AAPG EXPLORER

JANUARY 2015

Sailing Against the Wind

A tough year – but not for everyone

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Vol. 36, No. 1
January 2015

AAPG EXPLORER

PRESIDENT'S COLUMN

Doing what we do better ...

The Value of AAPG Membership

By RANDI MARTINSEN

A frequent focus of discussion between members of the Executive Committee and the AAPG staff is membership – how to better serve it, of course, but also how to grow it and retain it.

It certainly was a hot topic of discussion at the two AAPG House of Delegates mid-year meetings I attended, as well as at the Corporate Advisory Board (CAB) meeting I attended in November.

During November's CAB meeting a point was made that industry appears to place less value on membership in professional societies than it did years ago when many of our CAB members joined AAPG – circa 1980. At that time, geoscientists were strongly encouraged to attend luncheon meetings of local associations and be actively involved in one or more professional associations.

Perhaps this was the prevalent corporate attitude, because at that time AAPG and our affiliated and sister societies were the main sources of technical information.

Personally, at my company (Cities Service) I was encouraged to attend any and all local lectures, short courses and field trips and to be actively involved with professional associations. I also was strongly supported by my company when I wanted to give presentations at both local society meetings and at the AAPG Annual Convention and Exhibition. My bosses viewed geoscientists giving professional presentations and writing papers as good PR for the company.

But in today's "lean and mean" working environment, geoscientists more often

MARTINSEN

Active participation in professional associations is still extremely important to us as individual geoscientists.

are supported to be active in professional associations as long as it is on their own time – and it does not interfere with getting their work done.

* * *

Today technical information is readily available from a number of sources to geoscientists: the Internet, corporate subscriptions to Datapages and other online libraries. AAPG even gives away to the public much cutting-edge technical information via Search and Discovery.

So, from both a corporate and an individual viewpoint, perhaps it is not necessary to belong to any professional association to stay technically competent.

But if I can get my technical information elsewhere and if the value of membership in professional associations – and more importantly, the value of *active* participation in professional associations – is no longer recognized as having good value to our companies, then why belong to AAPG?

This is something I've pondered a lot the past year.

Here's what I think.

Often when I attend conferences on behalf of AAPG I'm asked to address the value of membership in AAPG. And while I believe membership in AAPG has a lot of value to offer (for pretty low dues), I believe our most valuable asset is our community. We are an incredible, diverse, global community of talented, creative, passionate, fun-loving geoscientists, and I'm very grateful to be part of this community.

AAPG has allowed me to build a diverse network of colleagues and friends. I have this wonderful group of geoscientists that I can contact if I need some data or to find out what is happening, or if I want help solving a perplexing problem, or to help me make sure my lectures are up-to-date and relevant.

As we all know, the petroleum industry that employs many of us is highly cyclical in terms of business and employment opportunities – and currently we are in a bit of a downswing. Most companies have reduced the number of new hires and some have implemented job freezes.

If the price of oil continues to drop, at what point will companies start laying-off geoscientists?

During the downturns (and also the upturns), the next job opportunity you have could well come from someone

See **President**, page 4

Candidates Announced for 2015-16

AAPG officer candidates have been announced for the 2015-16 term.

The person voted president-elect will serve in that capacity for one year and will be AAPG president for 2016-17. The terms for vice president-Regions and secretary are two years.

Biographies and individual information for all candidates is available online.

Ballots will be mailed in spring 2015.

The slate is:

President-Elect
❒ Paul W. Britt, Texplore Inc., Houston.
❒ Gretchen M. Gillis, Aramco Services Co., Houston.

Vice President-Regions
❒ Adebayo O. Akinpelu, Fixital Ltd., Lagos, Nigeria.
❒ Peter M. Lloyd, Asia Pacific Training Ltd., Falicon, France.

Secretary
❒ Heather L. LaReau, Noble Energy Inc., Denver.
❒ Nicole S. Morris, Atlas Resource Partners, L.P., Fort Worth, Texas.

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REGULAR DEPARTMENTS

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Cobalt International Energy produced over 3,700 bopd and 16.3 mmcfd at its Orca-1 presalt well in Block 20/11 of the Kwanza Basin offshore Angola. See story on page 12.

Photo courtesy of Cobalt International Energy.

Left: Beach Energy found Jurassic oil in the western flank Cooper-Eromanga Basin play in South Australia. The well found oil in two zones within the McKinlay-Namur section plus Mid-Namur and Birkhead reservoir potential. See story on page 12.

Photo courtesy of Beach Energy.

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Third Charles Taylor Fellowship Set Feb. 9 in Houston

The third annual meeting of the Charles H. Taylor Fellowship, featuring a keynote address by AAPG award winning geoscientist David N. Awwiller, will be held Feb. 9 in Houston at the Norris Conference Center-CityCentre.

The one-day gathering, convened under the leadership of AAPG Elected Editor Michael L. Sweet, provides an opportunity for face-to-face interaction among members of the AAPG editorial board – plus a reception and dinner.

The Charles Taylor Fellowship comprises current and all former members of the Association's editorial boards. It was established by the AAPG Executive Committee as a way to help ensure that the BULLETIN remains the world's premier scientific journal of energy geoscience.

This year's agenda calls for attendees to discuss several subjects related to AAPG Publications, such as the formation of the new AAPG Book Editorial Board, the creation of an AAPG Publications App, and the impact report from the first nine months of the new AAPG Wiki.

Other priorities include discussions of the criteria used in selecting "best papers"; improving editorial board operations; identifying suitable board and reviewer performance metrics and standards; updating the reviewer database; and determining the winners of this year's AAPG technical awards.

Awwiller, with ExxonMobil in Houston, is this year's winner of the Wallace E. Pratt Memorial Award, presented to honor and reward the authors of the best AAPG BULLETIN article published each calendar year.

Awwiller was co-author of "Organic Matter-Hosted Pore System, Marcellus Formation (Devonian), Pennsylvania," which appeared in the February 2013 AAPG BULLETIN.

His co-authors were Kitty L. Milliken and Tongwei Zhang, both with the Bureau of Economic Geology, Austin, Texas, and Mark D. Rudnicki, who like Awwiller is with ExxonMobil.

Invitees can make hotel reservations directly with the Norris Conference Center; for more information contact Paula Sillman at psillman@aapg.org.

President
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in your AAPG network – yes, that same network that many of you have cultivated at local, national and international meetings without ever thinking that you personally would one day be looking for a friendly hand.

* * *

What else does our AAPG community have to offer?

Many have found it to be a place to develop and hone communication, management and leadership skills. If you want the chance to showcase your capabilities, AAPG could very well provide the setting.

Also importantly, AAPG is where we can demonstrate these abilities before our employers may be willing to provide such opportunities. (And AAPG staff is working on additional ways that we can help develop these soft skills that are so important to a geoscientist's career.)

The importance of mentoring and leadership is something that is definitely on our CAB members' minds, perhaps because, like many in our profession they are close to retirement and concerned about the "passing of the baton" to the next generation of leaders.

Overall, the CAB sees mentoring and facilitating opportunities to develop and demonstrate leadership as something that makes AAPG relevant to our industry.

An added benefit that at least one of our members subscribes to is that now, no matter where her business takes her, she has people to contact to find out about opportunities and about possible contacts.

This member also said wherever she travels she has friends to meet and places to stay. Her AAPG network has not only contributed to her business opportunities, it has made her business (and vacation) travel more convenient and enjoyable.

The bottom line is this: Even if corporations do not view membership in professional associations to be as important as they once did, active participation in them is still extremely important to us as individual geoscientists.

We are responsible for ourselves and for how we develop as professionals and for how our careers develop and progress.

* * *

So, why join AAPG and be an active member?

Because active membership in AAPG will help you become the best geoscientist you can be.

It will help you develop as a professional geoscientist.

It will allow you to create the career that is best for you – and possibly (probably?) connect you with some great life-long friends.

And I'm sure that for many of you, these reasons are just the start to many other benefits. After all, we know better than anyone that digging a bit deeper often brings even more rewards.

AAPG membership – it's a good message to know. And at the start of a new year, it's a good message to share.

Voters: 'Not in my backyard'

How the Shale Boom Birthplace Came to Ban Fracturing

By HEATHER SAUCIER, EXPLORER Correspondent

It is perhaps the most ironic move in the industry in years.

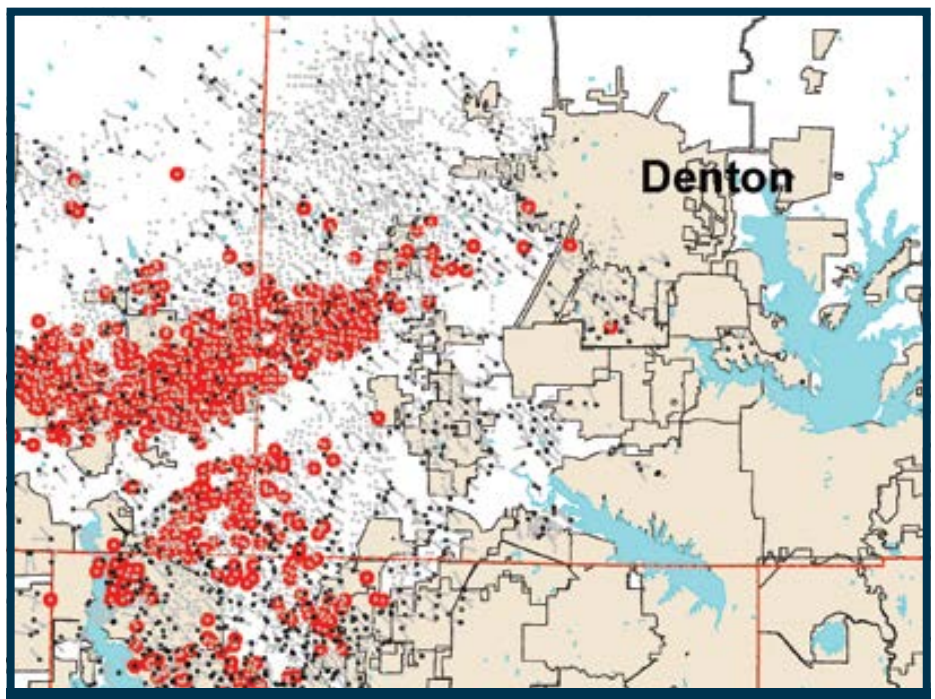
The Barnett Shale – considered the birthplace of the shale boom, where the right combination of horizontal drilling and hydraulic fracturing unleashed the nation's sweetly flowing unconventional hydrocarbons – has made history once again, but in a surprising way.

On Nov. 4, citizens in Denton – a city on the edge of the Barnett Shale in north Texas with a population of 123,000 – voted to ban hydraulic fracturing.

The ban was signed into law on Dec. 2, making Denton, which has 280 active gas wells, the first city in the Lone Star State to outlaw the practice.

In the wake of the vote, a storm continues to brew among a hodgepodge of players. There are relieved citizens touting their victory. There is the Denton mayor, who staunchly believes the ban will hardly put a dent in city coffers, much less operators' future plans to drill. There are the operators who vehemently disagree. There is the Texas Railroad Commission, which oversees drilling permits in Texas and promises to override the decision it considers illegal.

Then, there is the story behind the story – the convoluted path that made this perfect storm possible.



Familiarity breeds contempt? Denton, Texas, and its location near a lot of wells.

Did That Really Happen?

Eclipsed by the news of Republicans taking Congress from the Democrats the night of the election, the ban on fracturing supported by 59 percent of Denton voters quietly ushered in a new order.

Riled by the local campaigns of Frack Free Denton and the Denton Drilling Awareness Group (DDAG), citizens cast their ballots to not only stop hydraulic fracturing but to prevent a host of other objectionable practices they lumped under the "fracking" umbrella.

"They can't drill a well 300 feet from a park anymore. They can't flare 200 feet from a child's bedroom anymore," said Cathy McMullen, leader of the DDAG who was quoted in the Fort Worth Star-Telegram the day after the election.

Denton Mayor Chris Watts said residents have long complained about rigs outside their windows, concerns over contaminated water, bright lights and dust. When the city increased setbacks between wells and homes to 1,200 feet in 2013, it was not enough to quell residents, who wanted hydraulic fracturing banned altogether and gathered a reported 2,000 signatures of support.

Last July, Denton's city council voted 5-2 against a proposal to ban hydraulic fracturing and instead put the issue before voters.

"Any place has the right to exercise a vote, and Denton went all the way," said Ken Morgan, director of the Energy Institute at Texas Christian University (TCU) in Fort Worth, Texas. "What's going to happen to Denton is probably a fair amount of lawsuits."

Two already have been filed by the Texas Oil & Gas Association and Texas General Land Office, claiming state law pre-empts local laws.

A City-Created Problem

Things didn't have to go this far.

That is the opinion of Ed Ireland, executive director of the Barnett Shale Energy Education Council and former member of the City of Denton Gas Drilling Task Force.

Prior to the election, Ireland spent

See **Restraining Order**, page 8

Restraining Order

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months disseminating information to the public about the myths and facts of hydraulic fracturing – to little avail.

If the devil is in the details, then the details of the city's well permitting process lie at the heart of the controversy.

As drilling in the Barnett Shale began to approach Denton's city limits years ago, the city, in a curious move, tasked its fire department with issuing local drilling permits, Ireland said. Unfamiliar with its new domain, the fire department issued permits not for individual wells, but for entire well pads – in perpetuity, he said.

At the time, most of the drilling took place in rural parts of the city, so the fact that individual wells were not permitted was not an issue, Ireland said.

Then, the city began to grow.

"The city allowed the developers to build houses up to 250 feet away from existing pad sites," Ireland said. "So you've got operators who can drill forever and now houses up to 250 feet from pad sites.

"And the operators come back to drill and say, 'I have a permit,'" he said. "It's a city-created problem."

Not So Fast

The City of Denton contests Ireland's claims, insisting that individual wells have always required local permits.

"The development plat has always been intended to be the first approval required for a gas well in the city," said Public Information Officer Lindsey Baker in an email. "Once a play was approved in accordance with Denton Development Code guidelines, a gas well permit was issued by the Fire Department."

She added that each gas well development plat required the operator to identify various setback distances to each specific well's surface hole location before a permit was issued to a specifically identified well.

The city's mayor seems hazier on the issue. When asked about the fire department issuing permits solely for well pads, he said, "That may be accurate but that was a long time ago. That was before my time."

In October 2013, Denton officials took their governance to task, asking a Denton County court for a restraining order against EagleRidge Energy, a Dallas-based company, claiming it was drilling wells that violated the city's newly adopted and more stringent setback regulations.

District Judge L. Dee Shipman dismissed the request after reading EagleRidge's plat, which was issued in 2002.

"It looks to me like in their plat the city gave them the right to drill on that property multiple wells as long as they're approved by the Texas Railroad Commission," Shipman said, according to a transcript of the hearing. "And then you took that right to drill those wells that are properly approved by the Texas Railroad Commission away from them in the future. Why isn't that deprivation of a vested right?"

Days later the city dropped its request.

"A plat is a plat – not a permit for one well," Ireland said. "That plat permit is for as many wells as you want to drill. They have an entire pad site permitted in perpetuity."

Means to An End

The ban on hydraulic fracturing is really a ban on drilling, Ireland said.

"We are talking about wells in the Barnett Shale," he said. "They don't produce anything unless they are hydraulically fractured."

Somehow that message got lost as anti-frac'ing groups posted alarming claims on their websites. Frack Free Denton wrote: "Fracking (sic) is a major reason why Denton has the most unhealthy air and highest rates of childhood asthma in Texas," and "Fracking a single well contaminates four-eight million gallons of precious freshwater forever."

When asked about the ban on hydraulic fracturing specifically, Watts said he did not believe it would have dire effects.

"That's just one step of the completion process. Gas and oil wells that are producing now will go on producing," he said. Operators "can drill new wells, but no frac'ing."

He added that he didn't expect the city to take a huge financial hit either.

A July 2014 report issued by The Perryman Group of Waco, Texas, estimated that a hydraulic fracturing ban could potentially cost Denton $251.4 million in economic activity and 2,000 jobs over the next 10 years. It also could cost the city and its school district $5.1 million and $4.6 million in revenues, respectively. The study was commissioned by the Fort Worth Chamber of Commerce, which represents some industry players in the Barnett Shale.

"Without frac'ing, we can't drill any wells," said AAPG member Herb Martin, vice president of exploration at Devon Energy, the largest operator in the Barnett Shale since it acquired Mitchell Energy in 2002. "There is no play."

Look Before You Leap

Texas is no stranger to the oil and gas industry, and people buying houses here need to do their homework before settling down, said AAPG member David J. Entzminger, past president of the AAPG Southwest Region.

"It's kind of like buying a house in a floodplain," he said. "It's your option if you want to buy in that floodplain, but eventually – and it may be years later –

See **Public Image**, page 20

A year of anticlimax

The Year of Discovery Saw Few Surprises

By DAVID BROWN, EXPLORER Correspondent

In international exploration, the new normal is starting to look like the old normal.

And 2014 looked a lot like the year before.

"Our sense is, like 2013, it wasn't a standout year. The issue is that we had three years of standout volumes. So 2009 to 2011 were just remarkable years," said Julie Wilson, senior exploration analyst for Wood Mackenzie in Houston.

The past year in exploration appeared to represent "more of a return to normal, to more typical years," she said.

Not that there weren't some meaningful exploration wells, even important wells. But the world didn't see a bust-out of big, surprising, high-volume discoveries.

Mostly, it got a healthy dose of modest discoveries.

"One of the trends we're seeing over the last few years because of smaller volumes is that commerciality is becoming more of a problem," Wilson said – something that won't improve with lower production prices.

Also, fewer big discoveries mean less follow-up exploration and fewer follow-on finds.

"It almost like a satellite discovery without a hub," Wilson noted. "You need a hub first."


WILSON

> "One of the trends we're seeing over the last few years because of smaller volumes is that commerciality is becoming more of a problem."

The Polar Express

Russia's Rosneft might have brought in the most meaningful well of the year when it declared victory with its Universitetskaya-1 discovery in the Arctic Kara Sea, drilled with partner ExxonMobil.

The well, in the East-Prinovozemelskiy-1 license area, reached a depth of 6,932 feet in 266 feet water depth and opened up estimated recoverable field reserves of 130 million tons (950 million barrels) of oil and 338 billion cubic meters (17.7 trillion cubic feet) of gas, according to Rosneft.

"What was interesting there is that there's significant liquids volume," Wilson said. "Clearly, it is a significant structure."

Russia promptly named the new field Pobeda, meaning "Victory."

Rosneft later said about 30 structures were found in three East Prinovozemelskiy areas of the Kara Sea, with a combined total resource base estimated at 13 billion tons of oil equivalent.

Because of Western sanctions against Russia, ExxonMobil began pulling back from its ventures with Rosneft, and timing for the new discovery's development was uncertain.

However, Pobeda signaled a big step forward for Arctic exploration. Several companies also reported discoveries, mostly small, in parts of the Barents Sea. At 130 million tons of oil, the Pobeda field would be significantly larger than Statoil's 2011 Johan Casterberg discovery in the western Barents Sea.

Another Arctic project under way is Gazprom's Prirazlomnoye field, which is already producing and contains an estimated 72 million tons of oil reserves, according to the company.

One thing that didn't happen in 2014: Shell didn't drill in U.S. Arctic waters on its leases in the Beaufort and Chukchi seas. Wilson predicted exploration there would move forward at some point.

"I think Shell and others will eventually drill in the Arctic on the U.S. side," she said, "and also in the Canadian Arctic."

Another Opening

A pair of discoveries offshore Senegal opened a new play in that area, where Cairn Energy PLC, ConocoPhillips Co. and FAR Ltd. are exploring as joint venture partners. Senegal's national oil company Petrosen also has a 10 percent working interest.

Their FAN-1 well on the Sangomar Deep block targeted multiple, stacked deepwater fans and found oil pay in Cretaceous sands. The well was drilled to a target depth of 16,165 feet, about 62 miles offshore.

The partners later announced a second light oil discovery on the block, with the SNE-1 wildcat hitting an Albian sandstone reservoir.

"The play-opening discovery offshore Senegal was very good news for that margin, which hasn't had a lot of good news lately," Wilson noted.

She said success offshore Senegal portends more exploration in the northern reaches of the west African offshore provinces, especially off Mauritania.

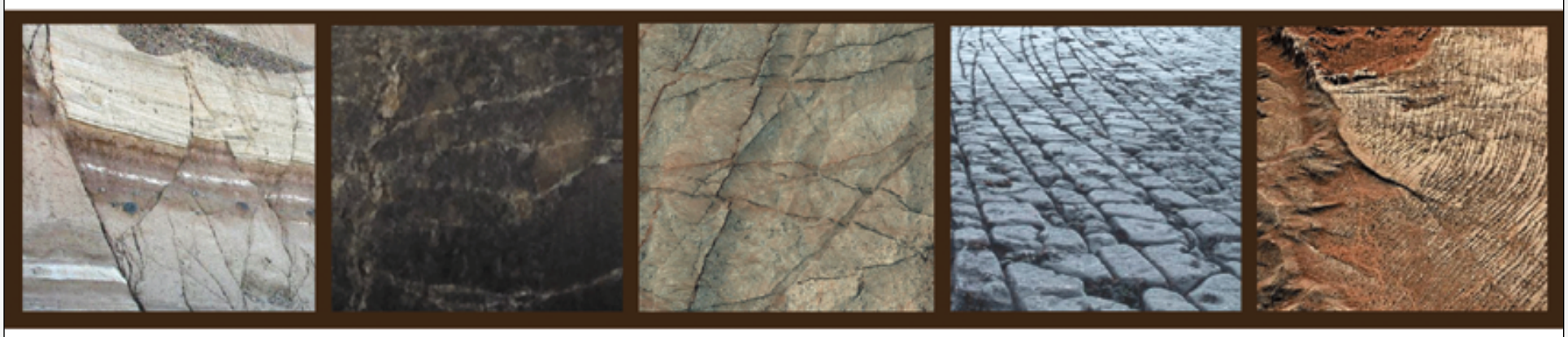
Eni S.p.A. and Shell reported good discoveries offshore Gabon and the Congo in 2014.

Eni S.p.A. estimated a discovered total of 1 billion barrels of oil equivalent, 80 percent crude, in a Lower Cretaceous presalt sequence on the Marine XII block offshore Congo.

"To me, the west African presalt discoveries in the Congo and Gabon were encouraging," Wilson said, "but there's a caution in the modest size of the discoveries and the gas content."

See **Gulf of Mexico**, page 14

Applied Geoscience Conference



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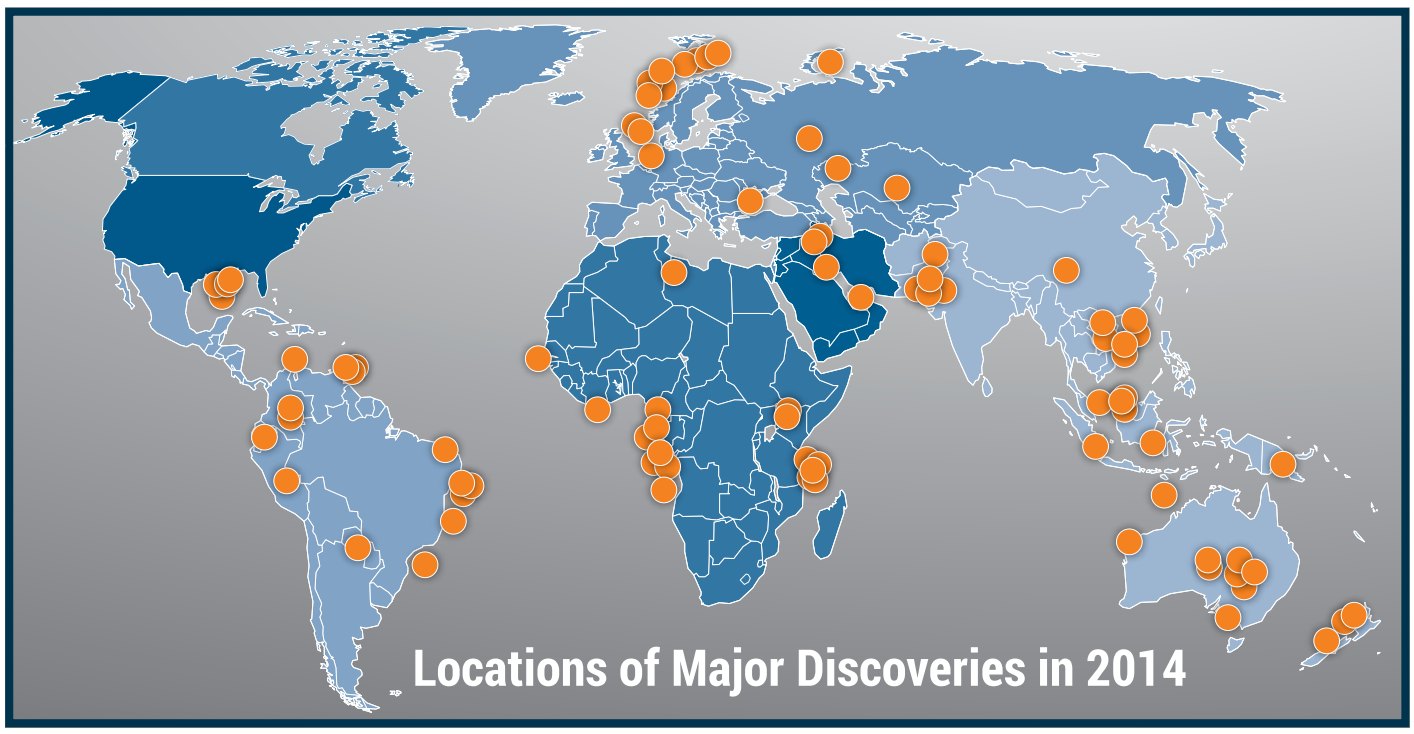
Where the Action Was: Discovery Highlights

By DAVID BROWN, EXPLORER Correspondent

Some highlights from international activity in 2014:



January

Petroamerica Oil Corp. reported two discoveries in **Colombia**. The La Casona-2 well found light oil in the Mirador formation, testing at 545 barrels of oil per day (bopd) and 3.6 million cubic feet of gas per day (mmcfd). Rumi-1 struck heavy oil in the Une Formation, testing about 1,000 bopd natural flow.

