

Conservation Committee Report

Volume 14 Issue 2

Jack Walters—Conservation Chairman

February 2012



The Conservation Pledge

I give my pledge as an American to save and faithfully defend from waste, the natural resources of my country; the soil, the water, the air, the minerals, the plant life and the wildlife.

This is my Pledge!

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"We Need an All-Out, All-of-the-Above Strategy that Develops Every Available Source of American Energy"

U.S. Secretary of Energy Steven Chu joined Pittsburgh Mayor Luke Ravenstahl to tour a range of research facilities at the National Energy Technology Laboratory (NETL), meet with local business leaders and stakeholders in the natural gas industry, and highlight local investments in cutting-edge energy innovations that are

laying the building blocks for an American economy built to last. During the visit, Secretary Chu highlighted President Obama's State of the Union address, where the President called for a new era for American energy, including the continued safe and responsible development of American natural gas resources. According to

independent estimates, the safe development of America's nearly 100-year supply of natural gas will support more than 600,000 jobs by the end of the decade. Secretary Chu also echoed the President's call to continue promoting investments in energy efficiency, one of the fastest, cheapest (continued on page 2)

New Models Help Optimize Development of Bakken Shale Resources

Study Provides Predictive Framework of Largest Lower-48 U.S. Oil Play

Exploration and field development in the largest continuous oil play in the lower 48 states, located in North Dakota and eastern Montana, will be

guided by new geo-models developed with funding from the Department of Energy's (DOE) Office of Fossil Energy (FE). The three-year project to develop exploration and reservoir models for the Bakken Shale resource play was con-

ducted by the Colorado School of Mines (CSM), through research funded by FE's Oil and Natural Gas Program. A "play" is a shale formation containing significant accumulations (continued on page 3)

"We Need an All-Out, All-of-the-Above Strategy that Develops Every Available Source of American Energy" (continued)

and most effective ways to reduce energy waste and cut energy costs for families, businesses and local governments.

"As President Obama made clear in his State of the Union address, we need an all-out, all-of-the-above strategy that develops every available source of American energy - a strategy that's cleaner, safer and full of new jobs for U.S. workers," said Secretary Chu. "Pittsburgh and the National Energy Technology Laboratory have a long history of advancing America's domestic energy interests and the work they are doing today will help bring in a new era of American energy fueled by homegrown energy resources."

"Now is the time for cities and leaders to step up to the plate and make responsible decisions toward becoming more energy-efficient, and I thank President Obama and Secretary Chu for their leadership," said Mayor Ravenstahl. "By developing the natural gas supply into a sustainable energy resource, we will create jobs, become more self-sufficient and continue to grow our economy. Working together with NETL, Pittsburgh will stay on the forefront of science and

technology and continue its leadership role in energy efficiency, waste reduction and cost cutting."

Secretary Chu and Mayor Ravenstahl were joined by NETL Director Anthony Cugini to tour the Energy Department laboratory, which announced today that it received six patents in 2011 for innovative technologies that are helping to address the nation's energy needs. As it has for decades, NETL continues to be at the forefront of the science and technology that supports the cleaner, safer and more efficient development of America's fossil energy resources, like natural gas.

NETL, and its predecessors, played an important role in today's booming American natural gas industry with early investments in shale gas extraction technologies. Today's announcement of six new NETL patents builds on that long tradition promoting cutting-edge energy innovations.

The six patents being announced today include:

- **Integrated Capture of Fossil Fuel Gas Pollutants, Including CO₂ with Energy Recovery:**

This process removes pollutants and reduces consumption from fossil fuel combustion systems, reducing the cost of cleanup in power plants.

- **Thief Carbon Catalyst for Oxidation of Mercury in Effluent Streams:** This substance helps reduce mercury in coal-burning power plants, making coal use more environmentally friendly.
 - **Semi-Continuous Detection of Fossil Fuel Gas Pollutants:** This device helps detect pollutants in systems that burn coal, allowing for a cleaner energy source.
 - **Method for the Production of Mineral Wool and Iron from Serpentine Ore:** This method generates a special kind of wool that has all the heat-resisting benefits of asbestos insulation without the harmful health and environmental hazards.
 - **Method for Sequestering CO₂ and SO₂ Utilizing a Plurality of Waste Streams:** This method helps remove byproducts from
- (continued on page 3)

"We Need an All-Out, All-of-the-Above Strategy that Develops Every Available Source of American Energy" (continued)

industrial flue gas, reducing the caustic byproducts released to the environment.

