

Forum

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The Section 999 Technology Transfer Index Can Also be Downloaded in its Entirety

Project			Activity				
Area	Contract Number	Project Title (linked to Summary)	Project Details	Month-Year	Type	Abstract	Activity Details
Unconventional	07122-07	New Concepts for Unconventional Gas Development in Shales, Tight Sands and Coalbeds	Performer: Carter Technology PI: Ernest Carter Project Cost: \$114,600 Federal Cost: \$91,680 Cost Share: \$22,920 Start Date: Jul-2008	2/19/2009	Report	New Concepts for Unconventional Gas Development in Gas Shales, Tight Sands and Coalbeds - Final Report	Forum: Author: Ernest E. Carter Organization: Carter Technologies Co Status: Complete
Unconventional	07122-09	Application of Natural Gas Consumption to Modeling Communication within and Flow of Gas in Tight Gas and Reservoirs, Rocky Mountains	Performer: Colorado School of Mines PI: Harris Project Cost: \$1,016,419 Federal Cost: \$670,417 Cost Share: \$346,000 Start Date: Aug-2008	1/1/2009	Document	Application of Natural Gas Consumption to Modeling Communication within and Flow of Gas in Tight Gas and Reservoirs, Rocky Mountains	Forum: Author: Organization: Colorado School of Mines
Unconventional	07122-12	An Integrated Framework for the Treatment and Management of Produced Water	Performer: Colorado School of Mines PI: Jing Owens Project Cost: \$4,527,688 Federal Cost: \$1,540,389 Cost Share: \$2,456,692 Start Date: Sep-2008	10/16/2008	Document	An Integrated Framework for the Treatment and Management of Produced Water	Forum: Author: Organization: Colorado School of Mines
Unconventional	07122-14	Comprehensive Investigation of the Biogeochemical Factors Controlling Microbially Generated Methane in Coal Beds	Performer: Colorado School of Mines PI: Junk Munakata-Marr Project Cost: \$1,246,740 Federal Cost: \$844,333 Cost Share: \$382,407 Start Date: Sep-2008 End Date: Sep-2010		Document	Comprehensive Investigation of the Biogeochemical Factors Controlling Microbially Generated Methane in Coal Beds	Forum: Author: Organization: Colorado School of Mines Status: Complete

Links to Detailed Project Summaries

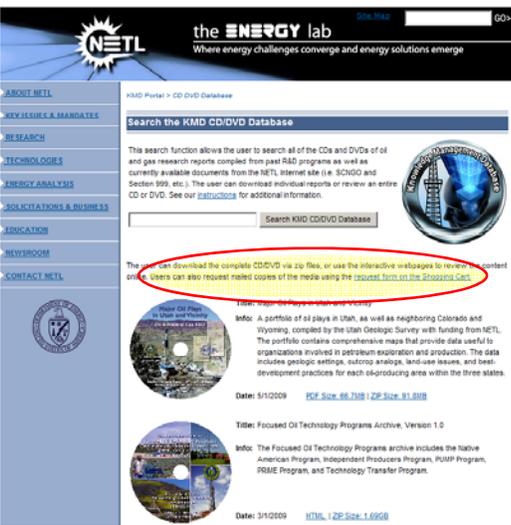
Links to Project Technical Abstracts



Online Ordering via Electronic Shopping Cart

Last But Not Least -

- The KMD provides the **USER** access to the **CD/DVD** collection. Some are on-line interactive and all have been **ZIPPED** for immediate download to your computer
- If you do not wish to, or cannot, download them, an electronic shopping cart is available for you to obtain, **free of charge**, disks of any of the CD/DVD's



The screenshot shows the 'the ENERGY lab' website with a search bar and a list of items. One item is highlighted with a red circle: 'You can download the complete CD/DVD via zip files, or use the interactive webpages to review content and users can also request mailed copies of the media using the option from the Download/Order button on the page.' Below this, two items are listed for sale: 'Utah Oil Plays in Utah and Wyoming' and 'Focused Oil Technology Programs Archive, Version 1.0'.

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Acknowledgements KMD Project Team Members

National Energy Technology Laboratory

Roy Long, Technology Manager Ultra-Deep Water
 Gary Covatch, SCNGO, Sec.999 Contract COR
 Virginia Weyland, SCNGO Project Manager
 Rand Batchelder, KMD Principal Investigator

URS Corporation

Jim Dean, Task Manager

TMS-NISC-IBM

Karl Lang
 Dr. William Pike
 Lacoa Corder

Performance Results Corporation

Jon Beavers
 Don Miller

Sextant Technical Services

Christopher Wyatt
 Frank Hutchinson
 Scott Streisel
 Elizabeth Warman
 Dale Cunningham

