

AAPG AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, AN INTERNATIONAL ORGANIZATION

# EXPLORER

JANUARY 2010



**Looking for Clues**  
Canada's Utica shale gets close inspection  
See story, page 10



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**On the cover:** Geologists from the Geological Survey of Canada (AAPG member Denis Lavoie, left; Tony Hamblin, right) strolling along an exposed cliff of the Utica Shale beside the Jacques-Cartier River, Donnacona, Québec. The city of Donnacona is located along the north shore of the St. Lawrence River, about 40 kilometers west of Québec City. The Utica Shale consists of dark-grey, organic-rich calcareous shale, with minor limestone interbeds. Photo courtesy of Robert Thériault.

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## PRESIDENT'S column

# Sunsetting the Global Climate Change Committee

By JOHN C. LORENZ

The AAPG Executive Committee met at the International Conference and Exhibition in Rio de Janeiro in November to discuss a variety of issues, among them the role and activities of the AAPG Global Climate Change Committee. This standing committee was formed several years ago with the mission statement "to promote and facilitate various fields of geologic study that relate to global climate change and potential solutions." Its unstated mission was to improve AAPG's image after a public relations setback.

The talented and passionate individuals on this committee have served under the able leadership of committee co-chairs Priscilla Grew and John Armentrout, and they have organized several well-attended forums. The committee discussions have been impressive in their range and professional tone. Scientific balance on the issues has been the committee's goal, and over the years this committee probably has come as close to balance as is possible given the nature of the debate.

The committee activities have indeed advanced the goal of improving the public perception of AAPG, but recent developments suggest that they have reached the limit of what can be done without becoming a distraction and undoing that progress. The issue before the Executive Committee in Rio was whether or not the Global Climate Change Committee's discussions and goals are continuing to serve the petroleum-geoscience interests of the AAPG membership.

People on various sides of the climate change issue have argued that AAPG has a moral obligation to take a stand on the climate change questions, and by sponsoring specific forum themes we have in fact implied that AAPG endorses specific viewpoints. But that presumes that AAPG is the keeper of the climate change truth. In fact, during the Executive Committee review, we asked questions such as: Does AAPG have experience or credibility in that field? Will taking a stand help us find oil and gas? Will continuing to be publicly involved create or save jobs in petroleum geology? Does either side have a politically winnable argument? Will staying involved help our public image?

The answer to all these questions was a definitive "No." Unless one merely wants to irritate the opposition, arguably not our mission, there was no advantage



Lorenz

to inserting AAPG more deeply into the climate change debate. Climate change is peripheral at best to our science. Moreover, the debate is becoming political rather than scientific, with less-than-scientific passion on both sides. AAPG is not designed

to be a political organization.

AAPG, as a scientific association of petroleum geologists, has the mission to foster and disseminate solid geoscience relevant to finding the oil and gas that power today's civilization, and we're very good at it. Our knowledge, expertise and credibility regarding climate change are concentrated in our familiarity with the marvelously wild changes in climate that are documented in the sedimentary and stratigraphic record. Moreover, we are the most knowledgeable people in the world about subsurface fluid flow in heterogeneous geologic media, whether that fluid is oil, gas, or sequestered CO<sub>2</sub>, and therefore we can contribute to potential climate change solutions when they are needed. AAPG can and has creditably published on those subjects. In contrast, as a group we have no particular claim to knowledge of global atmospheric geophysics through either our education or our daily professional work.

For our members who want to follow the climate change discussions there are numerous, easily accessed Web sites. If there's a demand, and if it helps us to find hydrocarbons or characterize potential sequestration reservoirs, AAPG can host climate-related technical sessions at our meetings – but like our other sessions, they should be composed of presenters who are doing the primary research.

In the meantime, the Executive Committee saw no advantage and several significant potential pitfalls in maintaining an AAPG Global Climate Change Committee. The AAPG Global Climate Change Committee has fulfilled its mission with passion and energy, providing lively debate. The members are sincerely thanked for a job well done.

## Bonus Insert, Supplement This Month

Two special items are included with this month's EXPLORER: An insert sheet containing information on the AAPG officer candidates for 2010, and the official announcement for this year's AAPG Annual Convention and Exhibition.

The officer insert can be found between pages 12-13 in this month's issue. There you'll find complete biographical information on all candidates, plus their responses to the question "Why I accepted the invitation to be a candidate for AAPG office."

The information also can be found online at

[www.aapg.org/business/candidates/index.cfm](http://www.aapg.org/business/candidates/index.cfm).

The ACE announcement offers the first look at this year's convention, which will be held April 11-14 in New Orleans.

In it you'll find out about the entire technical program, the forums, special events, luncheon speakers, short courses and field trips, registration details (including deadlines for getting reduced rates) and all housing information.

That information also will be available online at [www.aapg.org/neworleans](http://www.aapg.org/neworleans).

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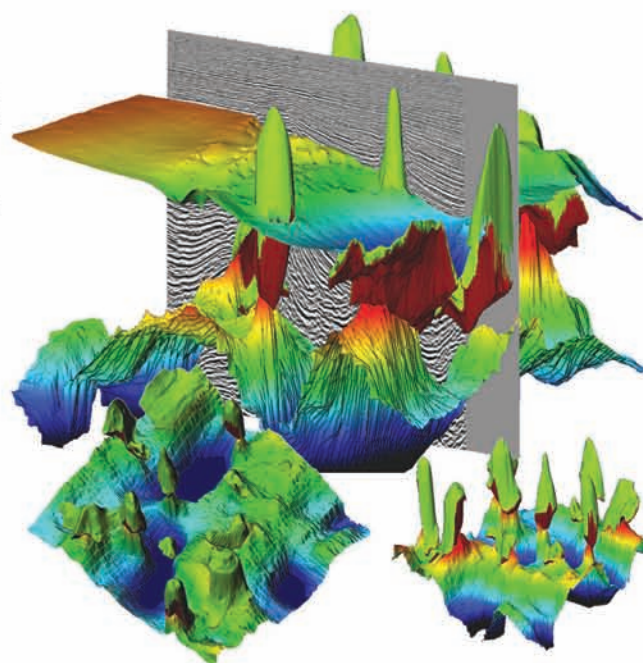
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37 percent exploration success rate

# Major Finds Brighten Tough Year

By LARRY NATION

AAPG Communications Director

The industry was walking on eggshells when 2009 opened. Oil was at \$44.60 a barrel and natural gas tabbed at \$5.62 per mm BTU, with both commodities continuing the downward roll that began with a landslide late the summer before.

Eggshells? The fear was that we might soon be walking on broken glass.

February was the bleakest month for oil, which hit the '09 low of \$33.87. Gas waited until late summer to hit bottom, touching \$2.50 before limping to about double by year's end.

"Abrupt changes in markets, prices and demand created urgent challenges across all the energy industries, while technology and new policies raised fresh uncertainties for 2009 and far beyond," said Ken White, IHS senior editor – International Oil Letter, who analyzed the year's discoveries for the Explorer.

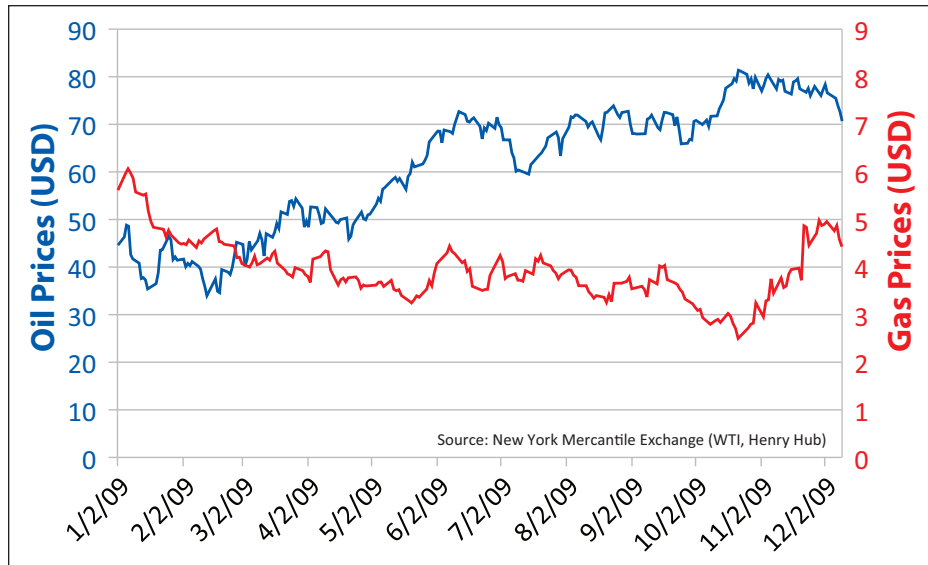
"Project financing had all but disappeared," he said, "and energy companies were forced to cut back on projected investment spending."

Despite the impediments, the industry responded with a remarkable year.

As White said, "With exploration drilling contracting by nearly 20 percent, it is all the more encouraging that the overall success rate in 2009 averaged 37 percent, just one percentage point down on the previous year."

For 2009 discovery-leader **Brazil**, it seemed press releases reported a discovery both onshore and offshore almost daily in '09.

For perspective, companies operating in Brazil must inform the National Petroleum



Agency (ANP) of indications of oil, gas or hydrocarbons in any exploratory well within 48 hours. The disclosures are routine, and do not necessarily indicate commercial viability.

However, there were plenty of finds worthy of reporting in Brazil, with 10 discoveries deemed viable by IHS – with the offshore Santos Basin yielding six discoveries and the Espirito Santos Basin three.

The massive pre-salt area runs 800 kilometers along Brazil's Atlantic coast and has oil deposits beneath a layer of salt resting as much as 3,000 meters beneath the ocean surface and another 3,000 to 5,000 meters below the seabed.

One of the more notable of the remarkable discoveries is the Guara project

in the Santos, with estimates up to two billion barrels of oil in place.

Interestingly, White pointed out that "state companies, prolific in the acquisition of assets through 2009, hardly feature when looking at the largest discoveries of the year in terms of reserve size.

"Indeed, only Petrobras and Iran's National Oil Company made the top flight with the largest discoveries attributed to two international players in the Kurdistan region of **Iraq** – Heritage Oil with its Miran West 1 and Gulfsands with Shaikan 1."

White noted the two Kurdish wells combined added recoverable reserves of over 3.4 billion barrels and helped underline the resurgence of the Middle East.

Also of major note, White said "further



success in the deepwater off **Israel** very early in the year proved a scene-opener for the Middle East."

Noble Energy was thought to have established seven Tcf of gas in place with its Tamar 1 well, and followed this with success at Dalit 1 in the same basin.

Exploration drilling offshore **Africa** in 2009 also produced some modest but nonetheless significant results, White said.

White said that while clarity on reserves is yet to be established, Anadarko's Venus B-1 oil and gas discovery in the deep water off **Sierra Leone** and the Hess A1-54/1 gas/condensate discovery in the Sirte Basin offshore **Libya** are viewed as very encouraging play openers.

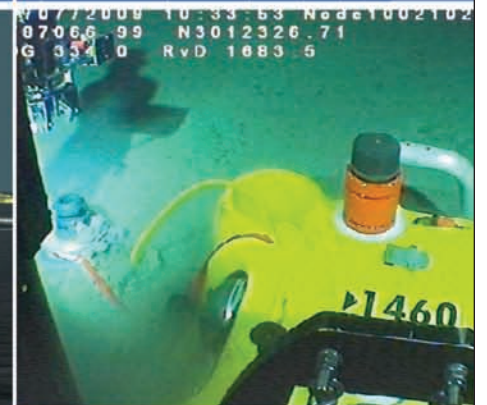
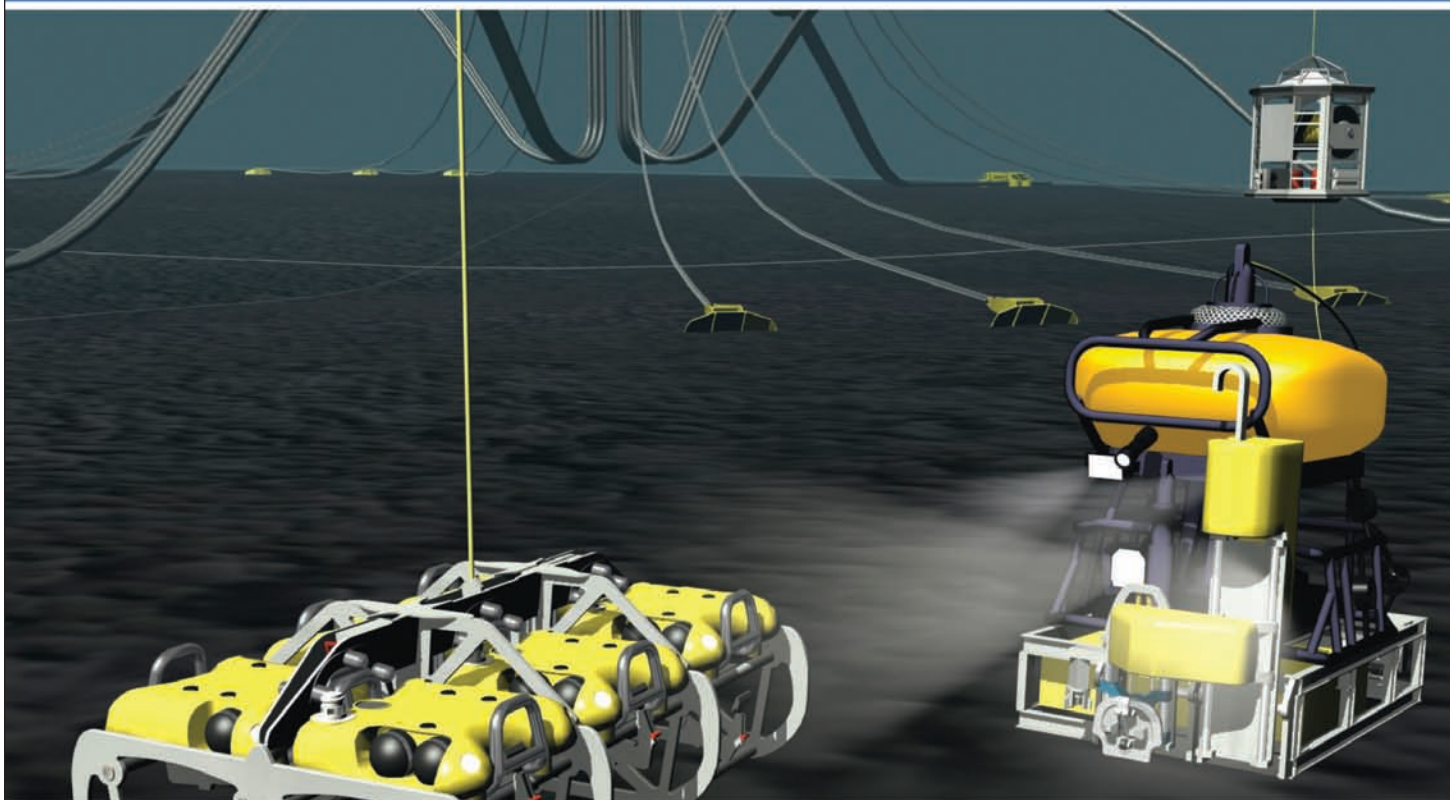
"The major implication of Venus B-1 is that it 'de-risks' a number of similar prospects that have been identified along the West African coast between the giant Jubilee field in **Ghana** and Sierra Leone, a distance of roughly 1,100 kilometers," White said.

"The Hess discovery is a play opener," he added, "because the offshore Sirte Basin is still unexplored and the quality of the find is such that some in the industry are suggesting reserves of seven Tcf."

The **Gulf of Mexico** recorded 10

See **Discoveries**, page 16

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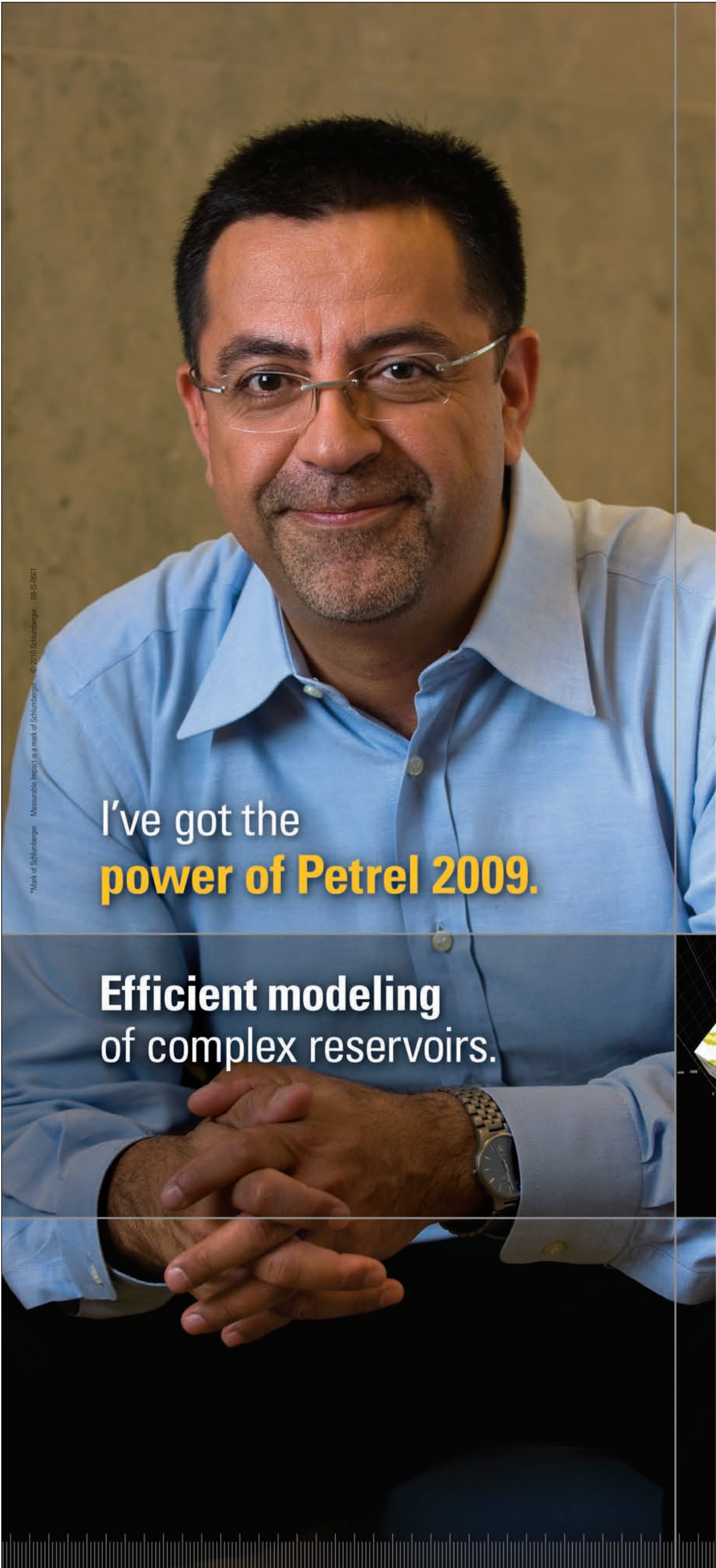
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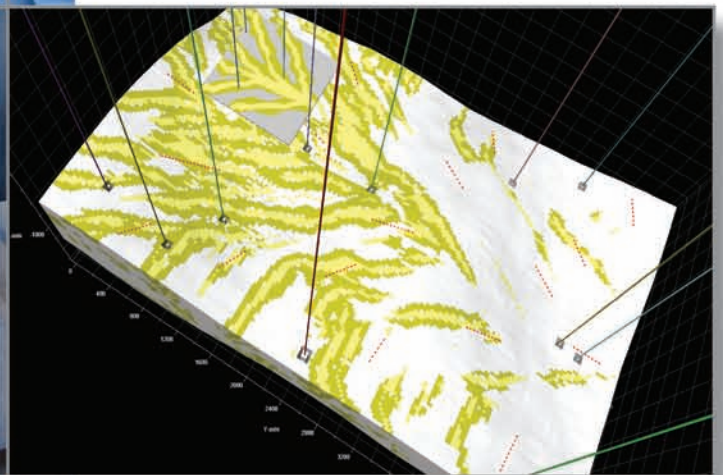
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APPEX London 2010, AAPG's international event for selling and buying upstream assets, will be held March 2-4 at the Business Design Centre in London, England.

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*APPEX explores case studies*

## 'Dusters' Provide Lessons to Learn

By BARRY FRIEDMAN  
*EXPLORER Correspondent*

The successful petroleum exploration stories are the easy ones to tell. Magazines such as the EXPLORER are filled with them.

But what of the other stories – the ones that don't end in smiles and champagne and platitudes about dreams coming true? Aside from the ones told at happy hour or in bankruptcy court, where do you go to hear them? And what would you hear?

Those are questions that AAPG

member Charles R. Speh, managing director of Milestone Exploration in Oakley, England, has been pondering for sometime. For Speh, the lessons learned from the failures (though he wouldn't call them that) in exploration may be more important than the ones learned from the successes.

It was his idea, then, to hold a symposium at this year's APPEX London conference called, appropriately enough, "Lessons Learned." Speh believes APPEX, AAPG's successful global event for the buying and selling of upstream assets, is an ideal place to hold this one-day symposium on case studies from around the world that were initially unsuccessful or even disastrous.

"The purpose ... is to enable oil and gas companies to learn about how other companies have gained 'value' from what may have been an initially less than successful drilling venture," he said.

According to Speh, by utilizing their specific expertise, technology, techniques, applications, working practices and what he calls "good common sense," many industry professionals have turned those setbacks into triumph.

They also learned, clearly, from their mistakes.

"What may have initially been a project with no commercial potential has been turned into one which had great commercial success."

### Finding Value

But his symposium, he wants you to know, is not a support group or gathering for the down and depressed and broke. Nor is it simply a pep talk.

"I want to convey a very positive message to all the attendees," he said.

First, to convey the message that there is value in unsuccessful explorations, Speh wants to dispense with one of the most overly used terms in the industry.

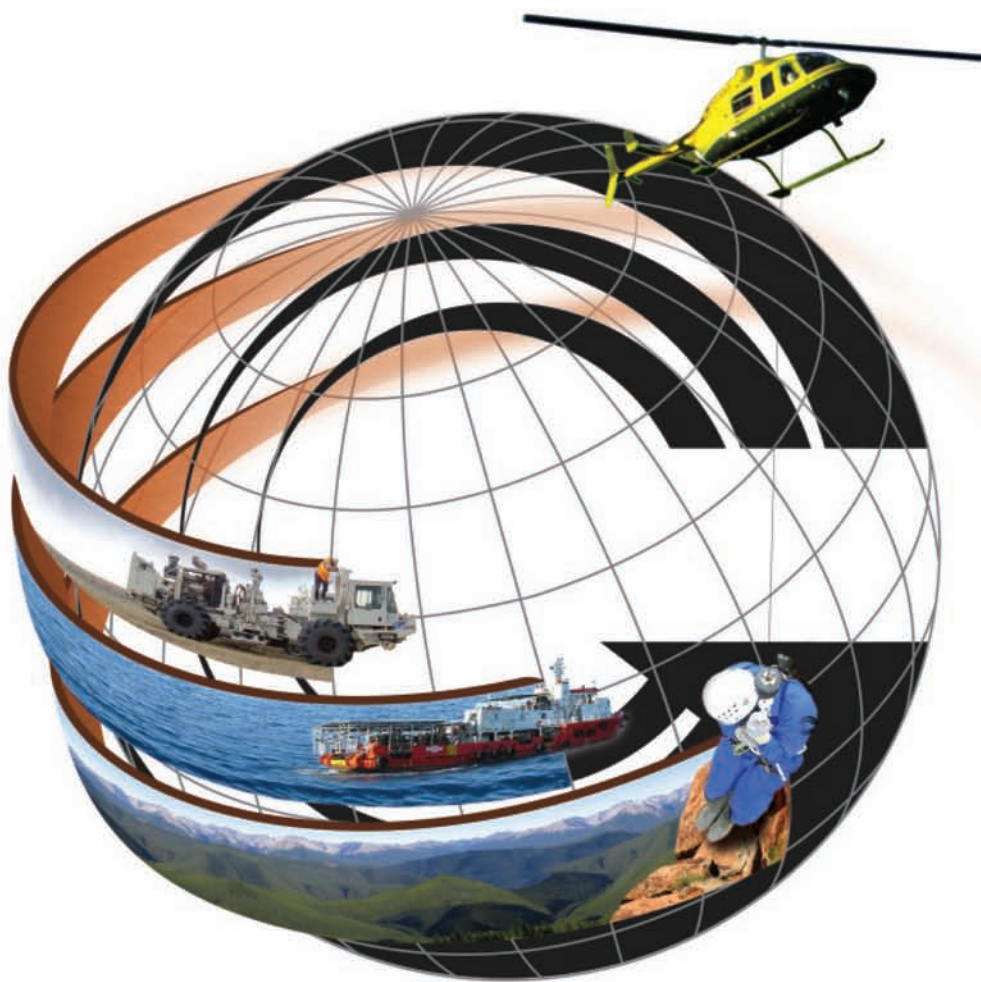
"I have avoided the use of the term 'dry hole' anywhere in either the title or proposed content," he says.

