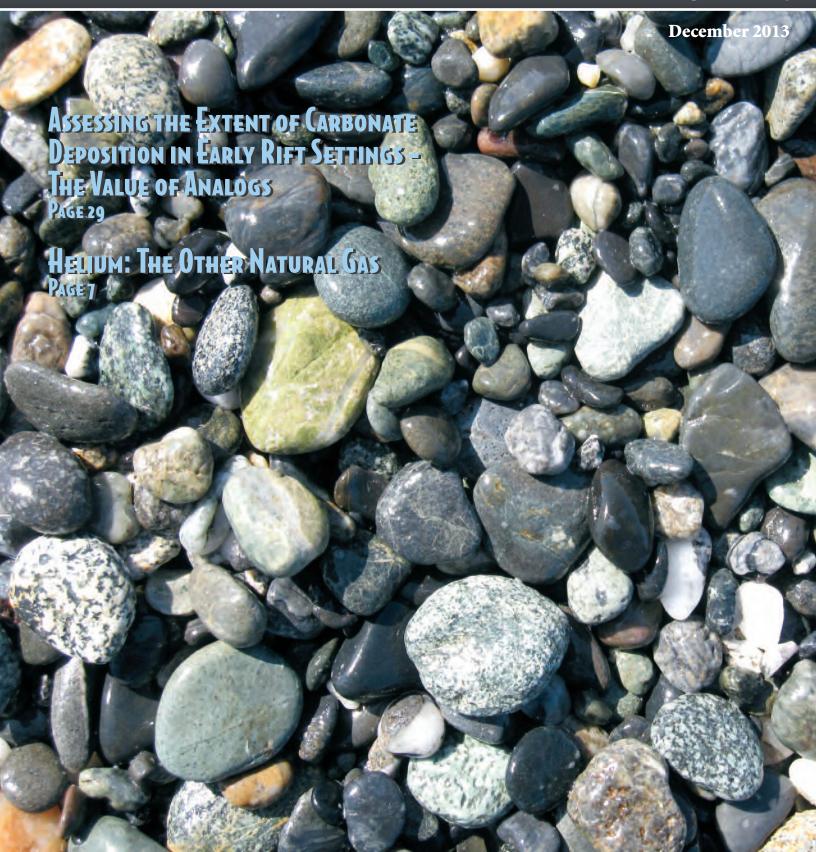


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Volume 56 Number 4

**Houston Geological Society** 



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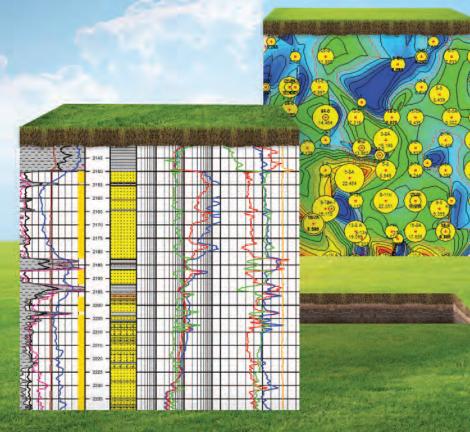
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December 2013

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**About the Cover:** Rounded stones from a variety of source rocks in the gravel along Gold Bluffs Beach, Redwood National Park, near Orick, California. Photograph by Michael F. Forlenza.

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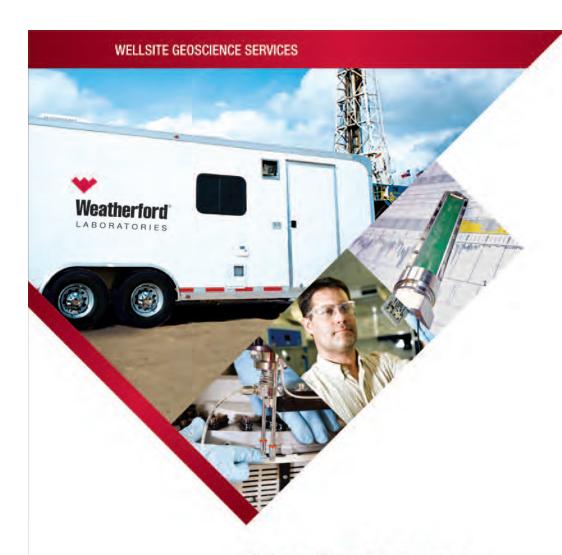


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# Change is Needed, are We Ready?

The question is largely one as to

whether the process continues as

is or is it modified to reflect what

is the new reality of reduced

membership and a smaller pool

of individuals that are interested

in serving on the Board.

The world changes and organizations need to evolve or face L extinction. Ultimately, organizations disappear due to the lack of interest and an inability of their reduced membership to support their overhead and infrastructure. This could be the fate of HGS, if we do not consider current and future trends and accept the fact that the conditions have changed over the past few years. Change is not easy, especially for those who have been heavily involved in running the organization. But change is necessary for future success.

Let's consider the facts as we know them. Over the past several years, largely as a result of the growth of unconventional resources, shale oil and shale gas, there has been an increase in the number of practicing geologists in the greater Houston area. Many, if not most, arrived directly from the university. The interests and needs of this new generation of professionals are different from those that have been engaged in the past. Their approaches to learning and networking are different

from prior generations. They see the Internet as a key connector. Many of today's practicing geologists are approaching the end of their professional careers and after three decades of drawing maps and making cross-sections, they are readying themselves for the golf course, tennis courts, and fly fishing. These retiring geologists will be disengaging from their profession and their needs will be shifting. Corporations, although generally supportive of professional organizations, have pulled back and are less supportive of their staff being actively engaged and are much more selective in what they fund. Majors and independents are running leaner and demanding more from their staff, with many workers feeling that they are on call 24/7. This has reduced everyone's free time and families and friends come before professional organizations such as the HGS. Committees and positions on the boards that run these professional organizations tend to be stagnant, with the same individuals engaged. Changes, when present, are often a result of the shifting of responsibilities among the same group of people rather than the infusion of new blood.

Renewals of memberships to professional organizations, such as the HGS and AAPG, have suffered over the past several years. We received notification recently that as a result of a lack of AAPG membership renewals there could be a reduction in the number of seats allocated to Houston in the House of Delegates. Drops in the HGS membership rolls have been even greater than those seen at AAPG. It is unclear, however, how much of this decrease was a result of complications associated with the transition to a new website that was fraught with bugs. Even taking this website

complication into consideration there appears to be a significant reduction by choice in the membership roster.

A review of the facts has resulted in some definitive actions and the initiation of a series of discussions and debates. Problems with the website have been resolved and credit card payment can be made online and the "member only" portions of the website are really limited to dues paying members. HGS has sent a letter to all individuals that dropped off of our membership rolls

during the past 18 months, when the website renewal became problematic. As of the preparation of this note, two weeks after the letter was mailed, about 10% those contacted have rejoined. The Houston membership of the House of Delegates has just started to contact those individuals that have not renewed their AAPG membership to ask them to renew and remind them of the benefits of membership.

The HGS Board, as well as a number of past-Presidents, is in an ongoing debate as to how elections should be held. The question is largely one as to whether the process continues as is or is it modified to reflect what is the new reality of reduced membership and a smaller pool of individuals that are interested in serving on the Board. By the time this reaches your desk at least part of this debate will be over. Either a change in the bylaws will be finally approved by the Board and will be presented to the membership for ratification or a new discussion will begin as to how we can increase the numbers of those members interested in serving on

From The President continued on page 9



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Michael Forlenza, P.G. hgs.forlenza@gmail.com

# Helium: The Other Natural Gas



Leak detection testing using helium gas

Recently, I conducted an investigation of pore-space gases to evaluate potential migration of hydrocarbons through the soil. This investigation required the detection of potential equipment leaks. In these applications, helium is often used as a tracer gas because it is inert, non-flammable, and extremely rare in the atmosphere. Helium leaks can be readily detected with a hand-held instrument. The helium for this testing was drawn for a pressurized tank of a type that is widely available at retail. But if helium is so rare, where did the gas in this tank come from?

### The Gas and Its Physical Properties

Helium is the second lightest and the second most abundant element in the observable universe where it makes up about 24% of the total elemental mass. This mass is more than 12 times greater than the mass of all the heavier elements combined. Most helium in the universe is helium-4 and is believed to have been created in the Big Bang and during the fusion reactions in stars.

From The Editor continued on page 9



# From the President continued from page 5

the Board and as committee members and chairs. In either case, whether the bylaws are modified or not, the active discussion now needs to focus on not simply having our members return to an active status but also on how we engage the next generation of geoscientists to become not simply dues paying members but active members, participating in committees and being willing serve on the Board. If we simply rely on those that have been engaged to continue to run for office we will be heading over a cliff. We need to learn what the new professionals need and want from our organization so that they will take the first step and join. We as an organization then need to work the next step, increased involvement. Relevancy is of increasing importance when we ask individuals to give more than their annual dues as they are asked to contribute their most precious of all commodities – their time. As we work toward the next generation, we also need to ensure that the needs of the more senior members are still provided for. It clearly is a balance that we must all work towards. Although this

will be an area for the Board to discuss for the next several months I ask that you become engaged. Let the Board know your thoughts. Talk to those that you work with, especially those that are not members of HGS, and ask what they would like to see HGS do that would convince them to join. Let us know, so we can begin the adjustments needed. If I have learned anything over the past several months, it is that changing this organization is similar to that of changing the direction of a supertanker. The process is slow and needs to be deliberate.

On a very different note, we are now into the holiday season. I would like to take this opportunity for myself, my wife Terry, and the members of the HGS Board to wish you a happy and healthy holiday and New Year. May all your wishes and prayers be answered.

Until next time...

# From the Editor continued from page 7\_

Despite this abundance, helium, the lightest of the noble gases, is rare in the Earth's atmosphere making up only approximately 0.00052% of the volume or 5.2 parts per million. In seawater, the concentration is only 4 parts per trillion. The atmospheric concentration is fairly constant despite the continuous release of helium from the lithosphere because most helium in the Earth's atmosphere migrates upward and finally escapes into space. In the Earth's heterosphere, the atmospheric zone more than 60 miles above the ground surface where gases separate by molecular weight, helium and other lighter elements are the most abundant gases.

At standard temperature and pressure, helium is a colorless, odorless, non-toxic, inert gas in the noble gas group. The boiling point of helium, -452° F (-269° C), is the lowest among the elements. This means that helium does not become a liquid until just a few degrees above absolute zero. A chemist or a physicist will tell you that the "nuclear binding energy" of helium-4 is very high which is why it is a product of both nuclear fusion and radioactive decay.

Helium, named for the Greek god Helios, was first detected in 1868 by the French astronomer Jules Janssen and the British physicist Norman Lockyer in the spectra from a solar eclipse. In 1895, helium was formally discovered on Earth by the Swedish chemists, Per Teodor Cleve and Nils Abraham Langlet. The Swedes observed the gas emanating from the uranium ore cleveite.

