



# **Oil and Natural Gas RD&D Program Sec. 999 Federal Advisory Committees**

**John R. Duda, Director, SCNGO**

**September 9-12, 2008**



# Outline

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

# National Energy Technology Laboratory

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



*Pennsylvania*



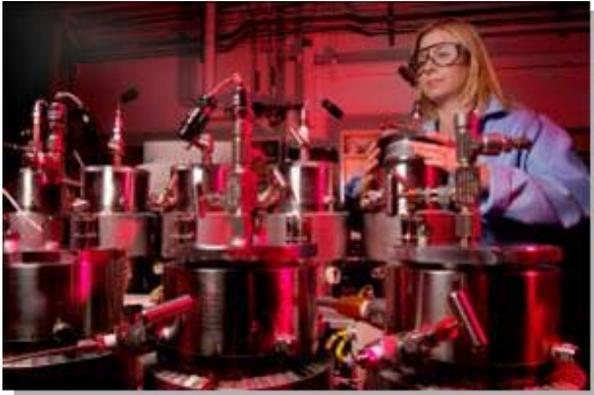
*West Virginia*



*Oregon*

# NETL Mission

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

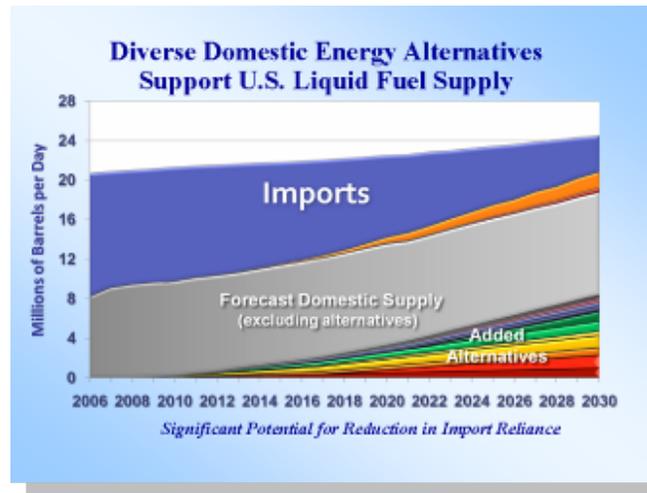


# NETL Applies Basic Science to Technology Development, Demonstration, and Transfer

## *Onsite Research and Development*



## *Systems, Analysis, and Planning*



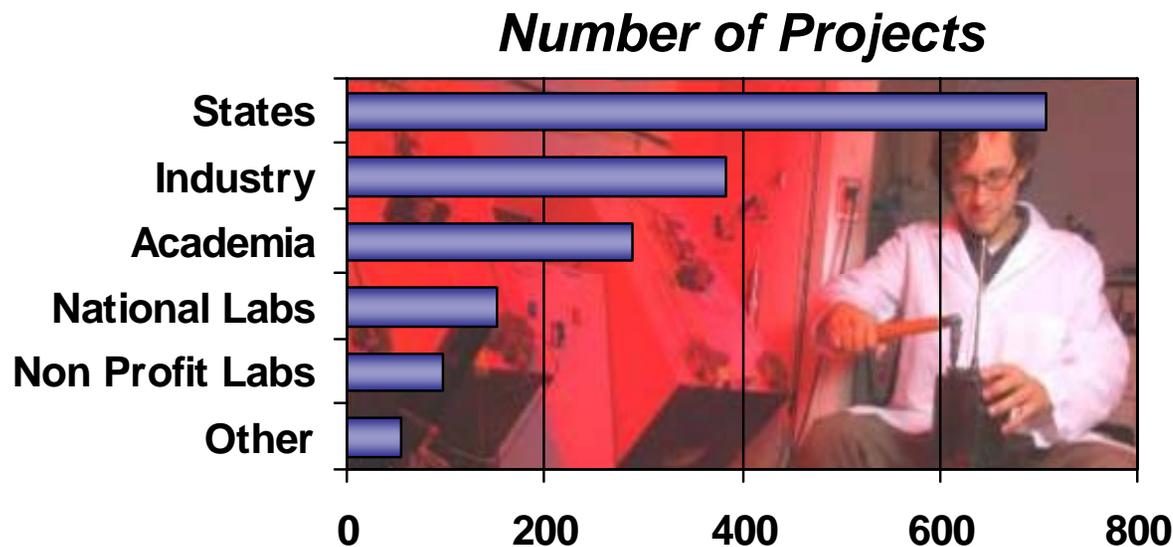
## *Extramural Research and Collaboration*