Specifically, by soliciting stories from those in the industry who have experience in these unmentioned "dry holes" (and who hasn't?), Speh plans to present 12 case studies from basins throughout the world, including well-established plays, but also – and Speh says this is important – the more obscure and less important plays.

"I want to attract a wide range of companies to present case studies," adding that AAPG members seem intrigued by the idea.

Ideally, he says, the program (still being finalized at press time) will include case studies from the recognized majors along with smaller, aggressive companies – but it won't be a top-down symposium. Speh believes that all in the industry can learn from the stories of all.

Since the conference is in London, Speh says he wants to include stories, as well, from the "very small" producers in the North Sea. It is they, he says, who have played such a vital role in sustaining the exploration and appraisal drilling programs in the region – even if they had to fail once or twice before becoming such a force. ■



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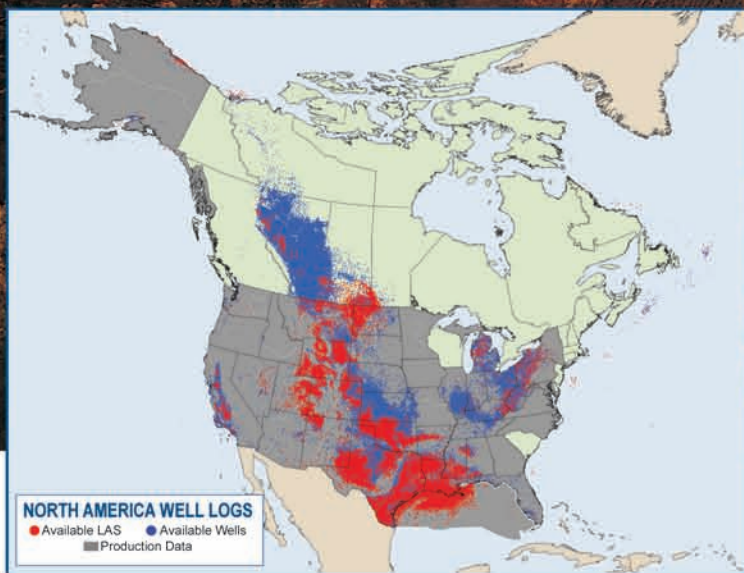
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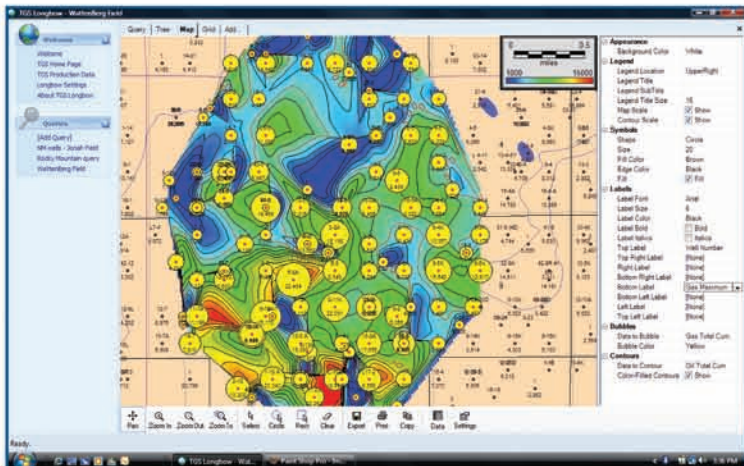


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*Utica emerges in Québec*

# Shale Play Extends to Canada

By SUSAN R. EATON  
EXPLORER Correspondent

L'Association pétrolière et gazière du Québec (APGQ) was formed in April 2009, in response to the province's burgeoning oil and gas industry – and in October, a mere seven months later, APGQ attracted 21 corporate sponsors, 18 exhibitors and close to 400 attendees, including a large contingent of students, to its inaugural two-day conference.

The reason for the excitement?

Participants gathered to learn about the Utica Shale gas play, North America's new-kid-on-the-block resource play.

Québec's emerging shale gas trend targets the Utica Formation, an Ordovician age, black calcareous shale with productive equivalents in the Appalachian Basin of the United States, and Calgary's service sector – facing yet another slow winter in the Western Canadian Sedimentary Basin – had a strong presence at the conference.

Hoping to enter the Utica Shale gas play on the ground floor, representatives from slick water fracture stimulation, micro-seismic monitoring, drilling and seismic companies learned a little French and got up to speed on Québec's *gaz naturel non classique* – Canada's newest unconventional resource play.

The conference's 37 speakers discussed far-ranging subjects, including Utica Shale geology, completion techniques, proximity to U.S. gas markets, carbon sequestration, economics, regulatory affairs, water usage and community outreach.

By all metrics, the first annual APGQ conference was an unqualified success – and Canada's Utica Shale has the "right stuff" to make it a contender in North America's emerging shale gas industry.

**By the Numbers**

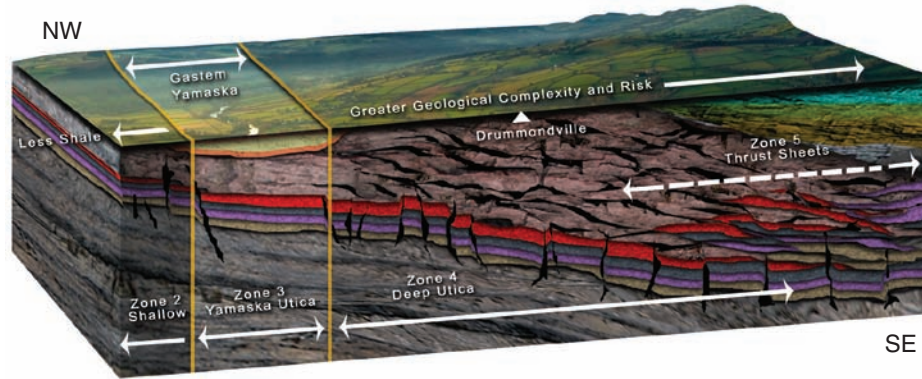
"The beauty of Québec is that Talisman has one million gross acres of contiguous land in the St. Lawrence Lowlands."

That's the thought of AAPG member Jean-Yves Chatellier, a geologist with Calgary-based Talisman Energy Inc., one of the two major E&P firms involved in Québec.

"This is early in the game," Chatellier said, "but until proven otherwise, the whole basin is deemed prospective."

Although he says that he didn't initially coin the phrase, Chatellier has stated publicly: "The Utica has Incredible-Gas-In-Place."

"In some areas," he added, "the Utica is overpressured, delivering more gas per



Graphic courtesy of Gastem Inc.; photo courtesy of Robert Thériault

Schematic seismic section (top), showing the three distinct plays in the Utica and Lorraine Shale Gas Fairway, with increasing structural complexity from NW to SE. Photo shows an outcrop of the Utica Shale in Cap-Santé, north shore of St. Lawrence River, showing well developed fracture sets.

unit volume of rock."

Resource figures publicly released by industry indicate about 93 Bcf of IGIP per section for the Utica Shale, increasing to 150 Bcf of IGIP per section for the basin's deepest targets.

An additional 200 Bcf of IGIP per section may be lurking in the Lorraine Shale, an uphole siliceous gas shale measuring 1,500 to 2,000 meters thick. While the Lorraine, the poor cousin to the Utica, exhibits great potential, it has yet to be production tested in Québec.

"Imagine 2,000 meters of organic rich shales (Lorraine)," Chatellier said. "That's huge!"

Despite the fact there is currently no production from the Utica, the oil and gas industry is on the cusp of proving the play's commerciality. This huge natural gas

resource is proximal to pipeline infrastructure that services both Québec and the northeast seaboard of the United States. Strategically located just 400 miles from New York City, Utica gas will command a US \$1 premium to NYMEX pricing.

Alternatively, the gas could be sold domestically, into the Québec and Ontario markets. According to Chatellier, Québec's annual gas consumption ranges between 200 to 240 Bcf per year, the majority of which is transported from Western Canada.

Royalty rates in Québec range between 10 to 12.5 percent, further enhancing the play's economics.

**'Entrepreneurial Exploration'**

The entrepreneurial spirit of grass roots exploration is alive and well in



Québec – during the past five years, a tenacious group of a dozen or so smaller exploration companies has added value to these lands, advancing technical knowledge on the play and farming out large, contiguous blocks to two major E&P companies, Talisman and Forest Oil.

Originally, these exploration permits were leased for the deeper, Ordovician age Trenton-Black River (TBR) hydrothermal dolomite play. However, in response to growing shale gas production from analogous U.S. Appalachian basins, the industry's exploration focus has shifted quickly to the resource play.

► In Québec, Talisman's first five vertical wells had been successful, with production tests in the Utica ranging from 300 to 900 mcf/day. Talisman invested \$38M last year in the Utica Fairway, and based upon early successes the company has ramped up its activity. In the fourth quarter, Talisman spudded two, 1,000-meter-long horizontal pilot wells, with completion plans for eight-stage fracs per well.

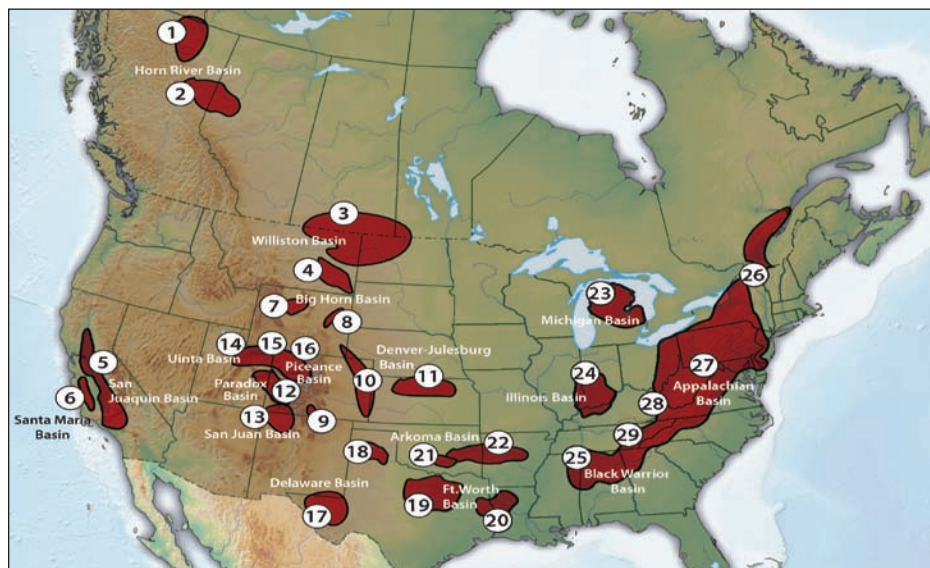
The horizontal wells will be drilled adjacent to vertical wells, enabling the acquisition of micro-seismic data to map fracture propagation in x-y-z space.

Talisman also is a player in the Montney Shale in British Columbia and in New York's Marcellus Shale.

► During the past two years, Forest Oil has announced Utica production rates, employing slick water fracs in both vertical and short-reach, prototype horizontals, of up to 1 mmcf/day. Last year Forest Oil employed four-stage fracs in its short-reach horizontals, but reported difficulties in cleaning up the wells and recovering frac fluids. Through a farm-in with Junex Inc., Forest Oil plans to drill a vertical pilot hole during the winter of 2010, followed by the drilling and completion of a horizontal wellbore.

"From a scratch position in 2006, we are now at a stage where the concept has been proven, and we are moving to the pilot stage," said Raymond Savoie,

See **Utica**, page 12



Shale gas basins of North America (left); the Utica Shale in eastern Canada is number 26. Right, a comparison of the Utica and Barnett shales.

	Utica Shale : QC & NY	Barnett Shale
Depth (ft)	2,000 – 6,000	4,500 – 9,000
Thickness (ft)	250 – 800	150-700
% Clay	15 – 26 <sup>1</sup>	15 - 30
TOC (%)	1.0 – 3.1	3.5 – 5.0
% Porosity (Free Gas)	3.2 – 3.7 <sup>1</sup>	3.0 – 4.8
Pressure Gradient	0.45 – 0.60 <sup>1</sup>	0.46 – 0.50
Thermal Maturity	1.3 - 2.0	1.0 – 2.2
OGIP	93 - 100 BCF/ Section <sup>1</sup>	207 BCF/ Section <sup>3</sup>
Gas Price (USD)	NYMEX + \$1.00 <sup>2</sup>	NYMEX – \$0.53 <sup>1</sup>

Sources: 1 - Industry Estimates  
2 - Gastem / Québec operators  
3 - Jarvie et al – AAPG Bulletin – April 2007

Graphics courtesy of Gastem Inc.

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**Utica**

from page 10

president and chief executive officer of Québec-based Gastem Inc.. "So far so good; the Utica is shaping up to be a major shale play in North America."

The game plan, Savoie said, is to establish repeatability in drilling and completion techniques and, ultimately, to prove the play's commerciality.

With an exposure to 486,000 gross acres in Québec's Utica and Lorraine Shale Gas Fairway, Gastem is moving forward with pilot projects in 2010, in various partnerships – including one with Talisman.

► In 2008, Canbriam Energy, a Calgary-based company created to chase resource plays in North America, secured 173,000 acres in the Utica Fairway, through farm-in deals with Gastem, Petrolympic Ltd. and Resources & Énergie Squatex. Canbriam also is actively drilling the unconventional Montney play in northeastern British Columbia.

"The Utica is a true shale basin, similar – yet mineralogically distinct – to those in the United States, including the Barnett and Marcellus," explained John Nieto, Canbriam's vice president of exploration.

According to Nieto, a petrophysicist and AAPG member, Canbriam is still a relative newcomer to the play.

"There's big potential in Québec, and if you can get in during the early stages of exploration, the rewards can be higher," Nieto said. "Obviously, early birds take greater risks."

Canbriam has done some comparisons on the cost of entry into Québec, Nieto said, and the Utica is very attractive compared to the Barnett's historical highs of upwards of \$30,000 (US) per acre.

At writing, Canbriam had drilled and cased three wells in the Utica play, and was production testing two of the three wells.

**Comparisons to the Eagle Ford**

Sitting in a topographic low called the St. Lawrence Lowlands, the Utica and Lorraine Shale Gas Fairway straddles the St. Lawrence River, running SW-NE in a narrow band between Montréal and Québec City. During the past five years, the entire 1.5-million-acre Fairway was leased by smaller oil and gas companies under initial five-year exploration terms. Ten-year extensions, based upon minimal work commitments, are readily available from the Québec government.

During the past three years, operators have drilled some 24 wells targeting the Utica Shale. With only 270 well penetrations in the St. Lawrence Lowlands, Québec remains a frontier with respect to oil and

See **Québec**, page 24**Utica Expertise Heads Toward the Border**

Gastem is the first organically grown Québec exploration company to export its Utica Shale expertise to nearby New York state, where it has more than 35,000 gross acres under lease in the Utica and Marcellus Gas Shale plays. In October, Gastem drilled and cased its first Utica well, Ross #1, to 4,950 feet.

"We've done a lot to compare the shales in Québec and New York in terms of the anatomy of a shale," said AAPG member Geraint Lloyd, Gastem's vice president of exploration.

"The Barnett has been the golden shale play that everyone uses as a standard," Lloyd said. "The Utica is actually closer to a marl than to a shale."

Lloyd's used many key metrics – drilling depth, thickness, clay content, TOC, pressure gradient, TOCs, IGIP and gas price (US) – to compare the Utica, favorably, to the Barnett.

According to Lloyd, Gastem has conducted numerous petrophysical evaluations to establish "whether or not we can break the rock." Because the Barnett contains a higher percentage of silica, it fracs easier than the more calcareous Utica.

Calgary-based Canbriam Energy's team is integrating log, core and seismic data, developing its proprietary geological and petrophysical models for the Utica Shale. Canbriam has designed both core analysis and wireline logging programs to optimize completion methods.

Leveraging upon its success in horizontal drilling and multi-stage completions in the Montney, a hybrid shale that's siliciclastic in nature, Canbriam is transferring this expertise to the Utica.

– SUSAN R. EATON

**Surveying the Utica, Lorraine Fairway: Three Distinct Plays**

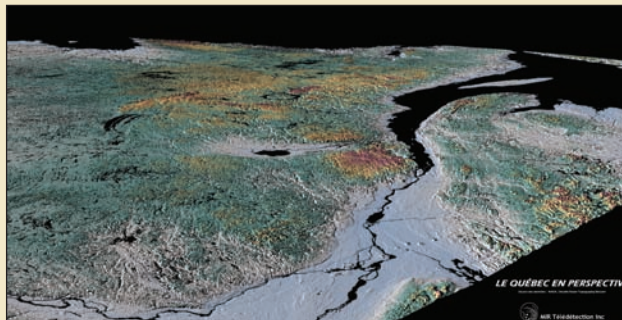
From west to east, with increasing geological complexity, the Utica and Lorraine Shale Gas Fairway comprises three distinct plays. Each play, according to data provided by Junex Inc., has a unique set of drilling and completion challenges:

► Shallow to medium depth platform (100 to 500 meters), TOC 0.5 to 3 percent.

► Medium to deep platform (500 to 2,000 meters), TOC 0.5 to 2.5 percent.

► Deep thrust belt (500 to 1,500 meters), TOC 1 to 5 percent.

Characterized by thermogenic gas,



the shallow to medium depth platform sits west of the Yamaska Growth Fault Zone, a pronounced structural feature that parallels the St. Lawrence River.

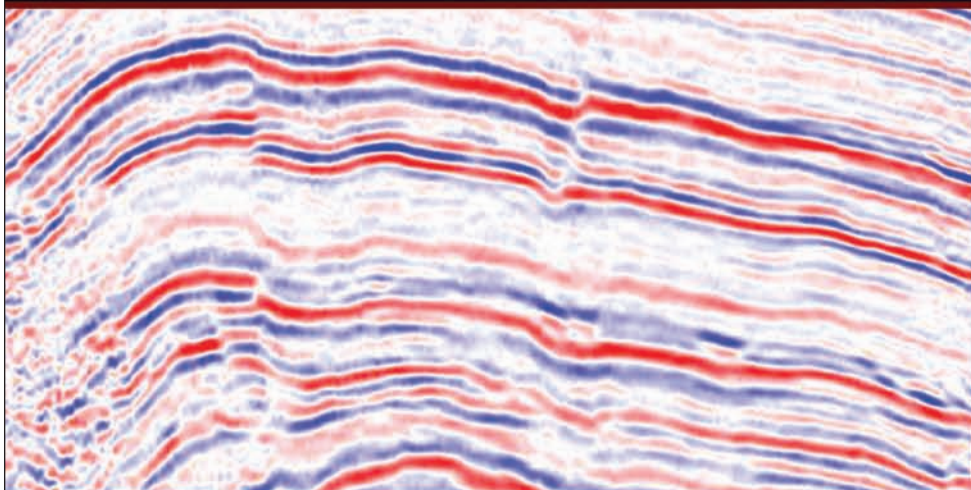
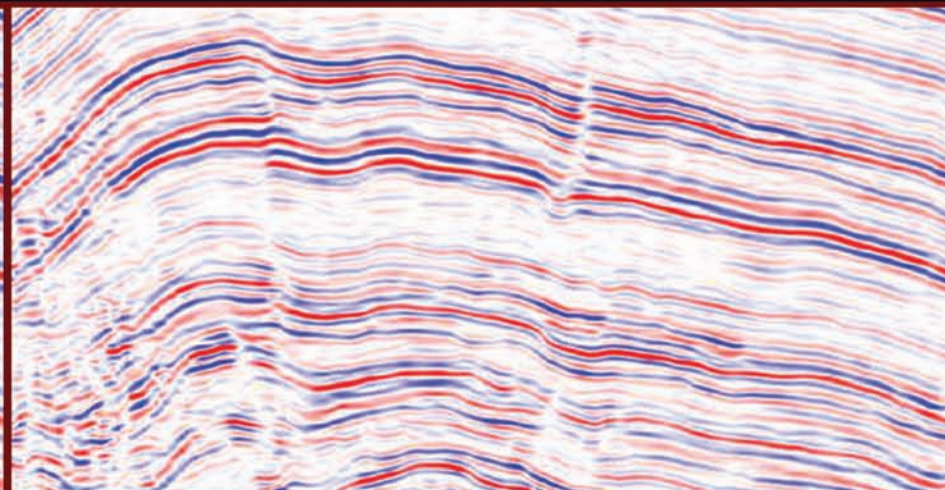
Sandwiched in the middle, the

normally faulted medium to deep autochthonous platform contains gas condensate to dry thermogenic gas in the Utica and Lorraine formations.

The deep thrust (or allochthonous) belt sits east of the Logan's Line, a prominent Thrust Faulted Zone paralleling the St. Lawrence River and related to the culmination of the Taconic Orogeny during Ordovician time.

Characterized by gas condensate to dry thermogenic gas, this play has yet to be tested during the recent wave of exploration, despite the fact that it produced gas shows in historical wells.

