



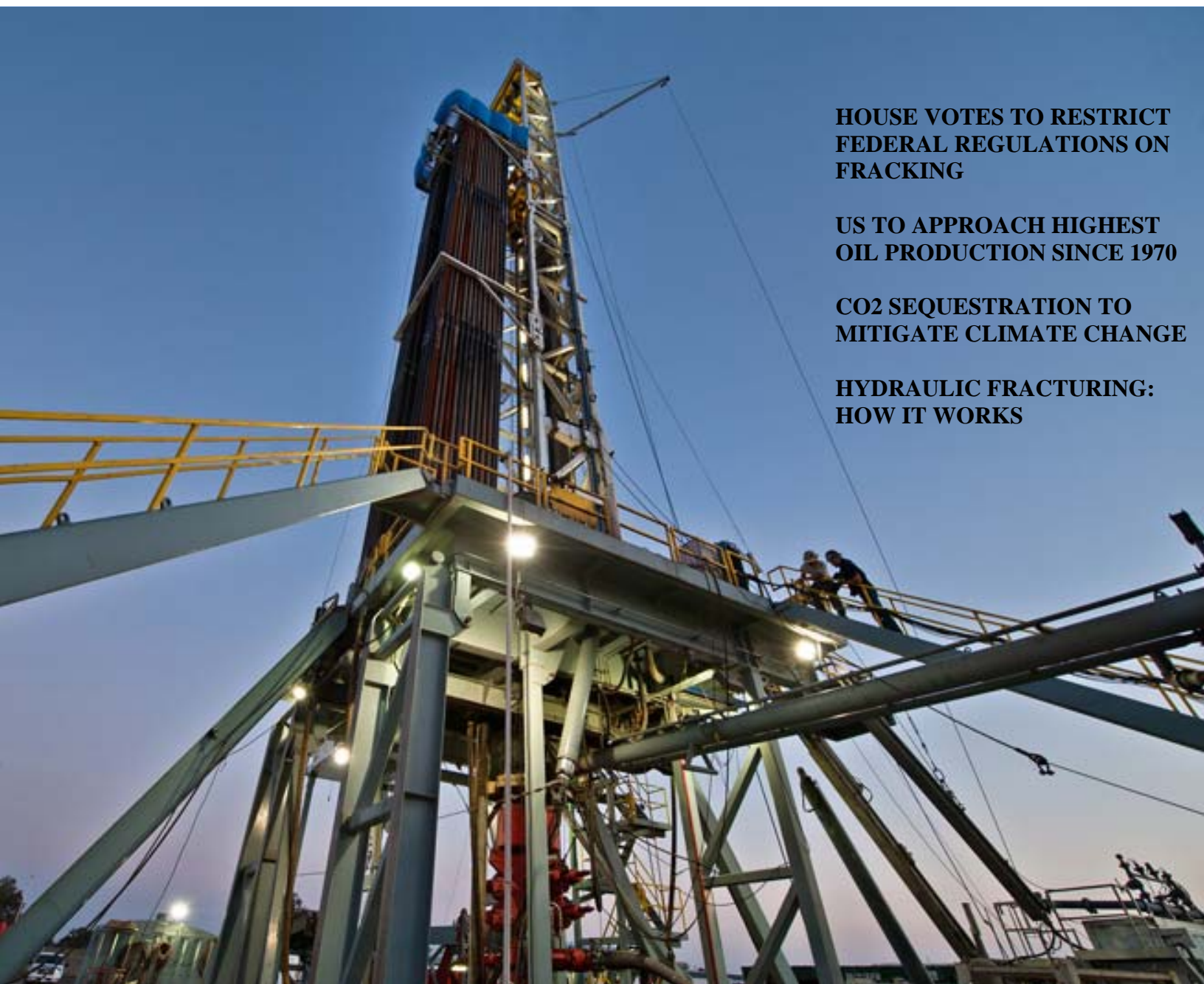
# *e***BULLETIN**

## **MISSISSIPPI GEOLOGICAL SOCIETY**

**Volume 62**

**No. 4**

**December 2013**



**HOUSE VOTES TO RESTRICT  
FEDERAL REGULATIONS ON  
FRACKING**

**US TO APPROACH HIGHEST  
OIL PRODUCTION SINCE 1970**

**CO<sub>2</sub> SEQUESTRATION TO  
MITIGATE CLIMATE CHANGE**

**HYDRAULIC FRACTURING:  
HOW IT WORKS**

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<b>AAPG</b>	Maurice Birdwell	Independent	(601) 936-6939
<b>GCAGS</b>	Danny Harrelson	U.S. Army R&D	(601) 634-2685

## *Other*

<b>Environmental</b>	Ken Ruckstuhl	Environmental Mgt.	(601) 992-8233
<b>Historian</b>	Stanley King	Independent	(601) 842-3539



# PRESIDENT'S LETTER

Greetings and Merry Christmas!