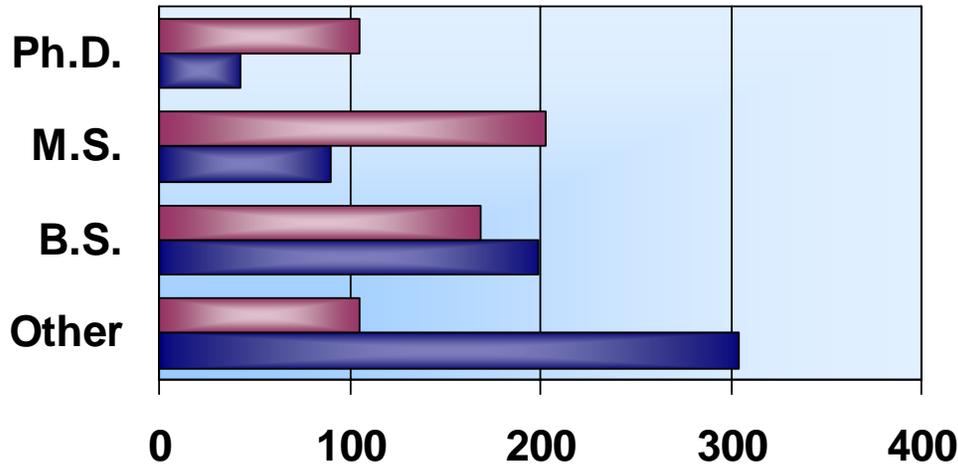
*More Than 1,800 Activities in the United States and 40+ Other Countries*

# NETL Implements & Manages Extramural RD&D

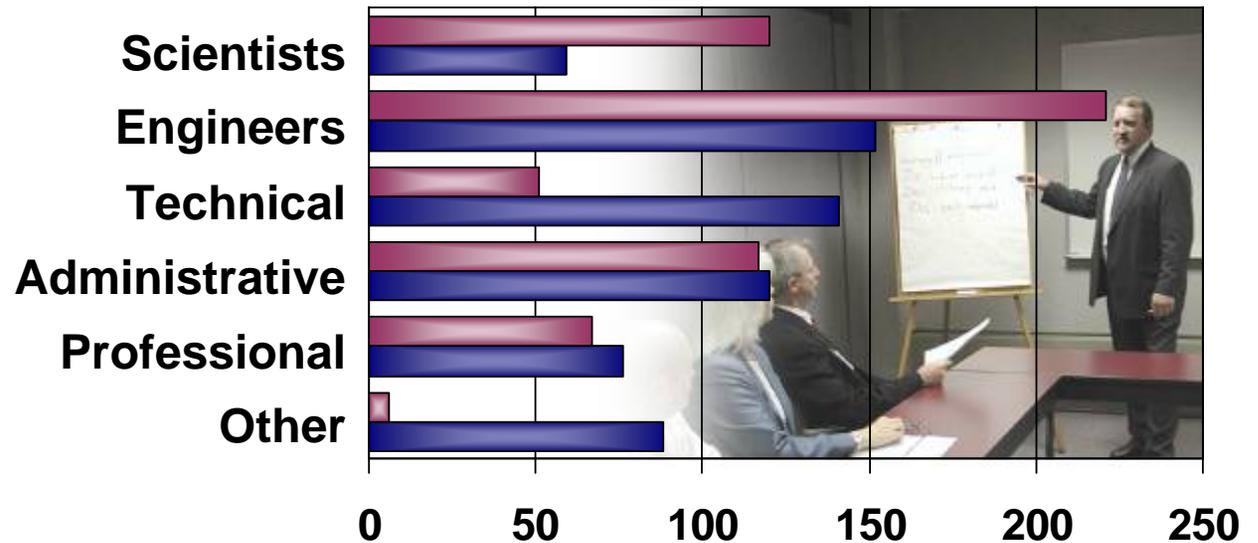
- **Over 1,800 research and deployment activities in U.S. and more than 40 foreign countries**
- **Total award value over \$9 billion**
- **Private sector cost-sharing over \$5 billion**
  - Leverages DOE funding
  - Accomplishes mission through commercialization
  - Ensures relevance



