# MISSISSIPPI GEOLOGICAL SOCIETY eBulletin



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# PRESIDENT'S LETTER Joe Johnson

#### **Fellow Members:**

I am proud to call myself your current president and thank everyone for their vote of confidence. We have a few new officers and some who will be returning to fulfill other positions. I appreciate these volunteers because they help MGS stay the course.

The Fall BBQ will be coming up on September, 10th. We are planning for a large turnout to kick off the beginning of our new working year for the society. I hope you will attend to share in some good food and conversation.

We have lined up our October speaker, it will be Dan Buller from Halliburton to discuss some of the current activity in North Louisiana on the Haynesville Shale. I have personally set through several of his presentations and he is extremely knowledgeable on this subject.

We are looking forward to seeing everyone at the Fall BBQ.

Sincerely, Joe



#### In This Issue:

**Meetings Schedule** Fall Barbeque MGS Fall BBQ Sponsors **Petrophysical Evaluation of** the Haynesville Shale in Northeast Texas and Northwest Louisiana. **IOGCC ANNUAL MEETING Lessons from the Barnett** Shale suggest caution in other shale plays. Who are these MGS members? GCAGS **MGS Membership Application** Members in good standing. **MGS Advertising Notice** MGS Boland Scholarship

Fund



MGS MEETING SCHEDULE			
When	What	Where	
September 10, 2009	Fall BBQ	Jackson Yacht Club	
October 8, 2009	Dan Buller—Petrophysical Evaluation of the Haynesville Shale in NE Texas and NW Louisiana	River Hills	
November 12, 2009	TBA	River Hills	
December, 2009	TBA	Colonial Country Club	
January 7, 2010	TBA	River Hills	
February 11, 2010	TBA	River Hills	
March 11, 2010	TBA	River Hills	
April 8, 2010	TBA	River Hills	
May 13, 2009	Spring Fling	Jackson Yacht Club	



# PATRIOTISM IS SUPPORTING YOUR COUNTRY ALL OF THE TIME AND YOUR GOVERNMENT WHEN IT DESERVES IT! Mark Twain

# August 11, 2009 September 1, 2009 October 6, 2009 November 3, 2009 December 1, 2009 January 5, 2010 February 2, 2010 March 2, 2010 April 6, 2010 May 4, 2010







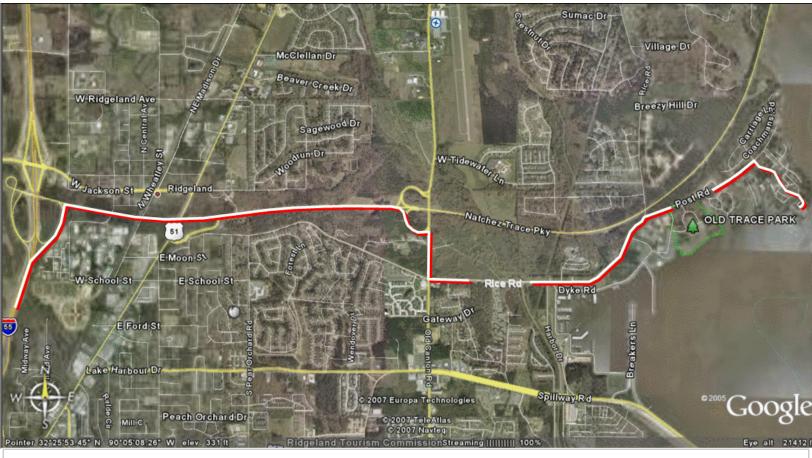
# Jackson Yacht Club

# 2009 MGS Fall Barbeque

**September 10th 5:30 PM – 8:30pm** 

Barbeque & Trimmings Keg & Cash Bar

\$15 per person (Students \$5)



#### **Driving North or South on I-55:**

Exit I-55 at Natchez Trace Parkway (exit #105A) and continue to stop sign, turn onto Parkway at stop sign to Tupelo (east), continue to Madison/Ridgeland/Ross Barnett Reservoir exit (2.0 miles), exit right and continue to stop sign, turn right (south) at stop sign onto Old Canton Road, continue to traffic light (0.2 mile), turn left (east) at traffic light on Rice Road, continue (1.3 miles) to Post Road (3 way stop), turn right (east) at 3 way stop sign and continue to Yacht Club Road (0.7 mile), turn right (south) on Yacht Club Road and continue to end of road. Jackson YC is located on the southwest shore of Ross Barnett Reservoir in Madison County Mississippi.