– SUSAN R. EATON

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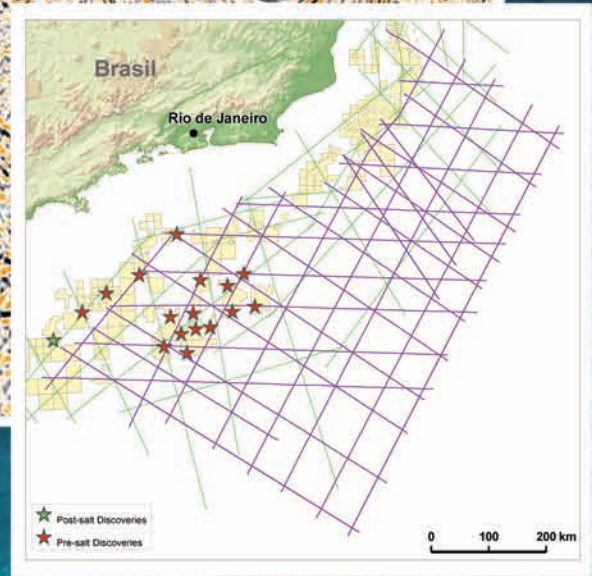
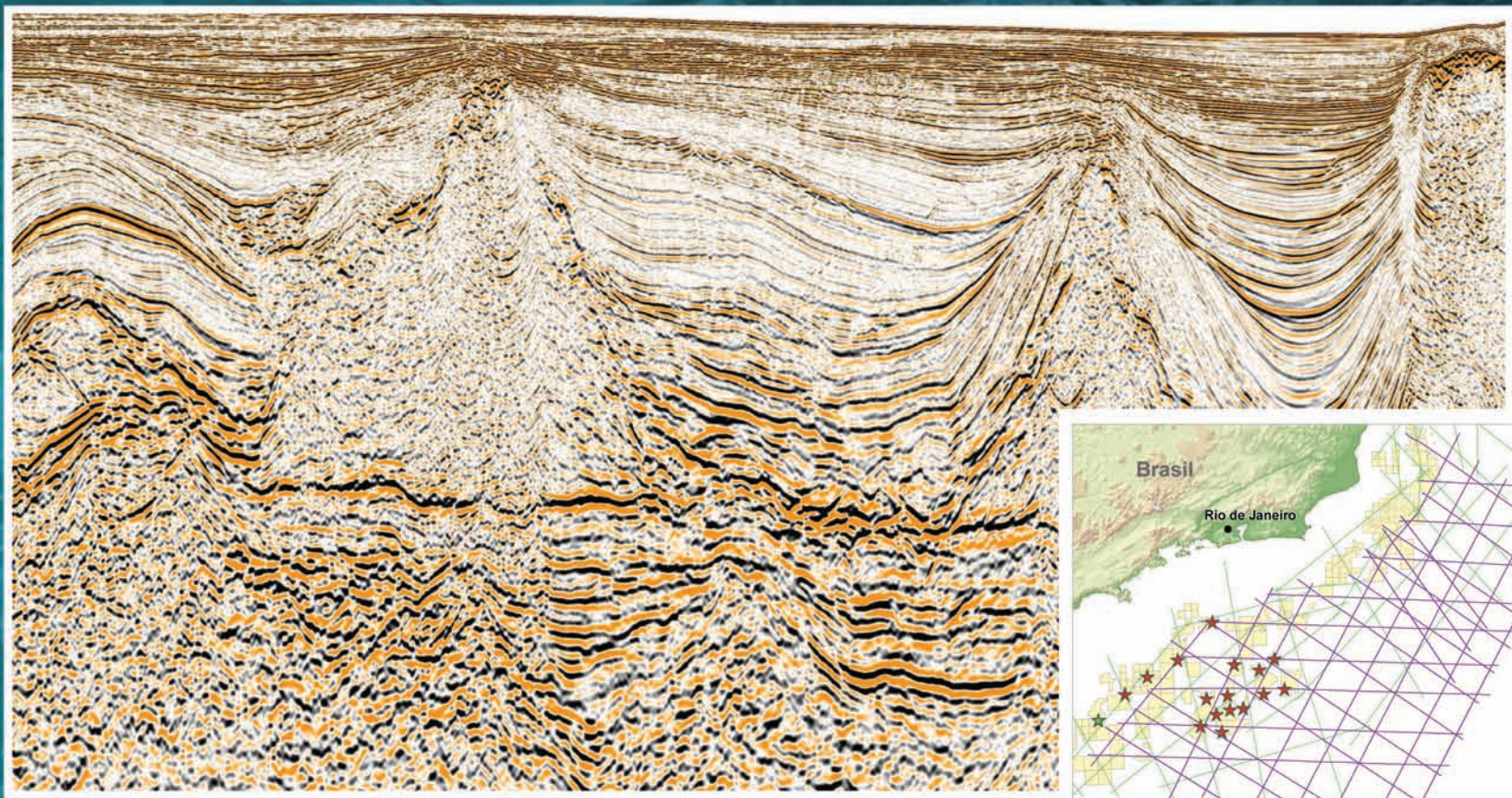
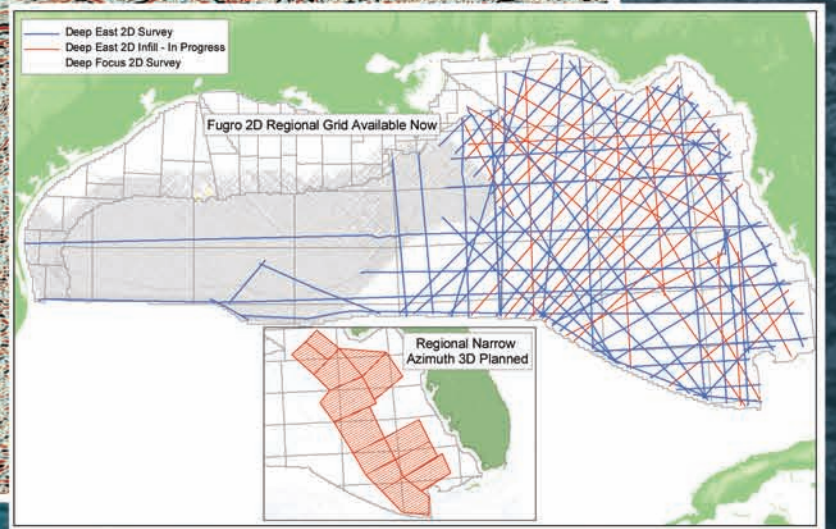
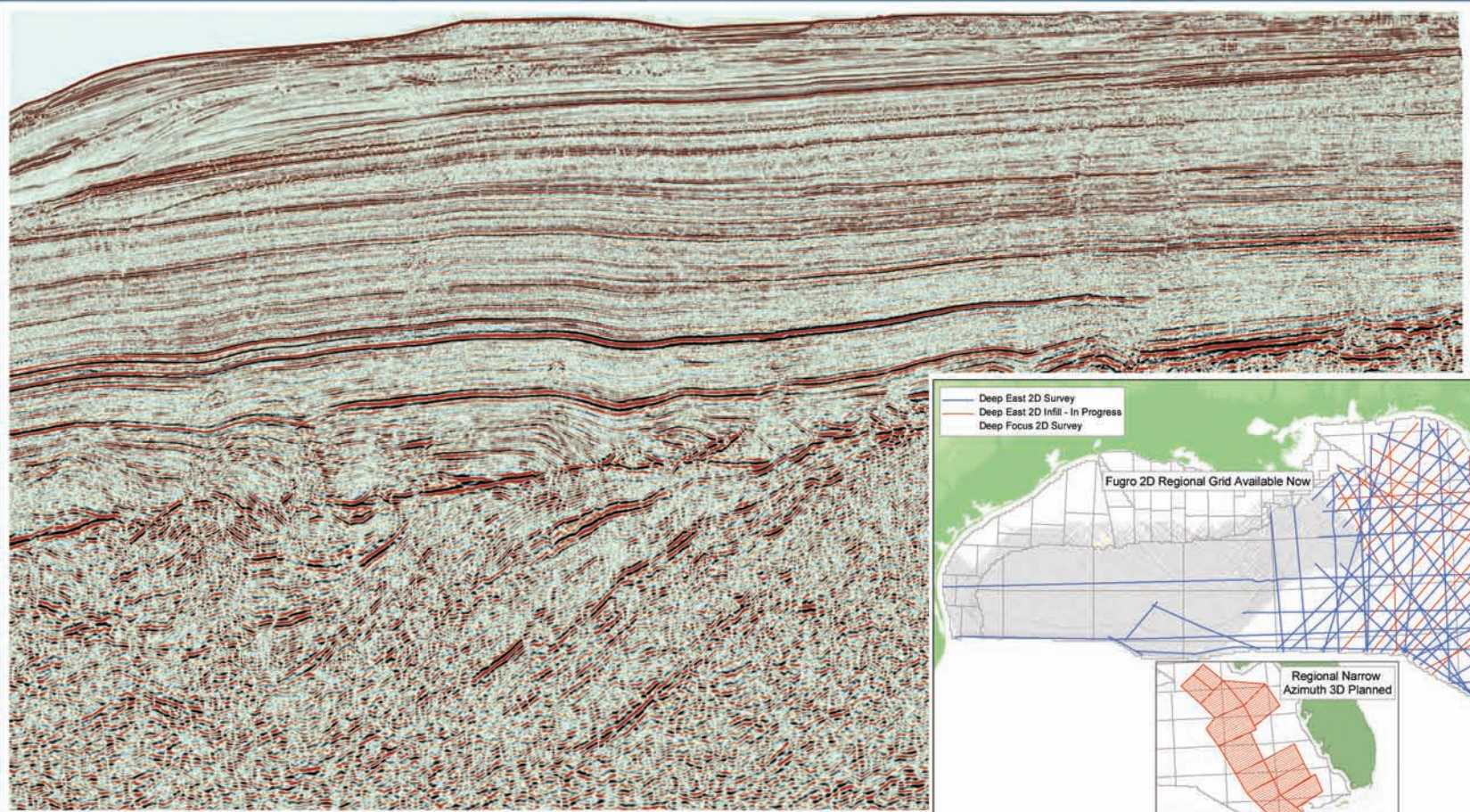
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An unconventional unfolding of events

# Saudi Field Gets 'Advanced' Approach

By DAVID BROWN  
EXPLORER Correspondent  
and KHALID M. SHOKAIR

The EXPLORER editor suggests a story about an advanced geophysical technique for identifying fractures, already in use by Saudi Aramco.

"Fractures are a big deal in developing shale gas and tight sands. It sounds like an important story for unconventional," I say.

He likes the fact this new approach is being used for unconventional development in Saudi Arabia.

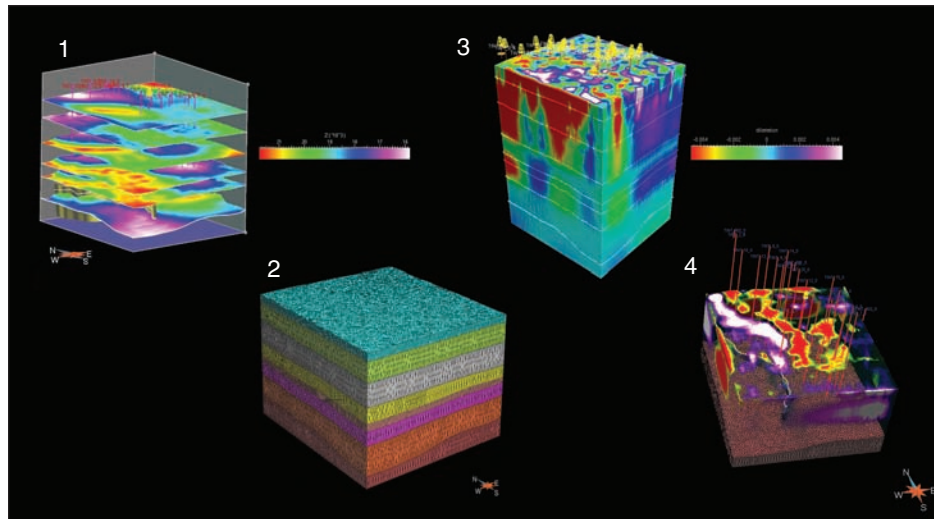
I send an e-mail to AAPG member Khalid Shokair, geophysical explorationist for Saudi Aramco's Concept Generation Team in Dhahran.

"This is a robust technique that can be used to model and evaluate a wide variety of structures in different tectonic settings – extensional, compressional, transpressional and transtensional," Khalid writes back.

"Within these geological settings, tight reservoirs can be restored and the amount of deformation can be calculated to assess unconventional plays.

"Our 3-D restoration techniques help to evaluate structure and to assess strain and fracture, which often play key roles in defining the viability of these deposits."

Picture this: Saudi Aramco was conducting an exploration program, drilling to a Permian-Carboniferous natural gas target south of the



Graphics courtesy of Khalid Shokair

High tech in Saudi Arabia, from start to finish: A view of the general setting (grids, wells, faults), followed by the generating of 3-D volumetric meshes layers (2), followed by calculation of 3-D displacement and 3-D strain fields (3), followed by final validation of structural deformation histories and analysis of reservoir-scale strain fields.

Ghawar Field.

But, unexpectedly, the well started to produce oil from the higher Tuwaiq-Mountain Formation.

That formation was supposed to have poor, tight reservoir qualities in the area.

Why was there so much oil?

"Several exploration wells in the south Ghawar area were drilled for deep gas targets," Khalid explains. "However, numerous oil shows were coming from a shallower, tight Jurassic carbonate section known to be deposited in a deep

carbonate environment.

"From our understanding of the fold geometry and the seismic expression of the master fault at depth, we have interpreted the structure in question as a fault-propagation fold," he continues.

"The fold limb above the upper fault tip has been deformed by intense shearing over the past tens of millions of years. This zone is highly strained, and is characterized by numerous small scale faults and fracture sets."

Khalid is getting ready to leave for



AAPG's International Conference and Exhibition in Rio de Janeiro, where he'll present the paper "3-D Structural Restoration Approach for Fracture Prediction – A Case Study from the Kingdom of Saudi Arabia."

His co-authors are AAPG members John H. Shaw, professor and head of the Structural Geology and Earth Resources Group at Harvard University, and Andreas Plesch, research associate with that group.

"In this case study, core and image logs of an exploratory well indicated two sets of fractures. While many of the fractures are drilling induced, several natural fractures sets were identified in the area of intense strain predicted from the structural restoration technique," he says.

"This tight rock is about 120 feet thick and has low shale content within high organic-rich formation.

"The combination of highly fractured reservoir with the source rock defines this nonconventional oil accumulation, and establishes an attractive play or sweet spot for exploration in other large structures within the Kingdom."

See **Saudi Fractures**, page 16

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## Discoveries

from page 6

discoveries, with BP making a "giant" find in the Tiber prospect in the Keathley Canyon with a potential of three billion boe. Tiber is in 4,132 feet of water with a 35,055 foot-TD – believed to be the deepest ocean-depth well ever.

Tiber also produces from the Upper Tertiary, same as Chevron's Buckskin No. 1 discovery well announced in February. Buckskin, also in Keathley Canyon, is located in about 6,920 feet of water and was drilled to 29,404 feet.

As 2009 is behind us, the new year opens with oil near \$70 and gas limping along around \$5 and global oil demand projections wobbling in concert with the latest economic surveys.

The specter of a new round of

company consolidations was raised by the mid-December ExxonMobil all-stock buyout of XTO, and any company with reserves that used to be viewed as a weed suddenly became a flower.

While overall budgets are still being trimmed, there also have been announcements of more of the budgets to be shifted to the exploration side of the business – including Chevron, ConocoPhillips, Hess and Marathon.

White also noted some encouraging news: financing difficulties have eased such that world-class projects like the US \$37 billion Gorgon LNG project in Western Australia are proceeding.

Meanwhile, the industry progresses – on eggshells.

For a full listing of 2009 global discoveries as provided by IHS, see the AAPG Web site. [E](#)

## Saudi Fractures

from page 14

*Communication is a little challenging. I'm in Tulsa; Khalid is at his office in Dhahran from 7 a.m. to 4 p.m.*

*That's 10 p.m. to 7 a.m. Tulsa time.*

*When I talk to Khalid by phone for the first time, it's 12:30 a.m. on a Sunday in Tulsa.*

"For the last several decades, Aramco structural geologists have attempted to understand and describe the evolution of the major folds in Saudi Arabia that provide traps for our large oil and gas accumulations," he says.

"Detailed studies in the field, interpretations of 2-D seismic data, and gravity and magnetic modeling have provided a basic understanding of the fold geometries and have successfully

supported many hydrocarbon exploration programs.

"Significant advances in 3-D seismic imaging, combined with advanced technologies in structural analysis, now provide more detailed information about the structure of these folds as well as smaller, reservoir-scale deformations.

"Imaging these kinds of faults and fractures is possible using wide-azimuth seismic 3-D technology. This type of advanced 3-D seismic data is not often available in the early stage of exploration due to the high cost and long time period required to acquire, process and analyze these data.

"Thus, 3-D geomechanical structural restoration has proven useful as a complimentary technology that enables explorationists to model and predict the most strained regions in the fold under investigation.

"Integration with well data and seismic attributes helps to constrain further the fracture patterns associated with these highly strained fold zones."

*Khalid tells me about the department where he works.*

*It was started specifically to generate new exploration plays in Saudi Arabia, using new ideas.*

"The newly formed Aramco Department of Exploration Resource Assessment has put in place a team to exploit these new technologies and apply them to identify and develop new concepts for future hydrocarbon resource exploration," he says.

"One of these unconventional concepts is tight reservoir exploration. Our group used these new technologies to help characterize the unconventional resource in collaboration with the Structural Geology and Earth Resources Group at Harvard, headed by professor Shaw.

"Most traditional methods of structural restoration rely on geometric or kinematic constraints to restore structures through time. While these methods have proven very useful in helping to validate structural interpretations and define paleo-trap geometries, they generally do not work well to predict patterns of reservoir-scale deformation.

"In contrast, we employed a new, 3-D, geomechanical restoration approach based on finite element techniques that restores the deformed area while taking into account rock properties and stress.

"This advanced technique was developed by the Nancy School of Geology (in France) in collaboration with the Harvard structural group."

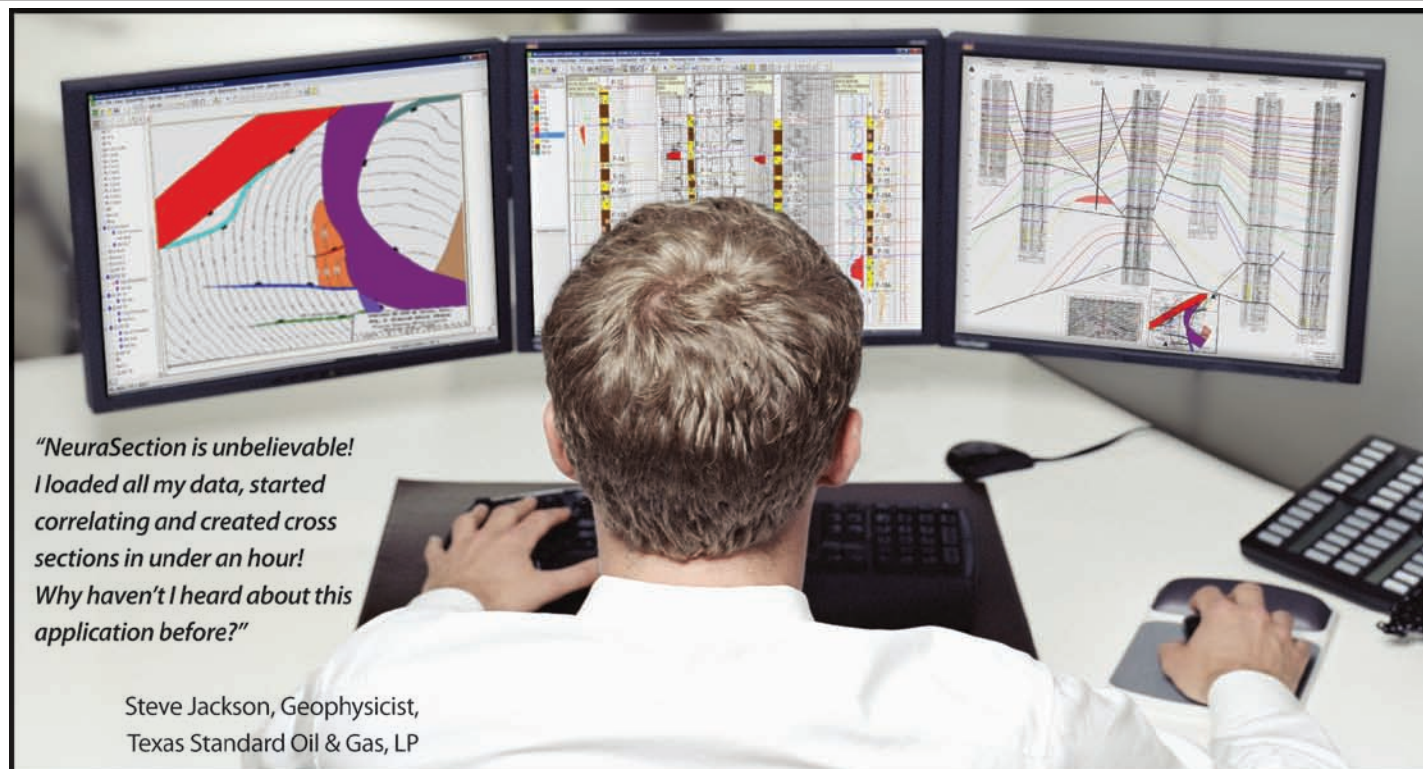
*I ask Khalid to send some figures to help illustrate the 3-D reconstruction technique. He also e-mails me his photograph for the story.*

"This restoration method requires surfaces representing geomechanical stratigraphic layers and faults extracted from 3-D seismic data. These horizons are triangulated and used to generate tetrahedral meshes.

"The interactions between these surfaces and faults have to be set in order to represent how the blocks can move during the restoration steps. The restorations also incorporate information about each rock layer's physical properties, such as lame's constant, shear modulus and density.

"This information can be direct measurement from cores or logs. Internal deformation within regions of the model is controlled by these rock measurements.

"During a sequential restoration of



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\*Carol Shiels, Geologist, Shiels Engineering

See **High Tech**, page 18



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The application deadline is quickly approaching for this year's AAPG Foundation's Grants-in-Aid Program: applications must be received by Jan. 31.

This year the program will be providing \$203,000 to the highest quality master's and Ph.D. student's research projects from throughout the world. In addition to domestic students, GIAs in past years have been awarded to graduate students from Africa, Australia, Cameroon, Canada, China, France, Germany, Italy, Lithuania, Netherlands, New Zealand, Nigeria, Poland, Saudi Arabia, Slovakia and the United Kingdom.

Students do not need to be AAPG members to apply.

Students whose thesis research has application to the search for and development of petroleum and energy-mineral resources, and/or to related environmental geology issues can apply online at [foundation.aapg.org/gia/index.cfm](http://foundation.aapg.org/gia/index.cfm).

Also, the Named Grants program is a special endowed segment of the Grants-in-Aid program, and students can look online ([foundation.aapg.org/gia/names.cfm](http://foundation.aapg.org/gia/names.cfm)) for grants restricted to their specific university or area of research.

## High Tech from page 16

each layer, restoration vectors at each node in the entire volume are calculated. Strain and dilatation – volume change – can also be calculated and visualized at each restoration phase.

"The total restoration values then can be posted over the reservoir layer under investigation.

"Zones of high strain generally represent highly deformed areas within the reservoir. Based on calibration with well, seismic and production data, these strain patterns can be used to understand the heterogeneity, the fracture density and direction, of the reservoir."

*Khalid is in Rio now. He gives me a phone call from there.*

"What we found out in this example is that we can expect to predict the same things in other places," he tells me.

"We don't need to shoot any extra seismic – we have everything. It's just a matter of continuing to apply this technique in Saudi Aramco.

"To see the strain variation we need some significant structuring or variation in the rock. If the fracturing is very gentle, we won't be able to see it using the 3-D reconstruction.

"That's the only limitation I see so far."

*When he talks about the reconstruction technique, Khalid sounds genuinely excited.*

*By now, Aramco has worked out a standard approach for using it.*

"The workflow starts when exploration geologists use regional information about tectonics and stratigraphy to define play fairways," he explains.

"Then surface grids are constructed from seismic data, preferably 3-D, for prospective structures using commercial structural-modeling software.

"Defining the initial geometries of the structures accurately is extremely important, and this can be aided by understanding of the kinematic of folding.

"Modeling and restoration of multiple cross-sections (1-D restoration) using kinematic balancing techniques (2.5-D restoration) can help to understand the best approaches and boundary conditions for the 3-D restoration.

"The next step is performing 3-D restoration based on the best restoration algorithms. A series of restoration scenarios, capturing the degree of uncertainty of such features as the dip of the master fault, can be preformed and the restoration result (dilatation) can be compared from all scenarios.

"The final step in this workflow involves the integration of strain results with well information, cores, fracture density from formation imaging tools, production test results and seismic attributes such as curvature and coherency to characterize the reservoir properties."

*I'm getting ready to leave for a conference in London.*

*So I send Khalid one last e-mail to confirm a few details for the story.*

"Many of these unconventional fractured reservoirs in the Kingdom were accidentally drilled and discovered, but not initially developed," he notes.

"Now that we have tools that we can use to structurally characterize the fracture sets in these reservoirs, we plan to incorporate this technology in our exploration and development efforts.

"Fractured, tight and unconventional petroleum reservoirs, including fractured shale-gas reservoirs, represent great resources. Emerging technologies such as this one will make more of these accumulations economic."

Later, he expands on the last point.

"We have not applied this technique yet to other unconventional plays. Now we are nearly finished from evaluating 3-D restoration softwares within our Aramco exploration environment.

"After that we will start applying this technique in some known similar exploration cases, as well as in tight sand unconventional plays."

*The EXPLORER editor also had gone to Rio.*

*Now he's back in Tulsa, working on the next issue of the EXPLORER.*

*"How's the Aramco story going?" he asks.*

*"To be honest," I tell him, "I'm not sure how to write it." ■*

# GAS PROSPECTING JUST GOT EASIER — AND MORE ACCURATE.



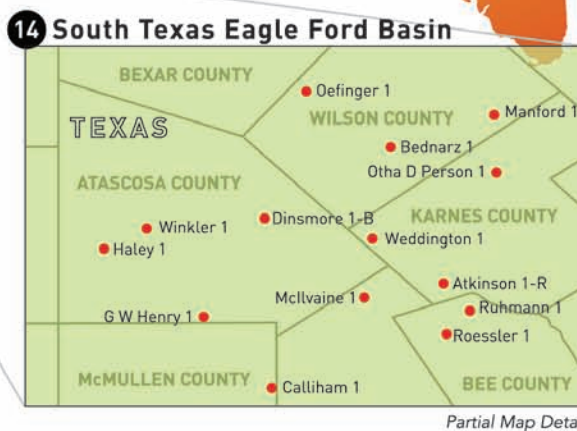
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42123003790000	TEXAS EASTERN TRANS CORP	GARBE GAS UNIT	1	DE WITT	10557	13610
42123002000000	SHELL OIL	BROWN, CORA S	1	DE WITT	12720	15850
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42163001920000	MGF OIL Corp	BEEVER	1	FRIO	5560	6040
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*A different breed of cat*

# Eagle Ford Joins Shale Elite

By LOUISE S. DURHAM  
EXPLORER Correspondent

A still-fledgling shale gas play appears to be on the cusp of snagging a sizeable spot in the limelight alongside U.S. shale gas heavyweights such as the Haynesville, Marcellus, Barnett and others.

