

# On the Rocks



*A Newsletter of the Michigan Basin Geological Society*

2004-2005 Number 3

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

November 2004

## EVENTS

**November 10, 2004:** This month's MBGS Meeting **will be of interest to geologists and engineers alike.** Kent F. Perry will speak about "**Natural Gas Storage Experience and CO<sub>2</sub> Storage and Sequestration**". See abstract and biography below.

**November 17, 2004:** Society of Petroleum Engineers monthly meeting "China – So Much to See and Learn – So Little Time" speaker is Bruce Bailey at the Golden Rose Restaurant on Okemos Rd, south of I-96. Contact Tim Griffin [tim.griffin@elpaso.com](mailto:tim.griffin@elpaso.com) ; Tel 248-994-4016; fax 248-994-4116 to make a reservation. See additional information below.

**May 5-16, 2005:** MBGS Grand Canyon Field Trip.

## MEETING LOCATION

Following last year's closing of the Lansing Mountain Jacks, we have searched for another site, which is convenient and affordable to hold MBGS meetings. The next few MBGS sponsored meetings will be held at **Coyote Creek** (formerly The Pour House), 6951 Lansing Road, Diamondale 48821. Take Exit 98 south off I-96. Coyote Creek is on the west side of Lansing road, south of I-96 (in front of the State Secondary Complex).

Map available at :

[http://maps.infospace.com/\\_1\\_BBCT160222TT7E\\_info.four/kevmmap?op=MoveMap&otmpl=%2Fkevmmap%2Fmap-out.htm&lat=42.6778&long=-84.6515&lat\\_p=42.6778&long\\_p=-84.6515&QA=6951+Lansing+&QC=Lansing&QS=mi&QZ=48821&QO=US&width\\_o=360&height\\_o=270&detail\\_o=1&scale\\_o=1&matchpass=ZIP9&width=478&height=359&detail=1&scale=2](http://maps.infospace.com/_1_BBCT160222TT7E_info.four/kevmmap?op=MoveMap&otmpl=%2Fkevmmap%2Fmap-out.htm&lat=42.6778&long=-84.6515&lat_p=42.6778&long_p=-84.6515&QA=6951+Lansing+&QC=Lansing&QS=mi&QZ=48821&QO=US&width_o=360&height_o=270&detail_o=1&scale_o=1&matchpass=ZIP9&width=478&height=359&detail=1&scale=2)

## DUES TIME STILL

If you have not renewed your MBGS dues for the 2005 season, please take the time to return the information below with your dues. **If your e-mail or postal label indicates 2004, then you have not paid your 2005 dues.** Timely renewal helps your officer's plan for the upcoming year and is the best way to ensure there will be no interruptions in receiving your On the Rocks newsletter.

### Michigan Basin Geological Society Dues Notice

Please fill out this form when paying your dues for 2004-2005. Dues are \$25.00 for active member and \$10.00 for students.

Name\_\_\_\_\_

Address\_\_\_\_\_

\_\_\_\_\_

Phone\_\_\_\_\_

E-Mail\_\_\_\_\_

Amount enclosed\_\_\_\_\_

Send Newsletter by e-mail\_\_\_\_\_ or Mail\_\_\_\_\_ @ address above

Make check payable to: MBGS

Send to: Tom Hoane  
1748 Danby Lane SE  
Grand Rapids, MI 49506

## LICENSING GEOLOGISTS IN MICHIGAN

As you may know, a bill was introduced June 30, 2004, into the Michigan House to license Professional Geologists. You may view the **current** entire text of that bill by going to the following website.

<http://www.michiganlegislature.org/documents/2003-2004/billintroduced/house/pdf/2004-HIB-6063.pdf>

## NEW PUBLICATIONS

Mineralogy of Michigan, update and revised by George W. Robinson.

This is a major revision of this important reference. Now in an 8.5" by 11" format with over one hundred full color illustrations of minerals found in Michigan. To order, contact Ms. Sharon Carter, Office of Geological Survey, DEQ, 525 W. Allegan Lansing, MI 48909-7756. Or call 517-241-1520 or email at [carters1@michigan.gov](mailto:carters1@michigan.gov)

Price \$ 45.00 (plus shipping)

# MBGS Meeting

**November 10, 2004 (WEDNESDAY)**

**Coyote Creek  
6951 Lansing Rd, Dimondale, MI.**

Schedule: 5:30 to 6:15 PM Social Hour  
6:15 PM Dinner  
Presentation after dinner

Cost \$25.00/member \$15.00 Student (includes dinner)