I hope this finds you enjoying or preparing to enjoy some quality time with family. May you and yours realize a blessed Christmas season! During this family oriented time of year be mindful of those for whom the lack of family for whatever reason brings longing or heartache. Be especially mindful of our brave sailors and soldiers away from home, and their families who miss them.

Some business –

Your officers and committee leaders continue to have productive monthly meetings considering new or improved events or activities. We are discussing how to make the Bulletin and Website deliver great value to members. A recurring theme to accomplish this is content, content, content. Matt and Steve reiterate that they can certainly put value-laden articles in their respective publications but they need to receive CONTENT! I will commit to provide something for the next Bulletin. Will you?

We discussed the forum for future Red Book updates. We are considering publishing updates in the Bulletin and making them available on the Website? (A reminder – we have sign an agreement with AAPG Datapages to make all our publications available through their website. We need your help finding out of print volumes to submit for scanning and publication.)

Maurice Birdwell and Rick Ericson are our AAPG House of Delegate Representatives. They are invited to the leaders meetings but could not attend the recent one. Maurice was kind enough to send some thoughts about how MGS could be better represented in the AAPG organization. More to come I am sure.

I pigeon-holed Bob Schneeflock at the last luncheon and he agreed to be the MGS liaison with Millsaps. Thank you, Bob! Now we need someone for USM, Ole Miss, and Jackson State ..... surely some of you are already connected at the hip to these schools and becoming MGS liaison will be very natural.

There is some building excitement with our MSU-MGS relationship led by Natalie Samai-Odegaarden. MSU AAPG Student Chapter Vice-President Ryan Travis joined us for our meeting. MSU students are entered into AAPG's Imperial Barrel Award competition. The department is getting licenses to Petra and Kingdom to support this effort and for general education purposes. (How about matching mentors with grad students and letting the pair work on field studies for Red Book updates? Any volunteers?) We look forward to seeing Bulldogs learn more about the oil and gas industry.

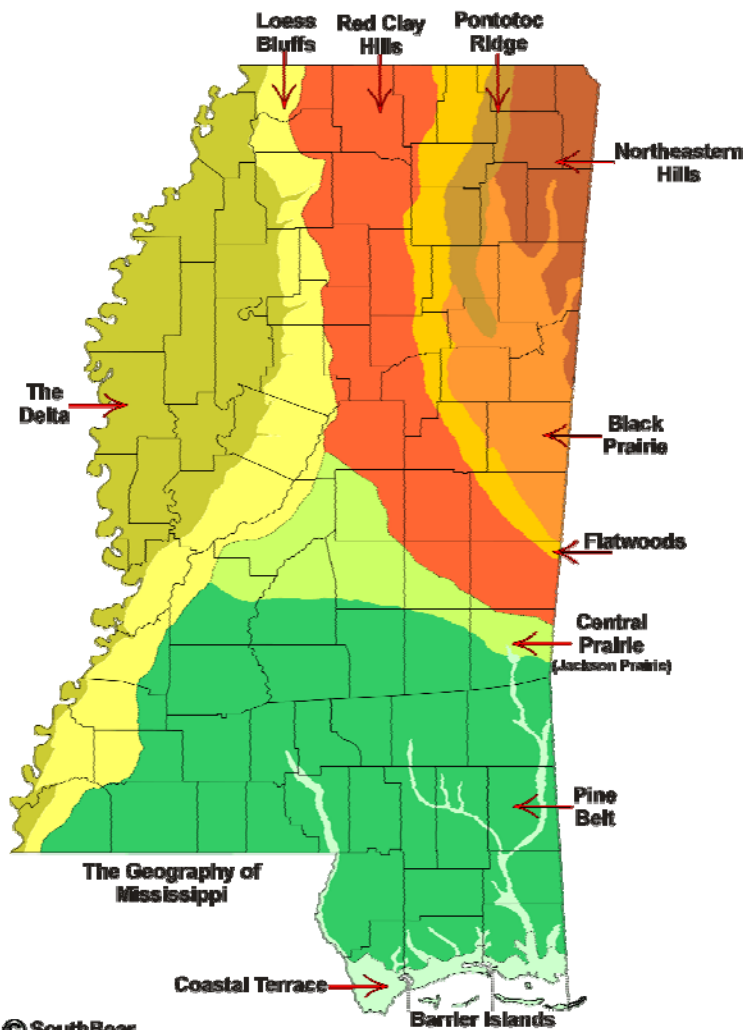
Can't we find some Golden Eagles, Rebels and Tigers to work with too? (Bob will help us get a bead on some Majors.)

Enough for now, again, I wish you all the merriest of Christmases. As the old ad used to say - remember to keep Christ in your Christmas!

