

# NOGS LOG

JANUARY 2015

Volume 55, Number 7



**JANUARY 8 - SGS/NOGS LUNCHEON**

**Presentation: A Tour of Abrupt Margin Prospectivity Around the African Margin  
and Major Challenges of the Abrupt Margin Play**

**Guest Speaker: John R. Dribus**

**Schlumberger Oil Field Services • New Orleans, Louisiana**



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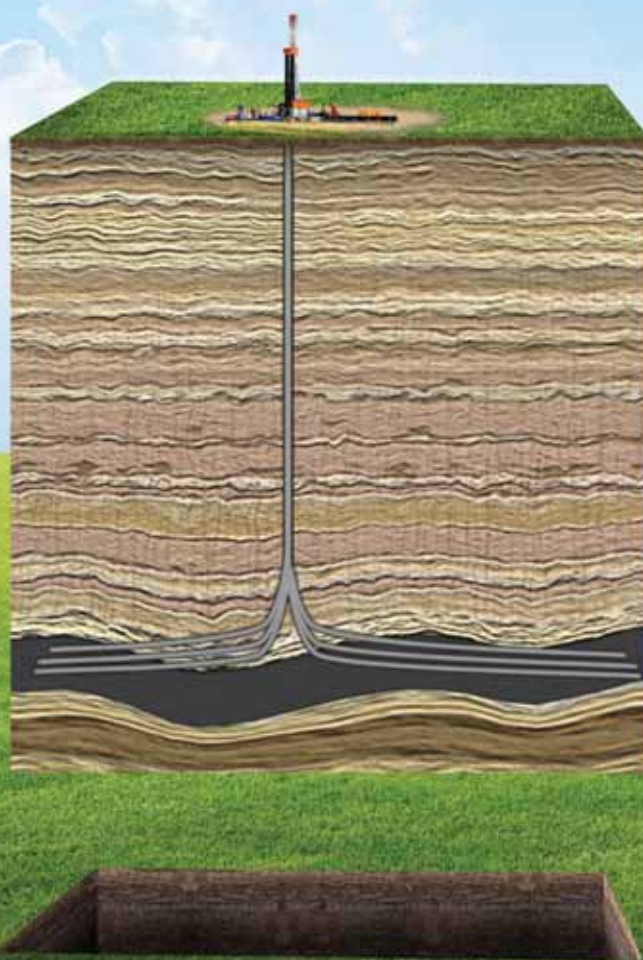
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Published monthly by the New Orleans Geological Society.  
This issue was sent to press on December 26, 2014.

**Interested in contributing to the NOGS LOG?** Please submit items by the 1st Friday of the month to [nogseditor@gmail.com](mailto:nogseditor@gmail.com). Advertising requests should contact the NOGS office at [info@nogs.org](mailto:info@nogs.org).

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## on the cover

### Cover Photo Submitted by Bill and Carolyn Haworth

#### Rundle Mountain — Banff National Park, Alberta, Canada

Thrust-faulted Devonian and Mississippian carbonates. The picture was taken in the summer of 2010 looking southeast from Sulphur Mountain (Elev. 2283 m; 7490') near the town of Banff.

Sulphur Mountain can be accessed via a gondola located across the river from the town of Banff. One can also hike to the top. The mountain is named for sulphuric hot springs found near the base of the mountain. A boardwalk at the top of the mountain links the visitor center at the end of the gondola with the site of a weather observatory built in 1903. The observatory building still stands today and visitors can peer through the windows and still see some of the furnishings and historical artifacts. Spectacular views of the surrounding mountains, the town of Banff, and the Bow Valley can be seen from Sulphur Mountain.

Sulphur Mountain was also the site of the Sulphur Mountain Cosmic Ray Station, a national historic site of Canada. This station was constructed for the International Geophysical Year (1957-58), which focused on increasing the understanding of atmospheric properties in polar regions. The station ceased operations in 1978.



*Bill and daughter Carolyn along the boardwalk at the crest of Sulphur Mountain on a cold June afternoon. The town of Banff is visible in the background.*

# From the Editor



Happy New Year! This next year will surely bring change as we begin with much lower prices per barrel than we did in 2014. Showcased in our photo spread, we have lots of great pictures of the fun times had at the Christmas Holiday Party in early December. As your year begins, please continue to submit items for the *NOGS LOG*. We also enjoy new ideas and images from our members, such as the cover photo and story submitted by Bill Haworth. Looking forward to a new year!

All the best,

*Jana L. Prouhet* - **NOGS LOG Editor**



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## From the President

Happy New Year!! The New Year brings about reminiscing on events from the previous year, creating resolutions or goals, and getting a fresh start. For NOGS this past year, we hosted and co-hosted many quality presentations at our luncheons, supported STEM and other educational and outreach activities, co-hosted the 18th Annual Deepwater Technical Symposium, attended and/or presented at other societal conferences, actively participated in other geo-related societies, hosted our annual golf tournament with proceeds going

to our Bill Craig Fund, awarded student scholarships from the Memorial Foundation, pledged to support area Children Museum initiatives, started to re-invigorate our committees and member participation, and managed to make time for some fabulous social events.

If you ever wondered what our organization does and provides to the society and our community, hopefully the 2014 highlight above gave you glimpse of the wonderful opportunities and activities that involves NOGS. Being a member of NOGS is more than an item to put on your resume or LinkedIn profile, it is an organization to be truly proud of knowing the emphasis we place on our geoscience field in the professional and educational aspect.

NOGS closed out the 2014 year with our annual Christmas Holiday Party hosted at the Metairie Country Club. It was a lovely evening of socializing, feasting, dancing, and celebrating. The venue was gorgeous and the staff was pleasant and attentive. NOGS would like to give a special thanks Jim and Camille Yeldell for sponsoring our party at the MCC, NOGA (especially Mary Walther) for helping us get organized with everything from the menu to the dance floor, the students who took time out of their "finals" schedule to come enjoy the festivities, and everyone who attended to make the evening perfect. Thank you also to Bill Whiting for making sure our students could enjoy the party and thanks to Annette Hudson for dealing with my spur-of-the-moment requests and remembering those small details that can make or break an event. Our evening couldn't have happened without the help from all!

If reading about the events and happenings that took place this past year make you sad that you missed them, don't worry...it's a new year with new opportunities!



## NOGS Office

Office Manager: Annette Hudson

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The office is located at 810 Union Street, Suite 300, New Orleans, LA 70112.

Correspondence and all luncheon reservations should be sent to the above address.



