



Advanced Resources  
International, Inc.

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# Advanced Resources International QUARTERLY UPDATE

Unconventional Resources • Enhanced Recovery • Carbon Sequestration

Advanced Resources International 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](http://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.



## THE GROWING CO2-EOR OIL RECOVERY AND UTILIZATION "PRIZE"

Vello Kuuskraa, president of Advanced Resources International, attended CO2 Conference week, an annual week-long meeting devoted to the role CO2-EOR can play in the future of energy around the world. Mr. Kuuskraa was the Opening Keynote Speaker at the 11th Annual CO2 EOR Carbon Management Workshop event. His presentation was entitled "The Growing CO2-EOR Oil Recovery and Utilization "Prize". This year's meeting was held in Midland, Texas, from December 9 through 13th, 2013

For more information:

<http://www.co2conference.net/category/2013-co2-conference/>



## EXPERIMENTAL MONITORING AT SECARB'S CITRONELLE FIELD SITE

George Koperna, a Vice President with Advanced Resources International made a presentation entitled, "Experimental Monitoring at SECARB's Citronelle Field Site", at the Surveillance and Monitoring of CO2 Injection Projects Short Course at the 2013 CO2 Conference in Midland, Texas on December 11th. His presentation discussed research and development monitoring tools deployed at the Southeast Regional Carbon Sequestration Partnership's Anthropogenic Test Site within the Citronelle Field. These technologies, developed by Lawrence Berkley National Lab and funded by the CO2 Capture Project, were deployed by the SECARB Project Team more than a year ago in the Project's instrumented monitoring well. Data collection, interpretation and costs were discussed as well as the primary use of each of the bundled technologies. The presentation closed with an estimation of recouped costs due to the semi-permanent deployment.

For more information:

<http://www.co2conference.net/category/2013-co2-conference/>

[http://www.Adv-Res.com/pdf/KOPERNA\\_Experimental\\_Monitoring\\_at\\_SECARBs\\_Citronelle\\_Field\\_Site\\_CO2-EOR.pdf](http://www.Adv-Res.com/pdf/KOPERNA_Experimental_Monitoring_at_SECARBs_Citronelle_Field_Site_CO2-EOR.pdf)

## APOGCE

## CHINA SHALE GAS AND SHALE OIL RESOURCE EVALUATION AND TECHNICAL CHALLENGES

Advanced Resources International, Inc. reports the results of its unique China Shale Geology Data Base in a paper presented at the SPE Asia Pacific Conference and Exhibition in Jakarta, Indonesia on October 24, 2013. The Data Base – supported by funding from BP, ConocoPhillips, Shell, and USDOE-EIA – contains data on shale geology and reservoir properties from more than a dozen basins in China. Developed from public Chinese language sources, the China Shale Geology Data Base is geo-referenced in GIS format using ArcView and is easy to use and update. Advanced Resources International utilized the Data Base in estimating China's risked, technically recoverable shale gas and oil resources at 1,115 Tcf and 32 billion barrels. However, China's shale geology is much more complex than that of North America. Faulting, high stress, excessive depth, and clay-rich lacustrine shales present serious challenges to development.

For more information:

[CLICK HERE](#) or visit [www.adv-res.com/unconventional-gas-literature.asp](http://www.adv-res.com/unconventional-gas-literature.asp)

<http://www.spe.org/events/apogce/2013/pages/about/index.php>



## GLOBAL UNCONVENTIONAL GAS SUMMIT 2013 ACHIEVING YOUR POTENTIAL

Mr. Vello Kuuskraa, President of Advanced Resources gave the Opening Keynote Address "World Shale Gas and Shale Oil Assessment: Focus on China" at the Global Unconventional Gas Summit 2013 held in Beijing China on October 22nd – 23rd, 2013. This is Mr. Kuuskraa's third year of participation in this highly attended conference.

The three-day programme, developed by the Gas Technology Institute, addressed the most topical and compelling issues in the world of unconventional gas by the highest calibre speakers. The programme format comprised a commercial stream, technical stream and new technical workshop, alongside outstanding business networking opportunities to bring global and Chinese gas players together.

This year's programme agenda examined the latest developments in making unconventional gas a sustainable energy solution for China, providing in-depth analysis of the critical commercial issues and the latest technological developments.