Questions



Attachment 7





Unconventional Onshore & Small Producer FACA Meeting

Robert W. Siegfried
September 9, 2010
Sugar Land, TX

Secure Energy for America 1

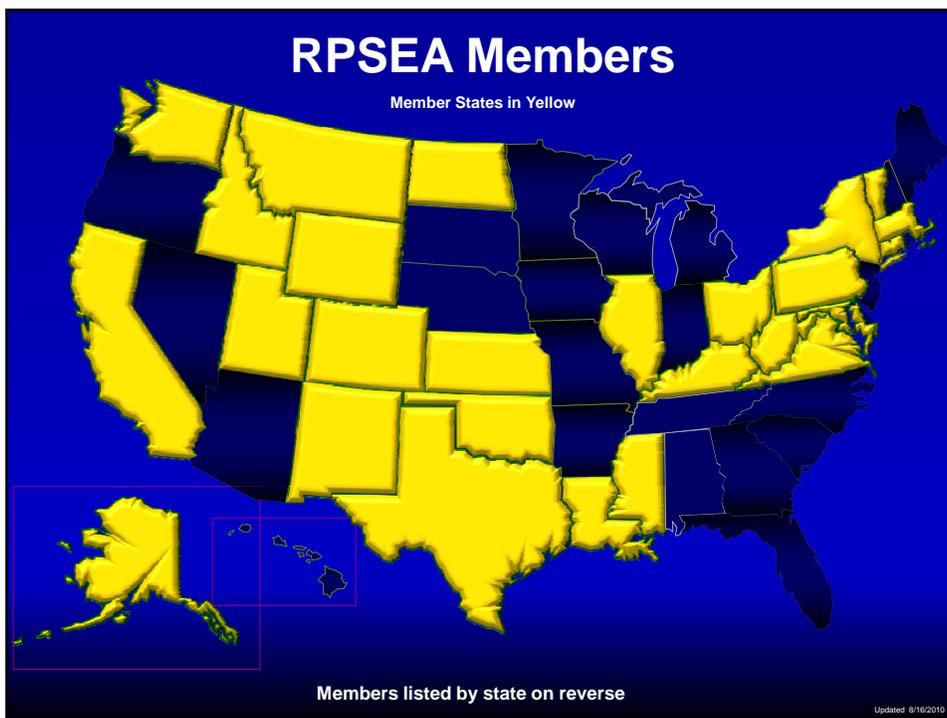
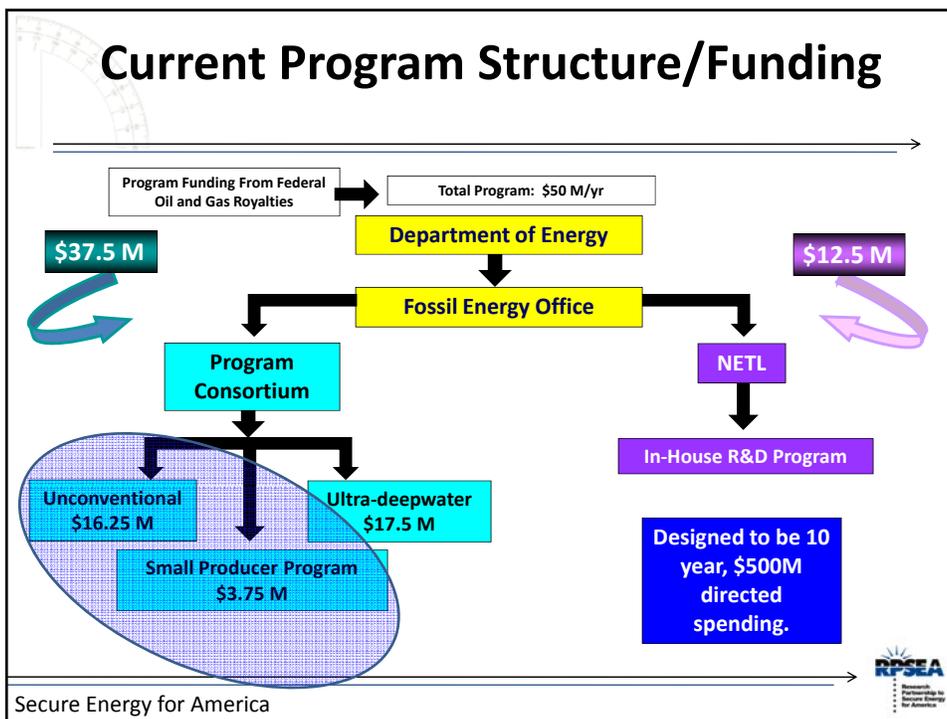


Contents

- RPSEA Organization
- Unconventional Resources Program Element
- Small Producer Program Element
- Technology Transfer Summary