Tullow Oil continued its success onshore north **Kenya**, where its Amosing-1 well encountered net oil pay of 160-200 meters in Block 10BB. Also, its Ewoi-1 well found 20-80 meters of pay, helping to derisk a basin flank play.

Pacific Rubiales Energy claimed an oil discovery in Block 131 of **Peru's** onshore Ucayali Basin, where the Los Angeles-1X well hit pay in the Cretaceous Cushabatay formation.

Flow rates from three test intervals were 135 bopd, 936 bopd and 2,351 bopd.

February

In the Sichuan Basin, China National Petroleum Corp.'s Gaoshi-1 and Moxi-8 wells produced an average of 600,000 cubic meters of gas per day.

CNPC raised its technically recoverable reserve estimates for the Anyue field Moxi block to 308.2 billion cubic meters. It said the Cambrian system Longwangmiao formation was the largest uncompartmentalized carbonate gas reservoir discovered in **China** to date.

Eni S.p.A. said its Nene Marine 3 well discovered light oil and wet gas in the Marine XII block offshore **Congo**, in a presalt clastic sequence at about 3,000 meters. Nene Marine 3 flowed more than 5,000 bopd in production tests, and ENI estimated the Nene Marine field contains 1.2 billion barrels of oil and 30 billion cubic meters of gas in place.

Total announced its 25/5-9 wildcat east of the Heimdel field in the central **North Sea** intersected a 69-foot oil column, and put the discovery size between 3.1 million-6.3 million barrels. The well targeted hydrocarbons in the Paleocene Heimdel formation.

Statoil's 7220/4-1 in the **Barents Sea** found a 130-meter gas column but poorer than expected reservoir quality in the Sto and Nordmela formations, and a 45-meter gas column in the Snadd formation.

The wildcat went to 2,806 meters vertical depth in 403 meters of water.

March

Jura Energy Corp. reported a gas discovery with the Maru East-1 exploration well on the Guddu block in **Pakistan's** Central Indus Basin. Short-duration flow on choke was 3 mmcfd.

The well was completed in the Eocene Pirkoh Limestone formation.

Statoil said its Zafarani-2 well flowed at a maximum rate of 66 mmcfd in a drillstem test. The well is in 7,875 feet of water about 50 miles off the coast of southern **Tanzania**. Statoil has a 65 percent working interest; ExxonMobil Exploration and Production Tanzania Ltd. hold the remainder.

Petrobras discovered a 188-meter column of intermediate oil in the Potiguar Basin with the 1-BRSA-1205-RNS (1-RNS-158) wildcat, also known as Pitu. The well is 55 kilometers offshore **Brazil's** Rio Grande do Norte in 1,731 meters of water. Total depth was 5,353 meters.

China National Offshore Oil Co. (CNOOC) made a gas discovery with its Lingshui 17-2-1 well in the east Lingshui Sag of the deepwater **South China Sea's** Qiongdongnan Basin. The well was completed at 3,510 meters and encountered 55 meters of total reservoir thickness.

Beach Energy found Jurassic oil with its Stunsail-1 wildcat in the western flank Cooper-Eromanga Basin play in **South Australia**. The well found oil in two zones within the McKinlay-Namur section plus Mid-Namur and Birkhead reservoir potential. Beach operated with a 40 percent interest; Drillsearch Energy holds 60 percent.

CNOOC made a gas discovery in the Bozhong 22-1 structure in the south-central region of **Bohai Bay**. The discovery well encountered 92 meters of gas pay and was completed at 4,611 meters depth.

April

GeoPark Ltd. tested the Aruco 1 exploration well in **Colombia** at 1,154 bopd of heavy oil. The well was the company's sixth discovery on Llanos Block 34 in the central Llanos Basin.

In the Valemon North prospect in the **North Sea**, Statoil's 34/10-54 S well proved a 164 meter gross gas condensate and oil column. The well and a sidetrack found pay in the Brent Group, the Statfjord Group, the Cook formation and other Jurassic rock. Estimated volumes were 20 million-75 million recoverable barrels of oil equivalent (boe).

Cobalt International Energy chalked up more success offshore **Angola**. Its Orca-1 presalt well in Block 20/11 of the Kwanza Basin produced over 3,700 bopd and 16.3 mmcfd. Cobalt estimated well reserves at 400 million-700 million barrels of oil. It holds a 40 percent interest; Sonangol and BP have 30 percent each.

Leni Gas and Oil announced total pay intervals of about 193 feet in the upper Gourdon sands in its GY-664 development well onshore **Trinidad**. Drilling continued through the Gourdon to the Gros Morne and Lower Cruse.

Helium! Santos air-drilled a wildcat to 2,295 meters in the Amadeus Basin of central **Australia**. The Mt. Kitty-1 flowed gas from four zones in the target Heavitree formation. Preliminary analysis indicated a helium content of about 5.8 percent of flow.

Shell's Rosmari-1 well penetrated a 450-meter gas column on Malaysia Block SK318, offshore **Sarawak**. The well was drilled to total depth of 2,123 meters, about 135 kilometers offshore.

Shell has an 85 percent interest and operates Block SK318; Petronas Carigali holds 15 percent.

Total E&P made an oil strike on Block CI-514 offshore **Ivory Coast** with the Saphir-1XB exploratory well, which encountered 40 meters of net pay. The well went to 4,655 meters in 2,300 meters of water. Total said it will focus extension to the north and east.

Premier Oil's Kuda Laut-1 well found 183 net feet of oil reservoir and 327 feet of gas reservoir in the Tuna production-sharing contract area offshore **Indonesia**. Premier is operator with 65 percent interest.

Following up on its Cardona discovery, Stone Energy Corp. found more than 275 feet of net oil pay in three separate sections of the deepwater Cardona South well on Mississippi Canyon Block 29 in the **Gulf of Mexico**.

May

KazMunaiGas Exploration Production Joint Stock Co. reported an oil and gas discovery in Carboniferous Bashkirian tier sediments in Rozhkovskoye field, **Kazakhstan**. Its U-24 well had maximum flow of 1,900 bopd of light crude oil and 6 mmcfd of gas.

Petrobras confirmed more quality oil in the Santos Basin presalt, **Brazil**, with its 4-BRSA1226-RJS. The well, known as Entorno de Iara 3, found oil in carbonate layers below salt starting at 5,549 meters. It was the third drilled on the Entorno de Iara block and the company's last exploration well in the Transfer of Rights (TOR) area.

June

Statoil and ExxonMobil made their sixth discovery in the Piri prospect on Block 2 offshore **Tanzania**. Piri-1 found gas in Lower Cretaceous sands in 2,360 meters of water. Statoil said Piri-1 added 2-3 Tcf of gas in place, bringing the block's total in-place resource to 20 Tcf.

A BG Group joint venture including Pancontinental Petroleum made an oil discovery in the Lamu Basin off **Africa's** east coast. The Sunbird-1 well in Kenyan permit L10A hit a 14 meter gross oil column and a 29.6 meter gross gas column in a buried reef reservoir.

Mubadala Petroleum said the Pagaga-2 appraisal well confirmed an 850-meter gas column in Block SK320 offshore **Malaysia**. The well was drilled to 2,685 meters total depth. Mabadala said the main gas-bearing zones produced 30-50 mmcfd. It also confirmed that the Sirih-1 discovery found a 293-meter gas column.

Repsol claimed two discoveries in a relatively unexplored area of western **Siberia** in the Karabashsky 1 and 2 blocks in the Ouriyinskoye field. The strikes could add 240 million boe to recoverable resources, said a Russian ministry.

July

Woodside Petroleum penetrated about 150 meters of gross gas pay in permit WA-430-P in **Western Australia's** Exmouth sub-basin. The Toro-1 exploration well reached total depth of 3,724 meters and found gas in the target Mungaroo formation.

OMV (Norge) estimated 20-50 million boe in its 7324/7-2 Hanssen discovery in the **Barents Sea** offshore **Norway**. It was drilled to 1,679 meters in PL537 and targeted the Middle Jurassic to Late Triassic Sto, Nordmela and Fruholmen formations, with secondary objectives in Late to Middle Triassic rocks.

Repsol found more oil on TSP block offshore **Trinidad and Tobago** with the TB14 well, which tested at 1,200 bopd. It

See **Discoveries**, page 14

Gulf of Mexico
from page 10

Wilson identified another new play area as a sleeper – a discovery that hasn't gotten a lot of headlines.

"Much smaller and possibly overlooked, the other play-opener was Paraguay," Wilson said.

President Energy's Lapacho well in Paraguay's Pirity Basin discovered two conventional oil pay zones in the Devonian Icla formation at 3,926 meters. It was the first oil discovery in the Paraguayan Chaco, according to the company.

Wilson said the pay is likely an extension of an Argentinian trend. Reservoir potential had not been evaluated but earlier the company said the discovery could be a stand-alone commercial producer.

President Energy has a 64 percent interest in the Pirity block and Petro-Victory Energy Corp. a 36 percent stake.

Around the World

Wilson has specialized in both Latin America and Gulf of Mexico research. She worked for BP for eight years in London and Aberdeen before joining Wood Mackenzie.

After 11 years with the firm she joined its Exploration Service team. She now advises clients on global industry issues, with a focus on exploration strategy and performance.

As she continued her assessment of the past year she mentioned three other areas of interest in international exploration: Colombia's deep water, offshore Malaysia and the Gulf of Mexico.

▸ Petrobras, with partners Ecopetrol and Repsol, announced the first discovery in Colombian Caribbean deep water with the Orca-1 exploratory well in the Tayrona block, about 25 miles off the coast of La Guajira.

The well was drilled in 2,211 feet water depth and found a sizable accumulation of natural gas at about 12,000 feet.

"That's another hot area that we're excited about and that operators are excited about," Wilson said.

▸ An accumulation of gas discoveries offshore Malaysia boosted that country's production potential. Shell's Rosmari-1 and Marjoram-1 well were both major gas discoveries on Malaysian block SK318.

"It is not a huge discovery story, but Malaysia has seen a string of good discoveries. Discoveries in Malaysia total over a billion barrels of oil equivalent," Wilson commented.

▸ In the Gulf of Mexico, Chevron said its Keathley Canyon Block 10 Well No. 1 discovered significant oil pay in the Lower Tertiary Wilcox Sands at the Guadalupe prospect.

The well was drilled to a depth of 30,173 feet in 3,992 feet of water, about 180 miles offshore Louisiana. Chevron USA and BP E&P each have a 42.5 percent interest in the Guadalupe well and Venari Resources LLC holds 15 percent.

"The Gulf of Mexico had a good year. We saw more success in the Lower Tertiary. Chevron's Guadalupe discovery was quite encouraging," Wilson noted.

She said positives for the Gulf of Mexico were:

✓ Continued success in the Paleogene, the Upper and Lower Tertiary, "which needed a boost."

✓ More success in the Jurassic play by Shell, although other companies had yet to join in.

✓ Infrastructure-led exploration by smaller companies.

Something's Missing

Drilling offshore Angola, a hot discovery topic in 2013, met with added success last year. Discoveries continued offshore and onshore East Africa. More big wells were reported in the Kurdistan region of Iraq.

But an important part of the exploration story for 2014 was something else that didn't happen. The world once again failed to add meaningful volumes of new hydrocarbon accumulations. Wilson said the lack of new discoveries in Brazil's principal offshore basins was especially notable.

"The one thing that stands out for us was the lack of (exploration) drilling in Brazil, in the Santos and Campos basins," she said.

"We can't rely on Brazil to keep supplying big volumes if Petrobras is turning away from exploration to evaluation drilling and to other areas," she added.

Maybe a shift toward evaluation work is inevitable, a new-normal response to recent history and today's exploration conditions. At this point, some people would say that the last thing the world needs now is additional crude oil production.

And that's not normal, at all.

Discoveries
from page 12

estimated 40 million barrels of oil in place for the well, in the north of Teak B field.

VNG Norge's Bue side-track well 6404/12-3A found up to 25 million barrels of recoverable oil equivalent near its Pil discovery well in the **Norwegian Sea**, partner Faroe Petroleum said. Targeting Middle and Upper Jurassic reservoirs, the well found a 59-foot hydrocarbon column

Mosman Oil & Gas Ltd. found oil in both the Eight Mile formation and Cobden lime on its Petroleum Creek project in **New Zealand**. Petrophysical analysis confirmed the Crestal-1 as a discovery, the company said.

The Pharos-1 wildcat hit a 53-meter gross gas interval with 34 meters of net pay in the Browse Basin, in permit WA-398-P offshore **Western Australia**. A ConocoPhillips-Karoon Gas Australia partnership made the discovery.

Shell listed another Jurassic Norphlet oil play find in eastern **Gulf of Mexico** deep waters. The Rydberg exploration well went to 26,371 feet and found more than 400 feet of net oil pay in Mississippi Canyon block 525. Shell now counts over 700 million barrels of oil equivalent in the play. Ecopetrol America and CNOOC-Nexen also hold interests.

OMV found oil with the shallow-water Istria XVIII in the Black Sea off **Romania**. The company said production potential was 1,500-2,000 boe/day.

Leni Gas & Oil's fourth development well in the Goudron field onshore **Trinidad** cut 187 feet of net oil pay in the Goudron sands. Further drilling was aimed at a Gros Morne sands oil target and Lower Cruse potential.

In more **Barents Sea** work, Lundin Petroleum announced its Gohta appraisal well 7120/1-4s found 10 meters of Upper Permian limestone conglomerate with good reservoir properties. The well in PL492 offshore Norway targeted the Gohta karst Roye formation and overlying Kobbe formation sandstones.

Eni said it made a "significant" gas and condensate discovery offshore **Gabon** on block D4 in the Nyonie Deep exploration prospect. Preliminary resource estimate for the NFW Nyonie Deep 1 presalt find was 500 million barrels of oil equivalent.

August

Pakistan Petroleum Ltd. made its third discovery on the Gambat South Block (2568-18) with the Sharf X-1 in district Sanghar, Sindh, **Pakistan**. Initial testing flowed 42 million standard cubic feet of gas per day and 199 barrels/day of condensate

Roxi Petroleum plc got oil and gas shows below 14,200 feet with Well A5, the first deep well on the BNG Contract Area in the South Emba sub-basin, **Kazakhstan**. Drilling targets mainly middle Carboniferous chances.

A recovered core of dolomitic limestone was "porous, fissured and filled with oil," the company said.

Oil & Gas Development Company Ltd. got condensate and gas from its Pasakh Deep Well No.4 in the Hyderabad district of Sindh Province, **Pakistan**. The well went to 11,350 feet, targeting potential of sands in Lower Goru Formation. Test flow was 14 mmcfd with 125 barells/day of condensate.

Shell's deepwater Marjoram-1 well discovered gas on Block SK318 offshore **Malaysia**, in 800 meters of water about 180 kilometers offshore. Shell holds 85 percent, and Petronas Carigali the remainder.

CNOOC reported gas flows in the deepwater Lingshui 17-2 well in the northern part of the **South China Sea**. The well tested at 56.5 mmcfd, but lack of existing infrastructure raised questions about development.

September

Kuwait Energy discovered oil with its Faihaa-1 well in the Mishrif formation at 8,858 feet, in Block 9 in northern Basra, **Iraq**. Preliminary flow rate was about 2,000 bopd of 20 degree API oil. Dragon Oil has a 30 percent interest.

Beach Energy Ltd. said the Martlet-1 exploration well intersected 19.6 feet of net oil pay at a measured depth of 4,770 feet on the western flank of the Cooper Basin in **South Australia**. Senex Ltd. has a 60 percent interest and is operator for the Namur sands discovery.

Oil and Gas Development Company Ltd. reached hydrocarbons with its Soghri-01 exploration well in District Attock, Punjab, **Pakistan**. Multiple horizons jointly tested at 17 mmcfd and 220 barrels per day of condensate. The well tested potential of the Sakassar, Chorgali, Nammal and Pattala formations.

Ophir Energy made a gas find with the Silenus East-1 in Block R offshore **Equatorial Guinea**. It said the well contains around 405 Bcf of mean recoverable gas, with the entire Block R having recoverables of 3.4 Tcf.

Cairn India Ltd. chalked up three more oil discoveries in western Rajasthan state, **India**. The company plans to spend $3 billion over three years to boost oil and gas output from the Rajasthan block, which has produced over 240 million barrels of hydrocarbons since 2009.

More oil offshore **Angola**, where Eni reported a deepwater oil discovery at the Ochigufu exploration prospect. The Ochigufu 1 NFW well was drilled to 14,666 feet in a water depth of 4,380 feet, about 90 miles offshore, encountering 154 feet of net oil pay. Eni said data indicate production capacity over 5,000 bopd.

Eni announced an oil discovery in **Ecuador**, 260 kilometers southeast of Quito, with the Oglan-2 in Block 10. It estimated 300 million barrels of crude in place, and projected per-well production capacity up to 2,000 bopd in the play.

The Parkmead Group discovered a 157-foot gas column at the Diever-2 well onshore in northern **Netherlands**. The well reached 7,457 feet and found gas was in a Rotliegendes age sandstone reservoir.

Petrobras announced an ultra-deepwater gas find in Poco Verde concession BM-SEAL-4 in **Brazil's** Sergipe-Alagoas Basin. The well, informally known as Poco Verde 1, is in water depth of 7,204 feet. ONGC-India has a 25 percent stake.

Real Energy Corporation Ltd. discovered gas with its Tamarama-1 exploration well in Queensland Cooper Basin ATP 927P, **Australia**. Evaluation indicated 69 feet of net sandstone gas pay in the Toolachee formation and 216 feet in the Patchawarra formation.

Rosneft made an Arctic discovery with ExxonMobil in the East-Prinovozemelskiy-1 license area in the **Kara Sea**, proving oil in Jurassic sediments and gas in Ceonmanian/Apt-Alb chalk deposits. Estimated recoverable reserves were 130 million tons of oil and 499 billion cubic meters of gas.

Statoil declared noncommercial its Pingvin prospect gas find in the Arctic, despite production potential between five billion-20 billion standard cubic meters. The 7319/12-1 discovery is in PL713 in the **Barents Sea**.

A Roc Oil subsidiary said its WZ12-10-1 well discovered oil in the Jiaowei (T42) formation on the Beibu Gulf Block 22/12 offshore **China**. The well found 13.7 feet of high porosity oil pay at the top of the Jiaowei, with confirmation by a sidetrack.

PT Medco Energi Internasional reported success on the South Sumatera Block, Indonesia and in Area 47, **Libya**. In Indonesia it found a 114-foot gas column in the Baturaja lime with its Hijau-2 well. Drillstem testing confirmed a flowrate of 5.05 mmcfd. The company's O2 well in Libya flowed 3,300 bopd and 140,000 standard cubic feet of gas per day.

October

Ophir Energy plc said the offshore Kamba-1 discovery in Block 4, **Tanzania**, found 1.03 Tcf of gas in the Cretaceous

See **Barents Sea**, page 16

Barents Sea

from page 14

Kamba and Paleocene Fulusi prospects. BG operates the Block 4 license; Ophir has a 20 percent interest.

Petrobras made a natural gas find with the Tanganika well, also known as 3-ESS-222, in **Brazil's** post-salt Espirito Santo Basin 72 kilometers offshore. The Malombe discovery evaluation well was drilled in 1,043 meters of water to total depth of 2,996 meters.

Statoil's 7220/2-1 discovered gas in license 714 in the **Barents Sea**. The well encountered a gas column of about 85 meters in the Sto and Nordmella formations. Initial recoverable gas estimate was one billion-two billion standard cubic meters.

Lundin Norway found oil and gas with an Alta exploratory well in the southern **Barents Sea**. The 7220/11-1 hit a gross hydrocarbon column of 57 meters, with 11 meters gas and 46 meters oil in carbonate rocks. Maximum test production rate was 3,260 bopd and 1.7 mmcfd.

Statoil added 1.2 Tcf gas in place with its Giligiliani-1 well on Block 2 offshore **Tanzania**, its seventh area discovery. The find came in Upper Cretaceous sands in 2,500 meters of water. ExxonMobil E&P Tanzania Ltd. holds a 35 percent interest.

Dubai Petroleum Establishment's T-02 deep well found mostly natural gas in the Pre Khuff formation of the Fateh field offshore **Dubai**. At 18,248 feet, T-02 was the deepest well in Dubai to date, representatives of the company said. Logs showed approximately 390 feet of gas zones.

On the Khalakan block in the **Kurdistan** region of Iraq, Gas Plus Khalakan Ltd. made a commercial light oil discovery with the Shewashan-1. The well produced from reservoir zones in the Cretaceous Shiranish, Kometan and Qamchuga formations.

Statoil's 25/8-18 S went to 1,863 meters measured depth and proved a 25-meter oil column in the D-structure of the Heimdal formation, north of the **North Sea** Grane field. The well terminated in the Upper Cretaceous Shetland Group. Statoil estimated the discovery at 30 million-80 million barrels of recoverable oil.

Shell intersected 200 meters of net gas pay with its Leopard-1 well in a presalt reservoir offshore **Gabon**. The well was drilled to 5,063 meters vertical depth in 2,110 meters of water. CNOOC is a 25 percent partner.

Chevron counted another **Gulf of Mexico** Lower Tertiary discovery when its Guadalupe No. 1 made a Wilcox Sands oil find in Keathley Canyon Block 10. The well was drilled to a total depth of 30,173 feet in about 4,000 feet of water, 180 miles offshore Louisiana.

A **North Sea** discovery spanned GDF Suez-operated Block 30/1f in license P1588 and BP-operated Block 30/1c in license P363. The find flow-tested at a maximum 5,350 boe per day. The prospect is referred to as Marconi by GDF Suez and Vorlich by BP.

Tullow Oil PLC said its Ekosowan-1 exploratory well in the South Lokichar Basin in **Kenya** found a 900-meter section of near-continuous oil shows through an interval of tight-faulted sands. But its Kodos-1 wildcat in Block 10BB in the Keiro basin hit alluvial reservoir sands of "mixed quality," Tullow representatives reported.

Petrobras found deepwater gas and condensates in its 4-BRSA-1265-ESS well in the Espirito Santo Basin, **Brazil**. The well, known informally as Lontra, is 81 kilometers offshore in the Golfinho concession area. Reservoirs were identified at 3,055 meters well depth.

CNOOC reported a mid-to-large oil and gas discovery with its Jinzhou 23-2 well in the **Bohai Sea**. The structure lies in the northern part of Liaodong Uplift in 10 meters of water. The well reached 1,097 meters and found oil and gas pay zones with a total thickness of 68.4 meters. On test, oil production reached 260 bopd.

Eni saw success on the East Sepinggan Block offshore East Kalimantan, **Indonesia**, where its Merakes 1 well discovered 60 feet of pay in high-quality sands. The Lower Pliocene clastic sequence holds 1.3 Tcf gas in place, it said.

Repsol's Leon well hit 150 meters of net oil pay within a 400-meter column on Keathley Canyon Block 642 in the **Gulf of Mexico**, about 219 miles offshore Louisiana. The well TDed at 9,684 meters. Ecopetrol is a 40 percent partner.

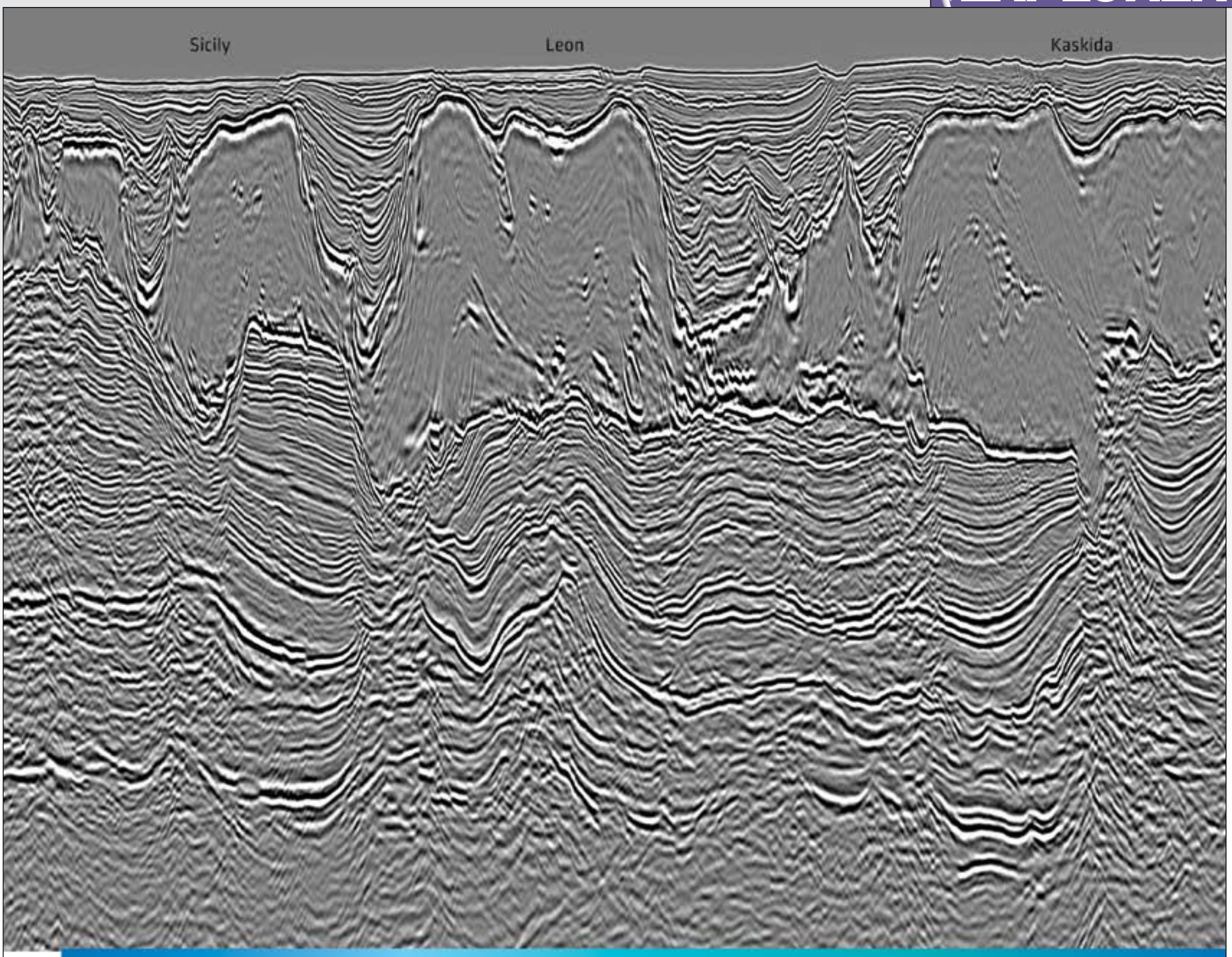
Eni hit a major find with a hydrocarbon column of 420 meters in a Lower Cretaceous presalt sequence on the Marine XII block offshore **Congo**. The Minsala Marine 1 well went to 3,700 meters in 75 meters of water. Eni estimated total potential of 1 billion boe in place.