To download brochure:

<http://www.gug2013.com/brochure-2013-1/>

## IMPROVING DOMESTIC ENERGY SECURITY AND LOWERING CO2 EMISSIONS WITH NEXT GENERATION" CO2-ENHANCED OIL RECOVERY (CO2-EOR)

Vello Kuuskraa, president of Advanced Resources International, was interviewed by U.S. DOE/NETL's Phil Dipietro about the NETL report "Improving Domestic Energy Security and Lowering CO2 Emissions with "Next Generation"



CO<sub>2</sub>-Enhanced Oil Recovery (CO<sub>2</sub>-EOR)", authored by Advanced Resources International. Interview released Oct 17, 2013.

To download the report, visit [http://www.netl.doe.gov/energy-analyses/pubs/storing%20co2%20w%20eor\\_final.pdf](http://www.netl.doe.gov/energy-analyses/pubs/storing%20co2%20w%20eor_final.pdf)

To see the interview, visit <http://www.youtube.com/watch?v=1RFiflU0WJ4>



### 3RD ANNUAL MEETING OF THE INTERNATIONAL STANDARDS ORGANIZATION IN BEIJING, CHINA

On September 24-25, 2013, Mr. Carpenter, VP, Advanced Resources International, Inc. attended the 3rd annual meeting of the International Standards Organization (ISO) TC-265 CO<sub>2</sub> Capture, Transportation and Geological Storage in Beijing, China. The meetings were held at the China University of Petroleum – Beijing and were preceded by meetings of the Capture, Quantification and Verification, and Crosscutting Issues working groups. Mr. Carpenter attended the meetings as the Chair of the US Technical Advisory Group (TAG) and Head of Delegation. At the meetings, Mr. Carpenter and the US TAG were successful in securing TC-265 approval for the creation of a sixth working group (WG6) to focus solely on CO<sub>2</sub>-EOR. The new working group will be co-convened by the Norwegian Technical Advisory Group (TAG).

For more information:

[http://www.iso.org/iso/home/standards\\_development/list\\_of\\_iso\\_technical\\_committees/iso\\_technical\\_committee.htm?commid=648607](http://www.iso.org/iso/home/standards_development/list_of_iso_technical_committees/iso_technical_committee.htm?commid=648607)



### TC-265: DEVELOPMENT OF THE FIRST INTERNATIONALLY ACCEPTED STANDARD FOR GEOLOGIC STORAGE OF CARBON DIOXIDE UNDER ORGANIZATION OF INTERNATIONAL STANDARDIZATION (ISO)

From September 15-18, 2013, Mr. Steven Carpenter, VP, with Advanced Resources International participated in the 30th Annual International Pittsburgh Coal Conference, which was held in Beijing, China. The focus of the conference was COAL - ENERGY, ENVIRONMENT AND SUSTAINABLE DEVELOPMENT, and a special focus on shale and coalbed gas. As a board member of the University of Pittsburgh sponsored event, Mr. Carpenter was the chair of the shale and coalbed gas section and the carbon management section. Additionally, Mr. Carpenter presented two technical papers at the conference. The titles were "MVA Techniques and Application at the Citronelle SECARB Phase III site, Alabama" and "TC-265: Development of the First Internationally Accepted Standard for Geologic Storage of Carbon Dioxide under Organization of International Standardization (ISO)".

For more information:

<http://www.engineering.pitt.edu/pcc/>



### COMMERCIAL & EXPERIMENTAL MONITORING AT SECARB'S ANTHROPOGENIC TEST SITE

George Koperna gave a presentation entitled, "Commercial & Experimental Monitoring at SECARB's Anthropogenic Test Site", at the US-Norway MVA Knowledge Sharing Meeting held in Pittsburgh, PA, on August 19th. The presentation opened with an overview of the SECARB Citronelle Anthropogenic Test objectives and milestones. Following the introduction the focus then shifted to the MVA program strategies and techniques that have been utilized for the project. The presentation ended with a discussion on the 'Lessons Learned' from the MVA program to date.

For more information:

[http://www.adv-res.com/pdf/ARI-US-Norway-Joint-Knowledge-Sharing%20Meeting-\(GKoperna\)-v8.pdf](http://www.adv-res.com/pdf/ARI-US-Norway-Joint-Knowledge-Sharing%20Meeting-(GKoperna)-v8.pdf)



### THE COAL-SEQ CONSORTIUM: ADVANCING THE SCIENCE OF CO<sub>2</sub> SEQUESTRATION IN COAL BED AND GAS SHALE RESERVOIRS

George Koperna, a Vice President with Advanced Resources International also participated in the US Department of Energy Carbon Storage R&D Project Review Meeting from August 20 – 22nd in Pittsburgh, PA delivering a plenary talk in the Regional Carbon Sequestration Partnership's Lessons Learned on MVA session on the experimental technologies deployed at SECARB's Anthropogenic Test Site, and two presentations in the parallel sessions. The first of the two talks was delivered in the Geologic Storage Session, providing an update on the "Commercial Scale CO<sub>2</sub> Injection and Optimization of Storage Capacity in the Southeastern United States" project. The final presentation covered the "Coal-Seq III Consortium" efforts.

