Stories covered in this edition:

A recap of the very successful collaborative research project conducted with Elk Petroleum regarding a gravity stable CO2 flood of their Grieve Field. [Click here for details.]

An introduction to a new reservoir characterization study of Fiddler Creek field, in collaboration with Underwood Oil and Gas of Casper. [Click here for details.]

An introduction to the new hires at the institute as well as a more in depth interview with one of the senior employees, Dr. Geoffrey Thyne. [Click here for details.]

The latest appointment to the Technical Advisory Board; Ken Hendricks of Anadarko Petroleum Corporation, is presented [here. We would also like to welcome John Stroud from Merit Energy, who will be introduced in the next issue.

To register your name on the EORI mailing list and receive this newsletter, please click [here], along with the event calendar for the coming quarter.

Director’s Message

Welcome to the inaugural edition of the EORI newsletter. The Institute has nearly reached its fourth anniversary and it has been a stimulating and rewarding time for all of us. For the most part, our activities during this time have been developed and guided by advice from the members of our Technical Advisory Board (TAB) who willingly share their expertise with us at our semi-annual meetings. This board consists of eleven members representing academia and industry. Our meeting with them last month was characterized by lively discussions centered around presentations of Institute projects concerning potential profitability of CO2 EOR projects, simulation of CO2 flooding at Grieve field, oil recovery by low salinity water-flooding, three-phase relative permeability studies, thermodynamic characterization of reservoir fluids, and a status report on the development of the EORI database. It was gratifying to get general approval from the TAB while at the same time garnering suggestions for new and improved ways to go about our work.

Of course all this great work by our scientists, engineers and economists will have little impact on promoting enhanced oil recovery if it is not transferred to Wyoming producers. Toward this end we continue to conduct a very active outreach program that provides meetings and seminars on such relevant topics as CO2 and chemical EOR, arranges face to face meetings among producers, and coordinate alliances on a wide range of energy issues.

We will continue to keep you informed of our activities in subsequent editions of our newsletter and we hope you find it interesting and informative.

Other News:

UW Receives Software Donation from Schlumberger [Here]
EORI Carbon Capture Research Published [Here]
EnCana Gift Produces World-Class Petroleum Research Facility [Here]
Journal article on IOR/EOR lowest-cost reserves additions [Here]

Have Your Say ... Questions or comments? Please click here To remove your name from our mailing list, please click here
Grieve Field CO2 flood simulation

In the second half of 2007, the EORI was involved in a collaborative project with Elk Petroleum investigating the suitability of their Grieve Field for CO2 flooding. The project was a tremendous success and it was determined that a CO2 flood in the Grieve field could yield in the order of 23 million barrels of oil from the Muddy reservoir.

Elk received the final EORI report of their simulation CO2 flood of the Grieve Muddy reservoir in November of 2007. The report covered three of more than twenty simulation runs performed by EORI on their detailed computer model of the Muddy reservoir. The report indicated that 23 million barrels was recoverable from the remaining oil in the reservoir and it also indicated that production rates of between 8,000 - 12,000 BOPD were possible assuming specific quantities of CO2 were available and specific numbers of injection and production wells were employed. In practical terms, the optimum production facilities and existing export pipeline are expected to limit the production to something on the order of approximately 8,000 BOPD. The project length is modeled at 30 years, however, 80% of the recoverable oil would be produced within the first 5-6 years following re-pressurization.

Concurrent with the EORI study, Elk engaged Chemical Tracers, Inc., (www.chemtracers.com) to determine the residual oil saturation of the Muddy reservoir at one of the Grieve wells. The result was a residual oil saturation of 34% which compared closely with 35% for this location from the EORI simulation, providing further confidence in the EORI computer model. Ryder Scott was provided with the EORI report to review and to employ in their reserves estimate.

Highlights:

• The simulation revealed that 23 million barrels of oil are potentially recoverable from the Muddy reservoir.
• The simulation indicates that a production rate of 8,000 - 12,000 barrels of oil per day (BOPD) is achievable once the field is re-pressurized.
• Re-pressurization, as modeled, is expected to take at least 2 ¼ years.
• An actual residual oil saturation test performed by Chemical Tracers Inc provided a close correlation to simulated results.

The full report is available HERE.

Above
Views of oil, gas, and water distributions at the start of injection (left), after an initial 14-year CO2 flooding operation in Scenario 3, (middle) and at the end of a 30-year CO2 flooding operation in Scenario 3 (right).

Questions? Please contact Shaochang Wo

Fiddler Creek Study

The Enhanced Oil Recovery Institute is currently working on a field study for Underwood Oil and Gas of Casper on their Fiddler Creek Field in the Powder River Basin. This study will provide information to Underwood about remaining oil reserves in the field and EOR potential. Fiddler Creek is one of many vintage fields in Wyoming and the EORI’s study will involve reservoir analysis, modeling, and simulation. A reservoir model of the field will be constructed for stochastic analysis of volumetric OOIP, and dynamic modeling will assess potential upside for EOR methods.

Questions? Please contact Mark Tomasso.
New Faces

Mark Tomasso
Mark joined the Institute in October, 2007 as a Senior Research Scientist. Mark is British and completed his Ph.D. in 2001 at the University of Birmingham, after which, he spent time at the University of Edinburgh and University College Dublin conducting post-doctoral research. Before joining the EORI, he was a research scientist with the Bureau of Economic Geology at the University of Texas at Austin. Mark’s work at the EORI will focus mainly on reservoir characterization and outcrop analogs in the construction of static reservoir models.