- **Method for Producing Components with Internal Architectures:** This technology improves a chemical process that is used to make fuel conversion more efficient for industry usage.

At the Pittsburgh City-County Building later in the day, Secre-

tary Chu and Mayor Ravenstahl announced that the city is ready to begin work on the first energy efficiency improvements to this historic building in over a decade. The upgrades, which are being undertaken with support from the Recovery Act and the Energy Department's Energy Efficiency and Conservation Block Grant (EECBG) program, are expected to create dozens of local jobs and save an estimated

\$475,000 per year on energy bills. The Mayor's office plans to re-invest these annual savings in Pittsburgh's Green Trust Fund to support further clean energy projects and local job creation across the city.

Source: U.S. Department of Energy

New Models Help Optimize Development of Bakken Shale Resources (continued)

of natural gas or oil. The U.S. Geological Survey estimates the Bakken Shale play contains 3.65 billion barrels of oil and 1.85 trillion cubic feet of natural gas that can be recovered using current technologies. The development of new fields, combined with advances in horizontal drilling and other production technologies, continues to increase these estimates.

Hydrocarbon traps in the Bakken petroleum system appear to be controlled by pinch-outs, where the formation tapers out against a nonporous sealing rock, and high areas in the geologic struc-

ture, where hydrocarbons tend to accumulate. Natural fractures and fracture concentrations are key elements for establishing Bakken Shale production "sweet spots," locations with the best production potential.

CSM determined that previously undetected oil accumulation areas could be outlined by mapping the distribution of shale within the reservoir, the impermeable rocks that form the reservoir's top and base seals, pinch-out zones, and fracture distribution in areas of subtle structure. With this in mind, CSM integrated information about rock

physics, the formation's rock strata, and seismic, fracture and thermal maturity data—all compiled during the course of the project—into a series of reports that can be used as an exploration model to predict high-potential fairways and traps for the Bakken hydrocarbon system.

CSM also developed a second model, a 3-D reservoir geomodel, that includes detailed subsurface mapping of depositional and fracture trends along with core-calibrated porosity from well logs. The reservoir

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New Models Help Optimize Development of Bakken Shale Resources (continued)

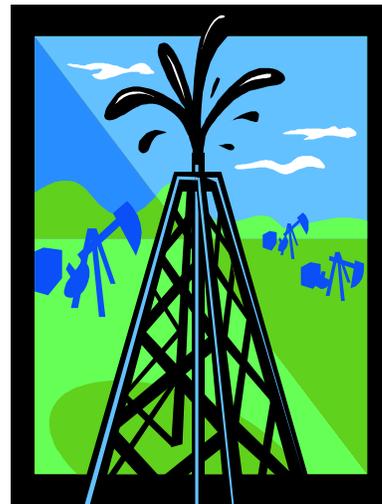
model was built using data from the Elm Coulee Field, where there is an extensive geological and production database to validate the model. Located in Richland County, Mont., the western portion of the Williston Basin, the Elm Coulee is the largest producing oilfield in the basin. More than 350 horizontal wells have been drilled in the Elm Coulee Field since the initial horizontal well was drilled in 2000. Several major and independent operators work the field.

In Elm Coulee wells, primary oil recovery, in which natural mechanisms drive oil from the reservoir, is only 5–10 percent of the estimated oil-in-place because of the shale reservoir's low porosity and low permeability. This poor primary recovery makes Elm Coulee an excellent candidate for secondary oil recovery, in which pressure is ap-

plied to force the oil from the reservoir. The poor quality of the reservoir essentially eliminates water injection as a secondary recovery method, but CO₂ flooding could be a preferred enhanced recovery method.

A consortium of 29 companies consisting mainly of independents, and initiated in conjunction with this DOE project, has been using the results of the study to further develop the Bakken. Information in the reports can be used to identify high potential yield areas by mapping critical elements such as fracture distribution, hydrocarbon maturity, and reservoir quality that were obtained during field studies and subregional mapping.