The newbie lies in south Texas in the Cretaceous Eagle Ford shale, which is long known for sourcing hydrocarbons to Austin Chalk fields as well as the renowned East Texas field. The play extends from near the Mexican border outward to the east/northeast across



Stoneburner

**“There is something funky going on ... We think it’s pretty clear it’s mainly a function of burial history.”**

several counties.

It’s early in the drilling game, but so far the shale appears to offer relatively high well production rates and low

drilling costs – a combo essentially guaranteed to warm the heart of any operator.

This being Texas, there’s plenty of oil

and gas infrastructure in place, along with large areas of ranch land available for leasing from owners long comfortable with – and knowledgeable about – the industry.

In other words, this won’t be a repeat of the earlier frenzied leasing activity in the still-relatively new Jurassic Haynesville shale play concentrated in northwest Louisiana. As the hype intensified there, landowners began demanding – and receiving – lease bonuses that soared into the stratosphere in many instances.

Petrohawk Energy Corp., which has hit significant home runs in the Haynesville play, was first up to the plate in the Eagle Ford play, where it now has 16 wells on production.

The company drilled the discovery well – the STS-241 #1H – in the fall of 2008 in what would be christened Hawkville Field. The horizontal well in LaSalle County flowed 7.6 MMcf and 250 barrels of condensate per day from the Eagle Ford.

Petrohawk validated the play when it moved about 14 miles to the southwest and drilled the Dora Martin #1-H.

In contrast to the discovery well, the horizontally drilled Dora Martin tested 8.3 MMcf/d with no condensate, even though completed at essentially the same TVD of 11,500 feet.

## ‘Something Funky’

This difference in production makeup is an intriguing aspect of the play.

The Hawkville, where Petrohawk holds 216,000 net acres, is in a kind of mini-basin, or natural topographic low, containing high porosity and high-resistivity facies, and positioned between the Edwards and the Sligo shelf margins.

The field is characterized by a downdip dry gas play in the southwest, a mid-dip gas/condensate and an updip oil play.

“There’s something funky going on,” said AAPG member Dick Stoneburner, executive vice president and COO at Petrohawk. “There’s burial history or a lot of things you can throw into the equation on why there are different thermal maturities at each end.

“We think it’s pretty clear it’s mainly a function of burial history,” he said. “The southwest end of the field at one part was considerably deeper than today, but it’s been uplifted.

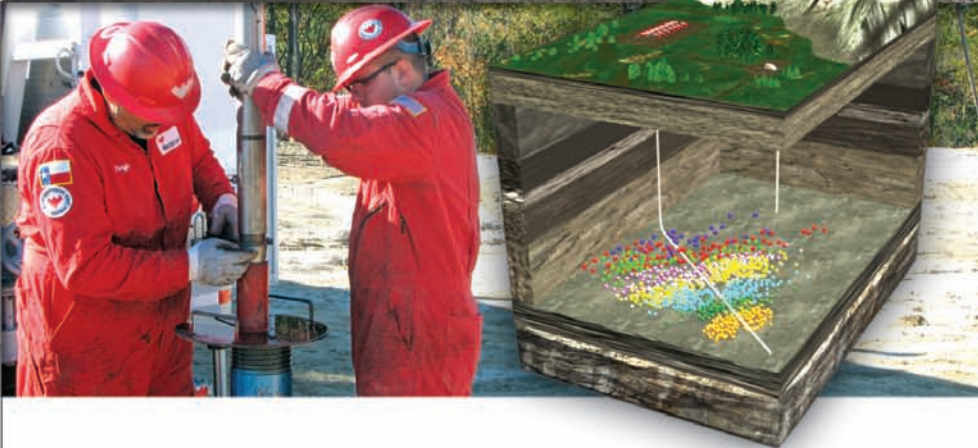
“This is a plausible interpretation based on the presence of the Chittim arch, which is a prominent Laramide feature,” Stoneburner said. “That would have had the ability to affect that end of the field and have it uplifted to the present depth, so the theory has support based on burial history and regional tectonics.”

With regard to mineralogical makeup, the Eagle Ford is a different breed of cat from what you might expect in a shale. Some samples contain as much as 70 percent calcite and a goodly bit of silica, with average clay content tallying 11 percent, according to Stoneburner.

“It’s very brittle rock and not water sensitive,” he said. “It has the perfect mineralogical makeup for a shale gas play.”

He noted that the Eagle Ford is so full of gas and so permeable, the rock actually falls apart as the gas is

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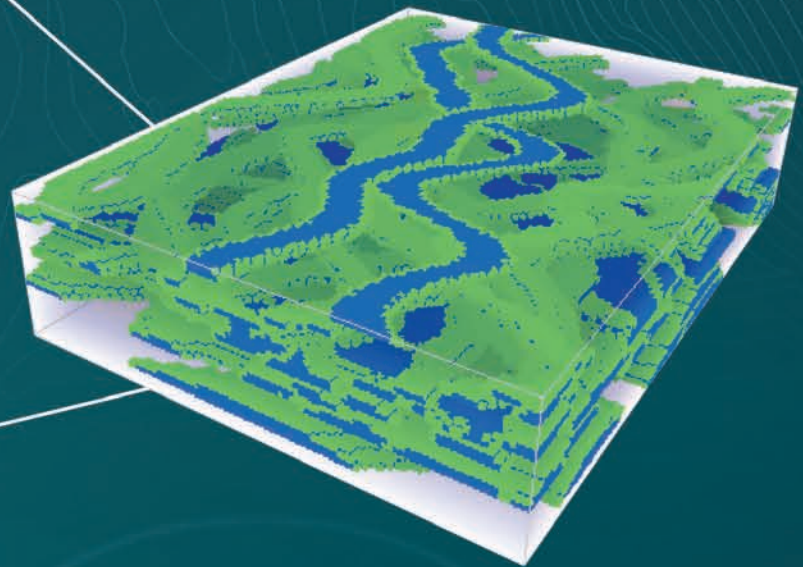
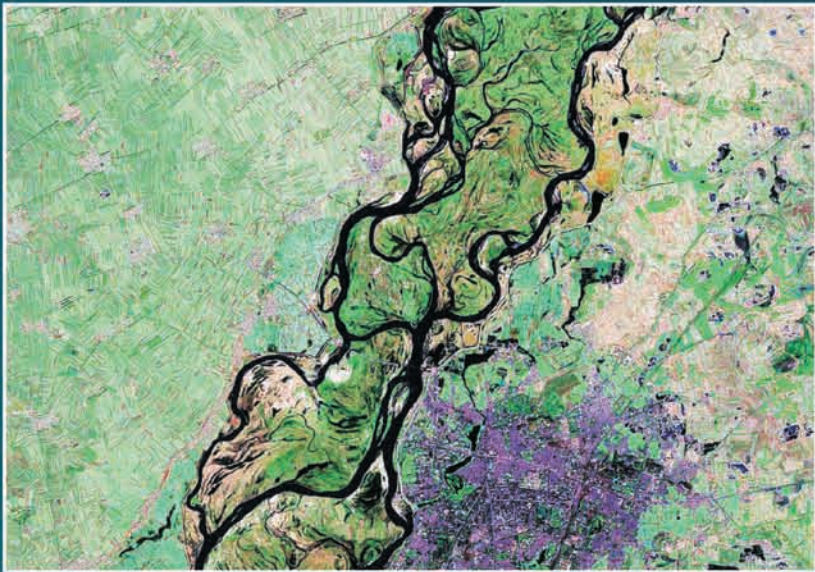
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See **Eagle Ford**, page 24

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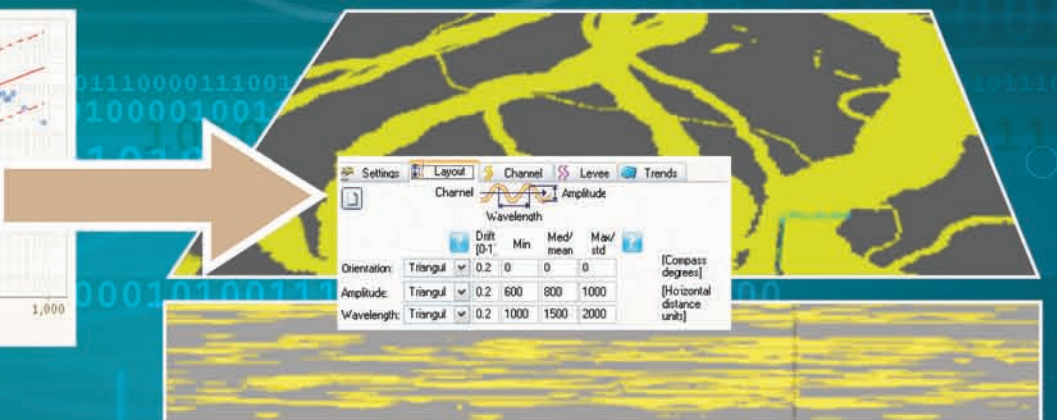
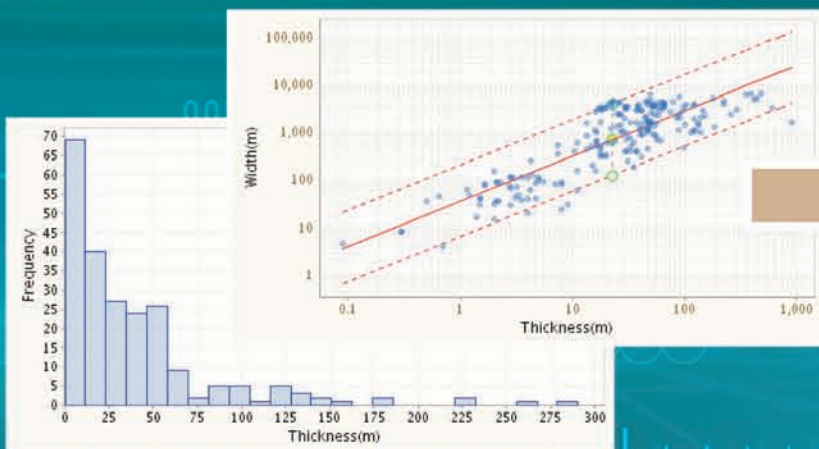
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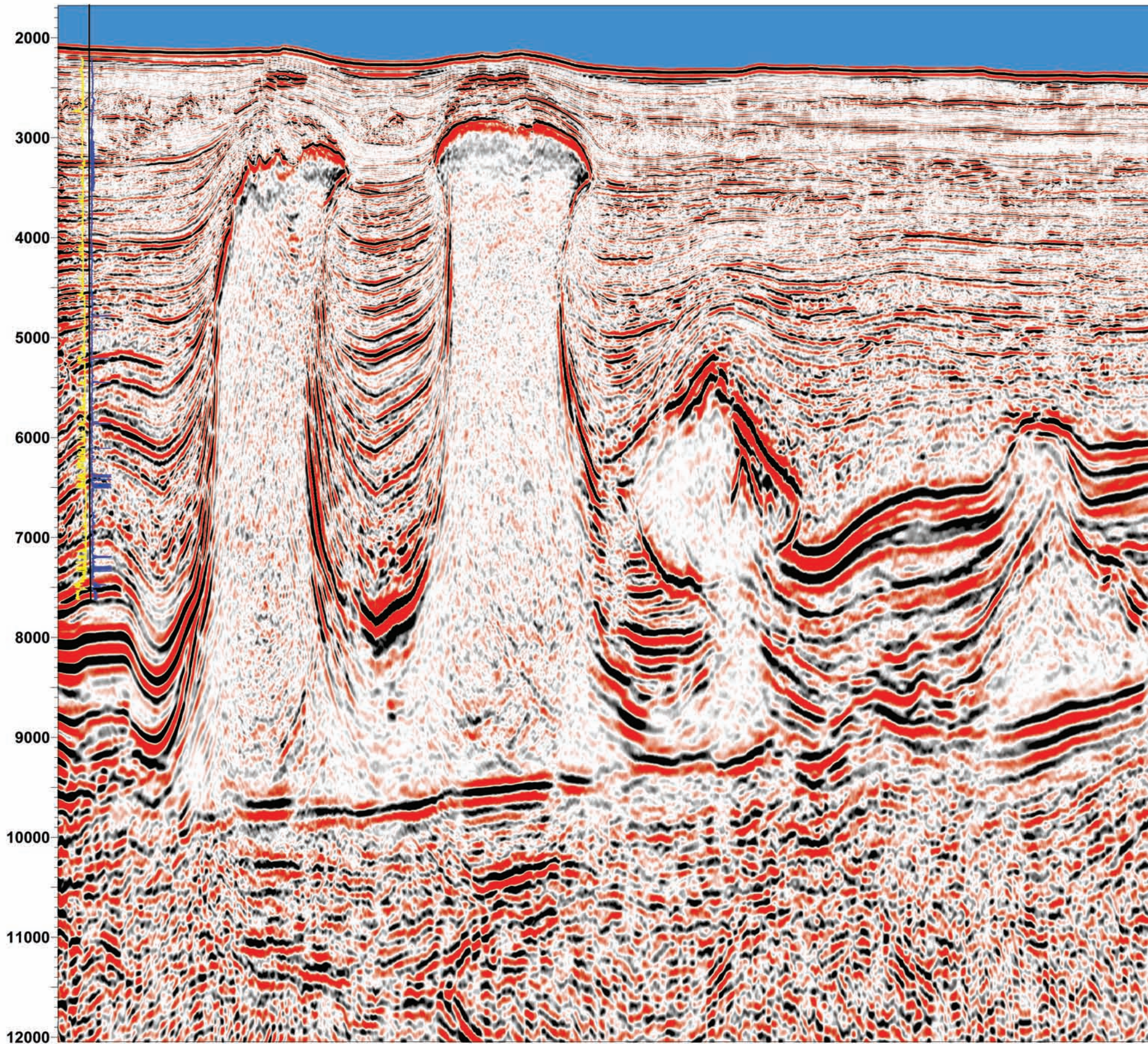
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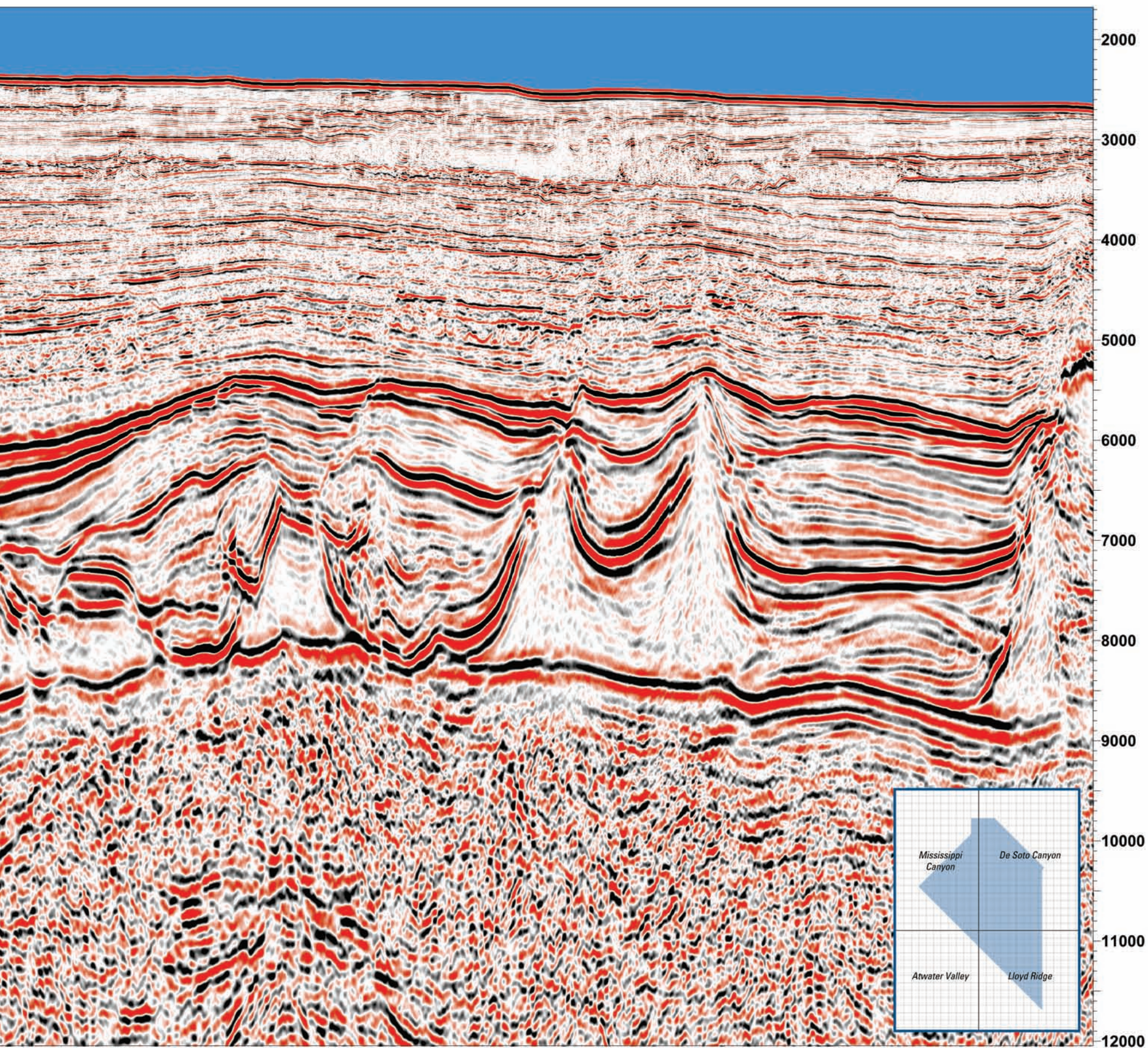


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## Québec

from page 12

gas exploration.

The province's historical production originates from two gas fields that, combined, produced just under 10 Bcf from the TBR and the unconsolidated Quaternary.

Talisman's Chatellier compares the carbonate rich Utica Shale to the Eagle Ford Shale in the United States (see related story, page 20).

"The Eagle Ford is the lowest cost for production, and locally it's condensate rich," he said. "The Eagle Ford is the first carbonate rich shale to produce condensate."

And, as Chatellier points out, wet gas with its higher Btu value fetches a higher price.

### More Opportunities

From Talisman's perspective, commercial success in the Utica could lead to further opportunities in the shallower Lorraine and in the deep hydrothermal dolomite play in the TBR.

"At the moment, we only have very sparse 2-D seismic data in Québec – that makes chasing the TBR a very dangerous game."

In the recent past, Talisman has produced up to 125 mmcf/d from the TBR in adjacent New York state. In 2007, Talisman drilled Gentilly #1, targeting Québec's TBR play. Drilled to a total depth of 2,529 meters, Gentilly #1 flowed 4.5 mmcf/day, declining to between 340 to 630 mcf/day. Suspended, the well was re-entered a year later, producing 800 mcf/day from the uphole Utica.

According to Lloyd, the Lorraine has a higher swelling clay content than the

Utica, and it's therefore sensitive to water. Citing the Montney Formation as a possible analog, Lloyd says it's possible to stimulate the Lorraine.

"For the moment," he added, "everyone has put the Lorraine in his back pocket, as it were."

Chatellier echoed Lloyd's thoughts on the Lorraine's commercial development: "It might take two decades, or a technological step change."

He suggested, further, that a propane frac might work.

"Propane might have the edge in the Lorraine," he said, "but that's only hypothetical." ■

To read more about this subject, visit the AAPG Web site.



## Eagle Ford

from page 20

liberated when a core is brought up to, say, 15 pounds of pressure.

"We haven't seen any fracturing in the Eagle Ford core data we've seen," Stoneburner commented. "This is a key difference with the Haynesville."

### The Price Is Right

The Eagle Ford wells appear to lack the high deliverability or ultimate recovery potential of the impressive Haynesville shale wells, but they're far less expensive on a per well basis. In fact, the development cost comparison between the Haynesville, Marcellus and Eagle Ford indicates they're very comparable, according to Stoneburner.

He noted Petrohawk's first Eagle Ford well topped out at \$14 million and required 60 days from spud date to TD. The last 10 wells they drilled averaged about 17 drilling days and ran up an average tab of \$5 million each.

Stoneburner emphasized geophysical support helped considerably to extend the limits of Hawkville beyond what was originally mapped. The field now spans 90 miles east-west and 15 miles north-south.

The company has an extensive 2-D grid and anticipates receiving its first set of 3-D data in the first quarter of 2010. More 3-D data will be coming in later, which is a good thing given that Petrohawk has latched on to yet another 25,000 net acres outside Hawkville.

Pioneer Natural Resources recently announced a major Eagle Ford discovery near Pawnee Field in Live Oak County about 60 miles southeast of San Antonio.

The Sinor #5 well reportedly flowed at an initial rate of approximately 8.3 MMcf/d and 500 barrels of condensate per day. The well was completed in a 2,300-foot lateral with a nine-stage frac stimulation. It reached a TVD of approximately 13,000 feet.

According to Scott Sheffield, chairman and CEO at Pioneer, the initial results of the well were highly encouraging, particularly given the significant volume of condensate and natural gas liquids. A second well has kicked off, and more are planned across the company's reported 310,000 gross acres in the play.

Pioneer has considerable experience drilling horizontal wells in the Edwards section, underlying the Eagle Ford.

Leasing activity is going gangbusters throughout the play where a number of other familiar names are in the game, including EOG, Swift, Anadarko and St. Mary Land & Exploration.

Perhaps the most profound yet unspoken statement about the play's potential is that the big guys are here as well.

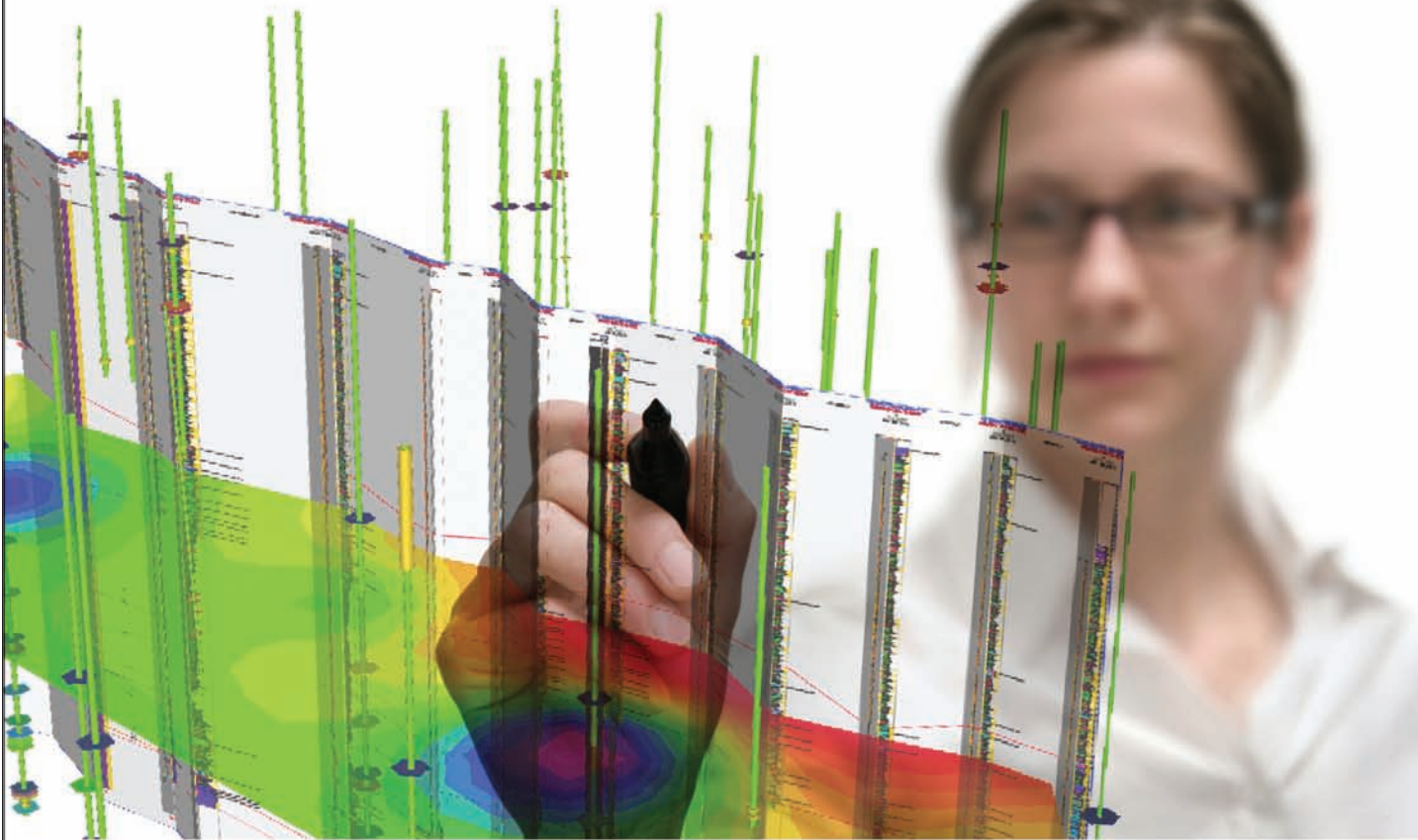
Both ConocoPhillips and Exxon Mobil have reportedly acquired large acreage positions but are keeping mum on their plans.

