

# PROGRAM facts

U.S. DEPARTMENT OF ENERGY  
OFFICE OF FOSSIL ENERGY  
NATIONAL ENERGY TECHNOLOGY LABORATORY

Strategic Center  
for Natural Gas & Oil

08/2008



## ULTRA-DEEPWATER AND UNCONVENTIONAL NATURAL GAS AND OTHER PETROLEUM RESOURCES RESEARCH PROGRAM

The Department of Energy's (DOE) Office of Fossil Energy supports research and policy options to ensure clean, reliable, and affordable supplies of oil and natural gas for American consumers. The National Energy Technology Laboratory's (NETL) Strategic Center for Natural Gas and Oil (SCNGO) implements a portfolio of Fossil Energy research & development (R&D) programs aimed at enhancing domestic oil and gas supplies in an environmentally responsible way.

### CONTACTS

#### John R. Duda

Director  
Strategic Center for  
Natural Gas & Oil  
304-285-4217  
john.duda@netl.doe.gov

#### James Ammer

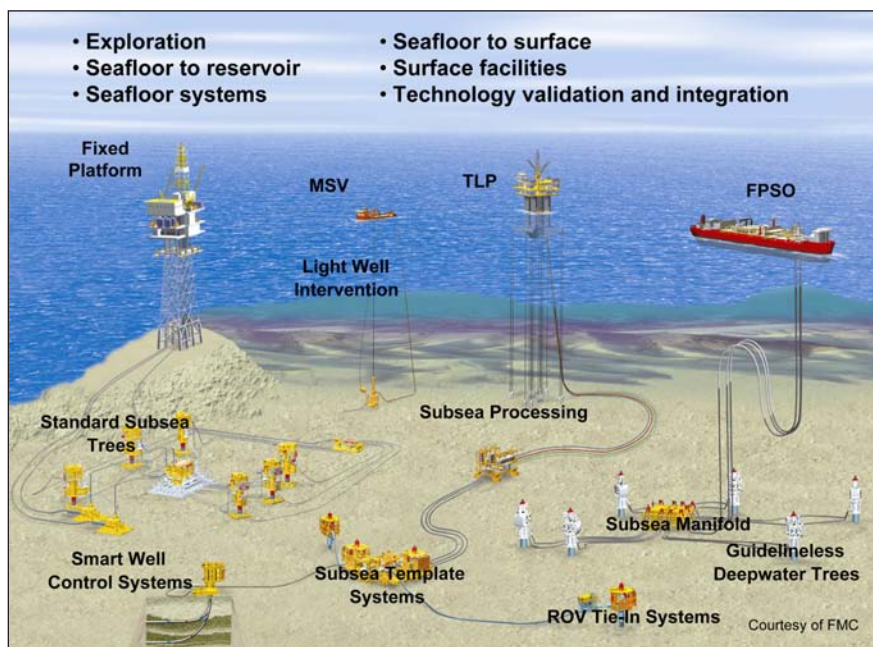
Division Director  
Natural Gas & Oil Project  
Management Division  
304-285-4383  
james.ammer@netl.doe.gov

#### Albert Yost

Acting Technology Manager  
Ultra-Deep Consortium  
Management Team  
304-285-4479  
albert.yost@netl.doe.gov

Natural gas and crude oil provide two-thirds of our Nation's primary energy supply and will continue to do so for at least the next several decades, even as we transition to a more sustainable energy future. The natural gas resource estimated to exist within the United States is significant, but because this resource is increasingly harder to locate and produce, new technologies are required to extract it. This is also true for the domestic oil resource, much of which will need to be produced from very deep water, forced from residual pockets left in older reservoirs, or extracted from unconventional deposits, all of which are difficult to develop with existing technology, even at current prices.

In August 2005, President Bush signed the Energy Policy Act of 2005 (EPAc) into law. Title IX, Subtitle J, Section 999 of the EPAc adds another dimension



Ultra-deepwater architecture and technology.



to the overall NETL/SCNGO oil and gas R&D effort, enhancing opportunities to demonstrate technologies in the field and accelerate their implementation in the marketplace. The Ultra-Deepwater and Unconventional Natural Gas and Other Petroleum Resources Program launched by Title IX, Subtitle J, Section 999 is a 10-year, \$50 million-per-year, public/private partnership designed to benefit consumers by developing technologies to increase America's domestic oil and gas supply and reduce the Nation's dependency on imports. A portion of the funding is directed towards cost-shared research, while another portion (25 percent) is used by NETL to carry out complementary R&D.

## Program Consortium

EPAct required the DOE to competitively select and award a contract to a consortium to administer three elements of the Title IX, Subtitle J, Section 999 program. The Research Partnership to Secure Energy for America (RPSEA), a 501(c)(3) not-for-profit corporation consisting of over 130 member organizations, was the industry consortium selected to administer the cost-shared portion of the program. NETL, on behalf of the Secretary, maintains oversight and review of the program.

