



Advanced Resources  
International, Inc.

December 2016

# Advanced Resources International QUARTERLY UPDATE

*Unconventional Resources • Enhanced Recovery • Carbon Sequestration*

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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.



## **PANEL ON ADVANCED RECOVERY IN HORIZONTAL PLAYS: THOUGHTS ON CO<sub>2</sub>-EOR FOLLOWING DUROZ**

George J. Koperna, Jr., gave a presentation at the 22nd Annual (2016) CO<sub>2</sub> Conference workshop, held in Midland, Texas, December 7, 2016. His presentation summarized next-step development considerations for existing wells in the Permian Basin horizontal ROZ depressuring play. Because of the depressuring process, follow-on CO<sub>2</sub>-EOR would require building reservoir pressure back to near MMP, which can be done with gas, water, or a combination of both fluids, each with a very different impact on project downtime. Varying well placement scenarios were discussed, highlighting the use of vertical production wells to “open up” the remainder of the ROZ section for future CO<sub>2</sub>-EOR operations in order to further develop the play.

For more information:  
<http://www.co2conference.net/>



## **USING CO<sub>2</sub>-EOR, THE ROZ AND CARBON MANAGEMENT FOR ENERGY INDEPENDENCE**

Vello Kuuskraa, President, gave a presentation at the 14th Annual (2016) EOR Carbon Management Workshop held in Midland, Texas, December 6, 2016. This presentation summarized how the combination of CO<sub>2</sub>-EOR in the ROZ and carbon management (CCUS) could enable the U.S. to achieve energy (oil) independence, while greatly reducing CO<sub>2</sub> emissions from the electric power sector. First is the need to address and overcome a series of real and perceived barriers hindering CCUS becoming widely accepted, including communicating the full set of benefits of CO<sub>2</sub>-EOR produced oil (that stores CO<sub>2</sub>) over conventionally produced oil (that does not store CO<sub>2</sub>). Finally, the use of CO<sub>2</sub>-EOR could provide \$70 per metric ton of “incentives” for capturing CO<sub>2</sub>, including \$32/mt from CO<sub>2</sub> sales and \$38/mt from “revenue neutral” tax credits. With advances in technology and additional financial support, this would enable 60% of the current U.S. electric power capacity to install carbon capture and sell the captured CO<sub>2</sub> for use and storage by the EOR industry.

For more information:  
[/pdf/Kuuskraa-ROZ-Midland-CO2-ROZ-DEC-2016.pdf](http://pdf/Kuuskraa-ROZ-Midland-CO2-ROZ-DEC-2016.pdf)



## **POTENTIAL ISSUES AND COSTS ASSOCIATED WITH VERIFYING CO<sub>2</sub> STORAGE DURING AND AFTER CO<sub>2</sub>-EOR**

On November 18, 2016, Michael Godec presented a paper entitled “Potential Issues and Costs Associated with Verifying CO<sub>2</sub> Storage During and After CO<sub>2</sub>-EOR,” at the 13th International Conference on Greenhouse Gas Control Technologies in Lausanne, Switzerland. Co-authors on the paper were David Riestenberg, and Shawna Cyphers, also of Advanced Resources International.



## **ENHANCED GAS RECOVERY AND CO<sub>2</sub> STORAGE IN COAL BED METHANE RESERVOIRS WITH N<sub>2</sub> CO-INJECTION**

On November 17, 2016, at the 13th International Conference on Greenhouse Gas Control Technologies in Lausanne, Switzerland, Anne Oudinot (along with co-authors David Riestenberg, and George J. Koperna, Jr.) presented a poster entitled “Enhanced Gas Recovery and CO<sub>2</sub> Storage in Coal Bed Methane Reservoirs with N<sub>2</sub> Co-Injection”, which explored the improvement of

ECBM with concomitant CO2 sequestration by optimization of the injected gas composition (mixture of CO2 and N2) for various coal ranks.



### **EVALUATION OF TECHNOLOGY AND POLICY ISSUES ASSOCIATED WITH THE STORAGE OF CARBON DIOXIDE VIA ENHANCED OIL RECOVERY IN DETERMINING THE POTENTIAL FOR CARBON NEGATIVE OIL**

Also at the 13th International Conference on Greenhouse Gas Control Technologies in Lausanne, Switzerland, Michael Godec (along with co-authors Steven Carpenter of the Enhanced Oil Recovery Institute, School of Energy Resources, University of Wyoming, and Kipp Coddington, of the School of Energy Resources, University of Wyoming) presented a poster entitled "Evaluation of Technology and Policy Issues Associated with the Storage of Carbon Dioxide via Enhanced Oil Recovery in Determining the Potential for Carbon Negative Oil."



### **RESIDUAL OIL ZONE "FAIRWAYS" AND DISCOVERED OIL RESOURCES: EXPANDING THE OPTIONS FOR CARBON NEGATIVE STORAGE OF CO2**

"Residual Oil Zone "Fairways" and Discovered Oil Resources: Expanding the Options for Carbon Negative Storage of CO2", was presented by Vello Kuuskraa at the recent GHGT-13 event. This paper/presentation discusses the identification and characterization of ROZ fairways adding a significant new option for efficiently and economically storing CO2.



For more information:  
<http://www.ghgt.info/ghgt-13>



### **STUDY FOR COUNTRY-WIDE ECONOMIC IMPACTS AND FRAMEWORK CONDITIONS FOR POTENTIAL UNCONVENTIONAL GAS AND OIL EXTRACTION IN THE EU: GERMANY AND POLAND**

On November 11, 2016, Michael Godec, Vice President, presented the results of a study conducted by Advanced Resources entitled "Study for Country-Wide Economic Impacts and Framework Conditions for Potential Unconventional Gas and Oil Extraction in the EU: Germany and Poland." This study was prepared for the European Commission Joint Research Center, and was presented in Petten, The Netherlands.

For more information:  
<https://ec.europa.eu/jrc/en>



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### **UPCOMING EVENTS**

100 AAPG Anniversary  
ACE 2017 Annual Convention and Exhibition  
George R. Brown Convention Center  
Houston, TX  
April 2-5, 2017  
<http://ace.aapg.org/2017>

2017 Offshore Technology Conference (OTC2017)  
NRG Park  
Houston, Texas  
May 1-4, 2017  
<http://2017.otcnet.org/>

The 11th Annual Wyoming EORCO2 Conference  
Casper Events Center

1 Events Dr., Casper, WY 82601  
July, 2017  
<http://www.uwyo.edu/eori/>

Carbon Management Technology Conference (CMTC 2017)  
Hilton Americas - Houston  
Houston, Texas, 77010  
July 17-20, 2017  
<http://fscarbonmanagement.org/cmtc/2017>

**Unconventional Resources Conference (2017URC)**  
Austin, TX  
July 24-26, 2017  
<http://urtec.org/2017>

2017 Pittsburgh Coal Conference  
The Thirty-Fourth Annual Pittsburgh Coal Conference  
Pittsburgh, PA, USA  
September 5 - 8, 2017  
<http://www.engineering.pitt.edu/pcc/>

SPE Annual Technical Conference and Exhibition  
Henry B. Gonzalez Convention Center  
San Antonio, TX  
October 9-11, 2017  
<http://www.spe.org/events/en/2017/conference/17atce/about.html>

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