Secure Energy for America 2

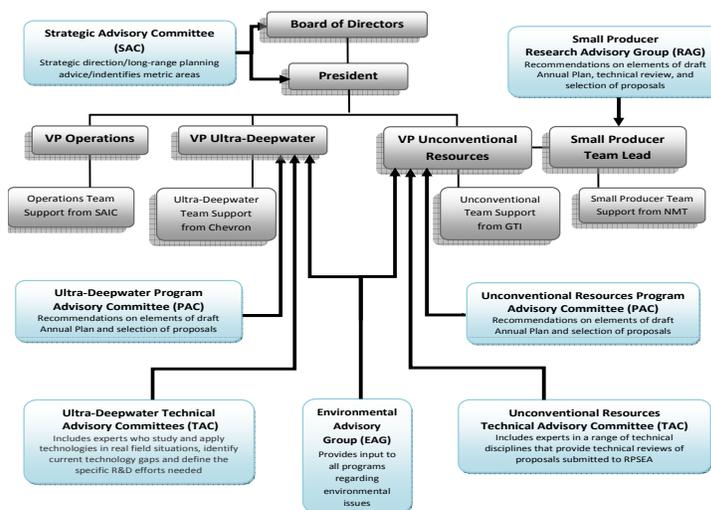


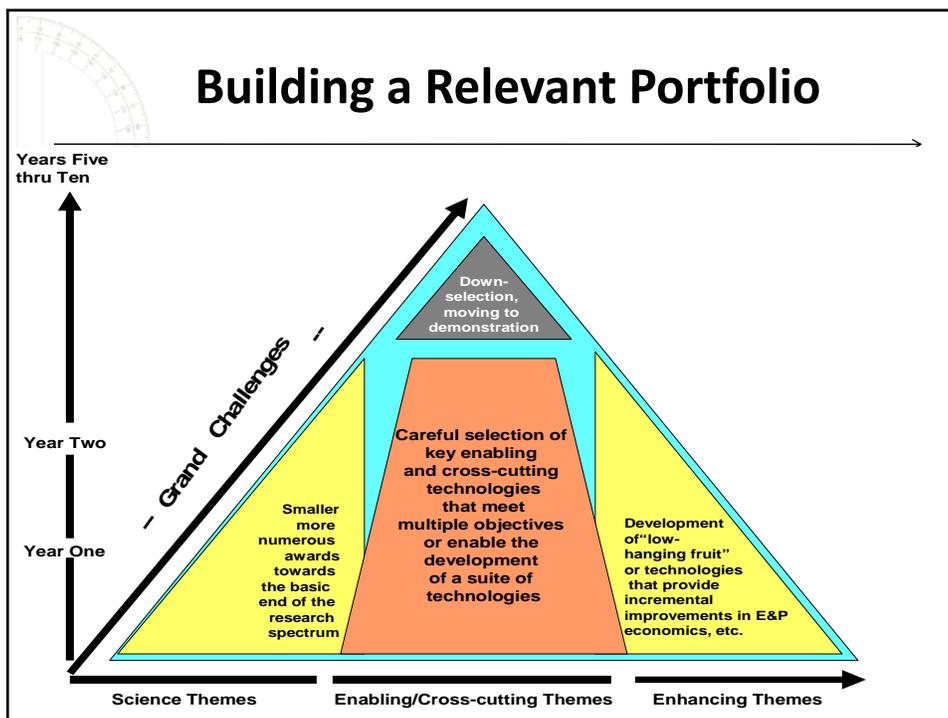
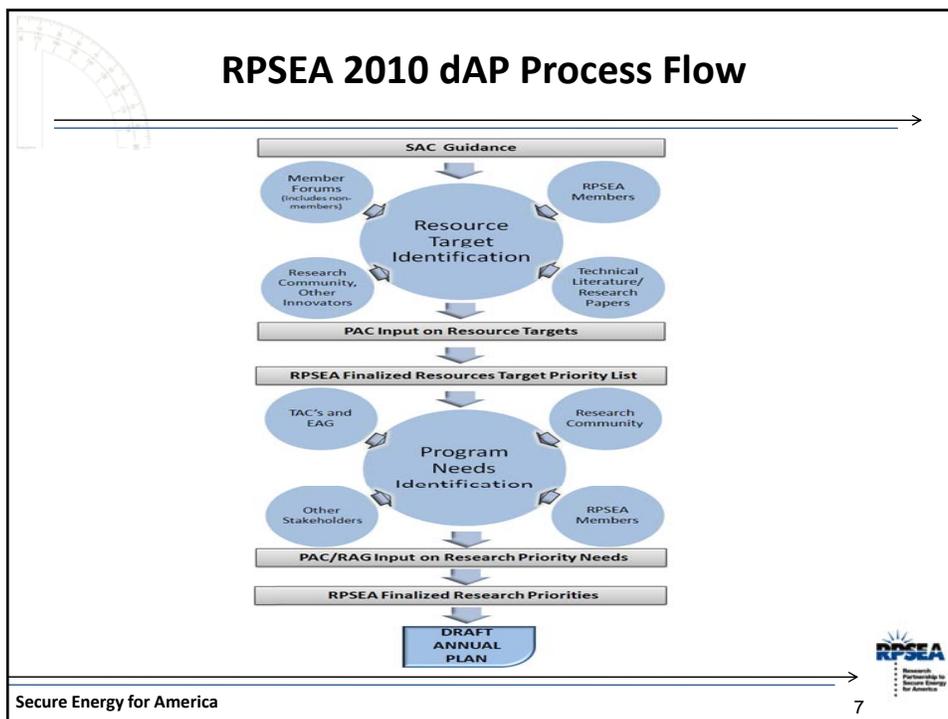