### **Geological Origin**

The helium atom

Most terrestrial helium was created by the natural decay of heavy radioactive elements, principally thorium and uranium, in the minerals cleveite, pitchblend (uraninite), carnotite, and monzanite. These minerals are often found in granitoid basement rocks. The

decay of these elements emits alpha particles which consist of two neutrons and two protons. Alpha particles are the same as helium nuclei. The nuclei pick up electrons from the surrounding rock. These processes are estimated to generate approximately 3,300 tons of helium per year in the Earth's crust

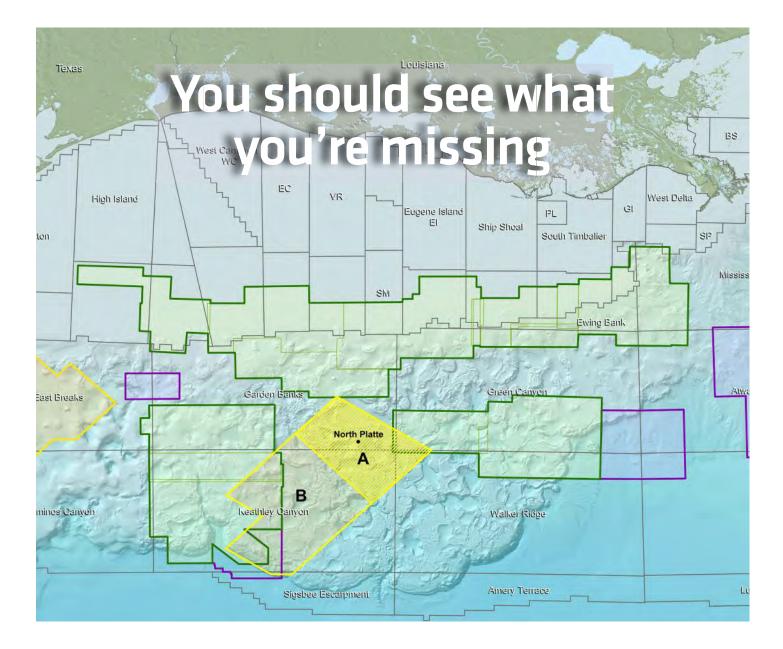
where the concentrations are up to eight parts per billion.

Because helium migrates and is trapped in the subsurface under conditions that also trap hydrocarbons, the greatest natural concentrations of helium on the planet are found in natural gas. Most unprocessed natural gas contains at least trace amounts of helium, yet very few

natural gas fields contain commercially exploitable concentrations. Helium concentrations in natural gas vary over a wide range from a few parts per million to greater than 70,000 parts per million (7 percent). Natural gas must contain at least 0.3% helium to be considered as a potential helium resource.

The wide range of helium concentrations in natural gas is determined by the geological setting. The geological setting most

From The Editor continued on page 11



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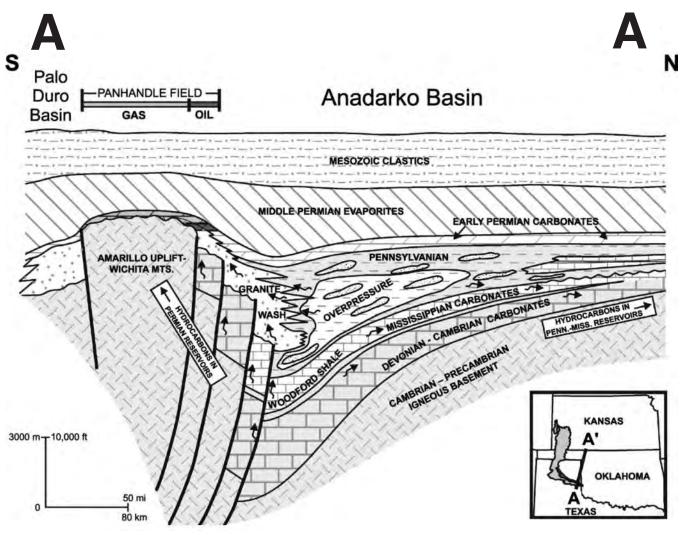
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# From the Editor continued from page 9



A cross section of the Anadarko Basin and the Panhandle Field where shallow fractured crystalline basement rocks and evaporite seals create a favorable setting for the generation and accumulation of helium gas.

favorable for the accumulation of higher concentrations of helium involves the juxtaposition of three conditions:

- 1) Granitoid basement rocks rich in uranium and thorium at a relatively shallow depth;
- 2) Fractured and faulted basement rocks providing a pathway for the helium to escape; and
- 3) An overlying trap consisting of a porous reservoir of sedimentary rocks capped by an impermeable seal.

The nature of the seal is critical for the accumulation of helium gas in exploitable concentrations. Helium has the smallest atomic radius of any element, about 0.2 nanometers. As it migrates upward through the stratigraphic column, the gas can fit through very small pore spaces. Typically, halite or anhydrite are the only sedimentary rocks that can block the upward migration of helium atoms. In some cases, shales with pore spaces plugged with abundant organic materials (kerogen) can serve as a less effective barrier.

By 1903, large reserves of helium were identified in natural gas fields in Oklahoma, Texas, and New Mexico. The Hugoton (Kansas, Oklahoma, and Texas), Panhandle West, Panoma, Riley Ridge in Wyoming, and Cliffside Fields are the gas fields where most domestically-produced helium has been extracted in the last 75 years.

The natural gas fields in northwest New Mexico have some of the highest known helium concentrations. These elevated levels of helium in natural gases occur in Paleozoic reservoirs on the Four Corners Platform and also in Paleozoic reservoirs in the deeper parts of the San Juan Basin. According to a 2012 publication by R.F. Broadent titled *Helium in New Mexico: Origins, Uses, Economics, Geologic Distribution and Exploration Possibilities*, the regional set of orthogonal faults that offset Precambrian basement throughout the deeper parts of the San Juan Basin may have acted as migration pathways that transmitted helium from its basement source into overlying Paleozoic reservoirs.

From The Editor continued on page 13

# **BOREHOLE IMAGING COURSE**

# Houston, Texas – 5<sup>TH</sup>, 6<sup>TH</sup> & 7<sup>TH</sup> FEBRUARY 2014

undreds of image logs have been acquired by US Oil companies in recent years. There is currently an important resource of image logs sitting in data archives. Images can provide unrivaled information of the geological structure, stratigraphy and sedimentology from the wellbore. The application of image logs in our industry has long been undervalued or not fully appreciated. The interpretation of images is a skill that needs to be learned and the best way to do so is with some of the industries' leading interpreters. Borehole images, both wireline and LWD can fill a vital data gap between core and seismic data.

### Course aims...

- Carry out QC of borehole image data: wireline and LWD
- Design a borehole image logging program
- Provide a brief structural interpretation
- Classify major lithofacies types and sediment dispersal indicators
- Describe fractures and faults
- · Appreciate limits of borehole images

## Who should attend...

Geologists, Petrophysicists & Geophysicists working with integrated reservoir models

#### Date

• 5th, 6th & 7th February, 2014 Price...

### Venue...

Overview...

· Quality control

· Structural analysis

• Horizontal well analysis

· In-situ stress analysis

• Image log technology and practice

• Sedimentological characterization

- in clastics and carbonate rocks.

· Houston, Texas.

• US\$ 2,500 per attendee. Price includes lunch, coffee and snacks, course notes and exercises. Spaces are limited to 20 attendees and will be filled on a first-come, first-serve basis.

DAY 1: Introduction: Borehole Image, Dipmeter and LWD acquisition and processing techniques, Log quality and artefact image recognition. Structural Interpretation: Basic principles - quick-look interpretation, Structural dip identification, unconformities, Large scale fault deformation structures. Practical Exercise - tectonic tilt, faults, unconformities.

DAY 2: Structural Interpretation: Fracture analysis. Practical Exercise - fracture analysis. Integration with surface seismic and production data. Practical Exercise - integration with seismic and production data. Analysis of borehole images in horizontal wells. Sedimentological interpretation: borehole image and dipmeter data.

DAY 3: Sedimentological Interpretation (continued): borehole images - clastic sequences. Practical Exercise - clastics. Sedimentological interpretation: carbonate sequences. Practical Exercise - carbonates. Approaches to permeability classification - carbonates; Petrophysical applications of image logs, in-situ stress analysis. Practical Exercise - in-situ stress analysis.

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# From the Editor continued from page 11

### **Helium Production and Storage**

Helium is commercially extracted from natural gas by a lowtemperature separation process called fractional distillation. Since helium has a lower boiling point than any other element, low temperature and high pressure are used to liquefy and draw off nearly all the other gases (mostly nitrogen and methane). The resulting crude helium gas (50 to 70 percent helium) is purified by successive exposures to lowering temperatures, in which almost all of the remaining nitrogen and other gases are precipitated out of the gaseous

a final purification step, usually resulting in 99.995% pure Grade-A helium. The principal impurity in Grade-A helium is neon. In a final production step, most of the helium that is produced is liquefied via a

mixture. Activated charcoal is used as

cryogenic process. This is necessary for applications requiring liquid helium and also allows helium suppliers to reduce the cost of long distance transportation.

The United States began stockpiling helium after World War I because Congress was concerned about catching up with the Germans in the race to build a fleet of dirigibles. In 1925, the United States established the National Helium Reserve, also known as the Cliffside Field Government Reserve, near Amarillo, Texas to serve as a strategic supply of helium for use in airships and other defense purposes.

The Bureau of Mines constructed and operated the large helium extraction and storage facility that went into operation in 1929. From 1929 to 1960 the federal government was the only domestic producer of helium. Although

Wyoming Riley Ridge **Area Fields** Church Buttes Field Utah Colorado **Reichel Field** Moab Burlington Las Animas Fields Scott City Lisbon Field Bushton Satanta Greenwood Field **Hugoton Field**\* Liberal **Ute Dome Field** Gruver **Beautiful Mountain** Panhandle Field **Keyes Field** Oklahoma Shiprock Field Chillicothe Cliffside Field **New Mexico** Thalia Field Amarillo Texas Explanation Cities The Panoma gas field underlies the western two-thirds of the **Hugoton Field in Kansas Bureau of Land Management** helium pipeline Helium gas fields

Major helium producing gas fields in the United States.

From The Editor continued on page 15

Field



the use of airships declined after World War II, new defense uses for helium arose such as a purging gas when refueling rocket engines and as a coolant in nuclear weapons programs.

As of December 2006, the total helium reserves and resources of the United States were estimated to be 744 billion cubic feet (BCF). This included 153.2 BCF of measured reserves, 192.2 BCF of probable resources, 213.8 BCF of possible resources, and 184.4 BCF of speculative resources. Included in the measured reserves were 24.2 BCF of helium stored in the National Helium Reserve, Helium resources outside of the United States are estimated to be approximately 1.13 trillion cubic feet. The majority of these resources are located in Qatar (362 BCF), Algeria (294 BCF), Russia (244 BCF), Canada (72 BCF), and China (40 BCF).

The National Helium Reserve is now operated by the Bureau of Land Management (BLM), a branch of the Department of the Interior, under the Federal Helium Program (Public Law 104-273). The Federal Helium Program includes all operations of the Bush Dome and Cliffside Field storage reservoirs in Potter County, Texas and the crude helium pipeline system. The BLM no longer supplies Federal agencies with Grade-A helium. Private firms that sell Grade-A helium to Federal agencies are required to purchase a like amount of (in-kind) crude helium from the BLM.

### **Usage and Price**

Due to its properties, helium plays a unique role in many commercial applications. Helium is used extensively in cryogenic applications, particularly in the cooling of superconducting magnets. The main commercial application for superconducting magnets is in medical equipment, particularly in magnetic

resonance imaging scanners. There is no substitute for helium in cryogenic applications if temperatures below -429 °F are required. Cryogenic uses consume approximately one quarter of the United States production. Helium's other industrial uses, accounting for approximately 50 percent of production, include: a pressurizing and purge gas, protective atmosphere for arc welding, and in processes such as growing crystals to make silicon wafers. The most well-known use is as a lifting gas in balloons and airships.