November

Partners Cairn Energy, ConocoPhillips and FAR Ltd. said their SNE-1 wildcat brought in a second light oil discovery offshore **Senegal**. The Sangomar block well was drilled in 1,100 meters of water about 100 kilometers offshore. It struck a 95-meter gross oil-bearing column with net pay thickness of 36 meters in an Albian sandstone reservoir.

Norske Shell intersected a 28-meter gas column with its 6305/8-2 appraisal well in Ormen Lange field in the southern **Norwegian Sea**. The well was drilled to 3,038 meters, reaching the Upper Cretaceous Kyrre formation.

See **New Zealand**, page 24



Obstacles and Opportunity Abound in Mexico

By HEATHER SAUCIER, EXPLORER Correspondent

Typically when runners are on their marks, they know the course ahead of them.

However, as industry players anxiously wait for Mexico to open its hydrocarbon-rich fields to foreign investors, the shortest course to the pay zone is not so clear.

Petróleos Mexicanos (Pemex), which has served as Mexico's national oil company for the past 76 years, has focused on production, rather than exploration, in order to generate roughly 30 percent of the country's revenue.


GUZMÁN

After watching the country's production rate steadily decline over the last decade, Mexican President Enrique Peña Nieto amended the country's constitution last August to allow third party operators to help achieve Mexico's short-term goal of raising production by 20 percent – to three million barrels a day – by 2018.

Up for grabs in the imminent Round One of bidding are 169 blocks for exploration and exploitation. They include mature oil and gas fields, the deep waters of the western Gulf of Mexico, heavy oil and the country's untapped shale formations.

Energy companies just north of the border are eager to dive into the exploration and production of Mexico's estimated 159 billion barrels of oil equivalent – but where will they go first?

When weighing the options, concerns about security, corruption and lack of infrastructure inevitably crop up.

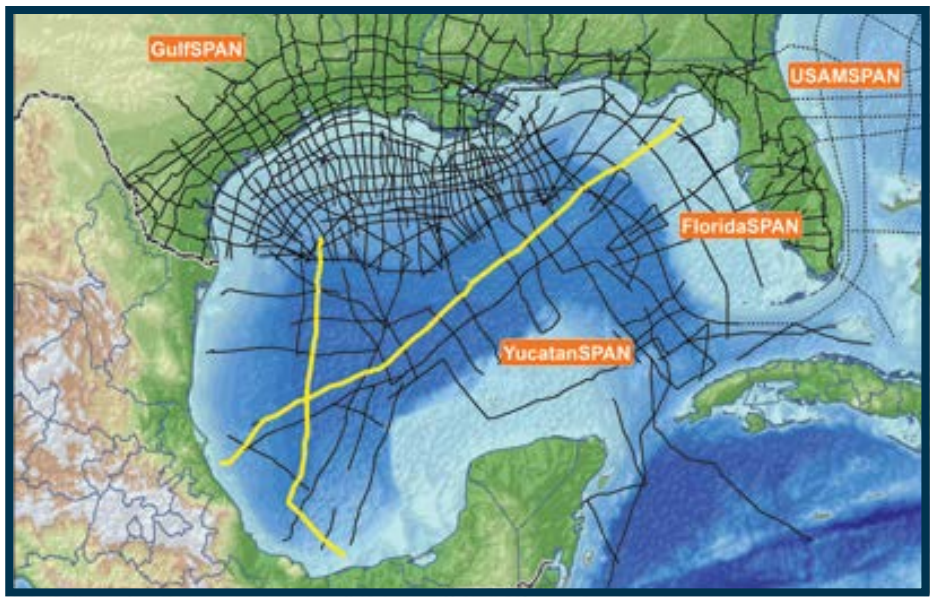
Factor in the tricky economics caused by the falling price of oil and gas, and the course for the players in this historical new play is anyone's guess.

The Playing Field

Mexico's most prolific oil field, the offshore Cantarell, once produced 66 percent of the nation's oil. It peaked in 2004 at 2.2 million barrels a day before dwindling down to today's 350,000 barrels.

Supplementing Cantarell is the offshore Ku-Maloob-Zaap field with 900,000 barrels a day.

Despite the fact that only six of the country's 12 basins with petroleum systems currently produce, Mexico is one of the top 10 oil and gas producers in the world, said Alfredo E. Guzmán, director for exploration and new ventures for Casa Exploration, a former executive for Pemex, former president of the AAPG Latin America Region and former AAPG vice president-Regions.



In fact, of the roughly 600 oil and gas fields in onshore and offshore Mexico, just a handful produce more than 80 percent of the country's oil and gas, Guzmán said.

That leaves the stakes wide open for foreign investors who soon will have access to 109 blocks of prospective resources for exploration and 60 fields with 2P reserves for exploitation.

The blocks fall into five categories:

- Deepwater Perdido area.
- Deepwater south.
- Chicontepec Basin (conventional and unconventional plays).
- Onshore, shallow waters and extra-heavy oils.
- Sabinas Basin (unconventional plays).

Mexico has discovered in its subsurface 263 billion barrels of oil and 279 trillion cubic feet of gas, Guzmán said. Those numbers do not include the "yet-to-be-found" conventional and unconventional resources.

If Pemex's estimate of 435 billion barrels of oil equivalent for the country's total endowment is correct, there are at least 159 billion barrels of oil equivalent to be produced, Guzmán said.

Low-Hanging Fruit

Guzmán predicts that operators will find it most worthwhile to explore and exploit Mexico's deep waters in the Gulf of Mexico and its shale, as both remain untouched and ripe for production.

Twenty-five exploratory wells have been drilled by Pemex with economic successes in the Mexican Perdido Fold Belt and the Catemaco Fold Belt provinces, he said.

"It has been confirmed that the Perdido Fold Belt enters Mexico with better conditions than across the border," Guzmán said.

Four discoveries in the Perdido Fold Belt have been made in the Supremus, Trion, Maximo and Vespa fields, with Trion being the best with 3P reserves estimated at 480 million barrels of oil equivalent – some of the largest in the Gulf.

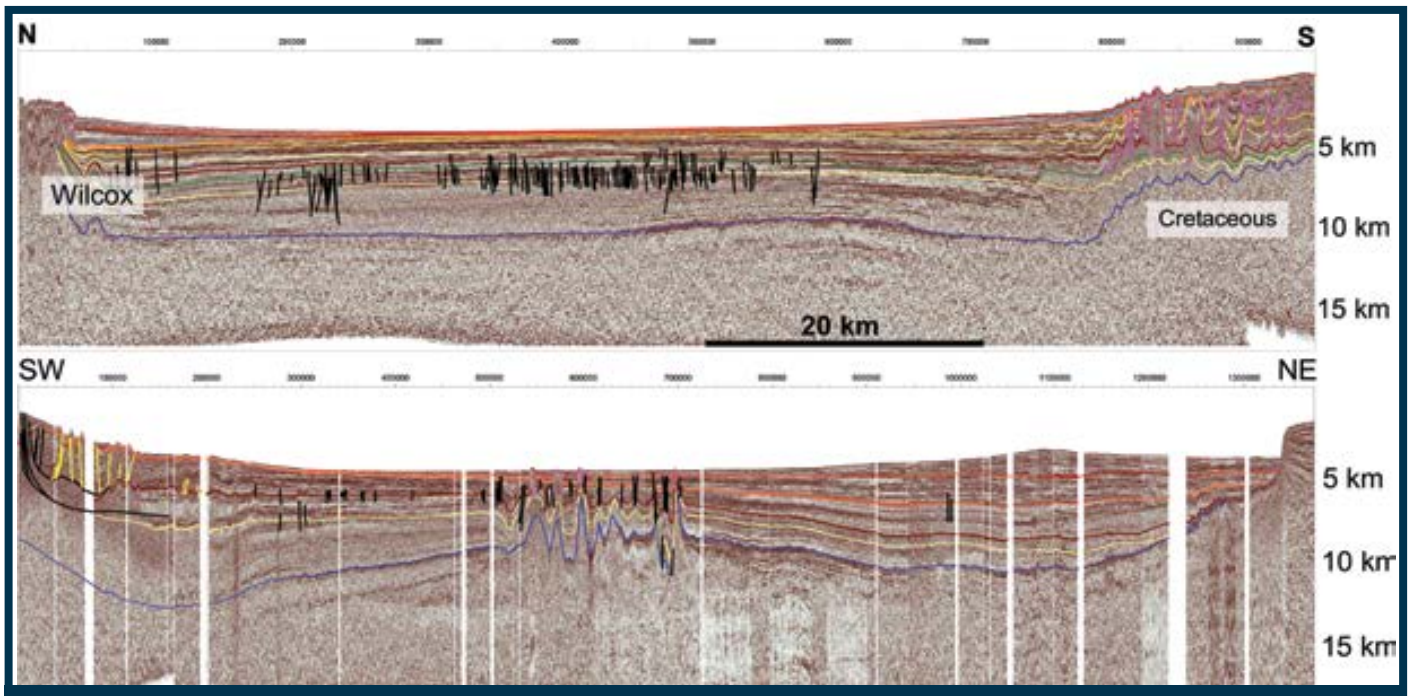
"To develop and produce these fields, it will no doubt require the major players – the ones with the deepwater experience," Guzmán said. "It is extremely low-hanging fruit."

In terms of unconventional oil and gas, ideal plays lie in the Paleozoic shale in the north, the Eagle Ford shale in the northeast, and the Jurassic shale in east central Mexico, Guzmán said. All three areas have the potential to produce liquids-rich gas, light oil and light-to-heavy oil.

To date, nine exploratory wells have been drilled in unconventional plays and 112 million barrels of oil equivalent of 3P reserves have been found. In the next four years, Pemex plans to invest $3 billion to drill 175 wells and acquire roughly 4,000 square miles of 3-D seismic data, Guzmán said.

While many may be eying the Eagle Ford shale – its proof in the pudding already

See **Deep Water**, page 20



Regional Distribution of Tertiary Strata – thick Wilcox section in southwestern offshore Mexico (see location map above).

Timeline

- Dec. 20, 2013: Mexican President Enrique Peña Nieto signs the country's proposed energy reform into law.
- Aug. 11, 2014: Mexico's constitution is amended to allow foreign investors into Mexico's prolific oil and gas fields.
- Aug. 13, 2014: Round Zero allocates 83 percent of Mexico's proven reserves and 23 percent of exploratory areas to Pemex in advance of the bidding process.
- It is estimated that Round One will occur in early 2015, allowing foreign investors to bid on 169 blocks.

Logistics

- Pemex, once a monopoly, is now a "State Productive Enterprise" and able to operate as any international oil company.
- Mexico now can do business with foreign investors in the industry under contract models such as production sharing, profit sharing and exploration licenses.
- Mexico retains full ownership of its hydrocarbons in place and maintains exclusive control over them, yet opens itself to activities related to search and extraction.

Assets

(As per Pemex)

- Mexico has 263 BBO of oil and 279 TCF of gas in its subsurface.
- Mexico's total endowment of hydrocarbons is estimated at 435 BBOE for producing basins, including unconventionals.
- An estimated 159 BBOE is waiting to be produced.
- Mexico's most prolific petroleum basins are: Southeastern, Veracruz, Tampico-Misantla, Burgos, Sabinas and the Gulf of Mexico proper.

Round One

(As per the Mexican Secretary of Energy, SENER)

- 169 blocks – 109 in new areas and 60 in areas of existing reserves – cover nearly 11 square miles.
- 2P reserves and prospective resources represent a volume of 3,782 and 14,606 MMBOE, respectively.
- Exploration and exploitation projects are expected to represent annual investments of $8.5 billion between 2015 and 2018.

– HEATHER SAUCIER

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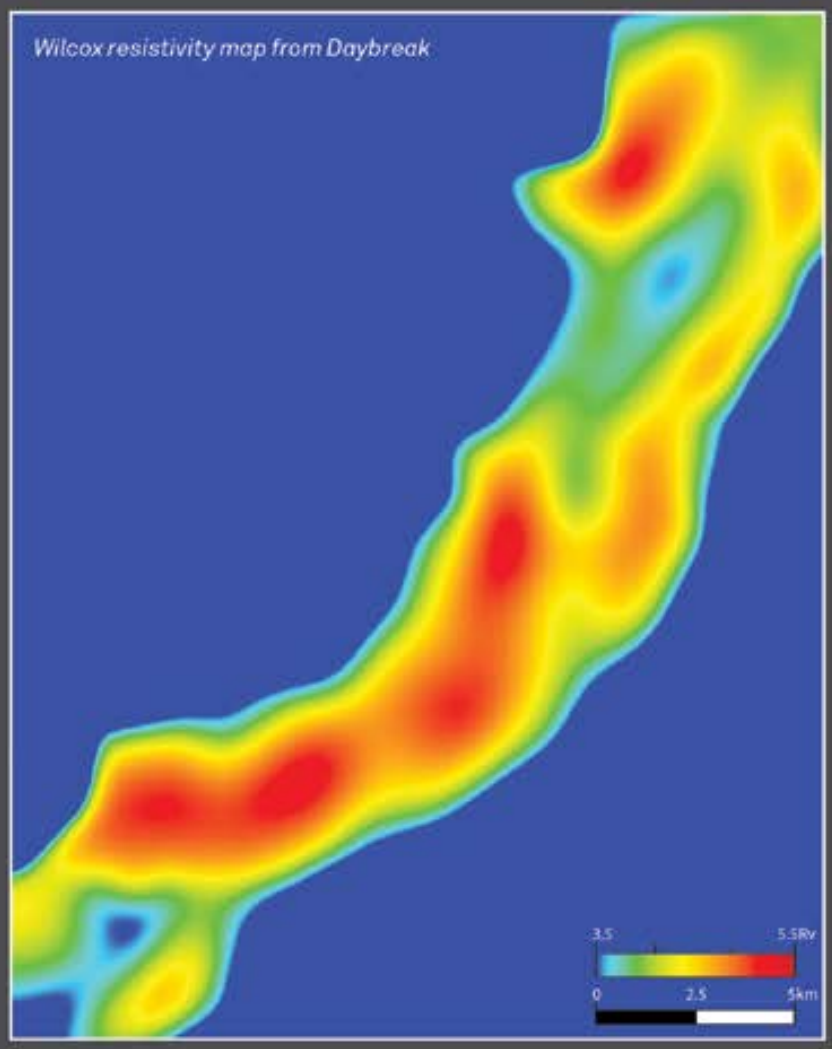

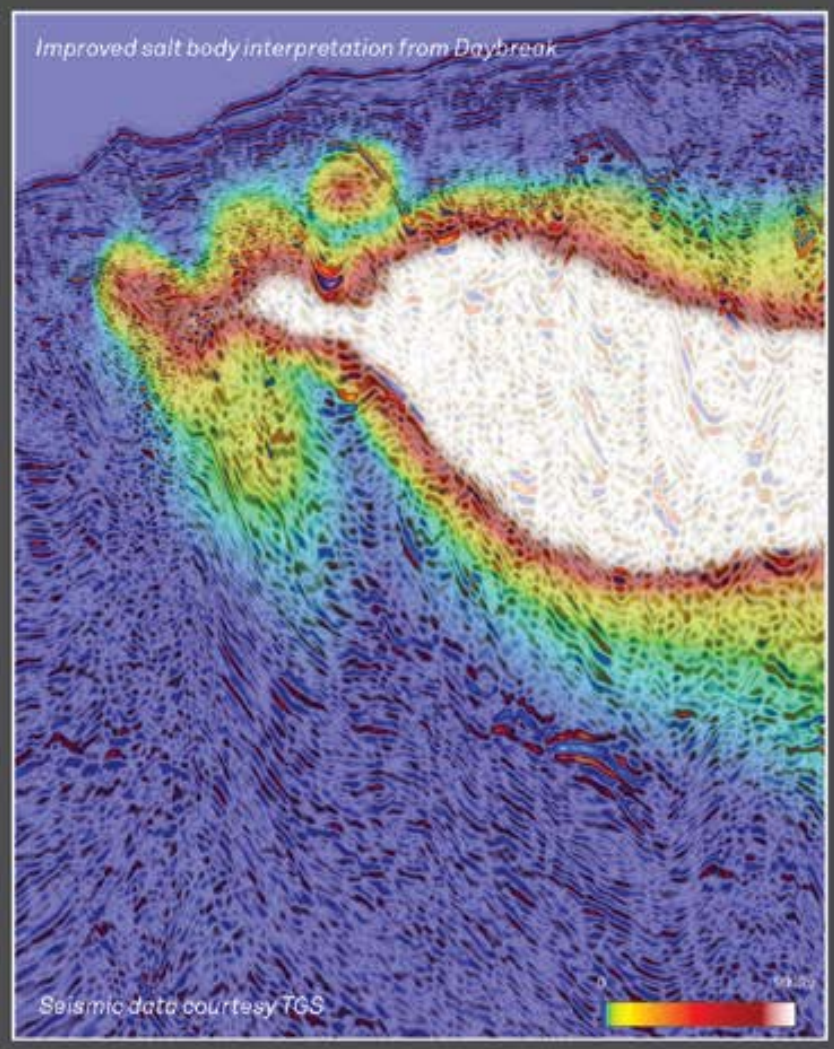

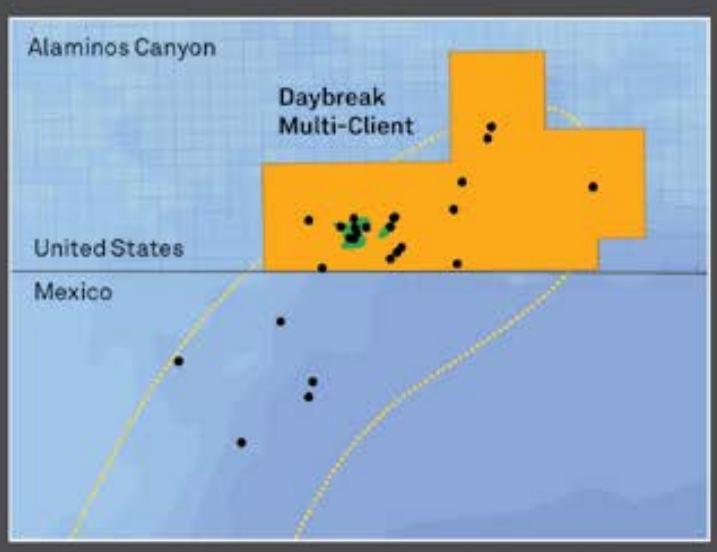

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Public Image
from page 8

you're going to flood."

Morgan of TCU said a better job must be done informing citizens about hydraulic fracturing, or the industry will continue to see more bans, similar to the one in Denton and those that occurred in Colorado over the past several years.

"The industry really needs to sit down and think about its public image and if there is misinformation out there. We've been able to enjoy lower prices at the pump. We've been able to have more jobs," he said. "If we begin to shut down these areas, will that have an impact? Yes. This is a hot potato."

Just as the governor of Colorado was able to strike a compromise with anti-fracturing advocates last August, the same type of dialogue must occur in other cities where tug-of-wars exist between industry and citizens, Entzminger said.

"As long as we have severed rights – meaning surface owners and mineral owners are not the same and probably don't have the same feelings – we're going to have some challenges that we are going to have to work around," he said.

"Sometimes people use frac'ing as a means to something that's not what they are really concerned with," he added. "What are people's real issues? This is what we need to know."

The Last Word

While citizens in Denton have won the battle, the war they must fight is just on the horizon. Angry and litigious operators aside, the fighting words of Texas Railroad Commissioner David Porter have been printed in countless Texas newspapers and continue to be shared:

"As the senior energy regulator in Texas, I am disappointed that Denton voters fell prey to scare tactics and mischaracterizations of the truth in passing the hydraulic fracturing ban," he said.

"Bans based on misinformation – instead of science and fact – potentially threaten this energy renaissance and as a result, the well-being of all Texans.

"This issue will continue to be hotly contested," he continued. "I am confident that reason and science will triumph, and the ban will be overturned."

Deep Water
from page 18

found in Texas – unconventional plays that could top it are the Upper Jurassic (Tithonian) shales just south of the Burgos field, said AAPG member J. Antonio Cuevas-Leree, president of the Mexican Petroleum Geologist Association and former exploration manager in the Northern and Southern Regions of Mexico at Pemex.

When factoring in today's economics, however, Cuevas-Leree insists the most lucrative opportunities lie in unexplored conventional plays – particularly the Austin Chalk and Edwards Limestone in northeastern Mexico, the Lower Jurassic Huayacocotla play in the Tampico Misantla Basin and the dolomitic facies of the Upper Tithonian in the southern region.

Looking from Texas across the border, others agree.

"I would think some of the best opportunities might be in the development of existing fields by using the application of new reservoir technologies to improve production rates and add reserves," said AAPG member Brian Horn, chief geologist at ION Geophysical. "While the deep water is very prospective, the well cost, development cost and time to first oil will require a more long-term approach."

Most companies are looking to monetize their assets, he added. Given the recent dip in oil and gas prices, operators and service companies that bring new technology and fresh ideas – which increase production or decrease cost in Mexico's mature basins – could reap rewards the fastest, he speculated.

Obstacle Course?

While opportunities in Mexico abound, so do obstacles. Guzmán is the first to admit that issues with security, corruption and lack of infrastructure could detract foreign investors.

He is quick to point out, however, the Mexican government already is on the case.

"The government is really working to allocate resources and create new positions in the armed forces and the police" to ensure exploration and production crews remain safe, he said.

In addition, the Mexican government is looking at ways to comply with the United States' Foreign Corrupt Practices Act, and has recently passed laws that require more oversight and regulations to prevent corruption, he added. Bids will be open, clear and transparent and available to the public via the Internet.

Furthermore, the government is implementing a large program to build and improve infrastructure – spending $20 billion to upgrade and expand the Mexico City airport, as well as build railroads, highways and pipelines that will run through Mexico into Central America, Guzmán said.

"Mexico is one of the most open economies in the world," he said, pointing to its auto and telecommunications industries. "Mexico is a stable country. We haven't had a coup in the last 70 years."

From a geological perspective, Horn puts it best: "I think one of the best things about the opportunities in Mexico is that they are in the southern half of the most mature oil and gas province in the world – the Gulf of Mexico," he said.

"The Gulf of Mexico is the laboratory for all new technologies in oil and gas exploration and development," he added. "Most exploration technologies have been developed in the Gulf Coast region.

"If you look at the history of our industry, you could say all roads lead to and from the Gulf of Mexico."

Sequel to legendary memoir begins

Giant Fields Offer Big Lessons in Finding Oil

By LOUISE S. DURHAM, EXPLORER Correspondent

Innumerable geoscientists worldwide are familiar with the AAPG Giant Oil Fields publications.

The legendary, now-deceased oilman and AAPG Honorary member Michel "Mike" Halbouty kicked off the series in 1970 with AAPG Memoir 14, "Geology of Giant Petroleum Fields."

Never one to rest on his laurels, Halbouty followed up on the initial publication with three additional volumes. The last, titled "Giant Oil and Gas Fields of the Decade 1990-1999," was completed in 2000.

"He had remarkable leadership skills and the vision to identify the most important things," said AAPG Honorary member Charles Sternbach. "He was my personal mentor and hero, and the Memoir series is his legacy."

Fear not, the series continues.

Sternbach and AAPG member Robert Merrill are spearheading the effort to compile "Giant Oil and Gas Fields of the Decade 2000-2010." Also playing a key role in the project is AAPG Honorary member Mike Horn.

The end product will be a compilation of papers covering fields in areas around the globe.

Since 2000, 168 fields have been discovered containing 500 MMBOE EUR, which geoscientists in general label "giant." They include both conventional and unconventional.

"Our target is to include a representative number of fields of different play types in this 168-field population," Merrill said. "We'll go below 500 million barrels if there is a particular field that opens up a brand new play."

The initial goal was to include perhaps 15 to 20 fields. The dedicated team now has 14 definite commitments for field papers – including one from Bill Zagorski on the Marcellus Shale, and from recently named AAPG Outstanding Explorer of the Year Hans Ronnevik – and is awaiting response to invitations issued to other potential contributors.

Others who would like to suggest or make a contribution are welcome to contact the team as well; the deadline is Feb. 15.

Already the potential lineup is global in scale.

"When you look at areas, we have commitments probably from India, Iraq, Norway, China, Brazil, the U.S. Gulf of Mexico, Ghana and Mozambique," Merrill noted.

Words of Widsom from Mike Halbouty

When the late Michel "Mike" Halbouty initiated the AAPG Giant Oil Fields series in1970, he penned a lengthy introduction to the publication.

Perusing a soupcon of his comments highlighted by AAPG member Robert Merrill reveals evidence that his insight remains profound today.

"… Through reading these papers, all of us shall profit. By reading, we gain ideas. Mental retention of an *idea* is the key to *new ideas*. It is these new ideas (that) will provide new petroleum.