# A Well-Trained Workforce



■ 582 Federal Employees  
 ■ 636 Onsite Contractors



# Outcomes from NETL's Programs

## *Technology*

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

## *Policy*

- Positively impact development of sound energy policies

## *Competitiveness*

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

## *Stability*

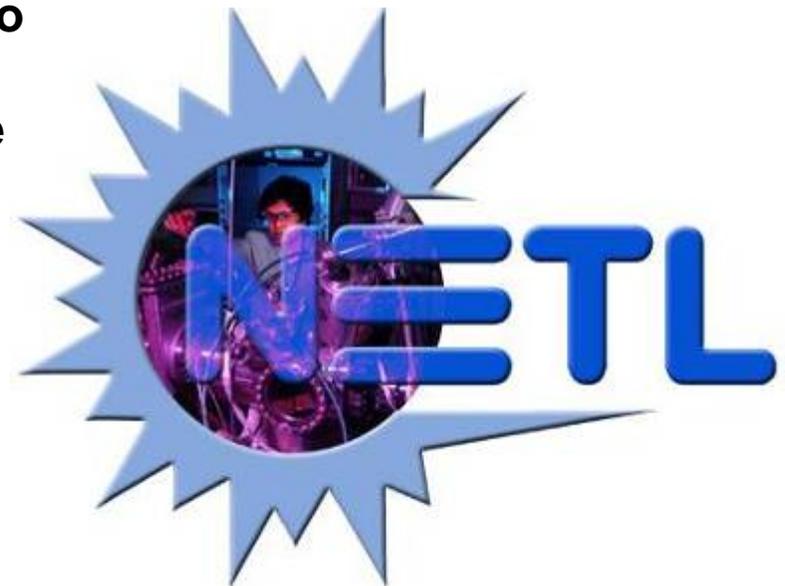
- Appropriately transfer technology to developing countries to improve geopolitical stability / global climate

