

AAPG AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, AN INTERNATIONAL ORGANIZATION

# EXPLORER

MARCH 2009



## Pass the Salt, Please

Ocean bottom technology  
trumps GoM challenges

See page 16







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**On the cover:** Deepwater seismic operations continue today in the Gulf of Mexico, fueled in part by new technology that can bring improved efficiency and cost-savings. One high-tech application garnering increased attention – and on display on this month's cover – is the use of ocean bottom seismic (OBS) nodes to acquire full, or true wide azimuth seismic data via recording in all directions, which can help overcome the challenges presented by subsurface salt sheets that severely distort seismic signals. The scene here is the Shell-operated Deimos Field in 1,000 meters of water in the Gulf's Mississippi Canyon area. The stories are on pages 16 and 18. The photos are courtesy of Shell E&P.

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## STAFF

AAPG Headquarters – 1-800-364-2274 (U.S. & Canada only), others 1-918-584-2555

**Communications Director**  
Larry Nation  
e-mail: lnation@aapg.org

**Managing Editor**  
Vern Stefanic  
e-mail: vstefan@aapg.org

**Communications Project Specialist**  
Susie Moore  
e-mail: smoore@aapg.org

**Correspondents**  
David Brown  
Louise S. Durham  
Ken Milam

**Graphics/Production**  
Rusty Johnson  
e-mail: rjohnson@aapg.org

**Advertising Coordinator**  
Brenda Merideth  
P.O. Box 979  
Tulsa, Okla. 74101  
telephone: (918) 560-2647  
(U.S. and Canada only:  
1-800-288-7636)  
(Note: The above number is for  
advertising purposes only.)  
fax: (918) 560-2636  
e-mail: bmer@aapg.org

## Time for Dues and Denver

Two areas of importance for AAPG members become electronic and online priorities this month.

✓ First, the 2009-10 dues statement will begin to be sent this month to all members via e-mail.

Members without e-mail addresses on file will receive a hard copy.

All will be able to pay online or print the pdf file to remit payment by mail.

The first notices are expected to be sent in late March. The graduated dues options remain in effect.

✓ Registration is now open online for this year's AAPG Annual Convention and Exhibition in Denver, which will be held June 7-10.

The full technical program is available in the announcement that accompanies this month's EXPLORER – including a look at the 1,000-plus technical presentations, 18 field trips, 22 short courses and various speakers and forums that are planned – but here's more important news:

Register by April 13 and you can save up to \$200. □

## PRESIDENT'S column

# Competition Doesn't Preclude Collaboration

By SCOTT W. TINKER

Recently I watched the U.S. Super Bowl, the "world championship" of a game played mostly in one nation.

I enjoy U.S. football, but I admit that the Super Bowl was the first pro game I have seen all season. I did not even know which teams were playing until the day before, when I read that Bruce Springsteen was going to perform at halftime. It turned out to be a very exciting game, with players' emotions running high.

I have come to expect high "emotions" from fans, who seemingly associate self-esteem with the outcome of a game. But it was refreshing to see the professional athletes themselves energized by the spirit of competition, instead of just by a paycheck.

Competition is everywhere.

In athletics, individuals compete for a starting position on a team. Teams compete for championships. Sports compete with other sports for attendance and TV advertising. Athletics compete with the arts and other forms of entertainment.

This type of competitive "scale up" is certainly not limited to sport.

In academe, competition occurs among individuals to be published, among departments for students, among colleges for university funding and among universities for reputation – sometimes determined by (you guessed it) the universities' record on the gridiron!

In business, competition occurs among individuals for promotions within departments; among departments for funding within companies; among companies for market share, among industries for capital and talented

people; and among cities to attract industries.

In government, competition is seen among individuals to be elected or appointed; among committees for appropriations; among political parties for public attention; among states for federal funding; among nations for natural resources and/or over ideology.

Bands, tribes, chiefdoms, states. It has always been thus.



Tinker

\* \* \*

How do we build bridges amidst all of this competition?

First, we must recognize that competition is often healthy. It causes humans to strive for excellence. It allows people and organizations to shine in ways that are unique and leads to achievement and innovation. It recognizes and celebrates diversity.

Next, we acknowledge that competition, at first glimpse, appears to inhibit bridge building. However, examined in a different light, we see that the components of any organization – university, industry, government, team – come together in a greater whole as the larger construct competes. Thus, we see people working together in departments, departments cooperating to make a company great and companies unifying as industries compete.

Call cooperation what you will – teamwork, integration, collaboration – it

See **President**, next page

## AAPG Balloting Opens

Balloting for AAPG officer candidates for the 2009-10 term will be available March 3 and will close May 15 at 11:59 p.m. CDT.

While electronic balloting is available to all members a paper ballot also will be sent.

Survey and Ballot Systems, which handles the AAPG election, has a coded system where only one ballot per person is counted, with the paper ballot taking precedent if both are submitted.

Candidate biographies and individual information continue to be available online at [www.aapg.org](http://www.aapg.org). The slate is:

### President-Elect

- Donald D. Clarke, geological consultant, Lakewood, Calif.
- David G. Rensink, Apache Corp., Houston.

### Vice President-Regions

- Adekunle A. Adesida, Shell Petroleum Development, Nigeria.
- Alfredo E. Guzman, consultant, Veracruz, Mexico.

### Secretary

- William S. Houston, Samson, Denver.
- Peter MacKenzie, MacKenzie Land & Exploration, Worthington, Ohio.

Vol. 30, No. 3  
The AAPG EXPLORER (ISSN 0195-2986) is published monthly for members. Published at AAPG headquarters, 1444 S. Boulder Ave., P.O. Box 979, Tulsa, Okla. 74101, (918) 584-2555. e-mail address: [postmaster@aapg.org](mailto:postmaster@aapg.org)  
Periodicals postage paid at Tulsa, Okla., and at additional mailing offices. Printed in the U.S.A.  
Note to members: \$6 of annual dues pays for one year's subscription to the EXPLORER. Airmail service for members: \$55.  
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POSTMASTER: Please send address changes to AAPG EXPLORER, P.O. Box 979, Tulsa, Okla. 74101.  
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# Cape Town Awardees

Winners have been announced for oral and poster technical presentations made at the AAPG International Conference and Exhibition in Cape Town, South Africa.

The winners will receive their awards June 7 in Denver during the opening session at this year's AAPG Annual Convention and Exhibition.

The award winners are:

## Gabriel Dengo Memorial Award (Best international paper)

□ **Charlie Kerans**, Department of Geosciences, University of Texas at Austin, for the paper "Carbonate Grainstone Geobody Occurrence and Organizations."

## Ziad Beydoun Award (Best international poster)

□ **George Pemberton, Murray Gingras and James MacEachern**, for the poster "The Role of Bioturbation in Low Permeability Gas-Charged Reservoirs."

Pemberton and Gingras are with the University of Alberta's department of earth and atmospheric sciences, Edmonton, Canada, and MacEachern is with the earth sciences department at Simon Fraser University, Burnaby, Canada.

Pemberton was a 2008 AAPG Grover E. Murray Memorial Distinguished Educator award winner.

## President from previous page

is fundamental to bridge building.

Competition taken to extremes – win at any cost, "my way or the highway," self-righteous judgments about differing beliefs – is unhealthy and destructive. Unbridled competition can undermine integrity in athletics, lead to unprincipled leadership in business, cause academic breaches of ethics and promote physical conflicts between nations globally.

Likewise, on the other end of the spectrum, forced homogenization of any system dampens the individual desire to strive, inhibits growth and results in extreme control and power in the hands of a limited few who, ironically, often professed initially to believe in distribution of wealth and power.

Examples of both abound.

\* \* \*

In our profession and our industry, competition is healthy.

Companies compete to advance technology and science, to secure leasehold positions and to improve industrial processes. Universities compete to advance research and educate students. Cities, states and nations compete to attract industry to further economic growth.

Taken to the extreme, particularly in the volatile price climate that we now live within, competition to survive has resulted in unethical leadership. Enron comes to mind.

This kind of competition has resulted in unhealthy rivalries between fuel industries that are both necessary for prosperity: think natural gas and coal. Policy makers are often presented either/or choices by over-exuberant lobbyists, and the result is that those same leaders think we can simply install wind turbines and solve our energy and environmental problem in the next few years. Competition can distort reality.

Collaboration also is healthy. Joint industry partnerships address major challenges on a scale that cannot be solved by one company alone. Industrial consortia support academic programs driving leading-edge research. The Advanced Energy Consortium, which I direct at the Bureau of Economic Geology, involves 10 major companies that compete fiercely in the market-place working together in a major, pre-competitive research environment (see related story, page 6).

Collaboration in government can lead to healthy compromise and thoughtful legislation. Unfortunately, statesmanship is often frustratingly absent in politics as elected officials vote along straight party lines, forgetting sometimes that they are elected to serve the people for the greater good of a nation or state, even if it puts at risk their own re-election.

Of course, collaboration can lead to cartels such as OPEC, which has a noble mission – to minimize price volatility – but also a record at times of serving its members' self interests; a fine line to walk.

Taken further, cooperation can lead to collusion; illegal agreements intended to mislead, deceive or defraud.

\* \* \*

Competition. Collaboration. Each powerful in its own right, but unhealthy at the limit.

Together do they create a paradox? Competitive collaboration? Collaborative competition?

I think the answer is most certainly "no."

Enter Communication. When faced with a dilemma, open dialog immediately. Not e-mail, but in person – voice to voice. Establish quickly the concerns of all parties and well as the desires.

Seek a "trilemma" solution: What is it all parties need and how can working together not only meet the needs, but perhaps add new value that was not there before? Bring in an objective third party to offer suggestions. And finally, be willing to make real accommodations and true compromise.

In fact, when universities, companies, governments and professional societies work together and seek compromises to address the complex global challenges faced by our profession and industry, the result is more powerful and society better served.

A bridge worth building. □

*Scott W. Smith*

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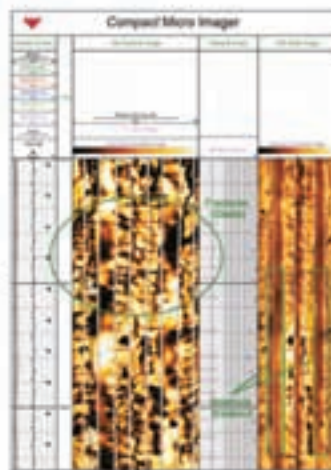


Image data obtained in a horizontal CBM (Coal Bed Methane) well with CMR on Well Shuttle.



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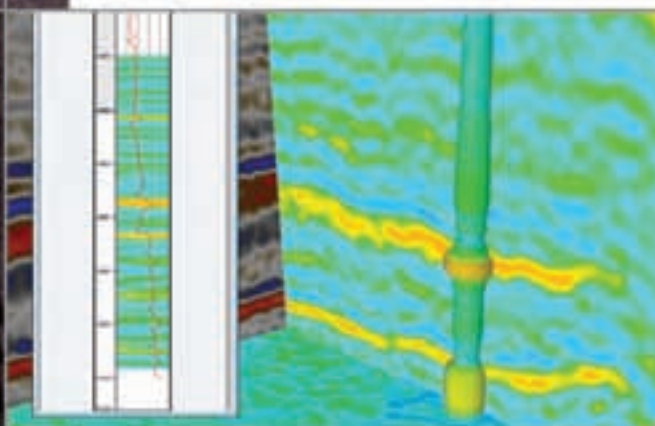
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## Getting to know you

## Nano Researchers Meet the Industry

By DAVID BROWN

EXPLORER Correspondent

Small technology. Big challenges. The Advanced Energy Consortium (AEC) in Austin has announced total funding of more than \$6 million for 27 separate nanotechnology research programs.

The idea is to develop useful applications of nanotech for the oil and gas industry – especially new nanotech sensors that could bring a quantum leap forward in enhanced recovery.

Will the money do any good?

Jim Tour, an AEC grant recipient, is a professor of chemistry and a nanotech researcher at Rice University in Houston. It will take



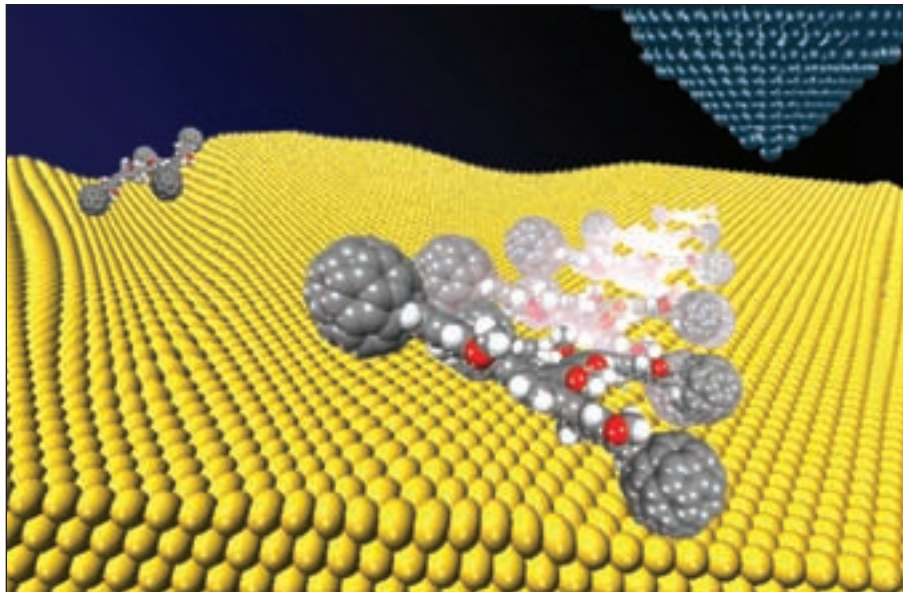
Tour

time for the AEC-funded scientists and researchers to develop practical oilfield applications in nanotechnology, according to Tour.

And the timeframe required depends largely on whether or not the AEC leaves the researchers alone, he said.

Only, it isn't what you think.

"A lot of it depends on what the consortium partners do," Tour said. "If they leave us academic types alone, it's going to take a long time."



Graphic courtesy of T. Sasaki/Rice University

The next big thing? Nanotechnology, a realm so small that geologists rarely consider its potential in hydrocarbon recovery, may be an important key to future operations. For example, researcher James M. Tour plans to build first generation nanobots (nano-sized entities that can gather and display information) suitable for oilfield application. Above, Tour's and collaborator Kevin Kelly's nanocars – single-molecule vehicles that measure 4x3 nanometers and have four buckyball wheels connected to four independently rotating axles and a organic chemical chassis. A similar concept – nanosubmarines? – could be used to gather data in oil reservoirs.

Tour is a leading researcher in the nanotech field. He received the Feynman Prize in Experimental Nanotechnology last year, and also won the NASA Space Act Award for his development of carbon nanotube

reinforced elastomers.

While he's worked on nanotech applications in national defense and health care, he admitted to knowing a minimum about oilfield work and petroleum geology.



"A lot of guys who've gotten funding are like me," he noted.

Which means, all of those pure researchers will need a lot of help and direction from the AEC to identify and work toward nanotech applications useful to the petroleum industry.

"If they're willing to come up to bat and to help us and to stand beside us in the lab, it will go much faster," Tour observed.

"If they're going to leave us alone, it's not going to go very fast."

## A Lot for a Little

Then there's the \$6 million in funding.

With public discussion of losses in the trillions of dollars and relief programs in the hundreds of billions, the number \$6 million sounds a little quaint – especially for researchers who use electron microscopes and molecule movers.

When \$25 million barely pays to fix a stretch of highway, \$6 million begins to seem like lunch money.

The AEC doesn't lack for deep pockets. Members of the consortium

See **Nanotech**, page 8

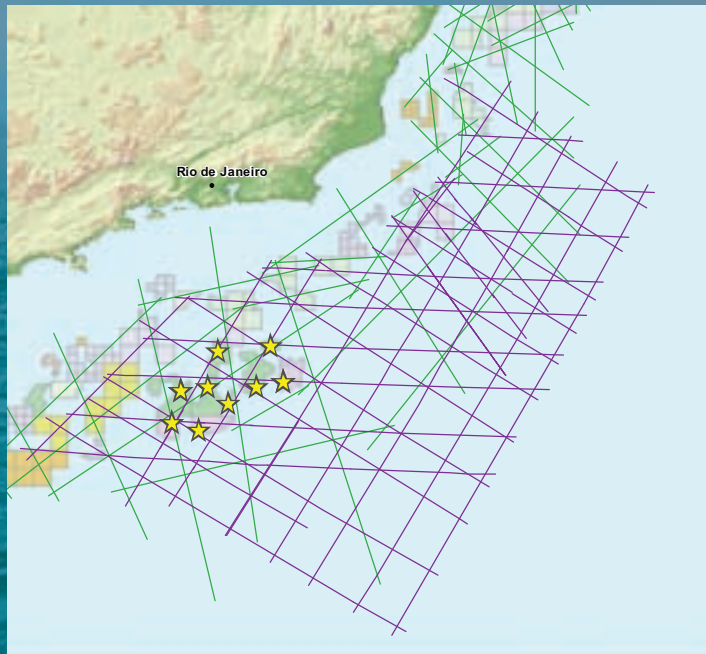
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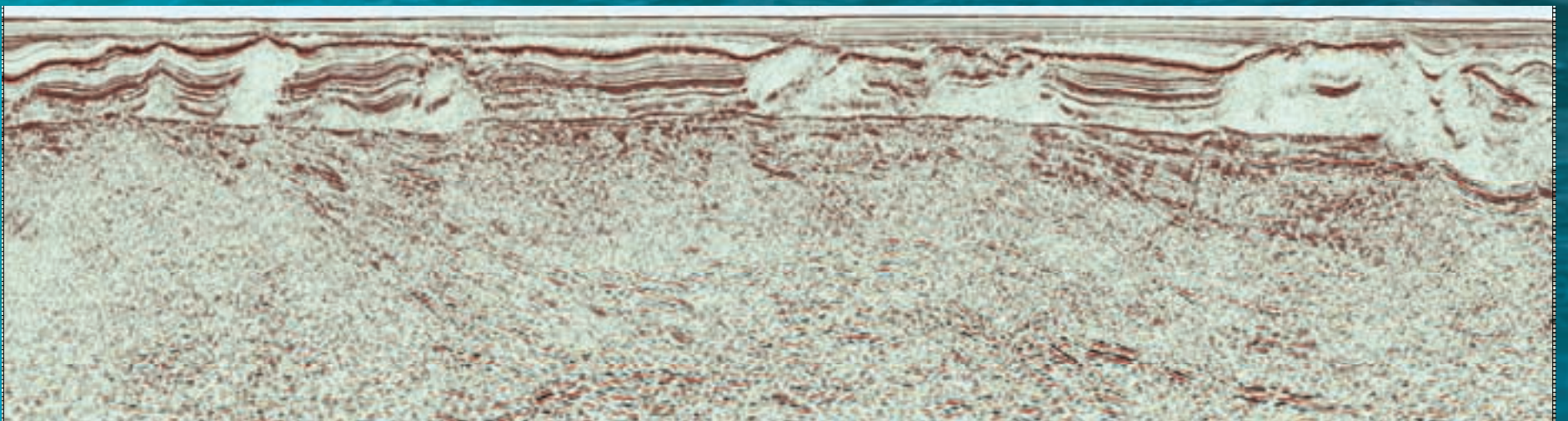


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evando.bartholazzi@fugro-br.com

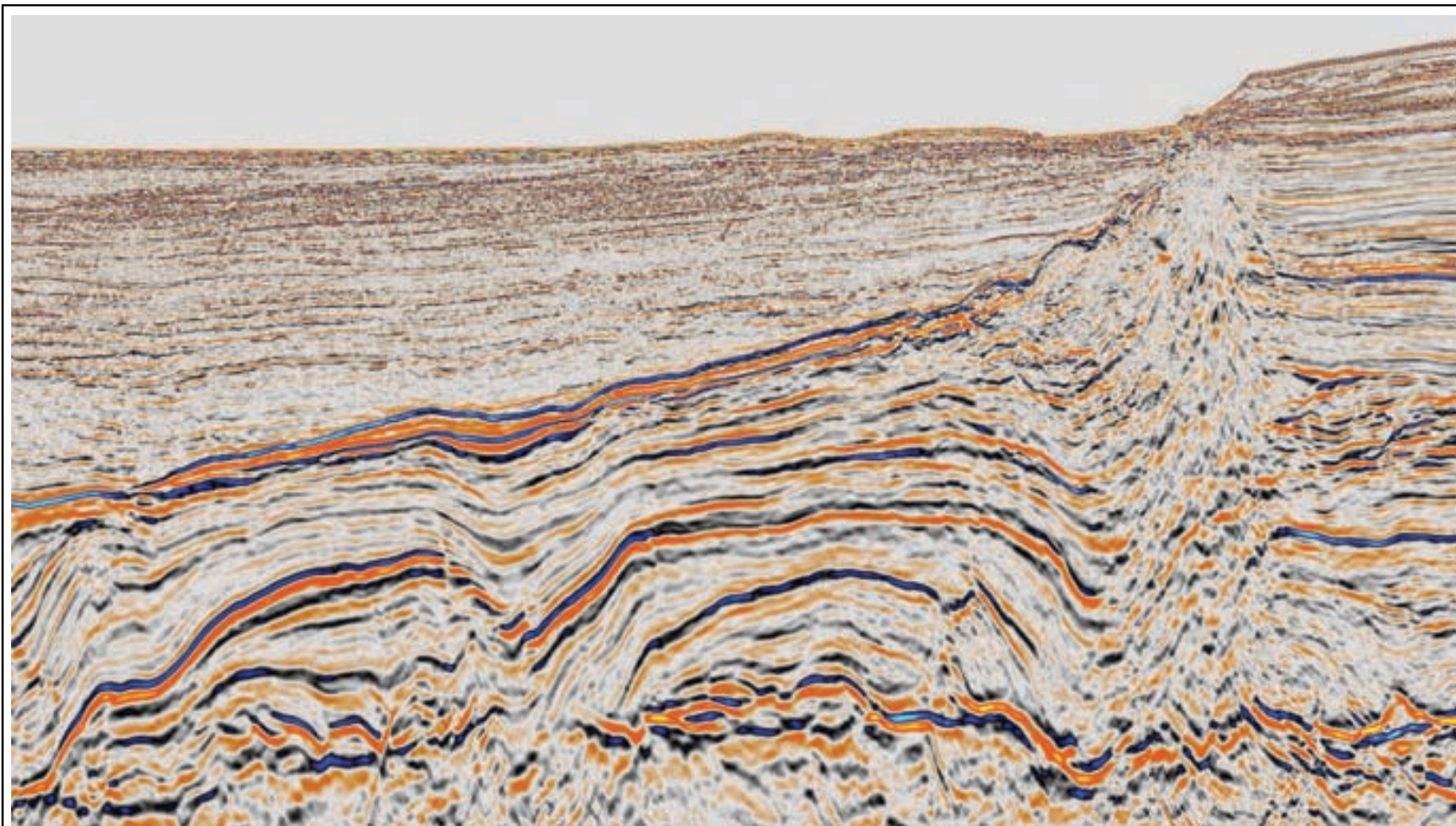
**Laura McAllan**  
713-369-5869  
lmcallan@fugro.com

**Mike Whitehead**  
713-369-5862  
mwhitehead@fugro.com

**Kenneth Mohn**  
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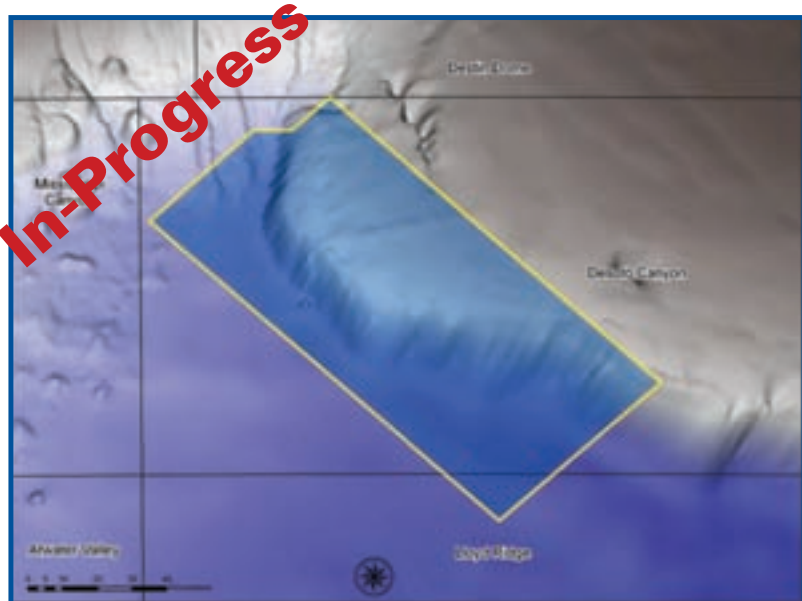




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## Nanotech

from page 6



Kipper

include Baker Hughes, BP, ConocoPhillips, Halliburton, Marathon, Occidental, Petrobras, Schlumberger, Shell and Total.