Mark Leslie
Mark is a geochemist who joined the Institute in November 2007. He has a B.Sc. in Geology from Michigan State University and a M.Sc. in Geochemistry from the University of Colorado. Mark has more than 17 years of industry experience as a geochemist and project manager with various organizations in the Colorado area. His research at the EORI will focus low salinity water-flooding.

Brian Reyes
Brian is the newest member of the EORI team. He is a graduate of Southern Oregon University and brings with him a wealth of experience gathered from working in a wide range of industries and environments. Brian will be working with team members on field geology of outcrop reservoir analogs and the EORI GIS database.

Staff Focus: Dr. Geoffrey Thyne

Education:
B.A. Chemistry and Zoology, University of South Florida; M.S. Oceanography, Texas A & M University; Ph.D. Geology, University of Wyoming.

Professional Experience:
Project Manager, Colorado Energy Research Institute; Research Associate Professor, Colorado School of Mines; Assistant Professor, California State University, Bakersfield; Postdoctoral Research Fellow, Colorado School of Mines; Research Geochemist, ARCO Oil & Gas; Senior Engineering Technician, ARCO Oil & Gas.

EORI Role and Responsibilities:
Senior Research Scientist responsible for development of EOR applications including geochemical and reservoir modeling.

What do you think are the main challenges facing Wyoming operators who are looking to increase production through Enhanced Oil Recovery Techniques?
Selecting the best EOR technique for their field is the main challenge. Currently there are two main options, chemical flooding and CO2. While both have shown positive results in Wyoming fields, there are cases where the degree of success has varied and the expense is very different. Providing accurate information that can be applied to a specific field will require both analysis of past application of these methods and development of screening/scoping tools that are customized to Wyoming reservoirs. In those cases where one of these two techniques is not applicable or too expensive, more traditional approaches such as well stimulation or in-fill drilling may be much more cost effective. Those decisions need to be made on a case-by-case basis and require extensive review of field geology and production histories.

How do you think we can overcome these challenges?
I think there are three critical steps. First, we need to contact Wyoming producers to find out what they see as the pressing issues and what their plans are for future production and development. Second, we need to compile all the information about the petroleum geology and production for all the fields in Wyoming in a single, easily accessible form. Much of this information is currently dispersed among several sources, such as the Wyoming Geological Survey, the Wyoming Geological Association, the Wyoming Oil and Gas Conservation Commission and various Federal agencies. Finally, we need to develop relatively simple screening and scoping tools customized for Wyoming producers that predict which technique is most appropriate and what the approximate costs and benefits are for that technique.

Which technology or innovation do you think holds the greatest promise for EOR/IOR in Wyoming?
Currently, I think CO2 injection, either in traditional WAG or gravity-stable flooding has the best track record. In the future I see promise in water flooding with lower salinity water, although that technique is still in the research stage. In the long-term, injection of nutrients and natural microbes that can convert residual oil to natural gas is a fascinating idea that I would like to learn more about.
The EORI is delighted to announce that Ken Hendricks, Sr. Staff Engineer at Anadarko Petroleum Corporation, has accepted an invitation to join the Technical Advisory Board. Ken was born and raised in Montana and graduated from Montana Tech in 1982, with a bachelor’s degree in Petroleum Engineering. After graduating he went to work for Diamond Shamrock/Maxus Energy in June, 1982 where he worked for 16 years, and held various engineering and supervisory positions in Texas, Montana, Wyoming, and Colorado, as well as an overseas position in Ecuador. During this period he worked with natural gas (both normally pressured and high pressured), water-floods, polymer floods, reservoir stimulation, natural gas injection, heavy oil development, and conventional oil and gas operations. In 1998 he moved on to Quicksilver Resources, as their Rockies Division Operations Manager, located in Casper, Wyoming. At Quicksilver he worked with heavy oil, water-floods, and natural gas (conventional and unconventional), from Montana to Texas and east as far as Michigan. In 2002, after Quicksilver announced the sale of their Wyoming assets, joined Howell Petroleum at Midwest, working the Salt Creek field. Shortly after joining Howell, Anadarko Petroleum Corporation purchased the company, and for the past 5 years Ken has worked for Anadarko Petroleum as their Production Engineering Manager at Salt Creek. Primary responsibilities in this role are engineering oversight (flood surveillance, wellbore reactivations, production optimization, CO2 nominations, etc.) of the CO2 activities at Salt Creek. Ken’s tremendous experience in reservoir engineering along with his specialist expertise acquired from working one of the few CO2 EOR operations in Wyoming make him a valuable addition to the TAB and we look forward to working with him.

Webpage: http://eori.uwyo.edu/kh.asp

Upcoming Conferences

2nd annual EORI Wyoming CO2 Conference. The EORI would like to thank again all presenters and sponsors for contributing to a very successful meeting. To access the presentations and view press coverage of the meeting please click here.

June 25th - 26th, 2008 - Platts Carbon Capture and Sequestration: Costs, Viability, and Development in a New Regulatory Environment, Renaissance Hotel, Houston, TX. The EORI is a media partner and the meeting includes a session on the complimentary economic and technical aspects of CCS and EOR. This new conference from Platts focuses on the growing opportunities for large scale sequestration in North America. Hear from the leading companies involved in EOR and CCS, discussing their experience with project development, finance, infrastructure, permitting and legal challenges, and much more. For details call Platts at 781-430-2100, or visit the conference web site: http://www.platts.com/Events/2008/pc819/