

# On the Rocks



*A Newsletter of the Michigan Basin Geological Society*

**2003-2004 Number 6**

[www.mbgs.org](http://www.mbgs.org)

**January 2004**

## EVENTS

**January 14, 2004:** MBGS-SPE Meeting The speaker is Dave Cramer and his presentation is: "Evaluating well performance & completion effectiveness in hydraulically fractured gas wells".

**February 4, 2004:** AAPG Distinguished Lecturer; 4:00pm, 1118 Rood Hall, Western Michigan University, Kalamazoo, Michigan: Dr. Luis Pomar (Universitat de les Illes Balears, Majorca, Spain) on: "Reservoir-scale Heterogeneity of Carbonate Platforms - Some Constraints from the Miocene of the Balearic Islands"

**February 11, 2003:** MBGS Meeting The speaker is Dr. Steven R. May, AAPG Distinguished Lecturer and his topic is: "Visualization and Volume Interpretation in Geoscience: 3-D Seismic and Beyond"

**April 18-21, 2004:** AAPG Annual Meeting, Dallas, Texas; for more information go online at [www.aapg.org/meetings/dallas04](http://www.aapg.org/meetings/dallas04).

**May 2004:** Conference/Field Excursion Gaylord, Michigan. For more information see the MBGS website at: [www.mbgs.org](http://www.mbgs.org).

**September 26-29, 2004:** Society of Petroleum Engineers annual meeting Houston, Texas

**October 3-6, 2004:** 33<sup>rd</sup> Annual AAPG Eastern Section Meeting Ramada Plaza Hotel Columbus, Ohio. The theme of this year's meeting is "Still Economic after all these Years."

# MBGS-SPE Meeting

**January 14, 2004**

Location: Mountain Jacks  
5800 W. Saginaw Highway, Lansing, Michigan

Schedule: 5:00 to 6:00 PM Social Hour  
6:00 PM Dinner  
Presentation after dinner

Cost \$30.00/member \$15.00 Student (includes dinner)

**Topic:** "Evaluating well performance & completion effectiveness in hydraulically fractured gas wells"

By Dave Cramer

## MBGS Dinner Meeting Reservation

Name \_\_\_\_\_

Number attending \_\_\_\_\_ Society \_\_\_\_\_

Enclosed Registration Fee \_\_\_\_\_

Please make checks payable to **SPE** and return to Paul Laubitz by November 17, 2003

Paul Laubitz  
ANR Pipeline Company  
27725 Stansbury Blvd., Suite 200  
Farmington Hills, Michigan 48334  
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## **2003-2004 MBGS Officers**

**The Executive Committee meeting minutes are available on the website.**

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ELECTRONIC PUBLICATIONS, MARK WOLLENSAK  
(see above)

WEBMASTER: GREG VARNUM  
[me@gregvarnum.com](mailto:me@gregvarnum.com)

## **University Talks and Seminars Websites**

Western Michigan University,  
[www.wmich.edu/geology/SeminarGeos.html](http://www.wmich.edu/geology/SeminarGeos.html)

Michigan State University,  
[www.glg.msu.edu/news/lectures.html](http://www.glg.msu.edu/news/lectures.html)

University of Michigan, Turner Lecture Series,  
[www.geo.lsa.umich.edu/announce/turner02b.html](http://www.geo.lsa.umich.edu/announce/turner02b.html)

Michigan AIPG Section website: [www.aipg-mi.org](http://www.aipg-mi.org).

## **MEETING CANCELLATION POLICY**

Monthly meetings will be automatically cancelled whenever the National Weather Service issues a "Storm Warning" for the Lansing area. If driving conditions are poor but a "Warning" has not been issued please contact any member of the Executive Committee for the status of the meeting.

## **MICHIGAN BASIN GEOLOGICAL SOCIETY PUBLICATIONS**

**Historical CD #1: Nine out-of-print publications from 1949 through 1965 and 1998**, Devonian to Silurian Rock Fieldtrips to MI, WI, IL and Ontario, 2000, \$15

**Historical CD #2: Four out-of-print publications from 1947, 1959, 1983 and 1991**, Northern Devonian and UP Fieldtrips in MI, 2001, \$10

**Historical CD #3: Six out-of-print publications from 1947, 1959, 1983 and 1991**, Northern Devonian and UP Fieldtrips in MI, 2001, \$12

**Special Price - Historical CD #1, #2 & #3, \$30**

**Stratigraphic Lexicon for Michigan**, 2001, prepared by MBGS and published by DEQ, 56 pp., chart, \$2.65 picked up or \$4 mailed, Can be ordered from MBGS or Geological Survey Div. of the DEQ

Price Includes postage, handling and any applicable sales tax. MBGS Members receive a 10% discount on MBGS publications.

