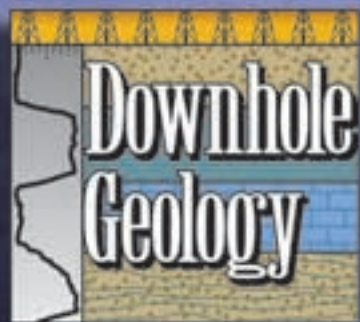


AAPG AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, AN INTERNATIONAL ORGANIZATION

EXPLORER

DECEMBER 2008



Going Deep for the Hole Truth

Technology
pushes exploration
in the right direction



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On the cover: Old fields are finding new life and new fields are getting a dynamic start thanks to downhole technological developments that are helping explorers see deeper and more clearly than ever into the subsurface. Several articles dealing with those advances can be found this month in our annual Downhole Geology issue, including one about a tool that is like a “downhole GPS navigation system.” See story on page 22. Cover photo and images – showing the penetration of a single thick bed at higher (top image) and lower incidence angles – courtesy of Baker Hughes.

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PRESIDENT’S column

Giving Thanks

By SCOTT W. TINKER

2009 will begin with a new president of the United States. President-elect Barack Obama has promised to press hard for alternative energies and set a price on carbon emissions.

These are worthy goals, but as I have discussed in preceding columns, they need to be approached in a well-considered manner underpinned by scientific, technological and economic realities.

When it comes to U.S. energy policy – and regardless of campaign rhetoric, which was both broad and deep on both sides during the election cycle – history shows that politicians tend to avoid energy policy considerations until forced by crisis.

Although I have never been a fan of the concept of crisis, arguably we are facing global economic concerns that are serious enough to warrant global energy policy action.

I look forward to working with members of AAPG in the coming year to inform global policy makers as they consider such policy.

* * *

In the United States, the period between late November and December is called (in politically correct terms) the “holiday season.” Among other things, and regardless of one’s religious leaning, it represents a time to be thankful.

Across the globe in different countries and cultures and at different times of the year, similar “seasons” exist, and thanks are given.

So at this time and in this season, halfway through AAPG’s fiscal year, allow me to offer thanks.

I have been privileged to travel the world a bit – to six continents and some 40 countries. I can say with conviction that the inside of a hotel room looks pretty much the same anywhere in the world. But outside of that room the wonders of the Earth and its inhabitants reach out, grab me and refuse to let go.

Accordingly, and often in spite of myself, I am reminded of the countless privileges that I and many members of the AAPG sometimes take for granted:

- ✓ To observe the geologic wonders of our planet Earth.
- ✓ To a college education.
- ✓ To (mostly) compensated employment.
- ✓ To unlimited information from as many perspectives as we can stomach.
- ✓ To worship as we please – if we please.
- ✓ To reasonably clean air and water.
- ✓ To food and a roof.
- ✓ To travel without fear.
- ✓ To medical care.
- ✓ To speak openly.
- ✓ To vote.
- ✓ To laugh.

* * *

If two words encapsulate these civil liberties, I think they would be freedom and hope. I realize that the dream of freedom is not uniquely American, but rather it is a human dream, and it pervades our world.

Freedom does not come without cost – human or otherwise. To those through the ages who made the ultimate sacrifice to preserve the right of freedom, I am



Tinker

thankful.

Every day of every year we must commit ourselves to preserving freedom so that everyone on Earth may someday enjoy the same.

To be sure, in developed nations, we must guard against a sense of entitlement;

true entitlements, perhaps best defined by Thomas Jefferson – to life, liberty and the pursuit of happiness – do not include the metaphoric house that is bigger than our parents. For that “house” we must always work, and work hard.

Often grand ideas such as freedom seem out of reach. Is pursuit not reserved for the likes of Nelson Mandela, Mahatma Gandhi, Martin Luther King Jr. or John Adams? What can you or I do to make a difference?

It starts with saying thanks so that others will know of their service and be bolstered to continue. Saying thanks is contagious.