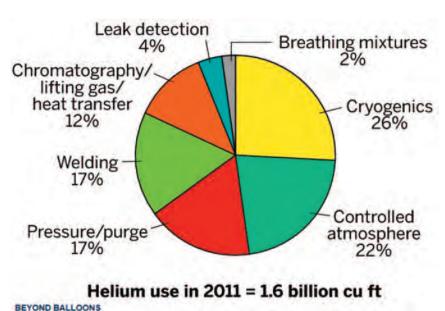
In 1995, Congress decided that the National Helium Reserve was not essential and initiated a program to sell the stored helium as part of the Helium Privatization Act of 1996 (Public Law 104-273). In accordance with the Act, the BLM began selling off the gas to private companies, while keeping 600 million cubic feet in reserve. The liquidation of the reserve had the aim of reducing the debt incurred by the program, but the sales also artificially depressed the price of helium.

Since then, up to one half of the world's helium demand has been met through sales from the reserve and, in some years, more helium was exported out of the United States for use overseas than was consumed domestically. Many analysts believe that the dumping of National Helium Reserve supplies onto the market has depressed the price of helium so much that it is being used as a cheap substitute for argon and other gases that have a much less limited supply, and thus is being wasted.

According to the January 2013 United States Geological Survey Mineral Commodity Summary estimated domestic consumption of helium gas in 2012 was 1.8 BCF. The price for crude helium in fiscal year 2012 was \$65.50 per thousand cubic feet to government users and \$75.75 per thousand cubic feet to nongovernment users. The price for the government-owned helium is mandated by the Helium Privatization Act. At the same time, the estimated price Grade-A gaseous helium from private industry sources was about \$170 per thousand cubic feet. Many argued that the government was not getting a fair price for the helium.

Amid the rising concern related to the closing of the Federal Helium Reserve, the House of Representatives passed bipartisan legislation on September 26, 2013 to postpone the government mandated shutdown in October 2013. President Obama signed the Responsible Helium Administration and Stewardship Act of 2013 into law which prevented the premature closing of the reserve.

### The Future



Helium uses in the United States. Source: U.S. Geological Survey

Although helium is continually being produced by radioactive mineral decay in Earth's crust, the rate of natural production and accumulation is so low that the gas can be considered a

nonrenewable resource. Some analysts estimate that, based on the forecasted rated of consumption and the volume of the known reserves, the helium supply will be depleted in about 40 years.

The commercial development of helium production has been stymied by the government-mandated price during the liquidation of the reserve. Industrial consumers are concerned that the market will be undersupplied when National Helium Reserve sales are discontinued. When that occurs, free market forces could lift the price of helium by an order of magnitude as commercial capacity will be inadequate to meet demand. As the

helium marketplace shifts from one dominated by distributions from the government reserve to a true commodity, the price will surely rise. Producing helium is capital and energy intensive. Energy costs strongly affect the cost to refine helium from natural gas. A large investment is needed in facilities, storage, and pipelines for

The commercial

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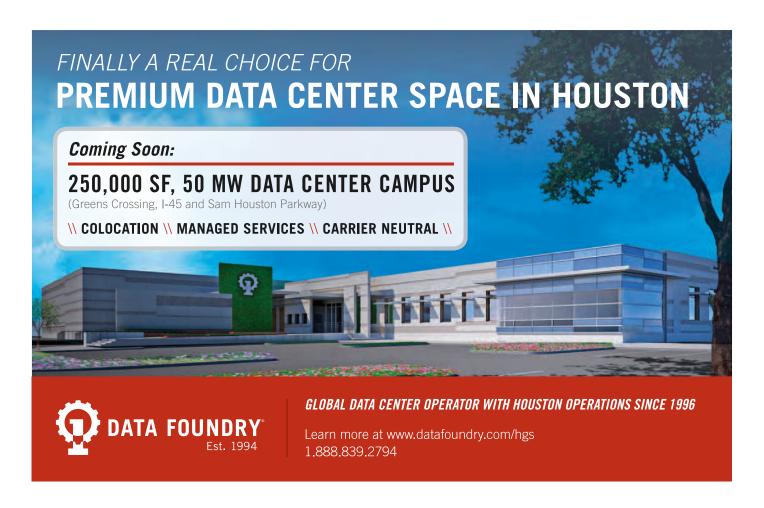
commercial market price of helium interests are reluctant investments. But with for and potential short production plants are lumited States.

Domestic suppliers a construct facilities to more of industrial users. Great construct facilities and potential short production plants are lumited states.

commercial scale helium production. With the market price of helium in flux, commercial interests are reluctant to make the required investments. But with forecasts for rising prices and potential shortages, new helium production plants are being built outside the United States.

Domestic suppliers are making plans to construct facilities to meet the future demand of industrial users. Geologists will play an important role in identifying geological settings favorable for the generation and accumulation of commercial concentrations of helium in natural gas reservoirs. So, while the exploration for natural gas will continue to draw most of

the attention of a large number of geologists, some of them will be on the lookout for helium, "the other natural gas." ■



liquidation of the

reserve.



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Letters to the Editor

Michael,

That is a great article in the October 2013 HGS *Bulletin* on Thomas Jefferson. I think the article is one of the all-time top five articles in the *Bulletin* in my opinion.

Thanks.

Bill Osten Houston, Texas

Comments on September 2013 Climate Change Editorials

Why would Mr. Browning, as a geologist, compare global temperatures of the Permian and Eocene to Pleistocene glacial cycles? It seems there were some very dramatic plate tectonic and volcanic processes he's ignored that were the dominant influences on climate during those times that contrast to the Pleistocene. Why would a geoscientist go to Wikipedia for research material when there is a voluminous cache of scientific research papers available that specifically address every point he's concerned about. This would include papers written by scientists from geological/geophysical, paleo-sciences, physics, astronomical, biological/botanical and climate science communities over many decades!

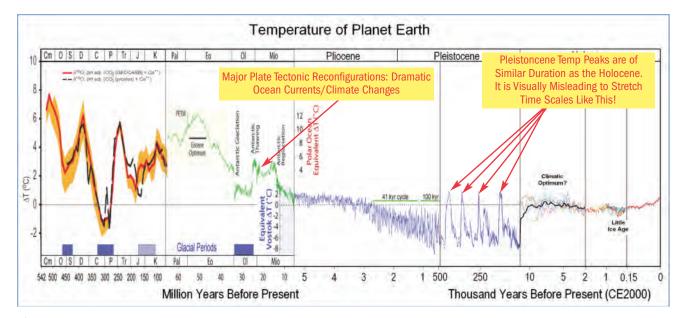
Why would a geoscientist, or any scientist for that matter, use such a visually misleading graph as his Figure 3? See my comments applied:

Knowing that high  $\mathrm{CO}_2$  levels during previous Pleistocene temperature peaks could not abate the onslaught of the Ice Ages, why would it stop the Ice Age around the corner? We're really not seeing anything alarming or different than trends of the past 500,000 years. The absolute failure of IPCC and Hansen to predict global temperatures, especially short term when errors should be least exacerbated, really depicts the outrageousness of the alarmism associated with the current "popular" global warming (now climate change) scare. See Hansen's 1988 presentation to Congress or any of the IPCC projections for that matter. It's really telling when observed temps fall far below the 95% cone of certainty or even below Hansen's predictions if Congress enacted dramatic legislation to curb  $\mathrm{CO}_2$  to a "stabilized" 1988 level. The one thing we know for certain is that the predictions of the AGW crowd are greater than 95% wrong.

Human condition doesn't *seem* to do better in warmer periods, Mr. Rine missed the sarcasm; it thrives in warmer periods! He also makes Mr. Shoup's arguments more poignant addressing the new "highs" of CO<sub>2</sub> levels being reported...just in case he doesn't get it, those higher CO<sub>2</sub> levels and a continued global temperature decline over the past 15 years or so just reinforces how incorrect the CO<sub>2</sub> dominated temperature predicting models are.

Professor Robert M. Carter put together very well written compendium on the science of climate in *CLIMATE: The Counter Consensus*. This would be a good starting point for those that don't read scientific journals as a curiosity or hobby and really are not comfortable doing research. Mr. Carter even gives helpful hints on

Letters to the Editor continued on page 21



**Figure 3:** Let's mash it all up, global temperatures through half a billion years.

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# Letters to the Editor continued from page 19

that too and documents the falsehood of the point Mr. Rine is trying to convey in his 97% comments. His contention of a lack of professionalism at HGS is unfounded and he tries to justify his comments by ideological hits on the Koch brothers. The magnitude of funding research by governments on the topic of anthropogenic global warming dwarfs private efforts at funding basic research. Mr. Carter documents this and makes a compelling case of how vast the corruption is in the mission of the government funding. Why would that be a surprise to anyone?

Mr. Browning asks an interesting question: "So what are we going to do in response to climate change?" If your fear is the woefully inaccurate projections of IPCC and Hansen you need to take that

into consideration and determine whether it is worth diverting capital to thwart the perceived risk based on that "science". If you put the Holocene portion of your graph back to the Pleistocene time scale you just might observe we're facing the next Ice Age just around the corner. Are you so sure you're identifying the right risk? Moving NYC to a higher elevation would most assuredly bankrupt the country and the project just might be finished in time to watch sea level fall a couple hundred feet. As long as we're a free nation, as individuals we have the opportunity to move and adjust our life styles to suit our risk tolerance. Don't take that for granted.

Gary Lanier Geologist, Katy, TX

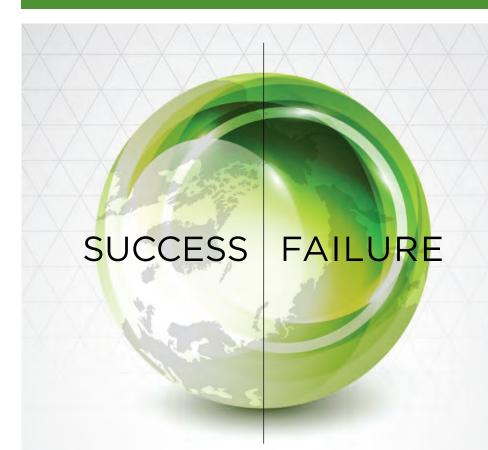
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December 2013

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The Westin Houston, Memorial City, 945 Gessner Road, Houston, Texas

# Call For Papers, Posters, Sponsors and Exhibitors

In twelve years this conference has become established as a leading technical E&P forum on Africa, with attendance that can exceed 400. Participants include operators, service companies, consultants, governments and academia. The two day program of talks, technical posters and vendors' exhibits will be held on September 9-10, 2014 in Houston, Texas.

The conference, which alternates annually between London and Houston, is organized by the Houston Geological Society (HGS) and Petroleum Exploration Society of Great Britain (PESGB). The HGS-PESGB African Conference covers all aspects of African E&P, with particular emphasis on new ideas for plays and prospects, the geology of the continent and its conjugate margins, and application of emerging technologies.

Abstracts (~200 words) should be submitted as soon as possible but no later than March 15, 2014 to the technical committee, Africa2014@hgs.org. The program will be finalized by the end of April.

Currently, volunteers are being sought to be proactive Session Chairs and anyone interested should contact the Technical Committee as soon as possible.

Details of sponsorship opportunities and display booths are available from the HGS office. To become a sponsor or inquire about exhibit space, contact sandra@hgs.org

Registration will be available from April 2014and Early Bird benefits will apply for a few weeks.

Further details will appear in the HGS and PESGB bulletins and on their websites, www.hgs.org and www.pesgb.org.uk.