Neil

# 2013-2014 MGS MEETING SCHEDULE

When	What/Who	Where
September 12, 2013	Fall BBQ	Jackson Yacht Club-5:30pm
October 10, 2013	Steve Craft Recent Activity: Smackover South Alabama	River Hills – 11:30am
November 22, 2013	MSOGB	River Hills – 11:30am
December 14, 2013	MAPL Christmas Party and Dance	Duling Hall, Fondren District 7:00pm
January 9, 2014	TBD	River Hills – 11:30am
February 13, 2014	TBD	River Hills – 11:30am
March 13, 2014	TBD	River Hills – 11:30am
April 10, 2014	Boland Scholarship Awards	River Hills – 11:30am
May 8, 2014	Spring Fling	Jackson Yacht Club– 5:30pm



## OFFICERS MEETINGS

August 4, 2013

September 10, 2013

October 8, 2013

November 20, 2013

December 12, 2013

January 7, 2014

February 11, 2014

March 11, 2014

April 8, 2014

May 6, 2014



Happy Holidays!

Santa's sleigh has arrived packed with the gift of free publicity!

AAPG values our relationship with you! Because of this we want to make your website and events visible to AAPG members and website visitors, by adding you to the AAPG Website!

Simply send us your society name (or name of a specific upcoming event), logo, and a link to your website (the main portal page, or a page within the site). People who visit our site will have a direct link to the web pages you'd like them to visit.

In return, we ask that you list our events on your calendar or website and include a link to the specific event as listed below.

**Playmaker Forum**

**23 January 2014 // Houston, Texas**

**<http://www.aapg.org/forum/2014/playmaker/index.cfm>**

**Fifth Annual AAPG-SPE Deepwater Reservoirs Geosciences Technology Workshop**

**28-29 January 2014 // Houston, Texas**

**<http://www.aapg.org/gtw/2014/houston/index.cfm>**

**Mississippian Lime Forum**

**20 February 2014 // Oklahoma City, OK**

**<http://www.aapg.org/forum/2014/MississippianLime/index.cfm>**

**AAPG/STGS Eagle Ford plus Adjacent Plays & Extensions Workshop**

**24-26 February 2014 // San Antonio, Texas**

**<http://www.aapg.org/gtw/2014/eagleford/index.cfm>**

To receive your gift, simply complete the following easy steps:

1. Email Grant Smith -- [gsmith@aapg.org](mailto:gsmith@aapg.org), and include your logo, link, and what you'd like the link to say (your society's name? an upcoming event?).
2. Tell us where you're posting the AAPG events (calendar? website?) by emailing us a link.

Thank you for participating in this partnership designed for big results!

Sincerely,

AAPG Education

American Association of Petroleum Geologists  
P. O. Box 979



# NEWS

## House votes to restrict federal regulation of fracking

WASHINGTON, DC, Nov. 21

11/21/2013

By Nick Snow

OGJ Washington Editor

The **US House** of Representatives approved legislation largely along party lines to keep the US Bureau of Land Management from imposing its own **hydraulic fracturing** regulations in states that already have their own requirements.

**HR 2728** passed by 235 to 187 votes, following heated debate. Democrats charged it would keep drinking water supplies from being adequately protected and not let the federal government enforce existing regulations. Republicans argued it would help unconventional oil and gas production continue to grow safely without excessive, duplicative rules.

“States have successfully, efficiently, and safely been regulating this process for the past 60 years and imposing a ‘one-size-fits-all’ federal regulatory structure, as the Obama administration is attempting to do, is both unnecessary and simply will not work,” Natural Resources Committee Chairman Doc Hastings (R-Wash.) said following the Nov. 20 vote.

But the committee’s ranking minority member, Peter A. DeFazio (D-Ore.), said the measure would strip federal agencies’ authority to enforce nearly every public health, safety, and environmental protection related to **oil and gas drilling** and its impacts.

States’ regulations vary tremendously, he continued. “Some require comprehensive pressure testing of the casing, which is essential. Some don’t. Some require producers contain the fluids which come back up. Others allow them to be stored in open, unlined pits,” DeFazio said.

### **EPA study provision**

The final bill, which initially was cosponsored by two committee members from Texas, Republican Bill Flores and Democrat Henry Cuellar, incorporated provisions from another measure, **HR 2850**, which House Science, Space, and Technology Committee Chairman LaMar Smith (R-Tex.) introduced on July 30.

Consequently, the House also approved a provision directing the US Environmental Protection Agency to submit the fracking study it has been conducting for 3 years at Congress’s request to additional scientific analysis before completing it by Sept. 30, 2016 when it passed HR 2728.

“In its zeal to regulate, EPA has rushed to link water contamination to hydraulic fracturing,” Smith said during the Nov. 20 floor debate. “It has made this claim in three high-profile cases, only to be forced to retract its statements after the facts have come out. EPA’s track record does not instill confidence in [its] ongoing studies of the relationship between hydraulic fracturing and drinking water.”

But committee member Suzanne Bonamici (D-Ore.), who led the opposition debate, said EPA’s Science Advisory Board fully reviewed the proposed study and determined that it was generally appropriate and comprehensive. It also recommended that the study consider some risks, but warned that a full risk assessment could add 5-7 years to the process, she added.