Plenty. And it starts with saying thanks so that others will know of their service and be bolstered to continue. Saying thanks is contagious.

I offer thanks to each of you: the scientists and engineers who bring excellence to every facet of what we do; the committed and capable staff in Tulsa; the leadership across the Regions, Sections, Divisions and House of Delegates; the members of committees who give both time and expertise; the dedicated and talented Executive Committee, with whom I am so fortunate to work with and learn from and so many others.

I offer thanks for your friendship, for it is the seeds that are sewn between individuals that grow into the threads of understanding, tolerance and, ultimately, into the fabric of freedom.

I offer thanks to you for the opportunity to serve at this time and in this place; it allows me, selfishly, to feed my passion for building bridges.

Finally, I thank my family for not changing the locks when I am gone. I will come home!

Actually, it's three years

Celebrating the 'Year' of Planet Earth

By LARRY D. WOODFORK
IYPE Chairman

The 2008 joint meeting of the GCAGS-GCSEPM/GSA/SSSA-ASA-CSSA held in October in Houston was a truly historic event of major importance in increasing awareness and support in the United States for the International Year of Planet Earth (IYPE).

Under a banner of "Celebrating the International Year of Planet Earth," nearly 10,000 geoscientists, soil and crop specialists and other experts in related disciplines from academia, industry and government – including many students – attended hundreds of scientific sessions



(including 10 plenary sessions focused on major IYPE science and outreach themes), visited hundreds of exhibitors

and participated in field trips and many convivial social events.

Among the other activities was the



Woodfork

launching of a hot air balloon promoting the IYPE in Green Discovery Park in front of the George R. Brown Convention Center in downtown Houston. Another memorable event was the 5K Fun Run/Walk along the Buffalo Bayou Trail involving

500 participants, each of whom received a commemorative T-shirt celebrating Planet Earth.

This meeting was the most ambitious, widely attended attempt to date to bring to the attention of the U.S. geoscience community the significance of the IYPE to the future of our planet and society – and remind them of their important, even paramount, role in its success.

By all accounts that came to my attention everyone in attendance became much more aware of and energized by the potential of the IYPE to make the world and society safer, healthier and more prosperous and experienced a realization that each of them can and should play an important role in achieving that goal.

Several years of planning and coordination among the sponsoring organizations and scores of individuals were involved in making it all possible.

Although there is a long of those people who worked to make this meeting a great success, I would be remiss if I did not single out for special recognition AAPG member Ralph Baird, chairman of the IYPE Development Committee; Jack Hess, executive director of GSA; Wesley Hill, GSA coordinator of international affairs; AAPG member Linda Sternbach, president of the Houston Geological Society, and Ellen Bergfeld, chief executive officer of SSSA/ASA/CSSA. They most certainly merit our special gratitude for their efforts in our behalf.

For those who could not participate in the meeting, a bit of background might be in order. The IYPE is a joint initiative of the International Union of Geological Sciences and UNESCO.

Its inception dates back to the 31st International Geological Congress, held in 2000 in Rio de Janeiro, where the concept for an International Year of Planet Earth emerged. After much preparatory work and dedicated promotional effort, the concept for an IYPE became a reality in December 2005, when the UN General Assembly proclaimed 2008 as an official UN International Year.

However, in reality, IYPE is a triennium (2007-09), with the central year of 2008 being the UN International Year.

Since January 2007 there have been many IYPE launch events and related activities held in numerous nations and regions around the globe. At present, there are 74 countries and regions with operational national committees for the IYPE involved in promoting its mission, goals and objectives. Please visit the IYPE Web site frequently at www.yearofplanetearth.org for continuously updated information and details.

AAPG, AGI and AIPG, are the three U.S.-based geoscience organizations among the IYPE's 12 founding partners. Other U.S.-based IYPE international partners are NASA, AGU, GSA and SEG.