Source: U.S. Department of Energy



Utility to Purchase Electricity from Innovative DOE-Supported Clean Coal Project

First U.S. Power Purchase Agreement for Electricity from Commercial-Scale Coal-Fired Power Plant with Carbon Capture

An innovative clean coal technology project in Texas will supply electricity to the largest municipally owned utility in the United States under a recently signed Power Purchase Agreement, the U.S. Department of Energy (DOE) announced today.

Under the agreement – the first U.S. purchase by a utility of low-carbon power from a commercial-scale, coal-based power plant with carbon capture – CPS Energy of San Antonio will purchase approximately 200 megawatts (MW) of power from the Texas Clean Energy Project (TCEP), located just west of Midland-Odessa.

The 400-MW TCEP plant is a first-of-its-kind Integrated Gasification Combined Cycle (IGCC) poly-generation facility believed to be the cleanest coal-fueled power plant operating anywhere in the world. The facility is capable of capturing 90 percent of the carbon dioxide (CO₂) it produces, as well as 99 percent of sulfur dioxide, 90 per-

cent of nitrogen oxide, and 99 percent of mercury.

TCEP was a third round selection under DOE's Clean Coal Power Initiative, a cost-shared collaboration between the Federal government and private industry aimed at stimulating investment in low-emission coal-based power generation technologies through successful commercial demonstrations. The \$2.4 billion plant will receive \$450 million in funding from the Clean Coal Power Initiative; of this, \$211 million comes from the American Recovery and Reinvestment Act of 2009. The facility is expected to be fully operational in 2015.

Many experts view gasification technology as the future for coal-derived electricity. DOE's Office of Fossil Energy has been instrumental in the research, development, and deployment of IGCC and other innovative energy technologies and is playing a pivotal role in advancing America's energy future while helping to enhance environmental protection.

Gasification uses oxygen and steam at high pressures to convert coal into synthesis gas, also known as syngas, which is

mainly a mixture of hydrogen and carbon monoxide. In a non-carbon-capture plant, the syngas is cleaned to remove impurities and sent to a gas turbine where it undergoes combustion to produce electricity. The hot flue gas from the gas turbine, containing CO₂, is used to generate steam, which is fed to a steam turbine to produce additional electricity and then vented to the atmosphere. This process is known as integrated gasification combined cycle (IGCC) because coal-fired gasification is integrated into a combined-cycle system that produces electricity from both the gas turbine and the steam turbine.

In the TCEP carbon capture plant, the carbon monoxide in the syngas will first be "shifted" to produce additional hydrogen and CO₂, cleaned of impurities, and then separated into pure streams of hydrogen and CO₂. The hydrogen will be combusted in an advanced combustion turbine, producing a carbon-free flue gas. Of the nearly 2.9 million metric tons of CO₂ that will be captured annually at the TCEP plant, approximately 83 percent will be used for

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Utility to Purchase Electricity from Innovative DOE-Supported Clean Coal Project (continued)

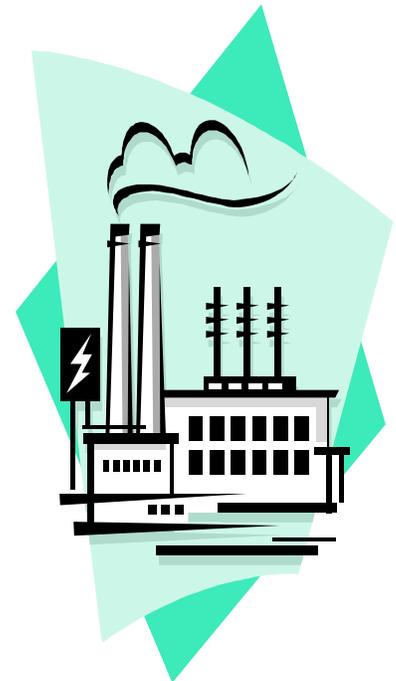
enhanced oil recovery in the West Texas Permian Basin, a process that both prevents the greenhouse gas from entering the atmosphere and enables more oil to be produced from regional oilfields; the remainder will be to produce urea, a high value product. The production of a co-product in addition to electricity significantly improves the overall economics of the process.