Jay Kipper, AEC associate director, said the

organization is well aware of the need to support and work with the nanotech researchers.

"One of the challenges we have is getting two really smart groups of people – the nanoscientists and the

petroleum scientists and engineers – communicating with each other," he said.

Meetings and focused workshops already have been useful and those successful efforts will continue, according to Kipper.

"We're spending a lot of time and energy developing tutorials, Web forums, presentations and podcasts, trying to get our nanotechnologists up to speed," he said.

The managing organization for AEC is the Bureau of Economic Geology at the University of Texas at

Austin. Given the Bureau's long history and deep involvement with the petroleum industry, it has plenty of resources for the task, Kipper noted.

"We've got a whole suite of tools we can access and people we can link up with," he said.

And the funding level turned out to be just right.

Luckily, nanoresearchers are cheap dates.

"They're pretty happy about the magnitude (of the grants). The size of the contracts is on the order of a couple of hundred thousand dollars

and up," Kipper said.

Also, the AEC's recently announced grants are only an initial round. Scientific progress will be rewarded with more funding going forward, depending on the degree and type of successful research results.

"We plan on giving out additional money in 2009," Kipper said, "but we don't know how much and we don't know when."

### Information, Please

Almost all of the AEC's initial funding recipients are programs at universities (see accompanying box on page 10).

AEC's original request for proposals last July targeted research "to develop micro- and nanoscale technology for enhanced reservoir characterization and hydrocarbon detection." Kipper said the request drew a large number of high-quality responses.

"Probably one in three was accepted. It was actually very difficult for us because they were super proposals we were getting – all of these proposals were top-notch stuff," he explained.

Kipper said the consortium wants research to focus on five areas:

- ✓ Sensors/Sensing.
- ✓ Power.
- ✓ Communication.
- ✓ Transportation control.
- ✓ Fundamental materials.

"The majority of the funding is focused on sensing," he noted.

"That's what the AEC is all about."

Powering such small devices will be a technical challenge, and "there's not just one correct answer, either. We're looking at a number of approaches," Kipper said.

Related problems of communication and control have to overcome corrosive downhole environments and the difficulty of working at such a small scale.

"Communication may be the single most significant issue for injectable sensor development," Kipper said. "These devices will have limited power, and we will have to overcome the attenuation of radio frequencies (RF) in brine-saturated rock."

Direct control of the downhole sensors is highly desirable, maybe even essential, but it also will be very difficult to achieve.

"We're going into a wet environment, so we're talking about nanosubmarines," Kipper said.

"GPS is not the proper term," he continued, "but you've got to be able to determine sensor location, so you know where the information is coming from."

### A Small Insight

Tour said nanotech can help the industry find and produce "left-behind" hydrocarbons, and improved recovery is the real driving force behind the AEC-funded research.

"It would be very nice if you could put a nanometer-size device down in the hole and it could give you information about what's there," Tour said.

But, "how do you build such a thing if it's going to have a power source, if it's electronic?" he asked. "And if it's not electronic, what are you going to build?"

Communication and control would probably require both a built-in power source and communication capability, Tour said. This indicates a device of at least a micron in size, or about 1/100 the width of a human hair.

See **Think Small**, page 10

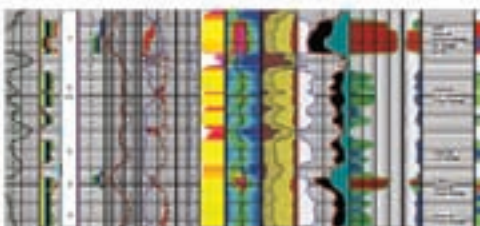


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\*Patent pending



## Think Small

from page 8

Of course, that's absurdly large for a rock-pore sensor device. You might as well be talking about a truck.

In his own work, Tour wants to develop a sensor no more than 1/10 that size. It might be around 100 nanometers by 30 nanometers, designed to carry a chemical sensing package into rock pores.

"We're looking at different structures. They have to be non-toxic, of course. Some are based on carbon scaffolds and some on silicon scaffolds," he said.

Those nanostructures will be loaded with chemicals that undergo changes when exposed to variations in temperature and pressure, the presence of salt and hydrocarbons, and so on.

"The moieties we append onto the nanometer-sized entities, which we're calling 'nanobots,' they will display that information," Tour said.

As the nanobots pass through the rock, they will record the types of environment they encounter along the way.

"We can build chemical groups that can tell us other things. For instance, how much hydrogen sulfide did it see?" Tour said.

"These are basic chemical reactions that occur between organic moieties, or organometallic moieties, and different environments. It's just that now we're appending these units onto the nanobots," he added.

Preliminary research steps prove the nanosensors can be created, according to Tour.

"We've demonstrated that we can

## Consortium Members

Almost all of the Advanced Energy Consortium's initial funding recipients are programs at universities. They are:

- ✓ Alberta Research Council.
- ✓ Boston University.
- ✓ California Institute of Technology.
- ✓ Georgia Institute of Technology.
- ✓ Harvard University.
- ✓ Kyoto University.
- ✓ Louisiana State University.
- ✓ Massachusetts Institute of Technology.

- ✓ Northeastern University.
- ✓ Northwestern University.
- ✓ Pennsylvania State University.
- ✓ Rice University.
- ✓ Tufts University.
- ✓ University of Calgary.
- ✓ University of California-Berkeley.
- ✓ University of California-San Diego.
- ✓ University of Michigan.
- ✓ University of Oklahoma.
- ✓ University of Texas at Austin. □

actually append on entities that can potentially allow us to interrogate, say, the amount of salt versus the amount of water," he said, "but we have yet to do the kinetics partitioning.

"We also have demonstrated their solubility in water," he added. "You have to get them truly soluble in water so you can pump them down."

To date, his researchers have "just begun the work of pumping these into core samples," Tour said, "but nothing has been pumped into the actual ground."

### Knowing Your Environment

Capturing information is only one part of a much bigger challenge in designing a nano-sized sensing device.

"What we are building won't necessarily give us a map of the route it took," Tour noted. "It will just tell us what the environment was like. It would be very nice to have some other source that gives you information about the path it took."

And therein rests the problem: How

do you get all of the capabilities into a unit small enough to enter and, ideally, pass through rock pores? How do you get it to communicate a location?

"That can be particularly hard in the downhole environments because you've got water down there, you've got salt down there. It's very hard to transmit signals, especially with this small package that has to be self-contained," he said.

There's also no guarantee that one of Tour's nanobots will survive the harsh environment. So, he's planning to pump down more than one.

"We will send down something on the order of  $10^{15}$ . It would be a thousand trillion – that would be a quadrillion," he said.

Even with a high mortality rate, more than enough nanobots should survive to provide meaningful information. Tour said he would like to recover enough to do statistical analysis.

"Fundamentally, we can recover one and get some information. Practically, if we recover  $10^6$  we would

be doing pretty well. But depending on the information we want, we don't need a lot of them," he observed.

### High-Tech Appeal

Tour has done a significant amount of work in nanotech and has already started considering ideas for oil and gas applications, even for downhole nanosensors.

"I've been thinking about this area for probably a year and a half," he said. "We've already made things that can apply to this area."

"I've never had any funding (for oil industry-related work) and that's part of the problem. This is going to be my first," he added.

AEC was founded to offer exactly that kind of funding – to nanoresearchers who had never considered applications for the oil and gas industry and had no support to do that kind of work.

Kipper said some of the scientists have been surprised to find out how technology-driven and even high-tech the oil industry is today. They'd thought of it as a low-tech business.

"This has actually been a good PR tool. It wasn't intended that way, but it has been," he said.

If results are successful, Kipper sees nanotech sensor technology as the next big advancement for the industry.

"This is sort of blue-sky research. We don't have any thought that all of this is going to work. If it does work, it's going to be phenomenal," he said.

And Tour expects to get both the funding support he needs and the expert advice he has to have from the AEC.

"From what I understand," he said, "they are eager to help." □

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## Price squeeze starts 'the dance'

# Seismic Projects Get New Scrutiny

By LOUISE S. DURHAM  
EXPLORER Correspondent

It's perhaps an understatement to say the last few years of impressive commodity prices and all-out activity in the oil and gas industry have been exciting for everyone involved in the business.

And although volatility is a hallmark of oil and gas prices, the most recent, unusually vicious freefall in prices seemingly was not on anyone's radar screen.

"Those of us with gray hair have seen it all," said Steve Mitchell, vice president and division manager at Fairfield Industries.

"We saw it go from \$70 to \$10 pretty quickly, but not as quickly as this particular fall came.

"Most everyone wasn't looking over their shoulder enough, because we got slammed in the back with this one," Mitchell added.

"Plus, there's the news media blitz of recession, recession, recession, making you think you'd better hunker down before you want to because the market's down," he said, "so deciding where you need to conserve can become a very delicate line."

### Riding the Cycle – Again

But this is a business rife with risk takers who have become adept at weathering the down times – and equally adept at taking advantage of these troughs to prepare for better days ahead.

"You naturally go into a survival mode, knowing that budgets and projects are going to be cut," Mitchell said, "and that the service contractors have gotta dance.

"Yet by the same token, as you ax, cut,

Still rolling: Apache Egypt, working with geophysical services provider CGG Ardiseis, utilized 12 vibrator trucks to acquire an unparalleled 678 vibe points per hour on this project. Despite current conditions of uncertainty today, geophysical companies are keeping busy on projects that will be needed tomorrow.



Photo courtesy of Apache Corp.

conserve cash you know it will come back," he said. "And the one thing you have to do is keep the technology going – not just R&D but getting the product to market – so you're not a has-been when it does come back.

"Technology is such a buzzword, but what's key is technology that can be readily seen to save money for both the contractor and the client," Mitchell said. "When the end-user oil company can see it will cost less yet give the same quality data or better, that's when you've got a winner."

Mitchell noted the healthy companies that exercised discipline during the recent high-flying times are continuing to develop new technologies despite the current

slowdown in the industry and the global recession.

In addition to the contractors, certain E&P companies are doing their part in designing and developing new tech applications with an eye to the future.

"We know the business is cyclical and will turn around," said AAPG member Mike Bahorich, executive vice president for exploration and production technology at Apache Corp. "And we know there are a lot of things the industry needs to do to be more successful when it does turn around – and I'm absolutely comfortable the industry will come out of this.

"What happens when times get tough, people are forced to innovate," Bahorich



noted. "As the saying goes, necessity is the mother of invention, so as we have lower prices we're forced to come up with new methods for doing things more efficiently to produce oil and gas at a price the market will bear."

### The Silver Lining?

Industry downturns can actually be advantageous for certain companies.

An example is TGS, which is 95 percent-focused on multi-client seismic, using a business model that entails putting together multi-client projects and then chartering other companies to acquire the data.

"In down times like now, the oil companies will start putting downward pressure on day rates for geophysical vessels," said AAPG member Robert

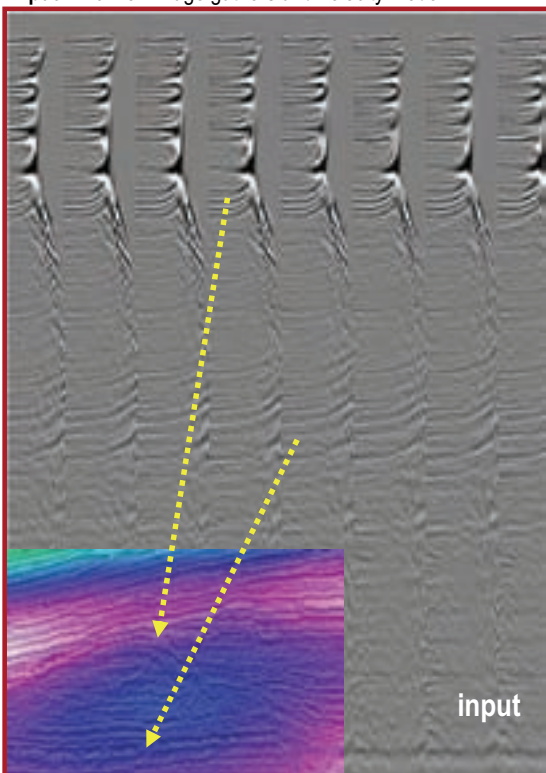
See **Outlook**, page 14

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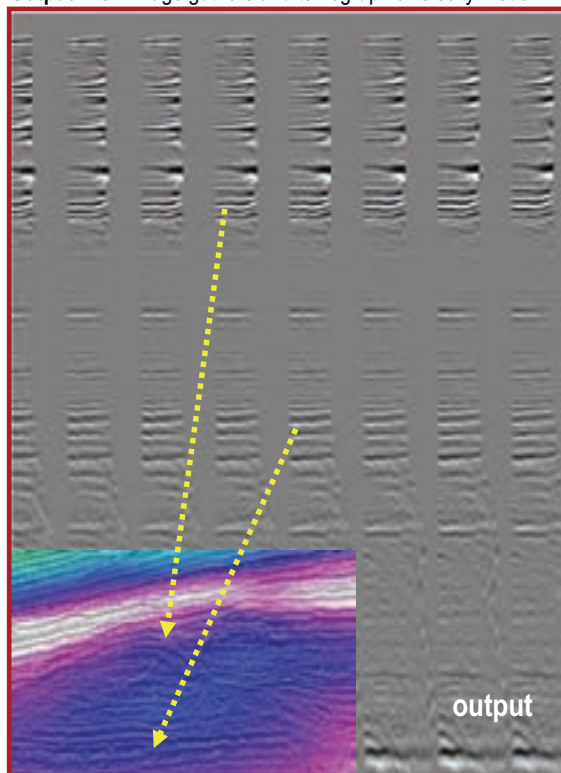
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## Outlook

from page 12

Hobbs, COO at TGS. "Because we're only taking charters for these vessels for individual projects or a short-term string of projects, we can take advantage of these lower rates.

"Because of this very flexible business model, we look at times like this as opportunity to gain market share," Hobbs noted. "We can put together multi-client projects at very efficient rates by taking advantage of the lower vessel costs."

"We're careful about evaluating new projects," Hobbs emphasized. "Part of that is thinking ahead to when there's an upturn.

"We want to make sure projects we acquire are in areas we believe will see enhanced E&P activity and, therefore, enhanced sales when things pick up," he added.

## One of the dark holes of previous downturns in the industry has been that old bugaboo: layoffs.

There are a number of innovations currently in progress that may increase efficiency in the industry, according to Bahorich.

He cited, for example, advances in horizontal drilling.

"There are new technologies out there that may enable a much larger number of frac stages in a single horizontal lateral," Bahorich said. "Once you've drilled a horizontal well and put in a number of frac stages in that well, the net developing cost for one additional frac stage is very low because you have the horizontal drilled and

all the infrastructure is in.

"So it's just the amount of money needed to put one set of perfs and one additional pump job of proppant and fluid," Bahorich noted. "The development cost in that case can be fifty cents an Mcf.

"Driven by that, you'll see rate acceleration, higher EURs and lower development costs through much more densely stimulated wells," he said.

### Eyeing the Innovations

Regarding the geoscience side of the

industry, Bahorich views high density seismic on land to be one of the most exciting technologies to emerge. He noted the combination of very high-density sources and very high-density receivers is "just around the corner." The result will be still-more improved, more cost-effective imaging.

Marine seismic is one focus of Apache's technology expertise.

"We have a patent pending on a new method for shooting marine seismic," Bahorich said. "It's a new method for designing infill that involves a unique shooting geometry.

"It saves 10 to 20 percent of the cost and gives you equivalent data," he said.

"Considering that seismic boats can run a half million dollars a day, savings of this magnitude can be quite significant."

The company also has a patent pending on a logging technology for exploration of unconventional reservoirs.

The technology solves the problem for certain zones where there's no log response associated with pay. It enables the operator to see gas pay where, in some instances, it's invisible with traditional logs.

Bahorich emphasized Apache develops ideas in-house and works with outside partners to develop them.

Besides spurring technical innovations, industry downturns offer numerous opportunities for large companies as well as the not-so-large to gain muscle by acquiring assets and/or whole companies at attractive prices.

Apache appears well positioned to take advantage of the situation given that it has close to a cool \$2 billion sitting in its coffers, according to president and CEO Steve Farris.

"We're very interested in making significant asset acquisitions, both domestic and international," Bahorich said, noting the company typically buys assets as opposed to companies.

### Lay Off the Layoffs

One of the dark holes of previous downturns in the industry has been that old bugaboo: layoffs.

There's optimism this time may be different given the major effort to staff-up over the last few years after letting so many employees go during past rough patches in the industry – the late '90s being the most recent trough.

To date, there's only been a trickle of announced cuts in personnel.

Most companies appear to be maintaining the status quo or – in some cases – beefing up staff to be prepared for a rebound in commodity prices. Devon, for instance, is said to be expanding its U.S. intern program this year by 15 percent.

Brazilian NOC giant Petrobras, which is sitting on billions of barrels of newly-discovered oil offshore, announced it's hiring personnel and cutting costs in other areas.

Apache has decided to avoid layoffs at this point, according to Bahorich. This mirrors the path the company took in 1998 when its peers were downsizing staff. In fact, he related they went to such extremes to cut costs via other means they actually followed one employee's advice to get rid of all styrofoam cups in the building.

"We didn't think it would save much," Bahorich said, "but we were looking at every possible cost savings.

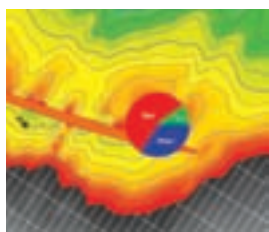
"Right after that, the turnaround came," he said, "and we were back in business."

Despite the general consensus that the current slump is temporary, Mitchell noted he thinks the business is facing a tough year – or perhaps slightly more.

"After that I think all of a sudden, it's gonna be like it was in the '90s," he said. "We'd all been beaten up so long, and all of a sudden we turned around and it's getting better – you don't realize it." □

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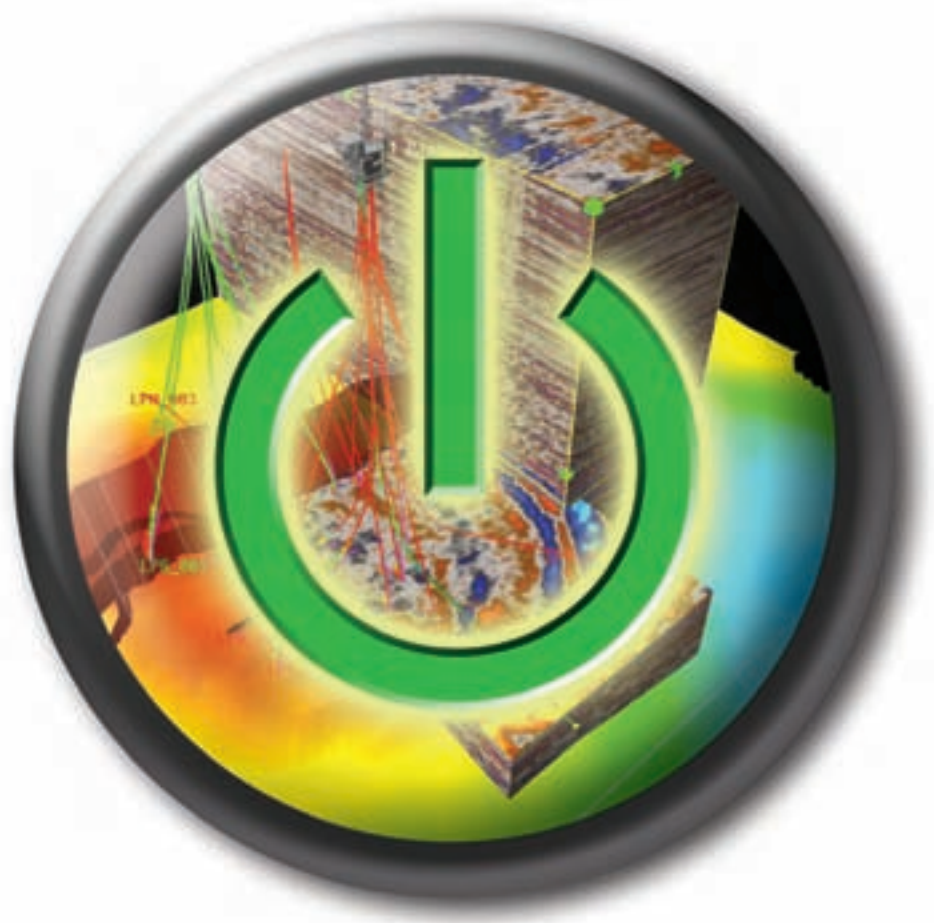
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## 807 sensors used

## OBS Data Answer Field Questions

By LOUISE S. DURHAM  
EXPLORER Correspondent

You don't have to dig too deeply to know that optimistic stories about the world of E&P are, to be kind, becoming hard to find.

Still – surprisingly? – oil field activity actually is chugging along as usual for many folks, even in today's complex and unusual business environment.

For example, the large scale, deepwater Gulf of Mexico programs that require many years to segue from concept to production and development are not based on commodity prices at any given time, meaning they tend to keep on going whatever the market environment.

This deepwater action continues to rock 'n' roll in large part because the sophisticated, savvy operators who venture into these typically high risk, pricey plays are always on the prowl seeking new technology to bring improved efficiency and cost-savings to each and every project.

One high-tech application garnering increased attention is the use of ocean bottom seismic (OBS) nodes to acquire seismic data.

The deepwater Gulf is rife with subsurface salt sheets that severely distort seismic signals resulting in an inferior image of the deep, complex reservoirs.

A now-proven solution to this problem, particularly for development projects, is all-azimuth illumination using OBS node technology to acquire full, or true wide azimuth seismic data via recording in all directions, according to Mike Spradley, acquisitions marketing manager at



Photos courtesy of Shell E&P

Deep sweep: Ocean bottom seismic nodes were deployed in the Gulf's Deimos Field.

Fairfield Industries.

This is a stark contrast to conventional streamers that routinely record narrow azimuth data with a single illumination direction or else re-shoot in several directions to acquire additional azimuth data – an expensive undertaking.

#### Pass the Salt

The Shell-operated Deimos Field in 1,000 meters of water in the Gulf's Mississippi Canyon area is the site of a recently completed OBS node technology application using Fairfield's Z3000 node system designed to work in water depths

down to 3,000 meters.

The Deimos OBS 3-D program took place in 2007 and covered about 134 square-kilometers. It was only the second deepwater node survey worldwide, according to Frans Smit, senior operations geophysicist at Shell E&P Co.

The initial deepwater node program – using the same Z3000 system – wrapped up successfully in 2006 at BP's Atlantis Field in the Gulf. BP is Shell's non-operating partner at Deimos.

Deimos sits beneath a salt overhang that had prevented adequate imaging of the site. As a result, when the Shell folks began developing the field about two




years ago, they quickly recognized they needed a whole different kind of seismic data because there were myriad uncertainties about the volumes, where to put the wells, what field development system to select, etc.

"We felt we needed more certainty to determine a final development plan," Smit said.

"We did some testing with long offset streamer data before the node survey, and it was established we needed very long offsets," he said. "It would be very expensive to get these offsets (using streamers), and we had infrastructure in the area that would make it difficult to acquire a survey like that."