GSA has made the IYPE a focus of its

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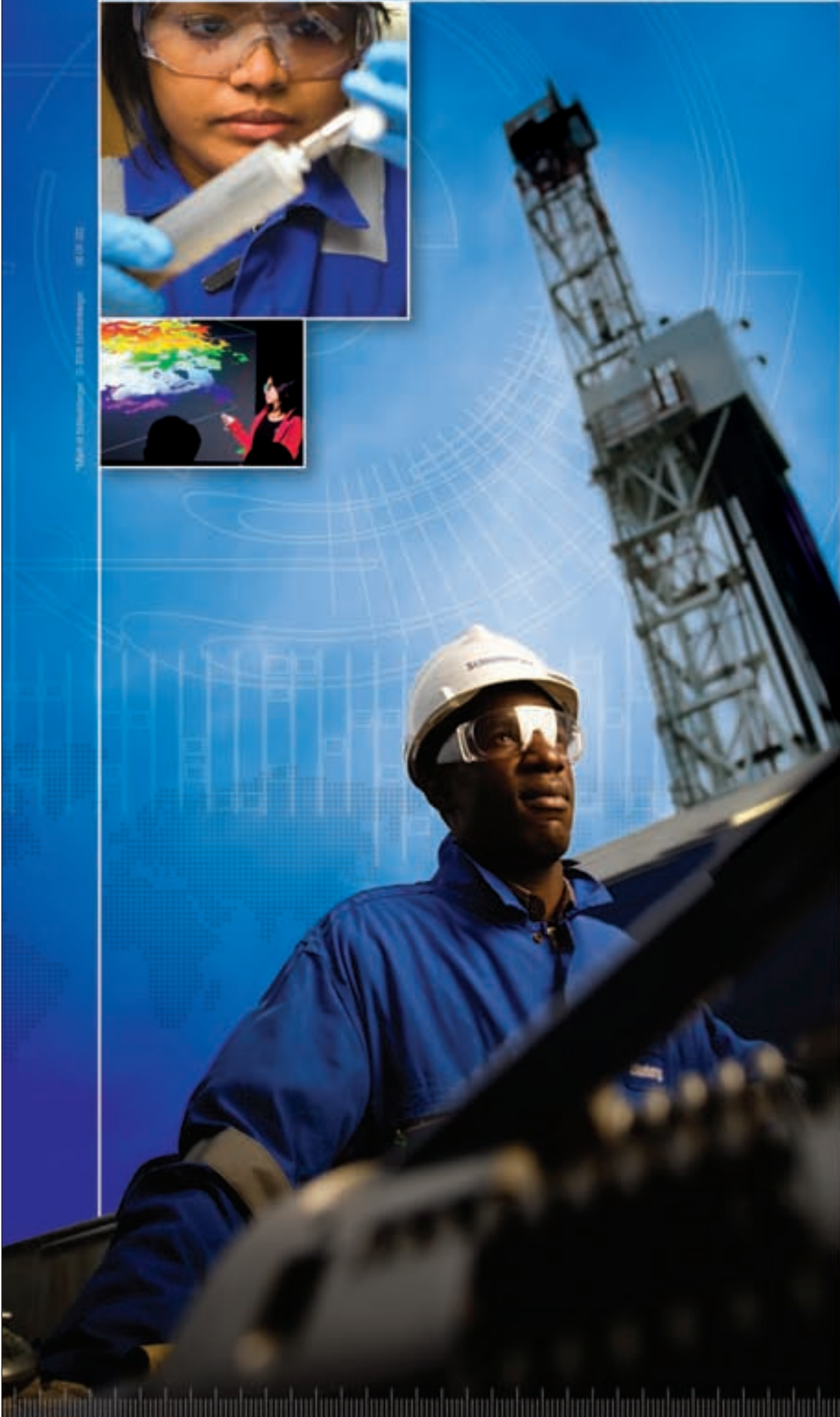
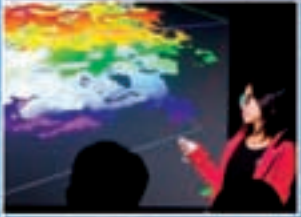
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Thinking ahead of the bit

'Sideways' Takes An Ensemble

By DAVID BROWN
EXPLORER Correspondent

The title of a 2004 popular movie could also apply to a new challenge in downhole geology.