Conference Committee for 2014:

Martin Cassidy (chair), Al Danforth, Ian Poyntz, Donna Davis and Sandra Babcock (HGS)

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- Student Posters / Industry support University Research
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# **TECHNICAL PROGRAM**

## **MONDAY, FEBRUARY 17, 2014**

7:00 am	Registration Opens	Fourth Floor
Breaks & Social Hour	Core Display	Fourth Floor, Pecan and Pine Rooms
	Selected Core from Emerging and Est	ablished Unconventional Reservoirs
8:00 am - 5:00 pm	Technical Talks (Oral )Sessions	Fourth Floor, Azalea Room
11:35am - 1:00 pm	Poster Sessions	Fourth Floor, Cedar and Cypress Rooms
	Invited Presentations from Industry an	nd Academic Consortia
5:00 pm - 7:00 pm	Poster Sessions and Social Hour	Fourth Floor

MORNING DAY 1

	OUTCROP TO SUBSURFACE CHARACTERIZATION / MESOZOIC SESSION SESSON CHAIRS: FRANK WALLES / JOHN BREYER	
8:00 - 8:10	Opening Remarks	
8:10 - 8:45	Eagle Ford/ Boquillas BEG Talk Steve Ruppel, University of Texas	
8:45 - 9:20	State of Stress in the Marcellus Based on Minifrac Tests Terry Engelder, The Pennsylvania State University, PA	
9:20 - 9:55	Niobrara Outcrop to Subsurface Bill Drake, Pioneer	
9:55 - 10:25	Coffee Break	

	O SUBSURFACE CHARACTERIZATION / PALEOZOIC SESSION 2 IRS: MIKE CAMERON / ERIK KVALE	
10:25 - 11:00	Utica Shallow Subsurface to Subsurface Tina Gammill, Anadarko	
11:00 - 11:35	Regional Upwelling During Late Devonian Woodford Deposition in Oklahoma and Its Influence on Hydrocarbon Production and Well Completion  Erik Kvale, Devon Energy	
11:35 - 1:00	Lunch Break	

# **Poster Sessions**

Invited Presentations from Industry and Academic Consortia

View them Monday from 11:35 am - 1:00 pm During Social Hour.....5:00 pm - 7:00 pm

Cedar and Cypress Rooms......Fourth Floor

Core Display.....
Selected Core from Emerging and Established Unconventional Reservoirs Supporting the Oral Technical Presentations

# Open during Coffee and Lunch Breaks

Pecan and Pine Rooms..... .....Fourth Floor

#### **AFTERNOON** DAY 1

	EMERGING PLAYS / MESOZOIC SESSION CHAIRS: MIKE VAN HORN / GRETCHEN GILLIS	
1:00 - 1:35	Unita Basin, Utah Newfield TBD	
1:35 - 2:10	Colombia La Luna / Gachetta—Middle Magdalena, Llanos, and Catatumbo Basins Dr. Joel Walls, INGRAIN	
2:10 - 2:45	Unconventional Targets in Saudi Arabia Brian Gratto, Saudi Aramco	
2:45 - 3:15	Coffee Break	

	EMERGING PLAYS / PALEOZOIC SESSION CHAIRS: OBIE DJORDJEVIC / ROB BEFUS SESSION CHAIRS: OBIE DJORDJEVIC / ROB BEFUS	
3:15 - 3:50	Resource Potential of the Wolfcamp-Cline and Other Formations in the Permian Basin Jackie Reed, Reed Geochemical Consulting	
3:50 - 4:25	Duvernay Raphael Wust, Trican	
4:25 - 5:00	Mississippian Lime KS/OK - Hybrid Conventional / Unconventional Components of the Inner Ramp Areas Dr. Evan K. Franseen, University of Kansas	

# **SOCIAL HOUR**

Monday from 5:00-7:00 PM **FOURTH FLOOR** 

# **TECHNICAL PROGRAM**

2014 Applied Geoscience Conference Westin Memorial City, Houston, Texas

# **TUESDAY, FEBRUARY 18, 2014**

7:00 am	Registration Opens	Fourth Floor
Breaks & Social Hour	Core Display	Fourth Floor, Pecan and Pine Rooms
	Selected Core from Emerging and	Established Unconventional Reservoirs
8:00 am - 5:00 pm	Technical Talks (Oral) Sessions	Fourth Floor, Azalea Room
11:35am - 1:00 pm	Poster Sessions	Fourth Floor, Cedar and Cypress Rooms
	Invited Presentations from Industr	v and Academic Consortia

MORNING DAY 2

- RESER	MUDROCK SYSTEMS CHARACTERIZATION - RESERVOIR INSIGHTS FOR INTEGRATION SESSON CHAIRS: TARAS L. BRYNDZIA / WAYNE CAMP	
8:00 - 8:10	Opening Remarks	
8:10 - 8:45	Microbial Relationships to TOC Original Elemental Suite Controls  Michael Tice, Texas A&M	
8:45 - 9:20	Mudrock Subsurface Diagenesis—Impact and Attributes  Aysen Ozkan, Shell	
9:20 - 9:55	Chemostratigraphy, Biostratigraphy, Lithostratigraphy, and Sequence Stratigraphy of the Eagle Ford Harry Rowe, BEG	
9:55 - 10:25	Coffee Break	

- NEW GI	MUDROCK SYSTEMS CHARACTERIZATION SESSION 6 - NEW GEOPHYSICAL INSIGHTS SESSION CHAIRS: BRUCE HART / PAUL COLLINS	
10:25 - 11:00	Barnett—Full Integration of Geophysical Characterization Through Microseismic TBD	
11:00 - 11:35	Full Integration Case Example TBD	
11:35 - 1:00	Lunch Break	

# **Poster Sessions**

Invited Presentations from Industry and Academic Consortia

11:35 am - 1:00 pm

Cedar and Cypress Rooms......Fourth Floor

# Core Display.....

Selected Core from Emerging and Established Unconventional Reservoirs Supporting the Oral Technical Presentations

# Open during Coffee and Lunch Breaks

Pecan and Pine Rooms.....Fourth Floor

# AFTERNOON DAY 2

AND PR	RESERVOIR CHARACTERIZATION TOWARDS OPTIMIZED STIMULATION SESSION 7 AND PRODUCTION SESSION CHAIRS: RANDY LAFOLLETTE / JOEL GEVIRTZ	
1:00 - 1:35	How Many Fracs Are Producing in My Horizontal Well David Craig, Reservoir Development	
1:35 - 2:10	Duvernay vs EagleFord Dr. Marc Bustin, University of British Colombia	
2:10 - 2:45	Diagnostics for Evaluating Production within Unconventional Laterals Stuart Cox, Marathon Oil	
2:45 - 3:15	Coffee Break	

AND P	R CHARACTERIZATION TOWARDS OPTIMIZED STIMULATION SESSION 8 RODUCTION HAIRS: SUNIL GULRAJANI / GREG GETZ
3:15 - 3:50	Regional PVT Consideration for Unconventional Liquid Production Kevin Ferworn, GeoMark
3:50 - 4:20	Reservoir Reach– How Do We Utilize Reservoir Characterization and Put It All Together for Enhanced Producibility for Specific HC Phases  Mark Papa, EOG Resources
4:20 - 4:50	Custom Completion Approaches Based Upon Improved Reservoir Characterization  Brain Clark, Schlumberger

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Frank Walles—Talisman Energy	Mike Cameron—Hess	Joel Gevirtz - Halliburton
David Tonner—Weatherford	Greg Moredock—Core Labs	Bruce Hart—Statoil
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Randy LaFollette—Baker Hughes	Steve Macalello—ConocoPhillips	Simon Hughes—Weatherford
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HGS General Dinner Meeting

Joseph Carl Fiduk, PhD Chief Geologist, WesternGeco Houston, Texas

# Influence of Salt Structures and Salt Deformation on Petroleum Exploration in the Deepwater Northern Gulf of Mexico

Hydrocarbon exploration beneath the shallow allochthonous salt canopy of the ultra-deepwater central Gulf of Mexico has encountered three thick, sand-rich, submarine fan successions that punctuate an otherwise relatively condensed and fine-grained basin-center stratigraphy. These sand-rich fans are Late Paleocene, Early Miocene, and Middle Miocene in age, which coincide with periods of very high sediment influx and basin margin instability. They are the primary exploration targets in most ultra-deepwater fields, recent discoveries, and failed exploration tests.

The underlying basement configuration contains the horsts and grabens of a rift basin setting. The deep parts of the rift became salt basins filled with the Jurassic Louann salt. During the Cretaceous, kilometers-thick salt nappes extruded from these basins onto the basin margins. The nappes may have coalesced to form a regional allochthonous salt nappe around the margin of the salt basins, similar to the modern Sigsbee Escarpment. Later clastic sedimentation caused deflation of the nappe, leaving remnant salt structures behind. The remnant salt bodies form the core structures over which younger sand-rich fans are folded and draped.

Regional three-dimensional Pre-Stack Depth Migration data show that remnant salt bodies from the now deflated Cretaceous nappe form the core structure in fields at Chinook and Cascade, and in recent discoveries at Stones, Das Bump, St. Malo, and Jack. Both seismic and well data show that the sand-rich outer fan of all three fan systems overlies the zone of salt nappe remnants. It would be a remarkable coincidence for the sandy outer fans of three different age depositional systems and the termination of two more widely separated (both temporally and spatially) allochthonous salt systems to stack vertically. The fact that they do suggests that both deep-water fan deposition and allochthonous salt emplacement were responding to a deeper structural control.

### **Biographic Sketch**

JOSEPH CARL FIDUK has a bachelor of science degree and a master of science degree in geology from the University of Florida

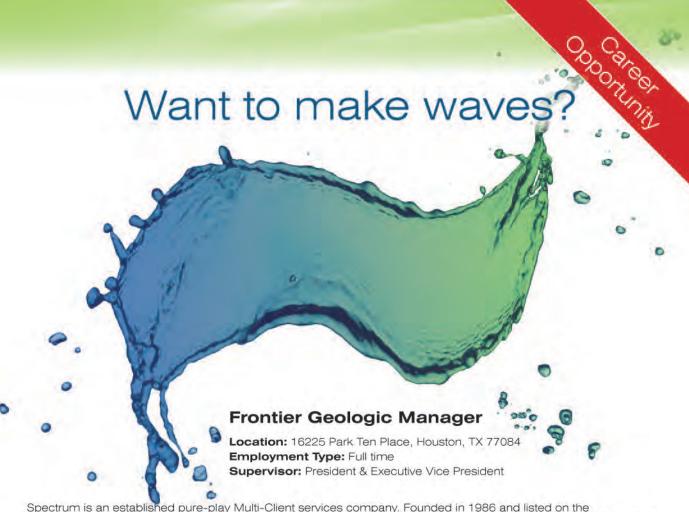
plus a master's degree in business administration from the University of Texas of the Permian Basin. He later received his doctorate degree in geology and geophysics from the University of Texas at Austin. He has worked for the United States Geological Survey, Gulf Oil, Discovery Logging, the Texas Bureau of Economic Geology, British Petroleum,



Texas A&M University, the University of Texas, and the University of Colorado. He later worked as a private consultant and Chief Geologist for CGG and CGGVeritas. He is currently Chief Geologist for WesternGeco in Houston, TX.

Dr. Fiduk's research interests cover coastal and shelfal clastic deposition, salt structural deformation and evolution, basin analysis, shelf margin to deep marine depositional processes, marine sedimentology, petroleum systems analysis, and the use of three-dimensional seismic data in petroleum exploration. He is currently involved in salt-sediment interaction research in the Flinders Ranges, South Australia, fluvial deltaic deposition in the Cretaceous Seaway of northwest Colorado, and deep marine stratigraphic analysis in the Gulf of Mexico. Dr. Fiduk teaches internal training classes on seismic interpretation and salt tectonics for WesternGeco and external industry courses for Nautilus U.S.A. and local geological societies.