"… We must learn, and learn well, what factors control petroleum generation, migration and accumulation, so that we may apply our knowledge of those factors …

"… As we make it a point to learn how these giant fields formed, we should study the modes of occurrence of the accumulations, the types of trap, how each trap formed and how it was found, the age of the reservoir and the age, or ages, of the sediments in which the petroleum generated and from which it was expelled and migrated to the trap.

"We should ask ourselves: first, what is usual about each of these accumulations? And second, what is *unusual*?

Then we must concentrate on the unusual, for commonly it is that unusual aspect which is the key to accumulation …"

– LOUISE S. DURHAM

Seeking Significance

And, yes, the project team said, unconventionals also will be included in the new volume, with the Marcellus and Bakken shale plays on the "for sure" list at press time, accompanied by such conventional barnburners as the Taq Taq field in Iraq and Johan Sverdrup offshore Norway in the North Sea.

"The purpose of these papers is so the reader can gain ideas and understand what are the controlling factors of these fields, what controls petroleum generation, migration and accumulation," Merrill said. "If we can understand giant fields, this gives us ideas to go forward that might allow us to look at a basin or area slightly differently.

"As geoscientists, we need to understand what's common in these different accumulations," he continued. "And even more importantly, what is different in each accumulation, because it's the unusual thing in a field that may contain the key to the next (one) we find."

In other words, the importance of examining the out-of-the-ordinary aspects of a giant field can't be overemphasized. This can be the pathway toward creative ideas that could lead to another discovery.

Merrill cited some conventional field examples, including a source rock field

See **Giant Fields**, page 24

Giant Fields
from page 22

discovery offshore Egypt.

"The important thing about this discovery is it showed a source rock older than anything others had postulated before," he emphasized. "So here we have a new source rock in the eastern Mediterranean Basin that becomes very important because we now have the potential to find other accumulations there.

"Another area of the world with significant discoveries where people didn't realize there was source rock is offshore Madagascar," he said. "There are a number of giant gas fields there because somebody finally proved up the source rock; this is another province that came to fruition in the 2000s decade.

"Also in this same decade, there's deepwater offshore Brazil where people found there were reservoirs, source material and we have some giant fields."

In your quest for the unusual, don't overlook the standard must-haves that are common to all fields.

"In all instances you have to have a trap, a reservoir, a source rock," Merrill emphasized. "Also there's the timing – the generation and migration has to be right.

"If we lump petroleum system factors together in giant fields, it helps us to discover new oil and gas accumulations."

New Zealand
from page 16

CNOOC's Lufeng14-4-1 exploration well in the eastern **South China Sea** interested about 492 feet of oil pay and tested at around 1,320 bopd. The well is in the Lufeng Sag in the Pearl River Mouth Basin, in average water depth of 475 feet.

Talisman Energy and Ecopetrol made a heavy oil discovery on Block CPO-9 in Meta, **Colombia**. The Nueva Esperanza-1 stabilized at a flow of 910 bopd in an initial eight-day flow test after 309 feet of perforations in the T2 formation.

A Tag Oil step-out in **New Zealand's** onshore Taranaki Basin hit more than nine meters of net oil and gas-bearing sands in the Mt. Messenger formation. The Cheal-E-JV-6 was drilled to total depth of 1,939 meters.

A Marathon Oil subsidiary drillstem tested 6,100 bopd of light oil with a combined 10-15 mmcfd from non-associated gas zones on the Harir block in Iraq's **Kurdistan** region. The Jisik-1 reached 15,000 feet and found stacked zones of Jurassic and Triassic reservoirs. Total holds a 35 percent working interest and the Kurdistan regional government a 20 percent carried interest.

Karoon Gas Australia Ltd. got oil from five separate zones with its Kangaroo-2 appraisal well in the Santos Basin offshore **Brazil**. The well tapped a 250 meter gross oil column and 135 meters of net reservoir pay in Palaeocene and Maastrichtian sections.

December

OMV produced first oil from its Maari redevelopment drilling campaign in **New Zealand**. Output from the MR-8A well was estimated at 4,500 barrels of oil per day gross. OMV will invest about 205 million euros in drilling five wells.

Petrobras said it made the first natural gas strike in **Colombian Caribbean** deepwater with its Orca-1 well in the Tayrona Block, about 30 miles offshore La Guajira. Total depth was 13,910 feet with the gas accumulation above 11,800 feet. Petrobras holds a 40 percent interest; Ecopetrol and Repsol have 30 percent each.

President Energy PLC discovered oil with the PY-PE-Lx-1, or Lapacho well, in **Paraguay**. The company said it discovered two conventional oil pay zones in the Devonian Icla formation at a depth of 3,926 meters. Petro-Victory is a 36 percent partner.

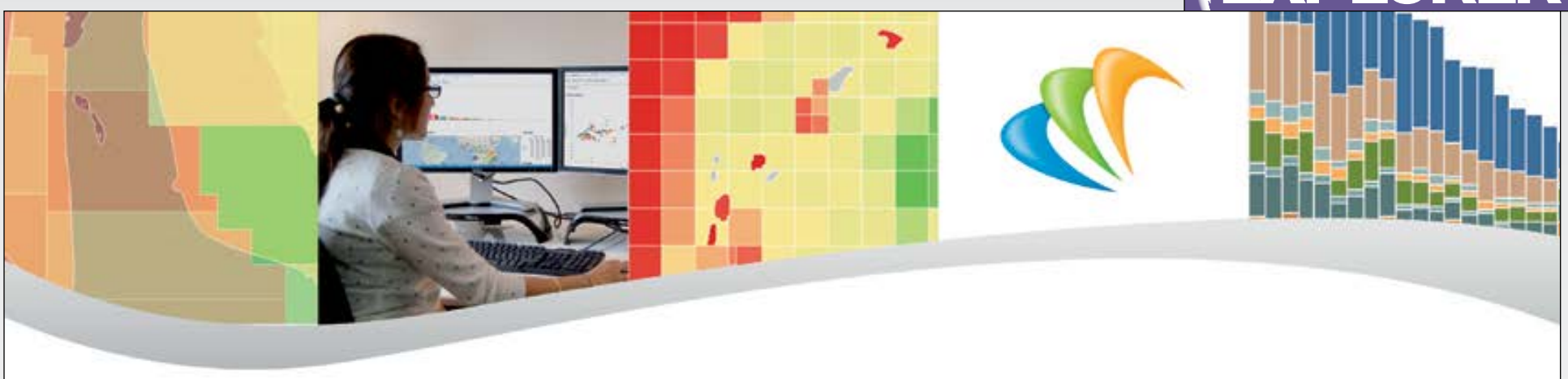
InterOil Corp. has confirmed the presence of a "multi-hundred-meter hydrocarbon column" in excess of the 200-meter gross gas interval previously encountered by the Raptor-1 well, 12 kilometers west of the Antelope field in **Papua New Guinea**.

Centrica Resources Norge made a gas discovery with its 6707/10-3 S wildcat in the **Norwegian North Sea**. Centrica said the well, about 20 kilometers northeast of the Aasta Hansteen field, was the first exploration well in production license 528 B. It found a gas column of about 12 meters in the Upper Cretaceous Kvitnos formation.

Bengal Energy's Nubba-1 well found light oil shows in five different Jurassic reservoirs in Permit ATP752P in the Cooper Basin, **Australia**. It also intersected up to 20 feet of gas pay in the Permian Toolachee formation.

Origin Energy Ltd. said its Speculant-1 wildcat found a 145-meter gas column in the Waare C formation in the offshore Otway Basin of western Victoria, **Australia**. Drilling targeted a tilted fault block structure of about seven square kilometers.

Santos and 40 percent venture partner Drillsearch Energy discovered wet gas with the Yarowinnie South-1 well in the Cooper Basin, **Australia**. Drillsearch estimated almost 49 feet of net gas pay over several intervals in the Patchawarra formation. It was the second wet gas discovery for the PEL 513 joint venture.



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Tinker Takes His Conversation to Students

By BARRY FRIEDMAN, EXPLORER Correspondent

Energy.

There is truth. There is passion. There is verisimilitude.

And there is a film that captures it all.

"Public understanding of energy is very low. Energy education is vital."

That's past AAPG president and newly named AAPG Honorary member Scott Tinker, who helped create and narrates the film "Switch," a non-partisan, non-advocacy documentary about the world's energy needs, on why he thought the project was necessary.

The documentary, as you'd imagine, talks about where the world is now in terms of energy needs, but its focus, mostly, is on the transition – how, in fact, we make the switch to future energy sources … once we agree on what those should be.

The film, directed by Harry Lynch, is part of the reason the Switch Energy Project was honored at last year's AAPG Annual Convention and Exhibition in Houston with an AAPG Geosciences in the Media Award.

It's also a reason young people around the world have eagerly embraced its message – its been shown to AAPG student chapters on virtually every continent – and its focused approach.

This project, intentionally, is not so much a call to action as it is a call to understanding.

Scott Tinker, right exploring energy issues in his award-winning documentary, "Switch," which has become a popular attraction for geoscience students around the world. This scene found him at PS10, the world's first concentrating solar tower, near Sevilla, Spain.

Lights On, Heat Down

As importantly, it dials back the – you should pardon the expression – heat on an already overheated issue.

As Tinker says in the film, "The only way to find a solution is to go out and get it."

Despite the awards he and Lynch have received, Tinker mostly does not want the focus to be anywhere other than the message. When pressed, he'll talk about his involvement and tell you he had to relearn everything he knew about energy before he could see what needed to come next.

And that's a lot of relearning.

"I have been studying and speaking about energy for decades."

Even after 600 international talks, it wasn't enough.

"It still did not allow me to reach a broad, non-energy audience," Tinker said.

Which is where and why the collaboration for "Switch" started.

"Harry Lynch is a documentary filmmaker interested in energy," he said. "We met and agreed we would set off on a grand adventure with a vision to raise the level of energy education. The Switch Energy Project comprises the film 'Switch.'"

(Incidentally, teachers, professors and school libraries can receive a free Education Edition DVD of the film).

But it's not just the documentary. The project also includes the video-based website, Facebook, newsletters and other social media, as well as the soon to be released Switch Energy Lab, a series of 28-short format videos, which will show Tinker in the lab doing energy experiments, expressly designed for middle and high school students with curriculum for teachers.

"I think," Tinker said, "it is part of a growing conversation on energy and we are happy to be a part of it."

Specifically, the film – which has won or been invited to 17 international festivals – does not shill for one side or another, which is noteworthy. Tinker is an energy guy. He's the director of the Bureau of Economic Geology where he leads 200 scientists and staff, he's a professor at the University of Texas Jackson School of Geology, and he is the state geologist of Texas.

He knows there is not just one energy answer out there.

In the film, he goes looking for it … for them.

Everyone's a Critic …

He is heartened by what he found, heartened by the reaction to it.

"The project is being received very well," he said. "Global screenings of 'Switch' continue. More than three million people have seen it. The Web-based materials are heavily accessed and used. Feedback has been extremely positive and evidence of impact is apparent on many fronts."

The Boston Globe called it "affable";

Continued on next page

New LSU Dean Holds High Regard for Geoscience

By LOUISE S. DURHAM, EXPLORER Correspondent

Yes, you can go home again.

Just ask Cynthia B. Peterson, newly appointed dean and first woman of the College of Science, and professor of biochemistry at Louisiana State University in Baton Rouge, where she graduated Magma Cum Laude in 1979 with a bachelor's in biochemistry.

From there, she trekked a tad north to the LSU Medical School in Shreveport to earn both master's and doctorate degrees in biochemistry.

Following a stint at the University of California, Berkeley, for postdoctoral training, she began what would become a 22-year affiliation with the University of Tennessee.

First, she assumed the position of assistant professor of biochemistry and cellular and molecular biology, eventually being appointed associate dean in the College of Arts and Sciences.

"This immersed me in administration at the college level," Peterson said, "and laid the groundwork for me to step into this new position at LSU."

When she checked in as the new dean, she toted a plethora of professional honors and awards.


PETERSON

On the personal side, the roots run deeper than the early academic degrees.

"My parents both graduated from LSU, where they met," she said, "and I was born in Baton Rouge.

"It does feel like coming home, even more than I anticipated," she noted.

There's limited time to hang out with longtime chums given that this gregarious and dedicated administrator is very hands-on and moving quickly to get a handle on her new and demanding academic position.

For starters, she assigned herself the formidable task of meeting individually with each of the approximately 200 faculty members in the college.

"It's a great experience for me to learn who these hardworking, dedicated people are and what they are doing," Peterson emphasized. "They really seem to appreciate that.

"This is an exciting time at LSU," she noted. "It's a growth time, a time to implement new initiatives that continue under a strong tradition of excellence."

High Regard for Geoscience

A focus on science, technology, engineering and math (STEM)-related subjects has become a kind of cause du jour, particularly in the world of academia. Any college of science, by definition, would be front and center in this milieu.

"At LSU, I see investment into key strategic areas, particularly the STEM disciplines," Peterson noted. "So I have the opportunity to think about doing new things, such as adding faculty to the college to better meet demands in terms of growing our excellent student body."

The new dean conveyed high regard for geosciences at LSU, noting that geology is a strong program, which she is committed to growing.

"In the past five years, geology has increased its graduate program significantly and doing a great job in grooming its students for success," Peterson said. "Top quality master's and Ph.D. students are coming out and getting placed in some of the best jobs in the country.

"Geology enjoys a uniquely close relationship with industry, and support from the corporate and private community has had a big impact on the quality of programming that is available for student experiences and research," she noted.

Peterson emphasized that the geology and geophysics department is interested in hearing about the needs in the field and responding.

"There's an emphasis on being proactive, rather than reactive, in terms of trying to meet the demands from industry," she said.

The savvy Peterson anticipates innumerable trips to nearby Houston. Given its role as the hub of the global energy industry, it is a beacon to geologists and geophysicists alike.

"A lot of times, I hear people refer to Houston as LSU-west," Peterson quipped.

Continued from previous page

Variety said it "sidesteps the usual eco-docu strategy … and takes a far less hysterical route."

That lack of hysteria is one of the reasons it's receiving the Geosciences in Media Award: Energy companies, environmental groups, government agencies, leading universities, general audiences and most reviewers are not retreating to their corners.

But since it's about energy and the future and how we get there, not everyone is happy with it, a fact admitted on the film's own website.

"However, because it does not overtly advocate for or condemn any resource, it has also angered some who do, including anti-nuclear protesters, renewable-only promoters and fossil fuel lobbyists," it reads.

A critic for the Los Angeles Times agreed, who wrote, "In trying to be agenda-free – you'd be hard-pressed to say which energy source Tinker favors – the film ends up lacking any real passion, which is the most fundamental fuel that drives the best issue-based documentaries."

The explanation for that: Tinker and Lynch invited experts, not politicians, to participate. Carbon sequestration specialists are rarely volatile as United States senators.

This was always the point.

"What will it take," Tinker asks, "to go from the energy that built our world to the energy that will shape our future?"

The questions are right there. The answers are, too – right until they aren't.

As he says in the film, "Oil is running out … or is it? Coal can be cleaned … or can it? Renewables will power the future … or can they?"

From left: Min Chen, vice president of Chevron China Energy Company; Chengzao Jia, AAPG representative and former vice president of PetroChina and Chinese Petroleum Society; and Xiongqi Pang, vice president of China University of Petroleum, Beijing.

Publication Pipeline

Going Out and Bringing In

By COURTNEY CHADNEY, EXPLORER Correspondent

It was a long journey – and anticipation seemed to build by the week – but another AAPG Publication Pipeline delivery finally arrived successfully at its destination, this time to the AAPG Student Chapter at China University of Petroleum in Beijing (CUPB).

The freight of two pallets of 2,553 donated books, weighing 1.7 tons, included many tomes on geological subjects desperately needed by the students, such as paleontology, sequence stratigraphy, geotectonics, mineralogy and more.

The shipment originated at AAPG headquarters in Tulsa and was made possible largely by the kind sponsorship of the Chevron China Energy Company.

AAPG member Yvonne "Ye" Ran, minister of public relations for the AAPG CUPB Student Chapter, said the donations promote development of geological science within the university in more ways than one.

"The geological books in English donated by AAPG have helped us a lot," she said. "On one hand, it enlarges students' horizons and lets us learn how the research of geology develops in other parts of the world. On the other hand, more reading rooms can be established for students and professors in the College of Geosciences to borrow and read for convenience."

> **"This donation encourages all members of AAPG Student Chapter of CUPB to go on making persistent efforts to expand our chapter's influence."**

Before the arrival of this shipment, foreign language books in the university library had been scarce, with limited copies of the few books they owned. Students were allowed to check textbooks out for one month at a time – if at all – and so they often found themselves forced instead to purchase books online with their own money, Ran said.

Ran and other representatives of AAPG, CUPB and Chevron China Energy Company gathered for the first time in late November to celebrate the August shipment.

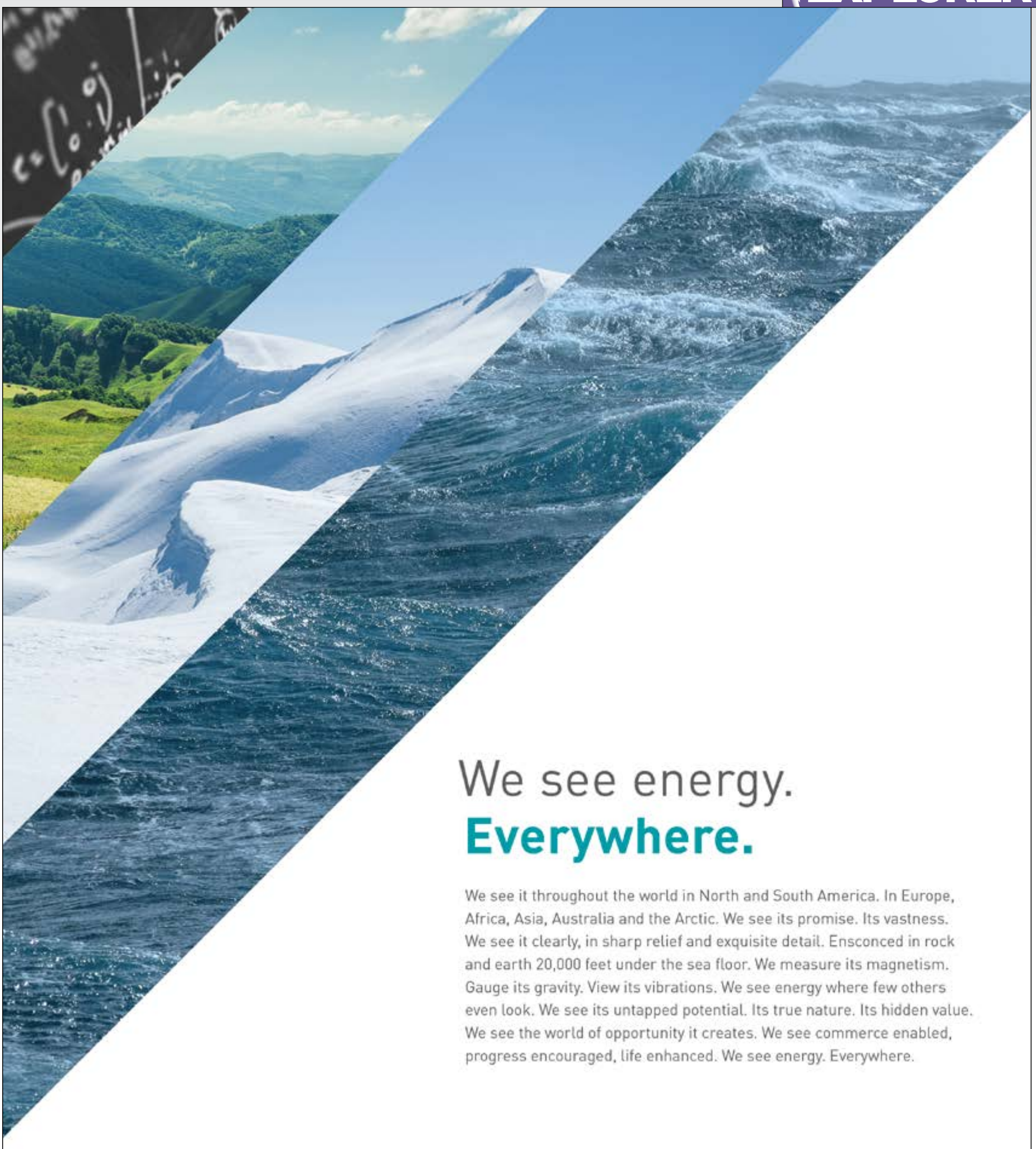
"Being a part of this chapter, I feel honored to make a contribution to the service for students in our university and the development of our AAPG student chapter," Ran said.

The shipment fully achieves the CUPB AAPG Student Chapter motto, Ran stated, which is "Going Out and Bringing In," meaning enlarging their activities' influence in their region and even the world, and bringing in resources to benefit their chapter, like the resources made possible by the Publication Pipeline.

"This donation encourages all members of AAPG Student Chapter of CUPB to go on making persistent efforts to expand our chapter's influence, both at home and abroad, and to continue providing more academic exchanges and platform to broaden the horizon for all students in our university," Ran said. "We'll strive to become a pioneer of student work for AAPG in China and even in the Asia-Pacific region."

AAPG's Publication Pipeline project was created as a way to collect geoscience books and journals from those who no longer need them and then to forward these resources to overseas universities and libraries.

See more at: aapg.to/CmtyPubsPipeline.



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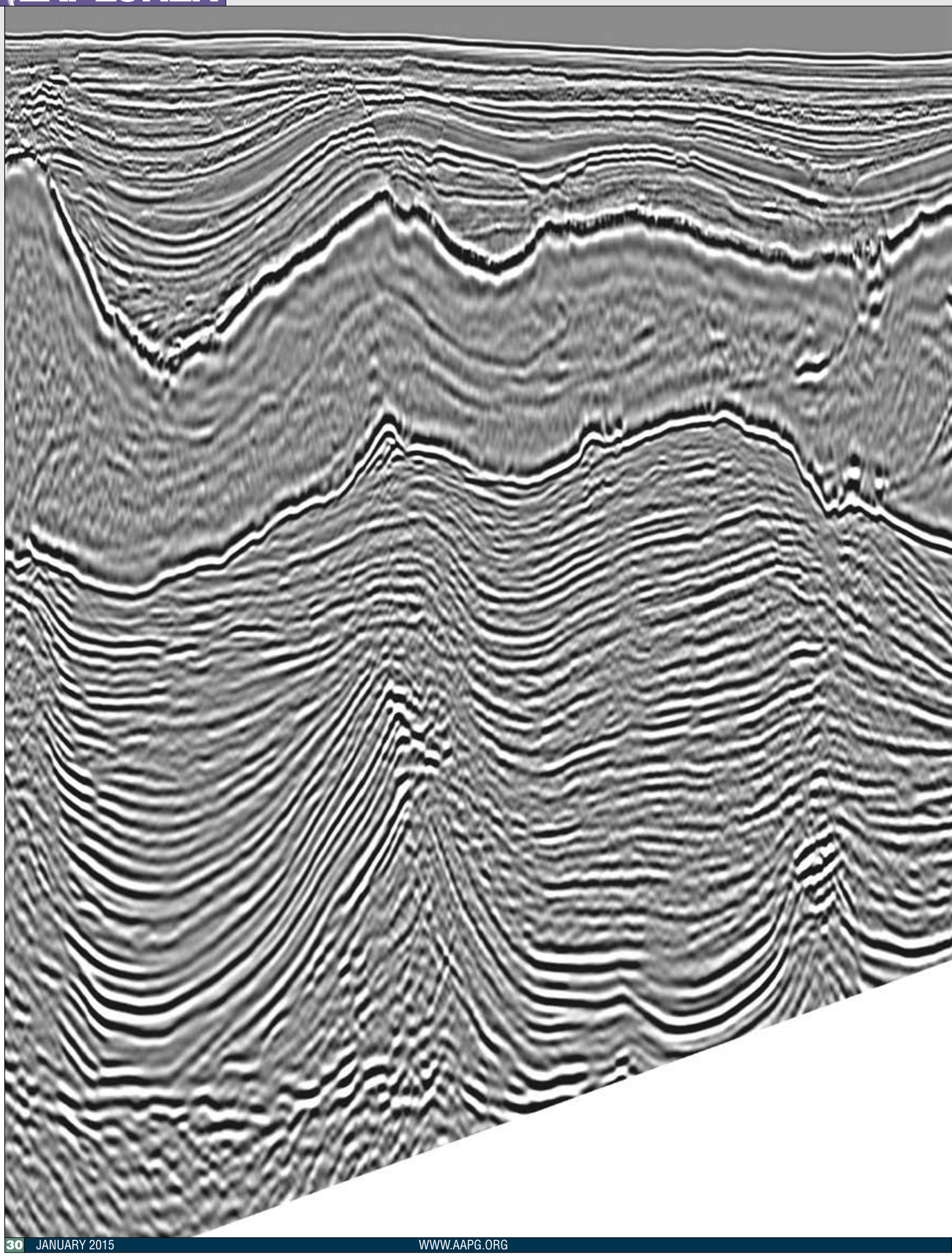

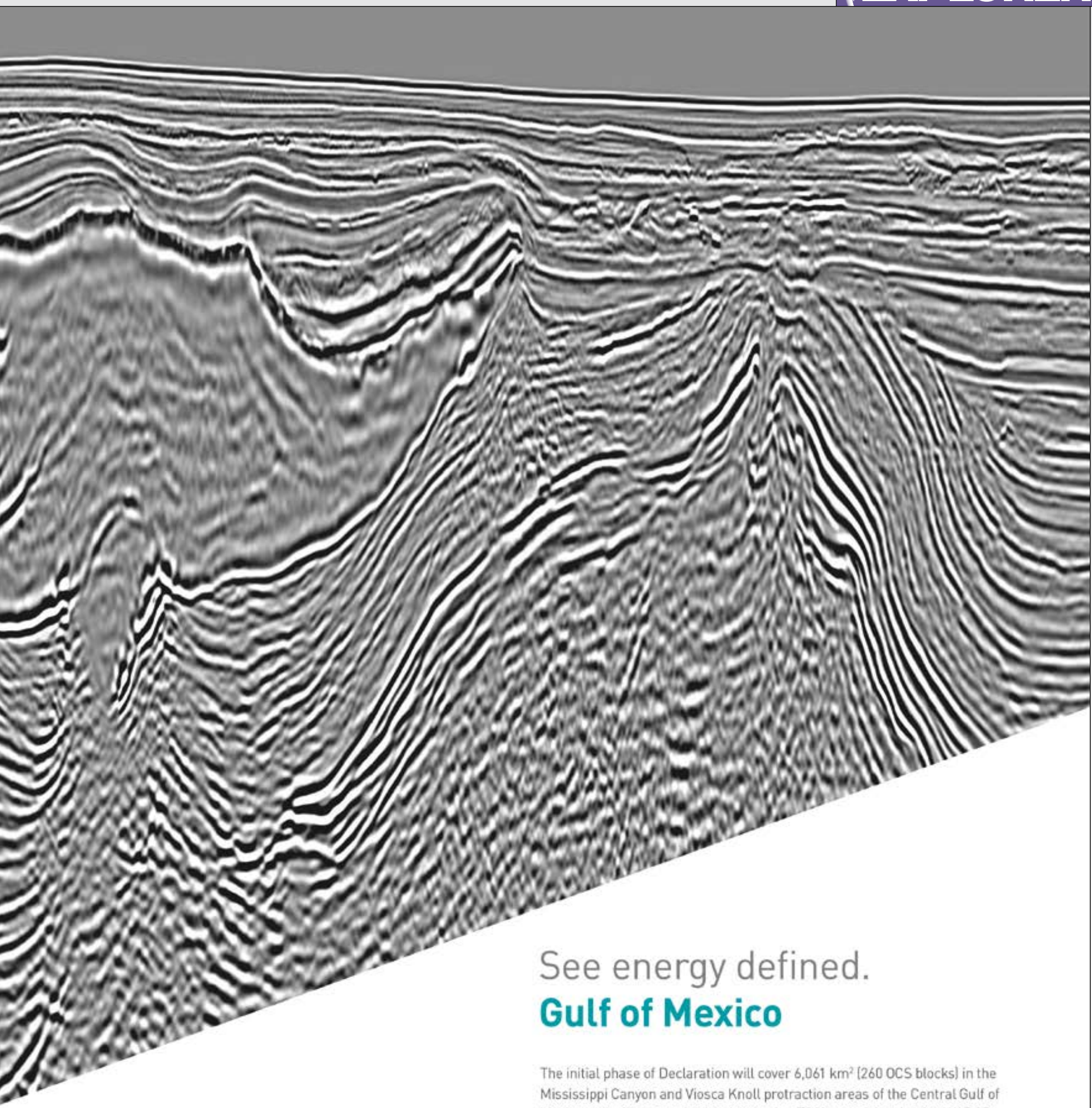

A mutually beneficial relationship

AAPG – NAPE Celebrating 20 Years of Collaboration

By CAROL CAIN McGOWEN

A concisely worded 20-year-old message written on AAPG letterhead announced the beginning of a long relationship.