It was called "Sideways."

While that movie had a lot to do with wine tasting, today's challenge involves a potential bottleneck for horizontal drilling.

Resource plays have uncorked an abundance of drilling opportunities in the United States, and almost all of them involve horizontal development.

An up-and-down understanding of formation, structure and reservoir isn't enough anymore.

Now the geologist has to be aware of geology along the lateral.

"Let's kick this up a notch."

Jack (Thomas Haden Church), "Sideways"

Southwestern Energy Co. opened up the Fayetteville Shale play in 2004.

According to its third-quarter release, the company now has pushed production to more than 600 million cubic feet a day.

As of Sept. 30, Southwestern had drilled and completed 722 operated wells in an eight-county area of the Arkoma Basin in Arkansas – 652 of them horizontal wells.

Average per-well initial production has jumped to 2.88 million cubic feet a day, up from 1.26 million in the first quarter of 2007, thanks in part to longer laterals.

Southwestern said its typical Fayetteville Shale horizontal well now is drilled with a lateral of more than 3,700 feet, at a completed cost of \$3 million.

A good grasp of downhole geology is key to the play, said AAPG member Alan Clemens, vice president and chief geoscientist for Southwestern Energy in Houston.

"We need good geological control to help land these horizontal wells and steer them through the formation," he said. "We have an interval we like to stay in – it seems to have fewer drilling problems."

Clemens said the lateral ideally will stay in a 30-to-60-foot interval within the productive shale.

The vertical depth range for the Fayetteville Shale is 1,500-6,500 feet.

The geologist must understand the formation geology well enough to steer the well while coping with challenges that include structural complexity.

"One of the big things we've learned in this area is that there is more structural complexity than we originally thought," Clemens noted.

Data from a downhole tool supports the lateral drilling process.

"There is a gamma tool we use that is located behind the drill bit," he said. "What we can do with that tool is correlate the gamma with a vertical well nearby to tell us where we think we are in that formation."

But the gamma tool might sit 30-50 feet behind the drillbit, so the geologist has to be aware of the actual position of the bit while drilling through the formation, he added.

For a better look at formation structure and setting, Southwestern has increased its use of 3-D seismic. That gives a much clearer picture than 2-D, which might have a spacing of two or three miles between lines, Clemens said.



Clemens



Photo courtesy of Southwestern Energy

You can't tell by looking, but this rig working the Fayetteville Shale play in central Arkansas is encountering a complex subsurface. Fortunately, it has some help on the side.

"Ooo – jumpin' at the bit, huh?"
Stephanie (Sandra Oh), "Sideways"

Geologists also benefit from a close look at formation characteristics. According to Clemens, the company drills an exploratory well completely through a target formation, then pulls and analyzes cores.

The cores provide information about rock properties. In other areas where rock properties already are known, a vertical pilot well is drilled for structural information.

Compare that to the approach used by Equitable Resources Inc. in the Appalachian Basin, where it's pursuing a tight Berea sands play.

"We start with our structure maps. We have good control in these areas – we've drilled a lot of wells out here," said AAPG member Jim Pancake, senior geologist for Equitable Production Co. in Pittsburgh.

Pancake also is president of the Pittsburgh Association of Petroleum Geologists, host society for AAPG's Eastern Section meeting earlier this year.

His company works primarily in



Pancake



Canich

southern West Virginia and eastern Kentucky. It expects to drill 25 to 30 Berea wells in 2008.

Each well costs \$1.4-\$1.5 million and has a first-month flow rate of about 1.5 million cubic feet per day. Equitable estimated it could have another 3,800 drilling locations in the play.

Overall, the company plans to drill more than 375 horizontal wells in 2008. It primarily drills those in the Lower Huron Shale and, increasingly, the Marcellus Shale.