“The proponents of this legislation mischaracterize EPA’s study plan as flawed for failing to include a comprehensive risk assessment,” Bonamici said. “That position is not consistent with the conclusions of the highly qualified scientists, researchers, and industry representatives who are members of the EPA’s Independent Science Advisory Board, and importantly, Title II could delay the release of this very important study.”



# NEWS

## Earlier bills

HR 2728 was considered immediately after the House passed another bill, **HR 1965**, by 228 to 192 votes which was aimed at reforming other Obama administration oil and gas policies.

“In recent years we have seen a boom in energy jobs and economic growth on state and private lands,” said Rep. Doug Lamborn (R-Colo.), who chairs the Natural Resource Committee’s Energy and Power Subcommittee and introduced the original bill in May. “I believe the only reason we haven’t seen that same dynamic growth on federal lands is because of excess regulations. My bill would reduce the federal red tape and frivolous lawsuits that act as stumbling blocks to job creation and energy development.”

The measure the House approved incorporated four more bills, adding provisions that would require the Secretary of the Interior to develop a federal onshore energy production strategy every 4 years, nullify the Obama administration’s February 2013 plan for managing the National Petroleum Reserve-Alaska, give the Interior secretary authority to conduct Internet-based auctions for onshore federal leases, and encourage more Indian tribal energy resource development by blocking any federal fracing requirement unless Indian landowners consent to it.

The House also agreed to consider **HR 1900** when it reconvened on Nov. 21. Rep. Mike Pompeo (R-Kan.) introduced the original bill on May 9. It would amend the Natural Gas Act by requiring the Federal Energy Regulatory Commission issue a decision on a proposed **natural gas pipeline** within 12 months of receiving a completed application. The House passed the measure by 252 to 165 votes on Nov. 21.

Prospects for any of the approved bills becoming law looked dim. The US Senate appears unlikely to consider them. US Sen. Orrin G. Hatch (R-Utah) introduced a companion bill to HR 2728 on Nov. 20, but the White House has said it would veto the measure aimed at limiting new federal **fracing** regulations.

Passage of HR 2728 nevertheless drew cheers from oil and gas industry and other groups.

“This legislation safeguards oil and gas development on federal lands by empowering states to regulate energy development, as they have been doing safely and responsibly,” observed Independent Petroleum Association of American Pres. Barry Russell.

“The long history of effective state regulation demonstrates that a one-size-fits-all federal requirement is unnecessary and will not increase environmental protection,” he said. Russell also applauded passage of the provisions from HR 2850 dealing with EPA’s fracing study.

Erik Milito, the American Petroleum Institute’s upstream and industry operations director, said, “Hydraulic fracturing and horizontal drilling are safe, proven technologies that have allowed the US to outpace Russia as the world’s number one producer of oil and natural gas.

“Hydraulic fracturing’s 60-year track record of safety—achieved under the stewardship of state regulators—has been recognized by both current and former Obama administration officials, and this legislation will preserve state leadership against unnecessary or duplicative federal regulations,” Milito added.

Christopher Guith, vice-president of policy at the US Chamber of Commerce’s Institute for 21<sup>st</sup> Century Energy, said, “Today’s vote in the House sends a strong signal against federal government interference in America’s most promising economic opportunity: energy development. We appreciate the support of a bipartisan majority of House members and look forward to working with Congress to ensure a policy framework that will allow our nation to take full advantage of our energy opportunities.”

Contact Nick Snow at [nicks@pennwell.com](mailto:nicks@pennwell.com).



# NEWS

## *HIGHEST OIL PRODUCTION SINCE 1970*

HOUSTON,

12/16/2013

By OGJ Editors

US crude [oil production](#) is expected to approach the historical high achieved in 1970 of 9.6 million b/d through 2016, the US Energy Information Administration said in an early release of its [Annual Energy Outlook 2014](#).

However, crude oil production is expected to level off and then slowly decline after 2020 while [natural gas production](#) grows steadily, showing a 56% increase from 2012-40 when gas production reaches 37.6 tcf.

EIA projects low gas prices will enable gas-fired electric power generation to overtake generation formerly supplied by coal and nuclear plants in some areas, with gas accounting for 35% of total power generation while coal accounting for 32%.

US exports of gas via pipeline and as LNG are expected to increase to 3.5 tcf in 2029 and remain at that level through 2040, EIA said.

Increased production of oil and gas will enable the US to sharply reduce its use of imported fuels. Net use of imported energy sources, previously 30% in 2005, is expected to decline to 4% of total consumption in 2040 from 16% in 2012.

The jump in crude production will shrink the import share of petroleum and other liquids supply to 25%, EIA said.

“America is in the midst of a game-changing energy revolution,” stated John Felmy, chief economist at the American Petroleum Institute. He added, “This potential has been unlocked by innovations in [hydraulic fracturing](#) and [horizontal drilling](#) that have made America the world’s top energy producer.”