# MGS Fall BBQ Sponsors:

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#### Petrophysical Evaluation of the Haynesville Shale in Northeast Texas and Northwest Louisiana

Dan Buller, Halliburton, 416 Travis, Suite 505, Shreveport, LA 71105

#### **ABSTRACT**

The Late Jurassic Haynesville Shale is an unconventional, overpressured gas reservoir located in northeastern Texas and northwestern Louisiana. Relatively high natural gas prices and recent success in other shale gas plays have led a number of operators to invest significantly in the Haynesville. It has great potential for development by applying all the new technology that is available in the oil and gas industry today.

Petrophysical evaluation of reservoirs has long been used for exploration and reserves estimates. New logging tools and analysis techniques have been developed to provide more precise data about target zones and bounding layers that are important when considering hydraulic fracturing for unconventional reservoirs.

A processed log interpretation calibrated for the Haynesville shale is computed using a typical triple combo suite of logs. Other log data such as borehole imaging, magnetic resonance, dipole sonic, and spectral gamma ray will improve and verify the interpretation. Core samples provide essential data on mineralogy, TOC, and rock mechanical properties to calibrate this processed log computation and improve the accuracy of the total shale interpretation.

Identification of the following reservoir characteristics provides the starting point for completion and hydraulic fracture stimulation design.

Identification of free gas zones
Identification of rock types and mineralogy
Total organic content
Quantification of effective shale porosity
Estimates of shale permeability
Mechanical stress measurement for hydraulic fracturing design
Identification, classification, and orientation of marginal class, open conductive, and drilling induced fractures

A number of Haynesville Shale examples are presented to highlight all interpretation techniques and variations in the shale itself within its proven productive area. This interpretation can be critical for the hydraulic fracture design approach for the Haynesville Shale.

#### SPEAKERS' BIOGRAPHY

## Dan Buller Halliburton Energy Services

Dan Buller has 28 years in formation evaluation. He started with Schlumberger by logging wells in Kansas & Oklahoma from 1981-1988. He moved to Shreveport as a wireline sales engineer with Schlumberger in 1988. He joined Numar Corp. in 1996 and subsequently, Halliburton, in 1997. He is currently working as a Principal Petrophysicist and NMR Logging Specialist supporting Halliburton's Southeast Technology Team and is based in Shreveport, LA. He has published technical articles in JPT, World Oil, and The Oilfield Review. Dan obtained BS degrees in Physics and Math in 1980 from Nebraska Wesleyan University, and a MS in Physics in 1981 from Kansas State University. He is a member of SPE, AAPG, & SPWLA.

#### **HUGHES SOUTH CORPORATION**

2829 LAKELAND DRIVE, SUITE 1670 FLOWOOD, MISSISSIPPI 39232

June 10, 2009

#### **Dear Oil & Gas Producers:**

#### **RE: IOGCC ANNUAL MEETING**

I am pleased to advise you that the State of Mississippi has been selected to host the <u>2009 Annual Meeting</u> of the Interstate Oil and Gas Compact Commission (IOGCC).

The Annual Meeting of the IOGCC will be held on October 4–6, 2009, at the Imperial Palace in Biloxi. The Current President of the IOGCC is Governor Brad Henry of Oklahoma. The Incoming President is Governor Rick Perry of Texas who will assume the leadership of the IOGCC at the Annual Meeting in Biloxi. Both Governor Haley Barbour and Lieutenant Governor Phil Bryant of Mississippi will be in attendance at the Annual meeting. It is a signal honor for the State of Mississippi to be selected to host this event. Mississippi's selection as the host site is also a tribute to the oil and gas industry of our state.