Optimism rules.

"The recent results of other active players in the trend bodes very well for establishment of a much more regional accumulation than just Hawkville field," Stoneburner said, "and we're encouraged by the success of other players and the expansion of the play."

"We think the activity will change dramatically over the course of the next year," he added, "and change positively." ■

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Experts add to 'unique' setting

# Strong Program Makes Rio a Hit

By VERN STEFANIC  
EXPLORER Managing Editor

Once again, Rio delivered. The 2009 AAPG International Conference and Exhibition, held in November in Rio de Janeiro, recaptured the excitement of AAPG's first conference there in 1998 by offering a compelling blend of top-notch technical presentations, expert industry analyses, cutting-edge technology and the always-colorful Brazilian culture.

"Rio 2009 was a tremendous success," said conference vice chair Marcio Mello. "We have been receiving a huge amount of comments, from all around the planet, about how Rio made the difference."

Figures (still unofficial at press time) showed about 2,080 people from more than 50 countries attended, making it the third largest ICE of all time (behind Perth's 2,626 and the first Rio meeting, 2,214).

But more than the numbers, Rio will be remembered for "the fantastic and robust technical sessions," Mello said. "The number of papers about the pre-salt and South Atlantic petroleum geology was unique."

"The community is saying that it was the best ever."

Sessions dealing with pre-salt and South Atlantic margin topics were indeed filled to capacity – a special panel session on "Giant Fields of the Decade" also drew a lot of attention – but the largest gathering was for a plenary session on "Opportunities in a High-Stakes Environment," which drew a standing-room only crowd to a large banquet hall.

The session boasted several big industry names, all offering their insights and perspectives of the current and future state of affairs for the profession. That panel included:



▶ **Jose Sergio Gabrielli de Azevedo**, chairman, Petrobras (who also drew a large gathering for a post-panel press conference).

▶ **Mark Albers**, senior vice president ExxonMobil Corporation.

▶ **Amin Nasser**, senior vice president E&P, Saudi Aramco.

▶ **Yves-Louis Darricarrere**, president E&P, Total.

▶ **Andrew Gould**, chairman, Schlumberger.

"Never before at an international AAPG meeting had so many CEOs and managers appeared together," Mello said. "This was unique."

AAPG's next ICE will be held Sept. 12-15 at the TELUS Convention Center in Calgary, Canada.



## Call for Papers Issued for ICE 2010; Deadline Feb. 4

The call for papers has been issued for this year's AAPG International Conference and Exhibition, set Sept. 12-15 in Calgary, Canada.

The meeting theme is "Frontiers of Unconventional Thinking: Saddle Up for the Ride."

Proposed meeting themes include:

- ▶ Sedimentology – Depositional Models for High Latitude Systems.
- ▶ Circum-Arctic Tectonics and Basin Formation – Arctic Basin Tectonics, Deepwater and Ultra-deepwater Arctic Basins, UNLOS Surveys.
- ▶ Mixed Carbonate/Evaporite Successions – Depositional Models and

Reservoirs.

- ▶ Petroleum Systems – Source Rock, Migration, Trap, Seals.
- ▶ Geophysics – Advances in Harsh Environment Acquisition and Processing, Advancements on Seismic Acquisition on Ice, Under Basalts.
- ▶ Rift to Drift, Passive Margin, Transition Tectonics – Source Rocks, Reservoirs, Migration from Rift to Drift.
- ▶ Exotic Reservoirs of the World – What Produces Where in the World? Chalks, Cherts, Phosphates, Granites, Hydrates.
- ▶ Reservoir Management: From Discovery to Abandonment –

- Geological and Reservoir Modeling, Second, Tertiary Recovery, Multidisciplinary Teams of Professionals.
- ▶ Risk Analysis and Assessment – Oil Sands, Shales and Tight Sands.
- ▶ Environmental – Environmental Concerns of Unconventional Development.
- ▶ North American Unconventional Oil – Oil Sands, Tight Oil Sands and Carbonates, Oil Shale, Heavy Oil.
- ▶ North American Unconventional Gas – Coal Bed Methane, Tight Gas Sands and Carbonates, Shale Gas.
- ▶ International Unconventional Oil – Oil Shales, Tight Oil Reservoirs.

▶ International Unconventional Gas – Coal Bed Methane, Shale Gas.

▶ Geoscience Investigations and Petroleum Search Beyond Traditional Exploration Confines.

▶ Unconventional Resources – Oil Shales, Gas Shales, Tight Sand Reservoirs, Oil Sands and Heavy Oil.

▶ Frontier Reservoirs – Arctic and Deepwater Discoveries, High Porosity and Permeability in Giant Fields.

A copy of the call for abstracts is available and abstracts can be submitted online at [www.aapg.org/calgary](http://www.aapg.org/calgary).

The deadline for submitting abstracts is Feb. 4.

AAPG WOULD LIKE TO THANK THE FOLLOWING COMPANIES FOR THEIR GENEROUS SUPPORT OF THE 2009 INTERNATIONAL CONFERENCE & EXHIBITION IN RIO.

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## PROFESSIONAL news briefs

**Matt Gentry**, to director and chief operating officer, Antares Energy, Houston. Previously chief geologist, Antares Energy, Houston.

**Dave J. Katz**, to exploration team lead-regional geology, Nexen Petroleum, Plano, Texas. Previously senior geologist, Nexen Petroleum, Plano, Texas.

**George D. Klein** has published a new book about his experiences as a geologist, titled "Rocknocker: A Geologist's Memoir." Klein is with SED-STRAT Geoscience Consultants in Sugar Land, Texas.

**Jay Leaver** has been named president of Sun River Energy, Wheat Ridge, Colo. Leaver is with Thomasson Partners Associates in Denver.

**Joseph P. Lemon**, to senior geoscientist/manager of geosciences, Phillips Production Co., Warrendale, Pa. Previously senior geophysicist, Chesapeake Energy, Charleston, W.Va.

**J. Mark Lester** will retire as executive vice president of exploration for Chesapeake Energy at the end of January 2010. Lester will serve as a consultant to Chesapeake through June 30, 2010, and help transition his responsibilities to **Steven C. Dixon**, also an AAPG member.

**Glen Mah**, to geologist, Niko Resources, Calgary, Canada. Previously chief geologist, Tanganyika Oil, Calgary, Canada.

**Paul A. Martinez**, to director-international business development,

Occidental Petroleum, Los Angeles. Previously director of geosciences, Occidental Libya Oil and Gas, Tripoli, Libya.

**Jay Moore**, to owner/senior geologist, Alluwee Energy, Arlington, Texas. Previously regional geologist, XTO Energy, Fort Worth, Texas.

**Nahum Schneidermann** is retiring from Chevron International E&P, San Ramon, Calif., after nearly 36 years with the company. He plans to continue consulting and teaching.

**John B. Wagner** has won the A.I. Levorsen Award for the best paper at the GCAGS annual meeting. Wagner is with Nexen Petroleum USA, Plano, Texas.

## SPOTLIGHT on...

By **BARRY FRIEDMAN**  
*EXPLORER Correspondent*

An award from the Osage Nation recognizes Tulsa-based Spyglass Energy Group for "its dedication and responsible service in successfully operating on the Osage Nation Mineral Reserve."



**Wickstrom**

To AAPG member **Charles Wickstrom**, the managing member of Spyglass, it's as it should be.

"We received this award," he said, "because, in fact, we are not only good stewards of the subsurface mineral estate, but also

because our company and our operator (Nadel & Gussman) demonstrate a real concern for the surface environment and for the people of the Osage Tribe."

Spyglass has spent much of its corporate creative energy on the Osage Tribe in Oklahoma. Spyglass' main area of concern is Osage County in northeast Oklahoma. Its members, according to Wickstrom, have more than 130 years of experience working in the oil and gas fields of the county.

"There are many geological and economic reasons to focus on the Osage," Wickstrom said. "First, the Tribe is very pro-business. They have long realized the bounty that oil and gas has provided for their people."

The tribe originally was forced to leave their ancestral home near St. Louis and then again forced to relocate into the Oklahoma Territory – on land they had to purchase from the Cherokees.

"One of the members of the Tribe had a vision that this land would provide for the tribe, though he did not know how or what," he said.

"Second, this is shallow, sweet-oil country with long-lived reserves. Third, it is a beautiful area in which to work.

"There aren't many better places to be than on a rig watching the sun rise over the Tall Grass Prairie."

It was for all of those reasons the Osage honored Spyglass – including Spyglass' support on the Tribe's annual Energy Summit as well as donating material to the Osage Museum in order, Wickstrom says, "to share our positive experience of working with the Osage Tribe."

As a sovereign nation, the Osage is able to grant concessions on their mineral estates. For Spyglass – and before that, when Wickstrom was with Ceja Corporation – was able to put together exploration concessions on over 250 square miles in the Osage, resulting in the acquisition of 200 square miles of 3-D seismic data and the drilling of dozens of wells.

Best of all for Wickstrom, those concession areas are still being developed and will continue to be developed over the next 20 years.

It's obvious for Wickstrom that while the award is meaningful, it's not the hardware, the plaque, that matters.

"My relationship with the Osage Tribe covers decades and lifetimes," he said. "Members of the Tribal Council and fellow geologists have worked, lived and now passed on. Many have come and gone and a few of us remain and we continue to bring up the next generation who will work together and prosper from what the land of the Osage continues to provide." ■

# Utah Hingeline - Data Available

## Unlocking its potential means overcoming its challenges

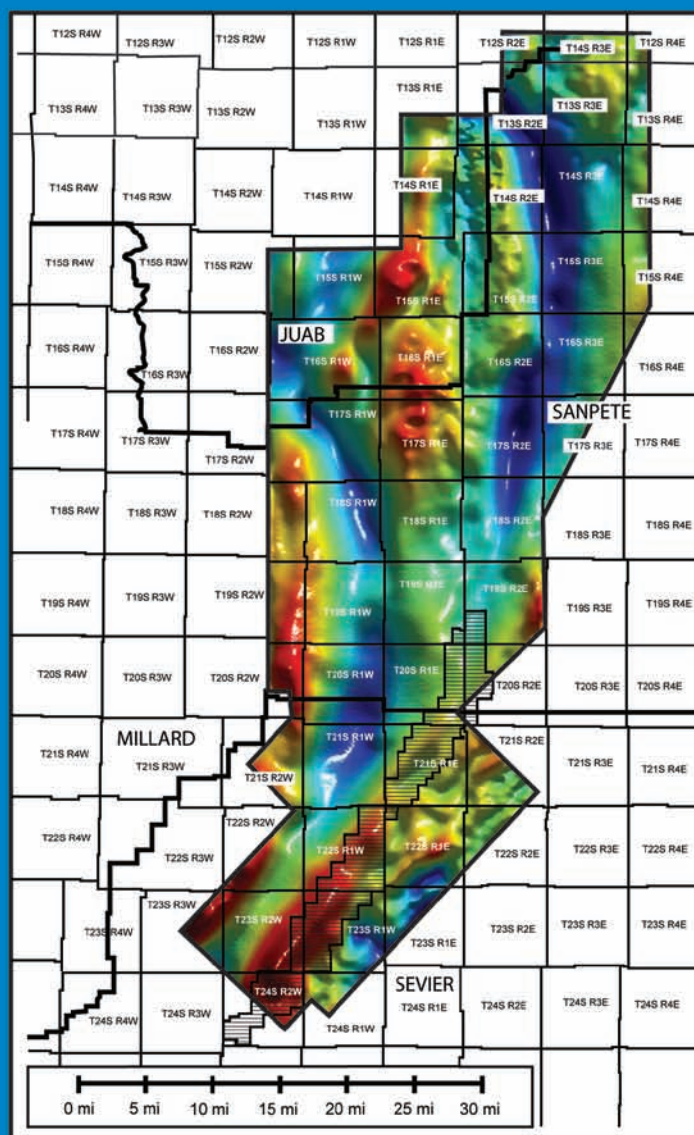
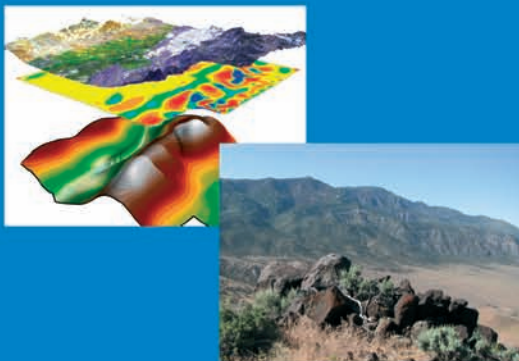
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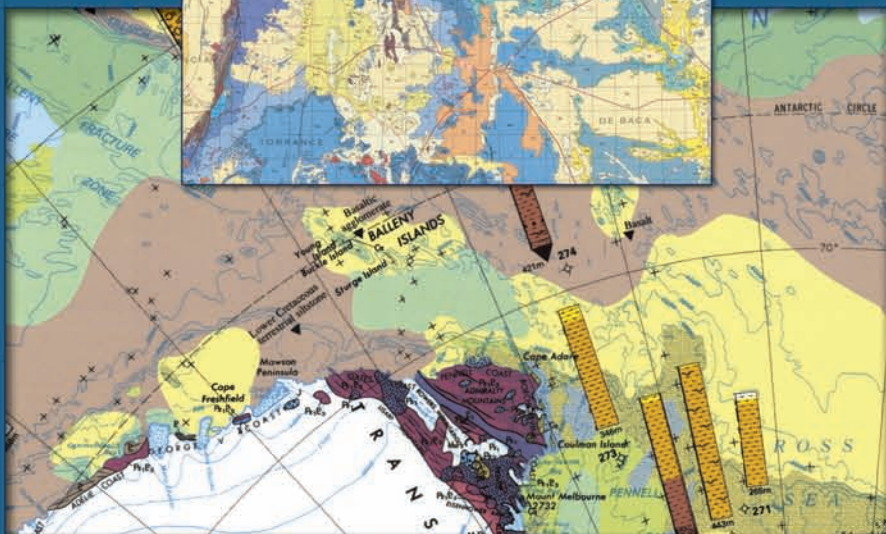
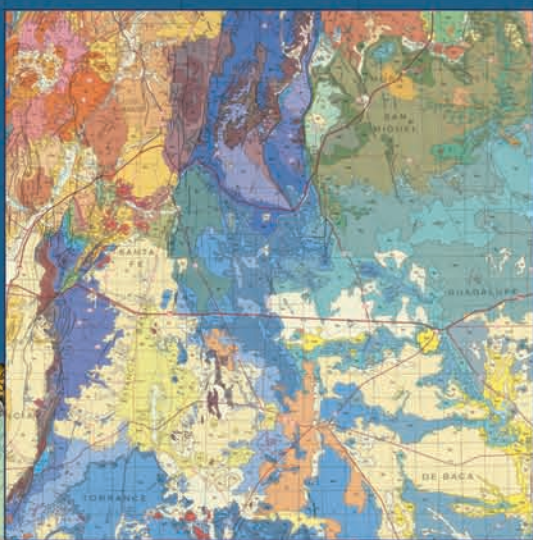
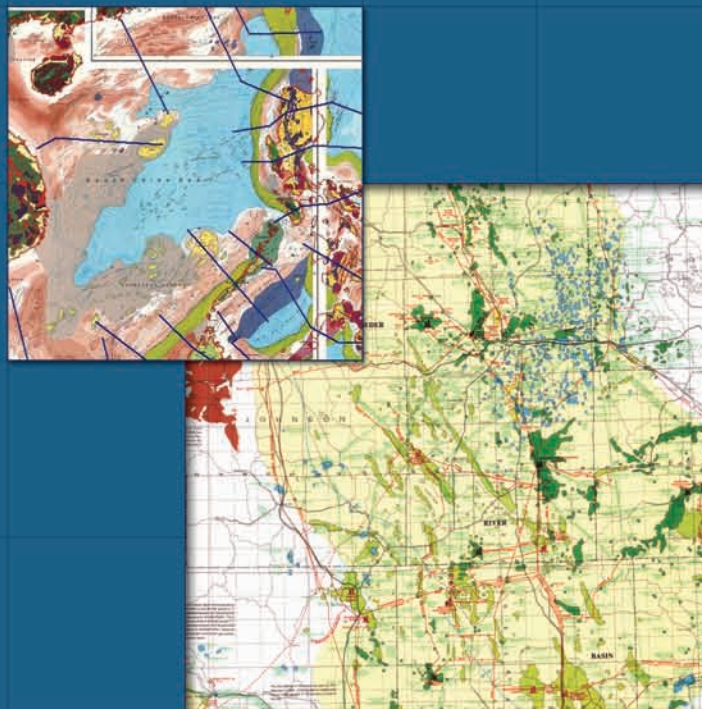
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## WASHINGTONwatch

## Authorizing and Appropriating

By DAVID CURTISS  
GEO-DC Director

Congress passes many laws – that is its principal function as outlined in Article I of the U.S. Constitution. It also controls the nation's purse strings, deciding how tax revenue collected from the people will be spent for the people.

That is a basic civics lesson taught in schools across the country.

But what isn't taught is how these two responsibilities intersect – or frequently do not.

There is an important distinction between "authorizing" legislation to create new programs and laws, and "appropriating" legislation to fund these programs and government operations.

Federal efforts to preserve geological and geophysical data illustrate the interplay between authorizations and appropriations. It also is an issue of concern to the Association as expressed in an AAPG statement, and one that we are working on.

\* \* \*

The Energy Policy Act of 2005 authorized the National Geological and Geophysical Data Preservation Program Act of 2005. Under the act Congress instructed the secretary of the Interior Department to conduct a program:

- ▶ To archive geologic, geophysical and engineering data, maps, well logs and samples.
- ▶ To provide a national catalog of such archival material.



Curtiss

- ▶ To provide technical and financial assistance related to the archival material.

In order to carry out the program as envisaged, Congress further authorized the expenditure of \$30 million annually from FY2006 to FY2010.

The U.S. Geological Survey (USGS), an agency within the Department of the Interior, was given responsibility for developing and conducting this program and immediately set to work. The program is currently active and disbursing funds to state geological surveys to develop the national catalog. But since inception, and notwithstanding the \$30 million annual authorization, the program has only had \$750,000 to \$1 million dedicated each year to achieve its objectives. Why?

The Department of the Interior and its agencies, such as the USGS, are funded each year through the appropriations process. The House and Senate appropriations committees review the president's budget, submitted to Congress in February, and evaluate the

**Federal efforts to preserve geological and geophysical data illustrate the interplay between authorizations and appropriations.**

programmatic activities of each department and agency.

If you were to sum the total cost of each authorized program in every federal department or agency in most cases you would significantly exceed that organization's annual federal appropriations. If Congress does not specify in the appropriations bill how much a particular program should receive – and it typically does not – it falls to the department and agency heads to develop a spending plan with the available resources. There are never sufficient appropriations to fund all of the authorized programs.

\* \* \*

Having said that, several geoscience programs important to AAPG members received funding increases for FY2010.

The USGS received a 6.5 percent overall budgetary increase to \$1.1 billion. The following programs expect budget increases:

- ▶ National Cooperative Geologic

Mapping, up nearly 2 percent to \$28.2 million.

- ▶ Mineral Resources Assessment, up nearly 3 percent to \$53.8 million.
- ▶ Energy Resources Assessment, up nearly 6 percent to \$28.2 million.
- ▶ Data preservation holding steady at \$1 million.

At the U.S. Department of Energy the fossil energy program saw an overall 40 percent decline in funding. This decline was partially due to funding for clean coal technologies that had been included in the FY2009 budget, but then received significant increases in the American Recovery and Reinvestment Act of 2009 (i.e., the "stimulus"), which is an 18-month bill, and obviated the need for additional funds in FY2010. In the FY2010 appropriations cycle:

- ▶ Natural gas technologies saw an 11 percent decrease to \$17.8 million.
- ▶ Unconventional fossil energy technologies, funded at \$20 million, replace the petroleum-oil technologies program, funded last year at \$5 million.
- ▶ Carbon sequestration receives a nearly 3 percent increase to \$154 million.

While the natural gas program funding decreases this year, the scope of the program expanded. Last year the natural gas program was dedicated to methane hydrates. This year Congress indicated that the program should "fund research into production of methane hydrates, remediation treatment technologies and

See [Washington](#), page 37

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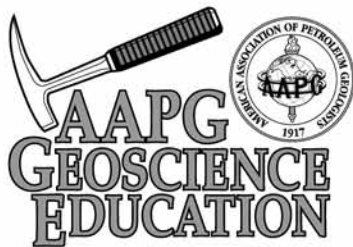
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# Vertical Wave Testing: Part 2

(The Geophysical Corner is a regular column in the EXPLORER, edited by Bob A. Hardage, senior research scientist at the Bureau of Economic Geology, the University of Texas at Austin. This month's column is the second of a two-part series that started in December, dealing with seismic wave tests – vertical wave testing.)

By **BOB HARDAGE**

Vertical wave testing is done by deploying seismic receivers downhole and recording the downgoing wavelet generated by each energy source being considered for surface seismic data acquisition across the area local to the receiver well.



Hardage

The objectives of a vertical wave test are to determine the frequency bandwidth of the downgoing wavelet that illuminates subsurface geology, and to observe how the energy and frequency content of that wavelet diminishes as the wavelet propagates through stratigraphic intervals that need to be imaged with surface-based seismic data.

Vertical wave testing is a rigorous technique that allows geophysicists to decide which seismic source is optimal for imaging specific sub-surface geology.

One limitation is that the data provide information that helps only in selecting the seismic source that will be used across a prospect. The technique does not provide information that helps in designing surface-based receiver arrays. Horizontal wave testing, described in last month's Geophysical Corner, has to be done to determine appropriate surface-receiver array dimensions.

\* \* \*

The source-receiver geometry used for vertical wave testing is identical to that used for vertical seismic profiling. A downhole receiver is positioned at selected depths by wireline, and the surface sources that are to be tested are stationed at selected distances from the wellhead (figure 1).

The downgoing wavelet generated by each source option proposed for use across a prospect should be recorded at depth intervals of 600 to 1,200 feet (200 to 400 meters), starting close to the Earth's surface and extending to the deepest interval of interest.

A vertical wave test can compare different sources, such as explosives, weight droppers and vibrators, or it can evaluate the relative merits of only one type of source, say a vibrator, when that source is operated under different conditions. In either type of wave test, the objective is to determine what source, operated in what manner, will generate a downgoing illumination wavelet that detects geology with a targeted thickness at a specified depth.

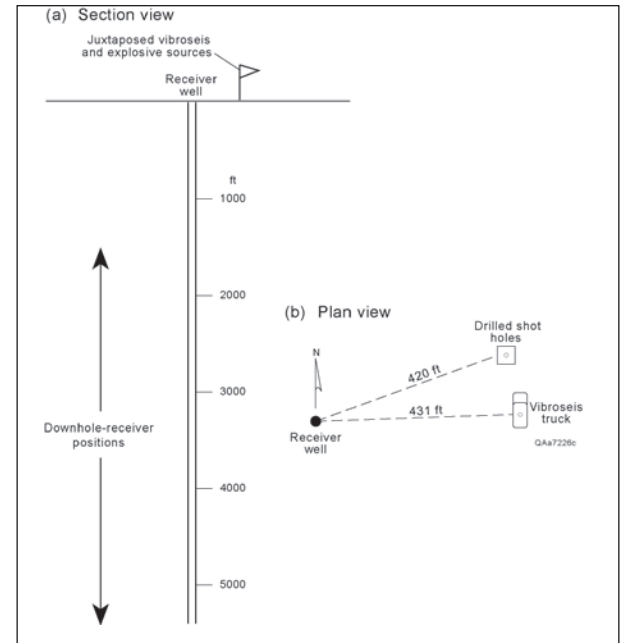
An example of wave-test data comparing vibrator-source wavelets against explosive-source wavelets is illustrated as figure 2.

In this source test, wavelets generated by a 40,000-pound vibrator

are compared against wavelets produced by small 10-ounce (280-gram) directional charges buried at a depth of 10 feet (3 meters). At this prospect, both source options create high-frequency wavelets, and either source would provide the desired illumination of the targeted geology.