<p>Alaska University of Alaska Fairbanks</p> <p>California Aerovironment, Inc. Campbell Applied Physics Chevron Corporation Conservation Committee of California Oil & Gas Producers Drilling & Production Company Jacobs Engineering Group Inc. Lawrence Berkeley National Laboratory Lawrence Livermore National Laboratory Natural Carbon, LLC Paulson, Inc. Stanford University University of Southern California Watt Mineral Holdings, LLC</p> <p>Colorado Altra Group LLC Bill Barrett Corporation Brownstein Hyatt Farber Schreck, LLP Colorado Oil & Gas Association Colorado School of Mines DCP Midstream, LLC EnCana Corporation Energy Corporation of America Faro Energy Garrison Energy Corporation HW Process Technologies, Inc. Leads Operating Company NCO Resources Noble Energy, Inc. Robert L. Bayless, Producer LLC Spatial Energy The Discovery Group, Inc. University of Colorado at Boulder Western Energy Alliance</p> <p>Connecticut APS Technology, Inc.</p> <p>Idaho Idaho National Laboratory U.S. Geothermal Inc.</p> <p>Illinois Gas Technology Institute</p> <p>Kansas The University of Kansas</p> <p>Kentucky Greenberg OIL LLC NGAS Resources, Inc.</p> <p>Louisiana Louisiana State University</p> <p>Maryland Lockheed Martin Corporation</p> <p>Massachusetts Entropy Limited Massachusetts Institute of Technology Woods Hole Oceanographic Institution</p> <p>Mississippi Jackson State University Mississippi State University</p>	<p>Montana Nanco Resources</p> <p>New Mexico Correlations Company Harvard Petroleum Corporation Independent Petroleum Association of New Mexico Los Alamos National Laboratory New Mexico Institute of Mining and Technology Sandia National Laboratories Strata Production Company</p> <p>New York Hess Corporation</p> <p>North Dakota Laserfish Corporation Western Standard Energy Corporation</p> <p>Ohio MesoCoat, Ltd. NGO Development Corporation The Ohio State University Wright State University</p> <p>Oklahoma Chesapeake Energy Corporation Devon Energy Corporation Interstate Oil and Gas Compact Commission Oklahoma Independent Petroleum Association MAP Royalty, Inc. Panther Energy Company, LLC. Petroleum Technology Transfer Council The Fleischaker Companies The University of Oklahoma The University of Tulsa The Williams Companies, Inc.</p> <p>Pennsylvania The Pennsylvania State University Vista Resources, Inc.</p> <p>Texas Acute Technological Services, Inc. Adventek International Corp. AGR Subsea, Inc. Alcoa Oil and Gas AMCO Consulting, Inc. Anadarko Petroleum Corporation Apache Corporation AT Balance Americas L.L.C. Athens Group Baker Hughes Incorporated Bridg Energy Partners, Ltd. B3 Services Company BP America, Inc. BMT Scientific Marine Services Inc. CameronCurtis-Wright EMD Capstone Turbine Corporation CARBO Ceramics, Inc. City of Sugar Land ConocoPhillips Company Consumer Energy Alliance CSI Technologies, Inc. Cubity DeepFlex Inc. Deepwater Structures, Inc. Deepwater XLP Technology, LLP</p>	<p>Det Norske Veritas (USA) Energy Valley, Inc. ExxonMobil Corporation GE Oil & Gas General Marine Contractors, LLC Granherne, Inc. Greater Fort Bend Economic Development Council GSI Environmental, Inc. Halliburton HIMA Americas, Inc. Houston Advanced Research Center Houston Offshore Engineering, LLC Houston Technology Center Intelligent Agent Corporation Knowledge Reservoir, LLC Konsberg Oil & Gas Technologies Inc. Larsen-Hall Group Marathon Oil Corporation M&H Energy Services Manick Systems, Inc. Nalco Company NanoRidge Materials, Inc. National Oilwell Varco, Inc. Navitus International, LLC Neplec USA Nexen Petroleum USA Inc. Oceanenergy International, Inc. OTM Consulting Ltd. Oxane Materials, Inc. Petrus International Inc. Petrus Technology, Inc. Petrobras America, Inc. Pioneer Natural Resources Company OO Inc. Quanelle, LLC Quest Offshore Resources Rice University Rock Solid Images RTI Energy Systems Schlumberger Limited Shell International Exploration & Production Simmons & Company International SleisLark, LLC Southern Methodist University Southwest Research Institute Statoil Stress Engineering Services, Inc. Subsea Riser Products Technip Technology International Tejas Research & Engineering, LP Tenaris Texas A&M University Texas Energy Center Texas Independent Producers and Royalty Owners Association Texas Tech University The Research Valley Partnership, Inc. The University of Texas at Austin Titanium Engineers, Inc. TOTAL E&P USA, Inc. Tubel Energy LLC University of Houston</p>	<p>VersaMarine Engineering, LLC Weatherford International Ltd. WFS Energy & Environment Zebel ZH Offshore Inc.</p> <p>Utah Novatek, LLC The University of Utah</p> <p>Vermont New England Research, Inc.</p> <p>Virginia Advanced Resources International, Inc. American Gas Association Independent Petroleum Association of America Integrated Ocean Drilling Program</p> <p>Washington BlueView Technologies, Inc. Quest Integrated, Inc. Washington D.C. Consortium for Ocean Leadership</p> <p>West Virginia West Virginia University</p> <p>Wyoming Big Cat Energy Corporation EnerCrest, Inc. WellDog, Inc.</p> <p>Newfoundland, Canada Propel Inc.</p>
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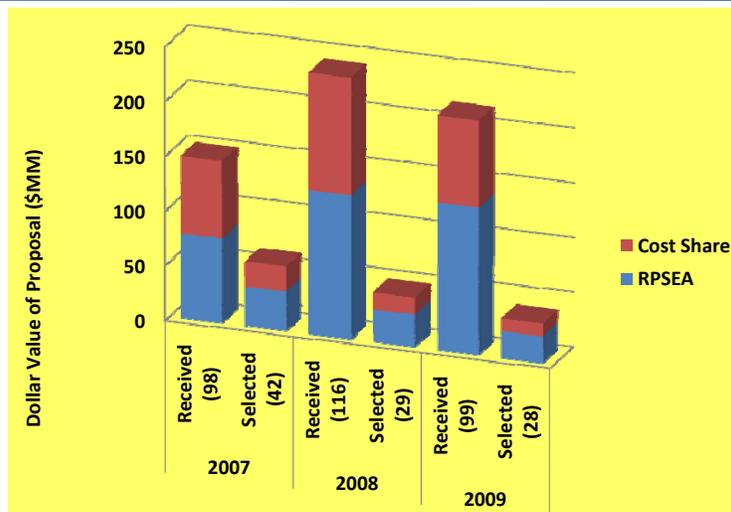
Pending member - company name in green

RPSEA Organization





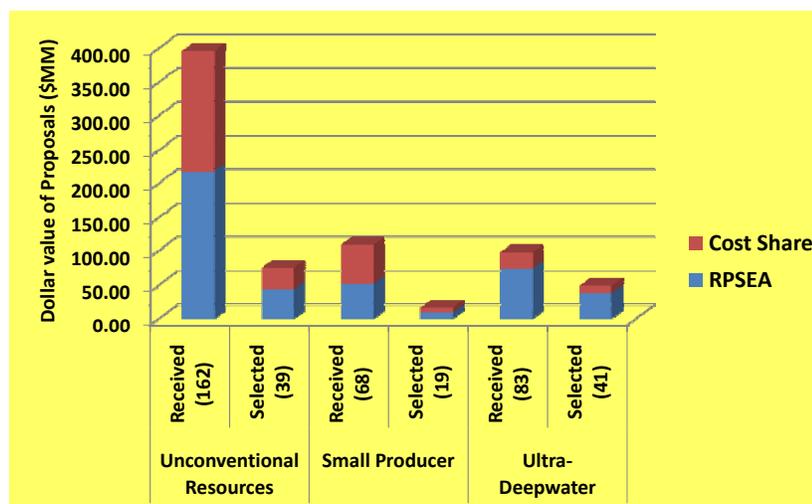
Summary of Proposals 2007-2009



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2007-2009 Proposals



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Portfolio Overview

RPSEA Program Selections 2007-2009				
	Small Producer	Unconventional Resources	Ultra-Deepwater	Total
Universities	14	25	10	49
For Profits	4	4	25	33
Non-Profits	0	4	5	9
National Labs	1	3	1	5
State Agencies	0	3	0	3
Total Selected	19	39	41	99