Orders for publications should be prepaid in U.S. Funds and addressed to:  
MBGS - Publications  
c/o Dept. of Geological Sciences  
206 Natural Sciences Building  
Michigan State University  
East Lansing, Michigan 48824-1115

## **MBGS Mug and Jacket Sale**

The Michigan Basin Geological Society is offering mugs and jackets with the society logo for sale. The mugs are \$5.00 each. The jackets are \$60.00 each plus postage. Please contact Dan McGuire at: Phone (517) 772-5219, Fax (517) 772-7021, or [danmcguire@sensible-net.com](mailto:danmcguire@sensible-net.com). Remember to include the correct size of the jacket and the quantity of each item. Checks should be made out to the MBGS.

# **Evaluating Well Performance and Completion Effectiveness in Hydraulically Fractured Gas Wells**

**Dave Cramer**

## **Abstract**

Hydraulic fracture stimulation often dictates the economic outcome of wells completed in gas reservoirs, especially in reservoirs exhibiting low permeability. Making the effort to understand well performance—the rate and pressure behavior of a well over its productive life—provides the opportunity to discover the key elements driving stimulation and completion effectiveness in any particular environment. This presentation demonstrates the integrated use of reservoir engineering tools to evaluate well performance, identify flow regimes, and distinguish between reservoir and completion induced behavior. These tools include well log analysis (for pay identification and petrophysical calculations), the reciprocal productivity semi log method (to normalize the inevitable variations in flow rate when evaluating the post-linear, infinite acting radial flow period), type-curve analysis, material balance (estimation of reservoir volume during pseudo-steady state flow) using the Cartesian plot, pressure buildup analysis (prefracture and post-fracture), finite-difference reservoir simulation, and systems analysis. Case studies of single wells and entire fields draining low permeability gas reservoirs are used to demonstrate this methodology, and significant reservoir, completion, and production factors affecting well performance are identified as an outcome. The above results are compared to history-matched output from 3D or pseudo-3D hydraulic fracturing simulators, comparing the simulated hydraulic fracture characteristics with the actual impact of the emplaced fracture, offering additional clues to stimulation effectiveness. The impact of critical completion and production factors will be revealed and discussed. These problems and factors include wellbore liquid loading (in reducing or eliminating the effective hydraulic fracture length), treatment fluid and proppant volumes, proppant concentration, fracturing fluid systems, treatment isolation strategies and sequencing of multipay completions, treatment flowback strategy, use of velocity/ tubing strings and selection of landing depths, and shutting in a producing well. Remedies are suggested for stimulation and completion induced problems.

## **Biography**

Dave Cramer is the Rocky Mountain Region technical manager for BJ Services. He has 25 years of experience in well stimulation and cementing. Cramer has authored 33 papers, delivered more than 100 technical-society presentations on well completion and performance topics, and is a co-inventor of two U.S. patents. He was awarded the Henry Mattson Technical Achievement Award by the Denver SPE chapter in 1993.

# CALL FOR PAPERS

## AAPG—EASTERN SECTION 2004 MEETING

You are cordially invited to attend the 33<sup>rd</sup> annual meeting of the Eastern Section of the American Association of Petroleum Geologists (ES-AAPG), in Columbus, Ohio, October 3-6, 2004. The theme of this year's meeting is "**Still Economic after all these Years.**"

From the historic days of the Drake well and the world's first giant oil-and-gas field (the Lima-Indiana producing trend) to the present-day exploration for new frontier horizons, our region has been contributing to the world's energy resources for nearly 150 years. Geoscientists have led the way in developing the ideas and innovative techniques necessary to sustain our industry, and are the reason our region is "**Still Economic after all these Years.**"

ES-AAPG together with AAPG's Division of Environmental Geosciences (DEG), Energy Minerals Division (EMD), and Division of Professional Affairs (DPA) will offer two concurrent oral sessions each day of the meeting and two full-day poster sessions. A post-meeting workshop also is being planned. This year's meeting not only incorporates our goal of highlighting new exploration plays, but also offers a forum to emphasize new ideas for old plays, new technologies and ideas for finding or developing reserves, and historical perspectives that provide a foundation for new opportunities. The technical Program Committee encourages you to contribute an abstract for an oral or poster presentation and participate in this informative and exciting meeting. All papers of interest to the Eastern Section will be considered.