"When you want wide azimuth (WAZ) over a small area, it's very hard to make it economically efficient," Smit added. "We

See [Deimos](#), page 22



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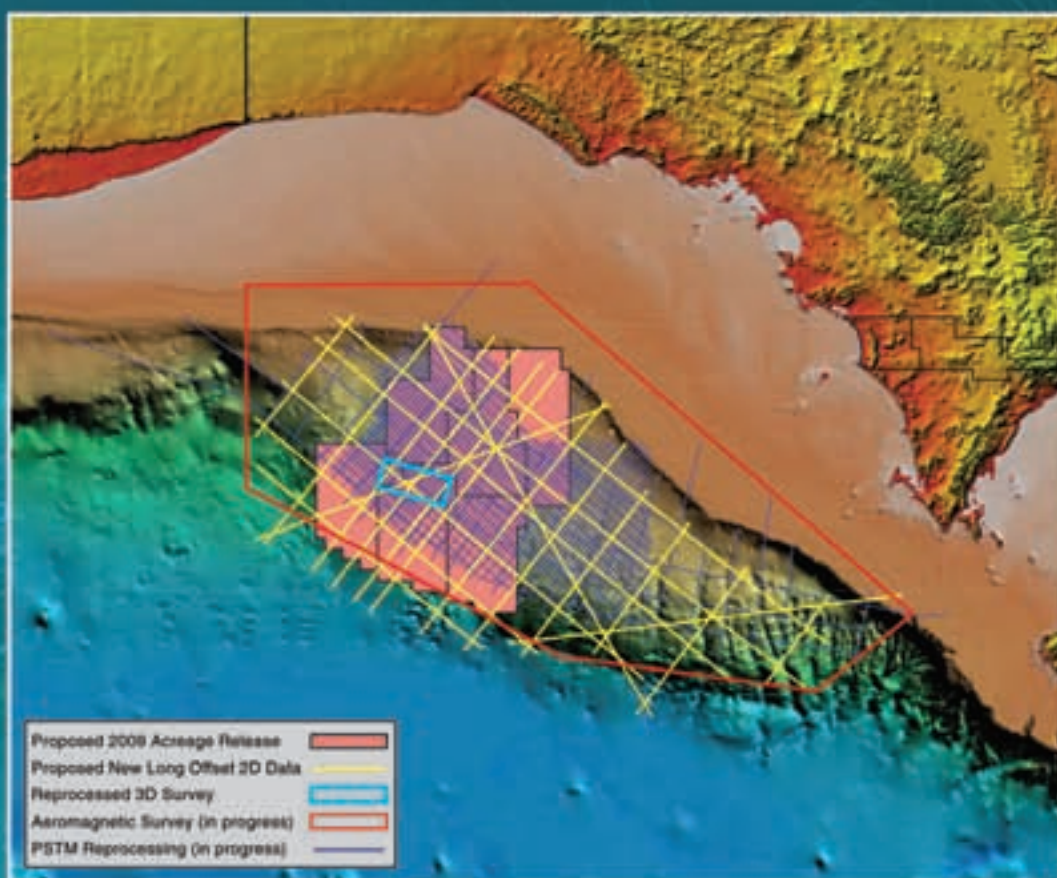
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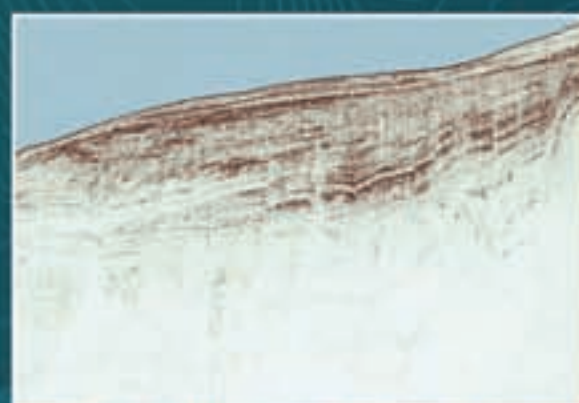
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Rachel Masters  
P: +61 8 9420 6080  
M: +61 408 00 77 99  
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## A 4-D confidence builder

## OBS Passes Repeatability Test

By LOUISE S. DURHAM  
EXPLORER Correspondent

An ocean bottom seismic (OBS) node 3-D survey at the Shell-operated Deimos Field in the Gulf of Mexico included an unusual twist.

Geophysical contractor Fairfield Industries and Shell implemented a 2-D node repeatability study simultaneously with the 3-D survey that took place in 1,000 meters of water.

The late 2007 repeatability study proved to be a giant step forward in documenting the ability to acquire time lapse, or 4-D, seismic data, via nodes on the seafloor. Repeatability, i.e., accurate repetition of each successive survey over time, has long been the challenge to successful 4-D application.

During the productive life of a field, changes in hydrocarbon saturation and pressure occur in the producing reservoir(s), impacting how the reservoir behaves. Time-lapse technology can help significantly to identify exactly where the changes occur, enabling reservoir monitoring and, subsequently, improved reservoir management.

Time-lapse surveys have proved to be a valuable tool for reservoir management in the North Sea. One high profile area is the BP-operated Valhall Field in Norway where BP installed a permanently placed ocean bottom cable system (OBC) in 2003.

#### Will It Work?

A downside to installing – particularly trenching – an OBC system for 4-D purposes is the considerable up-front cost,



Photo courtesy of BP (Atlantis)

OBS node deployment by ROV in the Gulf of Mexico's Deimos Field.

especially given that the need for testing may diminish as the reservoir becomes more predictable.

Towed streamers are another option for 4-D that has proven quite successful in a number of instances over the years. Some industry folks, however, question just how accurately streamers can go back and record over the same exact place. Infrastructure poses yet another obstacle to application of this technique, resulting in holes over some of the survey area.

In contrast, autonomous self-contained OBS nodes can be placed most anywhere on the seafloor, no matter how dense the congestion.

Nodes are deployed via remotely operated vessels (ROVs), ensuring positional accuracy and repeatability,

according to David Hays, vice president of the technology group at Fairfield.

"For us, at the start of the Deimos survey, there were two purposes," noted Frans Smit, senior operations geophysicist at Shell E&P Co. "First was to do the repeatability test, and second was to actually see Fairfield's deployment and retrieval methods in operation."

"Deploying 20 nodes ahead of the survey, retrieving them and downloading the data from each with 100 percent success gave us a lot of confidence," said Smit, who helped design the repeatability program at Deimos along with Fairfield.

Hays noted no one has ever conducted a full-scale time-lapse seismic experiment with nodes.

"We didn't this time either," he said, "but

we wanted to get insight into how nodes would measure up compared with other methods by doing a limited study where we just acquired one swath within a 3-D survey.

"Before we started production on the 3-D survey at Deimos using our Z3000 system, we laid out 16 nodes on a single 2-D line in the normal positions they would occupy in the 3-D grid," Hays said. "We then shot a swath of seven dual source sail lines into that one receiver line of nodes during what we refer to as Day 1."

Hays distinguished sail lines from shot lines, noting the boat has two gun sources on it, so there are two separate tracks of shots that are acquired in one sailing, or one pass of the boat. In the swath there are seven sail lines that produce 14 actual shot point tracks.

In addition to the initial 16 nodes deployed, there were four extra nodes laid out side-by-side – or co-located – with four of the regular grid locations, Hays noted.

"The purpose was to give a side-by-side look if you had identical shots and replaced a node almost exactly on top, just how repeatable the data would be," he said. "We did this as kind of a sideline experiment."

#### Staying True to Life

After acquiring the swath of data into the one line of 16 nodes, then those original 16 nodes were recovered via ROV, and the data were downloaded and set aside.

"On Day 6, it was time to begin the

See [Repeatability](#), page 20

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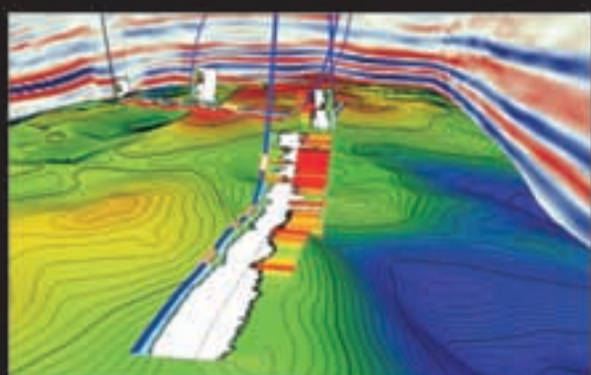
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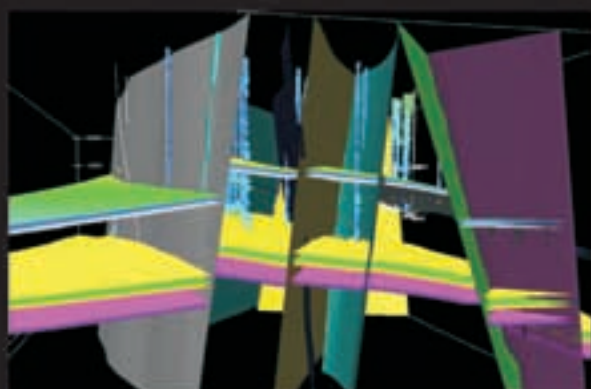
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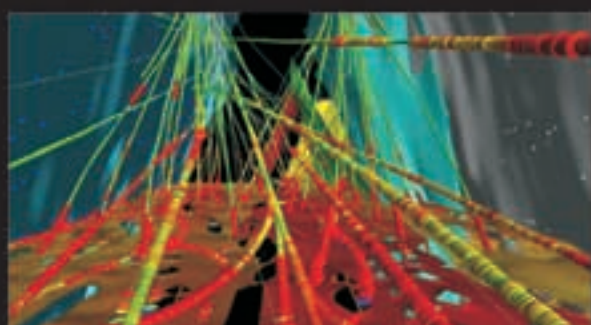
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## Repeatability

from page 18

production 3-D survey," Hays said. "But before getting started on that, we went down to the same line and redeployed 16 like nodes with the attempt of getting back to the same location, knowing we wouldn't precisely get to it but to the same nominal grid location."

Smit noted the instruction for this redeployment was not to search for the imprint of nodes on the seafloor from the first layout but to place them where they thought they should be.

"I later looked at the diving video," Smit said, "and it showed that the ROV operators did not get out of their way searching for the imprint of the previous deployment. They instead redeployed the nodes where they determined they should be, as will be the case in a 'real-life' 4-D survey."

This second set of 16 nodes was subjected to a second acquisition via the seven sail lines, and the node set stayed on the seafloor for the 60-day duration of the Deimos acquisition program.

On Day 45 the crew was back over this same location and acquired another set of seven sail lines – constituting the third experiment – as part of the production 3-D.

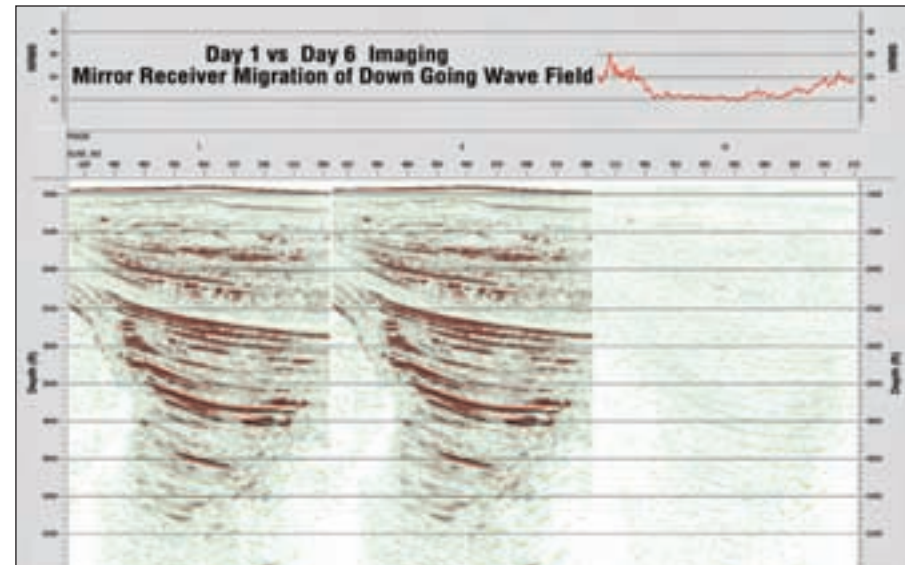
Following completion of the 3-D survey on Day 60, one last shooting occurred before the 16 nodes were recovered.

### Repeat Performances

In a perfect world, the data acquired from a repeatability exercise such as Deimos could be processed to form a seismic image to hand off to the interpreter. All would be identical, and nodes could be declared absolutely repeatable.

Forget perfect world.

"They're not decidedly identical and are



The acquisition on Day 6 (the monitor survey) is a good repetition of Day 1 (the baseline survey) with an NRMS statistic of 10 percent (ignoring edge effects).

different for various reasons," Hays said. "But you can measure those differences, and there's a statistic that's calculated to come up with a hard number to quantify that difference."

It's known as normalized root mean square (NRMS).

Simply speaking, when the NRMS number is low the data are very repeatable, according to Hays, who noted, "If it's zero, you have identical sets of traces from the experiments."

Hays cited differences encountered at Deimos.

"Between Day 1 and Day 6 (data), we had rather typical statistics of 10 percent NRMS, which is good," he said. "In the North Sea, streamer typically is 20-50 percent and OBC typically is 15-25 percent."

"The positive news of the story is in the deepwater environment, seismic data acquired by nodes is very repeatable, more

so than streamer and OBC," Hays said.

"They're fairly easy to put back close to where they were originally – in this case it was about five meters."

"You could never control an eight-kilometer-long streamer and varying currents and put every trace back with that precision," Hays pointed out.

### Convinced

When doing the comparison of Day 1 and Day 60, the NRMS registered a still-respectable 20 percent – but also prompted the question, "what's different this time from the first time?"

"In that 60 days, the conditions in the ocean changed, affecting the temperature and salinity of the water," Hays noted.

"One of the important things we learned is that to get a repeatable survey, then processing has to comprehend the wave speed differences in the water layer itself,"

he said. "Water is more dynamic than the crust of the earth, so things can change."

"It's a complicating factor," he said, "but when comprehended properly that repeatability statistic goes down."

"The hypothesis was that nodes will be a good tool for time lapse, and the conclusion is that's right, based on this experiment," Hays said.

Smit noted three pertinent aspects of the repeatability program:

- ✓ The survey showed the importance of subsea positioning – being able to get to the same location with new nodes.

- ✓ The ability to repeat source positions, especially in the presence of loop currents like in the Gulf.

- ✓ The shearwave noise on the vertical geophone is very location dependent and non-repeatable, so it's quite critical that this noise be removed, and the Fairfield processing showed this can be done.

"This test did a lot to convince us at Shell that OBS node technology is suitable for time-lapse seismic," Smit noted.

"It likely could be a part of future projects," he added.

Hays noted that while time-lapse seismic is common in the North Sea, it's not common in the Gulf of Mexico. He emphasized, however, that its value is being recognized, and it's positioned to become a key component of many programs.

"It will catch on, especially in these high dollar fields where the wells are so expensive," he said. "They really want to exploit these fields with maximum efficiency."

"You can replace a lot of guessing with data if you acquire the seismic signal more than once," Hays noted, cautioning that "not all fields have a strong 4-D signal, and those are hard to do."

"For the ones where producing the reservoir does change the seismic response," Hays said, "time-lapse is highly useful." □



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*Neftex Regions  
showing current lines  
of chronostratigraphy  
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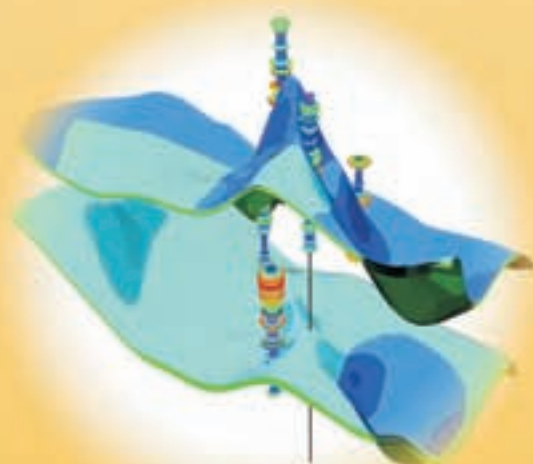
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- *Global portfolio of play schematics*

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March 2009

## Midland Valley

Structure  
World

In this month's edition of *Structure World* we announce details of an upcoming CO<sub>2</sub> storage project with StatoilHydro; update you on our Field Mapping Training and Support Initiative; and our interpreters tip covers the importance of integrating topographic and geological data.

**2009 Technology Meeting  
"Structural Geology  
in Uncertain Times"**

**15 - 16 Sept 2009, Glasgow (UK).**

Papers are invited from all areas of structural geology. Sessions will cover the oil and gas industry; CO<sub>2</sub> storage; mining applications; and academic teaching and research.

**Abstract deadline 30th April.**  
Email [events@mve.com](mailto:events@mve.com).

**Geo Team look forward to CO<sub>2</sub> project**

Midland Valley is excited to be starting a new project for StatoilHydro, and its Joint Venture Partners BP and Sonatrach, on the In Salah CO<sub>2</sub> storage site. The In Salah storage site is one of the biggest CO<sub>2</sub> capture projects in the World and has been in operation since 2004. The In Salah CO<sub>2</sub> project has a strong research focus with Universities and National Laboratories across the globe working on data from the site. Midland Valley will be using its skills in structural restoration, strain capture and fracture analysis to help understand the potential movement of CO<sub>2</sub> in the sub-surface.

Midland Valley hope to be able to share this project experience at our September Technology Meeting.

For further information on the range of consultancy services we can provide contact [help@mve.com](mailto:help@mve.com).

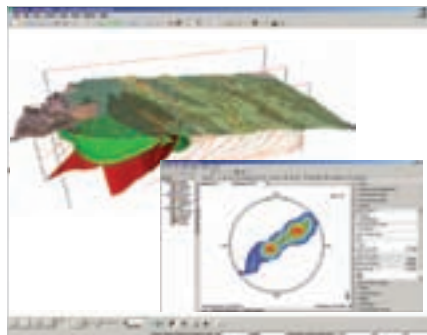
**Interpreters tip: The importance of integrating topographic and geologic data**

Visualising diverse data in the same 3D space provides an in-sight into the geology that analysis of distinct datasets cannot. Dataset integration into a single 3D space allows correlations to be made between the data, and compatibilities and inconsistencies to be identified. For example, geological models constructed by integrating a digital elevation model (DEM) and surface geology data can quickly reveal mis-matches between the topography and the interpreted trajectories of geological contacts.

Model construction and validation from integrated datasets are key features of 2DMove and 3DMove. The combination of data visualisation and model construction allows continual reference to data points when extrapolating to build a model or cross-section. Knowing which data points have been used is important for model QC. Ultimately integrating 3D datasets and creating 3D models is the best method of validating and communicating geological concepts and ideas.

The 4DMove component of Move2009

has been specifically designed with data integration and visualisation in mind and contains multiple tools to facilitate this. Geological maps, DEMs, field measurements, cross-sections, seismic data and well information can be imported in the most commonly used industry formats. The different data elements can be visualised in the same 3D space, and analysed together using the attribute analysis tool, all within 4DMove.



Cross-sections constructed and validated in 2DMove, visualised in 4DMove, integrated with DEM and geological map. Inset: field data plotted in 4DMove's attribute analyser.

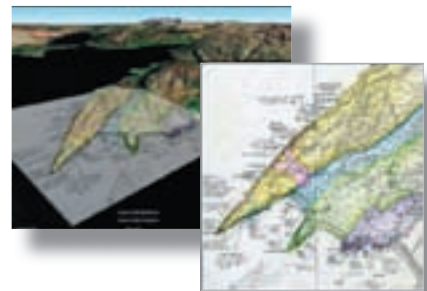
4DMove is available for \$7000. For more information on how you can use Move to integrate and visualise data and models, please contact [help@mve.com](mailto:help@mve.com).

**Midland Valley University Field Mapping Initiative (FMI) Meeting January 2009**

Earlier this year members of the FMI got together in Glasgow for their 2<sup>nd</sup> consortium workshop. The FMI brings together representatives from 8 leading geological departments across the globe and aims to develop a close integration between the traditional skills of field mapping and the use of sophisticated computer-based modelling techniques.

An excellent outcome of the meeting was the FMI members sharing their experiences of how they are using Move software a teaching tool, in particular, the students reaction to Move. At the end of the meeting everyone left with a new perspective and lots of ideas on how to improve and expand the teaching of field mapping to undergraduate and postgraduate students.

The next step for the consortium is to pool the collective information and make the training materials available for all universities wishing to improve field mapping teaching in their department.



Integrating Move with traditional mapping techniques from a 2<sup>nd</sup> year field trip. Images courtesy of University of Birmingham.

For more information visit the FMI section on our website [www.mve.com](http://www.mve.com) or contact [joanna@mve.com](mailto:joanna@mve.com).

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**The structural geology experts**  
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## Deimos

from page 16

were automatically drawn to nodes because that tends to be more economical for a limited area."

### Starting With Seismic Modeling

The node program at Deimos kicked off with a seismic modeling exercise to determine the optimal placement of the nodes on the ocean floor during acquisition. The modeling process utilized a wave equation modeling (WEM) method that handles multiples capably.

The modeled data reaffirmed that very long offsets acquired at a range of azimuth angles would be critical to illuminate the target, Smit said, noting these long offsets effectively undershoot the salt body.

There were a number of node deployment scenarios modeled to ensure maximum illumination of the sub-salt target area. Smit said the modeling gave them considerable confidence the program would be successful.

The plan was to cover the target area in a single patch using all of the available nodes, which numbered 900, according to Reagan Woodard, Fairfield's operations supervisor for the Deimos project. He said 807 nodes ultimately were used.

Prior to the actual survey, a select number of nodes were deployed on the seafloor, acquiring a limited amount of data before being retrieved, according to Woodard. This served a two-fold purpose:

- ✓ To determine the optimal gain setting for each type of sensor.
- ✓ To verify the operational readiness of the nodes and the deployment/retrieval methodology.

### The Work Begins

Field operations at Deimos were implemented via a remotely operated vessel (ROV) and a dual source shooting vessel.

Each Z3000 system autonomous node is an independent self-contained unit with a battery and highly accurate clock. Deployment on the ocean bottom using an ROV ensures positional accuracy as well as repeatability.

Smit noted a major advance during the survey entailed the efficiency gained via use of a nodebasket – a tool newly developed by Fairfield for the operation. Once operational, the nodebasket reduced the strain on the ROV significantly by limiting the number of ROV trips required.

The acquisition logistics at Deimos were governed in large part by the 60-day battery life of the nodes.

"All of the relevant data had to be recorded before the nodes were retrieved to recharge the batteries and download the recorded data," Woodard said. "During the survey, the speed with which the nodes were deployed and retrieved proved critical to the rate of progress."

As valid testimony to the operational flexibility of ocean bottom node acquisition in highly congested and otherwise challenging environments, all nodes were deployed and retrieved as planned, according to Spradley.

Adding to the infrastructure challenge at Deimos, there were strong loop currents in the area. This would have made streamer operations even dicier than usual, particularly long streamers, Woodard noted. Repeatability, which is a fundamental feature of node surveys (see related story, page 18), would have been impossible using streamers.

The pre-processing stage of the Deimos program focused on delivering four principal products:

- ✓ Accurate source and node positions.
- ✓ Accurate timing of the recorded data.
- ✓ Removal of any S-wave leakage on



the vertical geophone.

✓ Splitting the data in up-and-down-going wavefields.

A global process was used to deal with the post survey positioning calculations as well as the uncertainties in the timebreak of the recordings. Regarding shearwave leakage, a method was used where removal of the leakage was closely linked to the wavefield separation.

The pre-processed data were taken through mirror migration, initially using the same WEM algorithm utilized for the modeling, according to Smit. Using this approach – which is especially effective in deepwater environments – the downgoing energy is used for imaging.

### Big Advantages

A comparison of the resulting OBS node data with existing narrow azimuth data revealed significant improvements on the nodal data in terms of S/N, multiple content and structural definition, especially under the salt overhang.

"One of the big advantages for us on the interpretation and processing side was the ability to test a lot of alternative velocity models very quickly," said AAPG member Mark McRae, senior staff geophysicist on the Deimos Field team at Shell. "That's a function of the way OBS is acquired."

"When you process the data you do a reciprocal operation on it so you turn the nodes into shots in the processing," McRae said. "We had 807 nodes, so when we process and migrate we only have to do 807 shot migrations, whereas with a conventional WAZ you do a whole lot more shot migrations."

"The very fast migration turnaround times were very beneficial," McRae added. "As an interpreter, I need to test many models."

More specific to the interpretation, McRae said their well-to-seismic ties are substantially improved with OBS nodes. He noted this is relative to the two different directions of narrow azimuth streamer data they have over the area.

"A key point there is that in tying seismic to wells, we're now for the first time in the Deimos Field confident we can see the hydrocarbon fluid effects," McRae said. "We can see an amplitude effect that is correlatable to where the hydrocarbons are in the reservoir."

"This gives us a lot more confidence in future development of the field," he added.

When queried about the business value of the Deimos node program, McRae noted they're extremely pleased with the investment they made and highly confident they'll do well relative to the investment.