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Treasurer	Judy Lemarié	504-393-8659	Judy Sabaté	2014-16	504-861-3179
Parliamentarian	Alma Dunlap	504-737-2678			
Member-at-Large	Jean Jones	504-738-8091			



# UPCOMING Events & Activities



## January 8 • SGS/NOGS Luncheon

**Le Pavillon Hotel**

833 Poydras Street • New Orleans, LA 70112 • 504-581-3111

### Presentation:

***A Tour of Abrupt Margin Prospectivity Around the African Margin  
and Major Challenges of the Abrupt Margin Play***

### Guest Speaker:

**John R. Dribus**

Schlumberger Oil Field Services • New Orleans, Louisiana

*See page 9 for Abstract and Biography*

### **LE PAVILLON HOTEL**

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front desk for location.

Lunch served at 11:30 am

### **ADMISSION:**

**With reservation..... \$30.00**

**Without reservation..... \$35.00**

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**February 2**  
**NOGS Luncheon**

Holiday Inn Superdome • New Orleans, LA

*For more information, [www.nogs.org](http://www.nogs.org)*

**February 25**  
**NOGA Luncheon**

Chateau Golf and Country Club • Kenner, LA

*For more information, Peggy Rogers (NOGA)*

## NOGS CONTACT LIST

*Continued from previous page*

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2014-2015	Trustee	TBA
2015-2016	Trustee	William M. Whiting
2015-2016	Trustee	David E. Reiter
2016-2017	Trustee	J. David Cope
2016-2017	Trustee	Tom Klekamp

#### AAPG DELEGATES

##### Term Ends

2015	Susan A. Waters
2015	William M. Whiting
2015(a)	David E. Balcer
2015(a)	Earl W. Cumming
2017	Elizabeth McDade
2017(a)	G. Alex Janevski

#### NEW MEMBERS

Joseph P. Frank	Graduate Student
Erica K. Lassen	Student
Matt C. Smith	Geologist
Stephanie E. Welch	Instructor

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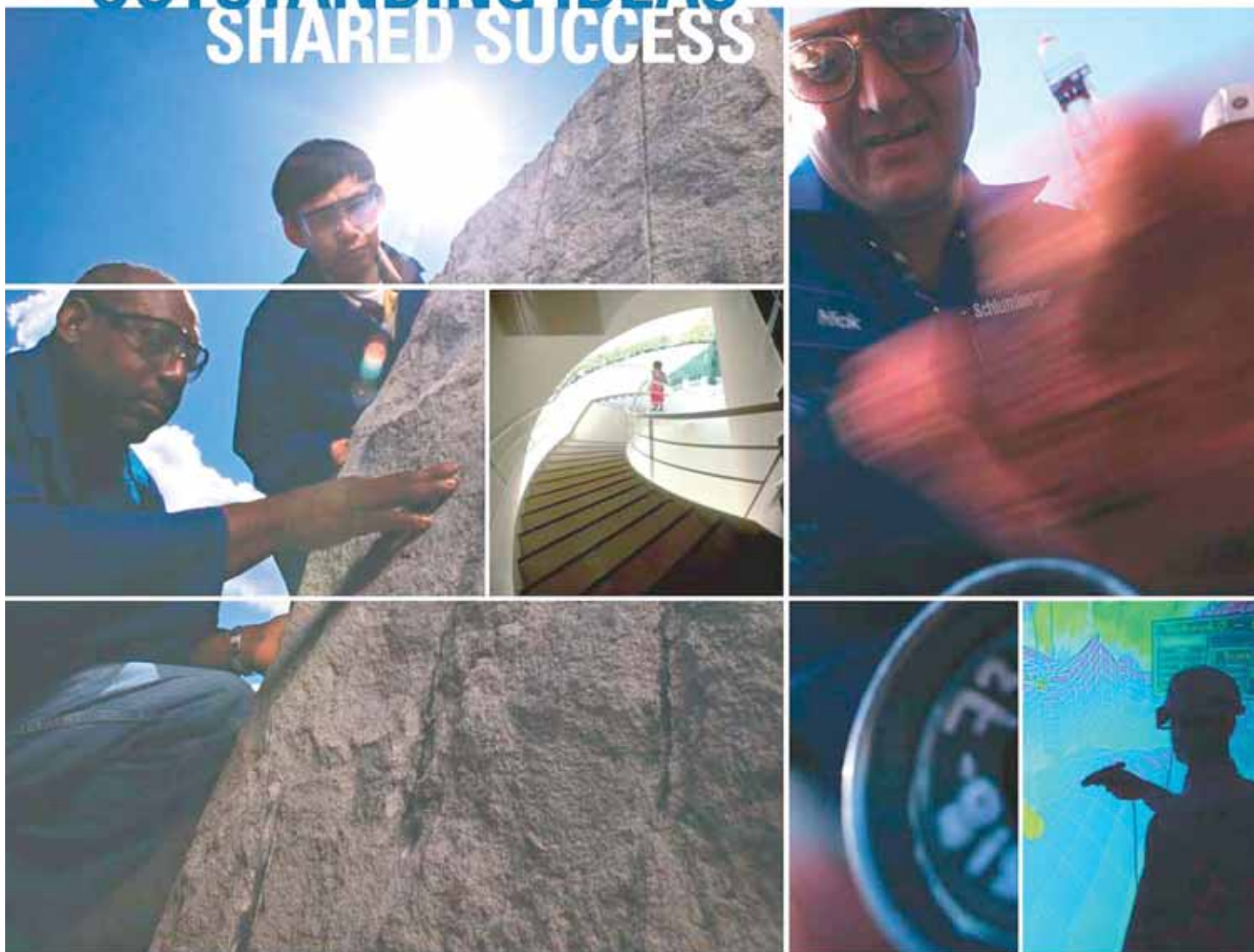
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# Jan. 8 SGS/NOGS Luncheon Presentation

☆☆☆ at Le Pavillon Hotel ☆☆☆



## A Tour of Abrupt Margin Prospectivity Around the African Margin and Major Challenges of the Abrupt Margin Play

*Presented by*

**John R. Dribus**

Schlumberger Oil Field Services  
New Orleans, Louisiana



### ABSTRACT

This talk begins with a review of characteristics of Abrupt Margin turbidites where they were initially identified in the deep water Tano Basin, offshore Ghana in the Jubilee Field and TEN complex. The talk then utilizes multiclient and other seismic data sets to conduct a quick tour of the basin margin turbidite fan potential in the deep waters of Morocco, Senegal, Angola, Namibia, and Mozambique. Throughout the talk, the seismic data are utilized to identify and describe 11 key geologic challenges and risks that remain to be resolved regarding continued exploration of this important new play that is attracting a lot of exploration interest and dollars on both sides of the Atlantic Basin. Key petroleum system issues are discussed, including sufficient overburden and adequate seal, stratigraphic versus structural trapping, migration through turbidite muds to charge the prospect while depending on similar muds as top seals, faults and stratigraphic compartmentalization, importance of adequate sediment influx to the area, and application of seismic amplitude anomalies for prospect risking.