The IOGCC is a multi-state government agency whose mission is to promote the conservation and efficient recovery of the Nation's oil and natural gas resources. The IOGCC, which was formed as a <u>compact</u> of energy-producing states in 1935, currently has a membership of thirty (30) states, as well as eight (8) associate members.

Our state has been requested to financially support the Annual Meeting of the IOGCC by contributing the sum of \$100,000.00 which is to be raised exclusively through private sources.

Toward that end, we are requesting that members of the oil and gas industry, including members of the oil-field service industry, if possible, each contribute the sum of \$1,000.00 to support this effort.

We are writing this letter to solicit your support in this effort. If you are able to support this request, your contribution should be made payable to the <u>Interstate Oil and Gas Compact Commission</u> (IOGCC) and sent <u>directly</u> to the IOGCC at the following address:

Interstate Oil and Gas Compact Commission Attention: Ms. Mary Oberly P. O. Box 53127 Oklahoma City, Oklahoma 73152-3127

Your contribution should be submitted to the IOGCC by <u>August 15, 2009</u>. Your contribution should clearly indicate that it is for the support of the IOGCC's Annual Meeting in Biloxi. Your contribution will help to insure the success of this event and will reflect credit on our state.

Sincerely,

Dudley J. Hughes

President

# Lessons from the Barnett Shale suggest caution in other shale plays

By Arthur Berman • on August 10, 2009

The Potential Gas Committee announced in late June that shale gas has increased the US resource base to more than 1,800 Tcf. Shale players are now more confident than ever that they are in the right business. The miracle of low risk and high reward must be working. The executives of these companies and the investment analysts that promote their stock have proclaimed a new miracle in which high capital costs combined with low gas prices somehow result in profit.

Since little is known about the commercial potential of new shale plays like the Marcellus and Haynesville, I decided to see what could be learned from the robust production history of the Barnett Shale. What I found surprised me. Most reserve predictions based on hyperbolic production decline methods were too optimistic when compared with production performance. There is little correlation between initial production rates (IP) and ultimately recoverable reserves (EUR). Average well life is much shorter than predicted, and the volume of the commercially recoverable resource has been greatly over-estimated. Core areas of the play do not have appreciably higher average EURs than the play overall, and the EUR from horizontal wells is not significantly greater than from vertical wells. Finally, average well performance has decreased consistently since 2003 for horizontal wells.

The Barnett Shale was the first shale gas play to be commercially developed and is the standard of comparison for this play type. There are now almost 12,000 producing Barnett wells, of which two-thirds are horizontal and one-third are vertical. Cumulative gas production is 5.64 Tcf, of which 3.62 Tcf comes from horizontal wells and 2.02 Tcf from vertical wells.

In 2007, I projected EUR for almost 2,000 horizontal wells in the Barnett Shale (*World Oil*, November 2007). At that time, these were the only horizontal wells with enough production history to evaluate. Now, with two additional years of production, I revised the decline curves for the same control set of 1,977 horizontal wells. The overall EUR decreased 30% from my previous estimate, and the average per-well EUR fell from 1.24 Bcf to 0.84 Bcf. The reason is clear: most wells do not maintain the hyperbolic decline projection indicated from their first months or years of production. Production rates commonly exhibit abrupt, catastrophic departures from hyperbolic decline as early as 12-18 months into the production cycle but, more commonly, in the fourth or fifth years for the control group. Pressure is drawn down and hydraulically produced fractures close.

Workovers and additional fracture stimulations may boost rates back to previous levels, but rarely restore a well to its initial decline trajectory. More often, a steep hyperbolic or exponential terminal decline follows attempts to remedy a well's deteriorating performance. This observation casts doubt on the validity of the common practice of "group curve fitting" used to predict EUR from early production in newer shale plays.