Dated June 20, 1994, the well-preserved letter from then-AAPG Executive Director Fred Dix is addressed to Dr. O.F. "Layi" Fatona, President, Nigerian Association of Petroleum Explorationists.

In it Dix writes: "I am pleased to inform you that the House of Delegates of AAPG approved the application for your society's affiliation. The affiliation is now completed, and I have every confidence that it will be mutually beneficial."

And since the formalities of that early communication between the two association leaders, the benefits have indeed been mutual.

At the time, NAPE's presence in Nigeria was well established. For AAPG, affiliation with the Nigerian Association provided an avenue for extending AAPG programs and services into sub-Saharan Africa. Previous AAPG affiliations were with two northern Africa societies – first, with the Earth Science Society of Libya in 1973, and second, with the Egypt Petroleum Exploration Society (EPEX) in 1984.

By the date of its affiliation with AAPG in 1994, NAPE was a seasoned organization.

Initially, the group formed in August 1975 under the name of Lagos Society of Geologists and Geophysicists. From the small local group of only 25 people attending its inaugural meeting at the Federal Palace Hotel in Lagos, the society soon expanded its membership and changed its name to accommodate colleagues from across the country.

Today NAPE represents over 8,800 individual members and 152 corporate members. From its headquarters in Lagos, NAPE has expanded its reach to include four regional chapters in Port Harcourt, Benin, Warri and Abuja.

More than 30 annual NAPE conferences have been held to date.

Out of Africa

In the beginning, the August 1990 AAPG EXPLORER could be credited as catalyst for NAPE's eventual affiliation with AAPG.

In a letter dated Oct. 9, 1990, Toyin Akinosho with Gulf Oil Company Ltd., a Chevron subsidiary, wrote to AAPG on behalf of the Nigerian Association. Akinosho reported reading about the first AAPG international Distinguished Lecturer program and the tour of professor Peter Vail, who had toured eight Pacific Rim countries earlier that year to lecture on the topic of "seismic stratigraphy."

Akinosho's letter congratulated Vail and the AAPG for "this attempt at globalization of the knowledge of petroleum geology."

Then describing the growing community of oil explorationists in Nigeria, Akinosho wrote, "NAPE is ready to coordinate a Distinguished Lecture tour of West Africa from Lagos."

A few weeks later, Gary Howell – then AAPG science director and international development adviser, wrote to Akinosho to say, "The reason for my writing is to extend an offer to NAPE to consider affiliation with AAPG."

NAPE's Executive Committee did consider, and four years later, with Layi Fatona as president, decided to affiliate.

"We did all that was required," Fatona recalled. "We were admitted, and I indeed addressed the House of Delegates at the (AAPG) annual convention."

Fatona also clearly recalls his message to the convention attendees.

"I proudly told the audience my prediction, that outside of the United States, and perhaps the U.K., the single largest one-country collection of AAPG members will be my country – my Nigeria and the Niger Delta oil province," he said. "I was proud then as I have remained to date, to have taken NAPE to this international level."

Those who were in attendance at the AAPG opening ceremony in 1994 recall how the process was formalized with the reciprocal attendance and participation of AAPG President Toby Carleton at the 1994 NAPE international conference and exhibition held at the old banquet hall of Eko Hotel in Lagos.

Some still remember "as if it were only yesterday" how Carleton opted to break all protocols and security by riding around

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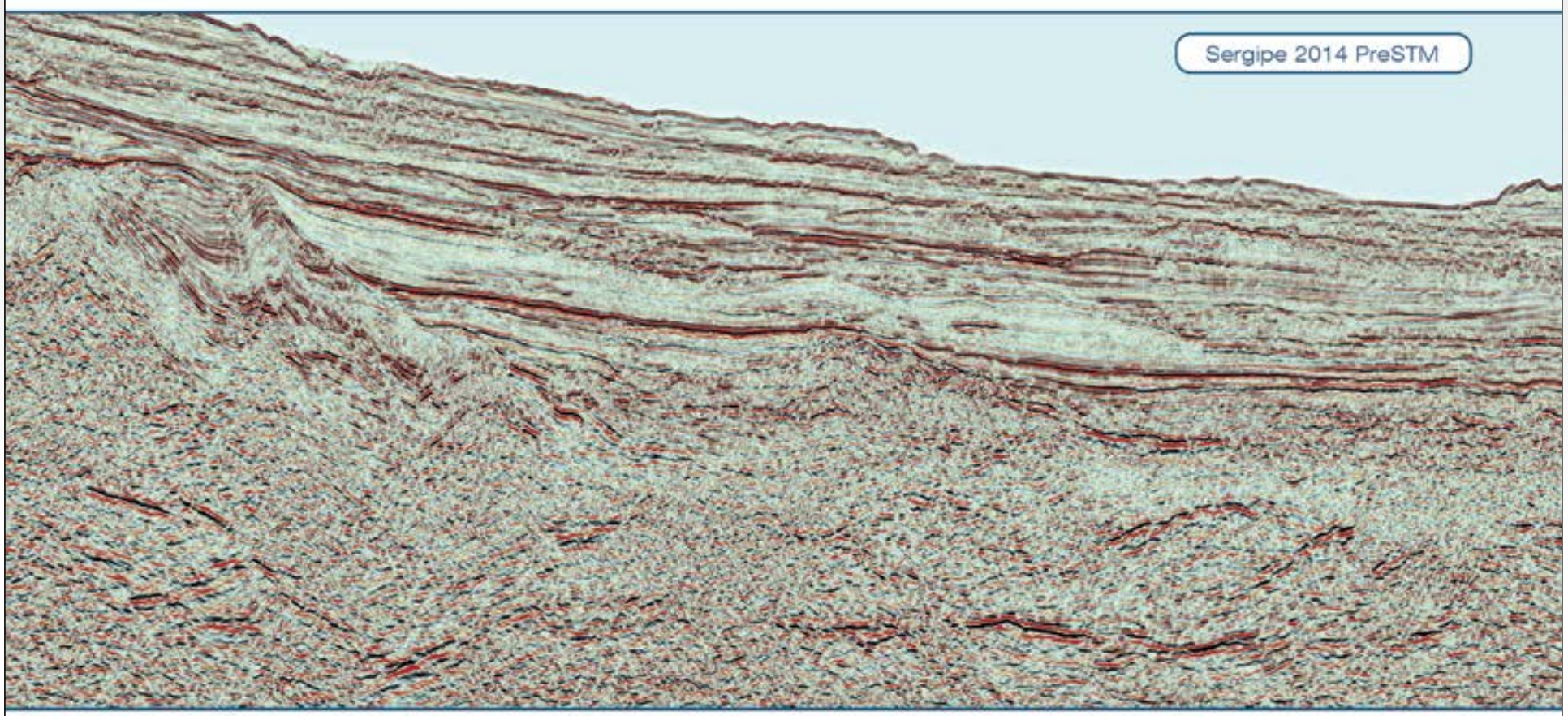
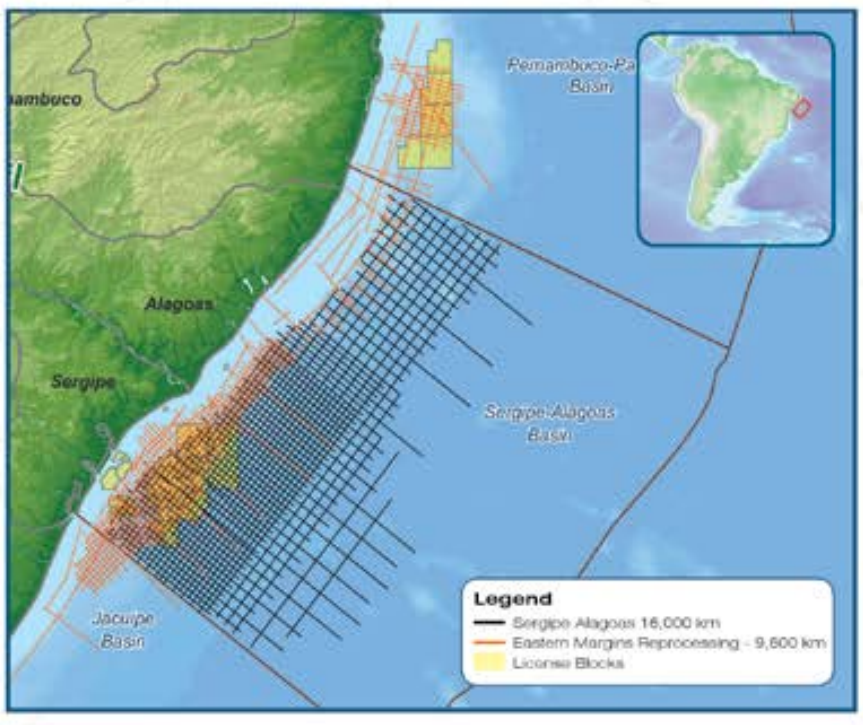
Anticipated 2015 License Round

Brazil: Eastern Margins

Long Offset 2D Multi-Client Seismic Data





Spectrum has available 16,000 km of newly acquired Multi-Client 2D seismic data offshore Brazil in the Sergipe and Alagoas basins along the eastern margin of Brazil. The new acquisition program will tie key wells in the basins, including the recent Barra, Muriu, and Farfan discoveries. PreSTM will be available in Q4 2014 and PreSDM data will be available in Q1 2015. In addition AVO attribute stacks and Broadband stacks will be available for license in Q1 2015.

To supplement the new acquisition in the active exploration area, Spectrum has completed the reprocessing of 9,600 km of data through both PreSTM and PreSDM and is offering this data to industry ahead of the expected bid round in 2015

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Spectrum

Africa Region

from page 32

Lagos in a personal car.

On his tour Carleton saw "the contrasting sides of Lagos," one eyewitness recalled. "No sirens and no escort car, driving past Jankara Market, the largest market in Lagos, where they sell everything from tie-dyed cloth and trade beads to herbs and traditional medicines, to Tafawa Balewa Square, Victoria Island, with its imposing buildings and memorials to World War I and World War II fallen soldiers.

"It was then," he continued, "that he (Carlton) realized that Lagos could have been any other city in the world, with all its shams, drudgery … and glistening neon lights."

An Ongoing Relationship

Opportunities for collaboration and cooperation between AAPG and NAPE have been many.

For example, the groups joined together to run two deepwater Western Africa conferences (DOWAC), in 2004 and 2010, in Abuja – "major collaborate events in which NAPE provided the platform while AAPG provided the quality control and editing," said past Region president Gilbert Odior.

"It also is worthwhile to mention that the activities of NAPE led to the formation of the AAPG Africa Region," he added, "and since its formation NAPE has provided more than 80 percent of the regional presidents and officers."

In recent years, the two associations have worked together closely to reach out to universities in Nigeria, with AAPG Africa Region members and NAPE members expanding the reach of the Imperial Barrel Award Program since 2008. In many cases IBA judges and mentors were both NAPE members and AAPG members.

Then in 2013, the two affiliates worked together to offer a Local-Student Chapter Leadership Summit. AAPG Africa Region Vice President Femi Esan attended Leadership Days the previous year to learn the L-SCLS model and implemented the program during the annual NAPE conference.

The next L-SCLS is planned Nov. 11-13 during this year's NAPE conference.

Thanks to collaboration with NAPE, there are 24 AAPG student chapters in Nigeria. The first AAPG student chapter formed in 1999 at the University of Calabar. Then after a hiatus with no new chapters forming for several years, 2001 brought a resurgence – since then, new chapters have formed across Nigeria nearly every year.

Since Carleton's visit to commemorate the AAPG-NAPE affiliation, other AAPG presidents and executives have flown across the Atlantic to pay respects to the relationship, learn from Nigerian geoscientists and benefit from NAPE's hospitality.

Those who have visited Nigeria and participated in NAPE conventions are past AAPG presidents Robbie Gries (2000, 2001) and Scott Tinker (2008), Alfredo Guzmán (2010), Stuart Harker (2011), David Curtiss (2012) and Alan Wegener (2013).

Robbie Gries was AAPG's first female president-elect when she traveled to Nigeria in 2000 for NAPE's 20th anniversary. The following year as president she attended the NAPE annual meeting in Port Harcourt.

For Gries, both trips were rich with experiences among the working professionals and students of Nigeria.

"It was truly impressive the way this organization had grown and become a major influence in the professionalism of its members," she said.

Friendships forged and memories of these visits remain strong to this day for Gries. But her lasting memories are of the students.

"With only an hour's notice, for both me and for the students attending NAPE, I gave an impromptu talk for 800-900 enthusiastic students," Gries said. "They were so eager to develop as geologists – and they all wanted a photo with the AAPG president!"

NAPE currently has its first female president in Adedoja oja Ojelabi – and considering over 60 percent of the NAPE members are students and young professionals, Ojelabi meets a lot of students and young professionals at NAPE events.

"With such a huge population of young talent, it is equal parts gratifying and equal parts challenging," Ojelabi said.

"It means NAPE must tailor programs to their demographics that will grab their attention and sustain their interest. That is the only way to ensure that they transition from students to young professionals and eventually active members," she added.

The responsibilities of being a role model for young talent is a fact not lost on AAPG President Randi Martinsen.

"My election as the second female president of AAPG and Doja Ojelabi's election as the first female president of NAPE is clear evidence of both AAPG and NAPE valuing the leadership capabilities of women," Martinsen said. "I hope Doja and I as role models of successful female leaders in the petroleum industry encourages more women to become petroleum geoscientists.

"West Africa is an important hydrocarbon province and the challenges facing our industry to find and produce hydrocarbons are immense," she added. "Organizations like AAPG and NAPE are important contributors to the technical and professional development of these young geoscientists."

* * *

Epilogue: Remember Fatona's prediction about Nigeria being the single largest one-country collection of AAPG members outside of the United States and the United Kingdom?

According to the annual AAPG membership count taken effective Jan. 1, 2014, the countries with the largest membership are, in order, the United States, the United Kingdom, Canada and … Nigeria.

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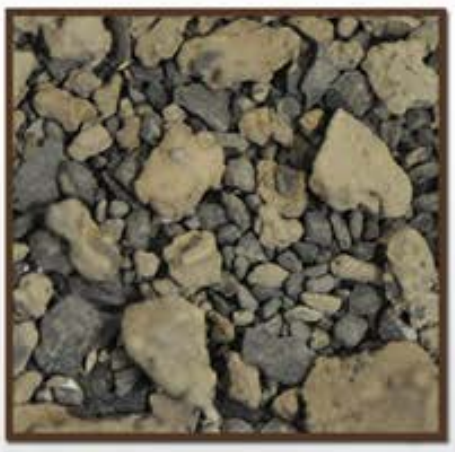

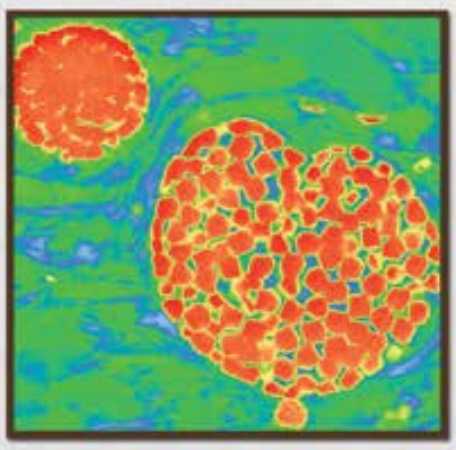

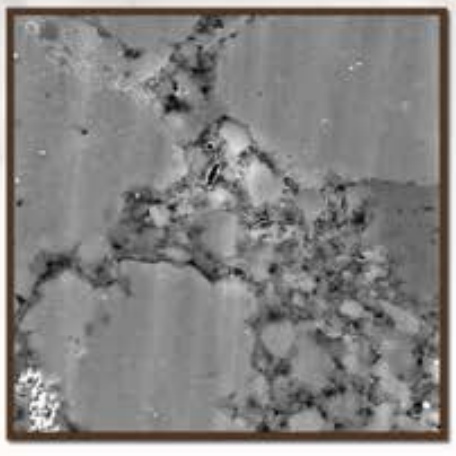

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Editor's note: AAPG President Randi Martinsen and Africa Region President Dave Blanchard were scheduled to address the 32nd annual NAPE international conference and exhibition this past fall, but the trips were cancelled due to the Ebola virus outbreak in West Africa. They sent meeting officials copies of their remarks, which AAPG Africa Region past president and current advisory counselor Nosa Omorodion read to the gathering on their behalf. Below are excerpts from that address.

Congratulating NAPE on 20 Years

Thank you for the honor of allowing me the opportunity to send my congratulations to all of you on the occasion of the 20th anniversary of the affiliation between NAPE and AAPG. I am very disappointed not to be there in person to celebrate 20 years of AAPG and NAPE working together … My good friend Robbie Gries (the first female president of AAPG) visited here twice and has spoken to me so often of how wonderful her visits to Nigeria were and how warm and welcoming the Nigerian people are.

I have heard similar comments from other AAPG presidents who have come here – both Scott Tinker and Paul Weimer have also told me of the wonderful reception they received in Nigeria. And my interactions with Nigerians at AAPG meetings and conferences have always been very positive.


MARTINSEN

As AAPG's second female president, I'm also disappointed not to be standing there side-by-side with Adedoja Ojelabi, NAPE's first female president. Although our industry has historically been male dominated, the times they are a changing, just like Bob Dylan predicted. There is widespread recognition that diversity – of gender, of ethnicity, of age, of culture – contribute to increased productivity and success in the workplace.

AAPG has many things to offer geoscientists, but geoscientists also have much to offer AAPG. As AAPG approaches its 100th anniversary in 2017, we need your energy, your enthusiasm and your talent if AAPG is to be as successful in its second hundred years as it was in its first hundred.

We are a global organization, and we need global input from all of you and from prominent geoscience associations like NAPE. So, if you are an AAPG member, I thank you. And if you are not an AAPG member, please consider joining.

The Nigerian Association of Petroleum Explorationists officially became an AAPG affiliate in 1994, announced at the AAPG annual convention's opening ceremony that year.

To mark the affiliation, then-AAPG President Toby Carleton traveled to Nigeria and was hosted during the NAPE's annual international conference is and exhibitions that took place at the Eko Hotel and Conference center, Lagos, in November 1994.

The AAPG Africa Region structure was created five years later, and the Region's first leadership team was headed by Nahum Schneidermann.

Since 1994, four AAPG presidents have visited Nigeria and attended the NAPE annual conference – in addition to Toby Carleton in 1994, there was Dick Bishop in 1998, Robbie Gries in 2000 and 2001, and Scott Tinker in 2008. AAPG President Paul Weimer visited Nigeria in 2012 and took part in the Africa Region Imperial Barrel Award finals competition that year.

In addition, AAPG vice presidents Alfredo Guzmán and Stuart Harker, AAPG Executive Director David Curtiss, Global Development and Conventions Director Alan Wegener, and Regions manager Carol McGowen also have visited Nigeria on various occasions.

The 20 years of affiliation has been of mutual benefit to both societies and has witnessed several landmark collaborations such as the field immersive program; AAPG/NAPE YP events; student chapter collaborations; donations of journals and books to tertiary institutions; regional conferences (DOWAC); Distinguished Lecturer programs; technical and professional seminars/exchanges; and membership drives, among many others.

And in 2013, the AAPG Africa office was established with very significant support from NAPE. The presence of an AAPG region office in Lagos will ensure growth of AAPG activities throughout the region to the benefit of both AAPG and NAPE – and most importantly, to the benefit of geoscientists across Africa.

– RANDI MARTINSEN


BLANCHARD

It is a great honor to have the opportunity to send my congratulations to all of you on the occasion of the 20th anniversary of the affiliation between NAPE and AAPG ... My sincere apologies for missing the conference, and I hope that in some small way this message conveys my sense of pride in our historic and strong affiliation.

This is a time to celebrate the collaboration between two societies, which for the last 20 years have shared a common vision, mission and passion for petroleum exploration.

The vision is simple: To be the pre-eminent professional geoscience society with a global reach. Our shared mission is to provide access to science for our members, and the industry at large, as well as providing a forum for professionals to network. And we have a shared responsibility – to provide support and inspiration for our young professionals and students who sometimes need a little bit extra encouragement to propel themselves onward toward graduation and starting a career.

I would like to share with you a couple of goals I hope to achieve during my term as AAPG Africa Region president.

One is to attend a NAPE conference, and I pledge to make every effort to be here with you all next year.

Second is to continue the progress made by my esteemed predecessors to increase AAPG membership in the Africa region – and by extension, in NAPE events. AAPG is making very big strides with students and young professionals, and now has over 45 AAPG student chapters across Africa. The Imperial Barrel Award program is a huge success in Africa and has fostered graduate students' skills by affording them the opportunity to compete in a global event that brings the real world of exploration to them and compels them to work hard and think smart in order to win the big prize.

We are especially grateful to NAPE for co-hosting the Imperial Barrel Award semi-finals for the past several years. In addition to students, young professionals and those who are just beginning their careers are becoming much more active in our societies and asserting themselves as leaders of the future.

Finally, AAPG is working closely with industry, governments, sister societies and universities to hold several events in Africa during the coming two years, including Geoscience Technology Workshops, Distinguished Lecture tours and an Africa regional conference in east Africa, intended to highlight the continent's recent exploration successes.

I wish you all a wonderful conference experience.

– DAVID BLANCHARD

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AAPG Education

NAPE President Adedoja Ojelabi

Fueling Growth, Fighting Corruption

By HEATHER SAUCIER, EXPLORER Correspondent

Oil should be a blessing. It creates jobs and puts food on the table for millions of people. It fuels the power that drives industrial growth and development to move countries beyond oil and gas into a sustainable future.

That is how AAPG member Adedoja Ojelabi, the first female president of the Nigerian Association of Petroleum Explorationists (NAPE), views the hydrocarbons she has been working to discover since beginning her career with Chevron Nigeria 24 years ago.

But it isn't always the case.

"It is known to also fuel corruption," she said. "Where institutions are weak and there is little or no oversight and corrupt practices are not being punished, then it is downhill from there."

Born and educated in Nigeria, the geologist has used her first year as leader of NAPE – an affiliate of AAPG and the largest single body of petroleum geologists in Africa – to start chipping away at the corruption, which can cause the industry to shy away from a continent that desperately needs the resources and opportunities provided by oil and gas.

"Many African countries have this problem now," she explained. "Rather than investing in schools, hospitals, industries, roads, infrastructure and diversifying the economy, corrupt politicians take what is meant for the commonwealth and fritter it away."

OJELABI

> "I wanted to get out there and move mountains. Geology was appealing and did not have too many women. I thought the world could do with more women geologists."

A top item on Ojelabi's to-do list as NAPE president was to organize a workshop on an issue common in many of Nigeria's oil fields: fluid metering and accounting.

With full support from stakeholders, NAPE made an official recommendation to the Ministry for Petroleum Resources that fiscalization should continue to be performed at pipeline terminals rather than at individual wellheads, as proposed by some government bodies. NAPE also recommended that government regulators make industry data more accessible by putting it online and in real time. The organization requested more reliable surveillance of pipelines through modern technology and upgrades of metering systems as well.