**Topic: “Natural Gas Storage Experience and CO<sub>2</sub> Storage and Sequestration”**

By  
Kent F. Perry  
Gas Technology Institute

## MBGS Dinner Meeting Reservation

Name \_\_\_\_\_

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

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

Please make checks payable to **MBGS** and return to Pat Poli by **November 8, 2004**. Members are welcome to attend the presentation after dinner for no charge. Please contact Pat Poli to ensure adequate seating. Send reservations to:

Pat Poli  
Engineering Section  
Engineering and Service Quality Division  
6545 Mercantile Way  
Lansing, MI 48909  
Ph: Bus 517-241-6141, Fax 517-241-6071  
E-mail: [pmpoli@michigan.gov](mailto:pmpoli@michigan.gov)

## **2004-2005 MBGS Officers**

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

PRESIDENT: DR. MICHAEL GRAMMER, WMU  
GEOLOGY DEPARTMENT  
Ph: 269-387-3667, fax 269-387-5513  
[mike.grammer@wmich.edu](mailto:mike.grammer@wmich.edu)

VICE PRESIDENT: DR. ROBB GILLESPIE, WMU  
GEOLOGY DEPARTMENT,  
Ph: 269-378-5354, fax 269-387-5513  
[robb.gillespie@comcast.net](mailto:robb.gillespie@comcast.net)

SECRETARY: ROBERT REYNOLDS,  
Reynolds Geological LLC  
Ph: 517-676-9936, fax 517-676-8169  
[reynoldsgeo@voyager.net](mailto:reynoldsgeo@voyager.net)

TREASURER & PUBLICATIONS: TOM HOANE,  
FMFM, DNR  
Ph: Bus 517-241-3769, fax 517-373-2443  
[hoanet@michigan.gov](mailto:hoanet@michigan.gov)

BUSINESS MANAGER: PAT POLI,  
MPSC, Energy Operations Division  
Ph: Bus 517-241-6141, Fax 517-241-6071  
[pmpoli@michigan.gov](mailto:pmpoli@michigan.gov)

PAST-PRESIDENT: TOM GODBOLD,  
GLMD, DEQ  
Ph: 241-1545, fax 517-241-1595  
[godboldt@michigan.gov](mailto:godboldt@michigan.gov)

CO-FIELDTRIP DIRECTORS:  
MARK WOLLENSAK, CPG  
HAMP, MATHEWS & ASSOC, Inc.  
Ph: 517-641-7333 Fax 517-641-7337  
Cell 517-719-8321  
[wollensak@voyager.net](mailto:wollensak@voyager.net)

LEONARD ESPINOSA, FMFM, DNR  
Ph: 517-335-3248, Fax 517-373-2443  
[espinosl@michigan.gov](mailto:espinosl@michigan.gov)

NEWSLETTER EDITOR: TOM WELLMAN,  
GLMD, DEQ  
Ph: 517-241-1530, fax 517-241-1595  
[wellmant@michigan.gov](mailto:wellmant@michigan.gov)

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.

# NATURAL GAS STORAGE EXPERIENCE AND CO<sub>2</sub> STORAGE AND SEQUESTRATION

## Abstract

The presentation will review the portfolio of technologies available within the underground gas storage industries in the United States, Canada and Europe and evaluates their applicability to CO<sub>2</sub> sequestration.

While the study places an emphasis on storage field integrity issues and in particular unwanted migration of gas, it should not be misconstrued that the gas storage industry has an issue with safety or performance. To the contrary, the industry has operated efficiently for over 90 years. The emphasis on field integrity issues was done with the purpose of learning as much as possible, from very few leak situations, for maximum application of an important topic to CO<sub>2</sub> sequestration.

A result of this study is that of the approximately 600 storage reservoirs operated in the United States, Canada and Europe, only nine have been identified to have experienced leakage; three due to cap rock issues, five due to well bore integrity and one due to reservoir selection (too shallow). In all cases, remediation procedures were and continue to be effective.

Gas Storage Operators have accumulated a significant knowledge base for the safe and effective storage of natural gas. While unwanted gas migration has occurred both due to mechanical problems with wells and geologic factors, overall gas storage has been effectively and efficiently performed.

Most gas leakage incidents in gas storage operations have occurred due to wellbore integrity problems. Poor cement jobs, casing corrosion, improperly plugged wells in converted oil and gas fields have all contributed to unwanted gas migration. Remedial action procedures and technologies are well established in the oil and gas industry to address these problems. Continuous attention will need to be applied to this area by the CO<sub>2</sub> sequestration industry but practices and technologies exist for accomplishing this.

