



Advanced Resources
International, Inc.

March 2011

Advanced Resources International QUARTERLY UPDATE

Unconventional Resources • Enhanced Recovery • Carbon Sequestration

Advanced Resources' Senior Staff:

Stephen Bumgardner

James S. Caballero

Steven M. Carpenter

Michael L. Godec

Jason A. Hummel

Jonathan R. Kelafant

George J. Koperna Jr.

Vello A. Kuuskraa

Robin Petrusak

David E. Riestenberg

Scott H. Stevens

Advanced Resources International (ARI) is a professional services firm that provides geological, reservoir engineering, business and policy analysis and advice on a global basis related to unconventional gas resources, enhanced oil recovery and geologic carbon sequestration. Our quarterly update highlights current industry trends, ongoing and completed projects, recent publications, upcoming workshops and events, and company news. We encourage you to visit our website at www.adv-res.com to learn more about our company history, research and technology activities, industry news and much more. You may also contact our offices listed at the bottom of this page for additional information.



GLOBAL TECHNOLOGY ROADMAP FOR CARBON CAPTURE AND STORAGE (CCS) IN INDUSTRY

On April 7, 2011, Michael Godec, Vice President of Advanced Resources International will make a presentation at the third workshop in Rio de Janeiro, Brazil, supporting the Global Technology Roadmap for Carbon Capture and Storage (CCS) in Industry. This effort is sponsored by the United Nations Industrial Development Organization (UNIDO) and the International Energy Agency (IEA). The overall objective of the Global Technology Roadmap exercise is to advance the global development and uptake of low carbon technologies in industry, contributing to the stabilization of greenhouse gas (GHG) concentrations in the atmosphere. Mr. Godec's presentation will summarize a sectoral assessment developed by Advanced Resources that supports this road mapping activity summarizing potential opportunities and constraints for the application of CO₂-EOR, using CO₂ captured from industrial sources.



COAL-SEQ FORUM VII

On March 7th and 8th, ARI hosted the Coal-Seq Forum VII at the Hilton Westchase in Houston, TX. The Coal-Seq consortium (in its third phase) has objectives to develop and test three advanced geochemical and geomechanical modules that will increase the accuracy of simulating CO₂ behavior in coals and shales, and couple these with flow simulation. The project also will address coal storage factors such as coal failure and permeability enhancement, matrix swelling and shrinkage, and competition of water as an adsorbed phase on coals, as well as other aspects of CO₂ sequestration.

Over the 2 days, numerous presentations were given on the results from the different DOE sponsored field pilots as well as on currently on-going laboratory studies. George Koperna gave an update of the status of the Coal-Seq consortium; Anne Oudinot gave a presentation on the results of the simulation work performed at the Pump Canyon CO₂-ECBM sequestration demonstration in the San Juan Basin; Robin Petrusak gave a presentation titled "Assessing Factors Influencing CO₂ Storage Capacity and Injectivity in Gas Shales – Review of Current Activities", Karine Schepers presented a theoretical study titled: "Enhanced Gas Recovery and CO₂ Storage in Coal Bed Methane Reservoirs: Optimized Injected Gas Composition for Mature Basins of Various Coal Rank" and Steve Carpenter gave a presentation titled "Advancing the Science of CO₂ Sequestration in Coal Seam & Gas Shale Reservoirs" as an update of the SECARB Task 10 coal-seam injection test in Southwest Virginia.

For more information, visit the Coal-Seq website www.coal-

[seq.com](http://www.seq.com)



OPTIMIZATION OF CO2 STORAGE WITH CO2 ENHANCED OIL RECOVERY

On February 28, 2011, Michael Godec, Vice President of Advanced Resources International gave a presentation at the First Technical Workshop of the 4-Kingdoms CCS Initiative in Al-Khobar, Saudi Arabia entitled "Optimization Of CO2 Storage with CO2 Enhanced Oil Recovery." Saudi Arabia, Norway, the Netherlands and the United Kingdom announced their Carbon Capture and Sequestration (CCS) initiative (4-Kingdom CCS initiative) to identify and address technical issues, including gaps in knowledge, which could impede further commercialization of CCS, and act in a coordinated manner to seek to enhance national expertise on CCS, and to encourage the sharing of knowledge and the transfer of technology.

Mr. Godec's presentation provided a review of the status CO2-EOR operations worldwide, and noting that additional growth in oil production from CO2-EOR is limited by the availability of reliable, affordable supplies of CO2, despite the fact that the worldwide application of "next generation" CO2-EOR technologies focused on increasing oil production could potentially create over 300 billion metric tons of CO2 storage capacity, while producing on the order of 1,300 billion barrels of incremental oil. The presentation showed that CCS can benefit from CO2-EOR, primarily as a result of the revenues (and cost avoidance) from sale of CO2 to EOR that can help make CCS economically feasible, while also helping to overcome some barriers to CCS.

http://4kmopm-sa.com/about_dha_kho.html



THE NATURAL GAS REVOLUTION: U.S. AND GLOBAL IMPACTS

On **February 16, 2011**, Vello Kuuskraa, President of Advanced Resources International, Inc., was asked to participate in the Global Leaders Forum entitled "The Natural Gas Revolution: U.S. and Global Impacts", sponsored by the Energy, Resource and Environment Program (ERE) of Johns Hopkins University's Paul H. Nitze School of Advanced International Studies, Washington, D.C. Mr. Kuuskraa's presentation was entitled "Economic and Market Impacts of Abundant Shale Gas Resources". He was joined on the panel by Melanie A. Kenderdine, Executive Director of the MIT Energy Initiative and John Quigley, Former Secretary, Pennsylvania Department of Conservation and Natural Resources.