## *Workforce*

- Provide trained energy workforce through university research programs

## *Region*

- Contribute to regional economic development



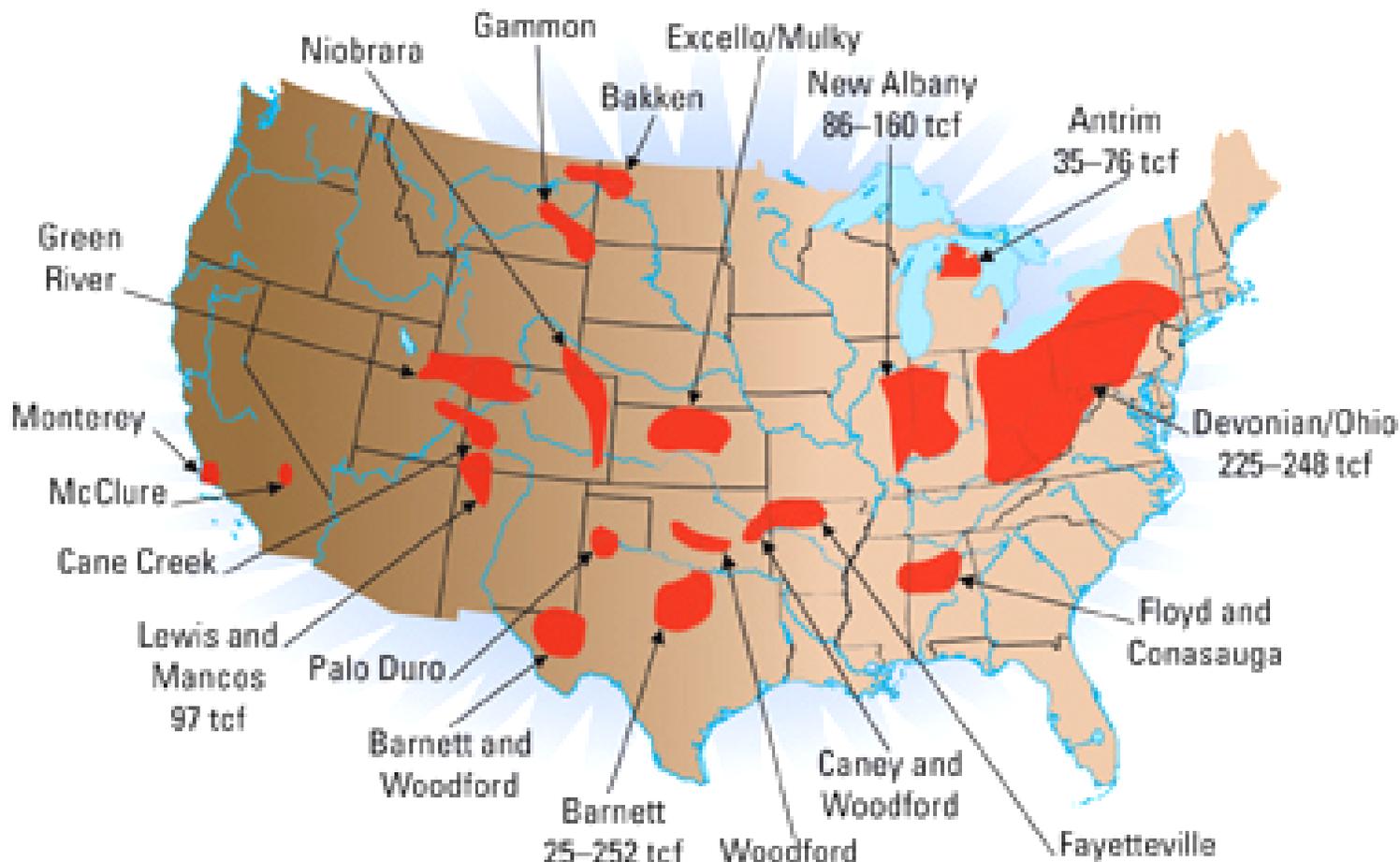
# “Unconventional” and *Frontier* Resources

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



*NETL and USGS scientists collaborate on India Expedition - Aug. 2006*

# Major U.S. Shale Basins



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

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

# NETL Natural Gas & Oil R&D Program

## *Comprehensive R&D Portfolio*



*Exploration &  
Production*



*Arctic Energy  
Office*



*Methane  
Hydrates*



*Environmental  
Solutions*



*EPACT 2005  
Title IX, Subtitle J*

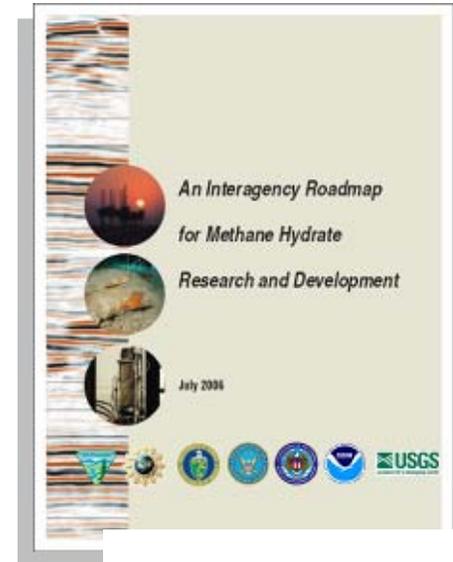
# Methane Hydrate

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



# R&D Priorities

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



AN INTERAGENCY FIVE-YEAR  
PLAN FOR METHANE HYDRATE  
RESEARCH AND DEVELOPMENT  
FY2007-FY2011



Prepared By  
The Technical Coordination Team of the  
National Methane Hydrate R&D Program