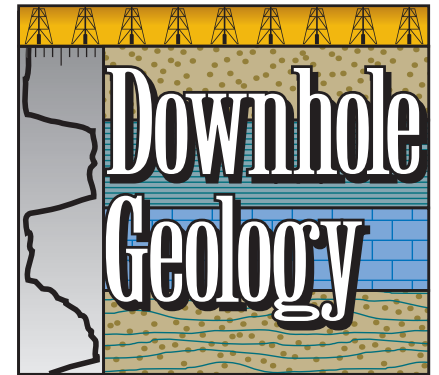
Shales in the area boost the chances for good production in tight-sands development.

"These tight sands mostly lie within organic-rich black shales, so there's good source rock," Pancake said.

Equitable brought horizontal drilling to the area in 2006, according to AAPG member Mike Canich,

the company's vice president-geosciences. Its first horizontal well cost \$4.7 million. Now, with experience, it can drill horizontals for less than a third that amount, he noted.

Like Southwestern Energy, it tries to have the best possible grasp of setting,



structure and formation before horizontal drilling starts.

The company, Canich said, has "done a fair amount of hole core work as well as sidewall corning."

"And it's constantly evolving and gaining complexity."

Maya (Virginia Madsen), "Sideways"

In Equitable's play areas, formations are typically dry and fairly shallow – 3,000-4,000 feet. To tackle the low-pressure Lower Huron/Devonian, the company developed its own air drilling techniques.

"One challenge we do have out here with air drilling is that we don't have the measurement while drilling tools," Canich said.

Geological insight contributes to another important piece of information: knowing what stimulation techniques are best for improving production.

In the Fayetteville play, Southwestern began by using cross-linked gel fracs, slickwater fracs or some combination of the two. After improving and refining its approach, it now employs only slickwater fracs in the shale, using them on all 97 wells it completed in the third quarter of this year.

For Equitable, conditions dictate nitrogen or nitrogen foam fracs for stimulation, Canich said.

The company applies seven to nine frac stages for a typical lateral of 3,700 feet.

In low-permeability plays, having natural fractures present – and understanding their nature and orientation – will improve the odds for favorable production.

"You do have to have a handle on whether you have fractures," Canich said. "Here, we aren't afraid of faults like some folks are in the Barnett, for example."

Also, the tight-sands zones "take longer to drill than the shales, just because of the nature of the rocks," Pancake noted.

"They're harder, so it's slower drilling. "We've had some mysteries. We drill these areas where we find that the bit wants to drop, or the bit wants to rise," he added.