The small directional-charge source option was selected for acquiring 3-D seismic data across this prospect because a significant part of the survey area was covered by dense timber that made vibrator operations difficult and expensive (due to timber clearing). However, small drill rigs could wend through the trees and drill shallow holes for deploying explosives without the necessity of clearing any timber for vehicle movement, resulting in more affordable data acquisition.

Figure 1 – Source-receiver geometry used in a vertical wave test. In this example, the objective is to compare the merits of vibrator and explosive sources. (a) Section view of geometry; (b) map view of geometry.



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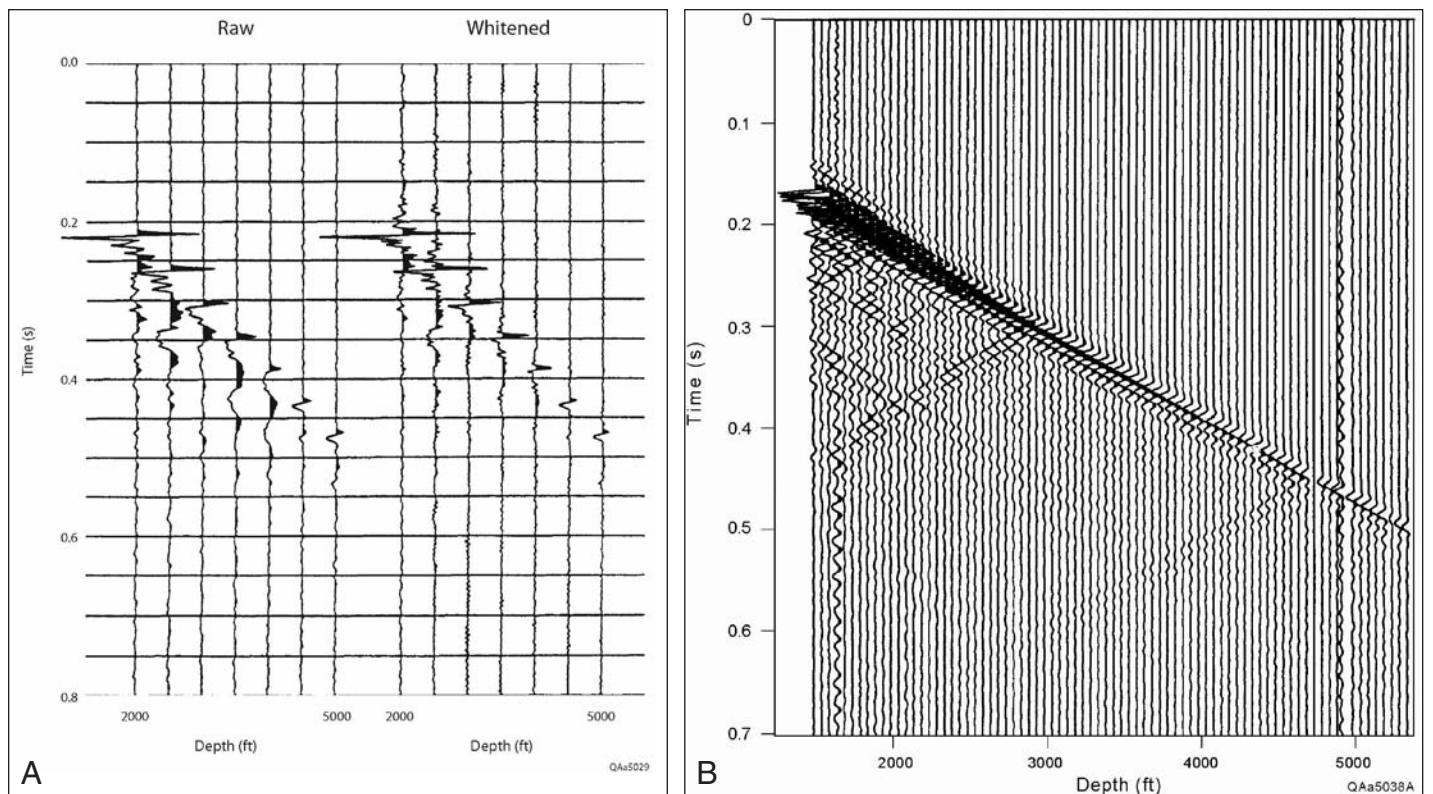


Figure 2 – Vertical wave test data acquired with the geometry exhibited on figure 1. (a) Downhole wavelets generated by small 10-ounce (280 grams) directional charges detonated in shallow 10-foot (three-meter) shot holes and recorded at depth intervals of 500 feet (150 meters). (b) Downgoing wavelets produced by a 40,000-pound vibrator and recorded at depth intervals of 50 feet (15 meters).

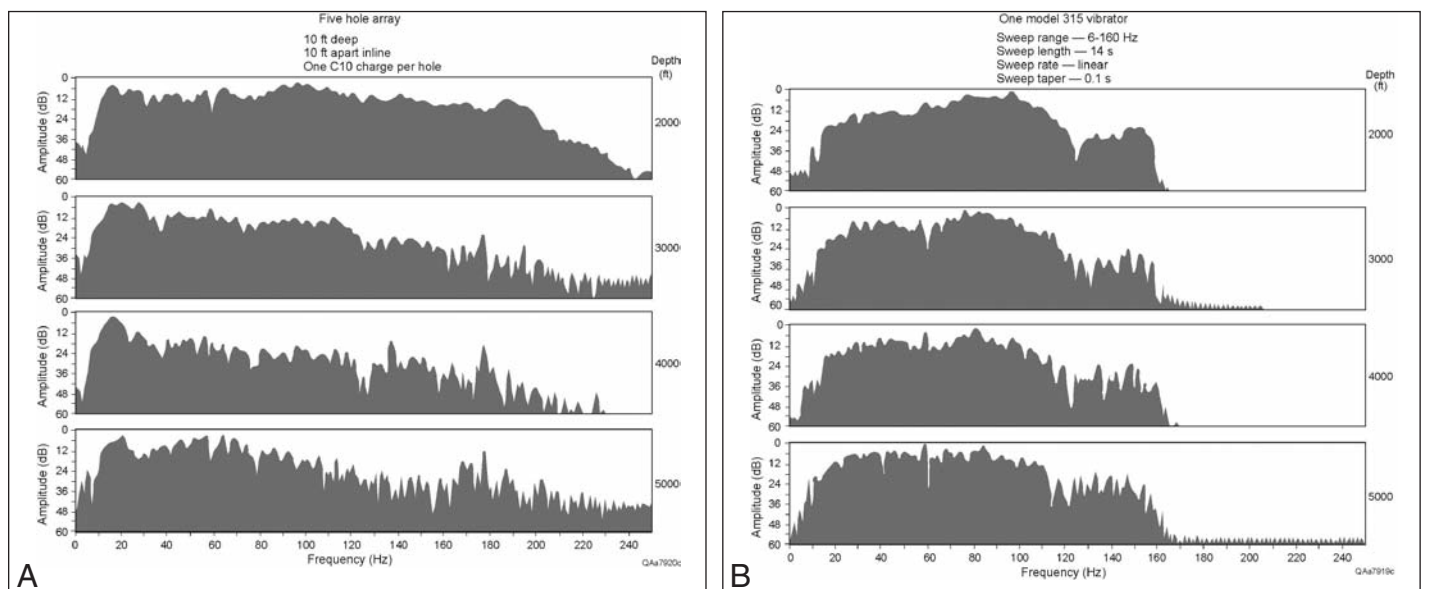
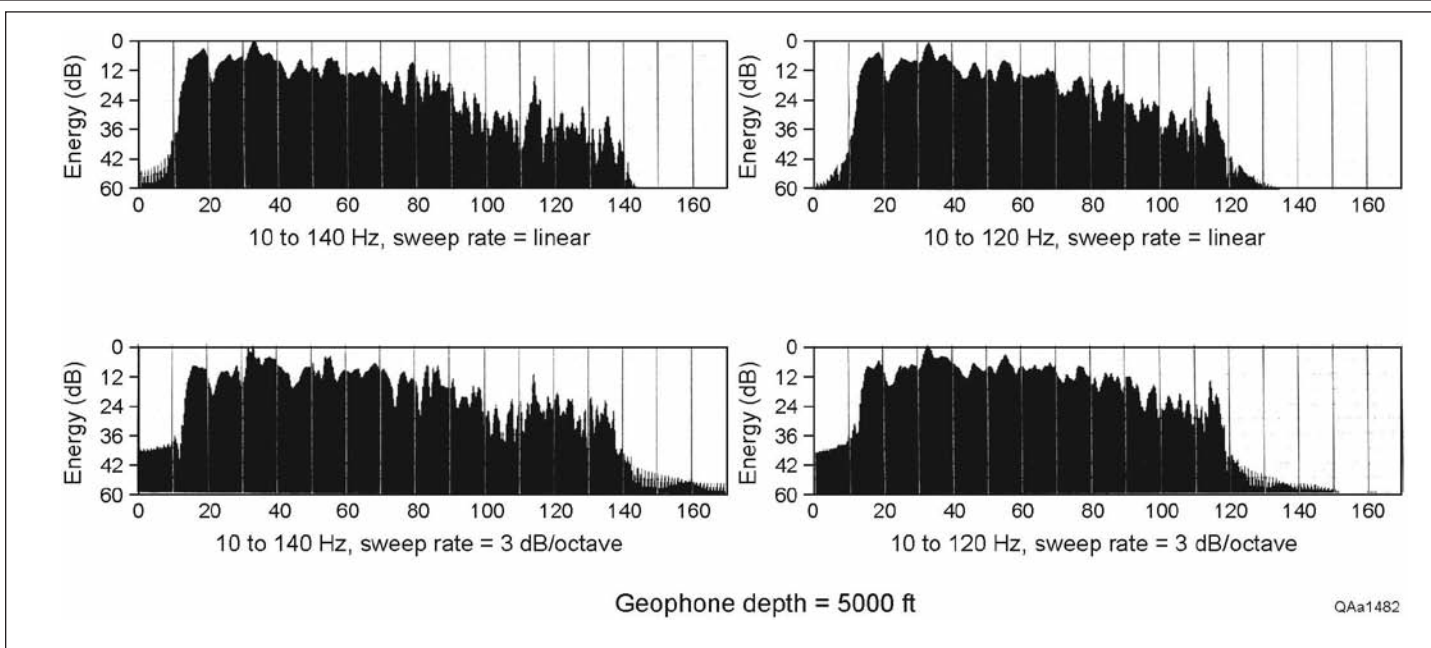


Figure 3 – (a) Frequency spectra of explosive-source wavelets selected from the data exhibited as figure 2a. (b) Frequency spectra of vibrator-source wavelets selected from the wave test data of figure 2b.



Figure 4 – Vertical wave test spectra comparing the merits of vibrator wavelets generated with different sweep parameters. The wavelets that were analyzed were recorded at a depth of 5,000 feet (1,500 meters), immediately above a targeted reservoir interval. The comment sweep rate = 3 dB/octave means that when the vibrator sweep advanced into a new octave of frequencies, the vibrator dwelled two times longer on each frequency component than it did in the preceding octave band. The intent of this test was to determine if this vibrator operation caused more high-frequency energy to remain in the wavelet when it reached target depth. In this instance, the optimal sweep parameters were judged to be a sweep of 10 to 120 Hz at a sweep rate of 3 dB/octave (lower right spectrum).



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\* \* \*

The frequency content of the explosive-source and vibrator-source test data is exhibited as figure 3. The frequency spectrum of the explosive-source wavelet measured at a depth of 2,000 feet (600 meters) extends to 200 Hz – and at a depth of 5,000 feet (1,500 meters) there is still appreciable energy at frequencies as high as 180 Hz (figure 3a).

The vibrator sweep of 6 to 160 Hz results in a frequency spectrum that exhibits an abrupt onset of energy near 8 Hz and an abrupt energy decrease at 160 Hz at all receiver depths (figure 3b).

These data supported the decision to use small directional explosives as the seismic source at this prospect. To increase the signal-to-noise ratio of the surface-recorded data, three shot holes, each having a 10-ounce (280-gram) directional charge, were shot simultaneously to increase the amplitude of the downgoing wavelet.

\* \* \*

Results from a second vertical wave test at a different prospect are illustrated on figure 4. At this prospect there were numerous buried data communication cables (some of them connected to intercontinental missile silos!).

Because of these buried cables, the option of drilling shot holes for explosive charges could not be allowed; the source had to be vibrators. Consequently, the objective of this wave test was to determine what vibrator sweep parameters would create a robust wavelet at a depth of 5,000 feet (1,500 meters) that had frequencies up to – and we hope above – 100 Hz.

As illustrated by the frequency spectra of the recorded vibrator wavelets, a non-linear sweep rate of 3 dB/octave produced a greater amount of energy above 100 Hz than did a linear sweep rate. With these test data, a decision to operate vibrators using a 10 – 120 Hz, 3 dB/octave sweep was made with confidence.

Good quality data were acquired; no buried communication cables were damaged as the production data were recorded; no missiles were launched.

\* \* \*

The message: Always execute a vertical wave test if there is any desire to compare the relative merits of seismic sources – and if a well is available for depth deployment of receivers.

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## UPCOMING REGIONAL WORKSHOPS

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1/20-21 **Rocky Mountain:** Applied Hydrodynamics in Petroleum Exploration & Production - Golden, CO.

1/TBD **Texas/SE New Mexico:** What's Your Bottom Line: Assessing Operating Costs (Midland College PPDC) - Midland, TX.

### February 2010

2/1 **Rocky Mountain:** Petra Basics - Golden, CO.

2/11 **Rocky Mountain:** Economics of Oil and Gas - Golden, CO.

For further information, view PTTC's online calendar at [www.pttc.org/national\\_calendar.htm](http://www.pttc.org/national_calendar.htm)

### Geosciences Technology Workshop: Deepwater and Ultra Deepwater Reservoirs in the Gulf of Mexico

March 16-17, 2010  
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A Cooperative Endeavor of AAPG, Houston Geological Society and PTTC, the event focuses on integrating geological, geophysical, and engineering information and will consist of presentations, dynamic discussions, exciting cross-disciplinary perspectives on deepwater and ultra deepwater reservoirs in the Gulf of Mexico reservoirs. For more information, go to [www.aapg.org/gtw](http://www.aapg.org/gtw).

## FOUNDATIONupdate

### Foundation to Honor Funkhouser, Holland

Two longtime stalwarts of the AAPG Foundation have been named recipients of the Foundation's top awards for 2010. The awards, announced by the

Exhibition, set April 11-14 in New Orleans.

In other Foundation news:

▶ The Foundation's financial campaign, "Meeting Challenges ... Assuring Success," received new donations recently and has reached the \$26 million mark.

▶ The Foundation Board of Trustees recently approved financial support for:  
♦ \$50,000 in support of the "K-12 Bookout Initiative" at Ellison Miles Geotechnology Institute.  
♦ \$25,000 in support of the University of Colorado's Interactive Geology Project.

▶ A new member has been added to the AAPG Foundation Trustee Associates:  
♦ **James M. Funk**, of Sewickley, Pa. The Trustee Associates will meet next on April 13, during the Chairmen's Reception at the AAPG annual convention in New Orleans.

The group's annual meeting will be Oct. 24-28, at the Ritz Carlton in Greensboro, Ga.

Additional meeting details will be mailed to members in early spring.

\* \* \*

All AAPG members can support the programs funded through the Foundation with their financial support. For more information contact Rebecca Griffin, Foundation manager, at (918) 560-2644, or [rgriffin@aapg.org](mailto:rgriffin@aapg.org).



Funkhouser



Holland

Foundation's Board of Trustees go to **Larry Funkhouser**, this year's winner of the L. Austin Weeks Memorial Medal, and to **David "Scotty" Holland**, the winner of the Chairman's Award.

The Weeks Medal, the Foundation's highest award, is given in recognition for extraordinary philanthropy and service directed to advance the mission of the AAPG Foundation. The award honors the late L. Austin Weeks, whose philanthropic legacy set an exemplary standard.

Previous Weeks award winners were Marta Weeks (2008) and T. Boone Pickens (2009).

The Chairman's Award recognizes those who have made extraordinary contributions (monetary or service) to the AAPG Foundation, and also calls attention to the role and value of the Foundation. Holland is the award's 11th recipient.

The awards will be presented during the next AAPG Annual Convention and

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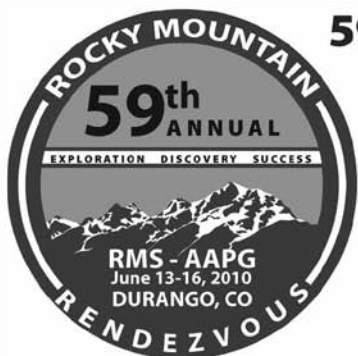
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- Upper Cretaceous Reservoirs of the San Juan Basin
- From the San Juan Basin to the San Juan Mountains:
  - Pt. I: Paleozoics of the Animas Valley North
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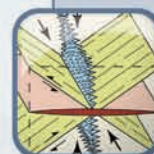
Stacy C. Atchley, Nathaniel H. Ball, and Luke E. Hunt E&P Note



This study examines the prediction of depositional facies and diagenetic products in wells that lack core control, their effects on reservoir quality, and the spatial distribution of depositional facies within a time-stratigraphic framework in the Valhalla field of Alberta.

### Fractures cause heterogeneous performance

Mohammed S. Ameen, Ismail M. Buhidma, and Zillur Rahim



The Khuff reservoir of Saudi Arabia is characterized by two distinctive domains of fractures: an older phase related to extensional plate tectonics and a younger phase related to compressional plate tectonics. These observations can be applied to other fracture-dominated carbonate reservoirs.

### Modern carbonate reservoir analogs

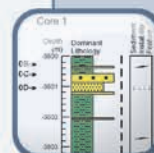
Paul M. (Mitch) Harris



Modern analogs like the Exuma Islands, Great Bahama Bank, can play an important role in the development of conceptual facies models for characterization of a reservoir. These carbonate sands highlight visualization and quantification techniques that conceptually delineate reservoir distribution and heterogeneity.

### Sand transfer and hydrocarbon potential

David J.W. Piper, Ryan Nofall, and Georgia Pe-Piper



This study examines the depositional environment of shelf-margin deltaic sediments in cores and contributes to the understanding of sand transfer from the Scotian basin to the deep-water Scotian margin. These cores provide direct evidence that sand was transferred through channels into deep water in the Early Cretaceous.

## MEMBERSHIP &amp; certification

The following candidates have submitted applications for membership in the Association and, below, certification by the Division of Professional Affairs. This does not constitute election nor certification, but places the names before the membership at large.

Any information bearing on the qualifications of these candidates should be sent promptly to the Executive Committee, P.O. Box 979, Tulsa, Okla. 74101.

Information included here comes from the AAPG membership department.

(Names of sponsors are placed in parentheses. Reinstatements indicated do not require sponsors.)

Membership applications are available at [www.aapg.org](http://www.aapg.org), or by contacting headquarters in Tulsa.

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Greenhalgh, Brent William, Questar, Salt Lake City (S.L. Russell, F.M. Terrell, K.D. Reisser)

## England

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## France

Safa, Philippe Henri, Total, Paris La Defense (F.E. Walles, S.M. Warshauer, J. Biteau)

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Saha, Sourav, BG Exploration and Production India, Mumbai (M. Khanna, V.K. Jain, S.D. Burley)

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Van Graas, Ger W., Statoil ASA, Oslo (T. Nedkvitne, C.H. Zwach, M.A. Abrams)

## Romania

Bega, Zamir, Petrom S.A., Ploiesti (R. Barbullushi, G. Tari, M. Nemcok)

## Saudi Arabia

Al-Beajji, Anwar M., Saudi Arabian Oil Co., Dhahran (A.M. Afifi, G.A. Grover, A.A. Murad)

## Scotland

Campbell, A. Ewan, Senergy, Banchory (P.L. Hackney, W. Kouwe, P. Schwans); Lagrilliere, Nick, Maersk Oil, Aberdeen (I. Berczi, V. Dvorakova, D.R. Cook); Percival, Colin John,

[continued on next page](#)

## Certification

The following are candidates for certification by the Division of Professional Affairs.

## Petroleum Geologist

## Ohio

Martin R. Shumway, MacKenzie Land and Exploration, Worthington (reinstatement)

## Oklahoma

Mary E. Hileman, Boone Pickens School of Geology, Oklahoma State University Stillwater (reinstatement)

## Texas

Gilbert O. Wopara, ENI Petroleum, Richmond (M. Petersen, E. Watkins, J. Doyle); David Scull, Strandline Consulting, Dallas (reinstatement)

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For eight years the AAPG Prospect and Property Expo (APPEX) has brought together principals, senior managers, business developers and new venture managers for an unmatched opportunity to network and do business with country and NOC representatives, suppliers and government representatives from around the world. This year's 2½-day program will offer sessions on Europe and the Former Soviet Union, the Caribbean and South America, Africa and Far East, as well as the future of stratigraphic plays and global frontier plays. The program is rounded out by four Prospect Forums, an International Pavilion Forum and two short courses.

How you'll benefit by attending APPEX 2010:

- One-stop shopping for upstream opportunities
- Meet, discuss and negotiate deals with global decision makers from the majors to independents of all sizes, consultants, governments and national oil companies
  - Information and education to advance your career
- An exhibition featuring prospect and supplier booths from around the globe



[www.APPEXLondon.com](http://www.APPEXLondon.com)

## Inmemory

Edward G. Purdy, an internationally renowned carbonate and petroleum geologist and an AAPG award winner, died Oct. 13 in Weybridge, England, after a short illness.

Purdy received a Special Commendation Award in 1998 and the Distinguished Service Award in 2006.

**Andrew David Berry, 85**  
Calgary, Canada, Sept. 11, 2009

**Robert William Blair, 92**  
Durango, Colo., Oct. 27, 2009

**Tun Yin Chang, 89**  
Sherman Oaks, Calif.  
Aug. 27, 2009

**Lloyd C. Fons (AS '02)**  
Houston

**Elizabeth Lee Gealy, 86**  
La Jolla, Calif., Sept. 25, 2009

**William E. Hanson (EM '45)**  
Shelton, Wash.

**Wilson Grover Harris Jr., 87**  
Mount Vernon, Ill., Sept. 11, 2009

**Edward G. Purdy, 77**  
Weybridge, England, Oct. 13, 2009

**Norman D. Raman, 91**  
Burton, Texas, August 2009

**John Patrick Shields, 81**  
Fort Smith, Ark., Oct. 25, 2009

**Richard James Wallace (EM '57)**  
Midland, Texas, Aug. 20, 2009

**James Anthony Wolleben (AC '73)**  
Austin, Texas

*(Editor's note: "In Memory" listings are based on information received from the AAPG membership department. Age at time of death, when known, is listed. When the member's date of either birth or death is unavailable their membership classification and anniversary date are listed.)*

### continued from previous page

Dana Petroleum, Aberdeen (S.L. Veal, J.J. Zimmerman, A. Hurst)

**Taiwan**  
Yang, Chih-Cheng, CPC Corp., Taiwan, Miaoli (W. Chen, T. Lee, K. Wu)

**Trinidad & Tobago**  
Nelson-Thomas, Tricia B., Petroleum Company of Trinidad & Tobago, Penal (C.L. Archie, C.K. Ramroop, S.C. Chatelal)

**Ukraine**  
Koltun, Yuriy, Institute of Geology and Geochemistry of Combustible Minerals-Ukrainian Academy of Sciences, Lviv (A.A. Kitchka, J. Golonka, T.M. Peryt)

**United Arab Emirates**  
D'Cruz, Melroy Anthony, Dubai Petroleum, Dubai (F. Chemin, F. Esmaeili, E. Akien)

## European Region Plans Black Sea, Caspian Conference

AAPG's European Region and the Ukrainian Association of Geologists will sponsor the "Exploration in the Black Sea and Caspian Regions Conference and Exhibition," set Oct. 17-19 at the Ukrainian House Conference Center in Kiev, Ukraine.

The event is intended to provide a setting for the dissemination of scientific and technical knowledge, with global specialists presenting information regarding relevant achievements, products and services.

For further details contact the AAPG European Region at [europe@aapg.org](mailto:europe@aapg.org).

## Washington from page 30

unconventional natural gas production from basins that contain tight gas sands, shale gas and coal bed methane resources."

The **petroleum-oil technologies program**, which in FY2009 only received \$5 million, was redirected by Senate appropriators to focus on unconventional fossil energy technologies and given \$20 million. The purpose of this program is to "establish a comprehensive research, development and deployment strategy for the development of unconventional oil, gas and coal resources."