I decided to examine the validity of the other common technique used in new play evaluation: prediction of EUR from IP. I projected decline curves for all the horizontal wells in the Barnett, and the resulting cross-plot of IP versus EUR provided a broad range of EURs that might be associated with a particular IP. For example, the well with the highest EUR in the Barnett Shale (8.8 Bcf) has a good correlation with IP (7.94 MMcfd). The next-best well has a EUR of 8.6 Bcf and a poor correlation to an IP of 4.28 MMcfd, while the fourth-best well has a EUR of 7.1 Bcf and an even poorer correlation to the IP of 1.9 MMcfd. In the end, I would prefer a high IP to a low one but, since approximately half of the EUR is produced in the first year, a well's early decline rate is more important than IP in predicting reserves.

Operators often state that shale plays have about a 30 to 40-year production life, but I found that the average commercial life for horizontal wells is about 7.5 years, although the mode is four years. There are many wells that should have 8-12 years of production but few that will extend beyond 15 years. About 75 percent of predicted EUR in horizontal Barnett wells has been produced by Year 5. In the control group, the first wells were drilled in 2003, and already 15% have reached their economic limit five to six years into their production life cycle.

The average EUR for all horizontal Barnett wells is 0.81 Bcf (the mode is 0.5 Bcf/well). This is about one-third of the 2.5 Bcf/well average predicted by many operators. My decline projections indicate that only about 300 horizontal wells in the play (4% of total) will reach or exceed a 2.5 Bcf threshold. This seems consistent with the average to-date cumulative production of 0.46 Bcf/well.

The variance between reserves that I calculate and those claimed by operators in the Barnett Shale is because of differences in approach. Most operators project at least 40 years of production for their wells. I project to an economic limit of 2,000 Mcf per month because this is the threshold below which cost exceeds revenue based on \$3.50/Mcf netback gas price, a 25% royalty, and average operating costs from operator 10-K SEC filings. Operators use a terminal decline rate of 4-8% even though there is no evidence for these rates from any shale well. I use 15% because this is corresponds to the decline rate for Barnett Shale wells with the longest production history. Operators typically use a "type curve" model to compute reserves that is a mathematically approximation of average decline rates. I projected each of the 1,977 wells in my control group individually using standard hyperbolic rate vs. time graphic methods, and used these results as a model to project reserves for wells outside the control group.

Since I averaged EURs over an area that comprises almost 15,000 square miles (9.5 million acres), I focused on the core areas or "sweet spots" centered in Tarrant and Johnson counties. While these areas include many of the best wells in the play, the average EUR is not much better than the overall play average. The average EUR for wells in the Tarrant County core area is 0.95 Bcf, and 0.84 Bcf in the Johnson County core area.

The US Geological Survey estimates technically recoverable Barnett gas resources of 26 Tcf, and many operators believe that this is too low. My calculations suggest that the Barnett EUR, based on 11,817 horizontal and vertical wells, will be about 8.8 Tcf. An additional 23,000 wells are required to reach 26 Tcf, at a cost of more than \$75 billion for leasing, drilling, and completion alone.

Another surprise is that horizontal wells do not have significantly higher EUR (0.81 Bcf) compared to vertical wells (0.62 Bcf). Horizontal completions only result in a 31% improvement in reserves for about 2.5 times the cost. Put another way, the nominal unit cost (leasing, drilling and completion costs only) of gas from a horizontal well is approximately \$4.30/Mcf compared to \$2.05/Mcf from a vertical well.

A final surprise is that well performance in the Barnett Shale has not improved over time because of new completion technologies or better knowledge about drill site selection and reservoir distribution, as many people assume. For horizontal wells, the peak average EUR of 1.14 Bcf/well occurred in 2003. Average EUR has declined every year since down to 0.59 Bcf/well in 2008.

When I state concerns about the economics of shale plays in the current low-price gas environment (*World Oil*, January 2009), operators dismiss them because they are hedged at higher gas prices. If every operator in the Barnett Shale was hedged at a netback gas price of \$8/Mcf, only 31% of horizontal wells would break even or make money. At \$6/Mcf, only 15% of wells would reach this commercial threshold.