Funding for the Consortium-administered elements of the Title IX, Subtitle J, Section 999 program is divided as follows:

- Ultra-deepwater architecture and technology (35% of funds).
- Unconventional natural gas and other petroleum resource exploration and production technology (32.5%).
- The technology challenges of small producers (7.5%).

The companies, universities, and other organizations that receive funds through this program provide cost-share contributions of 20 to 50 percent or more of total project costs, magnifying the impact of the public investment. The involvement of industry partners in all phases of the oil and gas R&D process increase the likelihood of near-term demonstrations of technologies developed by the Program, a key step in accelerating the movement of these technologies into the marketplace.

RPSEA began working in January 2007 and together with NETL/SCNGO and two Federal Advisory Committees formed to provide input into the process, produced the first Annual Plan for the Consortium-administered portion of the Title IX, Subtitle J, Section 999 program. This plan, approved in August 2007, led to the solicitation of research projects under each of the three elements mentioned above. A total of 43 projects were selected under the 15 RPSEA solicitations for 2007. Seventeen projects were selected under the Ultra-Deepwater program element, nineteen projects under the Unconventional Resources element and seven projects under the Small Producers element (see tables). RPSEA is in the process of finalizing contracts with the selected project performers and developing a technology transfer plan to ensure that the results of each project are broadly disseminated to the audience of potential users.

### 2007 Ultra-Deepwater Architecture Selected Projects

(awardee partners can be found at

<http://www.netl.doe.gov/technologies/oil-gas/EPAct2005/projects/index.html>)

RFP Number	Project Title	Primary Awardee
DW1201	Wax Control	University of Utah
DW1301	Improvements to Deepwater Subsea Measurements	Letton-Hall Group
DW1302	Ultra-High Conductivity Umbilicals	Technip
DW1401	Carbon Fiber Wrapped High Pressure Drilling and Production Riser Qualification Program	Lincon Composites
DW1402	Ultra-Deepwater Dry Tree System for Drilling and Production	Houston Offshore Engineering
DW1402	Ultra-Deepwater Dry Tree System for Drilling and Production	FloaTEC
DW1403	Fatigue Performance of High Strength Riser Materials	Stress Engineering
DW1501	Extreme Reach Development	Tejas
DW1603	Graduate Student Design Project: Design of Extreme High Pressure, High Temperature (XHPHT) Subsurface Safety Valve (SSSV)	Rice University
DW1603	Graduate Student Design Project: Robotic MFL Sensor for Monitoring and Inspection of Deepwater Risers	Rice University
DW1603	Graduate Student Design Project: Hydrate Plug Characterization & Dissociation Strategies	University of Tulsa
DW1603	Graduate Student Design Project: Flow Phenomena in Jumpers – Relation to Hydrate Plugging Risks	University of Tulsa
DW1701	Improved Recovery	Knowledge Reservoir
DW1801	Effect of Global Warming on Hurricane Activity	National Center for Atmospheric Research (UCAR)
DW1901	Subsea Processing System Integration Engineering	General Electric
DW1902	Subsea Power Generation Project	Houston Advanced Research Center
DW2001	Synthetic Benchmark Models of Complex Salt	SEAM

The 2008 Annual Plan was prepared and reviewed by the two Federal Advisory Committees, and approved in August 2008. The Plan lists ten new topics for ultra-deepwater R&D project solicitations along with one solicitation for the Unconventional Resources element and one for the Small Producers element. The 2008 solicitations are anticipated to be released in fall 2008. In addition, the 2009 Annual Plan has been prepared and will be reviewed by the two Federal Advisory Committees in September-October 2008. The 2009 round of solicitations are expected to be released Spring 2009.

Information regarding the solicitations will be available on both the NETL website, <http://www.netl.doe.gov> and the RPSEA website, <http://www.rpsea.org>.

Copies of the Annual Plan documents and reports from the Federal Advisory Committees are available on the Department of Energy website at [http://fossil.energy.gov/programs/oilgas/ultra\\_and\\_unconventional](http://fossil.energy.gov/programs/oilgas/ultra_and_unconventional).

### **2007 Unconventional Resources Selected Projects**

*(awardee partners can be found at <http://www.netl.doe.gov/technologies/oil-gas/EPAAct2005/projects/index.html>)*