EIA in March reported US monthly crude oil production was expected to exceed the amount of crude oil imports later in 2013 for the first time since February 1995, largely attributing it to production in shale and other tight rock formations in North Dakota and Texas ([OGJ Online, Mar. 20, 2013](#)).

“The EIA report confirms that the United States really is experiencing an energy revolution,” said Daniel Yergin, vice-chairman of IHS.

He said, “Once again, a combination of price, technology, and new areas has pushed away fears of shortage. And it’s not over. Technologies will continue to advance capabilities and widen opportunities. This also underlines even more the question of when and how this revolution goes global.”

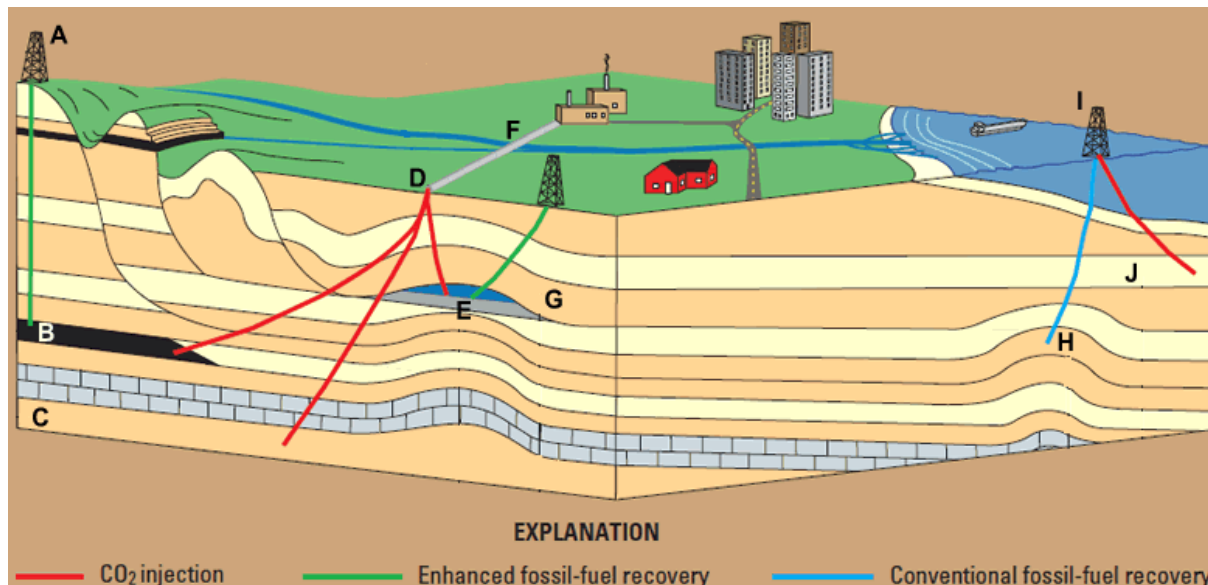
Yergin added, “Around the world—from China to the Middle East to Europe to Mexico—this surge from the United States has become a top focus of energy discussion and also a new factor in geopolitics.”





# GEOLOGY POST

## *CO<sub>2</sub> Sequestration to Mitigate Climate Change*



### Models of Carbon Sequestration

-- **A:** Coalbed methane production. **B:** Deep coal seam. **C:** Formation containing saline water. **D:** Injection of CO<sub>2</sub> into geologic reservoirs. **E:** Depleted hydrocarbon reservoir. **F:** Pipeline transporting CO<sub>2</sub> from power plants to injection site. **G:** Reservoir trap/seal. **H:** Natural-gas reservoir. **I:** Offshore natural gas production with CO<sub>2</sub> separation and sequestration. **J:** Formation containing saline water.

### Background

Human activities, especially the burning of fossil fuels such as coal, oil, and gas, have caused a substantial increase in the concentration of carbon dioxide (CO<sub>2</sub>) in the atmosphere. This increase in atmospheric CO<sub>2</sub> (from about 280 to more than 380 parts per million (ppm) over the last 250 years) is causing measurable global warming. Potential adverse impacts include sea-level rise; increased frequency and intensity of wildfires, floods, droughts, and tropical storms; changes in the amount, timing, and distribution of rain, snow, and runoff; and disturbance of coastal marine and other ecosystems.

Rising atmospheric CO<sub>2</sub> is also increasing the absorption of CO<sub>2</sub> by seawater, causing the ocean to become more acidic, with potentially disruptive effects on marine plankton and coral reefs. Technically and economically feasible strategies are needed to mitigate the consequences of increased atmospheric CO<sub>2</sub>. The United States needs scientific information to develop ways to reduce human-caused CO<sub>2</sub> emissions and to remove CO<sub>2</sub> from the atmosphere.