### BIOGRAPHY

**John Dribus** is the Global Geosciences Advisor for Schlumberger Oil Field Services. He is a Reservoir Geologist with over 39 years' experience, and has worked all aspects of petroleum exploration, exploitation, and production geology. He worked for five years as a uranium field geologist, and 20 years for Mobil Oil Corporation as a petroleum geologist, including 14 years working the deep water Gulf of Mexico and subsalt province. He worked the past 14 years for Schlumberger as Northern Gulf of Mexico Operations Manager, and as Global Geologic Advisor working deep water basins in the Gulf of Mexico, Greenland, the Black Sea, the Red Sea, Ghana (Jubilee), Gabon, Angola, and Brazil, with emphasis on sub-salt and pre-salt exploration.

His expertise is in exploration geoscience, petroleum systems analysis, global deep water turbidite analogs and regional geology, exploring in salt basins, and geological risk analysis. He is the former Chairman of the Advisory Board of the American Petroleum Institute (API) Delta Chapter, serves on the Imperial Barrel Award Committee of the American Association of Petroleum Geologists (AAPG). He is a member of the AAPG (30 years), New Orleans Geological Society (NOGS), Houston Geological Society (HGS), Society of Petroleum Engineers (SPE), and European Association of Geoscientists and Engineers (EAGE). In 2013, he was recognized by the Society of Petroleum Engineers with the Eastern North America Region Reservoir Description and Dynamics Award. In 2014, he received the Meritorious Service Award from the American Petroleum Institute (API) Delta Section.

### THE LUNCHEON RESERVATION DEADLINE IS MONDAY, JANUARY 5

Reservations can be made at [e.brennenman@chevron.com](mailto:e.brennenman@chevron.com) • Advance Payment: <http://sgs-neworleans.org/index.html>

### *"And Looking Ahead . . ."*

*The next luncheon will be held on February 2. Our guest speaker, Huiming Bao, Dept. of Geology & Geophysics, LSU, will present "Snowball Earth 3.0." Contact the NOGS office at 561-8980 or use the PayPal link on the NOGS website ([www.nogs.org](http://www.nogs.org)) to make your reservation.*

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## January 2015

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1  New Year's Day	2	3
4	5	6	7	8  Joint Luncheon	9	10
11	12	13	14	15	16	17
18	19  Martin Luther King, Jr. Day	20	21  Board Mtg	22	23	24
25	26	27	28	29	30	31

*January 8:* NOGS Luncheon, Le Pavillon, 833 Poydras @11:30 am (Note Day & Venue Change)  
*Guest Speaker:* John R. Dribus, Schlumberger Oil Field Services  
*Will Present:* A Tour of Abrupt Margin Prospectivity Around the African Margin and Major Challenges of the Abrupt Margin Play

February 2015						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2  Luncheon	3	4	5	6	7
8	9	10	11	12	13	14  Valentine's Day
15	16	17 	18  Board Mtg	19	20	21
22	23	24	25	26	27	28

*February 2:* NOGS Luncheon, Holiday Inn Superdome, 330 Loyola Ave. @11:30 am  
*Guest Speaker:* Dr. Huiming Bao, Professor, Department of Geology & Geophysics, LSU  
*Will Present:* Snowball Earth 3.0



# New Orleans Geological Auxiliary News

*"The objective of the Auxiliary is to promote fellowship among the wives of the members of the New Orleans Geological Society and to render assistance to NOGS upon request."*



## Celebrating 60 Years!



The Auxiliary was so excited to rate the centerfold in the December *NOGS LOG*. Our 60th Anniversary luncheon at Ralph's on the Park was an exciting day, and we were pleased to have an opportunity to show off so many of our ladies and their guests. Thanks to *NOGS LOG* editor, Tavia Prouhet, and graphic designer, Kristee Brown, for our great centerfold spread.

The Auxiliary was proud to honor charter members Carol Andrews, Mary Lou Main, Mary Collier, Ruth Bussey and Peggy Campbell. There were 16 past presidents on hand to receive white roses and pose on the lovely balcony of Ralph's On The Park.

At the luncheon we were especially glad to honor and visit with Peggy Campbell, who passed away November 22nd, just ten days later. Peggy had been an active member of the Auxiliary and hosted many NOGA events over the years. She will be missed by everyone.

On February 25th, the Auxiliary will have a luncheon at the Chateau Golf and Country Club. Once again guests are invited. A very entertaining guest, cartoonist Walt Handelsman, will be the speaker. Trudy Corona and Margie Conatser will chair this event. Watch for the invitation early February, and we can share our holiday stories.

The Spring Social this year will be April 11th at the Bayou St. John home of Paul and June Perret. Come and enjoy a beautiful evening with a sunset over the bayou, good food and lots of fellowship.

You can still join the Auxiliary for the 2014-2015 year. There are good times still to come.

Peggy Rogers, *NOGS LOG*



*Charter Members: Carol Andrews, Mary Lou Main, Mary Collier, Ruth Bussey, Peggy Campbell*

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# NOGS WELCOMES

*Submitted by Tom Klekamp*

At the November and December Board meeting the following new members were approved.

Our November new student members are both from UNO.

**Joseph Frank** is a graduate student. He earned a B.S. in geoscience in 2013 from Penn. State. In 2016 he will receive an M.S. in geology from UNO. Joseph is a member of the UNO AAPG Student Chapter.

**Erica Lassen** is an undergraduate at UNO and will receive a B.S. in geosciences in 2014. Erica lives on the Northshore.

Our December new members include an environmental geologist and one from academia.

**Matt Smith** is a geologist with Environmental Resources Management (ERM) in Metairie. He holds a B.S. in geology from Louisiana Tech (2005) and an M.S. in geology from LSU (2010). He is a member of GSA and the Paleontological Society. Matt indicates he is interested in NOGS' Education and Outreach programs.

**Stephanie Welch** is an Instructor at Southeastern Louisiana University. She received both a B.S. (2007) and M.S. (2009) in geology from LSU. She is interested in participating in the NOGS Continuing Education Committee.

