

PRRC Review

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The Petroleum Recovery Research Center is a division of
the New Mexico Institute of Mining and Technology

PRRC Wins DOE Awards



At the announcement ceremony in Albuquerque, PRRC scientists from left: Junhang Dong, Randy Seright, Robert Balch, Reid Grigg, and PRRC Director Robert Lee. Albuquerque, Oct. 6, 2004.

Four new PRRC research projects were funded recently by the U.S. DOE through the National Energy Technology Laboratory (NETL).

The National Energy Technology Laboratory (NETL) is part of the U.S. Department of Energy's Fossil Energy Office. In addition to conducting its own research, the NETL supports a wide variety of contracted research with national laboratories, universities and industry. It is the primary fossil energy research organization of the U.S.

The PRRC projects were among six major DOE research projects in New Mexico being funded by more than \$5 million in research grants. The projects were formally announced at an announcement ceremony/press conference in Albuquerque on October 6 by Acting Undersecretary of Energy David Garman. The awards total nearly \$4,750,000 for the four three-year PRRC projects, aimed at developing oil and gas and protecting water resources. One of

the projects has an additional benefit. By answering questions about the increased use of CO₂ for enhanced oil recovery, it may allow more CO₂ to be injected into geologic formations. Not only could more oil be produced but CO₂, which is a greenhouse gas, would be prevented from entering the atmosphere.

Projects

"Aperture-Tolerant, Chemical-Based Methods to Reduce Channeling," funded for \$1,199,903, principal investigator Randall S. Seright, PRRC senior engineer and section head (October 1, 2004 start date).

Chemical methods to improve oil recovery efficiency in fractured reservoirs and to reduce salt water production during oil and natural gas recovery operations.

"Treating Coal-Bed Methane Produced Water for Beneficial Use by

MFI Zeolite Membranes," funded for \$1,140,273, principal investigator Junhang Dong, PRRC researcher and assistant professor of chemical and petroleum engineering at New Mexico Tech (October 1, 2004 start date).

A new technology of reverse osmosis (RO) through molecular sieve zeolite membranes to efficiently treat the high-total dissolved salts (TDS) in coalbed natural gas produced water, turning waste into an asset.

"A Customizable Fuzzy Expert System for Regional and Local Play Analysis," funded for \$1,199,998, principal investigator Robert S. Balch, PRRC scientist and section head (January 1, 2005 start date).

A user-friendly, customizable fuzzy expert system tool that will speed local and regional play analysis and reduce subsequent drilling risk. This system may also provide a significant opportunity for identifying new reserves

"Improved Gas Flooding Efficiency," funded for \$1,199,965, principal investigator Reid B. Grigg, PRRC senior scientist and section head (April 1, 2005 start date).

Methods to improve the efficiency of oil recovery through CO₂ injection. Anticipated benefits from this work include reducing production costs, increasing ultimate production, and extending the production life of petroleum reservoirs; an additional benefit is the sequestration of a greenhouse gas.



SOUTHWEST REGIONAL LEAD ORGANIZATION

PTTC gratefully acknowledges that its primary funding comes through the U.S. DOE's Office of Fossil Energy through the National Petroleum Technology Office (NPTO) and Strategic Center for Natural Gas (SCNG) within the National Energy Technology Laboratory (NETL)

PRRC Researchers Honored

Robert Lee wins Moran award

PRRC Director Robert Lee was awarded the Bob Moran Statesmanship Award for 2004 by the Independent Petroleum Association of New Mexico (IPANM). Lee was presented with the award at a luncheon on August 6, 2004, during the IPANM's annual meeting in Ruidoso, New Mexico. The award is conferred upon individuals who have distinguished themselves as outstanding citizens of New Mexico who have made significant contributions to the state. Lee received high praise for his desire to serve the industry in ways that benefit both producers and administrators.

Jill Buckley Recognized at SPE ATCE 2004

Dr. Jill Buckley, head of PRRC's Petrophysics and Surface Chemistry Group, was given the honor of "SPE Distinguished Member" at a President's Luncheon in Houston during the Society of Petroleum Engineer's 2004 Annual Technical Conference and Exhibition. Buckley, who is a long-standing member of SPE, has gained international recognition as a leading authority in oilfield wettability research.

(Lee and Buckley stories courtesy of the NMT Public Information Office)



Converting Stranded Gas and Lowering Power/Operating Costs Workshop

The SW Regional Lead Organization of the PTTC cosponsored a stranded gas workshop with the Texas Region of the Petroleum Technology Transfer Council (PTTC) on December 15 at the Center for Energy and Economic Diversification (CEED) in Midland, Texas.

This workshop addressed the problem of waste, or "stranded," gas that may not be salable, as well as increasing power costs due to aging fields and deregulation. The workshop discussed engines that can burn "dirtier" gas, which can be coupled to induction generators to produce electricity in the field—thus helping with stranded and waste gas problems, reducing operating costs and possibly even generating revenue. Power and holistic field optimization to aid in proper engineering of the power system and maximizing field value was also discussed.

Future Workshops

Production Data: Gathering It and Using It; rescheduled for March 1 in Midland and March 3 in Farmington.