### What Is Carbon Sequestration?

The term "carbon sequestration" is used to describe both natural and deliberate processes by which CO<sub>2</sub> is either removed from the atmosphere or diverted from emission sources and stored in the ocean, terrestrial environments (vegetation, soils, and sediments), and geologic formations. Before human-caused CO<sub>2</sub> emissions began, the natural processes that make up the global "carbon cycle" (Figure 1) maintained a near balance between the uptake of CO<sub>2</sub> and its release back to the atmosphere. However, existing CO<sub>2</sub> uptake mechanisms (sometimes called CO<sub>2</sub> or carbon "sinks") are insufficient to offset the accelerating pace of emissions related to human activities.

### How Big is the Problem?

Annual carbon emissions from burning fossil fuels in the United States are about 1.6 gigatons (billion metric tons), whereas annual uptake amounts are only about 0.5 gigatons, resulting in a net release of about 1.1 gigatons per year (Figure 2). Controlling atmospheric CO<sub>2</sub> will require deliberate mitigation with an approach that combines reducing emissions and increasing storage.

Scientists at the U.S. Geological Survey (USGS) and elsewhere are working to assess both the potential capacities and the potential limitations of the various forms of carbon sequestration and to evaluate their geologic, hydrologic, and ecological consequences. The USGS is providing information needed by decision makers and resource managers to maximize carbon storage while minimizing undesirable impacts on humans and their physical and biological environment.



# GEOLOGY POST

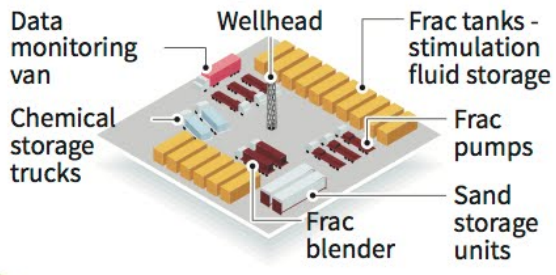
## Hydraulic Fracturing

### Hydraulic fracturing - how it works

**THE PROCESS**

Hydraulic fracturing, commonly known as fracking, is the creation of fractures in rock formations in the earth using pressurised fluid, generally for the purpose of extracting natural gas

**Common Fracturing Equipment**

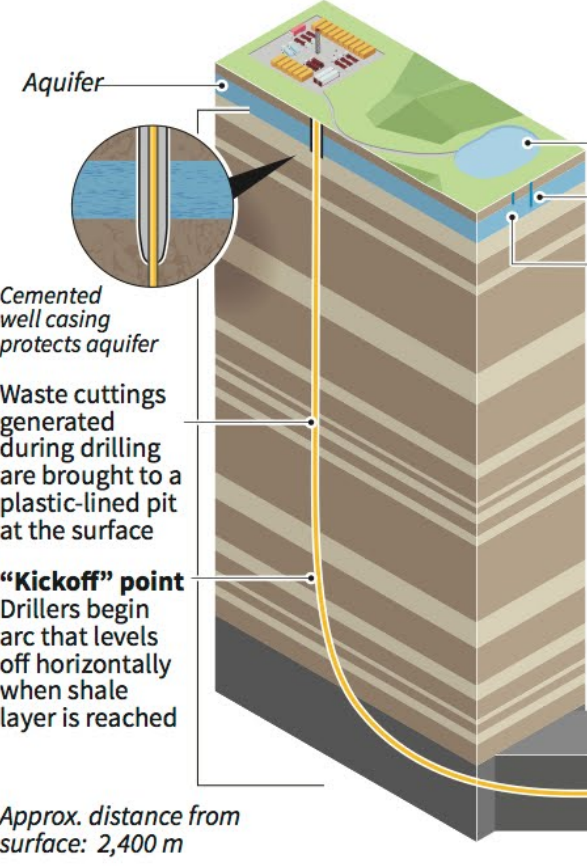
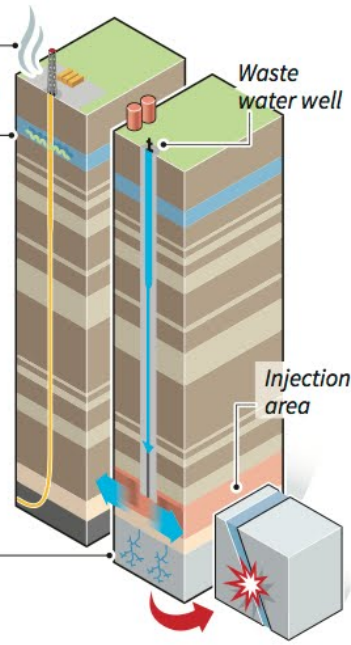