For more information:

[http://www.Adv-Res.com/pdf/CoalSeq\\_Koperna\\_Coal-Seq\\_Consortium\\_Advancing\\_Science\\_CO2\\_Sequestration\\_Coal\\_Bed\\_Gas\\_Shale\\_Reservoirs\\_DE-FE0001560.pdf](http://www.Adv-Res.com/pdf/CoalSeq_Koperna_Coal-Seq_Consortium_Advancing_Science_CO2_Sequestration_Coal_Bed_Gas_Shale_Reservoirs_DE-FE0001560.pdf)



### COMMERCIAL & EXPERIMENTAL MONITORING AT SECARB'S ANTHROPOGENIC TEST SITE

On August 19th, Mr. George Koperna and Mr. Steve Carpenter, both VP's of Advanced Resources, led a discussion and presented "Commercial & Experimental Monitoring at SECARB's Anthropogenic Test Site" as part of the joint US-Norway Workshop on "CO<sub>2</sub> Storage Demonstration Projects: The value of monitoring technology", held in Pittsburgh, PA. The presentation opened with an overview of the SECARB Citronelle Anthropogenic Test objectives

and milestones. Following the introduction the focus then shifted to the MVA program strategies and techniques that have been utilized for the project. The presentation ended with a discussion on the 'Lessons Learned' from the MVA program to date.

The purpose of the workshop is the continued collaboration under the US-Norway Memorandum of Understanding (MoU) task for collaboration on monitoring, verification, and accounting (MVA) for carbon storage. The workshop will focus on lessons learned from MVA pilot and large-scale projects, providing a high-level comparison of different MVA methodologies and approaches for offshore and onshore applications, including saline and enhanced oil recovery (EOR). Develop a summary document of the workshop highlighting specific technical issues and potential research and development opportunities.

For more information:

[ARI-US-Norway-Joint-Knowledge-Sharing-Meeting-GKoperna-v8.pdf](#)



**23rd  
World Mining  
Congress**

### MAPPING THE FUTURE: ADVANCES IN MINING ENGINEERING

Mr. Steven Carpenter, VP for Advanced Resources International, Inc. was the session chair for the Carbon Management-CCUS/UCG section of the World Mining Congress held in Montreal, Quebec, Canada on August 13, 2013. Mr. Carpenter moderated the opening plenary lecture by Dr. Jerry Hill who discussed the "Experience from Major CCUS Projects in the USA" then lead the discussion and Q&A for the following technical papers: "Laboratory and Small-scale Field Experiments for Designing Efficient UCG Systems", "Risk Management in Carbon Sequestration: Case Studies from Unconventional Reservoirs in the Appalachian Basin", and "Enhanced Coalbed Methane Recovery through Carbon Sequestration in the Central Appalachian Basin, USA: Assessment, Testing and Site Selection".

For more information:

<http://www.wmc-expo2013.org/>



### TALKINGTON PROMOTED TO PROJECT MANAGER

Advanced Resources International is pleased to announce the promotion of Clark Talkington to the position of Project Manager. Clark specializes in policy analysis and development, programmatic support and financial and economic analysis in the areas of climate change, conventional and unconventional oil and gas development, enhanced oil recovery and downstream utilization of gas resources including coal mine methane, with over twenty years of experience in the energy and environmental fields across public, private and multilateral organizations. Currently, he is located in Arlington, VA. He holds a Masters in Public Affairs from the LBJ School of Public Affairs at the University of Texas and a B.S. in Political Science from Texas A&M University.



### 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 (CO<sub>2</sub> 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](http://www.adv-res.com/pdf/COMET3_Brochure_SEPTEMBER_2012.pdf)



### UPCOMING EVENTS

#### **SPE 2014 Unconventional Resources Conference (2014URC)**

Woodlands Marriott Conference Center  
Woodlands, Texas.

April 1-3, 2014

<http://www.spe.org/events/urc/2014/>

#### **AAPG Annual Convention & Exhibition 2014**

George R. Brown Convention Center

Houston, Texas

April 6-9, 2014

<http://www.aapg.org/houston2014/>

#### **OTC2014**

2014 Offshore Technology Conference

Houston, Texas

May 5 – 8, 2014

<http://www.otcnet.org/2014/>

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

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