"Adedoja is a woman of passion," said AAPG member Lere Olopade, a friend and colleague. "Being the first female president of the association, Doja has demonstrated that what a man can do, a woman can do better in the running of affairs of NAPE."

Ojelabi is not one to flaunt her historical status at NAPE, but she does share words of advice to those striving to break barriers and move ahead.

"I have learned not to sweat the small stuff," she said. "Just do your best, give 100 percent and let your work speak for itself.

"There will be glass ceilings for both men and women," she continued. "As long as you stay up there you will either break it one day, or you will be close enough to squeeze through when someone else breaks it.

"As the first female president of NAPE," she added, "I think I broke through one myself."

Paying It Forward

In addition to her bold move of taking on corruption in Nigeria, Ojelabi is practically hailed for her support of African students wanting to study the sciences and enter the industry.

Prior to her involvement in the AAPG's Imperial Barrel Award (IBA) program in the Africa Region, little was known about the program's efforts to help geoscience graduate students win scholarships by participating in a prospective basin evaluation competition. Just four student teams participated in the program in 2008.

After Ojelabi became adviser three years later, that number grew to 15 and included students from northern, southern and western African universities.

"The yearly event has become the most veritable link between the oil and gas industry and the academia all over Africa," said Layi Fatona, an industry colleague of Ojelabi and past president of NAPE.

The increase in participation prompted Ojelabi to help raise more than $176,000 in IBA sponsorships and $1.8 million in Petrel software donations to universities. She also helped initiate an IBA mentorship program by pairing dozens of industry professionals and technical coaches with IBA teams across the continent to help students learn problem-solving skills, teamwork, efficiency and work ethics.

Her mentoring and fund-raising efforts are now considered a "best practice" and have been adopted by other AAPG regions.

A modest Ojelabi merely sees herself as a link.

"I don't really see it as mentoring – I look at it more as connecting people," she said. "There are so many talented, hard-working young people out there. Some just need a little direction, others a little encouragement

See **Mentor**, page 41

ICE 2015 Call for Abstracts Deadline Nears

The call for abstracts deadline is about to arrive for the next AAPG International Conference and Exhibition – a meeting that will be historic on many levels.

The abstract submission deadline is Jan. 15.

This year's ICE will be held Sept. 13-16 in Melbourne, Australia – the first time AAPG has used that city as a setting for ICE. The meeting will be hosted by the Petroleum Exploration Society of Australia.

It also will be the first-ever ICE that will be co-presented by AAPG and the Society of Exploration Geophysicists (SEG).

The meeting's theme is "A Powerhouse Emerges: Energy for the Next 50 Years" – a perfect theme, organizers say, because of both the AAPG-SEG union as well as the marking of the 50th anniversary of the Gippsland Basin oil discovery, which unlocked Australasian market activity.

Technical program co-chairs Pete McCabe, of the University of Adelaide, and Steve Mackie, with Santos, said their goal is to build an exciting program of talks, posters, short courses and field trips that focus on recent advances in petroleum geology and geophysics.

"Although the conference will be worldwide in scope, particular attention will be paid to the petroleum potential of the Asia Pacific region," McCabe said, "including sessions on unconventional reservoirs of the region and new and emerging E&P provinces in China, Southeast Asia, New Zealand and Australia.

In addition to the general sessions, the technical program also will feature three special symposia:

Melbourne, Australia, will be the site of the next AAPG International Conference and Exhibition, set Sept. 13-16. The call for abstracts cotninues, but the Jan. 15 deadline looms.

- The Reg Sprigg Memorial symposium will be a look back and forward for Australia's major petroleum provinces – the Gippsland Basin, Cooper Basin and Northwest Shelf, each celebrating 50 years of exploration and production.

- A second symposium honors the career of Marita Bradshaw, who recently retired from Geoscience Australia, Australia's geological survey, with a focus on the paleogeographic evolution of Australia through time and its relationship to petroleum accumulations.

- The third symposium, on Eastern Australasian Basins (EABS), will be coordinated by PESA and will feature recent advances in our understanding of petroleum basins along Australia's eastern margin and across the Tasman Sea to New Zealand.

EABS and the Western Australian Basin Symposium (WABS), alternately held biannually by PESA, form the key up-to-date discussions of the petroleum basins on the Australian plate.

The remaining 18 technical program themes are:

- CO_2 Storage.
- Carbonates.
- Environment, Regulation and Social License to Operate.
- Geochemistry and Basin Modelling.
- Geophysics.
- Getting More Out of Mature Basins.
- Mineralogy.
- New and Emerging E&P Provinces/ Australia-New Zealand.
- New and Emerging E&P Provinces/ South East Asia.
- Petroleum Systems.
- Petrophysics.
- Sedimentology.
- Stratigraphy and Applied Palaeontology.
- Structure and Tectonics.
- Technologies for Unlocking the Future.
- Unconventional Reservoirs.
- Worldwide Frontiers – China.
- Worldwide Frontiers – Other.

The abstract submission deadline is Jan. 15.

To submit an abstract, or for more information, contact Terri Duncan, technical programs coordinator, at (918) 560-2641; or email tduncan@aapg.org; or go to the website, ICE.AAPG.org

Exhibition space and sponsorship opportunities also are remain available.

Mentor
from page 38

so they do not give up when the going gets tough."

She volunteers as a mentor and awards an annual scholarship to the top, graduating female student of the geology department at the University of Jos in Nigeria, her alma mater, through the NAPE University Assistance Program.

Furthermore, she has facilitated Chevron Nigeria's sponsorship to ship books and journals donated to 10 Nigerian universities by the AAPG Publications Pipeline, which aims to collect geoscience books and journals from those who no longer need them and forward the resources to overseas universities and libraries.

Ojelabo also has assisted Chevron in donating 30 state-of-the-art computer workstations and other hardware to Nigerian geosciences departments.

Inspired by the Earth

Ojelabi recalled when she was a student, struggling to figure out what she wanted to be.

"I wanted to get out there and move mountains. Geology was appealing and did not have too many women. I thought the world could do with more women geologists," she said.

"I love to sit by the window on a plane during the day and just look down, seeing the Earth in plain view," she continued. "Seeing the rivers meander or a landslide or a waterfall, and I start to think about the end product, whether there will be erosion or sedimentation. Where will the water go? I love being a geologist because you have to think in many dimensions and use all parts of the brain."

There is no doubt that every part of Ojelabi's mind has been tapped in her career.

Starting out as a seismic interpreter, she has worked as a processing geophysicist, an operations and well-site geologist, a regional geologist/sequence stratigrapher, and now is manger of reservoir management organizational capability. In her current position, she is responsible for technical training and mentorship programs for all earth scientists and petroleum engineers at Chevron Nigeria.

She also has authored or co-authored several award-winning technical papers throughout her career.

And importantly, Ojelabi has witnessed firsthand how technology has changed the industry, and embraces the advancements while reminiscing about the good ol' days.

"It was one of the best times of my life to 'QC' seismic data as it was coming off the field. I was a greenhorn, but I was lucky that I had a great mentor," she said of AAPG member Spencer Quam, a former supervisor of seismic acquisition and processing. "I like that he threw me in the deep end, having to make the call about out-processing workflow, filters, deconvolution, spectral whitening, all that."

Two female mentors, Solange Bensimon, a former supervisor of oil mining leases, and AAPG member Iyabo Ogun, her predecessor, taught her how to check her work and be thorough, and how to stay organized and plan ahead, she added.

Recalling her structural mapping days, Ojelabi said she used paper seismic lines to interpret 2-D and 3-D seismic data.

"We had only one workstation and there was a time schedule to use it," she said. "Later, the company bought Seisline and Sun Workstations, and then bam! Computers were everywhere.

"Companies are finding huge amounts of oil, so that is good," she said. "But I still miss those days."

Looking Ahead

While she remains nostalgic about the past, Ojelabi may not fully realize how she is helping to change the industry in Nigeria for generations to come.

In 2012, she received the AAPG Distinguished Service Award for her outstanding leadership and dedicated service to the Association and its Africa Region. In 2010 she was elected AAPG vice president of the Africa Region and also served as a PROWESS (Professional Women in Earth Sciences) panelist at the international convention in Calgary that same year.

She also has hosted a "Women in Geosciences" roundtable for female geoscientists in Nigeria.

Ojelabi recognizes she works in a male-dominated field, but stresses that women have the ability to fit in when they leverage their strengths and adapt to working in environments that may not always be ideal.

"Women are great multi-taskers – we juggle family, work, friends, parents and parents-in-law," explained the married mother of three. "I have not always felt valued by more senior colleagues, particularly at the beginning. But I think with time I have proven that I have the ability to do many things and do them well. There have been times that I felt that my work was better than I got acknowledgment for, but over time I have realized that rating myself is not very objective, and I leave that for other people to do."

So far, her reviews have been stellar. To date, she has hosted 28 technical programs on behalf of NAPE and organized its 2013 annual conference, which was so replete with content and high-caliber speakers it continues to be discussed today.

"She organized perhaps the best annual international conference the association has ever had in its almost 40-year history," said Femi Esan, vice president of the AAPG Africa Region and Ojelabi's longtime colleague.

This year's conference, which will feature Africa's leading industrialists Aliko Dangote and Tony Elumelu, is expected to top the last.

Ojelabi also has worked to digitize NAPE's communications to reach members and non-members alike. She has overseen the building of a dedicated website for NAPE's annual conference, and has made NAPE's technical presentations, newsletters and bulletins available for downloading.

It's difficult to imagine how Ojelabi balances work and family, much less squeeze in a hobby or two. Going to the theater is one of her favorite pastimes – no doubt a love she inherited from her uncle, Oyin Adejobi, a famous stage actor who later made his way into African television.

"He was brilliant, even though he had a disability and could only walk with the help of a cane, more like a large pole actually," Ojelabi said. "He was musically gifted and would compose the most moving songs.

"To an extent, all of us in the family have some musical and stage talent," she added. "We've just been too lazy to pursue those interests."

In Ojelabi's case, laziness might not be the right word. Her passion for geology simply eclipses all else.

The Geophysical Corner is a regular column in the EXPLORER, edited by AAPG award-winning member Satinder Chopra, chief geophysicist for Arcis Seismic Solutions, Calgary, Canada, and a past AAPG-SEG Joint Distinguished Lecturer. This month's column deals with Sobel filtering for enhancing seismic coherence attribute.

Sobel Filtering Brings Edges Into Sharp Focus

By SATINDER CHOPRA and KURT J. MARFURT

Mapping of geologic edges such as faults or channel levees forms a critical component in the interpretation on 3-D seismic volumes. While the more prominent features often can be easily visualized, smaller features important to understanding the structural and depositional environment can be easily overlooked.


CHOPRA


MARFURT

Careful manual interpretation of such features is both tedious and time consuming. A seismic coherence attribute that enhances edges not only accelerates the interpretation process, it also provides a quantitative measure of just how significant a given discontinuity is in relation to others.

Since the seismic coherence attribute extracts all subtle features in the seismic amplitude volume, preconditioning the data to enhance geologic edges and minimize edges due to acquisition and processing is key to accurate analysis.

We find that the application of a Sobel filter to energy-ratio coherence volumes significantly sharpens faults and channel edges of interest.

We demonstrate this simple cascaded workflow with examples from Canada, where one of the objectives is to provide improved attributes for subsequent automatic fault plane extraction.

* * *

Sobel filters are one of many filters that are commonly distributed when one purchases a digital camera. For a flat photograph containing pixels of a given amplitude aligned along the x and y axes, the classical Sobel-filtered image is simply obtained by running a process equivalent to the square-root of the sum of the squares of derivatives of the amplitude in the x and the y directions.

Unlike a photograph, seismic images have a third dimension. A similar process (equivalent to the square-root of the sum of the squares of derivatives of the amplitude in the inline and crossline directions along structural dip) normalized by the RMS amplitude in the window of application to account for structural dip can be run on the seismic data. This normalization will enhance lower amplitude edges when applied to a coherence input volume.

In figure 1 we show the application of Sobel filtering on a 3-D seismic volume from Alberta, Canada, and compare it with an energy-ratio algorithm application for coherence attribute.

Notice that subtle stratigraphic features appear stronger on the Sobel filter display while the larger faults and fractures are much clearer on energy-ratio coherence. In this image, the two attributes are not redundant, but complementary.

Since the classical Sobel filter is routinely used in sharpening photographic images, we hypothesize that we can do the same by applying it to edge-sensitive seismic attributes such as coherence. We can achieve this goal by simply cascading the two attribute calculations.

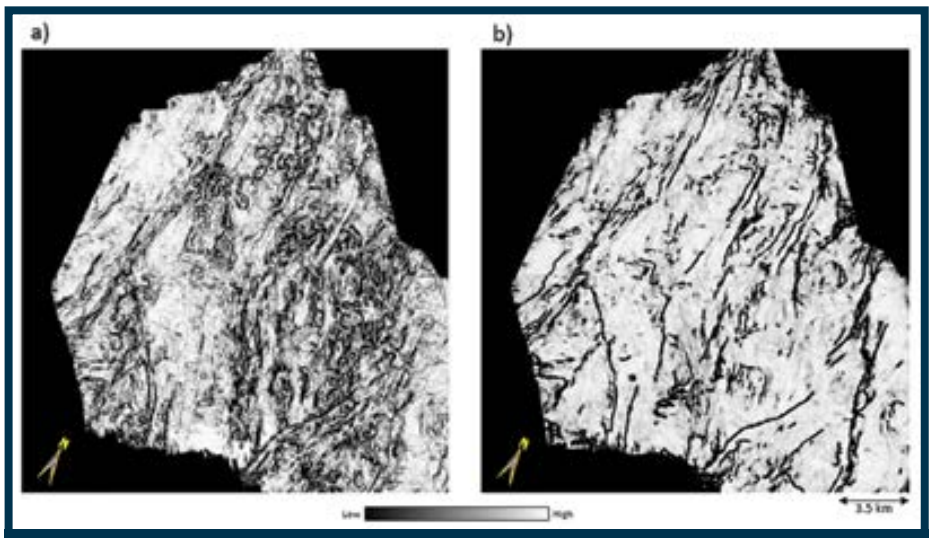

Figure 1 – Stratal slices from a horizon picked close to t=1200 ms through (a) Sobel filter similarity and (b) energy ratio coherence volumes. Although both "coherence" algorithms used the same structurally-oriented filtered data volume as input and the same 5-trace by ±10 ms analysis window, these two images are quite different, with the Sobel filter similarity showing more stratigraphic features and the energy ratio coherence providing sharper fault images.

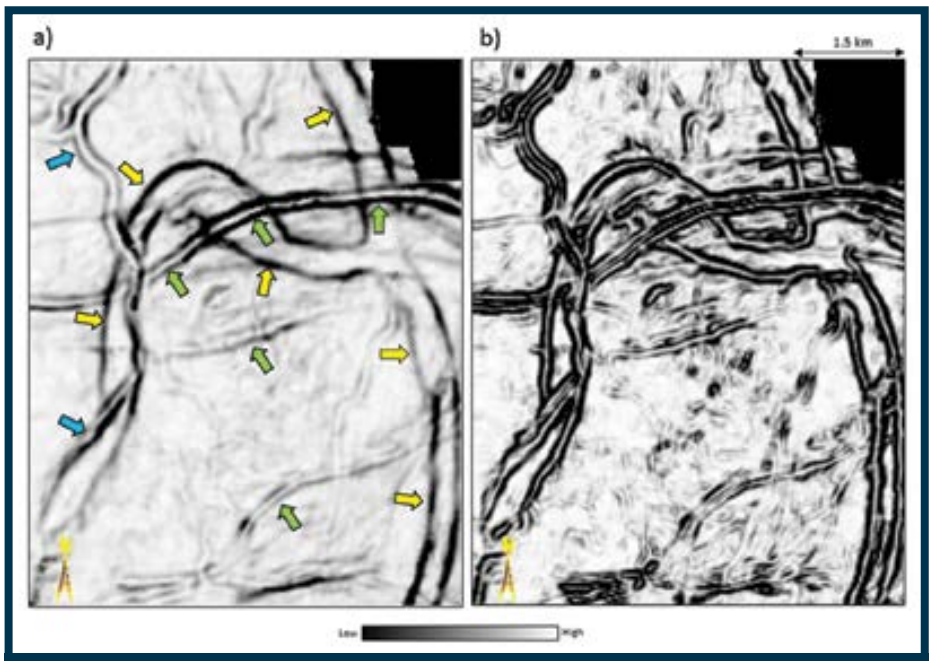

Figure 2 – Stratal-slices at a level close to a horizon picked at t=1020 ms through (a) energy ratio coherence volume computed from the seismic amplitude, and (b) Sobel-filter similarity computed from the coherence volume shown in (a). Notice the clarity with which the edges of channels seen in (a) are seen in (b).

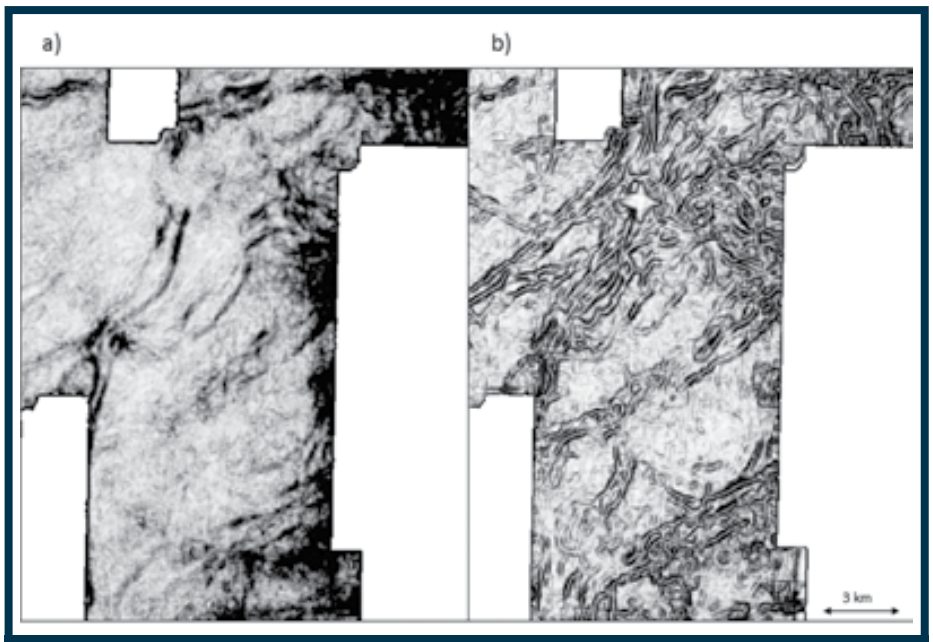

Figure 3 – Time slice at t=1020 ms from (a) coherence volume computed using the energy ratio algorithm, and (b) Sobel-filter run on the coherence shown in (a). Notice the clarity with which the edges of channels seen in (a) are seen in (b).

First we apply energy-ratio coherence to the original seismic amplitude to obtain good quality fault and channel edges.

We then take the output coherence image and use it as input to a Sobel-filter run along structural dip, thereby further sharpening any anomalies.

This workflow can be used to more rapidly delineate channels, or to automatically detect faults using modern image processing tools.

* * *

The data going into coherence computation are usually preconditioned using structure-oriented filtering, reducing the risk of enhancing aligned noise showing up as edges.

In figure 2 we show a similar comparison of coherence run on a 3-D seismic volume from south central Alberta, Canada, but now with the objective of illuminating Mannville channels that traverse the display.

In addition to the two main channels indicated with yellow arrows, there are some thin channels indicated by green and blue arrows that crisscross the main channels at many places.

In figure 2b we show the result of applying the Sobel filter to the coherence volume.

Notice the crisp definition of the channels on this display. Besides the main channels many of the narrower channels are seen clearly. Invariably, the definition of all the channels on the display is very prominent.

In figure 3 we show a comparison of time slices from a 3-D seismic volume from central Alberta.

Figure 3a shows a time slice through a coherence volume calculated using the energy ratio algorithm where we see indications of some NE-SW trending channels. As this display is at the level of a coherent reflector, we see high coherence everywhere except at the location of the channels.

Figure 3b shows the result of applying a Sobel filter to the coherence volume. Notice the high definition and clarity with which the channels now show up, as well as some of the other events around them.

Such convincing displays of the application of Sobel filters to coherence volumes suggest that discontinuity features – such as channels as well as faults – can be enhanced, resulting in crisper and more focused images.

We believe such images provide superior input to modern object extraction software application, as well as in visualizing the channel features clearly.

* * *

The present exercise can be easily extended to other features of interest, such as faults, which would be a useful input for automatic fault extraction software applications.

Such applications would definitely help with the geologic understanding of the subsurface area of interest.

(Editor's note: AAPG member Kurt J. Marfurt is with the University of Oklahoma.)

Editor's note: "ProTracks" is an ongoing feature of the EXPLORER, offering news and information pertinent to getting started or getting better in your career. Catherine Wasse is with Shell; Ailsa Messer, an AAPG Europe Education officer, is with BG Group; and Chun Hock, Tan is with Talisman-Sinopec.

PROTRACKS

ICE in Istanbul Was a Big Hit With YPs

By CATHERINE WASSE, AILSA MESSER and CHUN HOCK, TAN

The historic 2014 AAPG International Conference and Exhibition marked the first time an AAPG international conference was held in Istanbul – but that wasn't the only new dynamic at work.

The theme for the meeting – hosted by the Turkish Association of Petroleum Geologists and the AAPG Europe and Middle East Regions – was "The Spirit Between Continents: Energy Geosciences in a Changing World."

Building on that theme there were a number of successful activities for Young Professionals (YPs) and students that delivered an unforgettable conference experience to both groups.

Here is the summary of the two main activities for these groups that were held during ICE:

YP Meet-N-Greet.

The Meet-N-Greet, which has become an increasingly popular event at both AAPG annual and international meetings, took place in a room packed by approximately 100 participants and more than 40 professionals (mentors), including representatives from many of the major oil and gas companies.

The event started with a welcome speech from Catherine Wasse, co-chair of the Student and Young Professionals program in Istanbul, and the crowd was then dispersed into smaller mentoring groups.

This event ran along the lines of "speed dating:" After 15 minutes the mentors moved tables, rotating as frequently as possible to enable varied interaction and time for the mentees to chat with each other.

Throughout the sessions, the mentees made use of the precious time to ask as many questions as possible on topics such as:

✓ Interview tips.

✓ Suggestions for improvements to their master's projects.

✓ Possible career paths.

AAPG President Randi Martinsen's appearance was the highlight for many attendees as she joined the others in actively sharing her experiences about field trips and professional growth.

After enjoying complimentary refreshments, the attendees were then led together into the main hall for the opening ceremony.

"I always enjoy these events, and this was a bit more structured – and with a greeter, which I think was a fine idea," said mentor (and AAPG treasurer) Jim Tucker. "I found a number of groups of YPs and students to talk with, and learn a bit about them and their career plans."

"It was my first experience of YP Meet-N-Greet session, which I have enjoyed a lot and spent a great time with the young professionals," said mentee Subhashree Mishra. "The specialty of this session for me was conversations between the experienced peoples and young geologists, (who) exchanged knowledge about new carrier ventures in a very friendly environment. It also helps me to proceed in my research field."

Student Reception.

This year's Student Reception, sponsored by ExxonMobil, was held in the Hilton Hotel ballroom. Inspirational opening speeches were given by Jamie White (exploration manager of the Asia Pacific Middle East, ExxonMobil) and Randi Martinsen.

Approximately 100 students attended and had the chance to talk with employees of ExxonMobil and members of the AAPG over drinks. There was a lot of interaction and the setting provided a great opportunity to network.


WASSE


MESSER


TAN

Shell sponsored 53 students with funds that went toward travel and accommodation costs. In return, the students became volunteer workers during ICE – and did a superb job in their respective roles.

In fact, the conference would not have run as smoothly without them.

Want to know more about YP activities in your area? Visit our website at aapg.org/youngpros, and contact your Region or Section representative.


Students and AAPG officials mingled at the Student Reception in Istanbul.

Historical Highlights is an ongoing EXPLORER series that celebrates the "eureka" moments of petroleum geology, the rise of key concepts, the discoveries that made a difference, the perseverance and ingenuity of our colleagues – and/or their luck! – through stories that emphasize the anecdotes, the good yarns and the human interest side of our E&P profession. If you have such a story – and who doesn't? – and you'd like to share it with your fellow AAPG members, contact Hans Krause at historical.highlights@yahoo.com.

Oil for Life: Russian Pioneers Chose Wisely

By ARKADY I. GALKIN, FRANCESCO GERALI and IRENA G. MALAKHOVA

When referring to the early Russian oil industry, one almost always hears the names of the fields located in the southern Absheron Peninsula, in Azerbaijan. Rarely does one hear about the oil heritage of the northern Russian lands close to the basin of the Izhma-Pechora River.

Medieval Russian sources mention on the primitive production of oil on the territory of the Muscovite state. The Dvina Chronicle (15th century) states that the tribe of the Chudes, living on the banks of the Ukhta River, collected oil from the river surface and used it for various household purposes.

In 1692, the book "Noord Oost en Tartarye" (North and East Tataria), published in Amsterdam by Nicolaes Witsen, reported, "The Ukhta River is a day away from the village of Pechora ... On this river is a small spot where oil, that is black petroleum, separates from the water."

In 1745, in the area of Ukhta (today's Republic of Komi), there were some shallow hand-dug shafts and Fedor S. Pryadunov's small distillery, which produced lamp fuels for the locals until the 1870s.

The first reliable geological map of that area was prepared in 1846 by Graf Alexander A. Keyserling, who in his "Scientific Observations on a Trip to the Pechora Region in 1843," wrote numerous references on Ukhta petroleum – but these northern territories started to be systematically explored by scientists only after establishment of the Geological Committee of Russia in 1882.

Keyserling's references did not remain just in the closed circle of academy, but also fostered the intervention of some outsider entrepreneurs, like Mikhail K. Sidorov (1823-87), the pioneer in oil explorations in the Russian north.