Dr. Fiduk is a member of the American Association of Petroleum Geologists and a Certified Petroleum Geologist. He is also a member of the Houston Geological Society, the Society of Exploration Geophysicists, the Geophysical Society of Houston, the Society for Sedimentary Geology (SEPM) and a member of the Gulf Coast Section of the SEPM where he is the current president-elect. In his 30 plus years as a working geologist, he has published over 70 peer-reviewed abstracts and papers.



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Spectrum is hiring an experienced FGM to join our growing team. The FGM will join a team of well trained professionals working at the company's US headquarters, responsible for developing a portfolio of Multi-Client seismic programs in frontier exploration areas. Attractive salary offered with outstanding health and retirement benefits.

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### The following are preferred qualifications for the Frontier Geologic Manager role:

· Experience working for an oil and gas company

### Responsibilities/Requirements:

- Develop multi-client seismic surveys in new frontier areas.
- · Develop multi-client seismic surveys in new frontier areas.
- Estimate reserves in potential frontier areas.

- Mentor junior Geologic staff.
- · International travel is required for this position.



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December 2013

### Monday, December 16, 2013

Westchase Hilton • 9999 Westheimer Social Hour 5:30–6:30 p.m. Dinner 6:30–7:30 p.m.

Cost: \$30 Preregistered members; \$35 non-members/walk-ups

To guarantee a seat, pre-register on the HGS website & pre-pay by credit card. Pre-registration without payment will not be accepted. Walk-ups may pay at the door if extra seats are available.

# HGS International Dinner Meeting

Paul M. (Mitch) Harris Chevron Energy Technology Company Houston, Texas

# Assessing the Extent of Carbonate Deposition in Early Rift Settings – the Value of Analogs



**Figure 1.** Map showing analogs included in this study (World Imagery from ESRI ArcGIS Online Basemap).

Select lacustrine and marine depositional settings show a spectrum of styles of carbonate deposition and illustrate the types of carbonates to be expected in early rift settings, with an emphasis on microbialites and tufa. Early rift lake examples examined in this review are all from East Africa: Lakes Turkana, Bogoria, Natron-Magadi, Manyara, and Tanganyika. Other lake examples include four from the Western United States (Great Salt Lake and high lake level Lake Bonneville, Mono Lake and high lake level Russell Lake, Pyramid Lake and high lake level Lake Lahontan, and Searles Lake) and two from Australia (Lakes Clifton and Thetis). Marine basin examples are the Hamelin Pool part of Shark Bay from Australia (marginal marine) and the Red Sea (marine rift). Figure 1 presents a map showing analogs included in this study.

Landsat images and Digital Elevation Models (DEMs) for each example are used to delineate present and past lake/basin margins based on published lake-level elevations. For some examples, the shorelines representing different lake levels can be compared to evaluate how changes in size, shape, and lake configuration might have impacted carbonate development. Sequential maps showing

the lake level change undergone by Lake Bonneville/Great Salt Lake to emphasize the dynamic variation of size, shape, and configuration of the basin are presented on **Figure 3**. Searles Lake shown on Figure 3, serves as an example to illustrate the extent of carbonates (tufa in red) relative to a paleoshoreline.

The early rift lakes show a range of characteristics to be expected in lacustrine settings during the earliest stages of continental extension and rifting, whereas the Red Sea shows well advanced rifting with marine incursion and reef–skeletal sand development. Collectively, the lacustrine examples show a wide range of sizes, with several of them being large enough to produce carbonate deposits of potential economic interest. Three of the areas — Great Salt Lake and associated high-lake level Lake Bonneville, Pyramid Lake and associated high-lake level Lake Lahontan, and the Red Sea — are exceedingly complex. They illustrate a large degree of potential depositional facies heterogeneity. This is due to their size, irregular pattern, and connectivity of sub-basins within the overall basin outline.

**HGS International Dinner** continued on page 31



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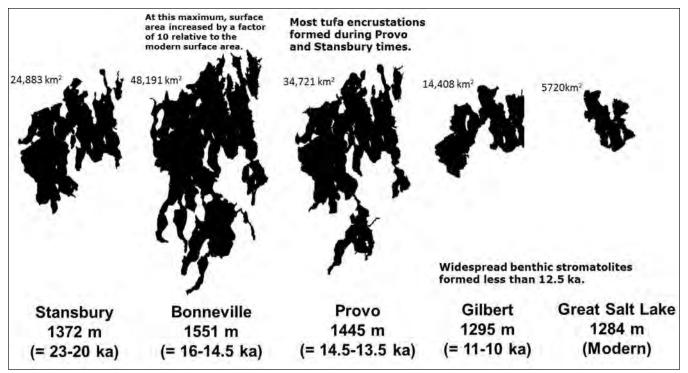
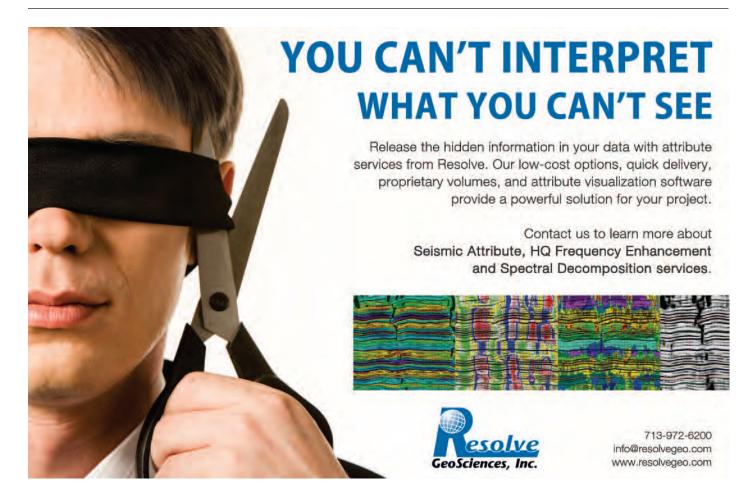


Figure 2. Sequential maps showing the lake level change undergone by Lake Bonneville/Great Salt Lake to emphasize the dynamic variation of size, shape, and configuration of the basin.

**HGS International Dinner** continued on page 33





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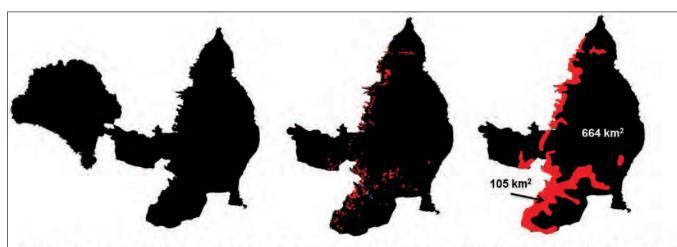
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# **HGS International Dinner** continued from page 31



- Topography suggest the majority of the tufa deposits formed at a time when Searles Lake was not fully connected toward the west and **overflow** to the southeast was occurring.
- Spring- and fracture-related tufas formed on the lake bottom in waters up to nearly 200 m deep.
- The reduced amount of tufa along the east side is attributed to continuous wave action driven by prevailing winds out of the west.

Figure 3. Searles Lake serves as an example to illustrate the extent of carbonates (tufa in red) relative to a paleoshoreline.

HGS International Dinner continued on page 35





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# **HGS International Dinner** continued from page 33

This presentation summarizes research done in collaboration with Jim Ellis (Ellis Geospatial) and Sam Purkis (National Coral Reef Institute, Nova Southeastern University). The following publications provide additional information:

Harris, P. M., Ellis, J., and Purkis, S., 2012, Analogs for Carbonate Deposition in Early Rift Settings: SEPM Short Course Notes No. 55, paper p. 1-75, and 2 DVDs.

Purkis, S. J., Harris, P. M., and Ellis, J., 2012, Patterns of Sedimentation in the Contemporary Red Sea as an Analog for Ancient Carbonates in Rift Settings: *Journal of Sedimentary Research*, v. 82, p. 859-870.

Harris, P. M., Purkis, S. J., and Ellis, J., 2013, Assessing the Extent of Carbonate Deposition in Early Rift Settings: *AAPG Bulletin*, v. 97(1), p. 27-60.

# **Biographical Sketch**

PAUL M. (MITCH) HARRIS, a Senior Research Consultant and Chevron Fellow with Chevron Energy Technology Company in Houston, Texas, performs carbonate research, technical service projects, consulting, and training for the various operating units of Chevron. His career's work has centered on facies-related,

stratigraphic, and diagenetic problems that pertain to carbonate reservoirs and exploration plays in most carbonate basins worldwide. He received his Bachelor of Science and Master of Science degrees from West Virginia University and a doctorate degree from the University of Miami, Florida. He has published numerous papers, edited several books, and



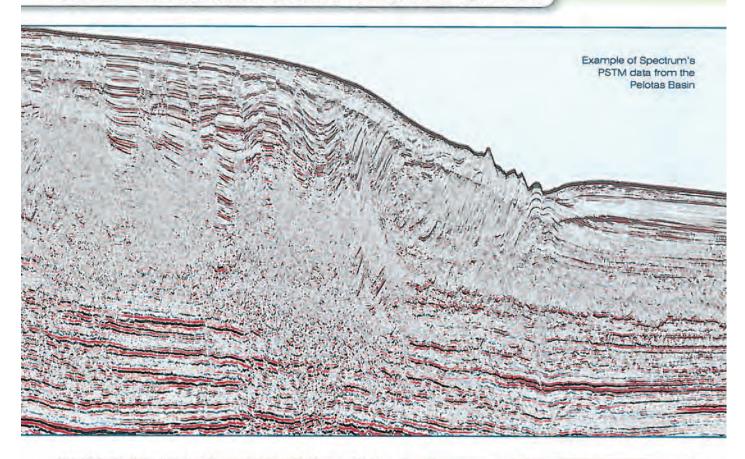
is adjunct faculty at the University of Miami and Rice University.

Dr. Harris has been a Distinguished Lecturer and International Distinguished Lecturer for the American Association of Petroleum Geologists (AAPG), received the Wallace E. Pratt Memorial Award for best original article published in the *AAPG Bulletin* in 1998, received the Robert H. Dott, Sr. Memorial Award twice for best Memoirs published by AAPG in 2004 and again in 2006, and received the John W. Shelton Search & Discovery Award for best contribution to the AAPG Search and Discovery website in 2009. He also served as President of the Society of Sedimentary Geology (SEPM) in 2010-2011. Dr. Harris was awarded Honorary Membership by the SEPM in 2002, received an Honorary Life Award from Permian Basin Section SEPM in 2011, and received Honorary Membership from AAPG in 2012.

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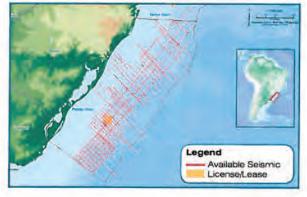
# Pelotas Basin Brazil

New 2D Multi-Client Seismic Available Q3 2013



Pelotas Basin in the southern most part of Brazil has not previously seen the same level of exploration as other basins in the region. However, Spectrum's new long-offset seismic shows promising indications of an active petroleum system in the Pelotas Basin.

The processing flow includes both pre-stack time and pre-stack depth migration. Deliverables are expected to be available to clients Q3 2013.





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# **Luncheon Meeting**

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Social 11:15 AM, Luncheon 11:30 AM

Cost: \$31 pre-registered members; \$35 for non-members/walk-ups

To guarantee a seat, pre-register on the HGS website & pre-pay by credit card. Pre-registration without payment will not be accepted. Walk-ups may pay at the door if extra seats are available.

Erik Scott Talisman Energy USA Inc.