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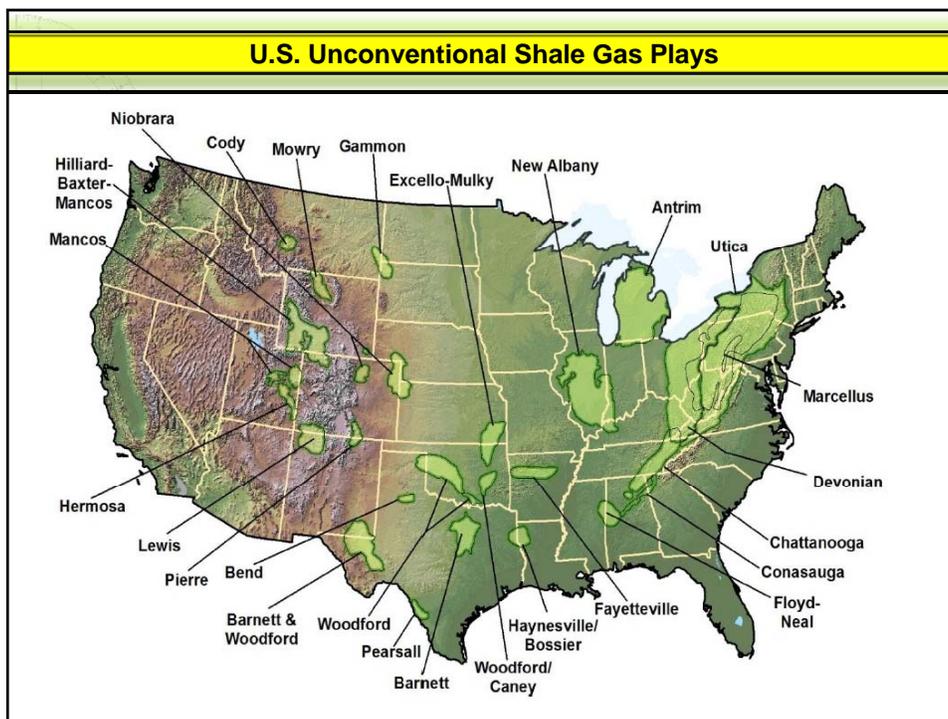
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- RPSEA Organization
- Unconventional Resources Program Element
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Unconventional Gas

- **Potential to Impact National, International Energy Supply**
 - Abundant
 - Low carbon
 - Suitable for transportation and power generation

- **Technical Challenges**
 - Cost
 - Environmental impact of development
 - These challenges are closely related
 - Concern over safety and unplanned environmental impact



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2011 Draft Annual Plan – Unconventional Onshore Program

- **Mission & Goal**
 - Unchanged from 2007-2010
 - *Economically viable* technologies to allow *environmentally acceptable* development of unconventional gas resources
 - Gas Shales
 - Tight Sands
 - Coalbed Methane
- **Objectives**
 - **Near Term**
 - Increase production & recovery from established unconventional gas resources, accelerate development of existing & emerging plays
 - Decrease environmental impact of unconventional gas development
 - Integrate project results & deliverables and engage in technology transfer to ensure application of program results
 - **Longer Term**
 - Technologies for high-priority emerging & frontier resources

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Unconventional Onshore Themes

- **Gas Shales**
 - Rock properties/Formation Evaluation
 - Fluid flow and storage
 - Stimulation
 - Water management
- **Coalbed Methane**
 - Produced water management
- **Tight Sands**
 - Natural fractures
 - Sweet spots
 - Formation Evaluation
 - Wellbore-reservoir connectivity
 - Surface footprint

Environmental Implications in All Aspects of Operations

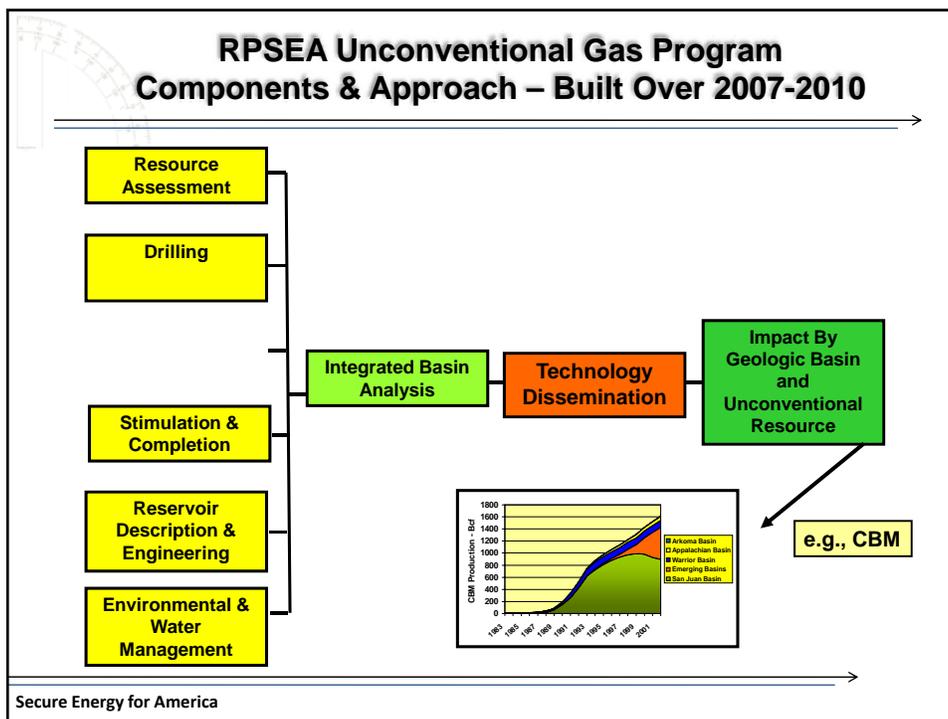






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	CBM 10%	Gas Shales 45%	Tight Sands 45%							
Integrated Basin Analysis										
Drilling										
Stimulation and Completion										
Water Management										
Environmental										
Reservoir Description & Management										
Reservoir Engineering										
Resource Assessment										
Exploration Technologies										
<table border="1" style="margin: auto;"> <tr> <td style="background-color: #90EE90; text-align: center;">H</td> <td>High Priority</td> <td rowspan="3" style="vertical-align: middle;">Total Cost to RPSEA</td> </tr> <tr> <td style="background-color: #FFD700; text-align: center;">M</td> <td>Medium Priority</td> </tr> <tr> <td style="background-color: #FFA500; text-align: center;">L</td> <td>Low Priority</td> </tr> </table>				H	High Priority	Total Cost to RPSEA	M	Medium Priority	L	Low Priority
H	High Priority	Total Cost to RPSEA								
M	Medium Priority									
L	Low Priority									