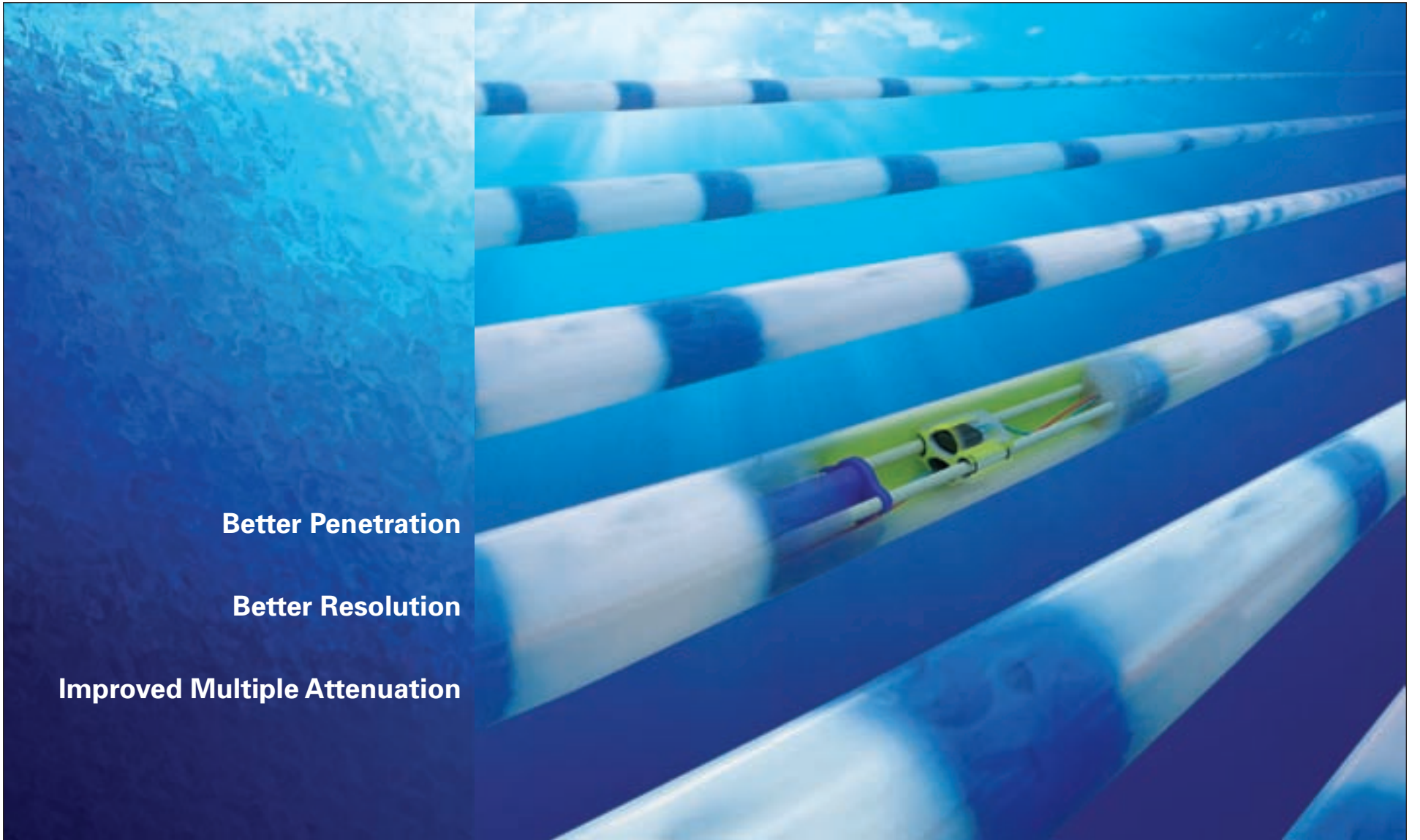
But in general, using well control and building a good geologic model before beginning horizontal drilling pays handsome dividends.

"We do a little bit of exploration with the drillbit. For the most part, it's not a lot of mystery. The structure varies a little with some of these wells, but nothing significant," Pancake observed.

In both shales and tight sands, steering a lateral effectively will reduce problems in drilling and completion. Those include drifting and deviation that can compound helical buckling or "corkscrewing," and unwanted "porpoising" that can create drag.

