



Advanced Resources
International, Inc.

September 2012

Advanced Resources International QUARTERLY UPDATE

Unconventional Resources • Enhanced Recovery • Carbon Sequestration

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.

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THE COAL-SEQ III CONSORTIUM: ADVANCING THE SCIENCE OF CO2 SEQUESTRATION IN COAL SEAM AND GAS SHALE RESERVOIRS

At the 2012 USDOE-NETL Carbon Storage R&D Project Review Meeting in Pittsburgh, PA, George J. Koperna, Jr., Vice President of Advanced Resources International, presented a status review of the ongoing Coal-Seq Consortium entitled, "The Coal-Seq III Consortium: Advancing the Science of CO2 Sequestration in Coal Seam and Gas Shale Reservoirs." This presentation highlighted the work towards project completion by Advanced Resources, Higgs-Palmer Technologies, Oklahoma State University, and Southern Illinois University.

Presentation:

www.adv-res.com/pdf/Coal_Seq_Koperna_082112_Summary.pdf



COMMERCIAL SCALE CO2 INJECTION AND OPTIMIZATION OF STORAGE CAPACITY IN THE SOUTHEASTERN UNITED STATES

At the 2012 USDOE-NETL Carbon Storage R&D Project Review Meeting, Dave Riestenberg, Project Manager for Advanced Resources International presented a poster entitled "Commercial Scale CO2 Injection and Optimization of Storage Capacity in the Southeastern United States." This presentation highlighted an upcoming project in collaboration with the University of Alabama at Birmingham and Southern Company.

Poster:

www.adv-res.com/pdf/Commercial_Scale_CO2_Injection_and_Optimization_of_Storage_Capacity_Poster.pdf



CO2-ENHANCED OIL RECOVERY: SHOW ME THE MONEY

With over a decade of service to the coal sector, COAL-GEN is the industry's most dynamic event covering the latest topics affecting the design, development, upgrading, operation and maintenance of coal-fueled power plants. With an anticipated attendance of over 3,500 industry professionals and more than 250 exhibitors, COAL-GEN is the industry's largest event focused on the solutions of today and the technologies of tomorrow.

Enhanced oil recovery is heavily promoted as the first viable, economic off take of CO2 from power generation facilities. This panel session discussed the many aspects that must converge for this process to become a reality, on August 16, 2012 at the Coal-Gen 2012 Conference in Louisville, KY. The panel included members from the Southern States Energy Board, the Gulf Coast Carbon Center, the Great Planes Institute and Steven Carpenter, Vice President, Advanced Resources International. Mr. Carpenter's presentation is entitled: CCUS= CO2 EOR = Energy Production = Energy Security.

Presentation:

[www.adv-res.com/pdf/CCUS_EOR-Carpenter\(FINAL\).pdf](http://www.adv-res.com/pdf/CCUS_EOR-Carpenter(FINAL).pdf)

**TEXAS HOUSE COMMITTEE ON ENERGY RESOURCES**

On June 26, 2012, Michael Godec, Vice President of Advanced Resources International, was invited to testify before the Texas House Committee on Energy Resources on the potential for enhanced oil recovery (EOR) in Texas, with a particular focus on the impact incremental oil production from EOR can have on the state's economy.

www.texasenergyfoundation.org

**CO2 STORAGE AND ENHANCED GAS RECOVERY IN UNMINEABLE COAL SEAMS AND GAS SHALES**

On June 20, 2012, Michael Godec, Vice President of Advanced Resources International (ARI), made a presentation and poster at the Coal Utilization Research Council's "Cutting Edge Coal Technology Showcase: A Pathway to Enhanced Coal Utilization", held in Washington, DC., Mr. Godec highlighted ARI's research activities focused on CO2 storage and enhanced gas recovery in unmineable coal seams and gas shales. Activities highlighted included the firm's participation several U.S. Department of Energy funded projects including the Tiffany, Allison, and Pump Canyon enhanced coalbed methane (ECBM)/CO2 storage field tests, the Coal-Seq Consortium, and work assessing of Factors Influencing Effective CO2 Storage Capacity and Injectivity in Eastern Gas Shales, including a small scale CO2 injection test in the Devonian Ohio shale, in collaboration with the Kentucky Geological Survey.

www.coal.org/index.asp

**THE GROWING OPPORTUNITIES TO UTILIZE ANTHROPOGENIC CO2 FOR EOR**

On May 2, 2012, Michael Godec, Vice President of Advanced Resources International (ARI), made a presentation at the 11th Annual Carbon Capture, Utilization, and Sequestration Conference in Pittsburgh, PA entitled, "The Growing Opportunities to Utilize Anthropogenic CO2 for EOR." The presentation addressed the following questions: What is the potential for CO2-EOR in the U.S. and globally? How much CO2 storage could result from CO2-EOR? Who will most benefit from pursuing CCUS with CO2-EOR? What changes can help more rapid CCUS/CO2-EOR deployment? What can slow it down? The presentation concluded that (1) CO2-EOR in oil fields can accommodate a major portion of the CO2 captured from industrial facilities for the next 30 years; (2) the amount stored depends on the priority placed on maximizing/optimizing storage; (3) the revenues (or cost reduction) from sale of CO2 to EOR helps CCS economics, overcomes some barriers, while producing oil with a lower CO2 emissions "footprint;" (4) large-scale implementation of CO2-EOR is dependent on CO2 supplies from industrial sources; and (5) focused R&D investment, supportive policies and pre-built CO2 pipelines can greatly accelerate the integrated use of CO2-EOR and CCUS.