**RISKS**

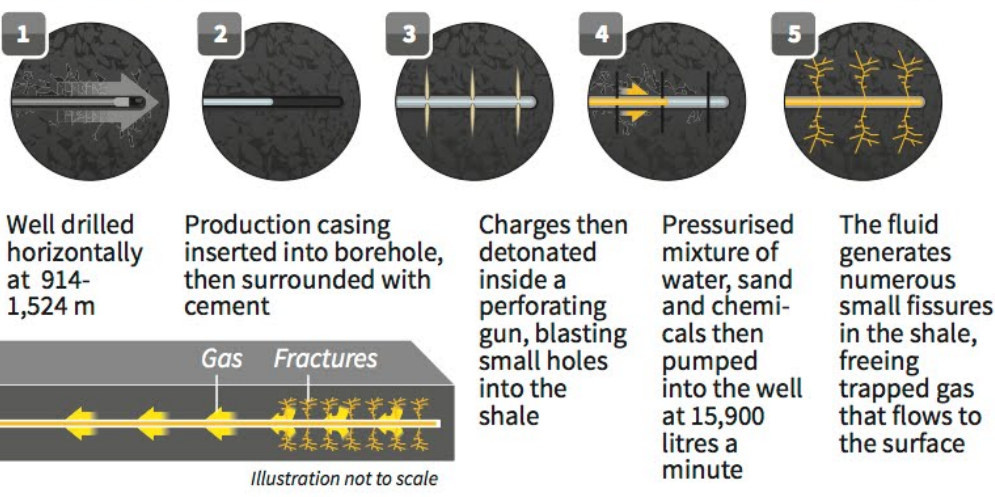
**Air emissions**  
Methane gas associated with natural gas extraction can leak into air

**Drinking water**  
Chemicals used in fracking process have the potential to contaminate aquifers

**Earthquakes**  
The disposal of waste fluid from the fracking process is cited as a cause of earth-quakes. Disposed fluids migrate below the injection area, destabilising the natural fractures in the rock formation



**Horizontal Drilling**



Sources: National Geographic, Chesapeake Energy, EIA., USGS



# GEOLOGY POST

## ARTICLES, PAPERS or NEWS?

**ATTENTION!!!!!!** Industry, Professors and Students:

I would like to add more content from the industry and our schools.

Submissions can include anything from professional papers, thesis abstracts, job opportunities to pictures. Anything!!!!

If you have any information or news you would like to share with the Society **PLEASE** email them to the MGS Editor at:

[mcaton@tellusoperating.com](mailto:mcaton@tellusoperating.com)

Thanks,

Matt Caton  
Editor



# CURRENT PRICES

**NYMEX Crude Oil Futures  
Close ( Front Month )**



Dec. 3, 2012 - Dec. 13, 2013

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**NYMEX Natural Gas Futures  
Close (Front Month)**



Dec. 3, 2012 - Dec. 13, 2013

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— Close





# GRADUATE STUDENTS

The following is a preliminary list of current graduate students and their thesis work. I would encourage you to offer your knowledge and expertise and help our future geologists gain the experience they need as they move forward in their careers.

Name: David Luke Thompson

Email: [dlt168@msstate.edu](mailto:dlt168@msstate.edu)

Phone: 601-750-5497

Career Goal: mining industries and/or economic geology industries

Thesis Title: "Stratigraphy, Environments of Deposition, and Mineralogical Characterization of Heavy Minerals from Selected Cretaceous Formations of the Northern Mississippi Embayment"

Name: Ryan Travis

Email: [rtravis1123@gmail.com](mailto:rtravis1123@gmail.com) and [rwt85@msstate.edu](mailto:rwt85@msstate.edu)

Phone: [214-796-2443](tel:214-796-2443)

Career Goal: Hydrocarbon Industry

Thesis Title: Void Collapse as Related to Dissolution Megaporosity.

I am developing new collapse equations, based off of Loucks' (1999) Cave Collapse Model, to better understand and model paleokarst reservoirs.

I am also working on an ongoing research project with Dr. Jon Sumrall utilizing petrographic and geochemical tools to understand the diagenetic history of a paleosol collapse breccia on Aruba.

Name: Michael Brooke

Phone: 601-594-6309

Email: [jmb374@msstate.edu](mailto:jmb374@msstate.edu)

Thesis Title: A Sequence Stratigraphy of the Haynesville/ Bossier interval in Jefferson County, MS using SEM analysis. Interested in someone who has worked in the newer shale plays. Also information about the Burkley-Phillips #1 well will be greatly appreciated.

Name: Natalie Odegaarden

Phone: 601-826-3903

Email: [nao23@msstate.edu](mailto:nao23@msstate.edu) and [napsamai@yahoo.com](mailto:napsamai@yahoo.com)

I would like to focus my thesis on the Smackover Formation in the Jay Field. I need help locating a core and logs in order to perform correlation, sequence stratigraphy, depositional environment and thin section analysis to name a few.

Name: Claire E. Babineaux

Email: [ceb445@msstate.edu](mailto:ceb445@msstate.edu) and [clairegeobx@gmail.com](mailto:clairegeobx@gmail.com)

Thesis Title: Glass cullet as an alternative aggregate for beaches: an ecological compatibility and public opinion survey. Area of research: Coastal processes-- The research I do focuses on the ecological compatibility of glass cullet to natural beach sand. I will simulate a natural beach environment and determine what grows naturally on sand. Then I will simulate a beach environment in which the composition is 100% glass cullet and determine what will grow naturally on the glass cullet as compared to natural sand. During this process, I will also be monitoring how coastal grasses and native biota within each of the simulated environments in order to determine whether it is affected. Sample will be taken and analyzed using microscopes and SEM. I will also be doing a public opinion survey to determine whether the general public will accept glass on the beaches in areas in which they live or visit in Mississippi.