### Information for Presenters

Authors are invited to submit new and original work for either oral or poster sessions outlined in this call for papers. Abstracts are due by **APRIL 1, 2004**. Authors will be notified of acceptance or rejection by June 1, 2004. Oral sessions will be 25 minutes in length followed by a 5-minute question period. Speakers are strongly encouraged to follow AAPG guidelines for slide preparation, as good visual aids go a long way toward making a quality presentation.

Conventional slide projectors, computer projector, screens, a lighted lectern, microphone, and laser pointer will be provided in each room. If a PowerPoint presentation is given, you must

provide us with your PowerPoint file a week prior to the meeting to reduce the possibility of technical difficulties. Poster sessions will run a full day. Poster authors are expected to be in their booths a minimum of 4 hours, split between morning and afternoon sessions. Authors will be provided two (three if requested in advance) 4 ft by 8 ft boards suitable for Velcro® attachment of posters, a table, chairs, and electricity. Abstracts should be submitted electronically, if possible, following instructions below or on our website: <http://www.ohiodnr.com/geosurvey/aapg04.htm>. Paper submissions are acceptable using the form included in this call for papers. Please also submit an abstract application form and state whether you prefer an oral or poster presentation or if either is applicable. Over-subscription may mean that some papers will be moved from poster to oral, and vice versa, but only upon approval of the authors. Many people will decide to attend a presentation based solely on its title. Therefore, it would be beneficial for you to make your title as brief and as interesting as possible while still conveying the main topic. **Please do not submit an abstract unless at least one author is certain to attend the meeting. Speakers are required to register for the meeting.**

### Proposed Topics:

- . Bypassed Reservoirs in Mature Fields
- . Geochemistry and Source Rock Studies
- . Cambrian/Ordovician Frontier Plays—Trenton/Black River, Knox, and Pre-Knox units
- . Fractured Reservoirs
- . Enhanced Oil Recovery
- . Unconventional Petroleum Systems and Methods for Hydrocarbon Recovery—Geochemical Techniques, Horizontal Drilling, Basin-Centered Gas Systems, Fractured Shale-Gas
- . Coalbed Methane Opportunities
- . Environmental Assessment, Remediation and Hydrogeology Issues
- . GIS and Computer Applications in Petroleum Geology
- . Historical Retrospect of Eastern Plays
- . Geophysical Methods Including 2D, 3D Seismic, and Aeromagnetic Interpretation
- . Detailed Studies/Case Histories of Oil and Gas Fields

- . Hydrocarbon Resources of the Great Lakes
- . Sequence Stratigraphy—Applications in Exploration and Development
- . Impact Features and Hydrocarbon Potential
- . Reservoir Characterization of Siliciclastics and Carbonates
- . Evaluation and Prediction of Stratigraphic Traps
- . CO<sub>2</sub> Sequestration—Studies and potential impact on the region
- . Impact Features and Hydrocarbon Potential
- . Reservoir Characterization of Siliciclastics and Carbonates
- . Evaluation and Prediction of Stratigraphic Traps
- . CO<sub>2</sub> Sequestration—Studies and potential impact on the region

**DEAL ROOM**—Space will be available to sell/buy prospects, properties, venture opportunities.

Contact: Amy Lang, Exploration Geologist  
 P. O. Box 340346  
 Columbus, OH 43234  
 Ph: (614) 717-9262  
 e-mail: [aburke@ee.net](mailto:aburke@ee.net)

**SPONSORSHIPS**—Sponsor a session, coffee break, event, room, or entertainment.

Contact: Pete MacKenzie, CGAS Exploration, Inc.  
 4770 Indianola Ave.  
 Box 14981  
 Columbus, OH 43214  
 Ph: (614) 888-9588  
 e-mail: [Pete@cgasinc.com](mailto:Pete@cgasinc.com)

**33rd Annual Meeting**  
**Ramada Plaza Hotel**  
**Columbus, OH Oct. 3-6, 2004**  
**Hosted by:**  
**Ohio Geological Society**  
**Ohio Geological Survey**

**General Co-Chairs**

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**EXHIBITOR, SPONSOR & DEAL ROOM  
 OPPORTUNITIES AVAILABLE**

EXHIBIT SPACE will be available throughout the meeting.