Compared to traditional power plants, IGCC offers many advantages, including increased power plant efficiency and resulting lower-cost electricity. Unlike conventional power plants that remove environmental contaminants from the large-volume nitrogen-containing flue gas after combustion, IGCC power plants remove contaminants before combustion. Because gasification plants operate at high pressure with oxygen instead of air,

the volume of gas that has to be treated is nearly two orders of magnitude lower, making the removal of environmental contaminants much easier. In addition, CO₂ is much easier to capture and is produced at higher pressures than that from conventional power plants.

Today, approximately 80 percent of the energy consumed in the United States comes from coal, petroleum, and natural gas, with coal-fired power plants accounting for approximately half of the electricity generated. With increasing global energy demands, coal is expected to continue to play a dominant role in meeting future energy needs. The implementation of clean, state-of-the-art coal-based technologies will ensure America's energy security while mitigating the environmental impacts of fossil fuel use.

Source: U.S. Department of Energy



DEP Awards 73 Grants to Protect, Improve Watersheds in 36 Counties

The Department of Environmental Protection announced that it will invest in 73 watershed protection projects intended to improve watersheds, storm-water runoff, acid mine drainage and educational programs,

among other environmental efforts.

This year, the Growing Greener program, which is funded by the Environmental Stewardship Fund, will award \$9.72 million for 57 projects around the state.

An additional project, funded by the Surface Mining Conservation and Reclamation Grant, will cost \$72,912. The U.S. Environmental Protection Agency's Section 319

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DEP Awards 73 Grants to Protect, Improve Watersheds in 36 Counties (continued)

Nonpoint Source Management Program, which was created through the federal Clean Water Act to help reduce water pollution from nonpoint sources, is funding 15 additional projects, which would total \$3.12 million.

“We are delighted to provide support to local communities and watershed groups to fund projects that enhance and protect Pennsylvania’s water quality,” DEP Secretary Mike Krancer said. “That includes projects that address abandoned mine drainage, stream bank restoration, stormwater reductions and agricultural runoff.”

These projects will reduce nonpoint source pollution in watersheds where streams are impaired by implementing agricultural and stormwater best-management practices; developing, repairing or installing passive systems to treat abandoned mine drainage; and supporting the establishment of riparian buffers, among other goals.

One of the Growing Greener program’s goals is to invest in projects that protect watersheds from impairment due to nonpoint source pollution or those that will restore damaged waterways. Some examples of priority areas are restoration activities to reduce pollutant load in impaired watersheds for which total maximum daily loads have been developed; projects in priority wa-

tersheds that would reduce the source of impairment; and priority activities that lead to water quality restoration and protection.

In this latest grant round, 130 applicants request about \$24.5 million. Applications came from counties, authorities and other municipalities; county conservation districts; councils of governments; watershed organizations that promote local watershed conservation efforts; and other authorized organizations involved in restoring and protecting the environment.

For more information on Growing Greener or to see the complete list of grant recipients, email GrowingGreener@pa.gov, call 717-705-4500 or visit DEP’s website at www.dep.state.pa.us, keyword: Growing Greener.

Media contact: Amanda Witman, 717-787-1323

Editor’s note: The 73 organizations that were awarded grants are listed below, alphabetically by county, with the project location and funding amount.

Allegheny

Pine Creek Land Conservation Trust, Crouse Run Stream, \$60,000; Borough of Crafton, Clearview Avenue Drainage, \$298,704; Borough of Jefferson Hills, Peters Creek Stream, \$70,000; South Fayette Conservation Group, Fishing Run

Stream, \$259,495; Allegheny County Conservation District, Allegheny County Watersheds, \$24,935

Armstrong

Armstrong Conservation District, Carnahan Run Stream, \$121,891

Bedford

Broad Top Township, Six Mile Run AMD Remediation SX0-D9, \$38,500; Broad Top Township, Six Mile Run AMD Remediation SX8-D1, \$321,390

Bucks

Bucks County Conservation District, Core Creek/Lake Luxembourg Watershed, \$293,900

Cambria

Clearfield Creek Watershed Association, Clearfield Creek Watershed, \$528,616; Cambria County Conservation District, Chest Creek, \$31,103; Cambria County Conservation District, Glendale Lake, \$16,287