April 2007



# The Program

## *NETL's Gas Hydrate R&D effort*

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

# Methane Hydrates

## *2008 Funding Opportunity Announcement*

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

# **Methane Hydrates**

## ***2008 FOA Selections***

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

# Environmental and Unconventional Oil/EOR

## *2008 Funding Opportunity Announcement*

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

# Environmental and Unconventional Oil/EOR

## *2008 FOA Selections*

- **Produced Water, and Other Natural Gas and Oil Environmental Issues**
- **Water Management Solutions to Enable Oil Shale Resource Development**
- **Alaska Environmental Issues**  
**Seven selections (environmental areas)**
- **Unconventional Resources/EOR**
- **Alaska North Slope Heavy Oil**  
**Nine selections (petroleum areas)**

# Arctic Energy Office Mission

*(Public Law 106-398)*

- **Fossil Energy:**

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

- **Remote Power:**

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



# Bakken Consortium Study, North Dakota

Surface Monitoring – Microseismic Inc.  
24 geophones / trace monitors all fracs

Headington  
44X-36

Headington  
42X-36

Headington  
41X-36

Buried Array - Schlumberger/Terrasciences  
18 holes drilled to 300'  
monitor fracs from geophones  
emplaced in shallow shot holes

DOE/NETL Program - 3 deep (~2000 ft.  
holes) monitor fracs from geophones  
cemented in these deep holes

Downhole Monitoring  
1600' of geophones  
emplaced by tractor system  
monitors both exterior fracs

# FY2009 Budget Summary

## (\$ million)

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

\*Omnibus

\*\* "Silent"

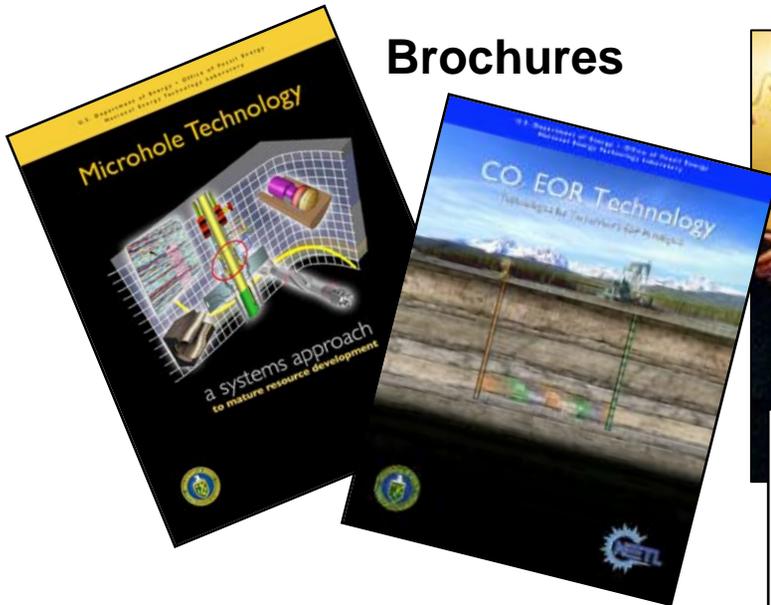
Note: Excludes Congressionally Directed Projects Funding