In addition to the \$38 million appropriated by Congress in FY2010 for the natural gas and unconventional fossil energy programs noted above, there is an additional \$50 million allocated directly from the Treasury to fund the **ultra-deepwater and unconventional research programs** created by Section 999 of the Energy Policy Act of 2005. These two programs are administered on behalf of the U.S. National Energy Technology Laboratory by the Research Partnership to Secure Energy for America, known as RPSEA.

Finally, on the renewable energy side of the equation, the DOE **geothermal technologies program** will receive \$44 million in FY2010, the same as in FY2009. This is in addition to the \$400 million of geothermal program funding that was included in the FY2009 stimulus package.

\* \* \*

Legislators return to Washington, D.C., this month to convene the second session of the 111th Congress. In February President Obama will deliver his budget request to Congress, setting in motion the appropriations cycle for FY2011.

As always, AAPG will push for significant, focused investment in the petroleum and related geosciences to advance the science and promote technology development. ■

*(Editor's note: David Curtiss, head of AAPG's Geoscience and Energy Office in Washington, D.C., can be contacted at [dcurtiss@aapg.org](mailto:dcurtiss@aapg.org); or by telephone at 1-202-684-8225.)*

American Association of Petroleum Geologists 2010 International Conference & Exhibition  
12-15 September • Calgary TELUS Convention Center (CTCC) • Calgary • [www.AAPG.org/Calgary](http://www.AAPG.org/Calgary)

# Call For Abstracts

Frontiers of Unconventional Thinking: Saddle Up for the Ride



Industry professionals and students are invited to submit abstracts for the AAPG 2010 International Conference & Exhibition. The technical program committee encourages abstracts that relate to any of the topics listed below. Planned sessions and formats (oral or poster) may be modified depending on actual submittals. Visit [www.AAPG.org/Calgary](http://www.AAPG.org/Calgary) for abstract submittal updates and additional information.

### Proposed themes for the AAPG 2010 ICE Technical Program include:

- Sedimentology — Depositional Models for High Latitude Systems
- Circum-Arctic Tectonics and Basin Formation — Arctic Basin Tectonics, Deepwater and Ultra-deepwater Arctic Basins, UNLOS Surveys
- Mixed Carbonate/Evaporite Successions — Depositional Models and Reservoirs
- Petroleum Systems — Source Rock, Migration, Trap, Seals
- Geophysics — Advances in Harsh Environment Acquisition and Processing, Advancements on Seismic Acquisition on Ice, Under Basalts
- Rift to Drift, Passive Margin, Transition Tectonics — Source Rocks, Reservoirs, Migration from Rift to Drift
- Exotic Reservoirs of the World — What Produces Where in the World? Chalks, Cherts, Phosphates, Granites, Hydrates
- Reservoir Management: From Discovery to Abandonment — Geological and Reservoir Modeling, Second, Tertiary Recovery, Multidisciplinary Teams of Professionals
- Risk Analysis and Assessment — Oil Sands, Shales and Tight Sands
- Environmental — Environmental Concerns of Unconventional Development
- North American Unconventional Oil — Oil Sands, Tight Oil Sands and Carbonates, Oil Shale, Heavy Oil
- North American Unconventional Gas — Coal Bed Methane, Tight Gas Sands and Carbonates, Shale Gas
- International Unconventional Oil — Oil Shales, Tight Oil Reservoirs
- International Unconventional Gas — Coal Bed Methane, Shale Gas
- Geoscience Investigations and Petroleum Search Beyond Traditional Exploration Confines — Remote Exploration, "First Ever" Basin Exploration; Ultra-deepwater Drilling and Development in Shallow Productive Basins

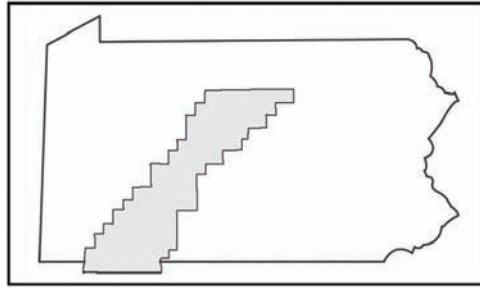
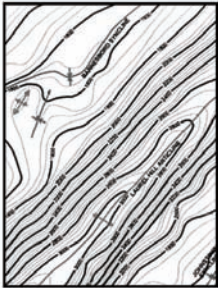
Abstracts site opens in early December 2009.  
Deadline for submitting abstracts is 4 February 2010.



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**READERS' forum****Career Center**

My name is Kody Kramer and soon I'll proudly graduate from Louisiana State University with an M.S. geology degree. This will be one of my greatest achievements, and I am very excited to finally apply my education to a career in the petroleum industry.

But for the past number of months, my fellow classmates and I have found it exceedingly difficult to find entry level positions with oil and gas companies in this economic slump, forcing many of us new, accomplished geology and geophysics graduates to take jobs in food service and retail just to make ends meet.

AAPG does an outstanding job hosting career fairs and expos, providing us with a chance to acquire those coveted positions as new

*Editor's note: Letters to the editor should include your name and address and should be mailed to Readers' Forum, c/o AAPG EXPLORER, P.O. Box 979, Tulsa, Okla. 74101, or fax (918) 560-2636; or e-mail to forum@aapg.org. Letters may be edited or held due to space restrictions.*

geoscience professionals, but there is one recruiting resource that appears to be dramatically underutilized; the Career Center of the AAPG Web site.

In my recent job search perils, I remembered, "Hey! I bet the AAPG Web site has lots of job opportunities posted!" but to my shock, there were only five jobs listed in the entire job databank, all seeking geoscientists with years of industry experience.

According to the AAPG Web site, our Association has over 30,000 members (45 percent of which hold the title of manager or above) and represents nearly 100 geoscience associations in our House of Delegates. That having been said, I would like to speak directly to the managers, recruiters and alike, and highly encourage you to recognize the usefulness of the Career Center for posting job opportunities for new graduates like myself.

It would be very rewarding for at least two reasons:

► Your companies benefit by expanding your job advertising reach to over 30,000 geoscientists, all in a single place.

► The 5,000 student members will have potentially the best resource for job recruiting and starting exciting, new careers in the oil and gas industry.

Now there's a win-win scenario.

Kody Kramer  
Baton Rouge, La.

**Salary Survey Helps**

This article (Salary Survey, June EXPLORER) was super helpful. I will be finishing my master's degree soon at Colorado State University, and I had no real idea of what kind of salary I could expect to make. A suffering economy combined with low oil and gas prices makes it difficult to predict from previous years salaries.

Using this article, I can enter my upcoming job interviews with a general idea of what kind of offers I will be receiving.

Jeffrey Dereume  
Fort Collins, Colo.

Gulf Coast Association of Geological Societies  
and the Gulf Coast Section of SEPM

**CALL FOR PAPERS**

**60<sup>th</sup> Annual Convention**  
**October 10-12, 2010**  
**San Antonio, Texas**

Hosted by the South Texas Geological Society



Welcome back to San Antonio! Our theme this year is "Weathering the Cycles" – a challenge that resource geologists certainly have faced and overcome in the past! How do we weather the economic cycles? We...

- ✓ Network with our community
- ✓ Experience the latest technology in the technical exhibition
- ✓ Take a course or a trip and grow new and diverse skills
- ✓ Listen to special presentations on strategies to endure and prosper during an economic downtime and prepare for the inevitable rebound.

By celebrating our successes, facing our challenges, and learning from the research results of our peers, we are paid back many fold by sharing ideas and experiences among our professional community. So come and share your experiences! Suggest a session topic, present an oral paper or a poster, learn about the latest ideas and technologies in our field. Come to San Antonio and enjoy the Gulf's own geoscience convention!

**PROPOSED TECHNICAL SESSIONS INCLUDE...**

- ✓ Organic 'Shales' of the Gulf Coast – Controls on Reservoir Quality and Producibility
- ✓ Gulf of Mexico Paleogene – Reservoirs, Events and Controversies
- ✓ Eastern Gulf of Mexico – Exploration Potential and Environmental Challenges
- ✓ Texas/Mexico Borderlands – Structures, Resources, and Lessons Learned
- ✓ Unconventional Resources – Exploration Decisions and Production Issues
- ✓ Integration of Seismic Geomorphology and Wellbore Data – Case Studies
- ✓ New and Evolving Technologies – Impact on Commerciality
- ✓ Horizontal Drilling and Formation Stimulation – Edwards, Wilcox, and elsewhere
- ✓ Carbon Sequestration – Risks, Opportunities, and Implications for EOR
- ✓ Alternative Energy Solutions – The Role of Geoscience
- ✓ Water for a Growing Region – Geology, Water Quality and Resource Management
- ✓ Geologic Training and Education – Preparing for the Crew Change

**HOW TO SUBMIT:**

Abstracts (not more than 250 words) should be submitted for review online or via email to the technical program chair. Papers should have application to Gulf Coast and Gulf of Mexico geology. Include your full mailing address, telephone and FAX numbers, email address, and whether you are submitting for oral or poster or either (preferred).

Submit abstracts by February 1, 2010 as instructed on the website [www.gcags2010.com](http://www.gcags2010.com)

Notification of acceptance by March 1, 2010. All presenters, both oral or poster, must submit either a paper (10-12 pages) or an extended abstract with key figures for review by **April 16, 2010** for inclusion in the *Transactions*. Full instructions for authors will be posted at [www.gcags2010.com](http://www.gcags2010.com).

**ABSTRACT DEADLINE: FEBRUARY 1, 2010!**

Questions or ideas for the technical program should be directed to:  
Dr. Mary Feeley  
Technical Program Chair  
281-654-3588  
[missy.feeley@exxonmobil.com](mailto:missy.feeley@exxonmobil.com)  
Dr. Alan Dutton  
GCSSEPM Co-Chair  
210-458-5746  
[alan.dutton@utsa.edu](mailto:alan.dutton@utsa.edu)

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A A P G F O U N D A T I O N

# An Open Door To The World



## An Exciting New Naming Opportunity... Endow a Distinguished Lecture Tour.

Since 1941, the AAPG Distinguished Lecture program has provided education scientific lectures at minimal cost to universities and geological societies worldwide. From humble beginnings to current achievements, AAPG Distinguished Lecturers have traveled millions of miles and spoken for more than a million hours on every possible facet of geology in almost every corner of the world. Yet, there is more to say and more to learn.

A one-time gift of \$300,000 will endow and name a Domestic Distinguished Lecturer Tour and \$350,000 will endow and name an International Distinguished Lecturer Tour. Because of the widely recognized success and benefits of this program, the Association and Foundation will match funds 1:1 for the establishment of a new Named North American Distinguished Lecturers and or Named International Distinguished Lecturers.

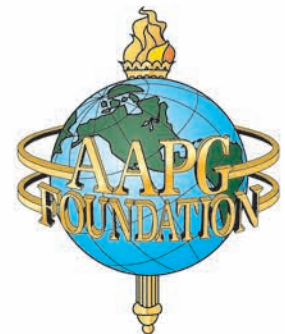
**Through the generous gifts from five major donors, the AAPG Foundation currently funds five Distinguished Lecture Tours in the names of individuals.**

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- Dean A. McGee Distinguished Lecture Tour

### North American Tours

- Allan P. Bennison Distinguished Lecture Tour
- J. Ben Carsey Distinguished Lecture Tour
- Haas-Pratt Distinguished Lecture Tour



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## CLASSIFIED Ads

## POSITION AVAILABLE

Tenure Track Faculty Position  
(Seismology)

The Department of Geology & Geophysics at Texas A&M University invites applications for a tenure-track faculty position in reflection seismology beginning September 2010. The position is offered at the Assistant Professor level.

The successful applicant will establish an active, innovative research program while complementing current departmental strengths in petroleum geology and geophysics, sedimentology, stratigraphy, and structural geology and will participate actively in the newly established Berg-Hughes Center for Petroleum and Sedimentary Systems. Furthermore, opportunities exist to participate in and build on collaborative programs with colleagues in petroleum engineering, oceanography, and elsewhere at Texas A&M University. Applicants must have a Ph.D. in Geophysics, Geology or a related field at the time of appointment. Post-doctoral research and teaching experience are desirable.

The successful applicant will be expected to teach effectively at the undergraduate and graduate

levels in geology and geophysics, including classes in the petroleum seismology curriculum; supervise undergraduate, M.Sc. and Ph.D. students; and initiate and maintain a vigorous externally funded research program.

Interested candidates should submit electronic versions of a curriculum vita, statement of research interests and teaching philosophy, the names and email addresses of at least three references, and up to four reprints by email attachments, to the Chair of the Sedimentary Geology Search Committee, [seismosearch@geo.tamu.edu](mailto:seismosearch@geo.tamu.edu). Screening of applications will begin January 15, 2010 and will continue until the position is filled.

The Department of Geology and Geophysics ([geoweb.tamu.edu](http://geoweb.tamu.edu)) is part of the College of Geosciences, which also includes the Departments of Geography, Oceanography, and Atmospheric Sciences, Sea Grant, the Geochemical and Environmental Research Group (GERG), and the Integrated Ocean Drilling Program (IODP). Texas A&M University, a land-, sea-, and space-grant university, is located in a metropolitan area with a dynamic and international community of 152,000 people. Texas A&M University is an affirmative action/equal opportunity employer committed to excellence through the recruitment and retention of a diverse faculty and student body and compliance with the Americans with Disabilities Act. We encourage applications from minorities, women, veterans, and persons with disabilities. Texas A&M University also has a policy of being responsive to the needs of dual-career partners ([hr.tamu.edu/employment/dual-career.html](http://hr.tamu.edu/employment/dual-career.html)).

\*\*\*\*\*

**Endowed Chair**  
**Subsurface Extraction and Sequestration Science**  
**The School of Earth Sciences and the**  
**Department of Chemistry**  
**The Ohio State University**

The School of Earth Sciences and the Department of Chemistry at The Ohio State University (OSU) invite applications for up to two faculty positions in the area of carbon sequestration. One of the positions will be as the Ohio Scholar in "Subsurface Extraction and Sequestration Science". The Ohio Scholar position is a Chair endowed by funds from the Ohio Third Frontier Program. A third related faculty position for an endowed professor in the Russ College of Engineering and Technology at Ohio University (OU) in Athens, Ohio, has been funded in the state of Ohio in the area of syngas fuel development with carbon capture. These three positions coupled with existing faculty research at OSU and OU will provide a firm collaborative foundation for Carbon Capture Storage research within the state and region. Our intention is to make the Ohio Scholar appointment in sequestration science at the level of Professor, although outstanding candidates at lower ranks are encouraged to apply. Applicants with a doctoral degree and research interests including, but not limited to, geological science, chemistry, physics, or related field, are encouraged to apply. We particularly seek individuals who employ integrative approaches to the analysis of fluid-rock interactions, or gas-material interactions and chemical conversion through fieldwork, laboratory experiments, or numerical modeling, as well as individuals who address the complex interactions among physical, chemical, and biogeochemical processes of sedimentary systems. Qualified applicants from science and engineering departments, and industrial and government laboratories are encouraged to apply.

The successful applicants are expected to have an established record of research achievement through publications and external funding. Applicants from industry with a similarly identifiable track record of excellence are encouraged to apply. They will be expected to contribute to the development, teaching, and enhancement of an education program in energy and environment at the graduate and undergraduate levels. The appointees are expected to develop and maintain an independent research program in the area of chemical and physical processes of geologic carbon sequestration, and are expected to generate external funds at a level that is appropriate for maintaining a research program at a major academic institution. Given the statewide aspect of the position, the Ohio Scholar is expected to have communication skills commensurate with being a scientific spokesperson for geologic carbon sequestration in Ohio, and to have involvement with and representation of scientific and technological issues related to geologic carbon sequestration and related environmental issues nationally and internationally. Applicants should submit a letter of application, curriculum vitae, and a statement of research interests and teaching philosophy. Candidates should arrange for three letters of recommendation to be sent under separate cover by the candidate's referees. Applications and letters should be sent to: Professor Jeffrey J Daniels, 275 Mendenhall Laboratory, 125 South Oval Mall, School of Earth Sciences, The Ohio State University, Columbus, OH, 43210. The anticipated start date for the position is October 1, 2010. The position will be open until filled. Information about the School of Earth Sciences and the Department of Chemistry can be found at <http://www.earthsciences.osu.edu> and <http://www.chemistry.ohio-state.edu>.

continued on next page

**HOUSTON GEOLOGICAL SOCIETY**  
*Explore Our Connections*

**Applied Geoscience Conference (AGC)**  
**2010 AGC of US Gulf Region Mudstones as**  
**Unconventional Shale Gas/Oil Reservoirs**

February 8-9, 2010

Hilton Houston North, Houston, TX  
INDUSTRY/GOVERNMENT/UNIVERSITY  
PERSPECTIVES FOR GULF COAST REGION  
MUDSTONE / SHALE GAS/OIL RESERVOIRS

- Learn Mudstone System Characterization.
- See Practical/Applied Methods for Mudstone Shale Reservoir Characterization.
- Hear new technical perspectives of the Haynesville, Bossier & Eagleford Shales.
- Apply these reservoir characterizations to Effectively Complete These Targets.
- Focus with Shale Gas/Oil experts within the characterization fields of exploration geology, exploitation geology, geochemistry, nano scale petrology, geomechanics, log analysis, & completions engineering.

Limited Seating available!

Register at:  
[www.hgs.org/en/cevi/1056](http://www.hgs.org/en/cevi/1056)  
Sold out in 2009

We will see you there!

## COMPREHENSIVE TECHNICAL PROGRAM

## SHALE HC CHARACTERIZATION EXPERTS:

Joe Macquaker Kevin Bohacs  
MEMORIAL UNIVERSITY EXXONMOBIL

Gary Lash Nicholas Harris  
SUNY Fredonia COLORADO SCHOOL OF MINES

Roberto Suarez-Rivera Kitty Milliken  
TERATEK, Schlumberger TEXAS BEG / U of T

Rick Lewis Dan Jarvie  
SCHLUMBERGER WORLDWIDE GEOCHEMISTRY

Jackie Reed Mike Conway  
REED CONSULTING STIM-Lab

Richard Vessell Phil Martin  
GEOSYSTEMS NEW CENTURY EXPLORATION INC.

Bob Bereskin Ursula Hammes  
BERESKIN AND ASSOCIATES TEXAS BEG / U of T

## ADDITIONAL INDUSTRY SPEAKERS

## TECHNICAL PROGRAM COMMITTEE

Frank Waller  
President, AAPG Energy Minerals Division  
Sr. Geol Advisor, Unconventional Resources  
DEVON ENERGY CORPORATION

Michael Van Horn, Vice President-Geoscience  
NEWFIELD EXPLORATION COMPANY

Bruce Martin, Senior Staff Geologist  
SOUTHWESTERN ENERGY

Mike Cameron, Corporate New Ventures  
NEWFIELD EXPLORATION COMPANY

**Houston Geological Society** **US Gulf Region Mudstones**  
**Applied Geoscience Conference (AGC)**  
**The Hilton Houston North Hotel, Houston, Texas**  
**Monday February 8, 2010 Agenda** **As Unconventional**  
**Gas/Oil Reservoirs**

## TECHNICAL PROGRAM CHAIRPERSONS:

Frank Waller, AAPG Energy Minerals Division President **Michael Van Horn**  
Sr. Geol Advisor, Unconventional Resources **Vice President-Geoscience**  
DEVON ENERGY CORPORATION **NEWFIELD EXPLORATION COMPANY**

## CURRENT PROGRAM

- 7:00 - 8:00AM Registration - Atrium Hilton Houston North (with Breakfast Items: Juice/Coffee/Rolls)
- 8:00AM "Approaches to Mudstone Characteristics Leading to HC Productivity"
- 8:15AM "Sequence stratigraphy in fine-grained rocks at the field to flow-unit scale: insights for correlation, mapping, and genetic controls."  
**Kevin Bohacs, Sr Hydrocarbon Systems Consultant, ExxonMobil Upstream Research**
- 9:00AM "Implications for Identifying Shale-Gas Reservoirs"  
**Joe H.S. Macquaker, Professor, Memorial University, Newfoundland, Canada**
- 9:45AM "An Integrated Geological and Petrophysical Study of a Shale Gas Play: Woodford Shale Permian Basin, West Texas"  
**Nick Harris, Professor, University of Alberta, Edmonton CA / Colorado School of Mines**
- 10:50AM "Processes and Controls on Shale-Oil/Condensate Production"  
**Daniel Jarvie, President, Worldwide Geochemistry / Institut Francais du Pétrole**
- 11:40AM **Buffet Luncheon - Atrium**
- 1:00 PM "Practical Applied Methods for Shale Reservoir Characterization"
- 1:10 PM "Stratigraphic analyses of Shale Systems - The Marcellus Shale Example and how those analytical techniques may be useful for characterizing Gulf Coast Shale Systems"  
**Gary Lash, Professor of Geosciences, SUNY Fredonia**
- 1:55 PM "Geochemical Parameters useful for improved Shale Gas Characterization"  
**Jackie Reed, Petroleum Systems Consultant, Reed Geochemical Consulting**
- 2:40 PM **Break**
- 3:00 PM "Integrated Imaging and Analysis of Sedimentary Materials: the Mudrocks"  
**Kitty Milliken, Jackson School of Geosciences, U. of Texas, Bureau of Economic Geology**
- 3:45 PM "Advanced porosity and permeability characterization in Gulf Coast Shales"  
**Richard Vessell, Vice President Geology / Petrophysics, GEOSYSTEMS LLP**
- 4:30 PM **Day 1 Summary Analysis - Technical Program Chairs**

**Houston Geological Society** **US Gulf Region Mudstones**  
**Applied Geoscience Conference (AGC)**  
**The Hilton Houston North Hotel, Houston, Texas**  
**Tuesday February 9, 2010 Agenda** **As Unconventional**  
**Gas/Oil Reservoirs**

## TECHNICAL PROGRAM CHAIRPERSONS:

**Mike Cameron** **Bruce Martin**  
Corporate New Ventures **Senior Staff Geologist**  
NEWFIELD EXPLORATION COMPANY **SOUTHWESTERN ENERGY COMPANY**  
7:00 - 8:00AM Registration - Atrium Hilton Houston North (with Breakfast Items: Juice/Coffee/Rolls)

- 8:00AM "US Gulf Region Mudstone Reservoir Characterization: Haynesville, Bossier, & Eagle Ford Shale Systems"
- 8:15AM "New insights into facies, depositional environments, sequence stratigraphy, and regional extent of the Haynesville Shale of East Texas and Louisiana"  
**Ursula Hammes, Scott Hamlin, Jackson School of Geosciences, U. of Texas, BEG**
- 9:00AM "An industry perspective on the Haynesville Shale Gas Play"  
**Phil Martin, President, New Century Exploration**
- 9:45AM **Break**
- 10:05AM "A comparison of pore types of the Eagle Ford, Haynesville, Pearsall, & Austin Chalk - Mesozoic Resources Plays of the Gulf Coast."  
**Randall Miller, President, Integrated Reservoir Solutions Division, CORE LABORATORIES**
- 10:50AM "The Eagle Ford Shale System - Regional Opportunity in Exploration"  
**Industry Author Management Acceptance Pending**
- 11:40AM **Buffet Luncheon - Atrium**
- 1:00 PM "US Gulf Region Mudstone Systems: Based upon reservoir characterization - How do we complete effectively?"
- 1:10 PM "Reservoir characterization in mudstone-dominated sequences: implications for successful completions"  
**Bob Bereskin, Bereskin and Associates, Mary K Milne, Erra Ek - Schlumberger**
- 1:55 PM "Taking advantage of Heterogeneity in Shale Gas completions"  
**Roberto Suarez Rivera, Rock Mechanics Specialist, Erra Ek - Schlumberger**
- 2:40 PM **Break**
- 3:00 PM "Utilizing Log Integration methodology for understanding Shale Mechanical Attributes"  
**Rick Lewis, Technical Projects Leader, Schlumberger Oilfield Services, Oklahoma City**
- 3:45 PM "How to design better completions within the softer shales of the Gulf Coast"  
**Mike Conway, President Stim-Lab, a Division of CORE LABORATORIES**
- 4:30 PM **Conference Summary Analysis - Technical Program Chairs**

**Applied Geoscience Conference (AGC)**  
**US Gulf Region Mudstones as**  
**Unconventional Shale Gas/Oil Reservoirs**

The Houston Geological Society presents an Applied Geoscience Conference focusing upon mudstone system characterization to improve exploitation of US Gulf Region Mudstone "Shale Gas/Oil" Reservoirs

## This Applied Geoscience Conference (AGC)

has four half day sessions:

Monday, February 8

**AM Session:** Understanding Mudstone Characteristics leading to HC Productivity

**PM Session:** Practical/Applied Methods for Shale Characterization

Tuesday, February 9

**AM Session:** US Gulf Region Mudstones: Reservoir Characterization of Haynesville, Bossier, & Eagleford Shales

**PM Session:** US Gulf Region Mudstone Systems Based upon reservoir characterization, how do we complete effectively?

15 Credit Hour Certificate (1.5 C.E.U.) will be earned with attendance  
Limited seating - so register early!

Registration Deadline of February 2, 2010

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Finalization

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continued from previous page

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\*\*\*\*\*

**ENDOWED FACULTY POSITION IN PETROLEUM GEOSCIENCE  
CONOCOPHILLIPS SCHOOL OF GEOLOGY AND GEOPHYSICS  
MEWBOURNE COLLEGE OF EARTH AND ENERGY  
UNIVERSITY OF OKLAHOMA**

The University of Oklahoma invites applications for the position of Associate Professor/Professor in petroleum geosciences. Depending on experience and qualifications, the successful candidate will be appointed as a tenured Associate or Full Professor in an endowed Professorship or Chair in the School of Geology and Geophysics, and is expected to add significantly to the University's petroleum geology/geophysics education and research programs. Applications are being solicited from both academia and industry.