## December 2014 Luncheon



**Mike Fein and Chris McLindon**

## CHILDREN'S MUSEUM OF ST. TAMMANY

### *Celebration* A TREASURE ODYSSEY

*Sunday, March 8, 2015*  
6 PM TO 10 PM • CASTINE CENTER

**ENTERTAINMENT:** Groovy 7, Culinary Showcase,  
Zoë's Desserts, Raffle, Live and Silent Auctions

**GENERAL ADMISSION TICKET: \$100**  
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or call 504.615.8859.





# NOGS 2014 Christmas





# Christmas Holiday Party



Photos courtesy of Arthur Christensen



# Petroleum Systems in "Rift" Basins

34<sup>th</sup> Annual GCSSEPM Foundation Bob F. Perkins Research Conference  
Houston, Texas December 6-9 2015

## ◆ Rifts & Overlying/Related Sag basins

### ➤ *Disproportionately*

#### – "Rich"

- ~30% of the "giant" fields are in rifts & overlying/related sag basins

#### – "Frustrating"

- Each rift basin or segment is a *UNIQUE* geological entity, yet all are variations on a common theme.

## ◆ Submit Abstracts by December 1, 2014

@ [http://www.gcssepm.org/conference/2015\\_conference.htm](http://www.gcssepm.org/conference/2015_conference.htm)

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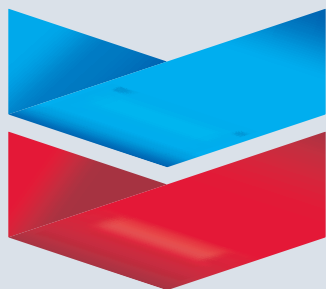


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# South Louisiana and Offshore Gulf of Mexico Exploration and Production Activities

LAFAYETTE DISTRICT, ONSHORE AREA

*By Carlo C. Christina*

During the month of November only 19 permits to drill were issued by the Office of Conservation, Lafayette District, Onshore Area. It should be noted that the price of Brent crude oil fell below \$100 per barrel for the first time in 3½ years. Following are the most significant locations and completions:

## NEW LOCATIONS

In Calcasieu Parish, **Southwest Holmwood Field**, (A), Fort Apache Energy will drill in Sec. 13, 11S-8W, to test the Marg tex section at 13,000 feet. This field was discovered in 1996 with 2 completions in the Marg tex sand, with one well flowing 1032 BOPD through perforations 11,860 to 11,888 feet. The field went off production in 1999 having produced a total of 335,000 barrels of oil. (248713)

In **South Grand Cheniere Field**, (B), Cameron Parish, LLOX will drill the #1 Bravanec in Sec. 13, 15S-6W to a projected depth of 12,500 feet. It is located 1 mile southeast of current production. The field was discovered in 1949 and produced until 2010. New production was found in 2012. (248664)

Energy Resource Technology has permitted its SL 21248 in **Little Temple Field**, (C), Jefferson Parish, in Sec. 36, 17S-22E. The objective section is the Cris I series of sands at a depth of 15,882 feet. The proposed well is located 3 miles southwest of production in a Big hum sand at 13,300 feet, which has produced more than 98,000 barrels of oil and 4 billion cubic feet of gas in 4 years. (248715)

In Plaquemines Parish, **Main Pass Block 35 Field**, (D), Bison Energy Partners will drill the #1 SL 20967 to a projected depth of 11,010 feet. The well is located 2½ miles north of production in the field. The well will be drilled offsetting a shallow well which has produced more than 167,000 barrels of oil from a sand at 7100 feet, and has been on production since 1999. (248665)

The Termo Company has permitted the #1 Laughlin in **Duson Field**, (E), Lafayette Parish, to test the Bol mex section in Sec. 26, 9S-3E. The well will be drilled to 13,078 feet and is located 1 mile northwest of nearest production. (248742)

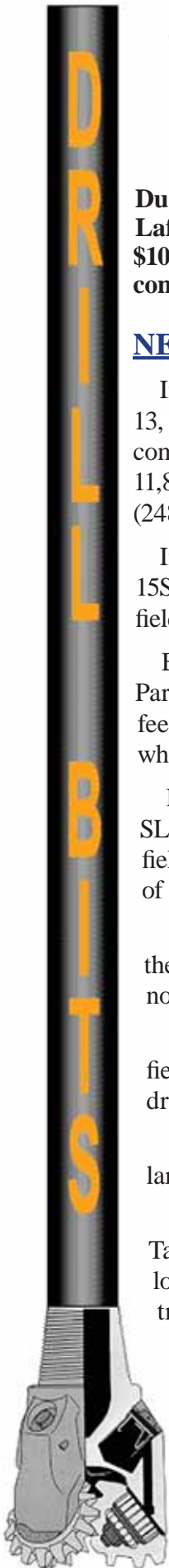
In St. Mary Parish, **Atchafalaya Bay Field**, (F), Apache Corporation continues to develop the field with the drilling of the #5 SL 20035, projected to test the deep Cib op 7 Sand. The well will be drilled to a proposed depth of 20,167 feet. (248667)

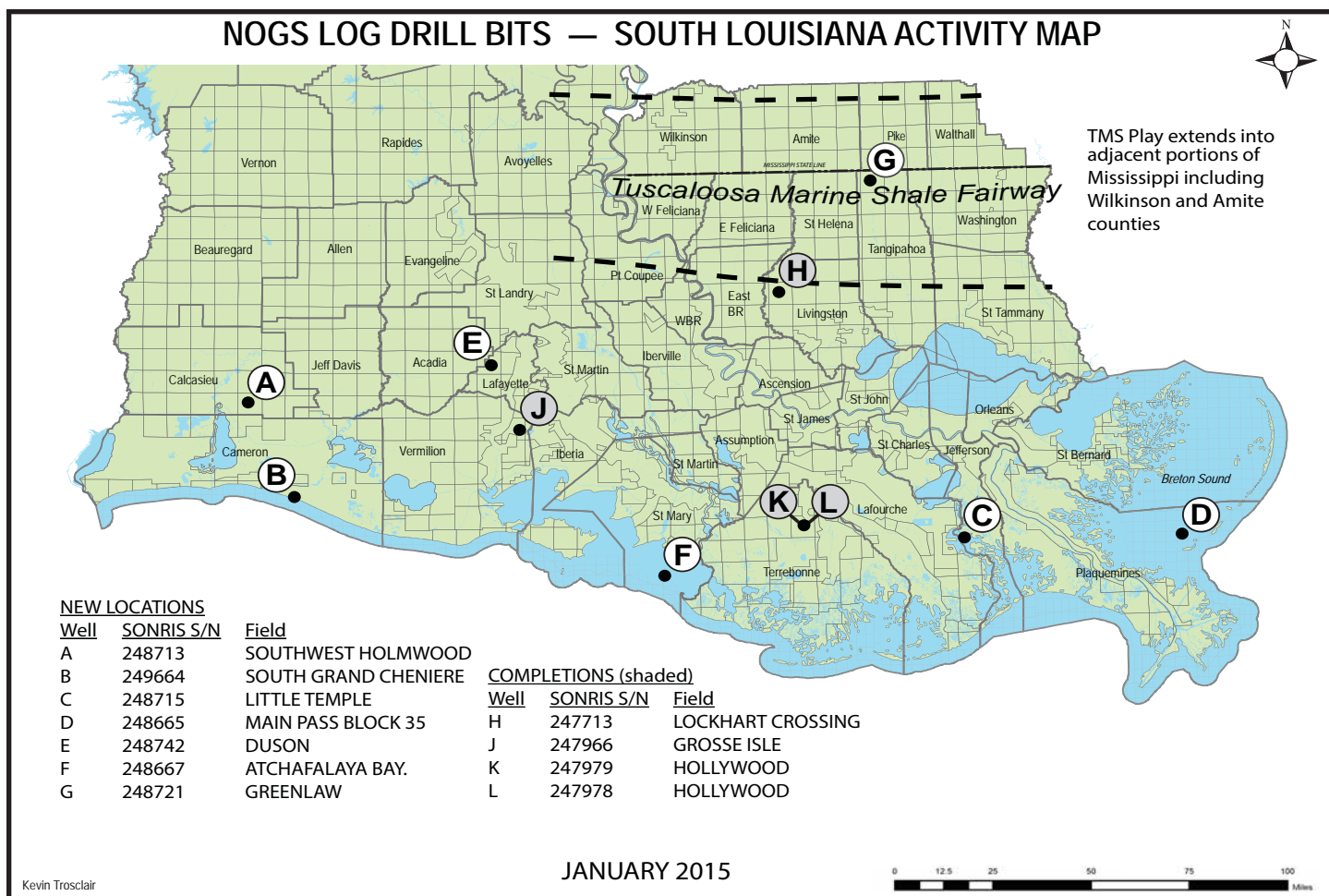
Atchafalaya Bay Field currently has 7 producing wells, and for the past 3 years has been the largest gas producing field in South Louisiana.