www.carbonsq.com/

www.carbonsq.com/pdf/2012/2012Complete_program.pdf

**THE SECARB ANTHROPOGENIC TEST: A US INTEGRATED CO2 CAPTURE, TRANSPORTATION AND STORAGE TEST:**

George J. Koperna Jr., Vice President, Dave Riestenberg, Project Manager, and Vello Kuuskraa, President of Advanced Resources International, Inc., and et. al. prepared this paper; "The SECARB Anthropogenic Test: A US Integrated CO2 Capture, Transportation and Storage Test," and was published in the International Journal of

Clean Coal and Energy, Vol. 1 No. 2, 2012, pp. 13-26. doi: 10.4236/ijcce.2012.12002

In Summary, The "Anthropogenic Test" stands to be the largest demonstration of a fully-integrated pulverized coal-fired CCS project in the United States to date, pulling together components of capture, transportation, subsurface storage and MVA. As a first-of-its-kind demonstration, this test will be very important for understanding the still as yet undefined challenges power plant capture can present to the emerging field of geologic CO₂ storage. Currently, this demonstration is completing the permitting phase and preparing for system commissioning and the onset of injection operations. Major project accomplishments to date include:

- The capture unit reached full operational capacity in June 2011.
- Pipeline construction and hydrostatic pressure testing were completed in November 2011.
- A detailed examination of the subsurface geology was completed in 2010, which was uniquely detailed due to the numerous geophysical logs available from existing Citronelle Field well penetrations.
- A characterization well was drilled in January 2011, which provided modern core and geophysical log data that confirmed that the test site represents an attractive location for safe, long-term geological storage of CO₂.
- The primary injection and backup injection wells have been drilled and analysis of the collected sub-surface core and well log data is ongoing.
- A robust MVA plan has been set forth to monitor and track the CO₂ plume's movement and the associated pressure field in the subsurface. This is currently in a baseline data collection mode.
- Perhaps most importantly, this novel integrated re-search and demonstration project is developing the multiple permitting pathways required for large-scale integrated storage projects in the United States.

www.scrip.org/journal/Home.aspx?IssueID=1727#19454



HOW FAR CAN CO₂ ENHANCED OIL RECOVERY DRIVE CARBON CAPTURE, UTILIZATION AND STORAGE?

Vello Kuuskraa, President of Advanced Resources International, was invited by the Atlantic Council to participate in their Energy and Environment Program discussion on "How Far Can CO₂ Enhanced Oil Recovery Drive Carbon Capture, Utilization and Storage?" This briefing, held on July 26, 2012 in Washington, D.C., investigated current domestic carbon and oil market dynamics, examined the potential for CO₂ EOR, and addressed the challenges of implementing large-scale EOR with CO₂ capture and storage.

Presentation:

www.acus.org/files/EnergyEnvironment/Kuuskraa.pdf

www.acus.org/event/how-far-can-co2-enhanced-oil-recovery-drive-carbon-capture-utilization-and-storage



COAL-SEQ PHASE 3 FORUM VIII COMING SOON

On October 23-24, 2012, the Coal-Seq Phase 3 Forum VIII will take place in Pittsburgh, PA at the Sheraton Station Square (<https://www.starwoodmeeting.com/Book/coalseq12>) located at 300 West Station Square Drive, Pittsburgh, PA 15219. The annual Coal-Seq Forum is an invitation-only event where experts from around the world present the latest results from field projects and other technology development efforts. Topics to be covered include the Kentucky CO₂ injection test, the Appalachian ECBM field projects as well as various researches on shale. A members-only meeting follows the Forum, whereby results from the consortium activities are presented. Consortium activities include developing robust mathematical models to accurately predict how coal permeability and injectivity change with CO₂ injection the performance of ECBM and/or sequestration projects, and identifying the geologic and reservoir environments required for successful projects.

www.coal-seq.com/upcomingevents.asp

If you are interested in participating, please contact Susan Pershall at spershall@adv-res-hou.com or call 281-558-9200 Ext 4 or complete the registration form below and fax to 281-558-9202. **Book your hotel reservations now for the discounted rate of \$199.00 plus tax is only available until Tuesday, October 2nd,**

2012.

[Objectives](#)

[Registration Form](#)



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.

COMET3 Brochure:

www.adv-res.com/pdf/COMET3_Brochure_SEPTEMBER_2012.pdf



UPCOMING EVENTS

SPE Eastern Regional Meeting *"Energy's Call to the Post"*

October 3 – 5, 2012
Clarion Hotel
1950 Newtown Pike
Lexington, KY, US, 40511
www.spe.org/events/erm/2012/

SPE Annual Technical Conference and Exhibition

October 8 - 10, 2012
Henry B. Gonzalez Convention Center
200 East Market St.
San Antonio, TX 78205
www.spe.org/atce/2012/index.php

Twenty – Ninth Annual International Pittsburgh Coal Conference

October 15 - 18, 2012
The David L. Lawrence Convention Center
1000 Fort Duquesne Blvd
Pittsburgh, PA 15222
www.engineering.pitt.edu/pcc/

Coal-Seq Phase 3 Forum VIII

October 23 – 24, 2012
Sheraton Station Square
300 West Station Square Drive
Pittsburgh, PA 15219
www.coal-seq.com/upcomingevents.asp

Shale Gas World – Argentina

October 30 - November 1, 2012
Marriott Plaza Hotel
Buenos Aires, Argentina
www.terrapinn.com/2012/shale-gas-argentina/index.stm
www.terrapinn.com/2012/shale-gas-argentina/data/brochure.PDF

GHGT 11

November 18 - 22, 2012
Kyoto International Conference Center
Japan
www.ghgt.info/index.php/Content-GHGT11/ghgt-11-overview.html

CO₂ Flooding Conference Week

December 3 - 7, 2012
Midland Center
Illinois & Main
Midland, TX 79701
www.co2conference.net/
www.eventbrite.com/event/2441873710

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