# Characterizing the Hydrocarbon Potential of a Paleo Stepped Slope Setting, Offshore Sabah

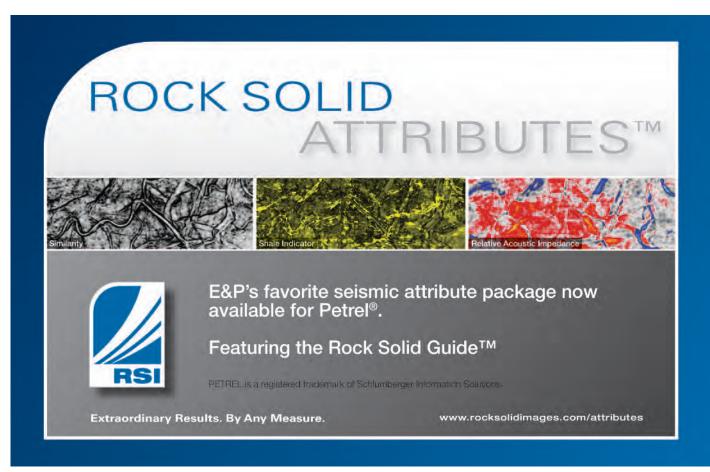
The exploration effort currently underway in Talisman Malaysia L on blocks in Eastern Malaysia, offshore Sabah, Borneo include establishing a new play in this area. Historically, previous drilling in the blocks has primarily tested the topset shelfal play system. Through new 3D seismic volumes, reprocessed 2D lines, remaining potential of the blocks are being identified. Initial evaluation of the Saracen 3D seismic volume on the north eastern portion of block SB309 identified the potential of a deep water reservoir play in the underexplored deeper part of the stratigraphic section. Investigation of the Stage 4A and 4B stratigraphy in the Saracen 3D seismic shows a number of basins along a stepped slope profile that could hold turbiditic channel and distributary systems. Seismic attribute extractions of the fill of these basins indicate patterns consistent with sediment distribution from turbidites and other sediment gravity flows. Mitigation of the main risks of reservoir quality and updip seal include detailed analysis of the seismic data as well as incorporating global analogues.

# **Biographical Sketch**

ERIK SCOTT is a Sedimentology/ Stratigraphy Advisor for Talisman Energy in the Woodlands, Texas, who works on a wide variety of projects in both exploration and production. Over his career, he has engaged in stratigraphic analyses of numerous areas that include the Gulf of Mexico, North Sea, offshore West Africa, southeast Asia, onshore North America



and the eastern Mediterranean. He received a Ph.D. in geology from Louisiana State University, studying under Dr. Arnold H. Bouma, with whom he investigated the influence of tectonics and structure on deep water sedimentation based on the turbidite outcrops in the Karoo Basin of South Africa.



# December 2013

Sunday

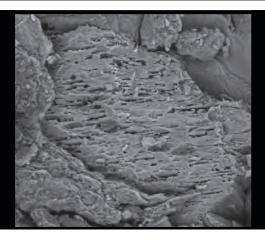
Monday

Tuesday

Wednesday

1	2	National Groundwater Association Expo Nashville, TN HGS Board Meeting 6 p.m.	4
8	9 HGS General Dinner Meeting "The Influence of Salt Structures and Salt Deformation on Petroleum Exploration in the Deepwater Northern GOM," Joseph Carl Fiduk, PhD, Chief Geologist, WesternGeco, Houston, Texas Page 27	10	HGS Environmental & Engineering Dinner Meeting Tentative
15	16 HGS International Dinner Meeting "Assessing the Extent Of Carbonate Deposition in Early Rift Settings – the Value of Analogs," Paul M. (Mitch) Harris, Chevron Energy Technology Company Page 29	17 HGS Northsiders' Luncheon  "Characterizing the Hydrocarbon Potential of a Paleo Stepped Slope Setting, Offshore Sabah," Erik Scott, Talisman Energy USA Inc. Page 37	18
22	HGS office closed 12/23/13-1/3/14	24	25 Christmas
29	HGS office closed 12/23/13-1/3/14	31	Members Pre-registered Prices: General Dinner Meeting

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**December 9-13, 2013** AGU Fall Meeting San Francisco, CA

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February 17-18, 2014 HGS Applied Geoscience Conference Integrated Approaches of Unconventional Reservoir Assessment and Optimization Houston, TX

March 22-23, 2014
Natural Gas Hydrate Systems –
Occurrence and Dynamic Behavior
Gordon Research Seminar
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# Vintage Geology

by Michael F. Forlenza, P.G.

# A Tasting of Geologically-Themed Wines

# Earthquake Zinfandel 2011 Michael David Winery, Lodi, California

15.5% alcohol 3.62 pH 0.63% titratable acidity \$21.99 retail

# The Wine

To a geologist, an earthquake is a powerful shaking of the ground following a release of tectonic forces along a fault zone. The tectonic

force in the 2011 Earthquake Zinfandel from the Michael David Winery comes from powerful fruit grown in the vineyards around Lodi, California. The red Zinfandel grape, also known as Primitivo, is planted in more than ten percent of California vineyards. The varietal is notable for its high sugar content allowing the juice to be fermented into levels of alcohol concentration exceeding 15 percent. The Michael David 2011 Zinfandel includes a blend of some Petite Sirah and Syrah.

The Michael David Winery is run by Michael and David Phillips, two brothers whose family has farmed in the Lodi region since the 1850s and cultivated wine grapes for nearly a century. According to the winemaker, David Phillips, the Zinfandel grapes for the wine were grown on old vines planted around the time of the great San Francisco Earthquake of 1906. This coincidence this historic seismic event and the powerful nature of the wine was the inspiration for the Earthquake name.

# **Geological Setting**

The grapes for the Earthquake Zinfandel were grown in vineyards planted in the alluvial soil outside of Lodi, California. Lodi lies at the northern extent of the San Joaquin Valley directly east of San Francisco, and between Stockton and Sacramento. This region is on the edge of the Sacramento River delta less than 25 miles east of the Sierra Nevada Mountains. The Lodi area has been home to grape growing since at least the 1850s when wild grapes vines were observed wound into trees along river edges. This led some early

trappers to refer the Calaveras River, which runs through the southern portion of the area, as "Wine Creek." The area surrounding Lodi has been federally-designated as the Lodi American Vinicultural Appelation (AVA).

The Lodi AVA, recognized for the distinctive quality of its wines, is noted for its classic Mediterranean climate (warm days and cool nights) and its distinctive sandy soils that provide a favorable environment for the production of high-quality wines. The Lodi

AVA was first designated in 1986. Since that time, producers began to recognize the wide variety of ecological differences across the 551,000 acres of the Lodi AVA. Local growers sought to create several subappellations that better reflect the diversity of the "terroir." These efforts resulted in an extensive historical and science-based documentation of the variations in climate, soil, and topography. This research led to the division of the Lodi AVA into seven distinct growing areas designated as sub-regions.

The Michael David vineyards lie within the Mokelumne River AVA sub-region. Named after the Mokelumne River, which drains out of the Sierra Nevada Mountains and passes through the heart of the appellation, this sub-region is the historical center of the Lodi wine growing region and is noted for its many famed old vine Zinfandel vineyards. The Mokelumne River AVA covers 87,500 acres, of which 42,000 acres are planted with wine grapes. The soil in the area formed on Pleistocene and Quaternary

alluvial fan deposits transported out of the nearby Sierra Nevada Mountains by numerous rivers. These vigorous, deep, well-drained soils are composed of sand and loam, often with fine to coarse gravel.

The book the *Geography of Wine: Regions, Terroir and Techniques*, edited by P.H. Dougherty notes that the surface in the Lodi region

Vintage Geology continued on page 43



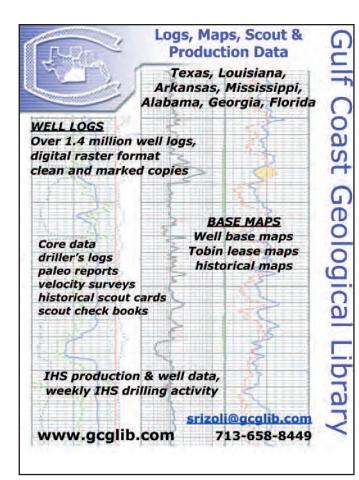


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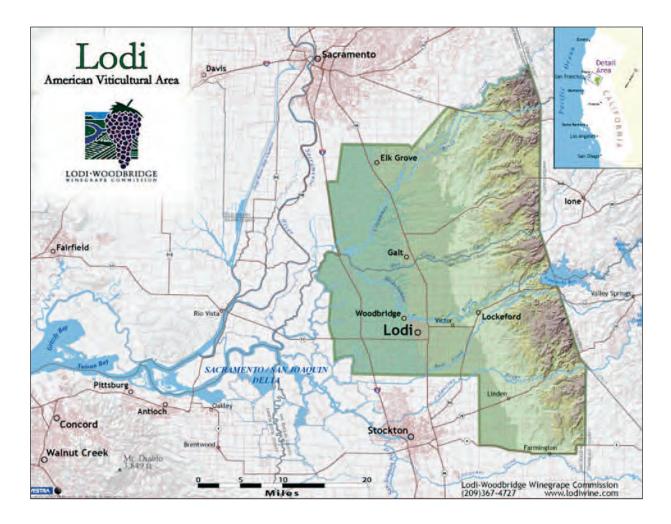
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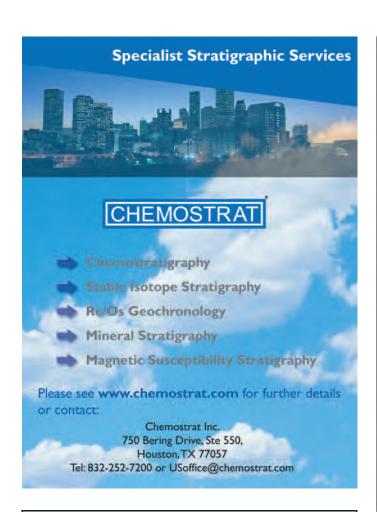
is composed of a set of geologically old (one million years before present) to recent alluvial fans and river terraces formed from glacial-fluvial and river deposits interbedded with the deposits of bay/delta incursions.

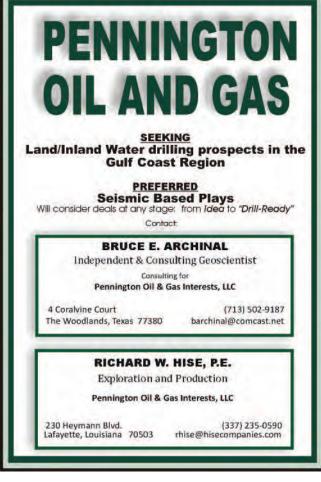
The surficial geology in this area is designated as the Quaternary Modesto Formation in the 2009 California Geological Survey publication Preliminary Geologic Map of the Lodi Quadrangle by T. Dawson. The Modesto Formation is described as being composed of arkosic alluvium, sand with minor gravel and silt. It forms low terraces, high floodplains, and alluvial fans along the Consumnes and Mokelumne Rivers. As noted in the 1939 United States Geological Survey Water-Supply Paper 780 by A.M. Piper, H.S. Gale, H.E. Thomas, and T.W. Robinson titled Geology and Ground-Water Hydrology of the Mokelumne Area, California, the recent Quaternary alluvium in the area of Lodi ranges in thickness of up to at least 50 feet and overlies the Pleistocene Victor Formation.

Ground surface elevations at the Michael David vineyards are between 20 and 25 feet above mean sea level. Ample rainfall and soil moisture retention allows most grape growers to farm without the use of irrigation, although the Michael David vineyard does draw irrigation water from the Mokelumne River. The soils and climate in this area has enabled winemakers to produce rich, concentrated New World style wines. This is due to abundant daytime heat and sometimes the addition of grape concentrate before bottling. The use of concentrate adds sugar which gives the wines the full bodied, thick and coating reds that Lodi is known for.