McRae acknowledged BP – fresh off its Atlantis Field Z3000 node survey – for working closely on the Deimos project and aiding their ability to acquire good data.

The program clearly attracted a lot of attention.

"We get questions about node surveys almost every week," Smit said. "There's a lot of technical interest."

"But these sort of surveys also are very expensive," he cautioned, "and each asset must consider their commercial aspects." □



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# Explore more



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## Getting to the nitty of Barnett's gritty

## Studies Shedding Shale's Secrets

By DAVID BROWN  
EXPLORER Correspondent

Today, advanced seismic and reservoir characterization tools are being used increasingly in unconventional resource plays, even in shales.

That's a little surprising.

Not long ago, operators approached unconventional plays with a basic geological understanding and application of technology for production.

All the learning curve was thought to be on the technology side – drilling techniques, use of horizontal wells, lateral length, fracture stimulation methods.

But consider this: Southwestern Energy Co. began drilling its highly successful Arkansas Fayetteville Shale play largely without 3-D seismic, and employed 3-D on only 20 percent of its Fayetteville wells in 2007.

By 2008 it expected to use 3-D seismic analysis on 75 percent of its Fayetteville wells.

And this year, more than 95 percent of the company's wells will be drilled using data from a growing 3-D seismic database, Southwestern said.

#### Barnett Objectives

AAPG Honorary Member Roger Slatt, a professor of petroleum geology and geophysics at the University of Oklahoma, is leading a research team in a reservoir characterization study of the Fort Worth Basin Barnett Shale.

Slatt has served as director of OU's School of Geology and Geophysics, head of the Department of Geology and



Photo courtesy of Roger Slatt

Roger Slatt shows his reservoir characterization class core that was taken from the outcrop in the background. A FMITM log from the same well is alongside the core.

Geological Engineering at the Colorado School of Mines and director of the Petroleum Technology Transfer Council's Rocky Mountain region.

The Barnett study pursues four objectives:

- ✓ To develop a log-, core- and seismic-based framework for regional mapping of stratigraphic and petrophysical units, with a sequence stratigraphic focus.

- ✓ To provide lithological/mineralogic input to determine and map

petrophysical properties from well logs and seismic.

- ✓ To develop a systematic, integrated workflow for reservoir characterization of gas shales.

- ✓ To provide an educational program for students to develop expertise in gas shales for petroleum industry career opportunities.

A presentation about the research by Slatt and several co-authors was added to AAPG's *Search and Discovery* database earlier this year. The Barnett



under study "is often considered to be homogeneous, undifferentiated black shale," they noted.

"This is an important point," Slatt said. "These are not just 'black shales.' There is quite a bit of variability."

#### The Next Level

The study area covers about 100 square miles in the Newark East Field, the heart of the Barnett play.

"We've been doing a lot of work in the Barnett – and to a lesser extent in the Woodford (Shale)," Slatt said, "and we've come up with the workflow that pretty much covers the process."

This approach begins with core description work, including thin sections and micropaleontology. Information is then correlated with wireline logs. Then high-resolution seismic and microseismic

See **Barnett**, page 26



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16 - 20	Well Logs / Core / Outcrop & Seismic	Houston, Texas
16 - 20	Carbonate Sediments: Application to Exp. & Dev.	Bangkok, Thailand
23 - 27	Open Hole Log Analysis	Houston, Texas
23 - 27	Applied Subsurface Geological Mapping	Sydney, Australia
30 - April 3	Overview of Seismic Exploration: Seismic Acquisition & Processing, AVO & Attributes & 2-D / 3-D Interpretation	Houston, Texas
30 - April 3	Petroleum Geology of Deepwater (Turbidite) Depositional Systems	Perth, Australia
April		
6 - 9	Applied Subsurface Geological Mapping	Houston, Texas
13 - 15	Seismic Interpretation Workshop	Houston, Texas
16 - 17	Basic Reservoir Engineering for Non-Engineers	Houston, Texas
May		
4 - 8	Descriptive Lithology Analysis of Cuttings & Cores	Houston, Texas
12 - 13	Practical Applications of SPE Petroleum Resources Management System (PRMS)	London, England
18 - 22	Seismic Survey Design, Acquisition & Processing	London, England
18 - 22	Carbonate Sediments: Application to Exp. & Dev.	Houston, Texas
18 - 22	Reservoir Engineering Fundamentals for Engineers	Houston, Texas
19 - 20	Practical Applications of SPE Petroleum Resources Management System (PRMS)	Houston, Texas
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## Barnett

from page 24

data are used for calibration.

"If you look at a typical seismic line through the Barnett, you can map the top of the Barnett and the bottom of the Barnett. A lot of companies do that, and then leave it at that," Slatt noted.

"If you look into the Barnett, you can see that there are differences in reflectivity that are internal," he said.

Application of seismic and other reservoir characterization tools has enabled the researchers to identify sequences within the shale.

"What we have found is that within these 10 rock types, they seem to be stacked in some kind of predictable fashion," Slatt said.

Sequence identification and

Registration is now open for Roger Slatt's online course "Introduction to Geological Reservoir Characterization" – one of six Web courses offered by AAPG.

This course covers the principles and practice of characterizing petroleum reservoirs using geologic and engineering data – including well logs, sample descriptions, routine and special core analyses and well tests. Many exercises will be done by

hand, without computer-assist (i.e. mapping, correlation, etc.). No sophisticated software will be required.

The class has a definite timetable with other students taking the same course both online and in the classroom; it is not a self-paced course.

For information and registration go to <http://www.aapg.org/education/online/details.cfm?ID=82>.

characterization can come from correlation through comparative mapping of related facies successions, rather than marker beds – an application of parasequencing to an unconventional resource play.

In this case, the stratigraphic framework was developed by analyzing the lithofacies stacking patterns, then defining parasequences.

"These Barnett rock types are arranged in parasequences," Slatt explained. "You get changes in mineral characteristics."

"We're doing seismic inversion now to improve our abilities in detecting these parasequences," he added. "What we're doing is going to the next level of characterization."

Work so far has produced effective

descriptions of the in-shale changes.

"Most of them are gradational," Slatt said. "You might have a quartz mudstone and a calcareous mudstone at the ends. Then we might have phosphatic mudstones that are quite different."

He said the study has recognized differences in organic content of the different facies – dolomitic facies or ash facies, for instance – in the Barnett play area.

Also, "we've been finding some excellent biomarkers. We can look at certain biomarkers and different ones occur in a rising sea level and in a falling sea level," Slatt noted.

Plans call for the Barnett study area to be expanded. Research already shows areal differences across the Fort Worth Basin.

"One reason it's important to go up another level of characterization is that your source areas change over time, probably due to tectonic changes. They're not all continuous across the basin," he said.

Operators are increasingly using 3-D seismic and microseismic in their resource plays. Microseismic typically gauges fracture response, and comprehensive reservoir rock studies will add another dimension to predictability.

"What we recognized from the microseismic is that when you look at microfractures, you see that the microfractures are stratigraphically confined. That implies to us there is some stratigraphic control," Slatt said.

"What we're trying to do now is to directly identify those microfracture zones that relate back to the stratigraphic zones," he added.

## Branching Out

Use of reservoir characterization and sequence stratigraphy tools in gas shales appears to be a coming thing, with advanced seismic results now being added in with core/log correlation studies and production data.

Devon Energy Co. of Oklahoma City funded the Barnett study and provided data. The company also supported an investigation of Oklahoma's Woodford formation led by Slatt.

That OU-Devon-Schlumberger project cored 200 feet of Woodford Shale section behind an active quarry in southern Oklahoma.

Researchers found that macroscopic features visible in whole core appeared in image log data. When sufficient in proportion and thickness, the features also could be resolved on conventional logs.

Those features include phosphate and pyrite nodules, near-vertical healed fractures and pulses of silica-rich layers.

Distinctions stood out in distinguishing between the stratigraphic sections of Middle and Lower Woodford apparently present in the cored interval, the researchers said.

Larger scale features – for instance, layers rich in phosphatic nodules and lenses – were correlative over at least 600 feet along the quarry walls.

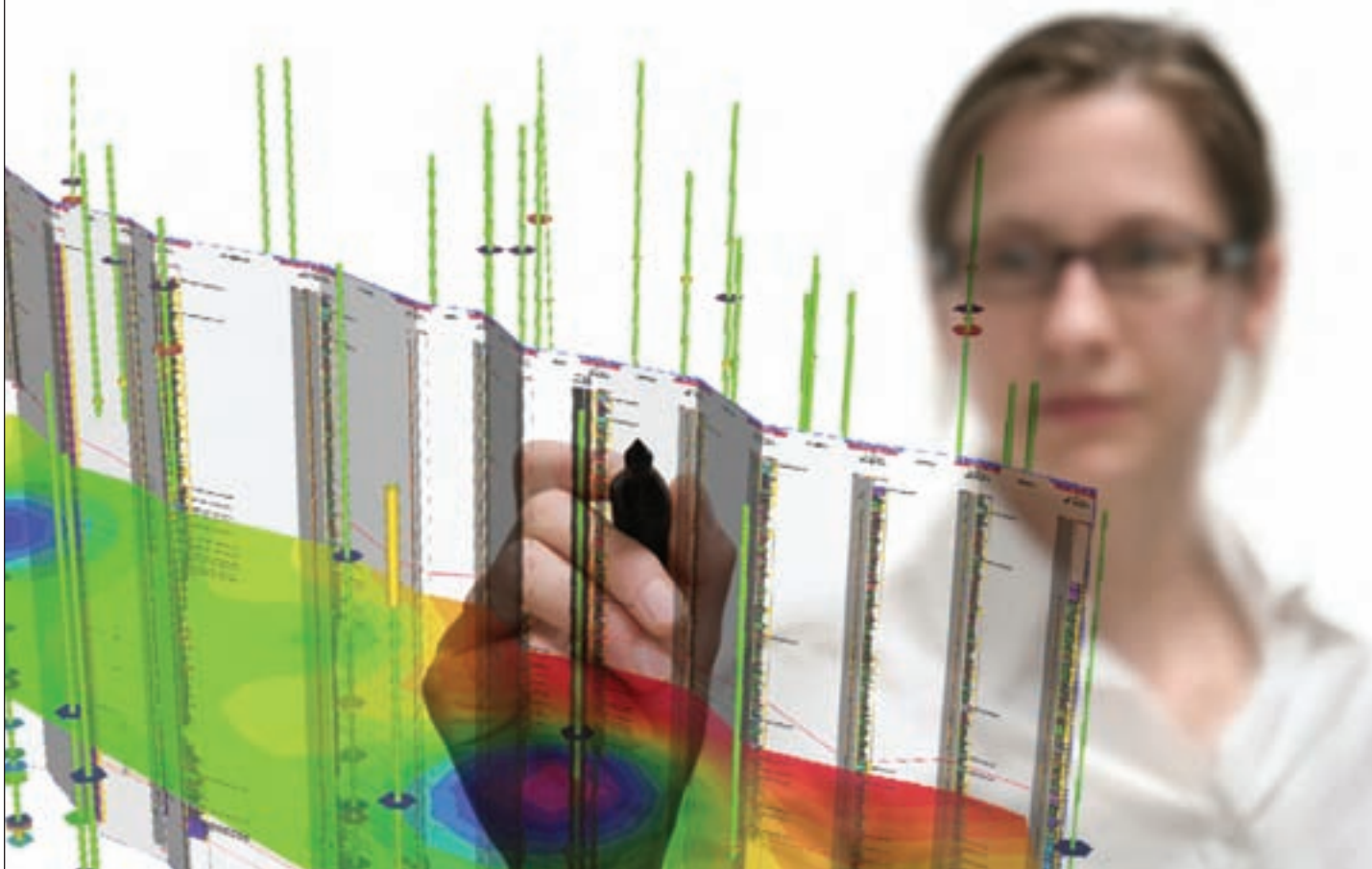
In both the Barnett and Woodford studies, results promise a better understanding of the shale and a clearer indication for placing laterals within the reservoir.

"It's all aimed at 'Where is the best place to put your horizontal wells?' based on the stratigraphy," Slatt noted.

In addition, the research has played an important role in introducing students to an emerging area of exploration and production.

"One of the keys to this project," Slatt said, "is that we're educating students in unconventional resource exploitation." □

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## WWWupdate

# Stats Keep Tabs On Your Browsing

By JAMIE M. EDFORD  
*Web Site Editorial Assistant*

Numbers can be a tricky thing. Any scientist who has taken measurements knows that the results are only as accurate as the measuring device. This is also true with Web statistics.

According to the tool AAPG previously relied upon to measure Web stats, we logged 7,601,510 page views in the past year, representing 1,086,203 visits to aapg.org. This is an overall upswing from 2007 of about 18 percent, where 6,287,941 "views" were logged using the same tool. There was a 2 percent increase in "visits," totaling 1,070,510.

However, these statistics include such non-human visitors as site indexing robots, and they failed to take into account users connecting from different IP addresses, such as those traveling with laptops.

(A person traveling on business connecting in five different cities would be counted as five separate visitors, rather than one.)

In 2008, AAPG began using Google Analytics to track Web site statistics. Google Analytics uses a tag-based tracking system that only counts actual visitors to the Web site. It remembers those visitors via browser "cookies," so even if they have different IP addresses for different visits, they are only counted as one visitor.

This has brought our Web statistics into a more accurate perspective, and it also has allowed some greater insight into the browsing habits of visitors to aapg.org.

According to information from Google Analytics, we have actually logged 2,085,686 page views in the past year. There were 776,055 visitors, of which 397,957 were unique, or from people whose computers have never logged a visit to aapg.org before.

If we average those numbers, it says that each visitor clicked on two or three pages.

Using the in-depth statistics now available through Google Analytics, we have found the most popular subsection of the AAPG Web site is the EXPLORER. Its 503,064 page views represent nearly one-quarter of the total pages viewed.

### It's All in the Details

Sifting down to the more minute details, the most popular online issue of the EXPLORER was March 2008, which had four times the page views as the next most popular issue. This was due in large part to the most read online story, the feature on the Appalachian Basin's Marcellus Shale.

The Marcellus Shale story's popularity is in large part thanks to aapg.org's top referring site: Google.

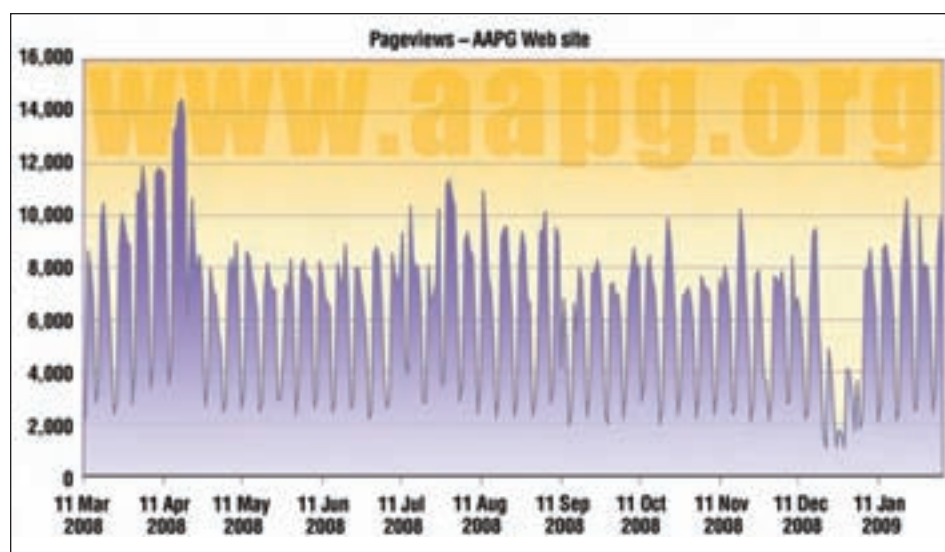
More visitors came to the AAPG Web site from Google searches than from any other source – including just typing the Web address in the browser or clicking a bookmark.

Over 4,500 visits were referred from someone searching for the words "marcellus shale." This was the third most popular total search referral

to the AAPG Web site, after "aapg" and "aapg.org."

Aside from the Marcellus, as well as the Bakken, Barnett, Haynesville and Woodford shales, another popular story on the AAPG Web Site that was often searched was the AAPG EXPLORER Salary Survey. It received over 23,000 page views.

See [Browsing](#), page 52



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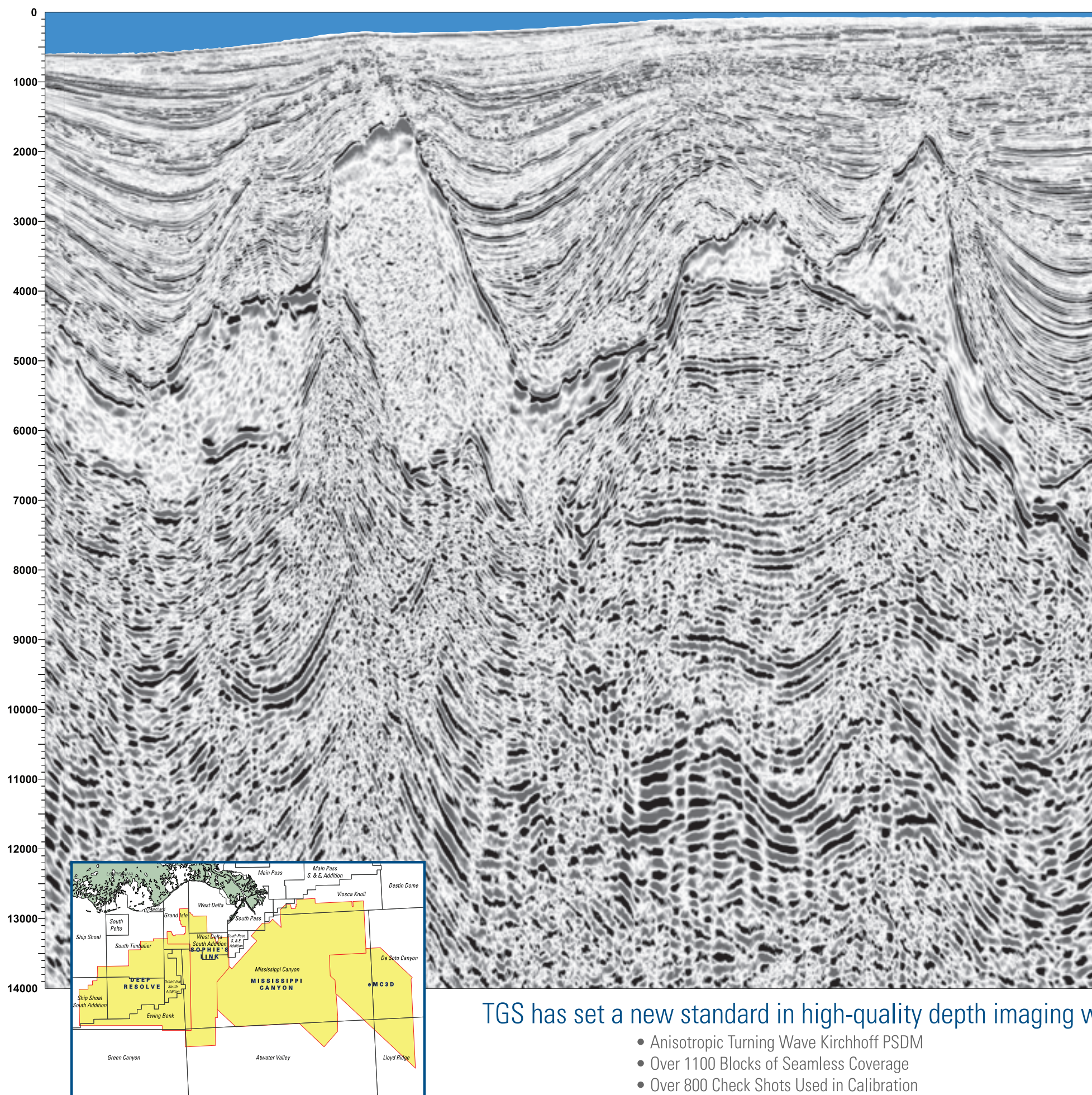
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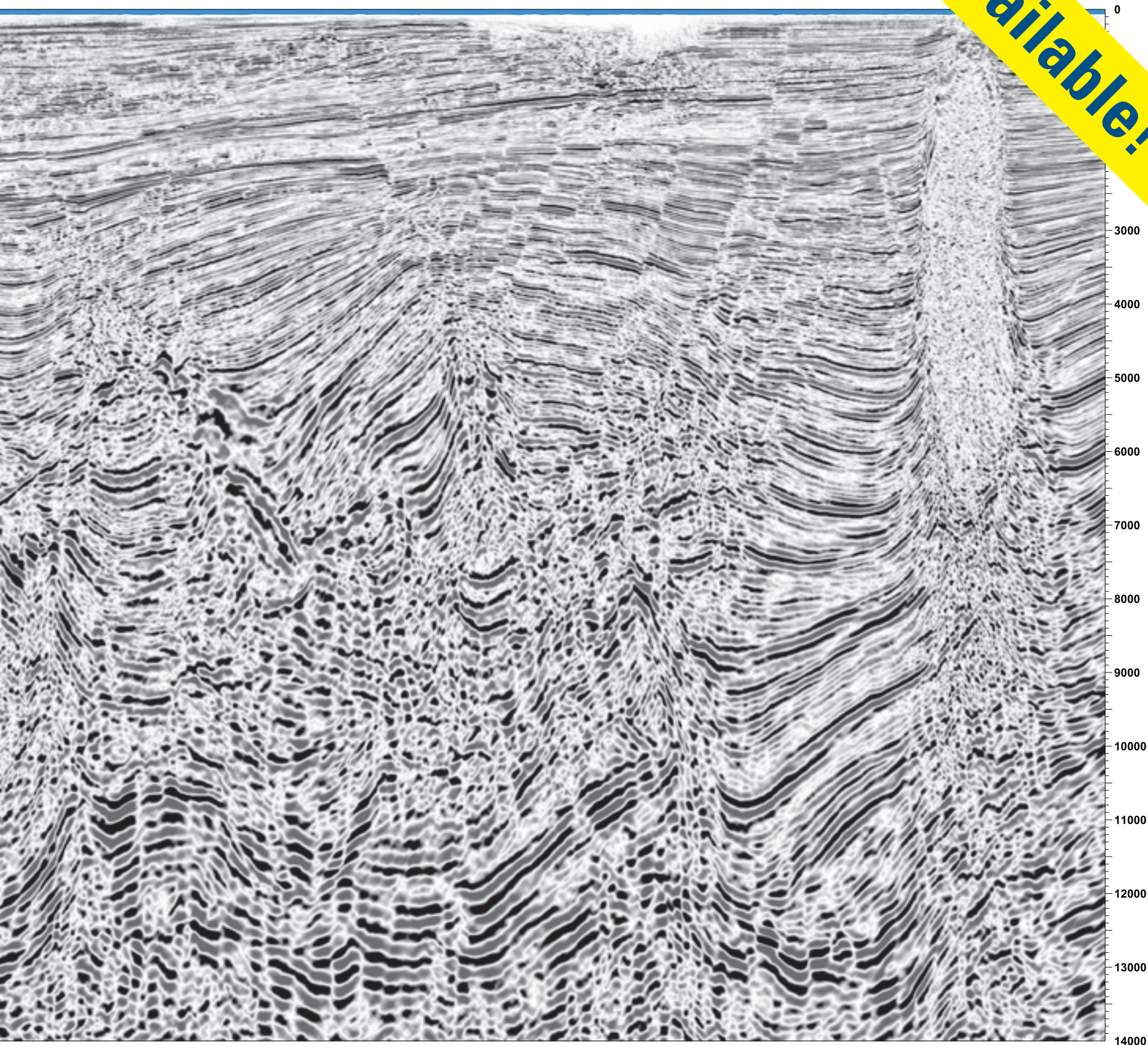
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# Prudhoe Bay Took 'A Total Team'

By JOHN M. SWEET

The thirst for exploring the unknown motivated the Richfield Oil Company people to discover the Swanson River oil field on the Kenai Peninsula in 1957. It should be no surprise that the Richfield corporate culture led them to the North Slope of Alaska. Meanwhile, some other high-level managements thought, "They are going to hell," for exploring in so remote an area.

Richfield sent its first geological field party to the Arctic Coastal Plain in the summer of 1959. By the early 1960s, nearly all of the companies with Anchorage offices (and some outside Alaska) had surface geologic parties working on the North Slope.

With the advent of helicopters, the geologists' mobility was further enhanced, making it possible to refine the interpretation of the surface geology and bring back samples that could be evaluated for age, oil source potential and reservoir quality.