The workshops will cover data-gathering techniques and devices in the oilfield as well as production accounting software.

Horizontal Drilling in the Permian Basin: Updates and Case Studies. April 7, in Hobbs NM.

This workshop will summarize the history of horizontal drilling in the Permian Basin of New Mexico, examine current techniques of drilling and completion, and examine a few case studies.

Project Notes

Devonian FEE Tool Training Workshop Held

The PRRC's Reservoir Evaluation and Advanced Computational Technologies (REACT) Group at the Petroleum Recovery Research Center presented the second exploration-based expert system of their NPTO-sponsored project, "Risk Reduction with a Fuzzy Expert Exploration Tool," at a training workshop on December 1 in Roswell at Eastern New Mexico University (ENMU). The interactive, web-ready and stand-alone software packages are now available as public-domain exploration tools to evaluate drilling prospects in two major plays in southeast New Mexico, the lower Brushy Canyon of the Delaware mountain group, and the Siluro-Devonian carbonates of Southeast New Mexico. The workshop provided training on the use of both software packages.

The promising results of this project have resulted in additional funding from the Department of Energy to create a set of tools to allow customized expert systems to be constructed by non-computer science professionals using proprietary and public information.

Please contact PI Robert Balch (phone: 505.835.5305; email: balch@prrc.nmt.edu) for more information on the project and the software packages.

NM WAIDS Produced Water Website is Ready

In their NPTO-sponsored project, "NM WAIDS: A Produced Water Quality and Infrastructure GIS Database for New Mexico Oil Producers," PRRC's Industry Services and Outreach Group (ISOG) is making more information available about produced water in New Mexico. The NM WAIDS web site at <http://octane.nmt.edu/waterquality/> contains a variety of databases and tools, as well as an online map for water data available from this site. Online corrosion and scale manuals and New Mexico water quality maps are also on the NMWAIDS website. In our summer newsletter, we will explore more of the NMWAIDS project. For more information, please contact PI Martha Cather (phone: 505.835.5685; email martha@prrc.nmt.edu)

Publications, Presentations

- Balch, R. S., Schrader, S., and Cather, M., "Devonian Basin Fuzzy Expert Exploration (FEE) Tool", Workshop, Roswell, New Mexico, December 1, 2004
- Buckley, J.S.: "Some Advances and Challenges in Oilfield Chemistry (Oilfield Chemistry Keynote)," 2004 SPE ATCE, Houston, Sep. 26-29.
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- Cather, M.: "NM WAIDS: A Produced Water Quality and Infrastructure GIS Database for NM Oil Producers," Semiannual report to the U.S. DOE (Sep. 2004) Project DE-FC26-02NT15134.
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- Grigg, R.B., Bai, B., and Liu, Y.: "Competitive Adsorption of a Hybrid Surfactant System onto Five Minerals, Berea Sandstone, and Limestone," paper SPE 90612 presented at the 2004 SPE Annual Technical Conference and Exhibition, Houston, Sep. 26-29.
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- Huang, X.: "Graphical Representations of the Results of the FEE Tool and Fuzzy Variable Definition System", Masters Independent Study, New Mexico Tech, Socorro New Mexico (November 2004).
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- Xiao, H., Bourandas, A., Kulkarni, A., Dong, J., and Teare, S.: "Nanomaterial Enabled Fiber Optic Gas Sensor for Fossil Fuel Energy Systems," *Optics East*, Conference of the International Society for Optical Engineering (SPIE), Philadelphia, October 25-28, 2004.

Texas PTTC Offers Barnett Shale Website

The Barnett Shale is currently one of the hottest domestic gas plays in the U.S. The PTTC Texas Region has received so many requests for more information from operators that they've created a one-stop website dedicated to Barnett Shale Resources at <http://www.energyconnect.com/pttc/BSR/>. These resources may also enable those working other gas shale plays to use Barnett Shale insights and lessons learned as an analog.



Petroleum Recovery Research Center
A Division of New Mexico Tech

The PRRC is a state-supported center that conducts research designed to improve methods of recovering crude oil and natural gas and that transfers petroleum technology to domestic oil producers. Funding for the PRRC comes from three sources: the State of New Mexico, the federal government (Department of Energy), and private industry.

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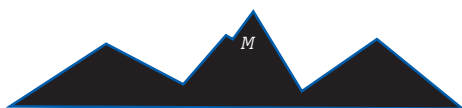
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OIL AND GAS PRODUCTION ON STATE TRUST LANDS BENEFITS NM SCHOOLS

- IN FY 2003-04, THE STATE LAND OFFICE EARNED ABOUT \$234.9 MILLION IN ROYALTIES FROM OIL AND GAS LEASES ON STATE TRUST LANDS.
- CURRENTLY 2.7 MILLION ACRES OF TRUST LANDS ARE UNDER OIL AND GAS LEASE WITH 18,700 PRODUCING WELLS
- THE STATE INVESTMENT COUNCIL INVESTS THE LGPF AND DISTRIBUTES FIVE PERCENT OF THE FIVE-YEAR AVERAGE MARKET VALUE TO THE BENEFICIARIES.
- PUBLIC SCHOOLS RECEIVE 83 PERCENT OF THE DISTRIBUTIONS.

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