Centre

Penn State University, Halfmoon Creek, \$35,491; Centre County Conservation District, Little Fishing Creek, \$312,432

Chester

Brandywine Valley Association, Little Buck Run Stream, \$375,100

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DEP Awards 73 Grants to Protect, Improve Watersheds in 36 Counties (continued)

Clearfield

Clearfield County Conservation District, Deer Creek, \$30,752; Lawrence Township, Passive Treatment System, \$69,836; Pike Township, Bilger's Run, \$41,000

Clinton

Lobb Narco Passive Treatment System, \$72,912

Cumberland

Cumberland County Conservation District, Yellow Breeches and Conodoguinet watersheds, \$10,294; Cumberland Valley Chapter of Trout Unlimited, Yellow Breeches Creek, \$11,200; Messiah College, Yellow Breeches Creek, \$35,800

Dauphin

Dauphin County Conservation District, Conewago Creek, \$223,500

Delaware

Villanova University, Stormwater Control Measures, \$145,000

Elk

Elk County Freshwater Association, Big Mill Creek, \$26,200

Erie

Western Pennsylvania Conservancy, Walnut Creek, \$82,250; Environment Erie, Walnut Creek, \$38,500; Girard Township, Culbertson Drive Stormwater, \$195,840; Penn State Behrend, Behrend Stormwater, \$36,495

Huntingdon

Western Pennsylvania Conservancy, Juniata River Watershed, \$55,000

Lackawanna

The Sewer Authority of the City of Scranton, Scranton Sewer Authority, \$125,000; Throop Borough, Lackawanna River, \$29,514

Lancaster

Lancaster County Conservation District, Mill Creek, \$192,520; Donegal Chapter of Trout Unlimited, Conowingo Creek, \$369,500; City of Lancaster, City of Lancaster Green Alleys, \$263,120

Lebanon

Jonestown Borough, Jonestown Rain Garden, \$54,653; Palmyra Borough, Swatara Creek Watershed Stormwater, \$364,548

Lehigh

Upper Macungie Township, Haasen Creek, \$106,678; Upper Macungie Township, Schaefer Run/Iron Run, \$40,000

Luzerne

Harveys Lake Borough, Harveys Lake, \$370,100; Luzerne Conservation District, Coal Creek, \$645,790; Earth Conservancy, Askam Borehole, \$250,000

Mifflin

Mifflin County Conservation District, Upper Kishacoquillas Watershed, \$455,926

Montgomery

National Audubon Society, Chadwick Place, \$47,500; Upper Merion Township, Crow Creek, \$18,155; Montgomery County Conservation District, Jenkinstown Creek, \$120,789

Montour

Montour County Conservation District, Chillisquaque Creek Watershed, \$287,750

Northumberland

Northumberland County Conservation District, Little Shamokin Creek, \$195,153; Borough of Northumberland, Lake Augusta, \$257,579

Northampton

Bethlehem City, Monocacy Creek, \$119,789

Philadelphia

Pennsylvania Environmental Council Inc., Philadelphia Stormwater Infiltration, \$200,000

Schuylkill

City of Pottsville, Schuylkill River, \$467,748

Somerset

Somerset Conservation District, Jimtown Stream Bank Stabilization and Habitat Improvement Project, \$60,000

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DEP Awards 73 Grants to Protect, Improve Watersheds in 36 Counties (continued)

Susquehanna

Susquehanna County Conservation District, Dubois Creek, \$130,000

Tioga

Babb Creek Watershed Association, Hunters Drift, \$210,008; Tioga County Commissioners, Marsh Creek, \$386,550

Union

Union County Conservation District, Limestone Run, \$26,270; Union County Conservation District, Buffalo Creek, \$106,159

Venango

Venango Conservation District, Lower Two Miles Run Stormwater, \$150,846

Washington

City of Washington, Catfish Creek, \$250,000

Westmoreland

Jacobs Creek Watershed Association, Shupe Run, \$60,000

Wyoming

Mehoopany Creek Watershed

Association, Mehoopany Creek Watershed, \$661,860

York

York County Community Foundation, Nixon Park Tributary, \$120,800

Multi-County Projects

The remaining projects, listed alphabetically, are multi-county efforts:

Nature Abounds, Pennsylvania Senior Environmental Corps., \$169,977; North Central Pennsylvania Regional Planning and Development Commission, North Central Greenways Implementation Grant Program, DEP's North-central region, \$150,000; North Central Pennsylvania Regional Planning and Development Commission, North Central Greenways Implementation Grant Program, DEP's Northwest Region, \$150,000; Northcentral Pennsylvania Conservancy, Ag Impaired Stream Restoration, \$366,180; PALMS, Lake Best Manage-

ment Practices Projects, \$283,000; Pennsylvania Horticultural Society, TreeVitalize, Phase VIII, \$200,000; Trout Unlimited Inc., Utilizing Mine Drainage Residuals to Control Phosphorus in the Chesapeake Bay Watershed, \$184,178; Trout Unlimited, Inc., AMD Technical Assistance Program, \$159,500; Trust for Tomorrow, Northwest Ohio River Watershed Initiative, \$100,000; and Western Pennsylvania Coalition for Abandoned Mine Reclamation, Quick Response VI, \$130,000.

Source: The Pennsylvania Department of Environmental Protection

The National Methane Hydrates R&D Program 2012 Ignik Sikumi gas hydrate field trial

Status Report - Jan 30, 2012

Site preparation for 2012 well testing at Ignik Sikumi began in December with the re-building of an icepad around the wellhead, which was completed December 20. Over the subsequent

weeks, the facilities and equipment for conducting the work arrived at the site, including crew accommodations, power supply, and well-service equipment. Installation and interconnection of testing equipment to

the wellhead is underway.

At the heart of the exchange experiment is a state-of-the-art Gas Mixing Skid (GMS), housed in an

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The National Methane Hydrates R&D Program 2012

Ignik Sikumi gas hydrate field trial (continued)

Arctic-grade shipping container. Specialized pumps, valves, and meters are required because standard oilfield equipment cannot move, mix, or measure injection gases at the pressures, temperatures, and rates required by the test design. The GMS was designed by ConocoPhillips, with input from key contractors, and manufactured in Texas. The skid was tested and commissioned near Houston, before being loaded onto trucks and driven to Prudhoe Bay on the Alaska North Slope. Other trucks carried carbon dioxide and nitrogen storage tanks for the test, as well as wellbore heating, gas measurement, and other peripheral equipment. The attached photo, made during commissioning, shows the GMS interior.

Status Report - Jan 1, 2012

The project has completed the majority of preparations for production related field trials. Specialized storage, metering and measurement equipment, necessary to carry out planned production testing operations, is on site and being prepared for use. The project officially entered its final production testing phase on December 16, 2011. Plans for the production testing phase of the project are to return to and re-enter the Ignik Sikumi #1 well, at its location adjacent to the L-Pad road within the PBU, from

an ice pad, starting in late January 2012. The production testing program will consist of site and well preparations followed by well perforation and the injection of a combination of N₂ and CO₂ into the methane hydrate reservoir. This injection phase will be followed by an extended period of depressurization and flowback of gas to the surface. Once the exchange test objectives are met, the intent is to use the wellbore for continued production testing, including depressurization, through the remaining time within the test window.

Collection of a full suite of data from wellbore instrumentation and the analysis of well flowback will be carried out throughout production testing operations. Following production testing, the current plan is to plug and abandon the Ignik Sikumi #1 well and restore the site. Field operations will be followed by review of the data collected and the initiation of extensive analysis of that data to determine the implications of test results.

Status Report - December 2011

The project has completed the majority of preparations for production related field trials. Final testing of specialized storage, metering and measurement

equipment, necessary to carry out planned production testing operations, along with training of personnel on equipment usage, is ongoing with completion planned by the end of December 2011. The project officially entered its final production testing phase on December 16, 2011. Plans for the production testing phase of the project are to return to and re-enter the Ignik Sikumi #1 well, at its location adjacent to the L-Pad road within the PBU, from an ice pad, starting in January 2012. The production testing program will consist of site and well preparations followed by well perforation, and an initial nitrogen injection. Subsequently, injection of a combination of N₂ and CO₂ into the methane hydrate reservoir will be carried out over about a two week period. This injection phase will be followed by an extended period of stepwise depressurization and flowback (above hydrate stability pressures) to assess the CH₄ / CO₂ exchange. Once the exchange test objectives are met, the intent is to use the wellbore for continued production testing, including depressurization, through the remaining time within the test window.