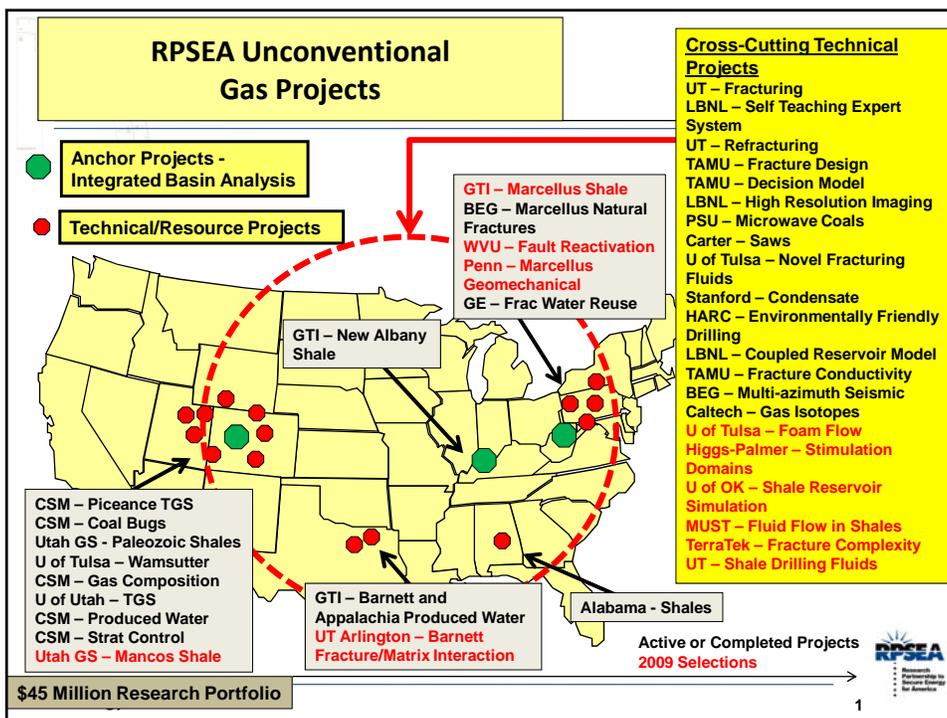
	CBM 10%	Gas Shales 45%	Tight Sands 45%
Integrated Basin Analysis		New Albany (GTI) \$3.4	Piceance (CSM) \$2.9
Drilling			
Stimulation and Completion	Microwave CBM (Penn) \$.08	Cutters (Carter) \$.09 Frac (UT Austin) \$.69 Refrac (UT Austin) \$.95	Gel Damage (TEES) \$1.05 Frac Damage (Tulsa) \$.22
Water Management	Integrated Treatment Framework (CSM) \$1.56		
Environmental			
Reservoir Description & Management		Hi Res. Imag. (LBNL) \$1.1	Tight Gas Exp. System (LBNL) \$1.7
Reservoir Engineering		Decision Model (TEES) \$.31	Wamsutter (Tulsa) \$.44 Forecasting (Utah) \$1.1 Condensate (Stanford) \$.52
Resource Assessment		Alabama Shales (AL GS) \$.5 Manning Shales (UT GS) \$.43	Rockies Gas Comp. (CSM) \$.67
Exploration Technologies	Coal & Bugs (CSM) \$.86		
2008 Program Priorities	H	High Priority	2007 Projects
	M	Medium Priority	
	L	Low Priority	

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	CBM 10%	Gas Shales 45%	Tight Sands 45%
Integrated Basin Analysis		New Albany (GTI) \$3.4	Piceance (CSM) \$2.9
Drilling			
Stimulation and Completion	Microwave CBM (Penn) \$.08	Cutters (Carter) \$.09 Frac (UT Austin) \$.69 Refrac (UT Austin) \$.95 Frac Cond (TEES) \$1.6	Gel Damage (TEES) \$1.05 Frac Damage (Tulsa) \$.22
Water Management	Integrated Treatment Framework (CSM) \$1.56	Barnett & Appalachian (GTI) \$2.5	Frac Water Reuse (GE) \$1.1
Environmental	*	Environmentally Friendly Drilling (HARC) \$2.2	*
Reservoir Description & Management		Hi Res. Imag. (LBNL) \$1.1 Gas Isotope (Caltech) \$1.2 Marcellus Nat. Frac./Stress (BEG) \$1.0	Tight Gas Exp. System (LBNL) \$1.7 Strat. Controls on Perm. (CSM) \$0.1
Reservoir Engineering		Decision Model (TEES) \$.31 Coupled Analysis (LBNL) \$2.9	Wamsutter (Tulsa) \$.44 Forecasting (Utah) \$1.1 Condensate (Stanford) \$.52
Resource Assessment		Alabama Shales (AL GS) \$.5 Manning Shales (UT GS) \$.43	Rockies Gas Comp. (CSM) \$.67
Exploration Technologies	Coal & Bugs (CSM) \$.86	Multi-Azimuth Seismic (BEG) \$1.1	
2008 Program Priorities	H	High Priority	2007 Projects
	M	Medium Priority	2008 Projects
	L	Low Priority	