The Coastal Plain is devoid of rock outcrops, so these early geologists worked in the hills where there were rock outcrops. In light of the spotty distribution of outcrops, the geologists would piece the geology together bit by bit, and during subsequent field seasons attempt to add new information where there was none or where available data were confusing ...

\* \* \*

The Prudhoe Bay discovery was a team effort in the broadest sense of the term. In an interview years after the discovery, H.C. Jamison said, "It (the discovery) is a measure of your capabilities as a professional group. And I stress the word group, because, boy, this thing was a total team situation."



Photos courtesy of Charles "Gil" Mull

The Atigun Pass in the Brooks Mountains – site for the Alaska pipeline.

AAPG Foundation Trustee Associate John Sweet was exploration manager for Arco's Alaska district in the 1960s, serving under the leadership of fellow AAPG member H.C. "Harry" Jamison – which meant they had not only a front-row seat but an active hand in the discovery of oil at Prudhoe Bay.

Sweet, who now splits his time in retirement between Boulder, Colo., and Green Valley, Ariz., decided the time was right to share his experiences and perspective of the historic discovery.

His recently released "Discovery at Prudhoe Bay," published by Hancock House, is available through the AAPG Bookstore.

Printed here, with permission, is an excerpt from that book dealing with the early efforts there of the geological and geophysical teams.

Contributions ranged from minor to major. At important stages, approvals were critical for the project to advance to the next step.

The Anchorage explorationists provided good reasons for drilling Prudhoe Bay. They, in turn, recommended it to the middle management of the Dallas exploration staff. Their stamp of approval was vital and was given.

For the Prudhoe exploration well, the top executives had to be convinced to allocate the capital to proceed. They did.

Prudhoe Bay would not have been drilled without the involvement of any one of these

See **Prudhoe Bay**, page 32

## Deep East - Offshore Florida



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Photos courtesy of Charles "Gil" Mull (left), Marvin D. Mangus

Richfield geologist Gar Pessel and the valuable Bell G-2 helicopter, near Elusive Lake and the Ribdon River; the geophysical camp site at the Driftwood anticline, 1950.



## Prudhoe Bay from page 30

three groups. What is not so obvious is the importance of discrete individuals. It is plausible that had some seemingly minor contribution not been made, the drilling project may have faltered.

\* \* \*

The only source of geologic structural knowledge in the Colville and Prudhoe Bay areas was the seismograph. This is where the geophysicist part of the explorationist team shines. In oil-field vernacular they are called doodlebuggers. There is no derision implied.

Historically, geophysicists and their families were a hearty lot because they were the advance guard of oil exploration. They moved often and many times to out-of-the-way places. Frequently they were not in a place long enough to establish friendships. They were not patsies, but the Arctic Coast was like the end of the world to them. They then literally lived on the job in buildings mounted on sleds called wanigans, which had been adapted to housing, eating, office and repair facilities. Crawler tractors pulled these mobile camps, keeping them close to the fieldwork.

Many of the geophysical supervisors during the early years of North Slope exploration in the early 1960s did not have college degrees in geophysics, as there were few colleges, if any, that taught exploration geophysics. Because there were physics and electrical concepts involved, these early supervisors had science backgrounds in mathematics, physics and electrical engineering.

Many of them had worked directly for some of the pioneers in exploration geophysics.

\* \* \*

As the oil companies started to accumulate seismic data in the early 1960s, the huge Colville and Prudhoe Bay structures began to appear on the maps of various companies. These structures were unreal in size. Had they been revealed at the surface they would have been much more imposing than the quintessential sheepherder anticlines in Wyoming.

Paul Lyons, a geophysicist with Sinclair, is given the credit for being the first person to make a map of the Prudhoe Bay structure from geophysical information, which he did in 1963. Several companies, including Atlantic and Richfield, had people making maps of Prudhoe Bay not too long after.

Rudy Berlin was then working for Richfield, but had first mapped the Prudhoe

continued on next page

“

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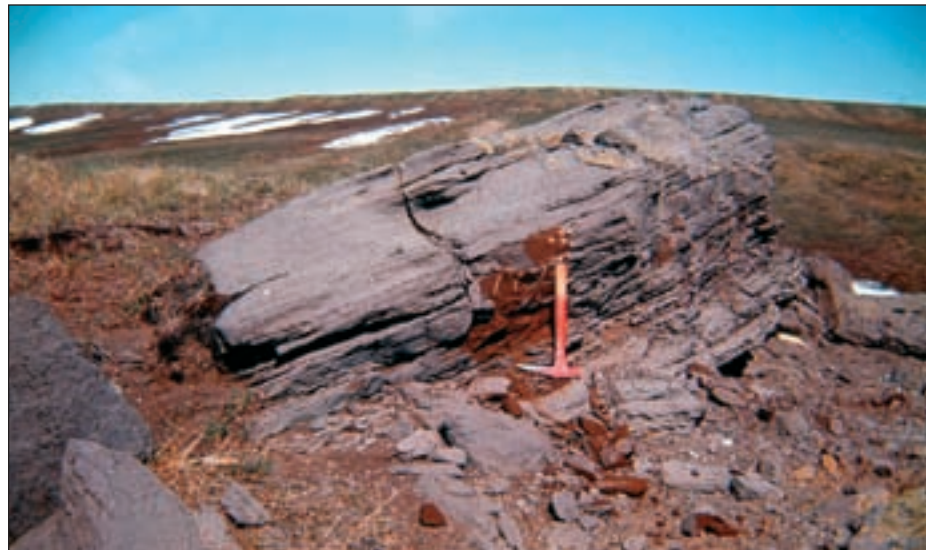
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Photos courtesy of John Sweet (left), Charles "Gil" Mull

Science class: Harry Jamison (dark glasses) took advantage of a flight to brief Alaska Gov. Walter J. Hickel (to his left) and state officials Phil Holdsworth and Roscoe E. Bell on the data used to justify drilling at Prudhoe Bay; right, an example of oil-stained rock found in the Arctic National Wildlife Refuge.

continued from previous page

Bay structure when he was working for Western Geophysical Company (under contract to Sinclair and BP); he had seen the Prudhoe structures even before the clients.

Dick Crick, the first Atlantic employee working in Alaska, remembers:

"The first time I heard about the Prudhoe Bay prospect was the summer of 1965 when we had a 'get acquainted happy hour' at the Petroleum Club with our Richfield counterparts. I remember that Rudy Berlin mentioned that he hoped the merger of the two companies (Atlantic, Richfield) would not cause them to move off the Slope without drilling a well to test the largest structural closure he had ever mapped.

"If anyone should be given credit for trying to sell the Prudhoe prospect, in my opinion it should be Rudy Berlin."

\* \* \*

At Prudhoe Bay the seismic data looked like a dream come true. In fact, to some it looked too good to be believable.

Also, the geophysicists did not have precise velocity data to apply to the problem. There was permafrost from the surface to a depth of almost 2,000 feet, and there was uncertainty as to how to deal with this variable, which affected seismic velocity. Permafrost ... complicates interpretations if the character and thickness of the permafrost is unknown. It affects the velocity of seismic wave travel through the earth.

The geophysicists later learned how this permafrost change from land to offshore influenced the seismic interpretation.

Louis Davis, general manager of North American Producing, was pragmatic and always cut to the heart of issues. At one of our conferences before Prudhoe Bay was approved for drilling, Rudy Berlin presented the seismic picture for the prospect in his inimitable impassioned way.

At the end, for additional emphasis, he very forcefully said, "If this was my oil company, I would drill this prospect."

Davis turned to Lee Wilson, drilling and production manager for Alaska, and whispered, "I thought this was his oil company!"

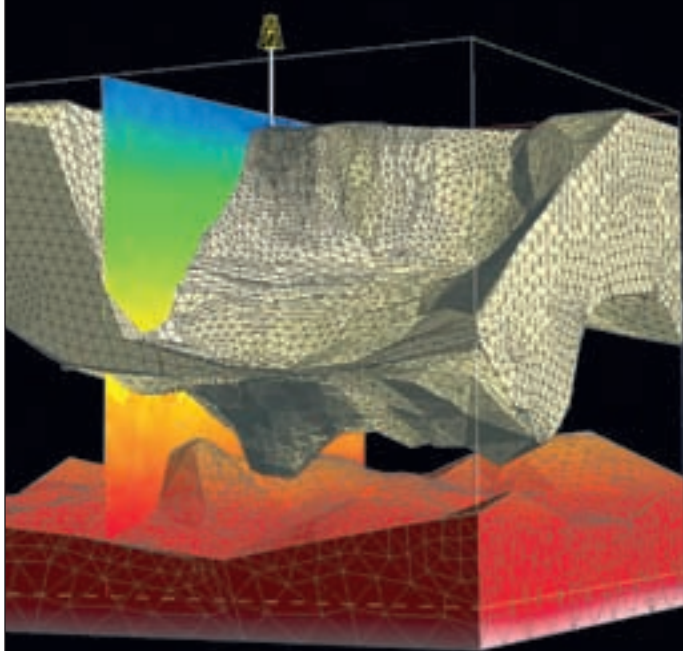
I am guessing Louis's remark was serious because he wanted team players and Rudy's innocent remark seemed to put him apart, but he was pitching for Prudhoe to be tested like the rest of us were.

ARCO had reached a moment of truth. In the district we thought we should drill the Prudhoe structure, and that is what we recommended. It was that or pull out of the North Slope.

We took the positive approach and moved in that direction ... □

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## GEOPHYSICALcorner

## Drill-Bit Seismic Still Has Teeth

(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 first of a two-part series on drill-bit seismic technology.)

By BOB HARDAGE

In concept, any type of mechanical vibration that is introduced into the Earth can be used as a seismic wavefield to illuminate and image subsurface geology. Seismic imaging does not always have to be done with controlled, sophisticated sources such as air gun arrays, vibrators or shot hole explosives.

One unique mechanical vibration that illustrates the principle of seismic imaging without the use of a conventional seismic source is the repetitive Earth impulses that are created by the teeth of a rotary-cone drill bit as a well is being drilled to reach a geologic target.

Drill-bit seismic technology was a topic of rather intense research and development in the 1980s and 1990s, and the application should not be forgotten.

\* \* \*

The principle of geologic imaging with a rotary-cone drill bit is illustrated on figure 1.

The key to the imaging procedure is to position a reference sensor at the top of the drill string, near the swivel. This reference sensor records each impact of each tooth of a rotary-cone bit as rock

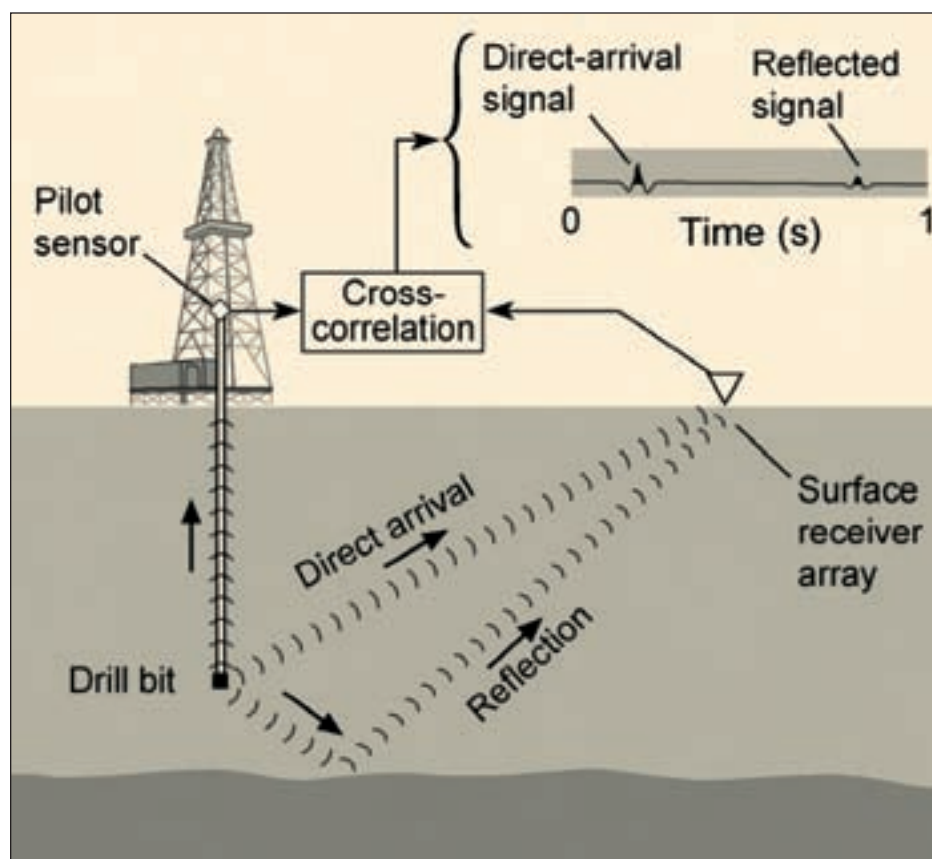


Figure 1 – In drill-bit seismic technology, the mechanical energy produced by an active rotary-cone drill bit propagates up the drill string to a reference sensor positioned on the swivel and also radiates into the Earth as a seismic wavefield. Seismic events are created that travel direct and reflected raypaths from the drill bit to surface-positioned sensors. A conventional seismic trace is created by continuously correlating the response of the reference sensor at the top of the drill string with the responses of the surface sensors.

strata are being drilled.

As shown in the diagram at left, the drill-tooth impulses propagate along direct paths to sensors deployed on the Earth surface (or on the seafloor if the well is offshore) at stations that allow specific target geology to be imaged. An imaging capability is created by the drill-bit wavefields that propagate downward and reflect upward from rock interfaces below the drill bit as depicted by the raypath diagram.

By continuously correlating the reference-sensor response with the responses of the surface sensors, a sequence of seismic traces can be created as the drill bit traverses equally spaced depth intervals during the drilling process. Usually this cross-correlation between reference sensor and far-field sensor responses is done continuously as the drill bit penetrates a depth interval equal to one joint of drill pipe (30 feet, or nine meters).

Depending on rock type, bit quality and drilling parameters, the cross-correlation computation during the drilling of this 30-foot interval may span a time period of five minutes to one hour. The resulting output trace is equivalent to that generated by a seismic source having a vertical dimension of 30 feet and positioned across the 30-foot interval that was drilled.

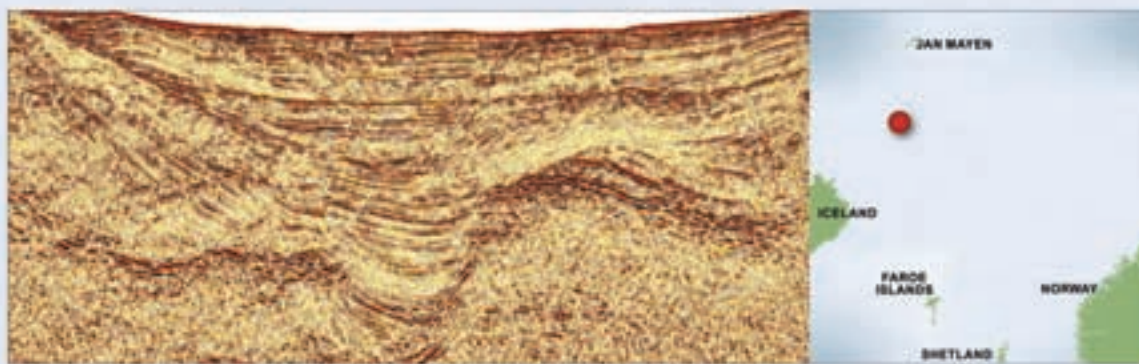
Under appropriate conditions, the image created from drill-bit wavefields can be quite good.

continued on next page

## Iceland - another saga to be told...

*"Born as a result of a complex tectonic relationship, Iceland inherited rather varied and dynamic character from its parents – The Eurasian & North American plates... Millions of years ago the Jan Mayen Ridge was part of Greenland sharing the same sedimentary basin, where source rock has been found and oil is known to have been generated..."*

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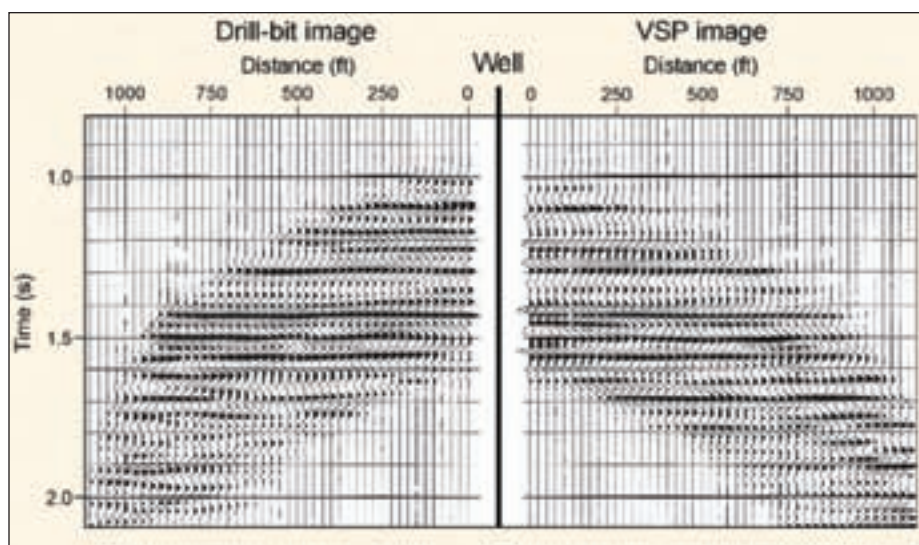


Figure 2 – Comparison between an image made with wavefields produced by a rotary-cone drill bit (left) and an image made in the same well with conventional vertical seismic profiling data (right).

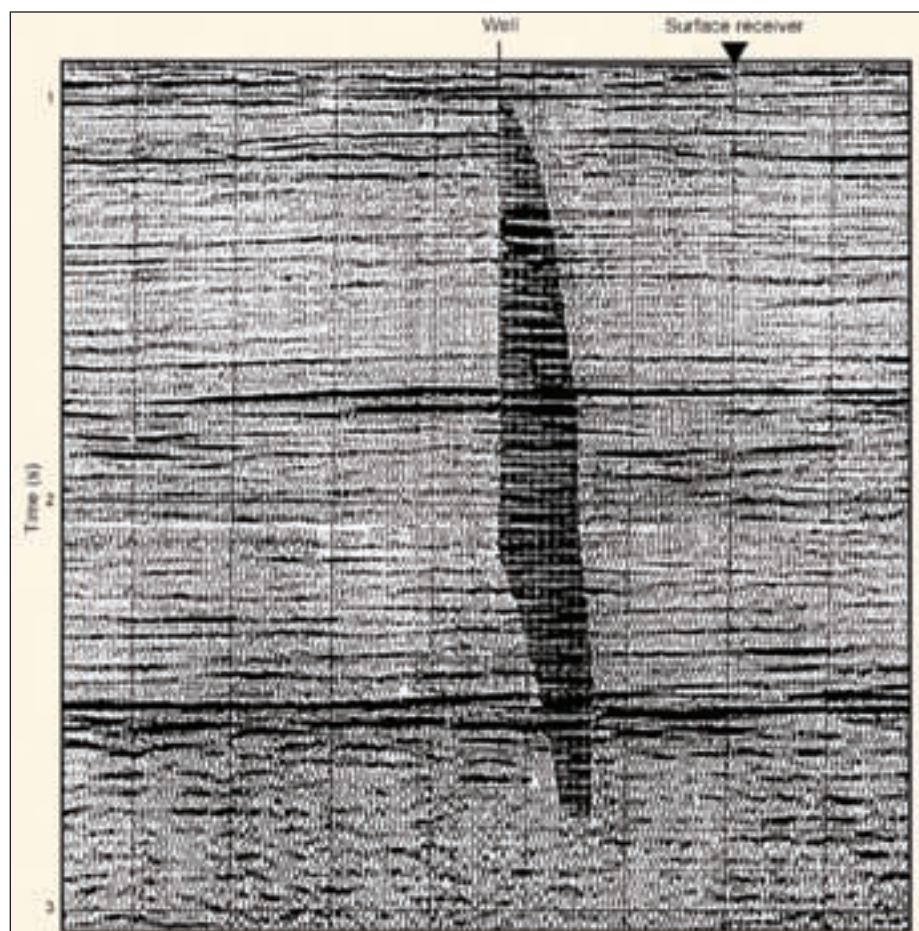


Figure 3 – Comparison between images made with wavefields produced by an active rotary-cone drill bit and by a conventional vibrator that made a 2-D profile across the drilled well.

continued from previous page

Figure 2, in fact, is an example comparing a drill-bit image created as a well was being drilled, and an image made from vertical seismic profile (VSP) data produced by a conventional seismic source after the well reached target depth. In this instance, the drill-bit image has a signal-to-noise character equivalent to that of the conventional VSP data.

A second example, comparing a drill-bit image with surface-recorded seismic data across the drilled well is displayed on figure 3. At this latter well site, the drill-bit image was a good match to the surface seismic data.

\* \* \*

Using a rotary-cone bit as a seismic source has several proven applications such as:

- ✓ Real-drill-time velocity check shot information.
- ✓ Guiding the bit to a target seen on surface-acquired seismic data.
- ✓ Real-drill-time imaging ahead of the bit.

- ✓ Real-drill-time depth-to-time conversion to know when the bit is reaching an important depth interval.
- ✓ Positioning the bit at the top of an interval that needs to be cored.

All of these applications, and others, were achieved with drill-bit seismic technology in the 1980s and 1990s.

Even with these proven applications, drill-bit seismic technology is not as widely used today as it was 15 and 20 years ago.

The principal reason for the technology's demise has been the conversion to poly-diamond-composite (PDC) bits by drilling contractors. PDC bits cut by a scraping action – not by vertical impacts of chisel teeth, as occurs with a rotary-cone bit.

Effective seismic wavefields are difficult to achieve with PDC bits. However, in current drilling practice, if a significant interval of rock is to be drilled with rotary-cone bits, the technique of drill-bit seismic technology is still on the shelf ready to be used.

Alternate technology that allows usable seismic data to be acquired when PDC bits are utilized has now come onto the scene and will be described in next month's article. □



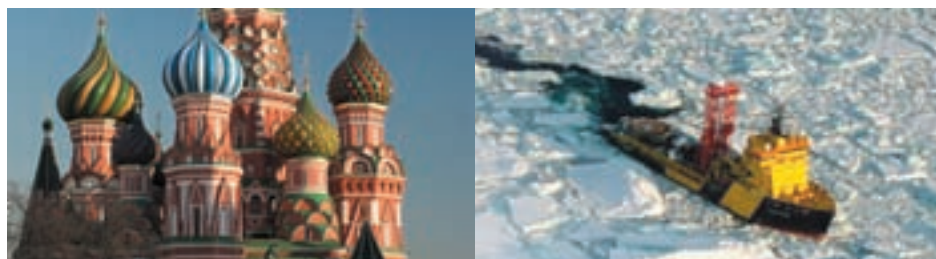
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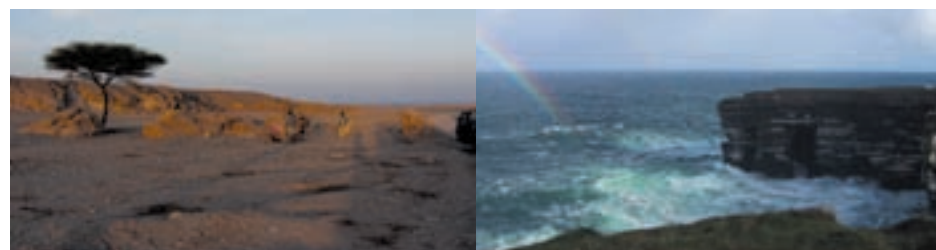
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## WASHINGTONwatch

## Fuel Rule Could Ripple Upstream

By DAVID CURTISS  
GEO-DC Director

In January 2007 California Gov. Arnold Schwarzenegger issued an executive order announcing that California would develop a low carbon fuel standard (LCFS). The purpose of the LCFS is to reduce by at least 10 percent the carbon intensity of fuels used for passenger vehicles in California by 2020.

The governor's action put the state into the familiar position of crafting unique and occasionally controversial environmental policy. And there is an old saying about these policies:

*"As goes California, so goes the world."*

Based on the executive order, the California Air Resources Board is preparing rules to create the LCFS and implement the program. They issued several draft documents in 2008 and expect to complete the proposed rule this month. Implementation would occur in 2010.