It is of special note that unwanted migration of gas has occurred in at least one field despite application of practically all-available technology and integrity determination techniques. Accordingly, the caution directed at the gas storage industry by Dr. Donald Katz, a pioneer in natural gas engineering and gas storage, in the 1960's is likely to be appropriate for the newly developing CO<sub>2</sub> industry today. The caution is paraphrased below:

*“Caution must be exercised in claiming that no gas will ever be found outside the intended well -- gathering line -- reservoir system. If any gas is found outside the intended system, it is possible that it can be handled so as to cause little or no harm, and should be no cause for calling a halt to the operations.”*

A number of technologies developed by the gas storage industry in the United States and Europe have been identified as having potential application to CO<sub>2</sub> sequestration. In all, 24 technologies or technology areas were identified as having application to CO<sub>2</sub> sequestration. Of those, five technologies were determined to be most relevant, especially from the aquifer storage area, which will have direct applicability to CO<sub>2</sub> sequestration. The five most relevant technologies/techniques are:

- “Watching the Barn Doors” (utilization of all techniques on a continuous basis)
- Gas Storage Observation Wells
- Pump Testing Techniques
- Caprock Sealing
- Surface Monitoring

The presentation will review these technologies, map their application to CO2 sequestration and review relevant experience from the natural gas storage industry.

## **KENT F. PERRY, BIOGRAPHY**

Kent Perry is Director, Exploration & Production Research at the Gas Technology Institute in Des Plaines, Illinois.

At GTI, he has responsibility for planning and managing a research program, which has the overall objective of developing new technology for enhanced recovery of natural gas in the lower-48 United States.

Past experience includes twenty-five years of natural gas engineering and gas production responsibilities including; gas storage engineering for *Northern Illinois Gas Co.*, production engineering with *Kansas-Nebraska Natural Gas Co.*, and, exploration and production for *Michigan Energy Resources Co.*

He holds a Bachelor of Science Degree in Petroleum Engineering from the Colorado School of Mines and is a member of the Society of Petroleum Engineers and a past SPE Distinguished Lecturer.

He has participated in National Petroleum Council studies on the potential for natural gas in the United States and has authored several papers on low permeability natural gas resources and hydraulic fracturing.

### **Kent F. Perry**

Director, E&P Research

### **Gas Technology Institute**

1700 South Mount Prospect Road

Des Plaines, Illinois, 847/768-0961 (voice), 847/768-0501 (fax), email: [kent.perry@gastechnology.org](mailto:kent.perry@gastechnology.org)

## **FOLLOW-UP OF SALT MINE TOUR**

Leonard Espinosa provides the following summary of the Detroit Salt Mine Tour on June 2, 2004. E.Z. Manos, MBGS member and Mine Manager of the Detroit Salt Company hosted MBGS members, Ann Stephens, Dave Baxter, Jane Smikgielski, Tom Cok, Walter Bolt, Hal Fitch, and Karen Fitch, Hollis Thomas, and myself on our third annual MBGS Salt Mine Field Trip. As there was only one shift operating “E.Z.” was able to show us parts of the old workings that we didn't usually have time to tour. Including ripple marks in the ceiling and an 85 year-old workers changing house made out of salt blocks with shift schedules still on the wall from the 1920's. Afterwards we made our usual culinary tour of Vince's Italian restaurant. **Thank you Leonard!**

Slide-23

This shows a very large area of disturbed bedding in the salt, where "water-clear" recrystallized halite crystals have grown. It also has many shale interbeds, thought to have some relationship to the epigenetic recrystallization.



Slide-26

In the old workings of the mine where dozens of Silurian ripple marks are visible on fracture surfaces of the salt. This view is looking up at the ceiling above the tunnel, which is nearly covered by a single sheet of ripple-marks.



# **SOCIETY OF PETROLEUM ENGINEERS**

## **Abstract**

### **CHINA ... SO MUCH TO SEE AND LEARN .... SO LITTLE TIME.**

If we think about China at all, most of us think of a country of tiny '3rd world' farms with mud huts, pig pens, fish ponds and chickens producing an endless supply of new flu viruses. Or we think of how cheap Chinese goods are flooding into our lives, whether we choose to "Buy American or Buy Canadian" or not. There's no way of avoiding it!! But what we are seeing now is only the tip of the iceberg. China, as an economic power, is coming down the track like a runaway railway train, and we are Pauline, strapped to the rails. Yet we North Americans know virtually nothing about the Chinese, their country, their lives or anything else for that matter. A billion people ... one third of the population of the entire earth ... 'over there ... somewhere'. 2 years ago, I had the opportunity to visit China for almost a month, to travel down the Yangtze River Valley, through the 3 Gorges Dam site .. to see their huge cities, and, as a naive westerner, to be set on my heels by the size, scenery, culture and their huge manpower resources. This talk is a very short pictorial travelogue of that journey.