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The National Methane Hydrates R&D Program 2012

Ignik Sikumi gas hydrate field trial (continued)

Collection of a full suite of data from wellbore instrumentation and the analysis of well flow-back will be carried out throughout production testing operations. Following production testing, the current plan is to plug and abandon the Ignik Sikumi #1 well and restore the site. Field operations will be followed by review of the data collected and the initiation of extensive analysis of that data to determine the implications of test results.

Source: U.S. Department of Energy, NETL



President Requests \$650.8 Million for Fossil Energy Programs

President Obama's FY 2013 budget seeks \$650.8 million for the Office of Fossil Energy (FE) to support improved energy security and rapid development of climate-oriented technology. The request includes \$420.6 million for Fossil Energy Research and Development, \$195.6 million for the Strategic Petroleum Reserve, \$10.1 million for the Northeast Home Heating Oil Reserve (and

includes a \$6 million rescission of prior year funds), \$14.9 million for the Naval Petroleum Reserves and \$15.6 million for the Elk Hills School Land Fund.

The FY 2013 budget request will allow FE to fulfill its mission: to provide the nation with the best opportunity to tap the full potential of its abundant fossil energy resources in an environmentally

sound and affordable manner; and to ensure America's readiness to respond to short-term energy supply disruptions.

Fossil Energy Research and Development

The President's FY 2013 budget requests \$420.6 million for a fossil energy research and

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President Requests \$650.8 Million for Fossil Energy Programs (continued)

development (R&D) portfolio. This program is designed to ensure we can continue to use the nation's abundant fossil resources through the development of clean energy technologies, with a specific focus on dramatic reductions of global carbon emissions at acceptable cost. Fossil Energy R&D will also address concerns associated with the environmental, health, and safety risks of shale gas development.

Advancing Toward a Low-Carbon Future

In FY 2013 and through the Recovery Act, the Coal program continues aggressive funding for carbon capture and storage (CCS) activities, including large-scale demonstration of injection and storage in geologic formations or beneficial utilization of carbon dioxide (CO₂) through the Regional Carbon Sequestration Partnerships and large-scale demonstration of carbon capture technologies through the Clean Coal Power Initiative, FutureGen 2.0, and Industrial CCS activities.

CCS Demonstrations. The CCS Demonstrations program, including the Clean Coal Power Initiative, FutureGen 2.0, and Indus-

trial CCS Demonstrations, enables and accelerates the deployment of advanced carbon capture storage, and utilization technologies to ensure clean, reliable, and affordable electricity for the United States. The 2013 budget request does not provide any demonstration funds because these projects are already strongly supported in large part through the 2009 American Recovery and Reinvestment Act.

Carbon Capture & Storage and Power Systems

The FY 2013 budget request for the Carbon Capture & Storage and Power Systems program is \$275.9 million. This program supports research to significantly reduce coal power plant emissions, including CO₂, and substantially improve efficiency to reduce carbon emissions, leading to a viable near-zero atmospheric emissions coal energy system, and supporting carbon capture, utilization and storage. It also includes \$35 million for NETL staff to conduct in-house coal R&D.

- *Carbon Capture.* The President's budget requests \$60.4 million for carbon capture R&D. This sub-

program is focused on the development of post-combustion and pre-combustion CO₂ capture technology for new and existing power plants as well as industrial sources.

- *Carbon Storage.* The FY 2013 budget requests \$95.5 million for carbon storage and utilization R&D. The activities conducted under this sub-program will be used to benefit the existing and future fleet of fossil fuel power generating facilities by reducing the cost-of-electricity impacts and providing protocols for carbon capture, storage and utilization demonstrations whose principal objective is to capture, transport, store, and monitor the CO₂ injected in geologic formations.