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	Gas Shales	Tight Sands
Integrated Basin Analysis	New Albany (GTI) \$3.4 Marcellus (GTI) \$3.2 Mancos (UTGS) \$1.1	Piceance (CSM) \$2.9
Stimulation and Completion	Cutters (Carter) \$.09 Frac (UT Austin) \$.69 Refrac (UT Austin) \$.95 Frac Cond (TEES) \$1.6 Stimulation Domains (Higgs-Palmer) \$0.39 Fault Reactivation (WVU) \$0.85	Gel Damage (TEES) \$1.05 Frac Damage (Tulsa) \$.22 Foam Flow (Tulsa) \$0.57 Fracture Complexity (TerraTek) \$0.83
Reservoir Description & Management	Hi Res. Imag. (LBNL) \$1.1 Gas Isotope (Caltech) \$1.2 Marcellus Nat. Frac./Stress (BEG) \$1.0 Frac-Matrix Interaction (UT-Arl) \$0.46 Marcellus Geomechanics (PSU) \$3.1	Tight Gas Exp. System (LBNL) \$1.7 Strat. Controls on Perm. (CSM) \$0.1 Fluid Flow in Tight Fms. (MUST) \$1.2
Reservoir Engineering	Decision Model (TEES) \$.31 Coupled Analysis (LBNL) \$2.9 Shale Simulation (OU) \$1.05	Wamsutter (Tulsa) \$.44 Forecasting (Utah) \$1.1 Condensate (Stanford) \$.52
Exploration Technologies	Multi-Azimuth Seismic (BEG) \$1.1	
Drilling	Drilling Fluids for Shale (UT Austin) \$0.6	
Water Management	Barnett & Appalachian (GTI) \$2.5 Integrated Treatment Framework (CSM) \$1.56	Frac Water Reuse (GE) \$1.1
Environmental	Environmentally Friendly Drilling (HARC)* \$2.2	*
Resource Assessment	Alabama Shales (AL GS) \$.5 Manning Shales (UT GS) \$.43	Rockies Gas Comp. (CSM) \$.67
	Anchor Project	2007 Projects
	2009 RFP Focus	2008 Projects
	Novel Concepts	2009 Projects



Unconventional Resources Program

- **Selected Projects Presented at Annual Workshop (April 2010)**
 - Early dissemination of preliminary results
 - Critical review by PAC
 - Review by PI Group
 - Communication among PIs
 - Identify opportunities for cooperation
 - Define program gaps for 2010 solicitation
 - Provide direction for draft Annual Plan
- **Emphasis on Integration of Results**
 - Workshop ideas
 - Need for active integration of projects into program – Reflected in 2011 draft Annual Plan
- **2010 RFP, 2011 Plan Structured to Build Upon Existing Program**

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Last Year: 2010 Draft Annual Plan – Onshore Program Solicitation

- **Integrated Program Targeting a Specific Resource**
 - Build on existing projects
 - May be comprehensive or directed toward specific technology area
 - Topic areas amended as per URTAC recommendations
- **Early-Stage Research on Novel Concepts for Unconventional Gas Development**
- **Innovative Approaches to Integrate the Results of Individual Projects**
- **Additional Emphasis in 2010 Solicitation**
 - **Improved drilling technology**
 - Gap identified by PAC and others
 - Increase efficiency and effectiveness of well construction
 - **Environment and Safety**
 - Industry credibility damaged by Deepwater Horizon
 - Ensure risks of unconventional gas development are clearly identified
 - Develop and apply technology to reduce and mitigate risks
 - Aligned with URTAC recommendation

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2011 Draft Annual Plan – Onshore Program Solicitation

- **Environment and safety risk assessment, reduction and mitigation**
 - Explicit focus, increased emphasis in all aspects of program
- **Innovative approaches for project integration**
 - Plan and manage field trials
 - Integrate the results of existing projects
 - Plan tech transfer
- **Develop an integrated resource-focused program**
 - **Topic areas (amended as per 2010 URTAC recommendations)**
 - Resource Assessment
 - Geosciences
 - Basin Analysis and Resource Exploitation
 - Drilling
 - Stimulation and Completion
 - Water Management
 - Reservoir Description and Management
 - Reservoir Engineering
 - Environmental
- **Novel concepts for unconventional gas development**



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- RPSEA Organization
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2011 Draft Annual Plan – Small Producer Program

- **Mission & Goals**
 - Unchanged from 2007-2010
 - Increase supply from mature resources
 - Reduce cost
 - Increase efficiency
 - Improve safety
 - Minimize environmental impact
- **Objectives**
 - Near Term
 - Improve water management & optimize water use
 - Improve oil & gas recovery in mature fields, extending economic life
 - Reduce field operating costs
 - Longer Term
 - Apply developed technologies to new basins/areas and develop new technologies to address the same objectives

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The Technology Challenges of Small Producers

Focus Area – Advancing Technology for Mature Fields

- Target – Existing/Mature Oil & Gas Accumulations
 - Maximize the value of small producers' existing asset base
 - Leverage existing infrastructure
 - Return to production of older assets
 - Minimal additional surface impact
 - Minimize and reduce the existing environmental impact
- Lower cost and maximize production while reducing environmental impact



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Small Producer Program – 2007-2008 Projects & 2009 Selections

- Nineteen projects addressing concerns of small producers operating mature assets
 - Produced water treatment (2)
 - Reservoir Characterization (3)
 - Enhanced oil and gas recovery (7)
 - Environmental impact & increased efficiency (4)
 - Stimulation, improved recovery and sweep efficiency (3)
- Projects each involve a consortium of researchers and small producers
- Small Producer Research Advisory Group (RAG) actively involved

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2010 Draft Annual Plan – Small Producer Program

- Awards to be made to Consortia
 - Small producers or organized for the benefit of small producers
 - Small producer: ≤ 1000 BOEPD
- 2011 Annual Plan Solicitations
 - Theme: Advancing Technology for Mature Fields
 - Path to initial application is critical
 - Complement 2007-2010 project selections
 - Increased environmental and safety emphasis



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2010 Draft Annual Plan – Small Producer Program

- **Technology Challenges**
 - Water management
 - Improve recovery/extend economic life of reservoirs
 - Reduce field operating costs and decrease environmental impact
 - Well monitoring and reservoir modeling to allow efficient field operations
 - Improved methods for well completions and recompletions
 - Field tests of emerging technology
 - Well and field data management
 - Capture and reuse of waste products to reduce costs or increase recovery
 - Leverage existing wellbores and surface footprint to maximize recovery
 - Novel Concepts to increase production from mature fields
- Other topics addressing the program theme of Advancing Technology for Mature Fields are welcome