The goal of an LCFS is to reduce carbon emissions per mile driven. It is one strategy for reducing carbon emissions from non-point source emitters, such as vehicles. To date, most carbon emission reduction strategies – such as carbon capture and storage – have focused on point sources such as power plants or other stationary sources.

Conceptually, developing a LCFS is a simple process:

✓ First, the carbon intensity of the fuels being considered is determined



Curtiss

(e.g., gasoline, diesel, natural gas, electricity, potentially others).

✓ Second, a base level, typically the emissions output of a previous year, is determined.

✓ Third, you set annual reductions for future years to meet the established

targets.

In response to such a standard, fuel providers would be forced to lower the

carbon intensity of fuels sold and broaden the portfolio of fuels offered. So, for example, fuel providers could lower the carbon intensity of gasoline or diesel by blending it with a lower carbon fuel, such as a biofuel.

However, there are limits to these measures, because many auto manufacturers only warranty parts for certain fuel mixtures, which limits adoption. And in many states, including California, there is limited infrastructure to transport and sell these fuels.

Perhaps the biggest challenge is calculating the carbon intensity of these

various fuels. Again, the concept is simple enough: You determine tailpipe emissions and then look at all of the upstream emissions, including production, transportation and other secondary outputs. These are the life-cycle emissions of a particular fuel. But it is essential that the methodologies and calculations to derive these emission values are developed in a transparent and open process.

One particular fear is the impact of a LCFS on the development of non-traditional fossil fuel sources, such as from oil sands, oil shale or other "heavy" oil resources. This could not only affect development of these resources in the United States but also existing imports from Canadian oil sands and possibly other nations.

Typically, production of these resources has a higher greenhouse gas footprint than other resources. However, when you compare the full life-cycle emissions, they compare favorably with other petroleum resources.

In fact, according to province of Alberta's oil sands Web site:

"[W]hen you look at the full life-cycle of emissions associated with a barrel of oil, approximately 80 percent come from tailpipe combustion (cars, trucks, planes, tankers). The remaining 20 percent are associated with production, which includes extraction, transport and refining.

"When you look at the full fuel cycle,

continued on next page

## Participants Sought for Next CVD

By DEBORAH SACREY  
Chair-Washington Advocacy Group  
Consider joining other AAPG members in Washington, D.C., May 11-13 for AAPG Congressional Visits Day (CVD).

Over the course of 2 1/2 days we will receive updates on current legislative issues and meet with federal agency representatives, senators, representatives and their staffs to discuss issues of concern to AAPG members.

The Washington Advocacy Group, a subcommittee of the Government Affairs Committee of the Division of Professional Affairs, is dedicated to helping AAPG members engage in the policy making process. As chair of the

group, my goal is to create opportunities where AAPG members can use their scientific and technical expertise about the energy geosciences to educate and inform decision-makers.

AAPG CVD is a unique opportunity to do so.

Space for this event is limited, so contact David Curtiss (202-684-8225, or dcurtiss@aapg.org) to reserve your spot.

Please note that AAPG does not provide funding for members' participation at AAPG CVD, but Divisions and Sections can consider sponsoring one or more of their members to ensure representation.

Join us in Washington, D.C. □



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**Session set Sept. 9-11**

# New Reserve Rules Focus of GTW

By **RICHARD NEHRING**

AAPG's first Geoscience Technology Workshop (GTW), "Geoscience Aspects of Estimating Petroleum Resources and Reserves," will be held Sept. 9-11 in Houston.

The GTW will focus on the contributions, challenges and responsibilities of geoscientists in estimating resources and reserves – important areas in light of the new definitions and guidelines for estimating reserves provided by the recently adopted Petroleum Resources Management System (PRMS).

PRMS was jointly developed by the SPE, AAPG, WPC, SPEE and the new Securities and Exchange Commission guidelines for reserve disclosure (see January 2009 EXPLORER).

Now, geoscientists need to understand the type and quality of the technical work that is required for estimation, how their contributions are used in the estimation process, and the professional and ethical requirements of resource and reserve estimation.

Eleven sessions are currently planned for this 2½-day workshop:

- ✓ The first two will address the PRMS definitions and guidelines and the general role of the geologist in resource and reserve estimation.
- ✓ The next four will address specific

aspects of geoscience contributions to estimation: petrophysical, geophysical, geologic mapping and geocellular modeling.

✓ The subsequent four sessions will cover engineering aspects, estimation of unconventional resources/continuous accumulations, quantifying uncertainty and ethical/professional issues in estimation.

The workshop will conclude with discussion of the key issues identified in the preceding sessions.

To facilitate discussion, attendance

at the workshop will be limited to 70-80, chosen both by invitation and by application. Instructions for application will be provided in an upcoming EXPLORER and on the AAPG Web site.

The GTW program has been developed to provide a timely means of providing practical information on the latest applications in geoscience. The emphasis of the GTWs will be on sharing information regarding a specified topic of high interest among professionals knowledgeable in that topic.

The organizing committee for this

GTW includes:

- ☐ Chair – **John Sneider** (chair, AAPG Reservoir Development Committee).
- ☐ Vice chair – **Creties Jenkins** (EMD president).
- ☐ **Delores Hinkle** (chair, SPE Oil and Gas Reserves Committee).
- ☐ **Richard Nehring** (chair, 2006 AAPG Hedberg Conference on Global Resource Evaluation).
- ☐ **John Ritter** (chair, AAPG Resource Evaluation Committee).
- ☐ **Pete Rose** (AAPG past president).

continued from previous page

Alberta's oil sands (Canadian SCO Blend) stack up very closely to Saudi Arabian (8.8 percent difference), Mexican (6.9 per cent difference) and Nigerian (4.6 per cent difference) oil in terms of emissions intensity. Alberta is less carbon intensive than Venezuelan oil (2.6 per cent lower)."

\* \* \*

California is taking the lead on developing the LCFS, but already several states in the northeastern and western United States have indicated they would follow California's lead in adopting their own LCFS. And there is talk Congress may consider a federal LCFS standard as part of climate change legislation that it will be working on in the 111th Congress.

Furthermore, President Obama has backed California's efforts to curb greenhouse gas emissions from vehicles by asking the U.S. Environmental Protection Agency (EPA) to revisit a Bush administration decision to prohibit California from doing so. The EPA is widely expected to reverse its earlier decision.

Clearly, these are issues that could have a significant impact on AAPG members, and we are monitoring the issue closely.

Please visit the GEO-DC blog and sign up for our e-mail updates; we'll keep you apprised as events warrant.

(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. The GEO-DC blog is online at [blog.aapg.org/geodc/](http://blog.aapg.org/geodc/).)

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## MAKINGadifference

## Map Idea Pays Student Dividends

By KEN MILAM  
EXPLORER Correspondent

After retiring four years ago from a successful career as a petroleum geologist, Owen Hopkins wanted to spark his passion for science in those who would follow.

He called it "planting the seed of geologic knowledge."

So the colorful and enthusiastic Hopkins pursued his idea, nurtured it and watched as it blossomed and began to bear fruit.

As president of the Corpus Christi Geological Society in 2006, Hopkins got the ball rolling with a three-pronged plan to draw public school students into his world.

✓ He began with the idea of "maps in schools" – putting colorful, laminated, framed U.S. Geological Society time and terrain maps of the United States at eye-level for fifth and sixth graders in the Coastal Bend area.

✓ He made personal presentations, speaking to kids and teachers in terms they related to, mentioning "Jurassic Park" and other popular themes.

✓ He got colleagues infected by his enthusiasm to help him spread the message.

Today, thanks to Hopkins' gift of gab and networking, some 1,100 geologic maps have been placed in schools around the country – and interest is growing internationally.

Several organizations, including AAPG, have lent financial and moral support.

Largely because of those efforts



Hopkins

Today, thanks to Hopkins' gift of gab and networking, some 1,100 geologic maps have been placed in schools around the country – and interest is growing internationally.



Hopkins is this year's recipient of AAPG's Public Service Award – but he is quick to name dozens of other individuals and organizations that have helped him plant and nurture his "seeds."

"It's like one of my prospects," he said. "Instead of oil and gas reserves, the return is how many kids we can get interested."

#### Getting Kids Interested

To say the idea has grown is an understatement. The project has branched, fractal-like, into other societies, organizations, cities, states and countries.

Boosters often add local or regional flavor, but the song remains the same: Put things into schools that will get kids interested in earth science.

Hopkins offered a summary of developments since the project began:

✓ 307 framed maps have been placed in schools around the country. (Framed maps are intended for high-traffic areas; rolled maps are given to teachers for their

classrooms.)

✓ The Houston Geological Society purchased 200 rolled maps for area teachers.

✓ The "Rocks in Your Head" programs, funded in part by AAPG, distributed about 650 maps to teachers who attended seminars in eight states during 2008.

✓ The Tulsa Geological Society placed 33 geologic maps of North America in local schools.

✓ Mike Pollok, a SIPES member in Oklahoma City, bought 50 framed maps to be placed in Purcell, Okla. area schools.

✓ West Texas Geological Society placed 36 framed maps in Midland and Odessa schools.

✓ The San Joaquin Geological Society is placing geologic maps of California in five schools each year.

#### A Bone to Pick

As the success of his maps in schools idea spreads (societies in several Texas

cities, Tulsa, California, Florida, Louisiana and Mexico have launched similar efforts), Hopkins said he is learning from experience and moving to the next phase.

Now he wants to put "bones in schools," to acquaint students with animals that thrived in their hometowns before there were towns.

Since 1990, a gravel pit near Corpus Christi has yielded thousands of La Brea-era bones and fragments. (Think of the movie "Ice Age," Hopkins urges students when he discusses the bones.)

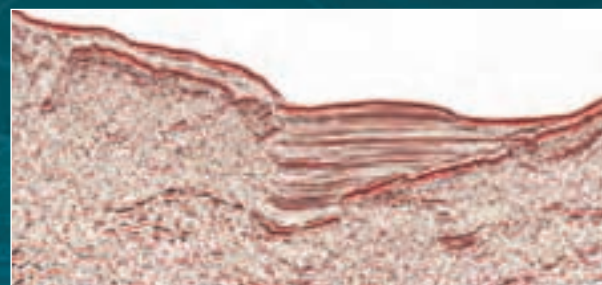
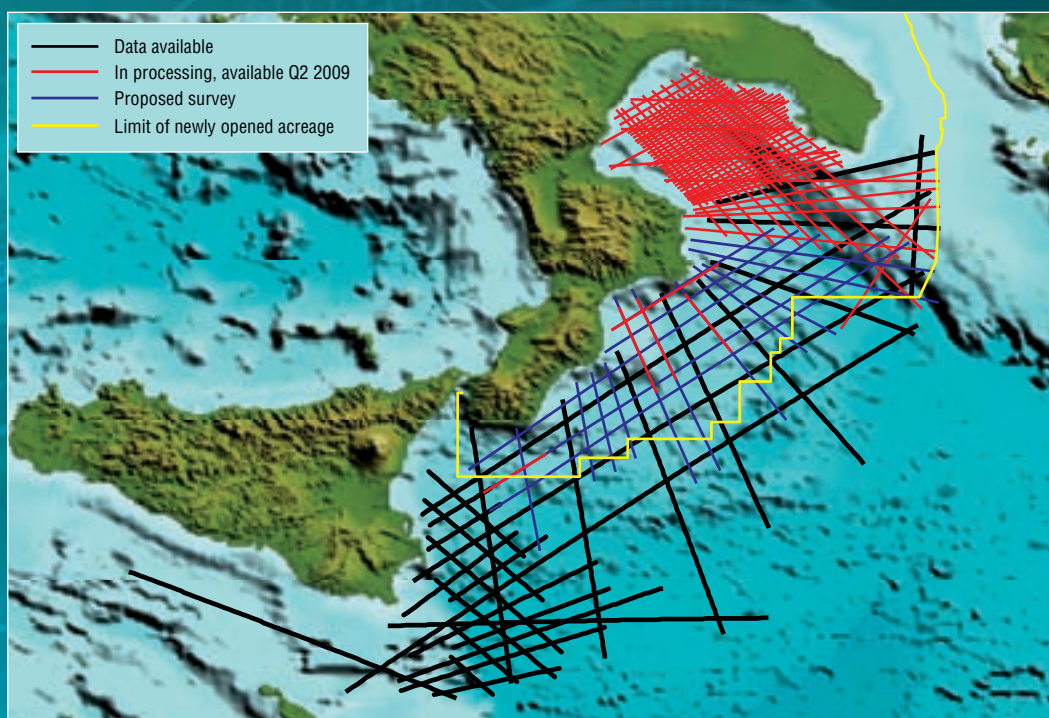
The site owners donated the bones to Texas A&M University in Kingsville, stipulating they be given away only for educational purposes.

Hopkins hopes to see bones placed in trophy cases, along with maps and a poster commissioned by CCGS depicting life in the Corpus Christi area 3,230 years ago.

continued on next page

When it's a question of Italian data...

... Ask Fugro



Offshore areas of Southern Italy, beyond the 1000m bathymetric contour, have recently been opened for licensing for the first time. Fugro have recently acquired 6500km of new, long offset data in the area which will be available Q2 2009 but key examples are already available. In addition Fugro has a further 4500km of data in the area.

This newly opened acreage includes the Gulf of Taranto which is the offshore extension of the most prolific oil province in Europe.

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# Foundation to Honor Pickens, Shelton

Two longtime geologists who have in their own ways made enormous contributions to geology and the support of geosciences will be honored with awards by the AAPG Foundation.

They are:

✓ Legendary explorationist and philanthropist **T. Boone Pickens**, who is this year's recipient of the Weeks Memorial Medal, the Foundation's highest award.

✓ Digital data pioneer **John W. Shelton**, who will be presented with this year's Chairman's Award.

Both awards will be presented in Denver during the AAPG Annual Convention and Exhibition. Pickens

will receive his award at the All-Convention Luncheon (where he also will be the keynote speaker), and Shelton will receive his honors during the Foundation's Chairman's Reception.

The L. Austin Weeks Memorial Medal, established last year, is given in recognition for extraordinary philanthropy and service directed to advance the mission of the AAPG Foundation. It



Pickens



Shelton

honors the late L. Austin Weeks, whose philanthropic legacy set an exemplary standard.

Pickens, a Foundation Trustee Associate since 1979, last year pledged \$9.4 million to the Foundation's

Meeting Challenges Assuring Success Campaign, designated to produce digital GIS products through Oklahoma State University's geology and geography department. It is

available to professionals and the public via AAPG's intranet database.

Shelton, who recently stepped down as chief editor of AAPG's online e-magazine *Search and Discovery* (see February EXPLORER), serves the Foundation as a Trustee Associate and Member of the Corporation.

A pioneer in the digital geology world, Shelton is recognized for his dedication and leadership in advancing efforts to provide AAPG Digital Products to geoscientists and to faculty and students at universities worldwide.

He also is a past AAPG Elected Editor and vice president. □

continued from previous page

## Different Ideas

Hopkins keeps finding new ways to get maps and rocks into schools and to involve students.

He recently spoke to school superintendents from 11 surrounding counties, encouraging them to send teachers to a January workshop in Corpus Christi. Each school received a framed map, a mammoth bone on a stand and poster, all paid for by CCGS.

Hopkins also took his presentation to high school welding students at Craft Training Center. With the center's cooperation, Hopkins asked each student to choose a bone and custom design and weld a stand for it.

The students take the stand, bone and posters back to their schools and have them placed in the trophy case. A plaque acknowledges the contribution of CCGS and the stand designer. The program is continuing with a goal of placing 50 such donations in schools by May.

Hopkins said two local welding companies donated materials for the stands.

Kingsville A&M biology department leaders donated 62 boxes of bones to two Corpus Christi schools, after Hopkins' presentation sparked enough interest among student to start paleontology clubs.

"The goal is to have each student select a bone, determine its bone name, animal, and then give it to a school in a presentation with a Texas A&M University-Corpus Christi geology grad students and a CCGS member," Hopkins said.

## Anyplace is a Good Place

The CCGS resolved to place some educational item in each of the city's local libraries.

For the new Garcia Library, the society donated a 65 million-year-old fossil fish (*Diplomystus*) in limestone. CCGS also commissioned artist Dinah Bowman to make a 7.5 x 3 foot mural depicting a "snapshot of Nueces County 13,230 years ago," which the posters will be copied from. Its scientific accuracy has been validated by experts at the University of Texas, Texas A&M-CC and Texas A&M-Kingsville.

A scanned enlargement 14 x 7 feet will be installed on a wall in the children's area of McKinzie Library in spring 2009.

And why stop there? CCGS also is making coloring books of all the animals depicted in the mural. □

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## REGIONS&amp;sections

## London, Bahrain and Now Singapore

(Editor's note: Regions and Sections is a regular column in the EXPLORER offering news for and about AAPG's six international Regions and six domestic Sections. Contact: Carol McGowen, AAPG's Regions and Sections manager, at 1-918-560-9403; or e-mail to [cmcgowen@aapg.org](mailto:cmcgowen@aapg.org).)

By CAROL MCGOWEN

Regions and Sections Manager

AAPG has taken another step toward making its presence officially known around the world.

A third AAPG regional office will open later this year in Singapore, intended to provide services for the Association's sprawling Asia-Pacific Region.

The Singapore operation will join the AAPG European Office in London, which opened in mid-2006, and the Middle East Office, established in Bahrain in 2007, as Regional bureaus.

With one-third of its membership residing outside the United States, AAPG's need for regional offices correlates to membership growth and industry activity. To spark this regional growth requires AAPG to become a local provider of products and services.

Region offices also bring AAPG closer to its members by providing a close point of contact that is responsive to local professional development needs and industry trends.

Regional offices serve as an extension of AAPG headquarters, while working with a better understanding of cultural practices unique to doing business in each Region.



Veal



Chambers



Arnold



Al Zubaidi

"They manifest the professional culture of that region and serve as the local identity of AAPG in areas far away from AAPG headquarters," said Istvan Berczi, European Region president. "Local office staff know better the mentality of the local people, thus offering programs and services better aligned with the interests of Region members."

During the first years of operation, regional offices are financially supported 100 percent by AAPG headquarters. During subsequent years the offices are expected to achieve an increasingly greater level of financial self-sufficiency by organizing revenue-generating programs and events.

Business success around the world requires relationship building. While many AAPG activities are handled by volunteer leaders in each Region, the continuity of contact by a local staff presence is essential to building and maintaining AAPG's network of professional relationships.

#### Asia-Pacific Office: Strategic Location

In January, AAPG's Executive Committee approved opening the third regional office in Singapore.

The Asia-Pacific Region is AAPG's second largest, with its members hailing from 20 countries. Asia-Pacific membership in AAPG has more than doubled in the last decade, with over half of the Region's AAPG members living within a 2,000-kilometer radius of Singapore.

The headquarters staff currently is working with Region leaders to register AAPG in Singapore, secure office space and hire office staff. Initially, the Asia Pacific office will be a one-person office, following the Middle East office model.

Singapore was selected on the basis of strategic geographic location, region center of petroleum business, ease of access and favorable political climate. It offers relatively low financial risk, a globally minded work force, absence of language barrier and mutually beneficial partnership opportunities.

"I am confident that an AAPG regional office in Singapore will significantly improve communication and coordination between members, the regional officers and all divisions of AAPG," said Joe Lambiase, Asia-Pacific Region president. "Enhancing the level of AAPG services within the region will certainly increase member satisfaction with AAPG."

#### European Office: On the Move

The European office serves AAPG's largest Region membership – and after 2-1/2 years of growth, the office has expanded to a multi-program operation employing three staff members. They are:

✓ Steven Veal, Region office director.

✓ Lika Chambers, conference manager.

✓ January Arnold, executive secretary.

When AAPG first established a presence in London, Imperial College London stepped up to offer AAPG office space at no charge.

"We greatly appreciate the generosity of Imperial College by allowing AAPG to conduct business within the Royal School of Mines building at Imperial College in South Kensington," Veal said.

But change is inevitable, and the London office relocated on Feb. 1 to a new office near Piccadilly Circus at 56 Brewer Street.

In its expanded facility, the London office is now charged with logistical operation of the annual regional conference (Oslo in 2008 and Yalta in

See R&S, page 49

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*"People are marvelous in their generosity  
if they will just know the cause is there."*

—Will Rogers  
1879-1935

# Recognition of Outstanding Educators

## Kindergarten–12th Grade Teacher of the Year Award Endowment

### Who benefits?

Beginning in 1996, the AAPG Foundation has sponsored the K-12 Teacher of the Year Award, which recognizes an outstanding teacher for excellence in the teaching of the earth sciences. Since then, consistent funding has been unavailable. The annual award consists of \$2,500 to the teacher, \$2,500 for science education in the teacher's school, and all-expenses paid, round-trip for two to the AAPG annual convention.

### How you can help?

Funding is currently needed for all future Teacher of the Year Awards. To become a financial partner with the AAPG Foundation in celebrating teacher excellence; the Foundation seeks an endowment of \$200,000 to provide funding for the award. To add your name to the list of contributors for the Teacher of the Year Award Endowment Fund, donate today at [foundation.aapg.org](http://foundation.aapg.org).

*A donation of \$200,000 is required to provide a naming opportunity for the donor.*

For program details or to provide your support for the "Meeting Challenges...Assuring Success" campaign contact Rebecca Griffin, Foundation Manager at [rgriffin@AAPG.org](mailto:rgriffin@AAPG.org), or phone 918.560.2644; or Alison Robbins, Corporate Relations Development Coordinator at [arobbins@AAPG.org](mailto:arobbins@AAPG.org), or phone 918.560.2674.





## FOUNDATIONupdate

By REBECCA GRIFFIN  
*AAPG Foundation Manager*

A new AAPG Foundation named grant was established, a major new pledge was received and a new "legacy" program was created during an active month for the AAPG Foundation.

✓ The new named grant was established by the Pittsburgh Association of Petroleum Geologists (PAPG) – a \$500 annual award that will be distributed through the AAPG Grants-in-Aid program.

The PAPG grant will be restricted to a student enrolled at a college or

university in the Appalachian Basin area and whose research includes Appalachian Basin geology.



David

with efforts to raise \$100,000 through matching gifts.

When fully funded, David's gift will

✓ Past AAPG president, Honorary member and Trustee Associate **Edward K. David** has pledged \$100,000 to the Foundation's "Meeting Challenges Assuring Success" campaign –

provide an annual Eddie David Named Grant through the Foundation's Grants-in-Aid program and an annual grant to support the George B. Asquith Scholarship for Excellence in Petroleum Geology at Texas Tech University.

Members are encouraged to join David's effort to provide funding for geoscience students.

✓ The AAPG Foundation provided \$20,000 to the Kansas State University Foundation in support of the Paul and Deana Strunk Geology Fellowship (made possible by a generous donation from Trustee Associate **Paul Strunk**).

✓ Finally, Foundation Chairman **William Fisher** announced creation of the "Legacy Circle" to honor and recognize members who want to further their generosity in support of the Foundation's mission through a lasting gift indicated in their will.

Membership in the "Legacy Circle" will be announced in the Foundation's annual report; donor preferences regarding the bequest and all information will be held in the utmost confidence.

For information on this and all Foundation programs contact Rebecca Griffin at (918) 560-2644, or e-mail [rgriffin@aapg.org](mailto:rgriffin@aapg.org). □

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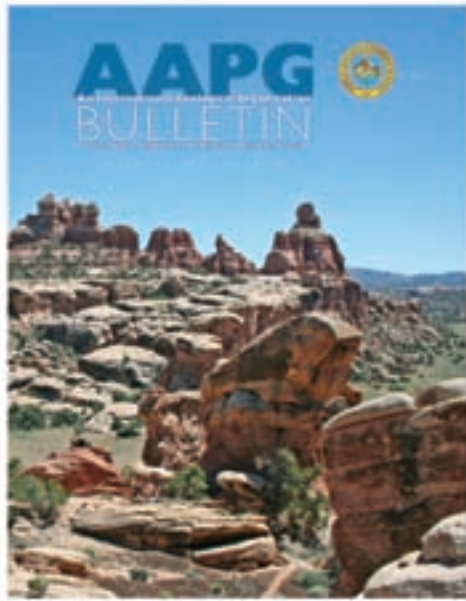
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*The March 2009 cover of the AAPG Bulletin*

# More science than you can shake a pick at.

## **Local tectonic control on parasequence architecture: Second Frontier sandstone, Powder River Basin, Wyoming**

*Boyan K. Vakarelov and Janok P. Bhattacharya*

Detailed analysis reveals that the Second Frontier sandstone in the Powder River Basin, Wyoming, is composed of seven wave-dominated parasequences, the architecture of which was strongly affected by syndepositional tectonic movement. The Second Frontier is a remnant of an extensive wave-dominated deltaic shoreface complex.