I am disturbed that public companies and investment analysts make fantastic claims about the rates and reserves for new shale plays without calibrating them to the only play that has significant production history. Almost every assumption used by the industry to support predictions about the Haynesville or Marcellus Shale plays is questionable based on well performance in the Barnett Shale. While it is true that every play is different and the Barnett Shale does not perfectly predict what will happen in other plays, it seems reasonable to temper and calibrate our uncertainty with what is known. There are many lessons we can learn from the Barnett Shale, and they all suggest a cautious approach to developing new shale plays.

#### Heads Up! Changes at AAPG?

AAPG's Globalization plans under discussion – what might be involved?

The AAPG (American Association of Petroleum Geologists) continues to expand its global reach, with international Regions (e.g. Africa Region, Europe Region, etc.) currently regarded as units roughly on a par with domestic Sections (e.g. Gulf Coast Section, otherwise known as the Gulf Coast Association of Geological Societies, or GCAGS). The AAPG is debating major changes to the Constitution and Bye-Laws to reflect the growing importance of its global nature. Some of the changes to the Corporate Structure which might or might not make their way into the amendments that will come before the membership for approval are potentially controversial.

Two possible changes which might be proposed that would engender debate are firstly to consider the domestic sections as making up a single Region comparable with the other international Regions, diluting the role of U.S. membership. The very name of the organization might also be under review, since the Association is no longer purely American.

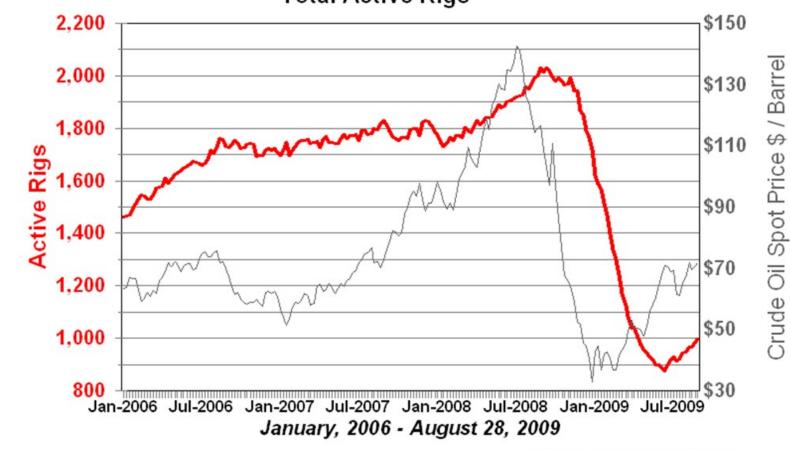
We urge all AAPG members to go to the Association's web site at <a href="http://discussion.aapg.org/">http://discussion.aapg.org/</a>

<u>corporatestructure/</u> and read the information currently available. Express your views to the local

Delegates who represent each local society with AAPG. Note that no detailed proposal has yet been

finalized, so this is the time for membership input.

#### U. S. Rotary Rig Count Total Active Rigs



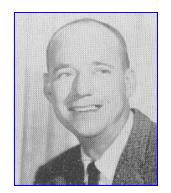
Sources: Baker-Hughes, Energy Information Administration (DOE), WTRG Economics WTRG Economics ⊚2009 www.wtrg.com (479) 293-4081

#### Who are these MGS members?

Hint: 1962

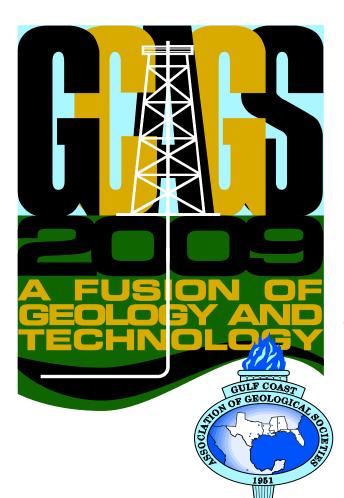








The 59<sup>th</sup> Annual Convention of the Gulf Coast Association of Geological Societies and the Gulf Coast Section of SEPM September 27-29, 2009 www.gcags2009.com



The Annual Convention of The GCAGS is fast approaching. Please make your plans to attend this outstanding event.