Sidorov's crew started to dig in the summer of 1868, using the spring pool system with a set of eight-inch pyramidal bits and driving pipes – but he had to quit in 1871 due to lack of results. He was able to resume the operations in June 1872, this time equipped with a Pennsylvanian cable tool system, fabricated in St. Petersburg, and supported by the counseling of the German geologist Hans von Höfer, later a professor at the Mining Academy and author of the 1888 textbook "Das Erdöl und seine Verwandten" (Petroleum and Its Relatives), that was the most important technical contribution on oil written in Europe in the 19th century.

Oil was found for the first time in good quantity in September 1872 at 173 feet, and began the legacy of oil in North Russia.

TIKHONOVICH

STRIZHOV

The Chibyu oil deposit. The well # 1. 1930s.

An Easy Choice?

In 1883, the financial oil corporation "Neft" was established in St. Petersburg. It was the first wholly Russian company with an internal vertical structure, committed in exploration, production, storage, refining and trading to invest large capitals in the Ukhta region, while the focus on the powerful foreigner competitors (e.g. the groups led by the families Nobels, Rothschilds and Vishau) was pointed exclusively in Azerbaijan.

In the 19o0s, oil wildcatters and speculators around Ukhta gradually were replaced by systematic operations based on geological surveys and topographic maps. This new wave of modernity in the Russian oil was heavily hampered by the 1917 socialist revolution and the Civil War that followed in 1918-23.

The nation's economy already was in a critical situation before World War I – but in the early 1920s, following these social and political events, the system was seriously compromised.

Soviet leader Vladimir Lenin decided to put oil on the top of the Russian economic agenda. Europe was deeply wounded by the war in which mechanization – on the ground, sea and in the sky – proved to be decisive.

The idea of the modern mechanized and oil-fueled western society took shape right after World War I. Lenin wanted gas for Russia; he also sought to supply Europe and get a good payback to stimulate the Russian economy. He tried quickly to set in motion oil production in the Pechora basin: despite the precepts of the new Russian political model, in 1921 he invited major U.S. oil companies to operate in the oil regions of Baku, Grozny, Emba and Ukhta.

Few companies accepted the gamble, however, instead setting their activities around Baku. Even fewer obtained satisfactory results. Ukhta was completely neglected by the foreign investors, most probably due to the area's precarious logistics.

After Stalin took power in 1927, the Russian repression and demands for oil found a common denominator in the almost unproductive Ukhta fields.

In 1928 the deputy director of the Russian Geological Committee and general supervisor for mining operations in the USSR, Nickolay N. Tikhonovich (1872-1952) – who in 1908 had led the great geological exploration of the Russian Sakhalin Island, resulting in many oil site discoveries – was arrested under accusation of being a dissident of the regime, and sentenced to death.

But, he was given a choice: the firing squad or finding oil.

Taking the second option, Tikhonovich received 10 years of forced labor and the directorship of the new Ukhta oil project. The Tikhonovich expedition in the Pechora region – composed of 195 people, of whom 139 were political prisoners – began in August 1929 under the strict control of the Joint State Political Directorate.

The whole operation was directed from the Ukhta-Pechora Camp (Ukhtpechlag), located in the Chibyu village (renamed Ukhta in 1939).

Within a few months Tikhonovich located and drilled the well Chibyu #5 in the top layer of the Lower Frasnian beds – which yielded just 30 barrels daily.

'Brothers in Oil'

The harsh weather and the scarcity of supplies would have discouraged many workers from accepting work in those inhospitable lands, but the "Ukhtpechlag" labor camp never experienced lack of personnel because many people considered "enemies of the state" were arrested and taken to forced labor camps.

During the 1930s, "Ukhtpechlag" confined about 54,000 prisoners. Among them was the geologist Ivan N. Strizhov (1872–1953), former senior director for the oil industry sector at the Supreme Council for the National Economy, imprisoned in 1929.

Strizhov, who between 1927 and 1928 visited and studied many U.S. refineries (he published his research in the book "Amerikanskiye nefteperegonnyye zavody," or American Refineries), was ordered to work with the wary Tikhonovich, who was reluctant to accept his collaboration.

Initially there were many contrasts and disagreements between the two, but they soon became "brothers in oil" and made an effective team.

After some fruitless speculations, Strizhov focused on the thesis proposed a decade earlier by the U.S. oil geologist J.L. Rich on the correlation between moving underground water and oil migration. This study (a great example of knowledge transfer despite politics) suggested that the combinations of porous and impermeable layers with anticlines could be the key to find oil in the southern Timan formation, on the west slope of the Urals chain.

It was therefore decided to direct the drill chisels down the southern Timan and the Seregovsk anticlines; just 12 days later Stizhov and Tiknonovich reached the great deposit then named "Chibyu."

The entire field seemed immediately promising, and already in 1932 Tikhonovich detected the existence of many larger deposits in the immediate vicinity of the area.

Continued on next page


GALKIN

Arkady I. Galkin
Petroleum-geologist. Field work in Yakutia, European Russia, Komi Republic till 1990. The author of many publications on geology, petroleum geology and history of geology and books about I.N. Strizhov (1999), I.M. Gubkin (2009) and on the history of oil & gas geology (2012 – with a co-author). Public lectures on the history of petroleum geology and repression in the USSR.


GERALI

Francesco Gerali (historian)
Post doctoral researcher at the National Autonomous University of Mexico, Mexico City. He is a native Italian researcher working on the history of the early oil industry. Since 2011 he moved in Mexico to work on the development of the Mexican oil between 1860 and 1920. He promoted the history of the oil industry at the symposia of the International Commission on the History of Geological Sciences and the International Committee for the History of Technology.


MALAKHOVA

Irena G. Malakhova
Geomorphologist, historian of geosciences. Head of Department for the History of Geology. Vernadsky State Geological Museum, Russian Academy of Sciences. Member of the Moscow Society of Naturalists, the Geological Society of America (History & Philosophy), and the International Commission on the History of Geosciences. About 80 publications on the history and methodology of geosciences.

Continued from previous page

In 1933, Tikhonovich transmitted the definitive geological report of the Ukhtapechlag to the USSR State Planning Committee. The production, started in the same year, increased at an exponential rate in the following years; regional demand was fully satisfied in a short time, and Ukhta oil thus was marketed in central Russia and northern Europe.

Still in the mid-1950s, the numerous oil fields surrounding the old Ukhtapechlag yielded about 360,000 barrels per day; in 1957, the last well pumping oil from the Chibyu deposit was declared officially not profitable and was capped.

Difficult Odds

The 1932 Ukhta oil discovery was significant both in terms of productivity and for the human and scientific commitment of its protagonists – it helped Russia to become second in the global rank of oil producing countries, preceded only by the United States, right when the country was experiencing a deep shortage of oil geologists.

The ratio of oil geologists/barrels produced between the two competitors was almost 1:9, which meant that each Russian oil geologist was expected to produce up to nine times as much oil as each U.S. oil geologist.

This is an example of the huge workload and stress that Russian oil professionals typically experienced.

Tikhonovich and Strizhov were released from forced labor when Ukhtapechlag was reorganized in 1938, then they could came back in Moscow in 1939 to work on the Russian oil geology.

DL Speakers Set Busy Month

January and early February are going to be busy months for AAPG's Distinguished Lecture program, with several speakers set to make tours.

That list includes:

Lisa Towery, senior geologist with BP America.

Her tour dates are:

✓ Jan. 19 – Illinois Geological Society, Poseyville, Ind.

✓ Jan. 20 – Mississippi State University, Starkville, Miss.

✓ Jan. 21 – University of Alabama, Tuscaloosa, Ala.

✓ Jan. 22 – University of Tennessee, Knoxville, Tenn.

Barry Katz, Chevron Fellow and Team Leader-Hydrocarbon Charge, Chevron, and this year's J. Ben Carsey Distinguished Lecturer.

His tour dates are:

✓ Jan. 20 – Panhandle Geological Society, Amarillo, Texas.

✓ Jan. 21 – Wyoming Geological Association, Casper, Wyo.

✓ Jan. 22 – Montana Geological Society, Billings, Mont.

✓ Jan. 23 – Saskatchewan Geological Society, Regina, Canada.

Don Clarke, the AAPG Ethics Lecturer, will give his talk on Jan. 21 to the Grand Junction Geological Society, Grand Junction, Colo.

Bruce Fouke, director of the Roy J. Carver Biotechnology Center and professor at the University of Illinois, Urbana-Champaign, Ill., and this year's Roy M. Huffington Lecturer.

His tour dates are:

✓ Feb. 4 – University of Tulsa.

✓ Feb. 6 – Oklahoma State University, Stillwater, Okla.

Juergen Schieber, professor, geological sciences, Indiana University, Bloomington, Ind.

✓ Feb. 9 – Memorial University, St. John's, Canada.

✓ Feb. 10 – Queen's University, Kingston, Canada.

✓ Feb. 11 – Illinois Geological Survey, Mt. Vernon, Ill.

✓ Feb. 12 – University of Tennessee, Knoxville, Tenn.

✓ Feb. 13 – Southern Illinois University, Carbondale, Ill.

Water Institute of the Gulf

New Institute Eyes Global Water Management

By LOUISE S. DURHAM, EXPLORER Correspondent

There's a major scientific initiative evolving in Baton Rouge, La., that is expected to have a positive impact around the globe.

It's the relatively new Water Institute of the Gulf, appropriately located in this city bounded on its western edge by the majestic Mississippi River as it wends its way southward to meet the Gulf of Mexico.

The Institute is self-described as a "not-for-profit independent research institute dedicated to advancing the understanding of coastal and deltaic systems and to applying scientific and technological solutions for the benefit of society."

The effort will entail collaboration with public, private and academic partners to protect and preserve the U.S. Gulf Coast region. The goal is to develop and share technology that can enhance water management efforts worldwide.

The founding partners are:

- State of Louisiana – the Office of Gov. Bobby Jindal, the Coastal Protection and Restoration Authority and Louisiana Economic Development.
- Baton Rouge Area Foundation.
- U.S. Sen. Mary Landrieu, D-La.

Such a major undertaking requires skilled leadership.

Enter AAPG member Charles "Chip" Groat, president and CEO of the Institute.

The globally recognized scientist came on board with a long list of illustrious professional accomplishments, including serving nearly seven years as director of the U.S. Geological Survey. He is a renowned expert on earth sciences, energy, resource assessment, ground water issues and coastal studies.


GROAT

> "The expertise we build here could reach out and create big opportunities globally for Louisiana-based expertise."

Groat also is no stranger to Baton Rouge, where he spent a number of years in the position of Louisiana state geologist and director of the Louisiana Geological Survey.

"This is all like coming home in a way," he said. "I did a lot of coastal, land loss and river work in my LGS days and then when I came back to LSU."

The Water Institute of the Gulf has an ambitious agenda designed to assist with coastal issues – not just on the U.S. Gulf Coast, but on a global scale.

AAPG member and Water Institute President and CEO Charles "Chip" Groat provided a sampling of the Institute's research priorities, which offers a glimpse of the potential impact the organization will have:

- Determine how much sediment is available throughout the coast, what are the characteristics of this sediment and how best to use it.
- Improve prediction of subsidence rates to design more effective protection and restoration projects.
- Better understand habitat resilience and what the future holds for fisheries given the impacts of climate change, land loss and restoration efforts.
- Improve simulation of how coastal land forms, such as barrier islands and inlets, and projects will respond to changes in climate and sea level.
- Integrate monitoring data into models to allow real-time forecasting of coastal conditions.

– LOUISE DURHAM

A Working Coast

The Louisiana coast is a kind of ground zero when it comes to land loss and related destruction caused by hurricanes and other forces, both natural and manmade.

It also provides a vast habitat for fish and wildlife, which means environmental issues like those created by the Deepwater Horizon spill are an ongoing concern.

Some of the land loss rates are of a crisis nature, especially when it comes to communities, the petroleum industry and others. Entire towns can be severely impacted, often with little warning, by major hurricane windfall and subsequent flooding.

This region is known as a "working coast," and much of the work is related to the energy industry, which has a huge investment here. The area is home to myriad pipelines, refineries, chemical plants, ports and more.

It's a major jumping-off place for supplies, equipment and other necessities for the offshore oil and gas industry.

"The industry cares as much as anybody else about whether the coast is disappearing and if it's going to get beat up by hurricanes, flooding," Groat noted. "We could be a help to them by

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producing products of particular interest to them."

Another issue to be addressed is the petroleum industry's need for water.

"There are huge developments going on in Lake Charles that have to do with LNG terminals and processing," Groat said. "One of the questions being asked is what are the water demands, the availability for that downstream part of the oil and gas industry."

There's seemingly no lack of problems just waiting to be tackled.

Fortunately, there are numerous experts available to apply their skill sets.

"The state saw the Water Institute as a way of getting the universities involved," Groat said. "From the beginning, we've said we're going to depend on LSU, UNO (University of New Orleans), Tulane and others to provide expertise.

"We're not going to staff up to do it all ourselves," he said, "but to do it with partnerships."

Job Creation

Groat emphasized that "40 percent of the money we get goes right back out the door to universities, consulting firms. We're not a barrier to work but a facilitator.

"We started in February 2012, and we now have 44 on staff," he added. "The opportunity to do work has been as great as we envisioned it to be.

"Our major program emphasis is on modeling natural systems and the things that affect them – modeling is our largest program," he stated. "Much of what we model or simulate relates to how the coastal systems and projects will respond to change.

"The expertise we build here could reach out and create big opportunities globally for Louisiana-based expertise, whether it be us, universities or the private sector," he noted. "Land reconstruction, refurbishment, refreshment, re-establishment in coastal areas worldwide is the target."

The Institute already is at work establishing international connections, and it is currently engaged in a project in the Mekong Delta.

In November, the Institute broke ground on a 1.5 million-square-foot Water Campus just south of the Mississippi River bridge in downtown Baton Rouge, only a short trek along the levee from the LSU campus. It will accommodate both the Water Institute and the Coastal Protection and Restoration Authority.

The campus will be constructed in three phases, with the first structure planned to house a large physical model of the Mississippi River. It will enable researchers to test a variety of coastal restoration methods, including river diversions.

In addition to numerous scientists and researchers, the campus is expected to house businesses with related interests.

Groat emphasized that the Institute is about applied research with the focus being on practical application.

"It's very much converting knowledge into action," he noted.

IN MEMORY

Cary Brock, 53
Houston, March 26, 2014
Bruce Fields, 89
Corpus Christi, Texas
Aug. 26, 2014
Paul Harrison, 76
Castle Rock, Colo., Sept. 14, 2014
David Hight, 64
Charleston, W.Va., Oct. 31, 2014
Kevin McNichol, 56
Houston, Oct. 14, 2014
Louis Reeder, 92
Tulsa, July 27, 2014
Charles Tenney, 87
Mills, Wyo., Jan. 12, 2014
George Tubb, 93
Englewood, Colo., Sept. 12, 2014
David Willis, 87
Richmond, Texas, Feb. 2, 2014
George Young, 69
Edmond, Okla., April 15, 2014

(Editor's note: "In Memory" listings are based on information received from the AAPG membership department.)

Finding value in interdisciplinary approaches

Soldo: 'Unraveling Paradigms' a Labor of Love

By EMILY SMITH LLINAS, EXPLORER Correspondent

Juan Carlos Soldo, who just recently led the successful IX Hydrocarbon Exploration and Development Congress in Mendoza, Argentina, knew as a teenager he wanted a career in geosciences.

Soldo hails from Ushuaia, Argentina, "the world's southernmost city" and home to the Southern Center for Scientific Research. It's surrounded by the Martial mountain range and Southern Ocean – and it is the perfect breeding ground for a budding geoscientist.

Soldo was interested in science in school, and before graduation he read an article called "10 Careers of the Future," which included careers in geophysics.

His path was set.

He earned an undergraduate degree in geophysics from the National University of La Plata in Argentina, a master's in reservoir engineering from the Instituto Tecnológico de Buenos Aires and a doctorate in geophysics at the Heriot-Watt University in Edinburgh, Scotland.

Soldo said South America is a great place to work for geophysicists – particularly for those interested in unconventional resources.

Argentina is second in the world for shale gas potential and fourth for shale oil – and now, following a period of slowed activity, seismic acquisition is increasing at an exponential rate.

YPF has acquired 4,500 square kilometers of 3-D seismic in 2014 – and that is only for one company.

Though unconventional reservoirs attract attention, they are not the only areas of interest in South America, according to Soldo. He cited great potential for offshore and pre-salt exploration in Brazil and strong development opportunities in the Andean cordillera of Bolivia and Peru. In areas like these, data acquisition takes some work.

"I am drawn to technologically challenging projects," he said.

The love of technological challenges is perfect for Soldo's current position as technical leader in geophysics in YPF's Exploration and Development Division.

YPF has geophysical leads for both operations and technology, so while his counterpart handles the permits, licensing and administrative aspects of exploration and development, Soldo focuses on the technical aspects needed to make those projects a reality.

Soldo said the most challenging aspect of his job is learning all possible methods available to geophysicists – and knowing which one to employ at the appropriate time.

"We have to use interdisciplinary geophysics to be effective. We use quantitative interpretation methods, rock physics for shales, full waveform inversion, non-seismic methods as well," he said. "Not all geophysics is 3-D seismic."

Soldo said one of the most rewarding aspects of his position is the opportunity he has to work on multiple company projects simultaneously.

He provides transversal management of all efforts involving geophysics, from deepwater exploration in offshore Uruguay, to offshore and onshore projects in the Golfo de San Jorge Basin, to supervising unconventional projects in the Neuquén.

"I'm jumping from project to project," he said. "It's a crazy amount of work."

Heading the Congress

Soldo's work does not stop when he leaves the office. His second full-time job is as president of the IX Hydrocarbon

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Exploration and Development Congress, held Nov. 3-7 in Mendoza, Argentina.

The Congress, organized every three years since 1989, traditionally is organized by geologists with decades of experience.

For the 2014 Congress, Exploration and Development Commission of Argentina's Oil and Gas Institute chose the 41-year-old geophysicist to run the event.

"I felt honored that the Commission chose me," Soldo said. "They must have wanted new blood."

Soldo's team titled the conference "Unraveling Paradigms," and they implemented changes starting from initial planning stages. They also moved the Congress from the traditional location in Mar de Plata to Mendoza, a petroleum province famous as a wine-producing region and for the nearby Aconcagua, which is the highest mountain in the Western and Southern hemispheres.

"Mendoza is a perfect setting for a conference on hydrocarbons," Soldo said.

While the 2014 event continued the tradition of oil and gas professionals exchanging ideas about exploration and development, it also added an intense focus on unconventional resources.

Primary conference objectives included:

- Promoting interdisciplinary interaction.
- Conducting systematic analysis.
- Review of methodologies for the characterization of non-conventional reservoirs.
- Discussing technological and conceptual challenges for energy growth.

A special feature was a 12-meter-long, four-meter-high cross-section model of the Vaca Muerta formation. Experts from nine companies stood along a seismic line illustration drawn on the model and explained their work in the area.

Soldo said examining and discussing the cross section was a perfect method for understanding the formation and explaining how to work effectively in the Neuquén Basin.

"We wanted to facilitate discussion and allow everyone to contribute. We wanted to open people's minds," he said. "I'm convinced that the only way for companies to be profitable is through sharing knowledge."

The Congress received unprecedented global attention. Attendees included AAPG President Randi Martinsen as well as officers and representatives from SEG and the European Association of Geoscientists and Engineers.

Soldo hopes this international, interdisciplinary presence will lead to a useful discussion on the many types of unconventional reservoirs present in the world today as well as the technology used to explore them.

"Now we have many types of unconventional resources, from tight gas, to coal bed methane, to shale oil and gas. Unconventionals really aren't so unconventional anymore," he said.

For a geophysicist passionate about technology, the Congress was an excellent opportunity to work toward developing methods for exploration and development.

"One of the biggest challenges of our discipline is implementing what once were cutting edge technologies into technologies that we use every day, that become our common currency," he said.

"It's time to change our perspective," he added, "to start thinking outside the box – to start making unconventionals conventional."

2015 Playmaker forums

'From Prospects to Discoveries'

By COURTNEY CHADNEY, EXPLORER Correspondent

For anyone looking to learn from the best oil finders in the business and to interact with successful explorers as they share accounts of their greatest discoveries, that opportunity is at hand.

Get ready for this year's editions of the Division of Professional Affairs (DPA) Playmaker Forums.

"From prospects to discoveries, professionalism leads the way," is the motto for the forums, a concept that is now entering its third year.

A "Playmaker" is a networking workshop in which geoscientists share professional insights and case histories with fellow geoscientists describing how they achieved both technical and business success in their search for new energy resources, according to AAPG Honorary member Charles Sternbach, past DPA president and chair of the DPA Playmaker Committee.

The forum is typically a one-day event with four main parts:

- The Art of Exploration and Professionalism.
- Prospecting Workflows – Understanding and Promoting Prospects.
- Recent Discoveries – Case Histories and Lessons Learned.
- Emerging Plays and Technology Advancements – The Future.

Each event also includes a luncheon with an inspirational keynote speaker, opportunities to network and an end-of-day reception to discuss all that will have been learned, to which young professionals are invited and encouraged to participate.


STERNBACH

> "Most exploration is based on analogs, so it is informative and inspirational to see how exemplary geoscientists succeed in exploration and business."

"Most exploration is based on analogs," Sternbach said, "so it is informative and inspirational to see how exemplary geoscientists succeed in exploration and business."

After the popularity and success of the Playmaker Forum in Houston over the past two years, the workshops are now expanding to other AAPG Sections and Regions, giving AAPG members from all over world different chances to learn from the industry's best.

This year's Playmakers are set for Midland, Texas; Calgary, Canada and London.

Sternbach also hinted at other possible future locations, including Oklahoma, Colorado, Pennsylvania and South America.

Highlighting the 'Intersection'

Sternbach seems most excited about this year's luncheon speakers, but specifically he is looking forward to the opportunity in Calgary to hear fellow geologist Clay Riddell "tell how he built Paramount Resources into a petroleum powerhouse," and in Midland, he said he's sure the talks about new and very high interest plays of Wolfcamp Spraberry, Clearfork and Atoka Formations will "pack the house."

He assures that the talks are practical, too, with information Sternbach believes many can apply right away.

He gave the following examples of past talks (many of which are posted on the DPA Web page: dpa.aapg.org):

- Steve Brachman spoke on how to sell a prospect: "A prospect is not a science project. It is important to have a 30-second, five-minute and full-blown presentation, and to know when to use each."

Continued on next page

Playmaker Forums are focused on the elements – both commercial and scientific/technical – required to successfully get from lease sale to discovery.

Playmaker Forums:

- Promote improved understanding of scientific and commercial requirements for successful prospect generation.
- Provide information to improve communications and interaction with the landholders and public.
- Ensure the highest degree of ethics in their professional activities.

The forum is intended for geoscientists, engineers, landmen and others engaged in the process of finding and producing oil and natural gas resources with the aim to integrate disciplines to focus on the elements that lead to discoveries.

This year's Playmaker Forums are:

- Jan. 14 – Midland, Texas (the Midland Center).
- March 2 – London (Business Design Centre).
- March 31 – Calgary, Canada (Hyatt Regency Calgary).

For more information on the program – or to join the Playmaker Forum committee – go to the DPA website, or contact Charles Sternbach at carbodude@gmail.com.

– COURTNEY CHADNEY

Editor's note: "Professional News Briefs" includes items about members' career moves and the honors they receive. To be included, please send information in the above format to Professional News Briefs, c/o AAPG EXPLORER, P.O. Box 979, Tulsa, Okla. 74101; or fax, 918-560-2636; or e-mail, smoore@aapg.org; or submit directly from the AAPG website, www.aapg.org/explorer/pnb_forms.cfm.

Shelton Honored by Alma Mater


SHELTON

AAPG Sidney Powers medalist and Honorary member John W. Shelton recently was given the Distinguished Alumni Award from the University of Illinois for his "stellar 60-plus-year career in the oil industry, academia and service to the community."

Shelton, who received his master's degree in geology from the school in 1951 and his Ph.D. in 1953, was recognized as "a brilliant scientist, inspiring teacher, prolific author, dedicated researcher and the driving force behind the creation of Datapages, AAPG's digital library, and Search and Discovery, its petroleum industry information website."

His career began in 1953 with Shell Oil Co. in Denver. In 1963 he moved to Oklahoma State University where he was a professor of geology for 17 years. In 1980 he joined Paul McDaniel at ERICO and later Masera in Tulsa.

When Masera closed in 2000 he officially retired, but actually spent the next 10 years as a full-time volunteer at AAPG headquarters, supervising the launch of Search and Discovery and implementing AAPG Datapages, the Association's digital library and publishing program.

His leadership continued during the growth of the digital library – he is often called the "father" of AAPG's digital efforts – and an AAPG award in his name was created that recognizes the best contribution to the Search and Discovery website over the year.

Shelton, who received the Sidney Powers medal in 2011, held two offices on the AAPG Executive Committee – elected editor in 1975-79, and vice president in 1988-89. He is an AAPG Foundation Trustee Associate.

His Powers citation reads:

"John Shelton had the vision to see the importance of digital publications to AAPG's future. He launched and nurtured AAPG's digital program to the benefit of AAPG members worldwide. Disseminating useful scientific information is AAPG's primary purpose. Digital publications have accelerated that process and John Shelton was responsible for its beginning."

PROFESSIONALnewsBRIEFS

Roger J. Barnaby, to senior staff earth scientist, Chevron Energy Technology, Houston. Previously senior geological adviser, Core Lab, Houston.

Matthew Battrick, has been appointed managing director and chief executive officer, Sun Resources NL, West Perth, Australia.

Marc Bond, to senior associate, Rose & Associates, London, England. Previously chief geophysicist, BG Group, Reading, England.

Steve Carlson, to senior geophysical adviser, Ecopetrol America, Houston. Previously lead geophysicist, Maersk Oil, Houston.

John McLeod, to geologist-technical expert, SM Energy, Denver. Previously senior geologist, SM Energy, Tulsa.

David Phelps, has retired from Apache Energy, Perth, Australia. He will reside in Asheville, N.C.