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Technology Transfer Approaches

- **Engagement of PAC and TAC Members**
 - Project selection and review
 - Participation in field tests as “early adopters”
- **Active Coordination with NETL on Knowledge Management Database (KMD)**
- **PTTC Engagement – Contract under review by NETL**
- **RPSEA Website Enhancement**
 - Project information
 - Program direction
- **2.5% set-aside for tech transfer in each subcontract**
 - 1.5% Project Level
 - 1% Program Level

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Project-Level Technology Transfer

- **Funded by 1.5% Set-aside**
- **Managed by subcontractors**
 - Project-specific websites
 - Participation in conferences, workshops
 - Preparation of articles for journals, trade publications



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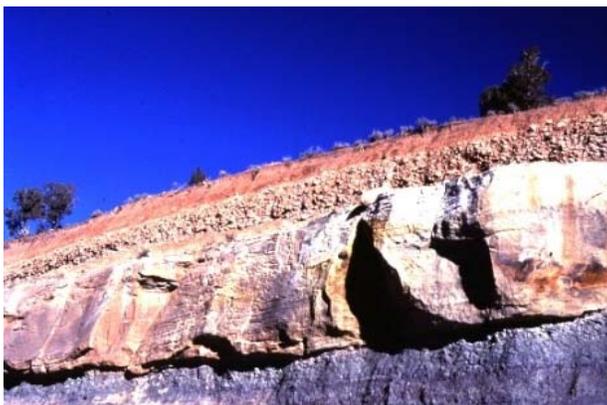


Program-Level Technology Transfer

- **Funded by 1% Set-aside**
- **Managed by RPSEA**
 - Website Enhancements
 - Coordination with NETL KMD, PTTC activities
 - Events at Major Technical Conferences (SPE, AAPG, SEG, etc.)
 - Directed publications, e.g. *GasTips*
 - RPSEA Forum Series, e.g. New Albany Shale Forum, June 2009, Unconventional Resources Workshop, April 2010



Questions?



Attachment 8

Comments from URTAC Meeting, September 9, 2010

- We should develop our findings and recommendations based upon the RPSEA Plan and look for ways to adjust it to better reflect the vision expressed in the DOE Plan, not the other way around.
- We should decouple the Executive Summary and the Policy sections in the Executive Summary/Policy subcommittee ... and make two subcommittees.
- One subcommittee should be designated to read and compare the RPSEA Plan and the DOE Plan and analyze the differences.
- We should recommend that respondents to solicitations be required to quantify the potential environmental costs and benefits of the technologies developed by their projects.
- This should not be a reactionary R&D plan ... we should not recommend a “defensive research” program that reacts only to current public concerns in some areas. The Plan should be balanced.
- We need to be more specific about recommending that DOE gather and publish data proving that current fracturing technology is safe.
- We should point out that many technologies designed to impact production costs or efficiency are often also technologies that positively impact environment, e.g., water shut off technologies reduce the environmental risks associated with water handling and disposal, tools that reduce drilling time reduce time on location and thus reduce environmental impact, a way to carry out short term onsite well testing can reduce footprint, etc.
- We should recommend that HSE impacts be one criterion for project selection and be weighted appropriately.
- We should recommend that proposals build on previous R&D and that an exhaustive effort be made to identify relevant past work and explain the incremental improvements being proposed ... lots of previous research work is being lost and there is a risk of “re-inventing the wheel.”
- Need R&D related to advancing the re-use of frac water with minimal cleanup
- Is there a way for DOE to provide up-to-date information on the state-of-the-art of various technologies and associated industry needs, as part of a tech transfer/outreach task?

- We should recommend that the Program gather and publish data to answer community concerns related to environmental impacts (“white papers”). Environmental issues are not just technology-related but also outreach-related.
- We should recommend that more attention be paid by the program to the interface between environmental and production issues. Resource development is dependent on understanding environmental impacts.
- Pay attention to the historic evolution observed in the exploration, development, production, regulation process ... regulations are often a reaction to recognized impacts of earlier activity. Demos can be used to validate or provide scientific advice/input for regulations.
- What about recommendations to address environmental/product demand issues ... lack of demand for ethane is an issue that may result in shut in shale gas wells. Is “technologies to better utilize undervalued resources” an area for R&D?
- The “policy” subcommittee should handle the differences between the two Annual Plans (DOE and RPSEA).

Attachment 9



Unconventional Resources Technology Advisory Committee

September 9, 2010

Committee Calendar and Next Steps

Elena Melchert
DOE/Office of Oil and Natural Gas
URTAC Committee Manager

Unconventional Resources Technology Advisory Committee

- **Committee Calendar**
 - September / October: ad hoc Review Subcommittee meetings
 - October 14, 2010, 8am-5pm, 14th URTAC Meeting in New Orleans
 - October: Editing Subcommittee meets to prepare final report of URTAC comments and recommendations
 - October 18, 2010, Editing Subcommittee sends final report to the Committee Manager for distribution to the URTAC members
 - October 21, 2010, 1:00 pm EDT, 15th URTAC Meeting, Teleconference in Washington, DC to vote on Editing Subcommittee report
 - October 22nd, Chair delivers URTAC final report of comments & recommendations to the Secretary of Energy

Unconventional Resources Technology Advisory Committee

- **Next Steps: October 14, 2010 URTAC 14th Meeting**
 - Review Subcommittee Chairs present comments, findings and draft recommendations at URTAC meeting in New Orleans on October 14, 2010.
 - URTAC reaches consensus on final recommendations
- **Next Steps by October 21, 2010**
 - Editing Subcommittee prepares final report and sends report to Committee Manager via email
 - Committee Manager forwards final report to members.

Unconventional Resources Technology Advisory Committee

- **Next Steps: October 21, 2010, 1:00 pm EDT**
 - Teleconference in Washington, DC
 - URTAC votes to accept Editing Subcommittee report
- **Next Steps: October 22, 2010**
 - URTAC Chair delivers final report to the Secretary of Energy