We will be presenting an unequaled scientific program along with social events which will keep all who come to Shreveport busy and glad they came.

There will be 79 oral presentations and 12 poster sessions. The session titles are as follows:

#### Sunday, September 27, 2009

Symposium on the Haynesville Shale and other Shale Plays

#### Monday, September 28, 2009

The Wilcox-Outcrop to the Abyss Visualization, Geochemistry, and Interpretation of Geologic Systems Structure and Lithostratigraphy: Old Fields and New Plays
Gulf Coast Sedimentation and Coastal

Gulf Coast Sedimentation and Coastal Subsidence

Stratigraphy, Correlation and Sedimentary Processes

#### Tuesday, September 29, 2009

Water Resources and Environmental Geology

Seismic Applications and Salt Tectonics in the Gulf Coast

Geology and Education- A Natural

The Geology and Evaluation of Shale Resource Plays

The Schedule of fees for the convention is as follows:

Pre-Convention Registration	\$150
Pre-Convention Registration	\$200
Includes Shale Symposium	
On-Site Registration	\$200
Does not include Shale Symposium	
On-Site Haynesville Shale Symposium	\$100
Academia	\$ 75
Student	\$ 25
Spouse/Guest	\$ 50
Icebreaker Only	\$ 50
All-Convention Luncheon	\$ 40
Hard Copy of <i>Transactions</i>	\$ 50

#### MEMBERSHIP APPLICATION / RENEWAL FORM

# MISSISSIPPI GEOLOGICAL SOCIETY P.O. BOX 422, JACKSON, MISSISSIPPI 39205-0422

#### 2009-2010

Membership year is June through May

New Membership (\$20/yr)	Renewal (\$20/yr)	Student (\$5/yr)	Associate (\$20/yr)
Boland Scholarship Fund	Donation \$	Total Amount Enclo	osed \$
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E-mail Address:			
College/University Attended:			
Degree(s) Obtained and Year(	s) Awarded:		
Professional Associations, Cer	rtifications, & Licenses:		

#### The following are MGS members in good standing

(i.e., paid their dues early this year)

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2009 - 2010 MGS dues are due. Steve Walkinshaw (o) Vaughan Watkins, Jr. (H) Stewart W. Welch (H)

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#### **September 2009 – May 2010**

#### I. Bulletin Advertisements:

Size	Rate/Year	Amt. Remitted
Full Page Ad (6" x 8")	\$500	\$
1/2 Page Ad (6" x 4")	\$300	\$
1/4 Page Ad (3" x 4")	\$200	\$
Business Card Ad (1 1/2" x 3")	\$100	\$
Professional Listing (1/2" x 3")	\$ 50	\$

#### II. Web Page Advertisements (www.missgeo.com):

Type of Web Page Ad	Rate/Year	Amt. Remitted
Front Page Sponsor		
(Banner Ad – limit of 5)	\$500	\$
Second Page Banner Ad	\$250	\$
Professional Listing/Link	\$100	\$

(Note: Please contact Steve Walkinshaw at (601) 607-3227 or mail@visionexploration.com for details concerning placing your ad on the MGS web site.)

**Total Remitted** 

\$		
<i>. . .</i>		

Please make checks payable to the Mississippi Geological Society. If you have any questions, contact Maurice Birdwell at (601) 936-6939 or mnbirdwell@comcast.net



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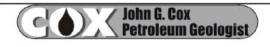
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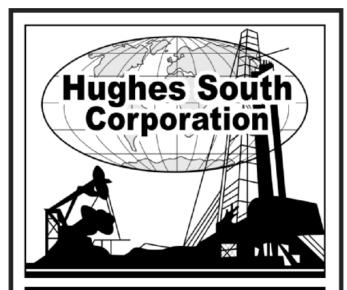
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#### I. Meade Hufford, CPL

Owner-President

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The MGS gratefully acknowledges this years contributors to the L. F. Boland Scholarship Fund for the 2009-2010 year.

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