## **Pore-throat sizes in sandstones, tight sandstones, and shales**

*Philip H. Nelson*

Pore-throat sizes in siliciclastic rocks ranges from submillimeter to nanometer scale. This size continuum is documented from previously published data, providing perspective on both the emplacement of petroleum in consolidated siliciclastics and fluid flow through fine-grained reservoirs.

## **Three common source rock evaluation errors made by geologists during prospect or play appraisals**

*Harry Dembicki Jr.*

The separate interpretation of total organic carbon, Rock-Eval, and vitrinite reflectance data may lead to a false sense of security when appraising prospects or plays. Full integration of these data along with supplementary analyses including pyrolysis-gas chromatography and burial history diagrams will help to alleviate this problem.

## **The Korudag anticlinorium in the south Thrace Basin, northwest Turkey: A super giant petroleum trap complex?**

*Samil Sen and Selin Yillar*

The Korudag anticlinorium in the south Thrace Basin, the most important gas-producing region in Turkey, is currently producing gas and oil. Mapping reported here indicates that this feature has yet to be tested and explored comprehensively and it may represent a super giant petroleum trap complex.

## **Stratigraphic framework and estuarine depositional environments of the Miocene Bear Lake Formation, Bristol Bay Basin, Alaska: Onshore equivalents to potential reservoir strata in a frontier gas-rich basin**

*Emily S. Finzel, Kenneth D. Ridgway, Rocky R. Reifstuh, Robert B. Blodgett, James M. White, and Paul L. Decker*

The Miocene Bear Lake Formation, exposed on the central Alaskan Peninsula and extending offshore, is the most promising reservoir in the frontier Bristol Bay Basin. The first chronostratigraphic framework for the onshore exposures allows correlation of discontinuous outcrop belts and therefore estimation of the distribution and geometry of potential reservoirs.

## **Overlapping faults and their effect on fluid flow in different reservoir types: A LIDAR-based outcrop modeling and flow simulation study**

*Atle Rotevatn, Simon J. Buckley, John A. Howell, and Haakon Fossen*

The nature in which depositional facies affects fluid flow across overlapping faults is poorly understood. Geological field data from Canyonlands National Park, Utah, and synthetic depositional models provide the basis for simulation to further constrain the effects of overlapping faults on fluid flow in different reservoirs.



Members may access the AAPG Bulletin online at [http://www.aapg.org/March\\_Bulletin/](http://www.aapg.org/March_Bulletin/)

Also, submit your next paper for consideration via <http://www.aapg.org/Bulletin/>

The AAPG is diligent about timely publication of the geoscience of the day.



*Membership, award issues on agenda*

# Delegates to Mull Bylaws Changes

By GEORGE BOLE

*Chairman, House of Delegates*

The following is a summary of the proposed changes to the AAPG Bylaws. These changes have been reviewed by the House of Delegates Constitution and Bylaws Committee. The changes are in final form and have been thoroughly vetted by our legal council, Craig Blackstock.

They were discussed in detail at the mid-year House of Delegates Meeting that convened in Houston on Jan. 17 and will come before the House of Delegates for consideration on June 7 in Denver.

They are being submitted by resolution of the House chairman, chairman-elect, secretary/editor and the chairman of the Constitution and Bylaws Committee.

All delegates have been made aware of most of the proposed changes via previous e-mails and the last issue of the "Delegates' Voice."

I encourage you to review and discuss the proposed changes with your delegates and fellow members and forward any comments or questions you may have.

**Proposed Bylaws Changes**

(strikeouts – deletions;  
underlining – additions)

A proposed amendment to Article I, Section 3, of the AAPG Bylaws to include certain scientific disciplines within the term "geological science" without excluding other appropriate disciplines and for the required experience of

applicants for Active membership to be in geological science.

**ARTICLE I. MEMBERSHIP  
SECTION 3. Active members**

Any person engaged in the practice or teaching of geology may apply for Active membership, provided the applicant holds a Bachelor's, Master's, or Doctor's Degree in geological science, including, but not limited to, geology, geophysics, earth science, geological engineering or environmental geoscience, from a college of acceptable academic standards and, in addition, has had three (3) years of experience in the practice or teaching of ~~geology~~ geological science. Credit for experience can be counted as follows: Master's Degree – one (1) year; Doctor's Degree – two (2) years. The Executive Committee may waive degree or current professional activity requirements if in its judgment an applicant has adequate professional experience and has attained standing in the profession.

\* \* \*

A proposed amendment to Article I, Sections 3 and 8, of the AAPG Bylaws to change the requirements for applicants for admission as Active Members.

**ARTICLE I. MEMBERSHIP  
SECTION 3. Active Members**

Any person engaged in the practice or teaching of geology may apply for Active membership, provided the applicant

holds a Bachelor's, Master's or Doctor's Degree in geological science from a college of acceptable academic standards and, in addition, has had ~~three (3) years~~ a minimum of one (1) year of experience in the practice or teaching of ~~geology~~ geological science. Credit for ~~experience can be counted as follows: Master's Degree – one (1) year; Doctor's Degree – two (2) years.~~ The Executive Committee may waive degree or current professional activity requirements if in its judgment an applicant has adequate professional experience and has attained standing in the profession.

**Section 8. Election to Membership**

Every candidate for admission as an Active Member shall submit a formal application on an application form authorized by the Executive Committee, signed by the applicant, and endorsed by not less than three (3) individuals, at least two (2) of whom are members who are in good standing, stating the applicant's training and experience and such other facts as the Executive Committee shall from time to time prescribe. Endorsers must have known the applicant for a minimum of one (1) year. The Executive Committee shall be the sole judge of the eligibility of the applicant for membership and the adequacy of the applicant's qualifications; provided, however, that the Executive Committee may not waive the endorsement or professional experience requirements set out in this Article I for applicants for admission as Active

Members. If the Executive Committee after due consideration, judges that the applicant's qualifications meet the requirements of the Constitution and these Bylaws, the committee shall cause to be published in the BULLETIN or by other suitable means, the applicant's name and the names of the sponsors. If, after sixty (60) days have elapsed since such publication, no reason is presented why the applicant should not be admitted, the applicant shall be deemed eligible to Active or Associate membership, as the case may be, and shall be notified of election to membership.

An objection to the admission to membership of an applicant must be submitted by an Active Member of the Association, must be in writing, must be received by the Executive Director at the Association's headquarters within sixty (60) days after publication of the applicant's name, must include a full statement of the circumstances on which the objection is based, and must be signed by the member raising the objection. If, in the opinion of the Executive Committee, the objection has merit, the Executive Committee shall reconsider the application.

\* \* \*

A proposed amendment to Article I, Section 5, of the AAPG Bylaws to include

See **Bylaws**, page 46

**CONOCOPHILLIPS SCHOOL OF GEOLOGY & GEOPHYSICS • THE UNIVERSITY OF OKLAHOMA**

AAPG/SEG 2009

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### FIELD SEMINARS

#### **Predicting Clastic Reservoirs Using Applied Sequence Stratigraphy: Understanding the Fundamental Drivers of Basin Fill Architecture**

May 31-June 6, in conjunction with the AAPG Annual Meeting / Begins and ends in Salt Lake City, UT

Leaders: Lee F. Krystinik, Fossil Creek Resources, Fort Worth, TX and Beverly Blakeney DeJarnett, Bureau of Economic Geology, The University of Texas, Houston, TX



#### **Characterization of Conventional and Unconventional Fractured Reservoirs: Modeling Rock and Fluid Dynamics for Optimizing Reservoir Management**

May 31-June 7, in conjunction with the AAPG Annual Meeting / Begins in Salt Lake City, UT, and ends in Denver, CO

Leaders: Laird Thompson, Utah Faults, Fractures and Fluids (UF3), Auburn, CA; James Evans, Utah State University, Logan, UT; Tom Doe, Golder Associates, Redmond, WA



#### **Folding, Thrusting and Syntectonic Sedimentation: Perspectives from Classic Localities of the Central Pyrenees**

June 15-19 / Begins and ends in Barcelona, Spain

Leaders: Antonio Teixell, Universitat Autònoma de Barcelona, Spain, and Antonio Barnolas, Instituto Geológico y Minero de España, Madrid, Spain



#### **Sequence Stratigraphy and Reservoir Distribution in a Modern Carbonate Platform, Bahamas**

June 15-20 / Begins and ends in Miami, FL

Leaders: Gregor P. Eberli, University of Miami, Miami, FL; G. Michael Grammer, Western Michigan University, Kalamazoo, MI; Paul M. (Mitch) Harris, Chevron Energy Technology Company, San Ramon, CA



### SHORT COURSES

#### **Interpretation of Old DST's for Bypassed Pay Potential**

June 5-7 / Denver, CO, with AAPG Annual Meeting

Instructor: Hugh W. Reid, Hugh W. Reid & Associates, Calgary, AB, Canada



#### **Pore Pressure Prediction in Practice**

June 6-7 / Denver, CO, with AAPG Annual Meeting

Instructor: Martin Traugott, Consultant, New Orleans, LA



#### **Quantification of Geologic Risk in the Conventional and Unconventional Realm**

June 6-7 / Denver, CO, with AAPG Annual Meeting

Instructors: Gary Citron, Rose & Associates, LLP, Houston, TX, and Mark McLane, Rose & Associates, LLP, Midland, TX



#### **Regional Stress and Reservoir Geomechanics**

June 11-12 / Denver, CO, with AAPG Annual Meeting

Instructor: Mark Zoback, Stanford University, Stanford, CA



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**American Association of Petroleum Geologists**



## Bylaws

from page 44

recipients of the Halbouty Award as Honorary Members of the Association.

### ARTICLE I. MEMBERSHIP SECTION 5. Honorary Members

Honorary Members shall be those Active Members of this Association who shall have contributed distinguished service to the cause of petroleum geology. Such determination shall be made by the Executive Committee. A recipient of the Sidney Powers Memorial Medal Award or the Halbouty Award shall become automatically an Honorary Member. Honorary Members shall not

be required to pay dues, but shall have all the privileges and advantages of Active membership in the Association.

\* \* \*

A proposed amendment to Article I, Section 6, of the AAPG Bylaws to provide for Student membership to be available only to full-time students.

### ARTICLE I. MEMBERSHIP SECTION 6. Students

Any full-time student majoring in geology or in a field of study related to or generally associated with geology at a college of acceptable academic standards may apply for Student membership. Student membership shall terminate upon termination of full-time academic enrollment.

\* \* \*

A proposed amendment to Article I, Section 7, of the AAPG Bylaws to provide for the employment of an individual applying for membership as an Associate to be associated with geological science.

### ARTICLE I. MEMBERSHIP SECTION 7. Associates

Any person not qualified for any other class of membership who is a graduate of a college of acceptable academic standards whose employment is associated with geology, geological science, may apply for election as an Associate. The Executive Committee may waive degree requirements, if in its judgment an applicant has adequate professional experience, and has attained professional standing.

\* \* \*

A proposed amendment to Article V, Section 6, of the AAPG Bylaws to include certain awards for which the Advisory Council shall not recommend recipients.

### ARTICLE V. ADVISORY COUNCIL SECTION 6. Honors and Awards

The Advisory Council shall recommend recipients for all honors and awards that may be established by the Executive Committee with the exception of the Matson Award, and the Jules Braunstein Memorial Award, the Gabriel Dengo Memorial Award, the Ziad Beydoun Memorial Award, and all student awards.

\* \* \*

A proposed amendment to Article XIII, Section 3, of the AAPG Bylaws to delete provisions inconsistent with the provisions for graduated dues set out in current subsection (e) of Article XIII, Section 3.

### ARTICLE XIII. DUES

#### SECTION 3. Dues Scheduling and Billing

\*\*\*\*

(a) \*\*\*\*

(b) \*\*\*\*

(c) \*\*\*\*

(d) An Associate who has completed the degree requirements, but not the experience requirements, for Active membership shall pay one-half of the regular Active membership dues for not more than four (4) years while not having satisfied such experience requirements and shall pay regular Associate dues thereafter while an Associate.

(e) There shall be three levels of annual dues for Active Members and Associates, which shall be based on gross annual personal income in United States dollars. The levels are: Level 1 – Annual income greater than \$50,000; Level 2 – Annual income greater than \$25,000 but not more than \$50,000; and Level 3 – Annual income of \$25,000 or less. Level 2 dues shall be one-half of Level 1 dues; Level 3 dues shall be one-fourth of Level 1 dues; provided, however, that in no event shall annual dues based on any level of annual income be less than \$20.00. An Active Member or an Associate whose annual income is in Level 2 or Level 3 may, at his or her option, pay dues that correspond with any higher level of annual income. The Executive Committee may provide for access to the BULLETIN and the EXPLORER by different means for persons paying different levels of dues.

(f) Except as required to initiate the various dues levels as set out in subsection (e) above, that the annual change in dues for Active Members and Associates cannot exceed twenty percent (20%), and that this annual change is noncumulative; and

(g) That a penalty to be established annually by the Executive Committee will be levied for each quarter year of delinquency beginning on July 1. □

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“hydrothermal dolomite” AND Davies

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**Questions?**

David G Morse, General Chair: [morse@isgs.illinois.edu](mailto:morse@isgs.illinois.edu)

Brian D. Keith, Technical Chair: [keithb@indiana.edu](mailto:keithb@indiana.edu)

# AAPG Career Center Nears Anniversary

By VICKI BEIGHLE  
AAPG Membership Manager

The AAPG Career Center, an online service created to provide guidance and expertise to members who seek to enhance their careers, is approaching its first anniversary.

If you're one of the many who have benefited from the service, congratulations on taking a big step to improve your career.

And if you're one of those who have yet to take advantage of the program – what are you waiting for?

The Career Center is an online site where AAPG members can post their resumes, and where any employer can post jobs.

For many members, that's reason enough to cheer. But there's more.

Another unique "Member Only" benefit AAPG offers is the **Member Registry**, which allows individuals to list their areas of expertise, as well as interests and experience.

Companies can post employment

opportunities for a nominal fee – in fact, at half the cost of Monster.com.

As the world's largest geological organization – we now have over 33,000 members worldwide – we have the resources through our Career Center to help employers find the best candidates our industry has to offer. And by posting their resumes, our members can reach out to companies looking for them.

The site is professionally managed and easy to navigate. We can work with companies to offer additional group discounts, and we encourage companies to create a profile – even if they do not have current openings – so they are on the site and searchable by our members.

Visit our Web site today, at [careercenter.aapg.org](http://careercenter.aapg.org) – and while attending the annual meeting in Denver be sure to visit the Career Center room onsite at the Colorado Convention Center. □

## MEMBERSHIP & 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.

**For Active Membership****California**

Hwang, Rong, Chevron, San Ramon (R.L. Kaufman, C.Y. Lee, D.K. Baskin)

**Colorado**

Cummins, Dean Lewis, self-employed, Colorado Springs (reinstate); Hagen, Thomas F., Pioneer Natural Resources, Denver (L.A. Parnell, L.R. Lehtonen, Q. Yang); Perry, Sandra Linthicum, Perry Remote Sensing, Denver (reinstate)

**Georgia**

Summerour, Joseph Heard, DrillingInfo, Duluth (A. Gilmer, M. Nibbelink, R. Trentham)

**Illinois**

Lasemi, Yaghoob, Illinois State Geological Survey Division, University of Illinois, Champaign (reinstate)

**Louisiana**

Alramahi, Bashar, ExxonMobil, Baton Rouge (S.L. Karner, G.R. Dasari, Q.R. Passey); Lu, Qiu, O'Brien Energy, Shreveport (A.L. Brittain, P.L. Lakin, B.E. Raborn); Mack, Jonathan Edward, Minerals Management Service, New Orleans (J.L. Shanks, J.H. Yenowine, T.E. Blood); Tatum, David Moore, Chevron, Covington (R.P. Langford, L.M. Brown, C.L. Tatum)

**Mississippi**

Lundy, Jeffrey Owen, self-employed, Madison (reinstate); McCallum, John S., retired, Meridian (reinstate)

**Ohio**

Daniels, Jeffrey John, Ohio State University, Columbus (P. MacKenzie, J.W. Collinson, M.G. Bevis)

**Oklahoma**

Longo, Lorraine "Lori," MAP, Oklahoma City (M.D. Hughston, L.H. Davis, S.H. Formhals); Whitman, Doug W., Chaparral Energy, Oklahoma City (D.C. Newby, P.T. Younger, J. Bell)

**Texas**

Afifi, Ahmed Said, BP, Houston (S.W. Krueger, R.G. Gibson, J.M. Casey); Ali-Adeeb, Jessica Moore, Chevron, Houston (S.W. Tinker, D.A. Wavrek, S.K. Shepherd); Ayers, Jennifer Marie, Chevron, Houston (M.L. Gerdes, E. Oatney, R.A. Eisenberg); Bagstad, David, Austin Geological Modeling, Houston (J.B. Claunch, T.A. Tucker, J.S. Ngalawa); Ball, Richard William, Chevron, Houston (L.T. Billingsley, D.L. Smith, W.S. Houston); Goodman, Landry "Lanny" J., self-employed, Garland (D.C. Shanabrook, L.D. Brisendine, T.J. Helms); Kennedy, Joseph Overton, self-employed, Austin (reinstate); Reed-Terry, Jimika Niya, ConocoPhillips, Houston (H.O. Vick, D.M. Orchard, G. Tarango); Williams, Wade Hampton, Chevron, Houston (L.D. Thomas, J. Jones, R. Brown)

**Canada**

Bergen, Tim D., Nexen, Calgary (D.A. Leckie,

continued on next page

## Certification

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

**Petroleum Geologist****Tennessee**

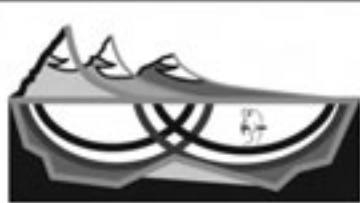
Burton, Jennifer Lynn, consulting geologist, Memphis (L. Sternbach, D. Behseresht, M. Parchman)

**Petroleum Geophysicist****France**

Olagundoye, Olatunbosun Olatunji, Total S.A., Pau (T.O. Itiola, O. Ogunkoya, G. Obob)

**Coal Geologist****Kansas**

Recoy, Harold Kenneth, Quest Resource Corp., Chanute (Reciprocity – American Institute of Professional Geologists)



March 27, 2009

Denver, Colorado / Downtown Marriott Hotel

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**Utah Hingeline Exploration Update**

**David Johnston – ExxonMobil**  
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## R&S

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2010), APPEX (the AAPG Prospect and Property Expo), the regional Imperial Barrel Award Program, student and professional short courses, the quarterly exploration luncheon in Aberdeen and the monthly petro-lunch program in London.

### Middle East Office: Local Connections

Abeer Al Zubaidi is director of AAPG's Middle East office; she's currently a one-person operation, working in close collaboration with the Middle East Region Council and AAPG headquarters.

Staffed by a native of the region, the Middle East office is well positioned to build on local contacts and cultural awareness – and by combining local planning efforts with systems already in place at AAPG headquarters in Tulsa, event brochures and regional marketing activities are carried out more efficiently.

"The most important service taken over by the regional office is the

planning and execution of AAPG conferences, workshops and courses within the Middle East," said Aboud Afifi, AAPG Middle East Region president. "And by offering AAPG courses locally, the office provides quality training at lower cost to the growing population of members in this Region, many of whom are in the early stages of their careers."

The Region's 2009 calendar of events begins with a series of short courses and Geosciences Technology Workshops. The office also supports other services planned by the Region Council, including the organization of AAPG student chapters and a regional IBA competition in 2010.

Significant value to AAPG's global operations is realized by building regional industry support for two highly successful, major conferences – GEO Bahrain and IPTC.

✓ First, the office will play a key role

in organizing AAPG's participation in the 2010 GEO Conference and Exhibition in Bahrain, a biannual event that is the region's largest gathering of geoscientists. AAPG serves as secretariat for GEO Bahrain.

✓ Second, the IPTC conference, which represents a regional partnership among AAPG, SPE, SEG and EAGE, will be held Dec. 7-9 in Doha, Qatar. Again, a key objective of AAPG's Middle East office is to build organizational capacity by providing logistical planning and support to IPTC.

AAPG's local presence facilitates local collaboration with other societies and associations doing business in the Region. For example, March 8-11 AAPG will jointly sponsor the Gulf Education Symposium along with Dhahran Geoscience Society, EAGE and SEG.

### Inter-Regional Collaboration

Later this year, efficiency through

collaboration will extend across AAPG Regions to bring geoscientists in both the Middle East and Europe a Geosciences Technology Workshop on unconventional gas resources. The joint region workshop will be held in Istanbul, Turkey – centrally located and easily accessible to both regions.

With co-chairmen from ExxonMobil and from Saudi Aramco, the program is sure to contain broad appeal and timely relevance.

Both AAPG regional offices offer support to the program committee and will handle logistics and operations.

AAPG's Regional offices are concrete examples of how the Association strives to serve as a primary source of science and professional development wherever geoscientists live and work. □

continued from previous page

M. Fustic, R. Mohr); MacMahon, Gordon R., Future Source Consulting, Calgary (W.M. Rodgers, D.P. Gatto, M.T. Oliver); McCulloch, Richard John, United Oil and Gas Consulting, Calgary (reinstate)

### Colombia

Pederos Bastidas, David Ricardo, Columbus Energy Sucursal Colombia, Bogota (D.L. Stoudt, S.A. Hermeston, S.R. Bell)

### Germany

Chevallier-Mesbacher, Johanna, Wintershall Holding AG, Kassel (K.C. Fischer, U. Moeller, S. Doering)

### India

Singh, Ram Krishna, ONGC, Dehradun (N.K. Verma, H.J. Singh, V. Dangwal)

### Kuwait

Ahmed, Khalid, Kuwait Oil Company, Ahmadi (S.S. Thakur, M. Fustic, F. Din)

### Mexico

Reyes Theojares, Juan Eduardo, Pemex E&P, Tampico, Tamaulipas (D.F. Rodriguez, R.O. Vazquez, U. Hernandez-Romano)

### Morocco

Didi, Salwa, ONHYM, Rabat (H. Jabour, M. Zizi, M. El Alji)

### Nigeria

Egbu, Ogechi Clementina, Nsukka, Enugu State (P. MacKenzie, R.D. Fritz, N. Schneidermann); Mode, Ayonma Wilfred, University of Nigeria, Nsukka, Nsukka, Enugu (O.A. Ehinola, B. Olaleye, L.C. Nosike)

### People's Republic of China

Hou, Guowei, CNOOC Research Centre, Beijing (R. Pan, A. Kang, X. Zhu); Liu, Chenglin, China University of Petroleum-Beijing, Beijing (R.R. Charpentier, D. Higley, X. Zhu)

### Russia

Verzhbitsky, Vladimir, TGS-NOPEC Geophysical Co. Moscow, Moscow (V.E. Khain, A.A. Kitchka, S. Drachev)

### Saudi Arabia

Hu, Yi Jun Herbert, Saudi Aramco, Dhahran (M.T. Bukhari, G.E. Jahraus, H. Xiao)

### South Africa

Thompson, Vaughn Grant, Parow (P.M. Lloyd, J.K. Agbenorto, D.D. Clarke)

### Switzerland

Renard, Philippe, University of Neuchatel, Neuchatel (G.E. Gorin, R. Labourdette, J. Burrus) □

## American Association of PETROLEUM GEOLOGISTS Annual Convention & Exhibition

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ANNUAL CONVENTION & EXHIBITION



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Announcement with this issue of *EXPLORER*!



[www.AAPG.org/Denver](http://www.AAPG.org/Denver)



## READERS' forum

## More Than a Bite

I have truly enjoyed Scott Tinker's columns, but I have concerns about "Myths, Realities and Sound Bites" (February EXPLORER), because it highlights again for me how we in the petroleum industry, by omission or commission, are missing the opportunity to educate the public and advance our own interests.

Everyone hates sound bites, so it becomes easy to ridicule opposing points of view by calling them that. The fact is, though, these are not intended as statements of fact but as statements of values – and while science *guides* public policy, values are what *drive* public policy.

Take the sound bite, "We cannot drill our way out of an energy crisis." As a statement of fact that strikes us as ridiculous, because obviously you can drill your way out of an energy crisis. But is it intended to be a statement of fact, or is it a statement of values? In other words, when faced with an energy crisis, is the best public policy to drill your way out of it (with all the pros and cons of that approach) versus some alternative approach (such as developing a diversified energy portfolio)?