Name: Courtney Killian

Email: [ck695@msstate.edu](mailto:ck695@msstate.edu)

Phone: 724-549-3544

My thesis will be geared towards hydrology, groundwater and surface water interactions.



# BOLAND SCHOLARSHIP WATCH

Faculty & Students,

This is a new year and the Mississippi Geological Society along with the Boland Scholarship Fund would like to remind you that we want to honor the most outstanding overall students for the 2013-2014 year.

Each year, the Boland Scholarship awards 1 student from each institution a check that rewards students for their hard work and dedication to the Geosciences and their community.

We look forward to a great year and hope to see you at our monthly meetings.

Best Regards,

Matt Caton  
Editor



THE UNIVERSITY OF  
SOUTHERN  
MISSISSIPPI

MILLSAPS  
COLLEGE



# BOLAND SCHOLARSHIP DONATIONS

Many thanks to the following people for there generous donations to the Boland Scholarship Fund

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Randy Bissell	Paul D Cate
Maurice Birdwell	Moon & Hines, LLC
Keith Gourgues	Joseph McDuff
Joseph McDuff	Steven & Chelsea Bennett
Jim Michael	DENMISS, LLC
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If you would like to make a donation please see Bill Bagnall at the monthly meeting or you can mail to the following address:

Mississippi Geological Society  
PO Box 422  
Jackson, MS 39205

# GEO LINK POST

**USGS TAPESTRY OF TIME AND TERRAIN** <http://tapestry.usgs.gov> The CCGS is donating to all of the 5th and 6th grade schools in the Coastal Bend. Check it out—it is a spectacular map. You might want a framed one for your own office. The one in my office has glass and a metal frame, and it cost \$400 and it does not look as good as the ones we are giving to the schools. Call Owen 510-6224 if you want one for your office for \$150. Duncan, Mike, Chris, Dave, Bob Randy, Seb., Kevin, Ken, Craig, Patrick, Robert.

**FREE TEXAS TOPO'S** <http://www.tnris.state.tx.us/digital.htm> these are TIFF files from your state government that can be downloaded and printed. You can add them to SMT by converting them first in Globalmapper. Other digital data as well.

**FREE NATIONAL TOPO'S** [http://store.usgs.gov/b2c\\_usgs/b2c/start/\(xcm=r3standardpitrex\\_prd\)/.do](http://store.usgs.gov/b2c_usgs/b2c/start/(xcm=r3standardpitrex_prd)/.do) go to this webpage and look on the extreme right side to the box titled TOPO MAPS DOWNLOAD TOPO MAPS FREE.

<http://www.geographynetwork.com/> Go here and try their top 5 map services. My favorite is 'USGS Elevation Date.' Zoom in on your favorite places and see great shaded relief images. One of my favorites is the Great Sand Dunes National Park in south central Colorado. Nice Dunes.

<http://antwrp.gsfc.nasa.gov/apod/astropix.html> Astronomy picture of the day — awesome. I click this page everyday.

<http://www.spacimaging.com/gallery/ioweek/iow.htm> Amazing satellite images. Check out the gallery.

<http://www.ngdc.noaa.gov/seg/topo/globegal.shtml> More great maps to share with kids and students.

[www.geo.org](http://www.geo.org) Don't forget we have our own web page.

<http://micro.magneet.fsu.edu/primer/java/scienceoptiscu/owersof10/>

<http://asterweb.jpl.nasa.gov/gallery/default.htm> Great satellite images of volcanoes

<http://terra.nasa.gov/gallery/> More here

[www.ermapper.com](http://www.ermapper.com) They have a great free downloadable viewer for TIFF and other graphic files called ER Viewer.

[www.drillinginfo.com](http://www.drillinginfo.com) This is an incredible (subscription) well and completion data service for independents. Can be demo'ed for free.

<http://terrasrver.com/> Go here to download free aerial photo images that can be plotted under your digital land and well data. Images down to 1 meter resolution, searchable by Lat Long coordinate. Useful for resolving well location questions.

<http://www.fs.fed.us/gpnl/volcanocams/msh/> This is a live cam of Mt. St. Helens refreshed every 5 minutes. At the bottom are old videos of past eruptions in this cycle. It is worth a watch especially now.





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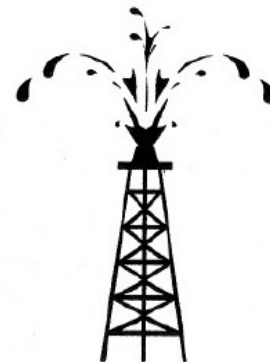
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