To imagine porpoising, think of the up-

See **Sideways**, page 8



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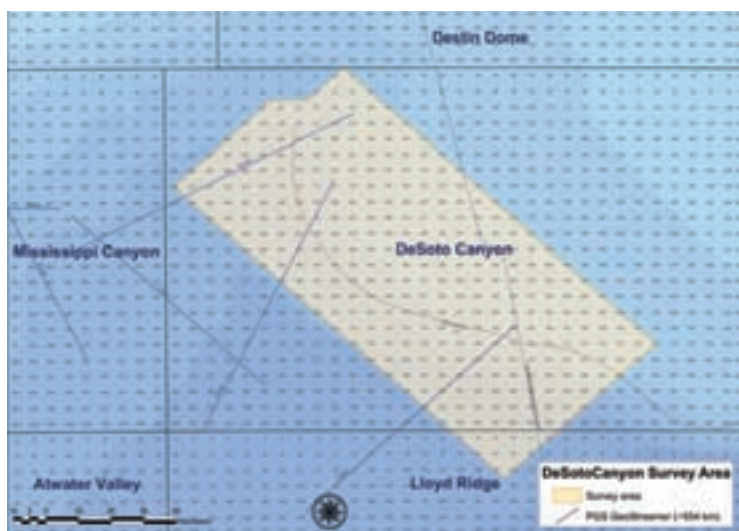
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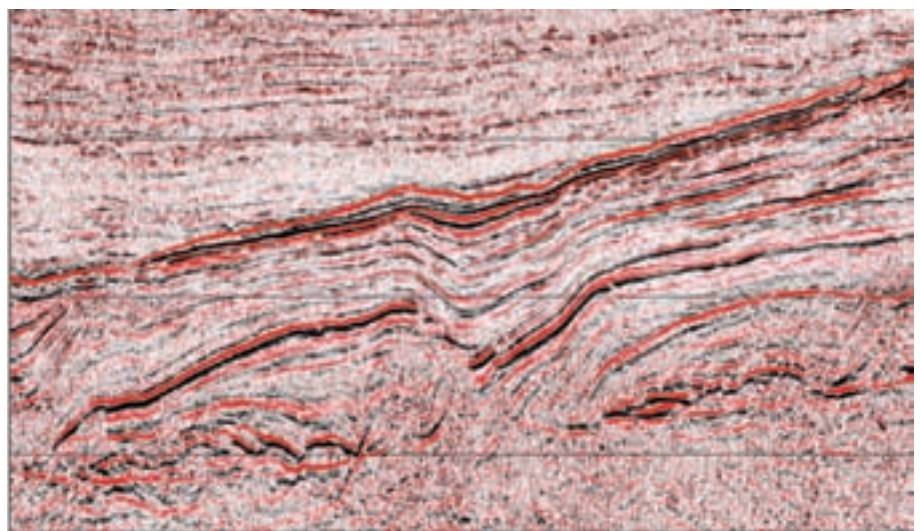
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Sideways

from page 6

and-down path of a porpoise as it moves across the top of the water.

"If a geologist oversteers, going up and down more than necessary, you get that porpoising," Clemens said.

Shale plays in general are moving to longer laterals, and Southwestern's Fayetteville laterals are now about 80 percent longer than they were early last year. Clemens said there is a natural hesitation when drilling long laterals in a new play.

"Part of it is a drilling issue," he said. "When you come into a new area, you don't want to get too far out with the laterals.

"It's also been an evolution of our completion techniques," he added.

"You have to keep your eyes open. That's all."

Miles (Paul Giamatti), "Sideways"

A good knowledge of formation geology contributes heavily to completion success and to making decisions about stimulation. Critical issues include the nature of the shale – silica and clay content, etc. – and the presence and type of natural fractures.

"We have a lot of discussion that goes on about whether there's a better place to land the drilling within the formation to give you better completions," Clemens said.

A frustration in cookie-cutter horizontal drilling is that no two of the cookies seem to be alike. The same approach can produce a different outcome on a different well.

"We'll see variable results when it looks like we've landed the well in the exact same spot as an offset well," Clemens noted.



Photo courtesy of Fox Searchlight Pictures

The cast of "Sideways" (from left: Church, Oh, Giamatti, Madsen) are no doubt discussing horizontal drilling while sharing a bottle of Pinot Noir.

His aim is to reduce geologic risk and shave costs in the ongoing shale play, where small percentage savings will add up to impressive results.

"We're investing over \$1 billion dollars a year in this project. Any savings we can capture in one well, multiplied over the thousands of wells which will be drilled in this play, can make a significant difference," he observed.

Because understanding the geology is so important, Southwestern keeps a group of geologists on the ground in the Fayetteville play.

"We actually have a staff of geologists

in the Arkansas region," he said. "They do all the field work and coordinate with the geologists in Houston."

Asked about his biggest challenge in the operation, Clemens didn't hesitate.

"One of the biggest challenges has been hiring and maintaining a quality staff. We have an outstanding group of people here and we're always looking for more," he said.

But with a limited amount of experience, expertise and specialized knowledge available, "everybody wants the same people," he noted.