<b>Project Title</b>	<b>Primary Awardee</b>
A Self-Teaching Expert System for the Analysis, Design and Prediction of Gas Production from Shales	Lawrence Berkeley National Laboratory
Advanced Hydraulic Fracturing Technology for Unconventional Tight Gas Reservoirs	Texas A&M University
An Integrated Framework for the Treatment and Management of Produced Water	Colorado School of Mines
Application of Natural Gas Composition to Modeling Communication Within and Filling of Large Tight-Gas-Sand Reservoirs, Rocky Mountains	Colorado School of Mines
Comprehensive Investigation of the Biogeochemical Factors Enhancing Microbially Generated Methane in Coal Beds	Colorado School of Mines
Enhancing Appalachian Coalbed Methane Extraction by Microwave-Induced Fractures	Pennsylvania State University
Gas Condensate Productivity in Tight Gas Sands	Stanford University
Gas Production Forecasting From Tight Gas Reservoirs: Integrating Natural Fracture Networks and Hydraulic Fractures	University of Utah
Geological Foundation for Production of Natural Gas from Diverse Shale Formations	Geological Survey of Alabama
Improved Reservoir Access through Refracture Treatments in Tight Gas Sands and Gas Shales	University of Texas - Austin
Improvement of Fracturing for Gas Shales	University of Houston
New Albany Shale Gas	Gas Technology Institute
Novel Concepts for Unconventional Gas Development in Shales, Tight Sands and Coalbeds	Carter Technology
Novel Fluids for Gas Productivity Enhancement in Tight Formations	University of Tulsa
Optimization of Infill Well Locations in Wamsutter Field	University of Tulsa
Optimizing Development Strategies to Increase Reserves in Unconventional Gas Reservoirs	Texas A&M University
Paleozoic Shale-Gas Resources of the Colorado Plateau and Eastern Great Basin, Utah: Multiple Frontier Exploration Opportunities	Utah Geological Survey
Petrophysical Studies of Unconventional Gas Reservoirs Using High-Resolution Rock Imaging	Lawrence Berkeley National Laboratory
Reservoir Connectivity and Stimulated Gas Flow in Tight Sands	Colorado School of Mines

## ADDRESS

### National Energy Technology Laboratory

1450 Queen Avenue SW  
Albany, OR 97321-2198  
541-967-5892

2175 University Avenue South  
Suite 201  
Fairbanks, AK 99709  
907-452-2559

3610 Collins Ferry Road  
P.O. Box 880  
Morgantown, WV 26507-0880  
304-285-4764

626 Cochran Mill Road  
P.O. Box 10940  
Pittsburgh, PA 15236-0940  
412-386-4687

One West Third Street,  
Suite 1400  
Tulsa, OK 74103-3519  
918-699-2000

## CUSTOMER SERVICE

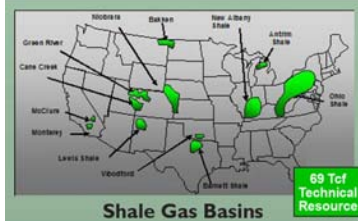
**1-800-553-7681**

## WEBSITE

**www.netl.doe.gov**



**Tight Gas Sand Basins**



**Shale Gas Basins**



**CBM Basins**

Unconventional natural gas and other petroleum resource exploration and production technology.

## 2007 Small Producers Program Selected Projects

(awardee partners can be found at

<http://www.netl.doe.gov/technologies/oil-gas/EPAAct2005/projects/index.html>)

Project Title	Awardee
Cost-Effective Treatment of Produced Water Using Co-Produced Energy Sources for Small Producers	New Mexico Institute of Mining and Technology
Enhancing Oil Recovery from Mature Reservoirs Using Radial-Jetted Laterals and High-Volume Progressive Cavity Pumps	University of Kansas
Field Site Testing of Low Impact Oil Field Access Roads: Reducing the Footprint in Desert Ecosystems	Texas A&M University
Near Miscible CO <sub>2</sub> Application to Improved Oil Recovery for Small Producers	University of Kansas
Preformed Particle Gel for Conformance Control	University of Missouri, Rolla
Reducing Impacts of New Pit Rules on Small Producers	New Mexico Institute of Mining and Technology
Seismic Stimulation to Enhance Oil Recovery	Lawrence Berkeley National Laboratory

## NETL Complementary Research Program

The Complementary R&D Program is being carried out by NETL's Office of Research and Development. The four principal areas of focus are:

- Drilling Under Extreme Conditions
- Environmental Impacts of Oil and Natural Gas Development
- Enhanced and Unconventional Oil Recovery
- Resource Assessment

Another activity is identifying and quantifying the benefits that are expected to accrue as a result of the entire Section 999H program and performing analyses in support of program planning.

The 2009 activities for the Drilling Under Extreme Conditions project area will be to focus on activities related to the Ultra-deep Single Cutter Drilling Simulator (UDS) with the goal of improving the economic viability of drilling for and producing from domestic deep (greater than 15,000 ft true vertical depth (TVD)) and ultra-deep (greater than 25,000 ft TVD) oil and natural gas resources.

The 2009 activities for the Environmental Impacts project area activities will include research that will inventory airshed contaminants attributable to oil and gas activities using sensors mounted on unmanned aircraft to monitor contaminant plumes from oil and gas operations. This will permit 3-D measurement of contaminants within the dispersion plume and will provide a basis for air quality models that better represent the effect of contaminants from widely dispersed oil and gas sources.

Activities in the Enhanced and Unconventional Oil Recovery area during 2009 will focus on the development of new technologies that improve upon current oil extraction processes, while the Resource Assessment area will include activities to perform a detailed assessment of the Marcellus Shale in the Appalachian Basin utilizing high resolution analytical reservoir characterization techniques. The project will integrate higher resolution instrumentation to evaluate the molecular distribution of components in the shale. The results will be used to help determine the mechanisms of gas storage and movement through the matrix and fractures of the shale to the well bore which will lead to more accurate reservoir modeling.