Goodrich Petroleum will drill another **Tuscaloosa Marine Shale** well in **Greenlaw Field**, (G), in Tangipahoa Parish. The #1 Kinchen 58 H will be located in Sec. 58, 1S-7E, drilled from a surface location in Sec. 5, 1S-7E, in a 7,000 foot lateral. The projected depth is 21,000 feet, or 13,000 feet, true vertical depth. Today, there are 6 active TMS wells in Tangipahoa Parish. (248721)

## COMPLETIONS

Hilcorp Energy has completed its #1 Denham Springs Country Club as a gas well in **Lockhart Crossing Field**, (H), Livingston Parish, flowing 1448 MCFD and 216 BCPD through perforations 17,930 to 17,946 feet. The well was drilled in Sec. 29, 6S-3E to a depth of 19,000 feet and completed in the **Tuscaloosa Sand**, 1 mile southeast of nearest production. As reported in Drill Bits, May 2014, Lockhart Crossing Field was discovered in 1979 in Tuscaloosa sands at 16,900 feet. In 1982 Wilcox sands were found to be productive at 10,500 feet and a series





of wells were drilled to develop the 1st Wilcox Sand. In 1986 a water flood program was initiated followed by a CO<sub>2</sub> flood. Since the discovery in 1979 more than 100 wells have been drilled in the field which has produced 27.4 million barrels of oil and 105.8 billion cubic feet of gas. (247713)

In Vermilion Parish, **Grosse Isle Field**, (J), Pennington Operating Company has completed the #1 Broussard as a gas well flowing 1272 MCFD and 347 BCPD through perforations 14,012 to 14,030 feet. The well was drilled in Sec. 29, 12S-4E, located 1 mile southwest of production. (247966)

Square Mile Energy has completed 2 gas wells in **Hollywood Field**, (K), (L), Terrebonne Parish. The #1 Casente was completed flowing 5015 MCGD and 144 BCPD through perforations 11,938 to 11,972 feet, with the bottom hole located in Sec. 10, 17S-16E. (247979)

The #1 Comeaux was completed flowing 5276 MCFD and 120 BDPD through perforations 11,505 to 11,570 feet with the bottom hole located in Sec. 13, 17S-16E. (247978)

## OFFSHORE GULF OF MEXICO SHELF AND DEEPWATER ACTIVITIES

by Al Baker

During November 2014, the BOEM approved **90** Gulf of Mexico drilling permits. Of these, **28** were for shelf wells, and **62** were for deepwater wells. Of the total number of permits, there were **15 new well permits** issued: 9 new wells situated on the shelf and 6 new wells situated in deepwater.

The shelf new well permits were comprised of 3 exploratory wells and 6 development wells. The exploratory new well permits were awarded to **EnVen Energy Ventures** for their **South Marsh Island 152 #1** well, to **Century Exploration New Orleans** for their **Ship Shoal 150 #C-8** well and to **Renaissance Offshore** for their **Ship Shoal 305 #1** well. The development new well permits were granted to **Arena Offshore** for their **Eugene Island 338**

#K-16 and #K-17 wells, to **Fieldwood Energy** for their **South Marsh Island 48 #E-8** well, to **Tana Exploration** for their **Vermilion 284 #C-2** well, to **Renaissance Offshore** for their **Ship Shoal 219 #A-18** well and to **W&T Offshore** for their **Ship Shoal 359 #A-17** well.

The deepwater new well permits consisted of 3 exploratory wells and 3 development wells. The exploratory new well permits were given to **Union Oil Company of California (Chevron)** for their **Keathley Canyon 814 #1** well, to **Anadarko Petroleum** for their **Green Canyon 659 #3** well and to **Deep Gulf Energy II** for their **Mississippi Canyon 215 #1** well. The development new well permits were received by **BHP Billiton Petroleum (GOM)** for their **Green Canyon 653 #SH-103** well, to **Deep Gulf Energy II** for their **Mississippi Canyon 771 #SS-2** well and to **LLOG Exploration Offshore** for their **Mississippi Canyon 546 #4** well.

On November 28th, IHS-Petrodata reported that the Gulf of Mexico mobile offshore rig supply stood at **118**, which is 1 greater than last month. The marketed rig supply consisted of **89** rigs, of which **74** were under contract. The contracted versus total rig supply utilization rate is **62.7%**, while the marketed contracted versus marketed supply utilization rate stands at **83.2%**. The marketed rig supply number reflects a decrease of 1 rig in comparison to the number reported last month, while the contracted rig supply number increased by 2 rigs during the same time period. In contrast, the November 2013 fleet utilization rate stood at 72% with 77 out of the 107 rigs under contract.

On November 28th, BakerHughes indicated that there were **54** active mobile offshore rigs in the Gulf, which is **73%** of the rigs under contract mentioned above. This active rigs number is **1** more than reported last month. The current active rigs count compares to 57 active rigs during the same period last year, representing a **5.3%** decrease in yearly rig activity.