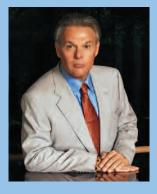
# **Tasting Notes**

The tasting panel was impressed with the dark dark purply-red color of the wine which coated the glass in thick sheets. Some of the panelist's remarks included: "subdued, but not in a bad way;" "lush, balanced tannins;" "black pepper on the finish;" and "tobacco and smoke notes." While none of the panelists noted a taste or aroma of Quaternary alluvium or arkosic gravel, the renowned wine critic Robert Parker observed abundant fruit flavors "intertwined with dusty, loamy soil" when tasting the Earthquake Zinfandel. While the area around Lodi has not experienced any recent seismic activity, Zinfandel fans may sense some shaking when tasting a glass of Earthquake.





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# Government Update

by Henry M. Wise, P.G. and Arlin Howles, P.G.

If you'd like the most up-to-date Texas rules, regulations, and governmental meeting information, we direct you to the HGS website to review The Wise Report. This report, which comes out as needed but not more often than once a week, offers the most up-to-date information that may be of interest to Texas geologists.

# AGI Geoscience Policy Monthly Review (September 2013)

#### **DOI Holds Offshore Wind Lease Sale**

On September 4, 2013, the Department of the Interior held its second competitive lease sale for renewable energy in federal waters. The sale consisted of 112,799 acres of Virginia's Outer Continental Shelf, and brought in more than \$1.6 billion in revenue. The first lease sale took place in July, and auctioned 164,750 acres of land off the coast of Rhode Island. That sale was won by Deepwater Wind New England, LLC, which had the high bid of \$3.8 million.

The increase in sales is part of President Obama's Climate Action Plan, which he released earlier this summer, an all-of-the-above energy strategy to diversify America's energy resources.

# **NRC Report Studies Land Change Models**

At the request of the U.S. Geological Survey and the National Aeronautics and Space Administration, the National Research Council (NRC) produced a report (http://nap.edu/catalog.php? record\_id=18385) synthesizing the most advanced models for assessing land change. The report focuses on how each model can best be used to help agriculture, regional planning, and disaster relief.

The report identifies six categories of modeling approaches: machine-learning and statistical, cellular, sector-based economic, spatially disaggregate economic, agent-based, and hybrid approaches, in order to compare their strengths and weaknesses at analyzing different types of land use. The report recommends opportunities for improvement within existing land change models.

# Role of Climate Change in 2012 Weather Events

The Bulletin of the American Meteorological Society released a report entitled "Explaining Extreme Events of 2012 from a Climate Perspective". The report was compiled by more than 70 scientists on 18 research teams from around the world, and examined the causes of 12 extreme weather events that occurred on five continents and in the Arctic in 2012.

The report shows that the intensity and evolution of the storms is largely due to effects of natural weather and climate fluctuations. In some events, like droughts, heat waves, and floods, evidence showed that the emission of greenhouse gases from humaninduced climate change contributed to the extreme event. The report concludes that while the events are a natural part of the climate system, the influence of human-induced climate change makes the event more likely to occur.

# New Map of Areas Most Vulnerable to Climate Change

A study published in Nature Climate Change provides a map of areas most vulnerable to climate change. Authors say they hope to give governments and environmental groups a roadmap to help them identify the places where they should invest in protecting and restoring threatened ecosystems. The paper indicates that the areas most impacted by climate change include southern Asia, western and central Europe, eastern South America, and southern Australia. Authors note this map differs from previous climate change maps, which are based largely on climate change exposure and show central Africa, northern South America, and northern Australia as the most vulnerable areas.

In this analysis, the vulnerability of each region is based on climate stability and vegetation intactness. The authors examined the expected stability of the climate with future predictions of climate change and the presence of native vegetation. The report is unique in its focus on human impact on land change through agriculture and urbanization. The map can be found at: http://www.agiweb.org/gap/email/2013/09/environment.html

# Climate Change Legislation in the 113th Congress

The Congressional Research Service (CRS) issued a report that describes and compares 52 bills introduced in the 113th Congress that directly address climate change. The CRS also issued a report on federal climate change funding from fiscal year (FY) 2008 through the President's request for FY2014. More than 75% of the \$77 billion for climate change activities from FY 2008 to FY2013 was to fund technology development and deployment. The American Recovery and Reinvestment Act of 2009 accounted for more than one-third of appropriated funding for FY 2008-2013. At least 18 federal agencies administer climate change related activities and programs.

# IPCC's Fifth Assessment Report on Climate Change

The United Nations' Intergovernmental Panel on Climate Change (IPCC) released the Fifth Assessment Report. According to the

Government Update continued on page 47

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# **Government Update** continued from page 45

report, there is overwhelming scientific evidence that greenhouse gas levels and the average world temperature continue to increase and that the global risk of dramatic changes to weather systems, global sea level, and flood and drought patterns are increasing as well. The panel reviewed latest peer-reviewed research and found with 95% certainty that greenhouse gas emissions from fossil fuel combustion are causing warmer temperatures and changing weather patterns. The panel predicts that anthropogenic warming would continue for centuries even if greenhouse gas emissions were to be stabilized.

# **Carbon Pollution Standards for New Power Plants**

The EPA proposed Carbon Pollution Standards under the Clean Air Act to cut carbon pollution from new power plants to improve public health and curb the effects of climate change. According to the EPA, the standards would ensure that new power plants are built with available clean technology, and would coincide with investments in clean energy technologies that are already being made in the power industry. The proposed standards mark the first milestone outlined in President Obama's Memorandum to the EPA on "Power Sector Carbon Pollution Standards." For existing power plants, the EPA intends to issue a proposal by June 1, 2014.

Under the proposed standards, "new large natural gas-fired turbines would need to meet a limit of 1,000 pounds of CO, per megawatt-hour, while new small natural gas-fired turbines would need to meet a limit of 1,100 pounds of CO, per megawatt-hour. New coal-fired units would need to meet a limit of 1,100 pounds of CO, per megawatt-hour, and would have the option to meet a somewhat tighter limit if they choose to average emissions over multiple years, giving those units additional operational flexibility." The proposal is open for comment and comments will be accepted up to 60 days after publication of the proposal in the Federal Register.

# EPA's Improved Environmental Impact Statement Map

The Environmental Protection Agency (EPA) has developed a mapping tool (http://nepassisttool.epa.gov/nepassist/eismapper/ index.html) that organizes Environmental Impact Statements (EIS) prepared by federal agencies, as well as EPA's comments concerning the EIS's. The National Environmental Policy Act requires federal agencies proposing projects or making decisions on major federal actions to develop an EIS. Within the database (http://www.agiweb. org/gap/email/2013/09/federalagencies.html), one can search by year, by state, or by EIS's with open comment records since 2004.

Government Update continued on page 49

# Come See What's New

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

28-29 January 2014 • Houston, Texas Norris Conference Center - CityCentre

Determining reservoir connectivity, calculating pore pressure, understanding the structural subtleties, identifying hazards, and developing accurate images (including subsalt), are deeply affected by new multi-disciplinary discoveries in science and technology. While new discoveries in the Gulf of Mexico, West Africa, East Africa, Brazil, and the Mediterranean grab headlines, what is going on behind the scenes affects everyone who works in deepwater offshore.

Exciting developments in our understanding of deepwater structure and reservoirs, along with new developments in technology, have helped propel the industry to a new level.

www.aapg.org/gtw/2014/houston/index.cfm

# **Are Shales Still Exciting?**

# Third Annual AAPG/STGS GTW: Eagle Ford + **Adjacent Plays and Extensions**

February 24-26, 2014 • San Antonio, TX

This workshop focuses on prospectivity and producibility, with an emphasis on the conditions and characteristics of successful wells, and the technologies and techniques used in achieving success.

The productive extent of the Eagle Ford has expanded, thanks to new information and understanding of the factors that make the formation producible in a particular prospect or location. The same is true of adjacent formations such as the Buda and the Austin Chalk, along with Cretaceous extensions of the Eagle Ford, which extend from the Eaglebine to the Tuscaloosa Marine Shale.

## **Topics:**

- . Geophysics, regional geology, and Eagle Ford Extensions
- · Sweet spots, reservoir quality, and the Eagle Ford
- Petrophysics
- · Geomechanical considerations
- Drilling the "new" zones: Lessons learned and "Must-Know" facts
- Completions: Hydraulic fracturing, proppant selection, understanding reservoir behaviors
- The right kind of frac: How can geologists help? What can engineers explain?
- . Decline curves: Seeking and finding answers

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# 2013 – 2014 Houston Open Enrollment Course Schedule

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# Candidate Search Underway

The nominations committee of the Houston Geological Society has begun its search for candidates in the two spring elections, one for delegates for the AAPG House of Delegates, of which a number of candidates are needed, and the other to elect a new HGS Board. To be considered for either of these you must be an active member of the HGS. Additionally, to run for the AAPG House of Delegates you must be a member of the AAPG.

If you are interested in running for an HGS office or for the AAPG House of Delegates, please contact Nominations Committee Chair Martin M. Cassidy at mcassidy.hgs@gmail.com or by phone at 713-503-8331. If you have any questions you may direct them to Martin. Information about the AAPG House of Delegates is also available from Martha Lou Broussard or Bonnie Milne, immediate past chair of the House of Delegates. Join the leadership, help guide the ship!



# **Government Update** continued from page 47.

EPA comment letters issued within the last 60 days are also available on the map.

# NOAA Releases Dataset from Deepwater Horizon Oil Spill

The National Oceanic and Atmospheric Administration (NOAA) released a dataset from the Deepwater Horizon Spill that includes more than two million chemical analyses of sediment, tissue, water, and oil, as well as toxicity results. NOAA stated the dataset "wraps up a three year process that began with the gathering of water samples and measurements by ships in the Gulf of Mexico during and after the oil release in 2010." The dataset is the result of collaboration between federal agencies, state environmental management agencies, BP, and its contractors. The collection will remain available through NOAA's archive systems for at least 75 years. A companion dataset is also available that details the ocean temperature and salinity data, currents, preliminary chemical results and other properties collected.

# House Approves Bill to Streamline Mining on US Land

The House of Representatives passed the National Strategic and Critical Mineral Production Act, by a 246-178 vote. If enacted, the bill will expedite government review of gold, silver, copper, and uranium mining on federal land. Supporters of the bill suggest the bill will help create jobs by reducing waiting periods for new mining projects, which can linger up to 10 years; opponents suggest that it would weaken environmental protections. The bill proposes to accept state review over federal environmental review and sets a 60-day limit to file legal challenges. The bill still awaits consideration and approval by both the Senate and President before becoming law.

# President Poised to Sign Bi-Partisan Helium Legislation

Both the House and Senate passed crucial helium legislation this September to avert the shutdown of the federal helium reserve near Amarillo, Texas. The reserve provides the United States with 40 percent of its helium supply, and is critical for supplying the private sector with helium for hospital equipment, solar panels, and the manufacture of computer silicon chips. H.R. 527, the Helium Stewardship Act of 2013, passed with an amendment by the House and is expected to be signed by President Obama in the coming weeks.

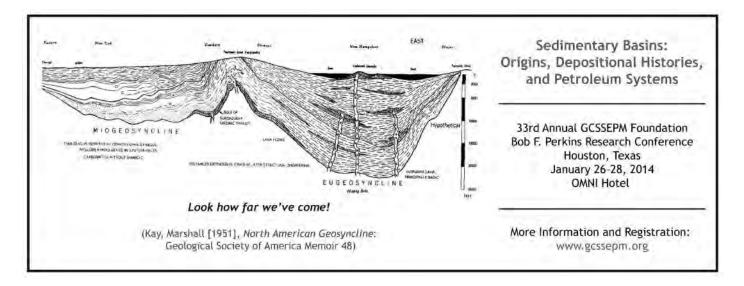
Revenue from the helium reserve helps provide funding for national parks, environmental remediation, and will help to reduce the national deficit by \$90 million over the next decade.