The successful candidate must have a demonstrated research record and the vision to establish and lead a strong multidisciplinary research program in petroleum geology, or a closely related discipline. This includes the opportunity to work closely with the Mewbourne School of Petroleum and Geological Engineering and the Oklahoma Geological Survey to investigate concepts, tools and methodologies to better define, characterize and manage oil and gas reservoirs. A qualified applicant should have demonstrated expertise in a range of geoscience technologies. The ideal candidate will also have experience in using these technologies to define and better understand geological features of economic interest, and should be an excellent educator with commitment to both undergraduate and graduate (M.S. and Ph.D.) education. A Ph.D. degree in geology or a closely related field is required. Salary and benefits will be competitive and commensurate with experience and anticipated potential.

The Mewbourne College of Earth and Energy possesses extensive industry-standard software, along with well-equipped and maintained computing labs for geological and geophysical mapping, analysis and interpretation, as well as rock properties/characterization laboratory facilities.

Additional information about the College and the entities that it houses can be found at <http://mcee.ou.edu>.

Review of candidates will begin February 1, 2010 and continue until the position is filled. The anticipated starting date is August 15, 2010.

Applicants are requested to submit a vita/resume, statement of research and teaching interests, and a list of five references who can be contacted, including names, phone numbers, email and complete mailing addresses. Questions or requests for additional information may be addressed Dean Larry R. Grillo, Chair of the Geosciences Search Committee, at (405) 325-3821, or [lrgillo@ou.edu](mailto:lrgillo@ou.edu).

Applications and nominations should be addressed to Geosciences Search Committee, University of Oklahoma, Sarkeys Energy Center, 100 E. Boyd Street, Room 510, Norman, OK 73019-1008.

The University of Oklahoma is an Affirmative Action, Equal Opportunity Employer. Women and Minorities are encouraged to apply.

\*\*\*\*\*

**David B. Harris Postdoctoral Fellowship  
Texas A&M University**

The Department of Geology and Geophysics at Texas A&M University, College Station, Texas, is pleased to announce the availability of a postdoctoral fellowship funded through a gift from David B. Harris. The postdoctoral fellowship appointment is two years. Outstanding young scientists who have finished their Ph.D. degree, or who will finish prior to 1 September 2010, are eligible to apply. Research may be in any area of the geological and geophysical sciences. However, we are particularly interested in receiving applications from scientists whose work will contribute to existing research programs in the Department of Geology and Geophysics. Information about the Department can be found at <http://geoweb.tamu.edu>.

Review of applications will begin January 1, 2010. Applications should include a curriculum vitae, statement of proposed research, and names and addresses of three referees. Applicants are urged to contact a member of the Department of Geology and Geophysics with whom they would collaborate. Electronic submissions are encouraged ([lamb@geo.tamu.edu](mailto:lamb@geo.tamu.edu), pdf or Word format) or they can be mailed to: Dr. Will Lamb, Chair of Selection Committee, David B. Harris Postdoctoral Fellowship, Department of Geology and Geophysics, Texas A&M University, Mail Stop 3115, College Station, TX 77843-3115, U. S. A.

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\*\*\*\*\*

**Tenure-Track Position in Geology**

The Department of Geological Sciences and Engineering at Missouri University of Science and Technology (which was known as University of Missouri-Rolla prior to 1/1/2008) invites applications for a nine-month, tenure-track faculty position in the

Geology and Geophysics Program to begin August 23, 2010. The position is intended at the assistant professor level, but appointment to associate professor level may be considered for qualified applicants. Outstanding candidates in one or more of the following fields are encouraged to apply: petroleum geology, clastic or carbonate sedimentology, sequence stratigraphy, and basin analysis. The Department currently has 18 full-time faculty, about 300 undergraduate and 70 graduate students with established B.S., M.S., and Ph.D. programs in Geology & Geophysics, Petroleum Engineering, and Geological Engineering. The successful applicant will contribute to the existing departmental excellence in teaching and mentoring of graduate and undergraduate students, scholarships, externally funded research programs, and service in various levels. We seek applicants who can complement our current program strengths in petroleum exploration, remote sensing/GIS, seismic stratigraphy, palynology, biostratigraphy, environmental geochemistry, petrology and tectonics, and earthquake seismology. More information about the Department can be found at <http://gse.mst.edu>. Questions regarding this position should be directed to the chair of the search committee, Dr. Stephen S. Gao ([sgao@mst.edu](mailto:sgao@mst.edu)).  
A Ph.D. is required at the time of employment.

See **Classifieds**, page 42

2010 Open Enrollment Course Schedule	
<b>Rose &amp; Associates</b>	<b>Risk Analysis, Prospect Evaluation &amp; Expl. Economics</b>
	Houston, Texas January 25 – 29, 2010
	Calgary, Alberta April 26 – 30, 2010
	Houston, Texas May 10 – 14, 2010
	Denver, Colorado* August 16 – 20, 2010
	Calgary, Alberta September 13 – 17, 2010
	Aberdeen, Scotland October 4 – 8, 2010
	Houston, Texas October 18 – 22, 2010
	<b>Risk and Uncertainty Analysis for Unconventional Resource Plays</b>
	Calgary, Alberta March 30 – 31, 2010
Houston, Texas June 8 – 9, 2010	
* includes material on unconventional resource assessment	
Register at: <a href="http://www.roseassoc.com/instruction">www.roseassoc.com/instruction</a> Questions: <a href="mailto:allisonduinn@roseassoc.com">allisonduinn@roseassoc.com</a> Ph: 713/528-8422	
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GeoCare Benefits Group Disability Income Insurance Plans, P.O. Box 189, Santa Barbara, CA 93102-0189, Email: [geocarebenefits@agia.com](mailto:geocarebenefits@agia.com). The Group Disability Income Plan is underwritten by New York Life Insurance Co. 51 Madison Ave., New York, NY 10010 under Policy G-29066/FACE, AR license #182374, CA license OC308R3. All coverage is subject to approval by New York Life.

\*Cornell University Employment and Disability Institute, 2008 American Community Survey.



## ◆ NEW PUBLICATION ◆

Report of Investigations No. 273

**Chronostratigraphy of Cenozoic  
Depositional Sequences and Systems  
Tracts: A Wheeler Chart of the Northwest  
Margin of the Gulf of Mexico Basin**

by L. Frank Brown and Robert G. Loucks

from the Bureau of Economic Geology  
Jackson School of Geosciences  
The University of Texas at Austin

This new publication presents a sequence stratigraphic Wheeler chart that integrates the regional Cenozoic stratigraphic framework of the northwest margin of the GOM.

The full-color chart, 42" x 62", is accompanied by a 28-page report that discusses 50 sequences.

Another recent publication by the Bureau of Economic Geology on the GOM is "Reservoir Geology, Structural Architecture, and Sequence Stratigraphy of a Growth-Faulted Subbasin: Oligocene Lower Frio Formation, Red Fish Bay Area, South Texas Gulf Coast" (RI No. 272, 2007) by Ursula Hammes and others.

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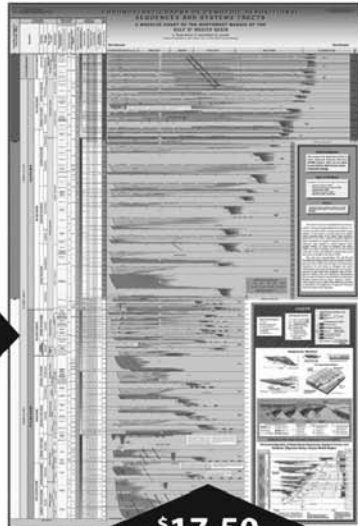
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RI No. 273 – Wheeler Chart

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ECONOMIC  
GEOLOGY**Classifieds**

from page 40

The application should include a complete curriculum vita, statements of research and teaching interests, and the names and contact information of three referees. Review of the applications will begin on 12/15/2009 and continue until the position is filled. Please send application to:

Human Resource Services  
Reference Number **00050313**  
Missouri University of Science & Technology  
HRS email address [hर्सinfo@mst.edu](mailto:hर्सinfo@mst.edu)  
300 W. 13th Street  
113 Centennial Hall  
Rolla, MO 65409-1050

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Missouri S&T participates in E-Verify. For more information on E-Verify, please contact DHS at 1-888-464-4218.

**Assistant Professor for the Department  
of Geological Sciences – Seismologist**

The Department of Geological Sciences at The University of Alabama invites applications for a tenure-track faculty position in Seismology beginning in August 2010. The position will be filled at the Assistant Professor level. Candidates must have a strong record of research and a Ph.D. in Geology, Geophysics or a related field. We are seeking an outstanding scientist, whose research will a) emphasize the use of seismic data to solve geological problems; and/or b) explore crustal structures, including sedimentary basin structures with using seismic data. The specific areas of research may include, but are not limited to, solid-earth seismology, reflection, refraction and exploration seismology. This is a tenure-track appointment and will be filled at the assistant professor level in August 2010. The successful candidate will be expected to (i) establish a vigorous, externally-funded, research program; (ii) teach geology courses at the introductory level, as well as develop and teach courses at the undergraduate and graduate levels in their field of expertise, and (iii) supervise student research projects at the undergraduate, masters, and doctoral levels. This position expands the Department's Geophysics program and complements other Department programs in Environmental Change and Natural Hazards, Petroleum Geology, Sedimentary Basin Analysis, Structural Geology and Tectonics. The Department of Geological Sciences hosts excellent computational and laboratory facilities in Geophysics.

Applications for this position must be submitted electronically. A list of required documents and application instructions can be found at <https://facultyjobs.ua.edu>. Names and contact information for at least 3 references should be attached as "Other Document." For additional information, contact Dr. Ibrahim Çemen, at [icemen@as.ua.edu](mailto:icemen@as.ua.edu) or 205-348-8019, or visit [www.geo.ua.edu](http://www.geo.ua.edu). Applications will be reviewed beginning January 15, 2010, and will continue until the position is filled.

The University of Alabama is an equal-opportunity/affirmative action employer and particularly encourages applications from women and minorities.

**Assistant Professor for the Department of  
Geological Sciences – Molecular Geochemistry**

The Department of Geological Sciences at the University of Alabama has an opening for a faculty member in the area of molecular geochemistry. We are seeking an outstanding scientist whose research

will explore and elucidate the complex interactions among physical, chemical, and biological processes at the molecular scale. Specific areas of research may include, but are not limited to, geomicrobial processes, interfacial chemistry, bioremediation, and biomarker applications to paleoenvironments/paleoclimatology or petroleum maturation/genesis. This is a tenure-track appointment and will be filled at the assistant professor level in August 2010. The successful candidate will be expected to (i) establish a vigorous, externally-funded, research program; (ii) teach geology courses at the introductory level, as well as develop and teach courses at the undergraduate and graduate levels in their field of expertise, and (iii) supervise student research projects at the undergraduate, masters, and doctoral levels. The Department has an excellent analytical infrastructure which includes electron beam, wet and dry chemistry, and stable isotope mass spectrometry instrumentation.

Applications for this position must be submitted electronically. A list of required documents and application instructions can be found at <https://facultyjobs.ua.edu>; other Document to include contact information for 3 references.

For additional information, contact the search committee chair, Dr. Rona J. Donahoe, at [rdonahoe@geo.ua.edu](mailto:rdonahoe@geo.ua.edu) or 205-348-1879, or visit [www.geo.ua.edu](http://www.geo.ua.edu). Applications will be reviewed beginning January 15, 2010, but will be accepted until the position is filled.

Prior to hiring, the final candidate(s) may be required to successfully pass a pre-employment background investigation.

The University of Alabama is an equal-opportunity/affirmative-action employer and particularly encourages applications from women and minorities.

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Unconventional Gas Plays**  
4 - 7 October 2010

The Geological Society, Burlington House, Piccadilly, London

CALL FOR ABSTRACTS - to be submitted by 31st March, 2010

It is generally recognised that unconventional gas resources will make up a major part of our future energy needs. In recent years there has been a marked increase in interest in these resources from industry and especially amongst the major western oil and gas companies. Many of the technical issues surrounding unconventional gas plays revolve around the complex engineering solutions required to commercially exploit them. The aim of this conference however is to specifically address the geoscience issues related to their exploration and exploitation. We invite oral and poster presentations on the following themes:

- Overviews of Unconventional Gas Plays
- Shale Gas
- Tight Gas Reservoirs
- Coalbed Methane
- Gas Hydrates

Within each theme we welcome contributions that address any relevant geoscience issue, such as petroleum system analysis, reservoir geology, geophysical evaluation, structural geology and fracture prediction as well as case studies on particular plays, basins or fields.

We aim to bring together key figures in industry and academia active in both established unconventional gas plays of North America and emerging plays of Europe, plus other plays around the globe. The following speakers have agreed to deliver keynote talks:

- Richard Chuchla (ExxonMobil) - Unconventional Gas Resources: An Integrated Global Perspective
- Ken Chew (IHS & Moreish Mews, UK) - European Unconventional Gas Plays
- Prof. Terry Engelder (Penn. State Univ.) - Shale Gas
- Prof. Dan Jarvie (Texas C.U./IFP) - Shale Gas
- Prof. Brian Horsfield (GFZ Potsdam) - Shale Gas
- Steve Cumella (Bill Barrett Corp.) - Tight Gas Sandstones
- Andrew Scott (Consultant) - Coal Bed Methane
- Tim Collett (USGS) - Gas Hydrates
- Prof. Graham Westbrook (Univ. Birmingham) - Gas Hydrates

Please send all abstracts and sponsorship enquires to Paul Doubleday at [doubled@statoil.com](mailto:doubled@statoil.com)

For further information about this conference, please contact:  
Steve Whalley, Event Co-ordinator: +44 (0)20 7432 0980  
or email: [steve.whalley@geolsoc.org.uk](mailto:steve.whalley@geolsoc.org.uk)

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**DIRECTOR'S**corner

# Year Offers Hopes, Dreams, Realities

By RICK FRITZ

Last summer during our staff retreat, we asked the question, "What will be obsolete in 10 years?"

The answers included credit cards, eye glasses, can openers, cancer, hard drives and almost anything made of paper – including money. I'll believe the last one when I see it.

Then we asked, "What will be new in 10 years?"

Answers ranged from laser lawnmowers to biometric identification to a cure for baldness. One even said that Pluto will be reinstated as a planet.

I kind of like that one.

\* \* \*

Each new year I ask myself what is in the future for AAPG. I always start with a review of the strategic plan. In the plan it states that AAPG has six goal areas:

▶ **Advance the Science.**

AAPG President John Lorenz is emphasizing the importance of constantly seeking and developing the best science. Under the leadership of AAPG Editor Gretchen Gillis the BULLETIN continues to improve and look for new ways to disseminate information. The special thematic issue on "The Geologic Occurrence and Hydraulic Significance of Fractures in Reservoirs" was just introduced and this year we are expecting a new thematic issue on the Deepwater Gulf of Mexico. We are also expecting a strong technical program at the Annual Convention April 11-14 in New Orleans.

Individually, the best thing you can do



Fritz

is contribute to the science through papers, presentation, education, etc.

▶ **Continuous Professional Development.**

Concerning professional development, AAPG is looking for new ways to provide education to the membership. AAPG education director Susan Nash has developed a series of new e-symposiums that provide focused, online live training. This year AAPG will offer 7-8 Geoscience Technology Workshops – AAPG's new quick-to-market workshop concept designed to discuss current plays and disseminate the newest technology into the marketplace.

▶ **Public Awareness and Understanding.**

AAPG's Public Outreach Committee has developed a new Web site called petroleumgeology.org, and in 2010 we plan to add more. Also, in 2010 staff is preparing a brochure and a short video called "We are AAPG" is on YouTube – already available for downloading and use in meetings and for recruitment and another one is in the works.

▶ **Membership and Member Services.**

Membership continues to grow for AAPG as we already are over 35,400

**We continue to need your ideas on how to improve and how to develop into the future.**

members for the start of the new year. In 2010 we plan to promote the new "Business Group Membership" for small companies and institutions around the world.

▶ **Financial Strength.**

Both the AAPG Association and Foundation are strong financially. However, fiscal year 2009-10 will most likely be in the "red" due to economic conditions and a one-time charge for freezing the employees defined benefit plan. As a result, in 2010 we will be reviewing all of our programs to see if there are any areas to cut expenses.

▶ **Global Presence.**

Finally, we continue to grow AAPG's global development program. The European office is fully staffed (see December EXPLORER) with Jeremy Richardson as new director. The Middle East Office has a number of new programs this year for building and serving the membership with a new set of officers under the leadership of Region President, Hussain al-Otaibi.

Also, 2010 will be a big year for the AAPG Asia-Pacific office as new director Adrienne Pereira begins to work with the

leadership in the Region to develop new member services. Both the Latin America and Africa Regions are developing new programs, too, and the Canadian Region will host AAPG's International Conference and Exhibition Sept. 12-15, in Calgary.

Clearly, a lot is going on in the new year. We continue to need your ideas on how to improve and how to develop into the future.

\* \* \*

Another question we asked the at retreat was, "What will be obsolete at AAPG in the next 5-10 years." The answers ranged from AAPG-only conferences to face-to-face meetings to the paper version of the EXPLORER.

Finally we asked, "What new developments do you see for AAPG in the future?" Digital 3-D geologic maps was my favorite response, although we are close to that now. Other answers included e-books on Kindle, 50/50 U.S./non-U.S. membership, and interplanetary virtual field trips.

I also liked the answer that the public's perception of petroleum is changed to positive.

That's the great thing about the new year – there is always hope for the future.

Happy New Year!

## Suit cites California consolidation

# AAPG, DPA Oppose Board Move

By PAUL W. BRITT  
DPA President

In late September, the Division of Professional Affairs, through past president Rick Ericksen, was contacted by the California Association of Professional Geologists (CAPG), which is seeking support to block a move by the state of California to eliminate the Board of Professional Geologists and Geophysicists (BGG) and merge it into the Board of Professional Engineers and Land Surveyors (BPELS).

Even though the BGG is self-supporting through dues, this cost-saving effort is an attempt by the cash-strapped state to consolidate boards and capture revenue to the state coffers. The merge leaves licensed geologists and geophysicists subject to a review board without representation, as this action did not require any change to the structure of the BPELS.

The following quote is from the Association of Environmental and Engineering Geologists Southern California Section:

"... The BGG has been eliminated effective October 23, 2009, and its responsibilities transferred to the engineer's board, BPELS. This action was taken by legislators under pressure to reach a budget compromise. Unfortunately, the action had no impact



Britt

whatsoever on the budget, and the BGG was abolished suddenly and without due process, eliminating any open, fair and transparent review of the potential consequences. Existing law that carefully and deliberately outlines the specific measures and

the timetable necessary for the elimination of boards and commissions was ignored entirely."

The CAPG filed a lawsuit attempting to block the action through an injunction and sought the support of professional organizations. The DPA filed a "declaration of support" of this application for injunction, and the AAPG Executive Committee, upon review, filed a similar declaration. Both also have agreed to provide financial support of this initiative.

The following was taken from the BPELS Web site:

"Legislation enacted during the 4th Extraordinary Session of 2009 eliminated the Board for Geologists and Geophysicists and transferred all of the

duties, powers, purposes, responsibilities and jurisdiction to regulate the practices of geology and geophysics to the Board for Professional Engineers and Land Surveyors. The transfer of authority became effective October 23, 2009.

The Geologist and Geophysicist Act ... and the Rules and Regulations pertaining to the practices of geology and geophysics ... remain in effect. The practices of geology and geophysics are still regulated. Individuals must still obtain licensure and practice in accordance with the laws and professional standards relating to geology and geophysics. The only change is that the Board for Professional Engineers and Land Surveyors will now be enforcing those laws."

The BGG was created in 1968 and the DPA was formed in 1967. The Geologist Suggested Practice Act did not come into existence until 1993, and that act states that all petroleum geologists "are suggested to be exempt from licensure/registration"; the California legislation exempts only those petroleum geologists and geophysicists who work for companies – if they are in public practice they must be registered; the Texas licensure law for geoscientists that was

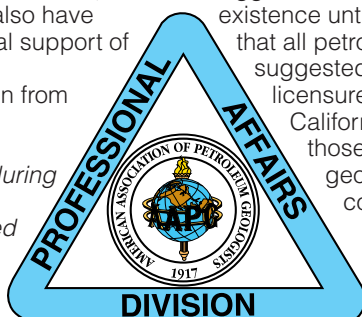
endorsed by both the DPA and AAPG, exempts those geoscientists who work for petroleum companies, but like California, Texas requires those in public practice to be licensed.

California's action to abolish the BGG without due process should be a concern to all geologists, regardless of your opinion on licensing. Subjecting geologists to review by a non-geological board diminishes the profession of geology.

Would they make CPAs subject to review by the lawyer's State Bar?

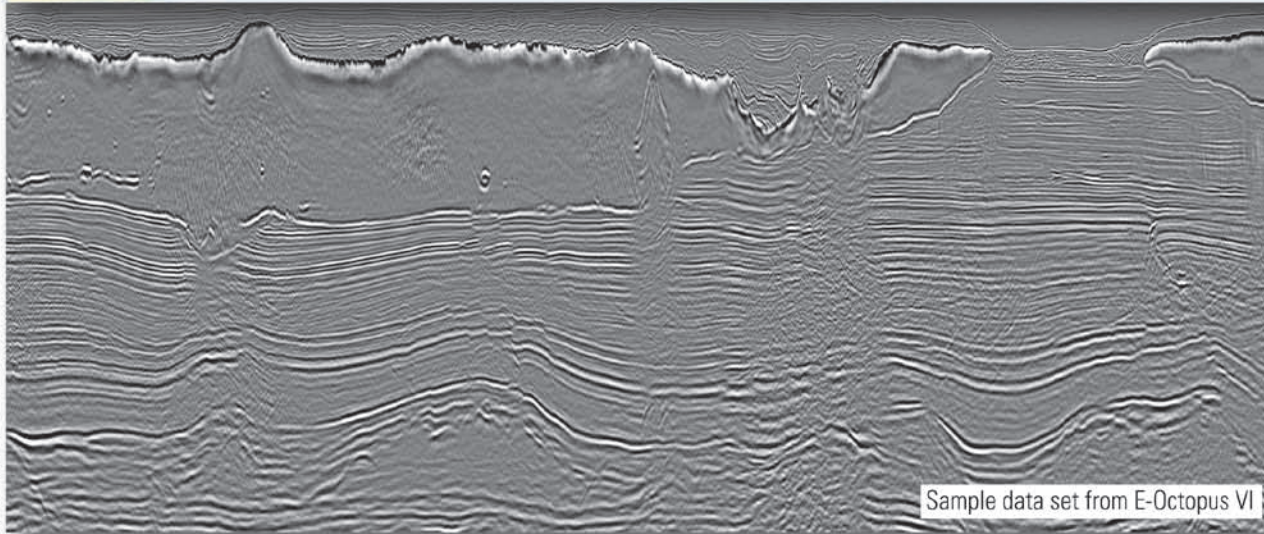
In fact, the BGG is the only board that was merged into another board, and the anticipated budget savings are basically non-existent. The BPELS will preside over any geological or geophysical review, but may not, and does not have to have, the expertise on the board to make a qualified scientific decision. Each of us needs to ask ourselves if this smacks of "taxation without representation," or in this case, "licensure without representation?" A violation of state law carries potential criminal liability, yet those presiding may not have to have geological expertise.

The DPA will continue to actively monitor and inform the membership on California's activities. ■



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