Contact: Jim Hanlon, Hanlon Exploration  
 2421 Johnstown Rd.  
 Dover, OH 44622  
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 e-mail: [GeoJimJH@aol.com](mailto:GeoJimJH@aol.com)

## ABSTRACT FORMAT AND INSTRUCTIONS

The format described below must be used to submit your abstract. Your abstract will appear in the proceedings exactly as it submitted, so please read and follow these instructions. All information listed below should be typed in the font of your choice, 12-point size, on an 8 1/2 x 11 inch paper, portrait orientation, 1-inch top, bottom, left, and right margins.

**1. TITLE**—The first item you should list is the title of your abstract. Titles should be in **bold** upper and lower case text, aligned with the left margin, beginning on the first line below the top margin. Example title: **The Integration of Ohio's Oil and Gas Well Data**

**2. AUTHORS**—After the title, skip one line and type the senior author's name first, followed by additional authors (see example below). CAPITALIZE the name of each author. In upper and lower case text following the name include the author's affiliation, city, and state/province. If the speaker will not be the senior author, put an asterisk (\*) after the speaker's name. Example authors: MCDONALD, JAMES, JOSEPH G. WELLS, LAWRENCE H. WICKSTROM\*, Ohio Division of Geological Survey, Columbus, OH, MICHAEL P. MCCORMAC and GREGG M. MILLER, Ohio Division of Mineral Resources Management, Columbus, OH

**3. ABSTRACT**—Skip another line and begin the body of your abstract. Abstracts for both oral and poster presentations are limited to 250 words or less. Only the title should be bold. Use full width of the page (within margins); indent the first line of each paragraph by 1/4 inch; lines must be single-spaced; justify the type to the left and right margins; no illustrations, references, or abbreviations. PLEASE PROOFREAD—no corrections will be made. You may either save the abstract form (available on the web site in Word) and your abstract in a Word document or in rich text format (.rtf) and email to Ron Riley, save the abstract form and your abstract in rich text format on a 3 1/2 inch floppy or compact disc and mail to Ron Riley, or print the completed abstract form, attach your printed abstract, and mail to Ron Riley. Use the following file name format (all lower case)—corresponding author's last name\_corresponding author's first name\_abstract number (use 1 for the first abstract submitted by the author, 2 for the second abstract submitted by the same author, and so on). Example file name: doe\_john\_1.rtf

## Abstract form on next page

### MAIL ABSTRACT AND ABSTRACT FORM TO:

Ron Riley, Technical Program Chair  
Ohio Geological Survey  
4383 Fountain Square Dr.  
Columbus, OH 43224-1362

### OR E-MAIL FORM FROM WEB SITE AND ABSTRACT TO:

[ron.riley@dnr.state.oh.us](mailto:ron.riley@dnr.state.oh.us)

### DEADLINE: APRIL 1, 2004

\***Deadline** (noun): a date or time before which something must be done and after which the opportunity passes: the time limit after which copy is not accepted for use in a publication

All papers of interest to the AAPG  
Eastern Section will be considered

AAPG-EASTERN SECTION 2004 ABSTRACT FORM  
Deadline\*: April 1, 2004

**NOTE: The content of your abstract is your responsibility. Please check it carefully.**

Speaker's Name (last name first)

\_\_\_\_\_

Affiliation (employer): \_\_\_\_\_

Office Phone: \_\_\_\_\_ Office FAX: \_\_\_\_\_ E-mail: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, ZIP/Postal Code:

\_\_\_\_\_

For: Oral \_\_\_ Poster \_\_\_ Either \_\_\_ Are you a student? \_\_\_

Please indicate preferred session: 1): \_\_\_\_\_

2): \_\_\_\_\_

If your paper does not fit a proposed topic, indicate your topic with two or three key words:

\_\_\_\_\_

Is this an invited paper? \_\_\_ Invited by whom? \_\_\_\_\_

Has this or a similar paper been presented before? \_\_\_\_\_

Where? \_\_\_\_\_ When? \_\_\_\_\_

How does this paper differ from previous ones?

\_\_\_\_\_

\_\_\_\_\_

Mode of presentation: 35 mm slides (one projector \_\_\_ two projectors \_\_\_) OR PowerPoint (single screen) \_\_\_\_\_