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President Requests \$650.8 Million for Fossil Energy Programs (continued)

- *Advanced Energy Systems.* The President's budget requests \$55.2 million for advanced energy systems R&D. This sub-program focuses on reducing the cost of gasification and enabling affordable CO2 capture, while increasing plant availability and efficiency, and maintaining the highest environmental standards.
- *Cross-cutting Research.* The FY 2013 budget requests \$29.8 million for cross-cutting research. This sub-program serves as a cross-cutting bridge between basic and applied research by fostering the development and deployment of innovative systems for improving efficiency and environmental performance through the research and development of instrumentation,

sensors, and controls targeted at enhancing the availability of advanced power systems while reducing costs of Advanced CCS and Power Systems.

Oil and Natural Gas Technologies. The Oil and Natural Gas Technologies R&D program ensures the prudent development of our domestic oil and natural gas resources. Funding for this program will support the coordinated effort by DOE, the Environmental Protection Agency and the U.S. Geological Survey to conduct research to understand and reduce the environmental, health and safety risks of natural gas and oil production through hydraulic fracturing. The program is also studying hydrates in the Arctic via a controlled in situ depressurization and CO2 injection, and evaluating natural gas hydrates in the Arctic as a potential fossil energy source for the nation. The FY 2013 budget requests \$17.0 million for this program area.

PETROLEUM RESERVES

FE's Office of Petroleum Reserves manages programs that

provide the United States with strategic economic protection against disruptions in oil supplies.

Strategic Petroleum Reserve. The Strategic Petroleum Reserve (SPR) provides strategic and economic security against foreign and domestic disruptions in oil supplies via an emergency stockpile of crude oil. The program fulfills U.S. obligations under the International Energy Program. The Department of Energy is requesting \$195.6 million in FY 2013.

The FY 2013 budget request provides for the management, operations, and security of the four SPR storage facilities, the relocation of the degasification plant to the West Hackberry site to maintain crude oil stocks at safe vapor pressure levels, cavern casing inspections and remediation as required to comply with state regulations and to assure storage integrity. The FY 2013 budget request also proposes to permanently cancel \$291 million of SPR Petroleum Account receipts available from the International Energy Agency mandated Drawdown of 2011.

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President Requests \$650.8 Million for Fossil Energy Programs (continued)

The total sales receipts from the Drawdown were deposited into the SPR Petroleum Account and the FY 2012 enacted budget included a \$500 million rescission from these receipts.

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Northeast Home Heating Oil Reserve. The Northeast Home Heating Oil Reserve provides a short-term supplement to the private home heating oil supplies in the Northeast in the event of a supply interruption. In FY 2011, the Reserve completed the sale of all the high sulfur heating oil in commercial storage and awarded new contracts for commercial storage leases for 1 million barrels of ultra-low sulfur diesel (ULSD). The FY 2012 budget cancelled the net sale receipts in excess of the cost to purchase 1 million barrels of ULSD and other related costs. The FY 2013 budget request of \$10.1 million continues operation of the Reserve, including the extension of the lease of commercial storage space and includes a rescission of \$6 million in prior year funds.

Naval Petroleum and Oil Shale Reserves. The FY 2013 budget requests \$14.9 million for the Naval Petroleum and Oil Shale

Reserves (NPOSR). The NPOSR program will continue to work towards closing out legal responsibilities of environmental remediation at Naval Petroleum Reserves No. 1 (Elk Hills, Calif.) and disposition activities at Naval Petroleum Reserves No. 3 (Casper, Wyo.). NPR-3 will begin implementing the disposition plan, with final disposition estimated to occur in FY 2015.

NPR-3 will be utilized for production and testing operations in order to retain asset value during preparation to transfer to potential new ownership. Production facilities will remain operational as long as economic. The program will continue Rocky Mountain Oilfield Testing Center (RMOTC) testing for 100 percent funds-in projects and those projects wholly funded by EERE's Geothermal Technology Program. Environmental remediation of NPR-3 facilities will continue to facilitate the sale/disposition of the property in a manner consistent with an approved property sale/disposition plan.

Elk Hills School Lands Fund.

The Elk Hills School Lands Fund provides a source of compensation for the California State Teachers' Retirement System as

a result of a settlement with the State of California with respect to its longstanding claim to title of two sections of land within NPR-1. The FY 2013 budget request provides \$15.6 million for the final payment to California under this settlement.

Source: U.S. Department of Energy