# Comprehensive Technology Transfer

## Conference Exhibits



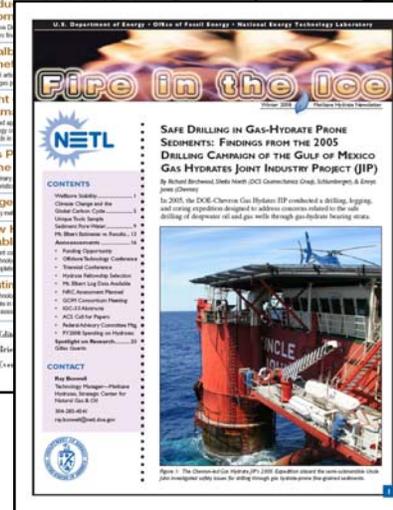
## Brochures



## Presentations



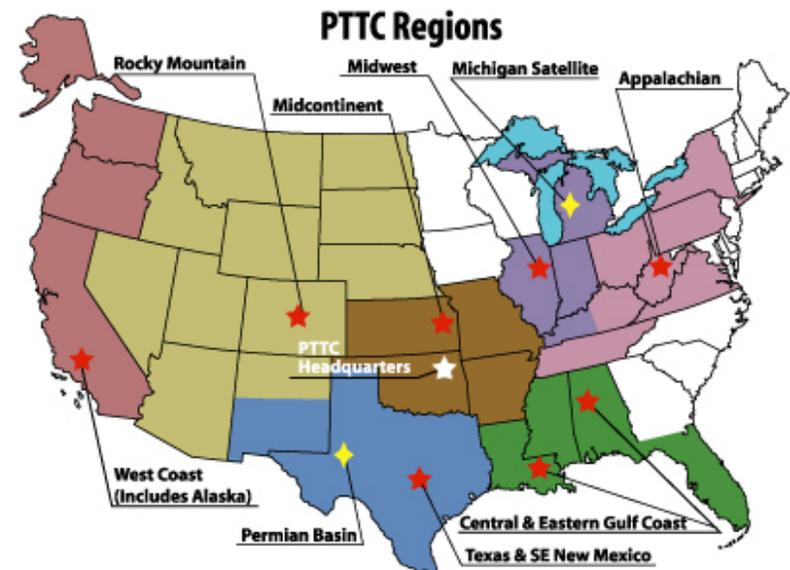
## Newsletters and Journals



## NETL Website

# Petroleum Technology Transfer Council Overview

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



# General Accountability Office Review

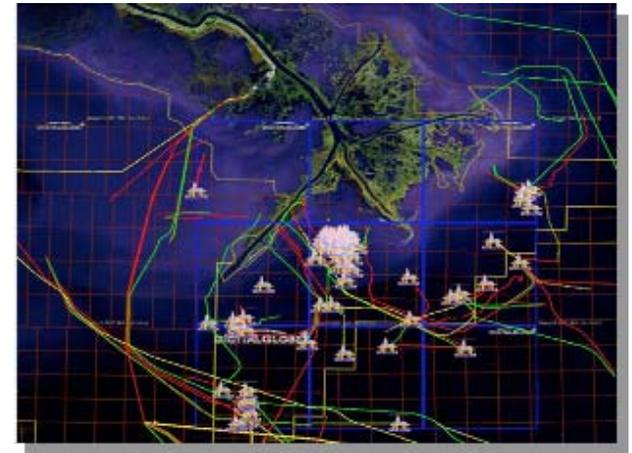
- **GAO report published December 2007; considered favorable**
- **Congressional request for follow up inquiry/Phase II effort**
- **SCNGO staff presentations on selected topics July 10, 2008**
  - *Decision Making*
  - Methane Hydrates
  - Carbon Dioxide/EOR
  - Environmental Technologies
  - Technology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

# Visualization, Simulation, Modeling and Analysis Support

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



Hurricane Katrina



Modeled GOM Infrastructure

# Our Websites



*Office of Fossil Energy*  
[www.fe.doe.gov](http://www.fe.doe.gov)



*NETL*  
[www.netl.doe.gov](http://www.netl.doe.gov)

# **QUESTIONS?**