Produced Water Forum

Millions of barrels of water are produced in New Mexico each year (photo courtesy of Brian Brister, NMBGMR).

The SW PTTC’s 2004 Produced Water Forum held April 1 in Farmington at San Juan College targeted research updates, latest regulatory issues, and some new uses for produced water. About 40 guests from government and industry attended the day-long forum.

The PRRC’s second produced water forum continued to address a vital industry problem: the costly handling and disposal of produced water. Over the past four years, New Mexico has produced some 2.5 billion barrels of water—634 million barrels in 2003 alone. Most of this water is not now reusable. Handling and disposal costs range from $0.25 to $3.00 per barrel, depending on the area. Although some of this water is re-injected, no cost-effective technology is, as yet, readily available for making this water reusable for other purposes. PRRC has joined forces with other research institutes and industry to find the solutions.

PRRC Section Leaders Randy Seright and Junhang Dong presented the latest results of their research. Their projects target water shutoff or reduction (limiting the amount of water produced) for conventional gas well operations through custom-tailored gel treatments, and the development of zeolite membranes for an economical method of handling contaminants in produced water. Allan Sattler of Sandia Labs talked about optimal water treatment processes being evaluated in the northwest and southeast corners of New Mexico by scientists at SNL and PRRC. Martha Cather of PRRC’s Industrial Services and Outreach Group presented the group’s DOE-funded produced water Geographical Information System (GIS) map and online database for New Mexico, which will soon be ready for public viewing.

In the afternoon, speakers from regulatory agencies in New Mexico spoke on aspects of produced water regulation in New Mexico. William Olson of the New Mexico Oil Conservation Division (OCD) talked about the OCD’s role in New Mexico’s coaled methane produced water disposal, and Richard Franklin from the Environmental Protection Agency discussed the EPA’s newly revised SPPC (Spill Prevention Control and Countermeasure) regulations.

Promising new uses for produced water were presented by Dale Wirth from the Bureau of Land Management (BLM’s produced water initiative), Matt Lavery from PNM, and Jerry Fanning from Yates Petroleum. The Produced Water Initiative includes proposed standards for produced water and two pilot projects conducted in fall 2003 involving plant tolerance of produced water. PNM is currently conducting a project with treated produced water for power plant use at the San Juan Generating Station. Yates’ pilot produced water study seeks a serviceable, above-ground system that will be an economical, regulation-compliant alternative to downhole disposal.

The proceedings from the Forum may be downloaded from PRRC’s website at http://octane.nmt.edu/sw-pttc/ProducedWater04Proc/ProceedingsPW.asp

In mid-July, shortly before the PRRC Newsletter went to press, the U.S. DOE notified researchers of funding for new three-year projects:

Robert Balch, PI: “Customizable Fuzzy Expert System for Regional and Local Play Analysis,” $1,199,998


Reid Grigg, PI: “Improved Gas Flooding Efficiency,” $1,199,965

Randall Seright, PI: “Aperture-Tolerant, Chemical-Based Methods to Reduce Channeling,” $1,199,903
PRRC Personnel Win Honors

Dr. Jill Buckley, head of PRRC’s Petrophysics and Surface Chemistry Group, has received New Mexico Tech’s Distinguished Research Award for 2004. Dr. Buckley has gained international recognition as a leading authority in oilfield wettability research, understanding the complex interactions between crude oil, rock, and salt water. She has helped develop a better understanding of how these substances interact and move underground, and her research group has developed an extensive “library” of oil samples from around the world, with a detailed chemical analysis of each.

Dr. Buckley is a co-founder, along with Dr. Norman Morrow, formerly of PRRC, of a highly successful biannual conference series on reservoir wettability. In addition, she was the recipient of the 2002 Society of Core Analysts Technical Achievement Award. (George Zamora, NMIMT Information Services)

Dr. Susan Schrader won the SPE Rocky Mountain Regional Student Paper competition in Norman, Oklahoma this April with her paper, “A New Method of Recoverable Reserves Estimation Using an Expert System,” winning a prize of $350 and a paid trip to the International Student Paper Contest in Houston at the ATCE in September, to compete with the other first place winners in the PhD division from the regional contests. A copy of the paper will also appear in this year’s ATCE Proceedings.

Dr. Schrader was awarded her PhD in May 2004 and is currently a post-doctoral researcher for the REACT group at the PRRC.

Ms. Shaqjie Ma is now a Microsoft Certified Database Administrator for SQL 2000. Ms. Ma is Programmer and Database Manager for PRRC’s Industry Service and Outreach Group. She has a Master’s degree from New Mexico State University.