<http://www.sais-jhu.edu/calendar/index.htm>

<http://www.sais-jhu.edu/academics/functional-studies/ere/index.htm>



USING CO2-EOR TO ACCELERATE THE USE OF CO2 CAPTURE AND STORAGE (CCS)

Vello Kuuskraa, President of Advanced Resources International, Inc., was asked to speak at the **February 2011** meeting of the Coal Industry Advisory Board's Meeting of the CIAB Associates. His presentation was entitled "Using CO2-EOR to Accelerate the Use of CO2 Capture and Storage (CCS)". The meeting was held at the National Coal Mining Association building in Washington, D.C.

<http://www.iea.org/ciab/index.asp>



ARI ANNOUNCES NEW VICE PRESIDENT

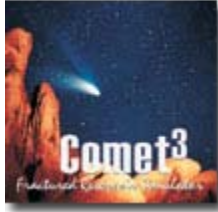
Advanced Resources International is pleased to announce the addition of a new Vice President, Steve Carpenter. Steve will be working from Cincinnati, Ohio, while spending time in DC and with clients. Steve comes to Advanced Resources by way of Marshall Miller & Associates, where he successfully created and developed the Carbon & Risk Management divisions from the ground up.

Mr. Carpenter has been providing technical, engineering and policy support to private and public sector clients since 1986. He is a Subject Matter Expert for climate change, carbon and risk management issues for the Canadian Standards Association (CSA), International Standards Organization (ISO), the Interstate Oil & Gas Compact Commission (IOGCC), the Energy Mineral Law Foundation (EMLF) and the US DOE. At ARI Steve will split his focus among two key areas: CCS and DOE's Regional Partnerships, in support of George Koperna's efforts and on public policy and related climate change/carbon management issues in support of Mike Godec's efforts.

Steve has held public office and was elected to the position of Trustee with the Energy Mineral Law Foundation. Mr. Carpenter holds a B. A. in Physics from Earlham College and is completing graduate degrees in Public Policy and Law.

For further information see <http://www.adv-res.com/unconventional-resources-staff.asp> or contact Steve directly at scarpenter@adv-res.com or 513-460-0360

[Steven Carpenter's Bio](#)



COMET3 RESERVOIR SIMULATOR

Advanced Resources' COMET3 reservoir simulator for coalbed methane (CBM) and gas shale reservoirs was the first of its kind in the marketplace, the initial version having been developed in the early 1980's when both resources combined contributed less than 1% to U.S. gas supply. Since then it has remained the industry-standard reservoir simulator for these reservoir types. Advanced technical features include:

- A triple-porosity/dual-permeability option for certain gas shale and coalbed methane (CBM) reservoirs
- Multi-component sorption for enhanced coalbed methane (ECBM) recovery and carbon sequestration (CO2 sequestration) applications
- A robust permeability model

A COMET3 brochure, as well as technical papers describing the model theories, and model testing and benchmarking studies, can be downloaded via the links below.

[Download COMET3 Brochure](#)



UPCOMING EVENTS

AAPG 2011 Annual Convention & Exhibition

April 10-13, 2011
George R. Brown Convention Center
Houston, TX

<http://www.aapg.org/houston2011/>

Developing Unconventional Gas (DUG)

April 18-20, 2011
Fort Worth Convention Center
Fort Worth, TX

<http://www.dugconference.com/>

OTC 2011

May 2 -5, 2011

Reliant Park

One Reliant Park

Houston, TX 77054

http://www.otcnet.org/2011/pages/schedule/tech_program/index.php**10th Annual Conference on Carbon Capture & Sequestration**

May 2-5, 2011

Pittsburgh, Pennsylvania

<http://www.carbonsq.com/>**EMLF 32nd Annual Institute**

May 15-17, 2011

Nemacolin Woodlands Resort

Farmington, PA

<http://www.emf.org/>**SPE Unconventional Gas Conference**

June 14-16, 2011

The Woodlands Waterway Marriott Hotel and Convention Center

The Woodlands, TX

<http://www.spe.org/events/ugc/>**Coal-Gen Conference & Exhibition**

Greater Columbus Convention Center

August 17-19, 2011

Columbus, Ohio

<http://www.coal-gen.com/index.html>**The 28th Annual Pittsburgh Coal Conference**

September 12-15, 2011

David L. Lawrence Convention Center

Pittsburgh, PA

<http://webster.engr.pitt.edu/pcc/2011conf.html>

For a complete list of industry news, recent white papers and case studies
please visit our website www.adv-res.com or contact one of our offices:

Washington, DC

4501 Fairfax Drive, Suite 910

Arlington, VA 22203-1659

Phone: 703.528.8420

Fax: 703.528.0439

Houston, TX

11490 Westheimer Road, Suite 520

Houston, TX 77077-6841

Phone: 281.558.9200

Fax: 281.558.9202

Knoxville, TN

603 W. Main Street, Suite 906

Knoxville, TN 37902-2613

Phone: 865.541.4690

Fax: 865.541.4688