On November 17th, the BOEM reported their final results for the **August 20, 2014, Western Gulf of Mexico OCS Sale 238**. Of the **81** tracts that received bids, **80** were deemed acceptable. One bid was rejected as insufficient. The rejected bid was on Alaminos Canyon 74. Venari Offshore had submitted a bid of \$865,585 for the tract. However, the BOEM mean range of value (MROV) for the tract was calculated much higher at \$6,500,000.

On November 6th, **Energy XXI** announced the results of its **Main Pass 61 Toro** well. The well reached a total depth of 10,835 feet MD/8,070 feet TVD and logged **170 net feet of oil** in the **J-6 Sand**. They expect the well to be completed within the next 30 days.

On November 6th, **W&T Offshore** released its third quarter operational results. The company achieved continued success in its deepwater Gulf of Mexico drilling program with two discoveries, both of which are being completed. At **Mississippi Canyon 782**, the **Dantzer #2** well found over **121 net feet of oil** in the two targeted Miocene intervals. At the **Atwater Valley 574 “Neptune” Field**, the **#SB-03** well reached a total depth of 20,650 feet and found in excess of **300 feet of net pay**. W&T has a 20% non-operated interest in both deepwater discoveries. In addition, the W&T Gulf of Mexico shelf program had a successful exploration discovery at its 100%-owned, **East Cameron 321 Field**. Their **#A-2 ST** well logged over **140 feet of net oil pay** in **five zones**. The well is currently being completed in the Lentic 1 Sand.

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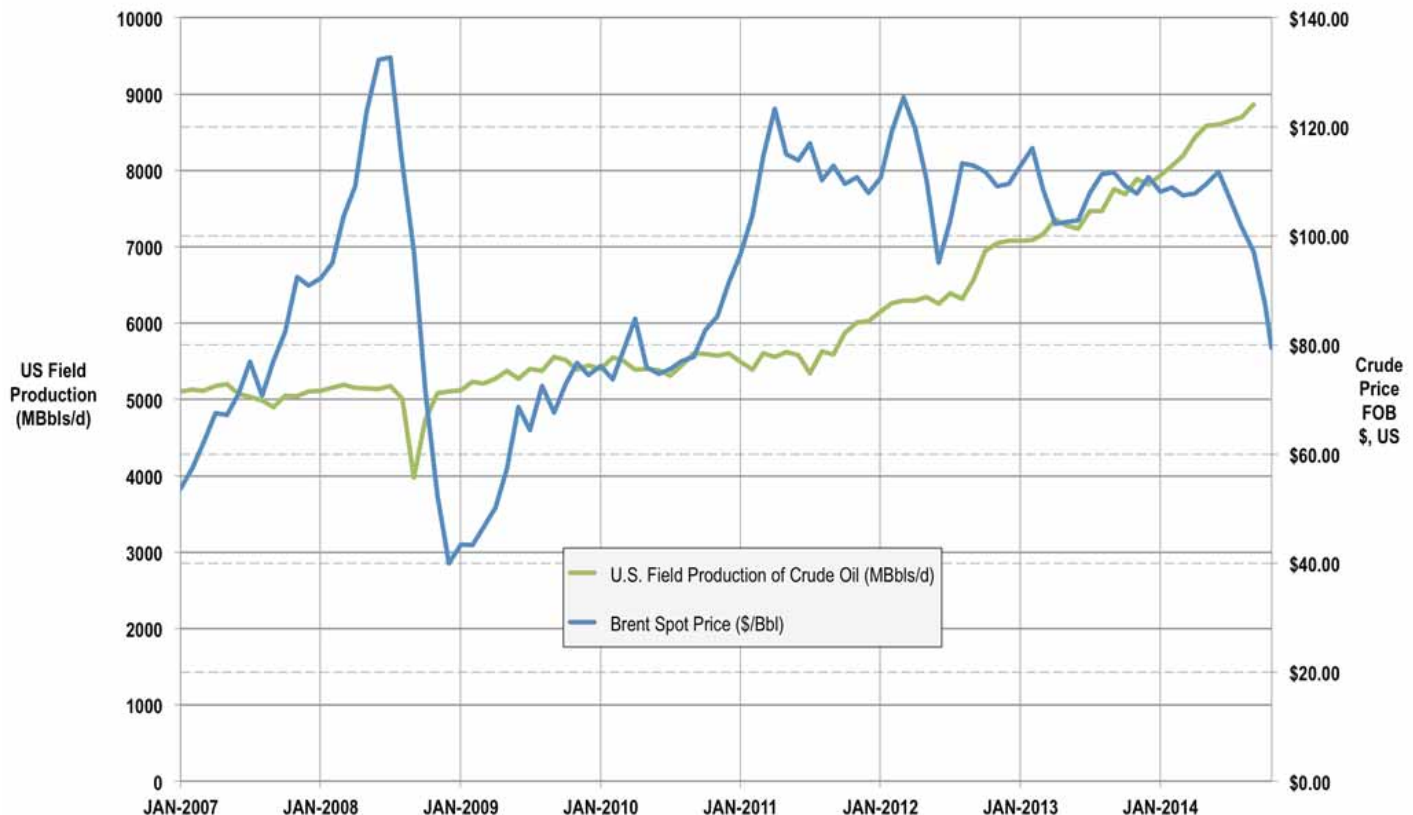
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Plot of US Field Production and Brent Crude prices, January 2007 to November 2014

Curves represent monthly averages. Data source: US Energy Information Administration