Robert Przygocki, to senior geophysicist, Maersk Oil, Houston. Previously retired from ExxonMobil, Houston.

Frank Rabbio, to senior geologist, LLOG Exploration, Evergreen, Colo. Previously exploration manager, Catamount Exploration, Greenwood Village, Colo.

Charles W. Wickstrom, to managing member, Iron Hawk Energy Group, Tulsa. Previously managing member, Spyglass Energy Group, Tulsa.

Ronald J. Woods, to senior staff geologist, Chesapeake Energy, Oklahoma City. Previously senior geologist, Equal Energy, Oklahoma City.

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- Paul Basinki's talk, "The Golden Age of Shale," focused on the ACB innovative prospecting approach, starting with the desired result (C), and figuring out the necessary processes (B) and the engineering needed to make the result happen.
- Richard K. Stoneburner discussed how the Eagle Ford play was developed using new workflows for unconventional reservoirs, beginning with core work and a basin wide view.

"AAPG is very fortunate to have leaders within the exploration community who are also AAPG leaders organizing these events," Sternbach said.

He referenced AAPG Honorary members Mike Party and John Hogg and DPA President Rick Fritz as the masterminds behind this year's upcoming forums.

"Mike, John and Rick know the plays that explorers want to hear, and are well respected within industry and AAPG for outstanding professionalism and leadership," he said.

Sternbach also emphasized how historic it is that the AAPG/ DPA is holding a Playmaker Forum with the Canadian Society of Petroleum Geologists (CSPG), which is "a great opportunity to build bridges with oil finders around the globe."

The past and expected future success of these events is the result of the intersection of a few different key focuses, Sternbach noted: "Excellence occurs at the intersection of talent, passion and economic rewards. Playmaker events focus intently on this intersection," he said, referencing Jim Collins' book, "Good to Great."

"AAPG members are among the best oil finders in the world," he said. "DPA members excel at professional skills that turn technical discoveries into business success. Attendees are passionate about finding energy. Participants desire to fuel business engines of stakeholders, investors, companies, personal fortunes and AAPG." E

Edith Allison, director of AAPG's Geoscience and Energy Policy Office in Washington, D.C., can be contacted at eallison@aapg.org; or by telephone at 1-202-643-6533.

Energy Trilemma Expected As Demand Grows

By EDITH ALLISON, Geoscience and Energy Policy Office Director

Demand for all forms of energy, including oil and natural gas, will grow significantly in the next 26 years – but political and regulatory uncertainties create risks that may constrain the private-sector investments needed to meet the demand.

That's the message found in several recent analyses of the global energy market, which could shed light on patterns of energy growth and issues constraining industry's ability to meet the growing demands.

In November, the International Energy Agency (IEA) released its 2014 World Energy Outlook (WEO), providing projections on the future growth of energy demand.

(This article quotes modeling results for IEA's central scenario that includes existing and proposed emissions reduction policies in the United States, the European Union and India, but does not include possible policies to keep atmospheric CO_2 below 450 parts per million).

IEA's projections include:


ALLISON

The financial investments necessary to provide energy to global consumers are huge.

- Global energy demand will grow 37 percent by 2040, even as the rate of growth is projected to fall from the current 2 percent per year to 1 percent per year after 2025.

This growth will occur primarily in the developing world, especially China and India. Demand will be essentially flat through 2040 in most Organization for Economic Cooperation and Development (OECD) countries. (OECD includes 34 developed countries, primarily in North America, Europe and Asia-Pacific.)

- The 2040 energy mix will be almost equally divided among oil, natural gas, coal and low-carbon sources. This mix reflects a decline in the proportion of global consumption (but not the total volumes) of coal and oil; a 50 percent growth in natural gas demand; and a 90 percent growth in renewable energy demand.

- Given few economic alternatives to oil for transportation and petrochemicals, oil demand will continue to grow by 14 million barrels per day (bpd), to 104 million bpd by 2040.

Oil demand declines in the OECD countries but surges in non-OECD countries, driven by growth in middle-class demand for vehicles.

- Low-carbon energies, nuclear and renewables will grow from 19 to 26 percent of the energy supply. Nuclear power grows just one percentage point to 12 percent of global electricity generation. This is accomplished through major additions in China and India, as the European Union, the United States and Japan retire over a third of their current capacity.

Renewable energy share of primary energy rises from 13 percent to 19 percent, and renewable energy grows to one-third of power generation.

- Energy efficiency is one of the fastest growing "energy sources," and is a valuable mechanism to reduce pressure on global energy supply.

By 2040 new efficiency efforts will reduce oil demand by 23 million bpd (more than the current production of Saudi Arabia and Russia, combined) and gas demand by 33 trillion cubic feet (more than current U.S. production).

Investment Requirements

The financial investments necessary to provide energy to global consumers are huge according to the IEA 2014 report, World Energy Investment Outlook (WEIO) and the WEO.

- More than $1.6 trillion was invested in 2013 to provide the world's consumers with energy.

This amount is double the 2000 investment, and by 2035 the annual investment required will be $2 trillion.

- Upstream oil and natural gas spending is projected to grow by a quarter, to $850 billion per year in 2035.

Most of the growth will be in natural gas, and North America will host most of this investment.

- The 2014 to 2040 capital investment requirement is distributed among:
  - ✓ Fossil fuels – $30 trillion.
  - ✓ Energy efficiency – $14.5 trillion.
  - ✓ Power sector – $21 trillion, of which $7.4 is for renewable power generation.

(Figures are for capital expenditures, such as material and labor to install a facility or drill a well. Operating costs and abandonment or decommissioning are excluded.)

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Risks Facing Energy Investment

Total energy expenditures are projected to rise at about half the rate of the global economy, as many economies become less energy intense and energy efficiencies take hold (WEIO). This gives some degree of confidence in maintaining adequate levels of investment.

However, as non-OPEC oil supply growth starts declining in the 2020s, incremental supply will need to come from the Middle East, the region with the largest undeveloped oil resources.

WEIO divides investment risks into three categories:

- **Economic risks** include market changes such as commodity prices, inflation rates or changes in exchange rates. Another financial constraint is reduced lending by the banking sector in response to regulations imposed in the aftermath of the financial crisis.

- **Political risks** include civil unrest, the quality of the legal system and political institutions, the complexity of permitting and licensing, and future emissions standards.

- **Project-specific risks** include geological and technical risk that the producible resources or efficiency gains are less than projected, risk of construction delays and environmental constraints or community opposition.

This month's column will primarily consider the political risks – one of which is the dominance of state-owned companies, which own nearly half of the world's power generation assets, and together with their host governments own more than 70 percent of global oil and gas reserves (proven plus probable).

Many states impose social goals on these companies – for example, subsidizing consumer fuel prices – that can reduce funds available for energy investment.

Also, many states that own large shares of the energy sector face growing demands for social services as their population grows – and that also reduces the availability of state funding for energy and creates requirements for private as well as state investment.

Investment needs grow more quickly in areas outside OECD and China, areas where financial institutions are weaker and capital needs are a larger share of the economy. For example, the Middle East and Africa hold a large share of future energy supplies but face several risks that may limit needed investments:

- Civil unrest and military conflicts.
- Weakly developed financial or regulatory institutions.
- Growing obligations to social programs as young populations enter the job market.
- Fossil fuel subsidies that consume a large share of state revenues, limiting funds available for energy investments. These subsidies also discourage energy-efficient vehicles or electricity generation. Many countries are currently working to reduce these subsidies.
- Energy investment will require a large share of these economies – over 3 percent of GDP in the Middle East, Africa and Russia. (Energy investment will be slightly over 1 percent of the United States and the European Union economies.)

OECD countries' investment climates have different but also negative investment risks. Licensing and permitting are slow and complex, and environmental policies are rapidly changing.

One area where change may occur is in global subsidies for renewable energy. Renewable energy subsidies, which are more common in OECD countries, were $121 billion in 2013, and fossil fuel subsidies were $548 billion. The renewable subsidy is larger per unit of energy even though it is much smaller overall.

* * *

As mentioned, all the projections are based on IEA's middle scenario, which assumes only existing and proposed emissions requirements. Slightly smaller but different investments – as well as new government policies – will be needed if countries choose to reduce CO_2 emissions by 7 percent per year, the level the Intergovernmental Panel on Climate Change assumes is necessary to keep global warming at or below 2 degrees Celsius.

For additional information on the constraints to adequately fund the global energy needs of the future, check out the World Energy Council's "World Energy Trilemma 2014: Time to get real – the myths and realities of financing energy systems."

The energy trilemma involves tradeoffs between energy security, energy equity (access and affordability) and environmental sustainability. And as the title suggests, this issue of the annual study considers the constraints to mobilizing the financing necessary to supply the energy demands in 2035.

Foundation Joins Geoscientists Without Borders

By APRIL STUART, AAPG Foundation Program Coordinator

The AAPG Foundation has joined the Society of Exploration Geophysicists (SEG) and the Society of Exploration Geophysicists Foundation (SEGF) as a partner in the acclaimed Geoscientists Without Borders (GWB) program.

The agreement was finalized in a signing ceremony in late November, attended by AAPG Foundation Executive Director David Curtiss and Deputy Executive Director David Lange.

The Foundation's associate-level commitment will bring a higher profile to geologists and geophysicists who are using scientific methods to help impoverished communities around the globe, and ensures important additional program funding required to continue the program's success.

The Geoscientists Without Borders program was established by the SEG Foundation in 2008 with a $1 million leadership investment from Schlumberger. It supports humanitarian applications of geoscience around the world.

The program has proudly awarded 21 projects in 17 different countries, and most recently was honored by World Oil with its 2014 Best Outreach Award.

Current program projects include:

- Archaeology (Thailand, Greece)
- Earthquake preparedness (Jamaica, Haiti)
- Landslide preparedness (Sweden, Brazil)
- Pollution mitigation (Romania)
- Tsunami preparedness (Indonesia)
- Habitat management (Australia)
- Volcano preparedness (Nicaragua, Guatemala)
- Water management (Honduras, India, Australia, South Africa, West Africa and Cameroon)

AAPG Foundation Executive Director David Curtiss and SEG Executive Director Steven Davis, signing the Geoscientists Without Borders agreement.

"The AAPG Foundation is excited to support Geoscientists Without Borders," said AAPG Foundation board chairman Jim Gibbs. "Supporting geologic initiatives that also help provide communities with healthier places to live is of real value to us. Obviously, the global aim and application of the humanitarian aspects of geoscience are efforts we can truly be proud to support."

SEG President Chris Liner called GWB "a premier humanitarian program" that benefits

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Foundation Contributions for November 2014

General Fund
Louis C. Bortz
In memory of Robert W. Blake and C. Clare Gregg
Chevron Humankind
Matching gifts/Robert Scamman and James Swartz
Brian S. Cook
Clayton Y. Davis
John V. Fontana
Tom and Carolyn Hamilton
Neculae Pandele
Dayna J. Salter
Daniel Skomorowski
Thunder Exploration Inc.
Ravi T. Venkateswaran
Matthew C. Weinreich
Michael and Lynn Wisda
In memory of Ken Masters
In memory of E.T. Hill
Edward C. Roy III

Awards Fund
Teacher of the Year Award
Thunder Exploration Inc.

Digital Products Fund
University of Kentucky
Brian S. Cook

Distinguished Lecture Fund
Thunder Exploration Inc.

J. Ben Carsey Distinguished Lecture Fund
Dorothy Carsey Sumner

Education Fund
BHP Billiton Matching Giving Program
Matching gift/David Tett
Frank J. Adler
Gene E. Richards

Grants-in-Aid Fund
Bernold M. "Bruno" Hanson Memorial Environmental Grant
Dorothy Carsey Sumner
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J. Ben Carsey Sr. Memorial Grant
Dorothy Carsey Sumner

John W. Robinson Named Grant
Michael S. Johnson
In honor of John W. Robinson

Jon R. Withrow Named Grant
Jon R. Withrow

In memory of Roy E. Matthews

Norman H. Foster Memorial Grant
John V. Fontana

Pittsburgh Association of Petroleum Geologists Named Grant
Matthew C. Weinreich

Wallace E. Pratt Memorial Grant
Dorothy Carsey Sumner

James A. Hartman Student Leadership Summit Fund
Chevron Humankind
Gift given by Richard Ball

Imperial Barrel Award Fund
Chevron

Military Veterans Scholarship Program Fund
Jesse Gilman
Alan and Karen Kornacki
Thunder Exploration Inc.

Newly Released Publications Fund
Thunder Exploration Inc.

L. Austin Weeks Undergraduate Fund
Thunder Exploration Inc.

The monthly list of AAPG Foundation contributions is based on information provided by the AAPG Foundation office.

Editor's note: Melissa Hughes is senior vice president with Creekmore Livingston Inc.

High-Limit Liability Coverage Available

By MELISSA S. HUGHES

A new high-limit personal liability umbrella policy is now available for AAPG members through the GeoCare Benefits Insurance Program.

The package is offered to help protect policyholders in cases involving high-dollar lawsuits – which could come from seemingly surprising places.

In fact, many are not aware of all the areas in their lives that can trigger a lawsuit. For example:

- A dog gets loose and bites a jogger passing your house on your sidewalk; not all property insurance may cover the damages.
- An individual owns a rental property in which the furnace malfunctions, causing carbon dioxide to escape into the home – and tenants suffer serious physical harm. Generic liability policies may not cover the damages.
- Finally, say a child's friend gets injured on a trampoline located in your backyard. The injuries aren't severe, but a lawsuit is filed anyway.

Homeowners insurance – also called property insurance – specifically covers you for incidents occurring on your property, but often with small maximum limits.

The result: Many people may think they have all the coverage they need, but they often are mistaken.

The new GeoCare high-limit personal liability package offers up to $10 million in coverage for preferred applicants.

For more information, call 1-844-244-1116, Monday through Friday 9 a.m.-8 p.m., and Saturday 9 a.m.-1 p.m. EST; or visit geocarebenefits.com/aapg/personal_umbrella.asp.

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those far beyond the SEG and AAPG community – "a truly global outreach project that has been rightfully recognized."

For more information on Geoscientists Without Borders please visit www.seg.org/gwb.

Professorial Award Deadline

A last reminder: Nominations for the AAPG Foundation Professorial Award, presented annually to a college or university professor who demonstrates outstanding leadership in the field of geoscience education, are now being accepted – but the deadline looms.

Applications are due Feb. 1.

The Foundation award is intended to put a spotlight on "Excellence in Education" by honoring professionals who inspire and shape the minds of future geoscientists. Student and faculty nominations are accepted for this award, and professors are encouraged to apply on their own behalf.

The Professorial Award winner will receive a $1,000 award, recognition at AAPG's Annual Convention and Exhibition, and a commemorative plaque.

For more information or to make a nomination, go online to foundation.aapg.org/programs.

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The University of Oklahoma invites applications for a tenure-track position in Geophysics at the rank of Assistant Professor. The school has a strong seismic program and is looking for a faculty member to broaden the scope of the program in non-seismic methods. We seek a dynamic colleague who will teach and supervise students at all levels, while conducting an independent, externally funded research program in his/her field of expertise.

The candidate should hold a Ph.D., have a demonstrated research record, and an interest in teaching undergraduates and mentoring graduate students. Potential areas of interest include gravity, magnetics, electromagnetics, and GPS applied to crustal processes. Salary, benefits, and start-up funds will be competitive and commensurate with experience. The ConocoPhillips School of Geology and Geophysics has a large, vibrant faculty with a broad range of research activities and strong ties to the petroleum industry. The student body currently includes 182 undergraduates and 110 MS and PhD students. The Mewbourne College of Earth & Energy possesses extensive software and computing labs with PC and Linux platforms networked to our own dedicated cluster within the OU supercomputer center (OSCER). The College hosts numerous industrial consortia, a research institute focused on seismic monitoring, and a field campus in Colorado for field courses in geology and geophysics. The geophysics group conducts active research projects that are funded by industry as well as by U.S. and foreign government agencies and institutes. The College maintains a comprehensive pool of geophysical equipment including GPR, seismic (active and passive), magnetic, and gravity instruments as well as extensive rock physics characterization laboratories. Through collaboration with industry, we have a suite of 3D seismic and microseismic data volumes that are used for teaching, algorithm calibration, seismic geomorphological analysis, crustal imaging, and a range of open source software for lithospheric-scale research. Information about the School and College, the facilities and the entities that it houses can be found at http://geology.ou.edu.

Review of applications will begin December 1, 2014, and on-campus interviews will start early in 2015. The search will continue until the position is filled. The anticipated starting date is August 15, 2015. Applicants are requested to submit a complete vita/resume, statement of research and teaching interests, and a list of five references who can be contacted, including phone numbers, e-mail addresses, and mailing addresses. Questions or information requests may be addressed to Chair of the Geophysics Search Committee, at (405) 325-3253, or ougeophysicssearchchair@ou.edu. Applications and nominations should be addressed to Geophysics Search Committee, University of Oklahoma, Sarkeys Energy Center, 100 E. Boyd Street, Room 710, Norman, OK 73019-1008.

The University of Oklahoma is an Affirmative Action, Equal Opportunity Employer. Women and minorities are encouraged to apply. Protected veterans and individuals with disabilities are encouraged to apply.

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Faculty Positions
Earth Sciences and Engineering at KAUST

The Physical Sciences and Engineering (PSE) Division (http://pse.kaust.edu.sa) at King Abdullah University of Science and Technology (KAUST) invites qualified applicants to apply for faculty positions at all ranks (Assistant, Associate and Full Professor) in the Earth Sciences and Engineering (ErSE) program.

KAUST is an international, graduate research university dedicated to advancing science and technology through interdisciplinary research, education, and innovation. Located on the shores of the Red Sea in Saudi Arabia, KAUST offers superb research facilities, generous assured research funding, and internationally competitive salaries. The university encourages fundamental and goal-oriented research to address the world's pressing scientific and technological challenges related to the sustainability of water, food, energy, and the environment. The science produced in PSE focuses on understanding, modeling and manipulating matter at all scales (nano, meso and macroscopic levels), in all forms (bulk, thin films, divided colloids, fluid flows, the earth as system, etc.) and in interaction with external stimuli (light, heat, fluids, stresses, etc.).

The ErSE program currently has eight full-time faculty members, about 40 postdoctoral fellows and research scientists and more than 65 graduate students. Research areas include: applications of modern computational methods to study geophysical problems associated with the atmosphere and/or ocean circulation, earthquakes, oil exploration, reservoir modeling and subsurface phenomena. These areas are enhanced through close collaboration with some of the best geophysical and meteorological centers in the world, and through KAUST's advanced central research facilities, including supercomputing and scientific visualization.

More information about the ErSE program and research activities is available at: http://erse.kaust.edu.sa.

The ErSE program at KAUST has open faculty positions at Assistant, Associate or Full Professor rank in experimental geophysics, in particular in the fields of:

1) Rock physics geophysics
2) Subsurface reservoir modeling
3) Petroleum geophysics
4) Ambient noise seismology
5) Atmospheric chemistry
6) Atmospheric aerosols

Applicants should have a proven track record in establishing a high-impact research program, and should show commitment to high-quality teaching at the graduate level.

To learn more about the PSE Division and complete the online application form, visit **http://apptrkr.com/546654**

Application requirements include the following:

- Updated curriculum vitae with a full list of publications
- Statement of research
- Statement of teaching interests
- Contact details of at least four potential referees

Applications received by January 31, 2015 will receive full consideration. Positions will remain open until filled.

www.kaust.edu.sa

DIRECTOR'S CORNER

Preparation Is Key to Weathering the Winds of Change

By DAVID CURTISS

No sooner had the ink dried on my last column about the winds of change buffeting our industry when we saw oil prices slide from $75 a barrel to $55. I didn't foresee these winds arriving at gale force, but that's what's happened. Happy New Year to us!

Already we're seeing press releases by major oil and gas producers announcing cuts to their 2015 spending plans in response to lower oil prices. And capital markets are jittery as traders process how this will impact the global economy, particularly countries like Russia and Venezuela, whose economies are largely dependent on oil and natural gas, and how central banks will respond.

There was a mood of uncertainty that pervaded the International Petroleum Technology Conference in Kuala Lumpur last month. How will the industry and our profession respond to sliding oil prices and what will be the long-term effects?

And yet, despite the mood, this eighth IPTC was the largest ever. More than 10,300 people attended the conference and exhibition, hosted by Petronas together with co-hosts Shell and Schlumberger.

IPTC is a cooperative venture of AAPG, the European Association of Geoscientists and Engineers, the Society of Exploration Geophysicists and the Society of Petroleum Engineers. It rotates between Asia and Middle East, and as a joint geoscience and engineering conference is the premier event of its kind in the eastern hemisphere.


CURTISS

How will the industry and our profession respond to sliding oil prices and what will be the long-term effects?

"Innovation and collaboration: Keys to Affordable Energy" was the conference theme – and as the conference unfolded it became clear that innovation and collaboration would sustain the industry in the uncertain times ahead.

* * *

Senior industry leaders led off the conference with what turned into a provocative executive plenary session.

The panel included executives from international and national oil companies and from multi-national service companies, and they zeroed in on how close collaboration between producers and service companies is essential to innovation and technology advances. You really need a producer willing to champion a new technology or approach in order to perfect it and gain widespread market adoption.

There also was lively discussion of how the costs to find and produce oil and gas have spiraled upward at a faster rate than the resulting revenues from production. Nevertheless, there was consensus that while both producers and service companies had businesses to run and shareholders to please, the relationships between them are and must remain symbiotic.

One particular insight that emerged from the conversation was that innovation shouldn't just be focused on finding and producing oil and gas. In the face of low oil prices and high costs, the industry must focus on improving efficiency.

That, too, requires innovation.

In fact, in response to a question of how low oil prices are likely to impact the unconventional oil and natural gas production, AAPG member Matthias Bichsel, former director of projects and technology and a member of the executive committee of Royal Dutch Shell plc, noted that he expected a wave of technical innovation in this space.

More efficient drilling and completion techniques as well as improved hydraulic fracturing technologies are some of the advances we can expect to see as producers seek to do more with less.

This view also was echoed in an article in the Dec. 6 issue of The Economist, about the impact of low oil prices on shale development. They foresee growth in shale production falling dramatically, and perhaps even a slight decline in production, as producers dial back investments.

Yet "adversity will eventually make shale stronger," they predict. Unconventional resources are not going away.

* * *

So, while the current climate is affecting our industry from Kuala Lumpur to Midland, how should we as individuals respond?

As I indicated last month, an important first step is accepting that our world is changing and that succeeding in this new environment will take new thinking and new approaches.

Innovation and collaboration – the themes of IPTC – should be watchwords as we seek to build our businesses, contribute at our jobs or serve our Members and customers.

A dash of good luck never hurts, of course. But fortune favors those who actively prepare for uncertain times.

DIVISIONS REPORT: DPA

DPA Lays Out Goals, Strategies For Coming Year

By RICK FRITZ, DPA President

I've always collected New Year's resolutions. My 2015 New Year's resolution is to stop texting my children in my house – while I'm in the house.

Communication is a lost art.

* * *

Recently, the AAPG Division of Professional Affairs held its mid-year meeting in Tulsa, and this year we are focused on the "Culture of Greatness" – the ability of our industry and profession to provide resources.

We started the meeting with a review of our strategic/business plan, which focused the group on DPA's culture: leadership, professionalism, ethics, certification, networking, education and communication of best business practices.

One of the primary goals in the meeting was to discuss and communicate our goals not only to the DPA leadership but also to Young Professionals interested in joining DPA.

The meeting centered on:

▸ Membership (of course).

For membership the DPA council has taken on several new programs, but the first is to search out active AAPG members and ask them via an invitation from three DPA members to join.

This is a lot of fun, as active AAPG members are often interested in joining DPA. I've had many respond, "I've thought about joining for years but was never personally invited."


FRITZ

A key discussion item was how to make DPA more viable outside of the United States.

The second program is to attract young professionals to join DPA. To that end we asked five young professionals to join us this year at the mid-year meeting. As most of you know, you need about seven-plus years of experience to join DPA, depending on your academic degrees.

The good news is, many of the young professionals who started early in the resource play boom are now approaching that experience level.

As a result we had great discussions on mentoring, continuing education and other DPA opportunities. Our primary "take-away" was to establish a "DPA Young Professionals" program, so we can start mentoring those who are interested in DPA and provide early guidance on career development.

▸ Section and Region reports and needs.

Many of the Sections and Regions provided reports at the meeting. A key discussion item was how to make DPA more viable outside of the United States. The status of certification was discussed, especially with regard to how it relates to geoscientists worldwide.

The general consensus: DPA needs to brand its business and professional expertise to non-U.S. professionals.

We also discussed plans to make sure DPA is represented at all Section and Region meetings.

▸ DPA forums (Playmaker; see page 50 for more on the upcoming events) and continuing education.

We had a lot of discussion on DPA "Gathering and Learning Services." The new DPA Playmaker Forums are a key part of serving our members and industry professionals.

Currently, we have three Playmaker Forums scheduled for the remainder of this fiscal year (winter-spring 2015) located in Midland, Texas; Calgary, Canada and London.

Our continuing education also is a key part of our program and we plan more courses around meetings including courses on ethics, reserves and geosteering.

▸ Governmental affairs.

Regarding governmental affairs we had a good discussion on the status of the Geo-DC office. There was general consensus that it was good to educate congressional staffs on resource issues but we would like to be more effective.

A review is planned.

▸ New programs and initiatives.

Finally we discussed new programs and initiatives. One of the most interesting is a review of industry and public opinion of frac'ing and water injection. As you know, there are controversial data out there – especially in regards to earthquakes.

We agreed to establish a new committee to review available information and decide if we should recommend a "White Paper" to the AAPG Executive Committee.

We also discussed the growing topic of Corporate Social Responsibility, or CSR. This has applications through DPA for professionalism, ethics and governmental affairs.

We decided a better term may be "Social License," as it relates to responsibility to all parties involved – government, public and industry.

Stay tuned for more.

All in all we had an excellent meeting and moved DPA a little further down the road.

Now, we look forward to a great year in 2015. Please come and join us!