Coming Events

Internet Resources for Oil and Gas Information: New Mexico, Colorado, and Utah. September 9, Farmington. Call 505-835-5685 for more information.

Project Notes

CO2 Sequestration Workshop and Project Review. The Southwest Carbon Sequestration Partnership held its first project review in conjunction with a mediated modeling workshop June 7-9 in Albuquerque. The workshop was second of three to offer stakeholders the opportunity to provide direct input into the integrated analysis of the systems-level decision-making framework. Participants were able to quantitatively compare alternative sequestration technologies and their relative environmental risks, monitoring and verification requirements, life-cycle costs, and applicable regulatory and permitting constraints. The resulting decision model will be used by policy makers and regulators, constituency groups and industry.

The project review overlapped the workshop, presenting a review by all Project Thematic Committees. Important “next steps” were also reviewed—MMV (measuring, monitoring, and verification) issues and the creation of a test case using as many variables as the Partnership’s databases could supply to date.

Devonian Data Ready. The REACT Group is pleased to announce the completion of its Devonian Carbonate Fuzzy Expert Exploration Tool (FEE Tool). This sister software to the well received Delaware basin FEE Tool assists in making preliminary drilling risk assessments for the Siluro-Devonian Carbonates of southeast New Mexico. The software has, at its core, a state-of-the-art fuzzy expert system developed by the REACT group at the PRRC. Modern databases and web-based Java software design make the software useable by anyone with web access and a Java capable browser. Rapid assessment of a prospective location with the ability to customize the system to each user’s needs are primary features of the software. A public demonstration and training session co-hosted by the PTTC is planned for late fall or early winter. For information on this event, or to gain access to either the Delaware or Devonian FEE Tools, please contact Principal Investigator Robert Balch by phone at (505) 835-5305 or by email at balch@prrc.nmt.edu
Publications, Presentations

Al-Dhafeeri, A.M.: “High-Permeability Carbonate Zones (Super-K) in Gharaw Field (Saudi Arabia),” Identified, Characterized, and Treated by Gels, PhD Dissertation, New Mexico Institute of Mining and Technology (May 2004).


Bryant, E.: “Adsorption and Desorption Studies of Some Model Surfactants from Oil-Based Drilling Fluids,” MS Thesis, New Mexico Institute of Mining and Technology (June 2004).


Sydansk, R.D., Al-Dhafeeri, A., Xiong, Y., and Seright, R.S.: “Polymer Gels Formulated with a Combination of High and Low Molecular-Weight Polymers Provide Improved Performance for Water-Shutoff Treatments in Fractured Production Wells,” paper SPE 89402 presented at the 2004 SPE/DOE Symposium on Improved Oil Recovery, Tulsa, OK, April 17–21.


Xiong, Y.: “Partially Formed Polymer Gels for Water Shutoff Treatments in Fractured Production Wells,” MS Thesis, New Mexico Institute of Mining and Technology (May 2004).


New Peruvian Data Portfolio

Researchers at the Texas Bureau of Economic Geology and the New Mexico Bureau of Geology and Mineral Resources have just completed a new digital oil-play portfolio of the prolific Permian Basin. The portfolio was developed as part of the U.S. DOE’s PUMP program.

The portfolio defines 32 oil plays in the Permian Basin and assigns all significant-sized reservoirs that had cumulative production of >1 MMmbbl through 2000 to a play. Each of the 1,339 reservoirs that had cumulative production of >1 MMmbbl through 2000 to a play. Each of the 1,339 reservoirs that had cumulative production of >1 MMmbbl through 2000 to a play. Each of the 1,339 reservoirs was mapped in a Geographic Information System (GIS). The portfolio contains a summary description of each play, including illustrations of key reservoir characteristics and reservoir data tables. The Digital Play Portfolio for the Permian Basin can be accessed through the BEG website at: http://www.beg.utexas.edu/resprog/
Petroleum Recovery Research Center
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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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OIL AND NATURAL GAS PRODUCTION 2003
figures current as of July 19, 2004

TOTAL NM OIL
66,295,092 BBL (BARRELS)

TOTAL NM NATURAL GAS
1,588,241,545 MCF (1000s CUBIC FEET)
479,671,030 MCF COALBED METHANE INCLUDED IN TOTAL

WELLS PRODUCING IN 2003
24,184 NATURAL GAS WELLS
21,857 OIL WELLS
456 CO2 WELLS
40,278 TOTAL WELLS

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