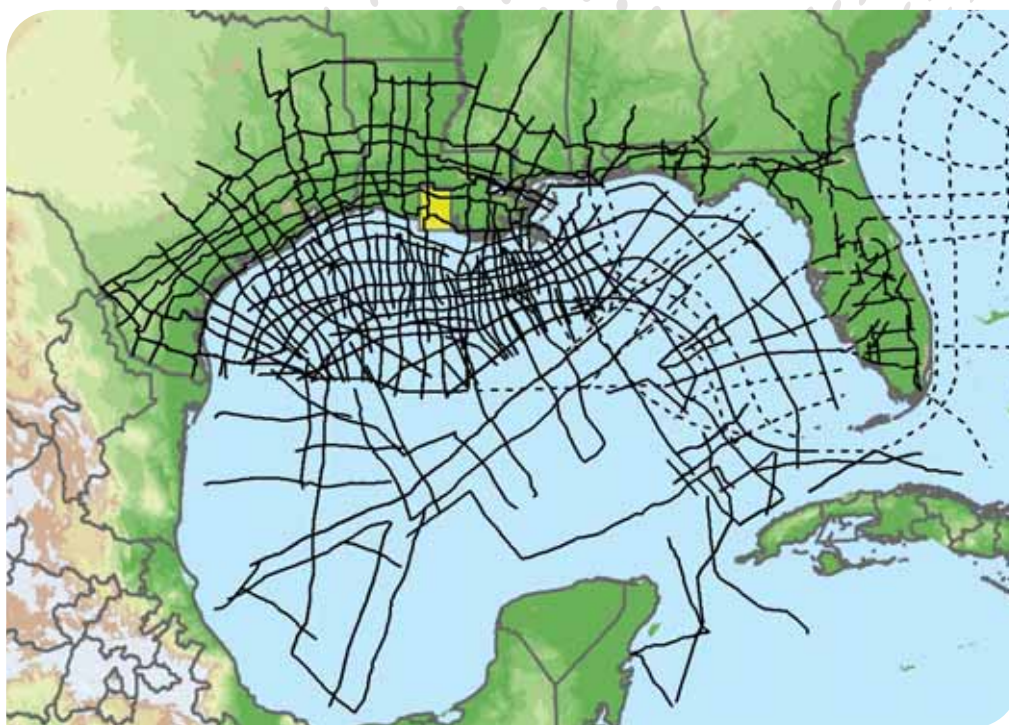
Carlo Christina showed a graph, similar to the one here, to me at the January NOGS meeting. We used data from the Energy Information Administration's website to reconfigure the data. Here we see a plot of the average monthly price of Brent crude in dollars per barrel from January 2007 through November 2014. (Louisiana sweet oil trades at basically at the same price of Brent crude and is a benchmark for what Louisiana producers will get for their product.) The dramatic price swing in 2008-09 reflects the recession. Not shown on this graph is the trend curve of Brent prices, which shows an upward trend. When prices readjust, we may be in for another price jump.

Also plotted on this graph is the average monthly production for the U.S. This upswing is, of course, due to increases through hydraulic fracturing in oil-rich shales.

According to Daniel Yergin (*The Prize* and *The Quest*, and VP of IHS Energy) the current pressure on the price of crude occurred when the failed state of Libya dumped its reserves on to the market. This triggered a global price shift; OPEC is allowing the markets be the arbiter of price. Not good for those of us in the oil and gas sector, but a present-under-the-tree for US consumers.

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*JRR Tolkien meets Jules Verne*

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Ninety percent or more of Earth's carbon is thought to be locked away or in motion deep underground—a hidden dimension of the planet as poorly understood, as it is profoundly important to life on the surface, according to scientists probing the world's innermost secrets in the decade-long, \$500 million project.

In a landmark volume, DCO scientists say estimates of carbon bound in the metallic core alone range from 0.25 to 1 percent by weight. If 1 percent proves correct, the core by itself sequesters four times more carbon than all known carbon reservoirs in the rest of the planet—and 50,000,000 times as much as that held in the flora and fauna on Earth's relatively wafer-thin skin far above.



# THE BOOKMARK

## BOOK REVIEWS:

### **The Frackers: the Outrageous Inside Story of the New Billionaire Wildcatters**

*Gregory Zuckerman, Portfolio Penguin. New York (2013) 404pp. ISBN 978-1-59184-645-1 List price: \$29.95.*

The story of the shale gas revolution, which is a revival of an 19th Century Pennsylvania fuel industry into the boom in shale gas and oil brought about by the combination of hydraulic fracturing and horizontal drilling.

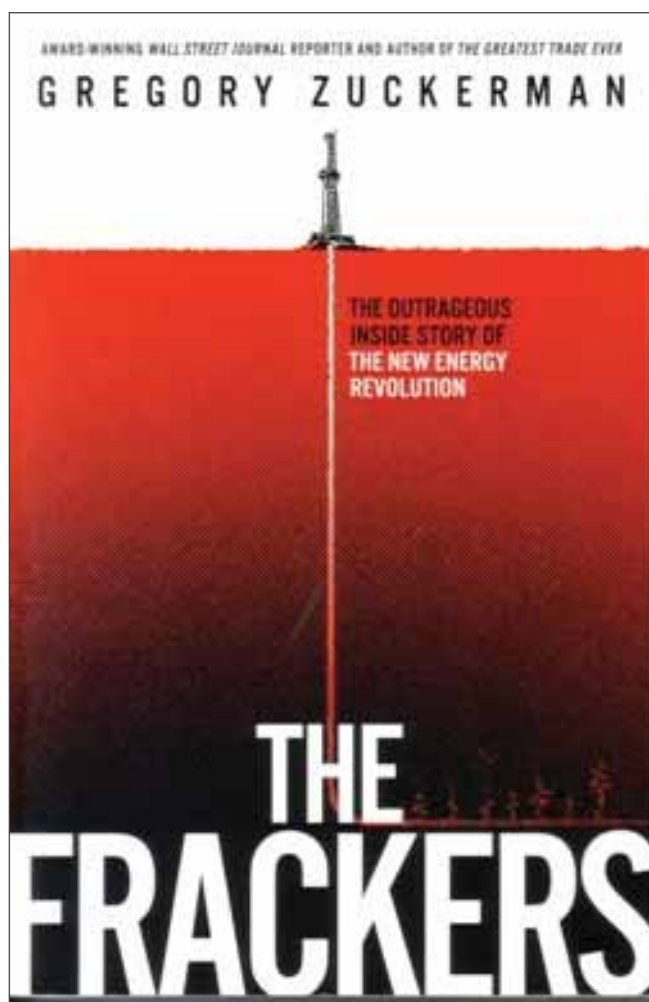
Gregory Zuckerman is a writer at *The Wall Street Journal*. He writes about hedge funds, big financial trades and other investing topics, and regularly pens the widely read "Heard on the Street" column. Greg appears regularly on CNBC and makes appearances on radio stations around the globe. Zuckerman, in *The Frackers*, describes the birth of oil well fracturing in the 1860s using nitroglycerine. Various mechanisms were invented and eventually the gel-fracks, and then how, almost by accident, by diluting the gel, slick-water fracks finally enabled gas to be produced at economically. The other part of the engineering side of this story is the advent of horizontal drilling and completions.

Geology and engineering are not Zuckerman's strong suit; in fact geologists might cringe at some of Zuckerman's statements. His characters – George Mitchell, Aubrey McClendon, Carl Icahn and others are the best parts of *The Frackers*. Mitchell drilled some 200 wells in the Barnett Shale before he was successful. Others jumped on the shale stage; there are successes, failures and the impact of Wall Street on the shale gas revolution. Even today we're seeing the price of these commodities settle out in the global markets

There is a brief review of the shale potential globally–those who can exploit it and those out of the game. He inserts a chapter at the end where the domestic (and international) politics and environmental aspects of fracking are discussed.