I am not arguing here; I am simply showing you there is a possible miscommunication going on. By missing this key point, we waste an opportunity.

For example, the sound bite "The United States should be energy independent," is again obviously wrong as a statement of fact in a globalized economy – but suppose it really is a statement of values (i.e., we should diminish the influence of foreign governments on the United States). That could in fact be a rallying cry for the importance of independent petroleum

*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.*

companies.

Instead of disagreeing, why didn't we step forward and say "Yes, we agree, and here's what we can do about it working together (strengthen the independents, etc.)."

And by the way, to establish our impartiality a bit, where was AAPG in correcting John McCain and Sarah Palin last fall when they repeatedly suggested (talk about sound bites!) removing the Congressional moratorium on drilling on the OCS would immediately result in lower gasoline prices at the pump?

If you wonder why the oil industry is demonized, it is in no small part due to our own missteps in establishing some level of objectivity and impartiality with the public, and respectfully treating the public's concerns as legitimate. Calling concerns about global warming a "sound bite" is a dismissive way of perpetuating an unnecessary (and ultimately fruitless) conflict.

Jim Evans  
Bowling Green, Ohio

## Congratulations, Ty

Regarding the selection of Ty Robinson as this year's AAPG Teacher of the Year (February EXPLORER): I would like to extend my personal congratulations to both Ty for earning this honor and to the AAPG for recognizing such an excellent teacher.

While attending college I had the opportunity to interact with Ty as a student in his class, a co-teacher in the field and as a fellow graduate student. I

was always impressed by Ty's equal passion for geology, science and teaching. His classes were always fun, interactive and informative.

Many of his students have excelled in both local and international science fairs and have continued on in careers in science as a direct result of his influence. He is a credit to both the geologic sciences and to the teaching profession.

James F. Miller  
Magnolia, Texas

*(Editor's note: An interview with Robinson will appear in an upcoming EXPLORER.)*

## So Far, So Good

Regarding your stories on the Amoruso field (February EXPLORER): Great story as far as it goes.

According to past published work in GCAGS (2002) and a *Search and Discovery* article, the turbidite/submarine fan complex where the Amoruso field is located is at the exit mouth of a critical feeder submarine canyon.

George Devries Klein  
Sugar Land, Texas

## A Worldly Suggestion

Regarding "Letter Perfect," Readers' Forum, February EXPLORER: Scientific nomenclature as utilized in publications of the "American Association of Petroleum Geologists – An International Organization" should mandate the use of international metric nomenclature and

measurement units.

While many of us in the United States began utilizing Imperial measurement units in the petroleum industry, most of us have grown internationally and utilize the metric system as used by most of the world. The use of "K," though scientific, should not be used in our publications or communications, as we are an "international organization."

Properly, we should use units the rest of the metric petroleum world uses: metres, cubic metres, kilograms, tons (metric) and M for one thousand, MM for one million, B for one billion and T for one trillion.

Porter Versfelt  
Houston

## A Silver Lining?

Following up on comments by Arthur Berman (Readers' Forum, February EXPLORER): Rather than question whether climate change is reversible, a better line of inquiry would be, "Would the benefits of a slightly warmer earth outweigh the negatives?"

I would think an honest, less hysterical analysis of the pros and cons, perhaps using Bjord Lomborg's analytical logic, could allow a more rational response to the question.

We might consider that a longer growing season in Canada and Russia, fewer winter deaths than those in summer, less concern for birds and mammals that follow the weather and aren't locked into their present day niches could put a more positive light on a very questionable and controversial subject.

David Callaway  
Houston

See **Forum**, page 52



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## UPCOMING REGIONAL WORKSHOPS

3/12-13 **Rocky Mountain:** Petroleum Geology for Non-Geologists - Golden, CO. Contact: 303-273-3107

3/26 **Eastern:** Michigan Field Experiences - Mt. Pleasant, MI. Contact: 269-387-8633

3/24 **Texas/SE New Mexico:** How To Start/Fix/Manage a Small Waterflood (Ellison Miles Geotechnology Center)- Farmers Branch, TX. Contact: 512-471-0320

4/1-2 **Midcontinent:** 18th TORP Oil Recovery Conference (KU Tertiary Oil Recovery Project) - Wichita, KS. Contact: 785-864-7396

4/6 **R Rocky Mountain:** Petra Basics - Golden, CO. Contact: 303-273-3107

4/8 **Rocky Mountain:** By-Passed Pays and Plays; Lessons Learned from Missed Opportunities - Golden, CO Contact: 303-273-3107

4/9 **Rocky Mountain:** By-Passed Pays and Plays; Lessons Learned from Missed Opportunities - Billings, MT. Contact: 303-273-3107

4/22 **Rocky Mountain:** Completions and Stimulations for Geologists (Minot State Univ.) - Minot, ND. Contact: 303-273-3107

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



## Next big event: Denver forum, sessions

# Climate Panel Stays the Course

By LARRY NATION

**AAPG Communications Director**

When members of the AAPG Global Climate Change Solutions Committee accepted their appointments, they knew this "kitchen" would be hot. And so it is. In fact, the committee's inception itself was prompted by sometimes-heated debate over the question of human impact on climate change.

Beginning as an ad hoc panel in 2006, the first charge was to study and revise the existing AAPG Climate Change Position Paper, which challenged anthropogenic causes for climate change. The position was controversial and unpopular with some, and was cited in national publications and widely discussed on the Internet.

After a year of discussion, the AAPG Executive Committee approved the rewording of the ad hoc committee's policy statement, using the new process for approving AAPG Statements. In fall 2007, the ad hoc group was succeeded by a new standing committee, the Global Climate Change Solutions Committee, appointed by then-president Willard R. "Will" Green.

Once under way, the new committee asked the Executive Committee to drop the word "Solutions" from the title to broaden its scope, and the official name is now the AAPG Global Climate Change Committee (GCCC).

Its charge is "to promote and facilitate various fields of geologic study that relate to global climate change and potential solutions."

The GCCC currently has 14 members, including three representatives recommended by the Executive Committee and three each from the AAPG divisions DEG, DPA and EMD. DEG member Priscilla Grew from the University of Nebraska agreed to be chair, recognizing "that this area of study and discussion is science in progress" and of great importance to AAPG, but unlikely to produce definitive universal consensus anytime soon.

The first projects undertaken by the GCCC were to host science forums on climate change before a standing-room-only crowd at the 2008 AAPG convention in San Antonio and at a special evening session at the 2008 international convention in Cape Town, South Africa.

The speakers for both forums were vetted and approved in advance by the full GCCC. The GCCC was able to engage highly qualified world-class scientists to speak on the key scientific issues: carbon dioxide and temperature, solar influences, glacial and geologic aspects of climate change.

(Videos and PowerPoint of all the San Antonio forum talks are available on *Search and Discovery* – AAPG's online journal.)

Forum co-conveners John Armentrout and Jeff Levine note that the committee recognizes that climate change "is complicated, political and emotional – and that's for openers." The forums have led some AAPG members to question in the EXPLORER whether the selected speakers reflect a sufficient balance of opposing viewpoints – or lack thereof.

While one of the GCCC's aims has been to bring to AAPG membership the highest level of vetted ("peer

reviewed") climate science that is being done today, some warn that application of the "peer reviewed" filter may not produce the balance of conflicting views that they would like to see aired in the forums.

"We recognize that temperature histories require great care in selection of representative data points," GCCC co-chair Armentrout noted, "and we have worked with Dr. Tom Peterson of NOAA to better address that issue, including the questions recently raised in the EXPLORER Readers' Forum. We acknowledge that the linkage of carbon

dioxide to temperature history is debated, and that is why the upcoming Denver technical session on CO<sub>2</sub> and temperature will include speakers with a broad spectrum of perspectives."

Co-chair Priscilla Grew notes that "the committee's intent is to present over time the scientific challenges and their implications as various experts see them."

The next big event is in June at the AAPG Annual Convention and Exhibition in Denver, where the Committee will present another forum, "Anticipating a Carbon Constrained

Future: Implications For The Fossil Fuel Industry," as well as the technical session on climate links between CO<sub>2</sub> and temperature, plus two poster sessions.

The GCCC session on geologic carbon sequestration already has ranked as one of the top draws for abstract submittals for the Denver meeting, and a number of abstracts had to be rejected due to space limitations.

No doubt, the "kitchen" still will be warm, since facts, opinions, emotions and politics don't go away easily. □

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Joint 61st ICCP- 26th TSOP Meeting  
Advances in Organic Petrology and Organic Geochemistry  
September 19-26, 2009 - Gramado/Porto Alegre, Brazil



International Committee for Coal  
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Gramado/Porto Alegre, Brazil  
September 19-26, 2009

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Advances in organic petrology and organic geochemistry

Field trips to the coal-mining and wine-tasting areas in Rio Grande do Sul

TECHNICAL PROGRAM AND ABSTRACTS:  
Prof. João Graciano  
E-mail: graciano@geologia.ufrj.br

GENERAL INQUIRIES AND REGISTRATION:  
Prof. Wolfgang Kalkreuth  
E-mail: wolfgang.kalkreuth@ufrgs.br

**ABSTRACT SUBMISSION DEADLINE: APRIL 30, 2009**

Meeting and abstract submission details:

[http://www.ufrgs.br/ICCP\\_TSOP\\_2009/](http://www.ufrgs.br/ICCP_TSOP_2009/)

ICCP: [www.iccop.org](http://www.iccop.org)  
TSOP: [www.tsop.org](http://www.tsop.org)

TSOP student research grant  
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## Inmemory

Eric K. Hanson, 52, president of Hanley Petroleum in Midland, Texas, past president of the American Association of Petroleum Landmen and scion of one of AAPG's most highly decorated leaders, died of cancer on Jan. 14.

He was the son of the late AAPG Honorary Member Bernold M. "Bruno" Hanson, AAPG president in 1986-87 and 1994 Sidney Powers Medalist, who died in 2000.

Robert A. Anderson, 78  
Lafayette, La., Nov. 7, 2008  
Maynard F. Ayler (EM '52)  
Golden, Colo.  
Elliot C. Bratt, 88  
Bayard, Neb., Jan. 8, 2009  
Joseph T. Carlisle Sr., 78

Millry, Ala., Sept. 15, 2008  
Rayford B. Gustafson Jr., 79  
Waynesboro, Miss., Nov. 12, 2008  
Connelly E. Hannum, 95  
Ardmore, Okla., Sept. 8, 2008  
John B. McKeon (AS '81)  
December 2008  
South Bristol, Maine  
Francis M. Pierce, 83  
Mattoon, Ill., Dec. 31, 2008  
John J. Wanner (AS '58)  
Dec. 26, 2008

(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 death is unavailable, the person's membership classification and anniversary date are listed.)

## Forum

from page 50

### Full Disclosure

I take exception to the statement that the SEC reserves disclosure change process "began after AAPG and the Society of Petroleum Engineers held the Interdisciplinary Reserves Conference in Washington, D.C., in June 2007" (Washington Watch, January EXPLORER).

The process began much earlier, possibly earlier than the April 2004 Energy Forum on Reserves in Houston that I attended and where Roger Schwall of the SEC announced the April 15, 2004, letter from the SEC to producers with operations in the Gulf of Mexico.

Many people in the reserves arena have contributed to the final resulting changes in the reserves disclosure rules.

I can name Neil Staley of The Energy Forum, Dan Yergin and David Hobbs of CERA, Peter Rose of AAPG (one of the organizers of the June conference mentioned) and, most importantly, the individual engineers and geoscientists

that contributed time and effort to communicate the message to the SEC that the rules needed change.

Many companies also contributed to the effort by providing funding and time to those of us who believed passionately that neither investors nor industry were being served by the original rules.

The Interdisciplinary Reserves Conference was certainly a contributing factor, but a lot of groundbreaking had been done by many groups and individuals prior to that meeting.

Stuart L. Filler  
Houston

### The Politics of Science

Regarding the President's Column in the January EXPLORER: I want to thank Scott Tinker for a clearly written column that points out the difference between the scientific and the political questions surrounding climate change.

In teaching courses for non-scientists I begin with a description of "What is science?" and try to point out that science cannot answer all questions, but the ones it can answer are answered with a logical view.

I will be using some of his comments in class.

Mary E. Dowse  
Silver City, N.M.

## Browsing

from page 27

### Back to the Big Picture

The next most popular feature of AAPG's Web site encompassed the meetings sub-sites, including annual, international, Hedbergs and all other meeting information hosted on [aapg.org](http://aapg.org). These sites received 319,327 page views, over one-third of which came via the San Antonio 2008 Web site.

In fact, the San Antonio annual meeting drove the AAPG Web site's highest traffic volume days of the year, which occurred in the days directly before the meeting began on April 20. Between April 16-18, approximately half of [aapg.org](http://aapg.org)'s 14,470 page views were from the San Antonio Web site.

This highlights the importance of the AAPG Web site as a source of information for annual meeting attendees. As last-minute registrations were submitted, travel plans were made and presentations finalized, visitors turned to the AAPG Web site to keep informed.

So, who is visiting?

The AAPG Web site has received visits from over 214 countries and territories over the past year. Every continent where AAPG has members is represented.

Over half the visitors to the Web site came from the United States. Houston has the honor of sending the most visitors, with Calgary, Canada, in second place.

The highest number of international visitors came from Canada, followed by the United Kingdom.

Web statistics do a lot more for us than simply give a number of "hits:"

✓ They tell us where our visitors are coming from, how they are finding us and what they are doing once they do find us.

✓ They indicate what people are searching for on search engines, and how much of that content they're finding via our Web site.

✓ They show us what parts of our Web site are important to our users, so we can continue to make enhancements; also, which parts aren't as highly valued.

All of this information helps to design a better Web experience for AAPG members and visitors to our site. □



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successful candidate will be expected to build and lead a research team that conducts cutting edge basic and applied research, technology development, and implementation of a geologic sequestration demonstration project. We welcome applicants from all sectors, including academia, industry and government laboratories.

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Applications should include a statement of leadership experience, research interests, curriculum vitae, and the names and contact information for at least three individuals who can provide letters of evaluation. Review of completed applications will begin March 15, 2009. Send an electronic copy of your application to: Ms. Sarah Schulmeyer at [sschulme@uwyo.edu](mailto:sschulme@uwyo.edu); if you have additional application materials to send, please direct them to the Carbon Sequestration Search Committee, School of Energy Resources, University of Wyoming, Department 3012, 1000 East University Avenue, Laramie, WY 82071-2000.

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Calgary, Alberta	April 27 – May 1
Denver, Colorado*	August 17 - 21
Calgary, Alberta	September 28 – October 2
Houston, Texas	October 19 – 23
Bali, Indonesia	October 19 – 23
Dallas, Texas	November 9 – 13

## An Overview of Exploration Play Analysis

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## DHI Interpretation and Risking

Houston, Texas May 7 – 8

\* includes material on unconventional resource assessment

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## DIRECTOR'S corner

## Association Budget OK – for Now

By RICK FRITZ

"Money is like a sixth sense," Somerset Maugham once said. "You can't make use of the other five without it."

This is certainly true in managing budgets during a recession.

Six months into fiscal year 2008-09, AAPG's financial health continues to be sound. However, with the current economic recession, the question is, "How will AAPG fare financially the next couple of years?"

At AAPG we use several key economic indicators to monitor association health. The first four indicators are:

## ✓ Advertising.

Most advertising revenue comes from the EXPLORER. During 2007 and 2008 the EXPLORER experienced extremely good advertising revenue. Advertising for the EXPLORER set records during the last six months of 2008; however, starting in 2009 advertising has slowed.

Nevertheless, the current rate is still good compared to historical rates.

## ✓ Sponsorship.

Industry sponsorship for most AAPG programs is still strong – especially for the annual meeting in Denver and large conferences such as AAPG's 3P Arctic – The Polar Petroleum Potential Conference



Fritz

and Exhibition in Moscow later this year. Monies are more difficult to obtain for smaller specialized conferences and programs.

For example, AAPG's Imperial Barrel Award is experiencing incredible success with over 80 universities competing this year. Currently the committee has received over \$52,000 in income but needs another \$100,000 to reach budget.

## ✓ Exhibitor sales.

Exhibitor registrations are good for the AAPG Annual Convention and Exhibition in Denver, and with an excellent technical program we are expecting robust preliminary registrations for the meeting. You can get more information about the program and registration in the Denver announcement that accompanied this EXPLORER.

Although a few companies are cutting

Although we see some areas of weakening revenue in 2009, we are still above the income levels we experienced in 2006 and 2007.

back in booth size we are still meeting budget in exhibition sales and continue to add to the exhibition floor.

## ✓ Educational registrations.

We are experiencing weaker markets for AAPG's education program in 2009 as companies reevaluate budgets. For example, AAPG's Winter Education Conference in Houston had 160 attendees last year compared to 120 attendees this year. This is still a higher registration rate than those of years previous to 2008.

Other economic indicators remain strong, including revenue from member dues payments. Total membership is a late economic indicator as it usually lags a year or more behind any major drop in the price of oil.

So generally, AAPG is healthy

financially. Although we see some areas of weakening revenue in 2009, we are still above the income levels we experienced in 2006 and 2007.

As a result, we expect to meet budget with a great annual meeting in Denver to close out AAPG's fiscal year.

\* \* \*

Since 1945 the United States has recorded more than 11 recessions. Each recession was essentially two to three years in duration no matter how the government tried to stimulate the economy.

The good news is that each recession was typically followed by six to 10 years of growth.

Although it is difficult to predict the demand and price of oil and gas, we do know that the global dynamics are significantly different from the oil boom and bust of the late 1970s. The economies of China and India will heat up again and the demand for natural gas from resource plays will play an important part in our energy future.

## DOI awardee to speak in Denver

By REBECCA DODGE  
DEG President

Imagine this as the imaginary plot for a screenplay: A tiny rural town on an Indian Reservation sits a few miles from a large oil field. Abandoned wells are leaking hot, salty water into the town's only drinking water source, a shallow aquifer.

The town's residents losing their clean water supply.

Sounds like the lead-in to a Hollywood blockbuster akin to Erin Brockovich, with Big Oil one of the lead actors.

The screenplay calls for top-rank stars and will certainly portray the petroleum industry in a very negative light.

But wait – the facts on the ground challenge this over-dramatized cinematic scenario!

In the real event:

✓ The federal and tribal governments coordinate considerable expertise and spends millions to delineate the contamination, in cooperation with the new industry owner of the leaking well, which acquired that well long after the leak began.

✓ The petroleum company plugs the leaking brine from the well it inherited and invests millions in designing a state-of-the-art remediation project, with recognizable results early on.

✓ The tribal environmental personnel and state agencies marvel at the cooperative process focused on the issue – a process in which they are fully informed and involved.

✓ Finally, the entire project receives the Department of the Interior's 2008 Environmental Achievement Award, in recognition that "the unique combination of methods and collaboration used to document remediation progress is unprecedented, and these techniques



Dodge

This is a fine example of the kind of work going on in our industry as we step up with determination to solve environmental issues associated with hydrocarbon exploration and production.



Photo by Christa Tyrrell, Ft. Peck Tribes, Office of Environmental Protection

A Hollywood ending? The PNR-1WD rig, with the town of Poplar in the background.

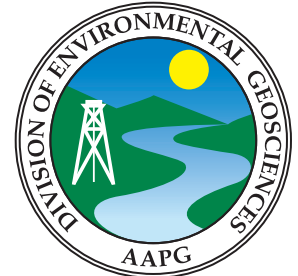
will likely supplement future industry standards for monitoring remediation."

This is pretty exciting stuff, in my book – reading about the thorough, involved process and its ongoing results actually gave me goose bumps.

This is a fine example of the kind of work going on in our industry as we step up with determination to solve

environmental issues associated with hydrocarbon exploration and production.

DEG is proud to claim the petroleum environmental scientist involved in leading the industry side of the successful team effort – our very own Mike Jacobs of Pioneer Natural Resources, U.S.A., who also is president-elect of DEG.



We also claim the lead U.S. Geological Survey scientist, Bruce Smith, as one of our own. Bruce, by the way, is our DEG chairman for the upcoming Denver AAPG Annual Convention and Exhibition.

So as you make your plans for the Denver AAPG convention, be aware that the DEG luncheon speaker Mike Jacobs will present this award-winning "Cooperative Aquifer Restoration Project, Fort Peck Indian Reservation – A Multi-Agency Success Story."

We hope that you will join us to learn more about the story, and watch for a detailed story on the project in an upcoming EXPLORER – or you could wait for the movie, although I predict it will have a different ending.

\* \* \*

Here's another reminder that DEG Committees seek your input and membership.

Please visit the DEG Web site at <http://deg.aapg.org/committees.cfm> to learn about the goals of the Environmental Geophysics, CO<sub>2</sub> Sequestration, Geohazards, Hydrogeology, Environmental Health and Safety and Research committees.

Network with your peers and share your expertise with industry partners. □



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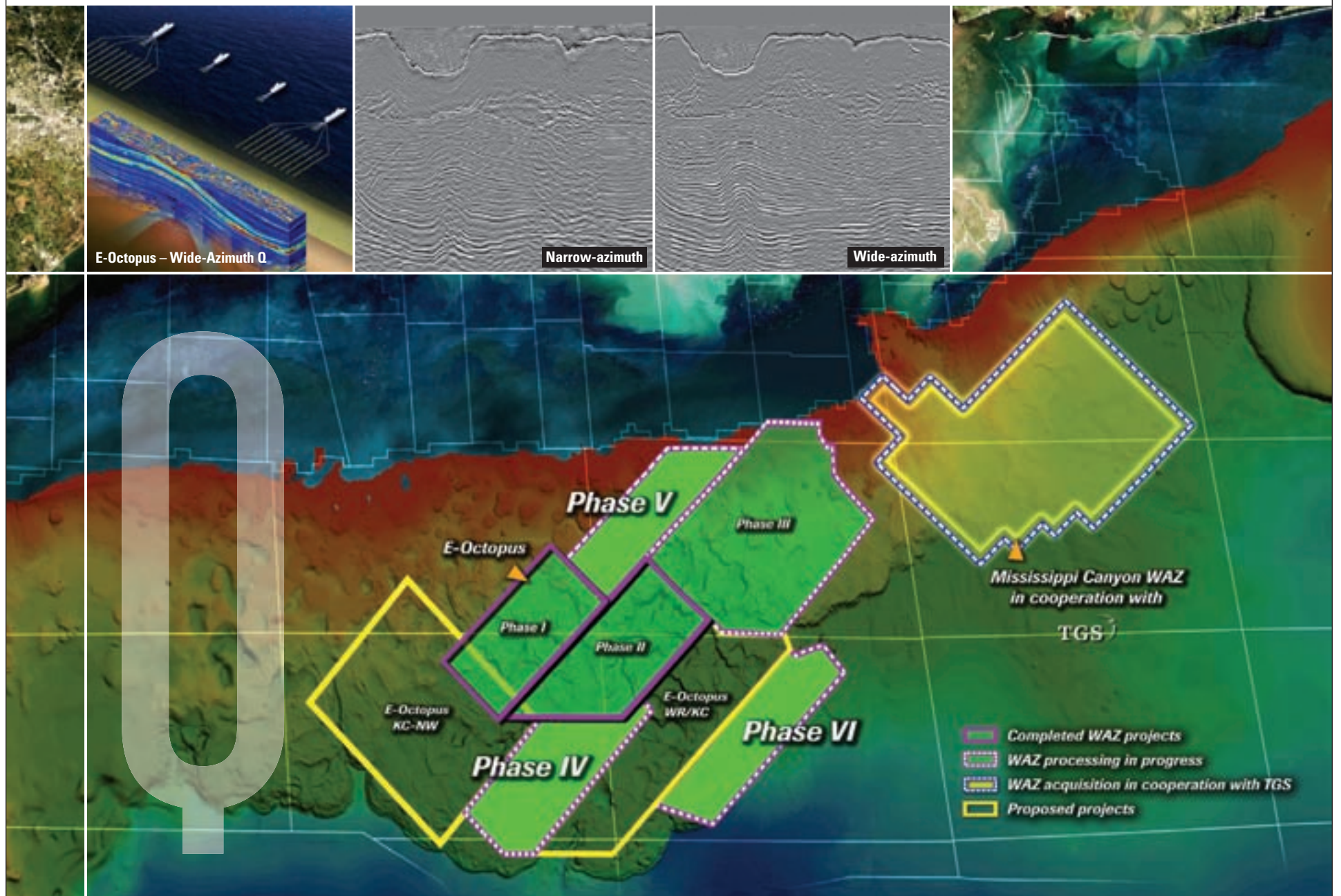
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