# From the Federal Register

NASA – National Aeronautics and Space Administration issued a statement of their intent to prepare an environmental impact statement for the Mars 2020 mission. NASA is seeking input on environmental issues and concerns associated with the proposed mission. "The mission would be designed to seek signs of past life on Mars, collect and store a compelling set of soil and rock samples that could be returned to Earth in the future, and test new technology to benefit future robotic and human exploration of Mars." Comments should be directed to Mr. George Tahu (mars2020-nepa@lists.nasa.gov).

**DOI** – The Department of the Interior will administer a survey through the National Park Survey to gauge public understanding of climate change. As part of the Climate Change Action Plan, the National Park Service will promote resources and public understand of how climate change will affect the National Parks.

NASA – The National Aeronautics and Space Administration opened registration for the 2014 Unmanned Aircraft Systems Airspace Operations Challenge. The Challenge encourages development of new technologies or application of existing technology to stimulate innovation in technologies of interest and value to NASA. The competition will be held April 28-May 2, 2014 at Camp Atterbury near Edinburgh, Indiana.

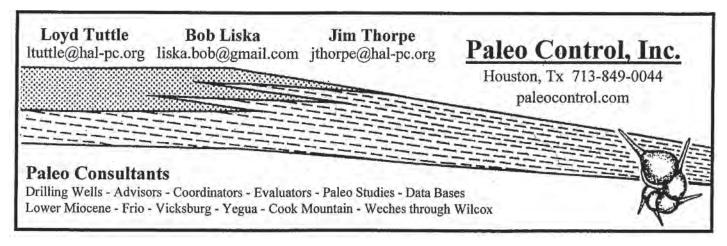


# **Geological Humor**

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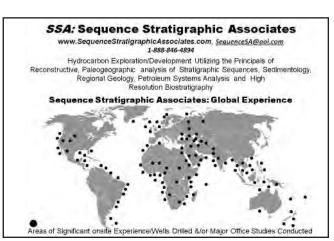
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# **HGS Welcomes New Members**

# **New Members Effective October 2013**

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James Kim

Samuel Landis

Robert Magee Tosin Majekodunmi Steve McAllister Andrew McCallister Linda Noyes David Olgaard See Hong Ong Spencer Riley Ira Rodney Prabhdeep Singh (Prab) Sekhon Jordan Smith Christopher Stamps Carl Swenberg Mike Timmer Laura Unverzagt

Sheila Wilkins Guanghua Xue **EMERITUS MEMBERS** Dennis Bell Robert Johnson Bill Morrison Geoffrey Allen

STUDENT MEMBERS Clint Barnette Earl Burke Michael Connell Zheniia Gao Muhammed Idrees Justin Jordan

Othneil King David Lankford-Bravo Zhiyang Li Marcos Mendez Fanjin Meng Alice O'bryan Onochie Okonkwo

Brvan Ott Richard Pagel Lily Seidman Dustin Villarreal Justus Wappel Weihang Wei Weihang Yang Mei Zhong

STUDENT MEMBERS

## **New Members Effective November 2013**

**ACTIVE MEMBERS** John Bates Franklin Bay Ted Brain William Rex Butler Luiz Alberto Cordolino Christopher Foster Jennifer Graham Joseph Greer Hillary Hall Sara Hanson-Hedgecock Roberto Heller Corev Holton

Mark Houston Andy Huggins Dawn James Gunther Kampfer Monica Keirn Nathaniel Liodas Tebis Llobet Maria Paz Menacho Carlos Molinares-Blanco John Murray Jacquline O'Connor Keith Owen Monica Rasmussen Manny Redifer

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Silvio Teixeira **EMERITUS MEMBER**  Adam Collard Corbin Crews Dilan Derici Murad Hasan Zeeshan Khattak Yun Li Patrick Loureiro Maisha Muiib Abiola Olabode Wei Si Dean Southeard Lei Sun

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# **HGS** Bulletin Instructions to Authors

All materials are due by the 15th of the month, 6 weeks before issue publication. Abstracts should be 500 words or less; extended abstracts up to 1000 words; articles can be any length but brevity is preferred as we have a physical page limit within our current publishing contract. All submissions are subject to editorial review and revision.

<u>Text</u> should be submitted by email as an attached text or Word file or on a clearly labeled CD in Word format with a hardcopy printout to the Editor.

Figures, maps, diagrams, etc., should be digital files using Adobe Illustrator, Canvas or CorelDraw. Files should be saved and submitted in .ai (Adobe Illustrator) format. Send them as separate attachments via email or CD if they are larger than 1 MEG each, accompanied by figure captions that include the file name of the desired image. DO NOT EMBED them into your text document; they must be sent as separate files from the text. DO NOT USE POWERPOINT, CLIP ART or Internet images (72-DPI resolution) as these do not have adequate resolution for the printed page and cannot be accepted. All digital files must have 300-DPI resolution or greater at the approximate size the figure will be printed.

<u>Photographs</u> may be digital or hard copy. Hard copies must be printed on glossy paper with the author's name, photo or figure number and caption on the back. Digital files must be submitted in .tif, .jpg or .eps format with 300-DPI or greater resolution at the printing size and be accompanied by figure captions that are linked by the file name of the image. The images should be submitted as individual email attachments (if less than 1 MB) or on CD or DVD.

# Advertising

The *Bulletin* is printed digitally using QuarkXPress. We no longer use negatives or camera-ready advertising material. Call the HGS office for availability of ad space and for digital guidelines and necessary forms or email nina@hgs.org. Advertising is accepted on a space-available basis. **Deadline for submitting material is 6 weeks prior to the first of the month in which the ad appears.** 

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No. of Issues	Random* Eighth	Random* Quarter	Random* Half	Random* Full	Full	Full	Full	Half	Full	Quarter
10	\$823	\$1,387	\$2,488	\$4,734	\$5,680	\$7,830	\$7,560	\$6,858	\$6,750	\$2,700
9	\$823	\$1,387	\$2,488	\$4,734	\$5,680					
8	\$750	\$1,260	\$2,242	\$4,307	\$5,169					
7	\$665	\$1,123	\$2,014	\$3,834	\$4,600					
6	\$590	\$990	\$1,782	\$3,392	\$4,069					\$1,890
5	\$497	\$837	\$1,503	\$2,860	\$3,432	\$4,698	\$4,536	\$4,104		
4	\$405	\$683	\$1,223	\$2,326	\$2,792					
3	\$327	\$550	\$990	\$1,886	\$2,262					\$1,080
2	\$232	\$392	\$704	\$1,339	\$1,607					
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One year	\$3,000.00	\$2,800.00	\$2,500.00	\$1,400.00	Free	Free
6 months	\$2,000.00	\$1,800.00	\$1,500.00	\$750.00	Free	Free
3 months	\$1,500.00	\$1,300.00	\$1,000.00	\$450.00	Free	Free
Monthly	\$ 700.00	\$500.00	\$ 400.00	\$200.00	Free	Free

We still offer Geo-Jobs - where your company can post job openings for 14 days at \$50.00 or 30 days at \$100.00.

For more information regarding website advertising visit HGS.org or email nina@hgs.org.

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# Application to Become a Member of the Houston Geological Society

# Qualifications for Active Membership

- Have a degree in geology or an allied geoscience from an accredite college or university; or
- 2) Have a degree in science or engineering from an accredited college or university and have been engaged in the professional study or practice of earth science for at least five (5) years.

# Qualifications for Associate Membership (including students)

- Be involved in the application of the earth or allied sciences.
- Be a full-time student enrolled in geology or in the related sciences

# Apply online at www.hgs.org and click on Join HGS

Annual Dues Expire Each June 30. (Late renewals – \$5 re-instatement fee Annual dues are \$24.00; emeritus members pay \$12.00; students are free.

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s.	Card #
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☐ AAPG member No.:		Endorsement by HGS member (not required it active AAPG member)	ured II active AAPG member)
Professional Interest:		Name:	
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☐ International E&P	☐ Gulf Coast E&P (onshore & offshore)	Signature	Date
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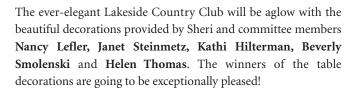
# Houston Petroleum Auxiliary Council News

Edie Bishop, HGS Liaison 713-467-8706 or ewbishop@bishorb.com

There is a saying that lightning never strikes twice in the same place but members hope that snow falls twice for the same event. The last time HPAC held a holiday musical at the Lakeside Country Club, there was a beautiful snowfall during the program. We will never forget the sight of the white blanketing of snow with the American flag waving on the terrace while listening to the "Sound of Music." Once again, Lakeside will be alive with this wonderful sound of music on December 10th as HPAC rings in the holiday season with yet another grand program.

The Kingsmen Chorus, one of the winners of the "Best Quartet in America" award, will perform under the direction of John Devine. This group, a four-part harmony, was formed about eighteen years ago and will have about twenty members performing. Along with the music, a very special luncheon has been selected by C

the music, a very special luncheon has been selected by Chair **Sheri McQuinn**.



The collaboration among the four Auxiliaries, Geological, Professional Landmen, Geophysical, and Petroleum Engineers which form HPAC, has been a blessing. Each of these auxiliaries had its own unique attributes which we all now enjoy. Sheri's husband **Mike McQuinn** is a member of Houston Association of Professional Landmen and it is a well known fact that the Landmen know how to throw a great party. This translates into a must attend event for HPAC on December 10th! Mark your calendars now and bring a friend. Guests are always welcome.



Katherine McKinney, Lynn Williams, and Mary Harle at the Fall Luncheon



1st VP Sally Blackhall, KHOU host Deborah Duncan, Neil Bush, and Luncheon Chair Shirley Gordon.

HPAC members are benefiting from President Barbara Peck and First Vice President Sally Blackhall's hard work, planning and production of this year's outstanding programs. Successful leaders make for a successful organization. Thank you, Barbara and Sally.

Editor Michael Forlenza's October Bulletin column on America's First Paleontologist with its companion photograph of a specimen at the American Museum of Natural History in New York reminded me yet again of how important the Houston Museum of Natural Science (HMNS) is to the Houston geological community. Guest Night is always well received and HGS will host this year's AAPG annual convention attendees with an evening at the museum. Because this is the season of giving, I should like to invite members of HPAC and HGS to consider volunteering at HMNS. You may reach the Director of Volunteers Lynn Wisda, wife of HGS member Mike Wisda, at 713-639-4609 or lwisda@hmns.org.

Remember that in addition to our regular luncheon programs and this special interest group, we have other interest groups: **Bridge: Audrey Tompkins** 713-868-0005 or **Daisy Wood** 832-581-3231, and **Book Club: Phyllis Carter** 281-397-9888 or **Anita Weiner** 713-572-9874.

Geologists, please encourage your spouses to join HPAC, where they will have an opportunity to meet other spouses of geologists, geophysicists, engineers, and landmen. They will participate in informative and entertaining programs, delicious lunches and welcoming fellowship. The HPAC membership form is included in the HGS *Bulletin*. Contact **Edie Bishop** at 713-467-8707 or ewbishop@bishorb.com for more information.

# **HPAC**

2013–2014 dues are \$20.00 Mail dues payment along with the completed information

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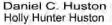
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# Robert D. Perez

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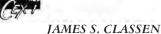
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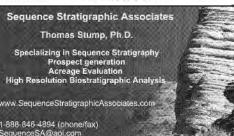


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