In a review of this book in the July 2014 *Geoscientist*, Dick Selley points out Zuckerman crediting George Mitchell's geologist James Henry with identifying the productive potential of the Barnett Shale but does not include the paper in the bibliography (see below). *The Frackers* seems hastily compiled and needs editing. For those wanting a quick story of the major players surrounding shale gas and oil, *The Frackers* is a good read, great for a post Super Bowl weekend.

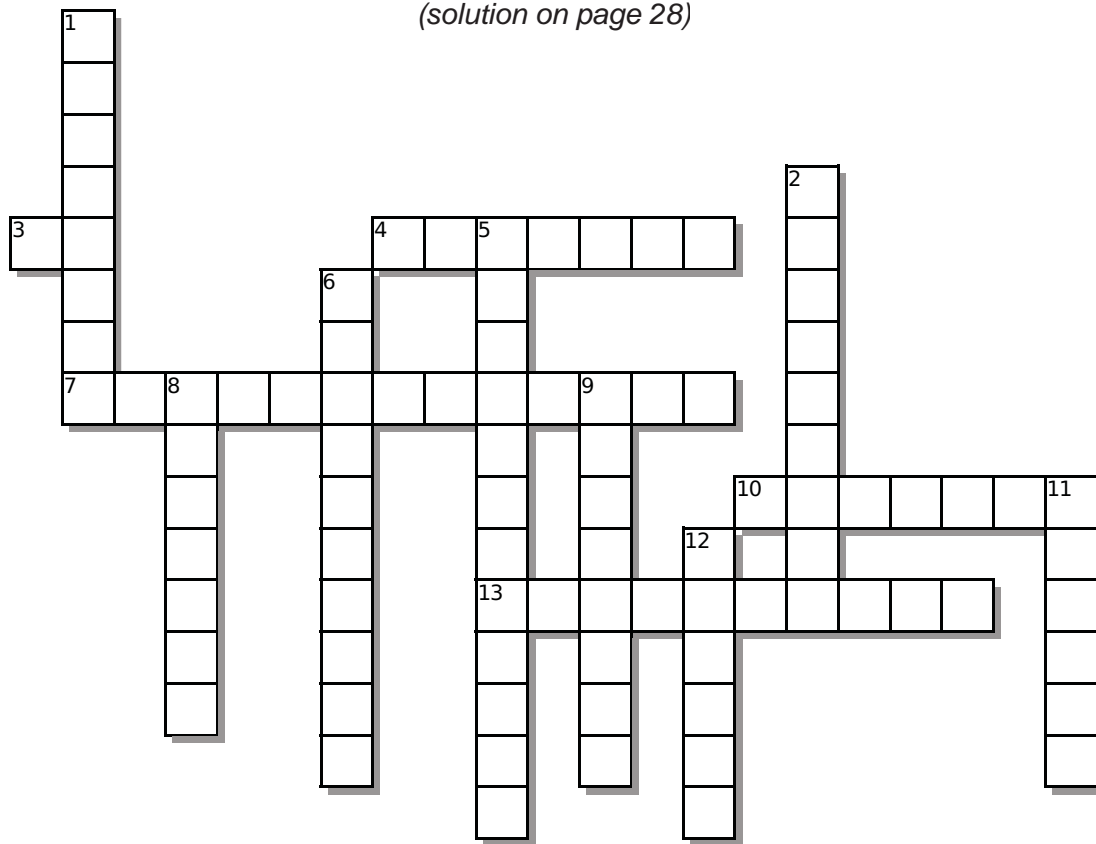
Henry, J.D., 1982, Stratigraphy of the Barnett Shale (Mississippian) and associated reefs in the northern Fort Worth Basin, in Martin, C.A., ed., *Petroleum geology of the Fort Worth Basin and Bend Arch area*: Dallas Geological Society, Dallas, Texas, p. 157-177.



# On The Lighter Side...

## GEOLOGY CROSSWORD

(solution on page 28)



### ACROSS

- 3 A Hawaiian term for a lava flow that has a rough, jagged surface. compare pahoehoe.
- 4 remains, imprints or traces of a once living organism that is usually found in sedimentary rock
- 7 in undisturbed layers of rock, the oldest rocks are on the bottom and each layer above is progressively younger toward the top
- 10 a naturally occurring inorganic solid that
- 13 an earthquake that follows and has its epicenter near a larger earthquake

### DOWN

- 1 a general term for semiarid and desert lands
- 2 a large, discordant, intrusive body of

igneous rock.

- 5 a process by which salts accumulate in soil
- 6 dropping of sediments that occurs when an agent of erosion such as gravity, glacier, wind or water loses its energy and can no longer carry its load
- 8 supercontinent; the single landmass that existed more than 200 million years ago and that gave rise to the present-day continents
- 9 the condition of equilibrium, comparable to floating, of units of the lithosphere above the asthenosphere
- 11 the manner in which light reflects from the surface of a mineral, described by its quality and intensity.
- 12 a fundamental particle of matter. Provides a positive charge in the nucleus of an atom.



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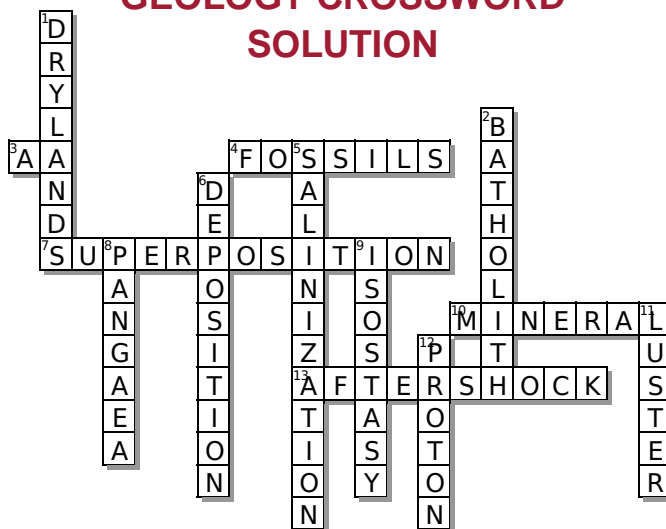


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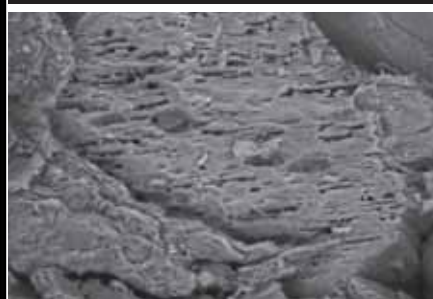
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