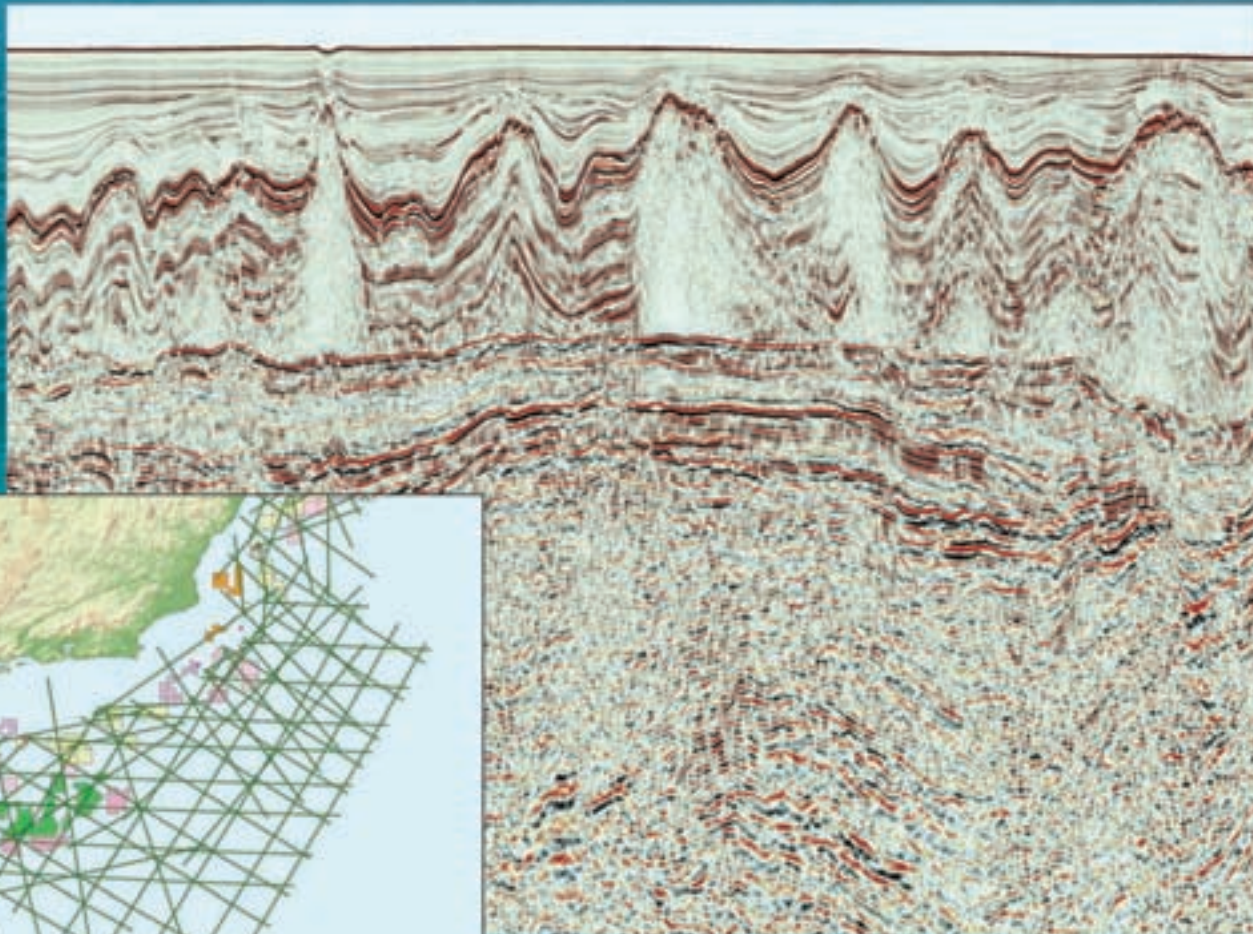
"And the award for Outstanding Performance by a Cast in a Motion Picture goes to ... 'Sideways.'"
Screen Actors Guild Awards

More than a comedy or a road movie, "Sideways" was a brilliant ensemble effort.

Clearly, according to all who participate in this game, drilling a successful horizontal well requires an ensemble of talents, too.

Understanding downhole geology gives the petroleum geologist an essential role. □

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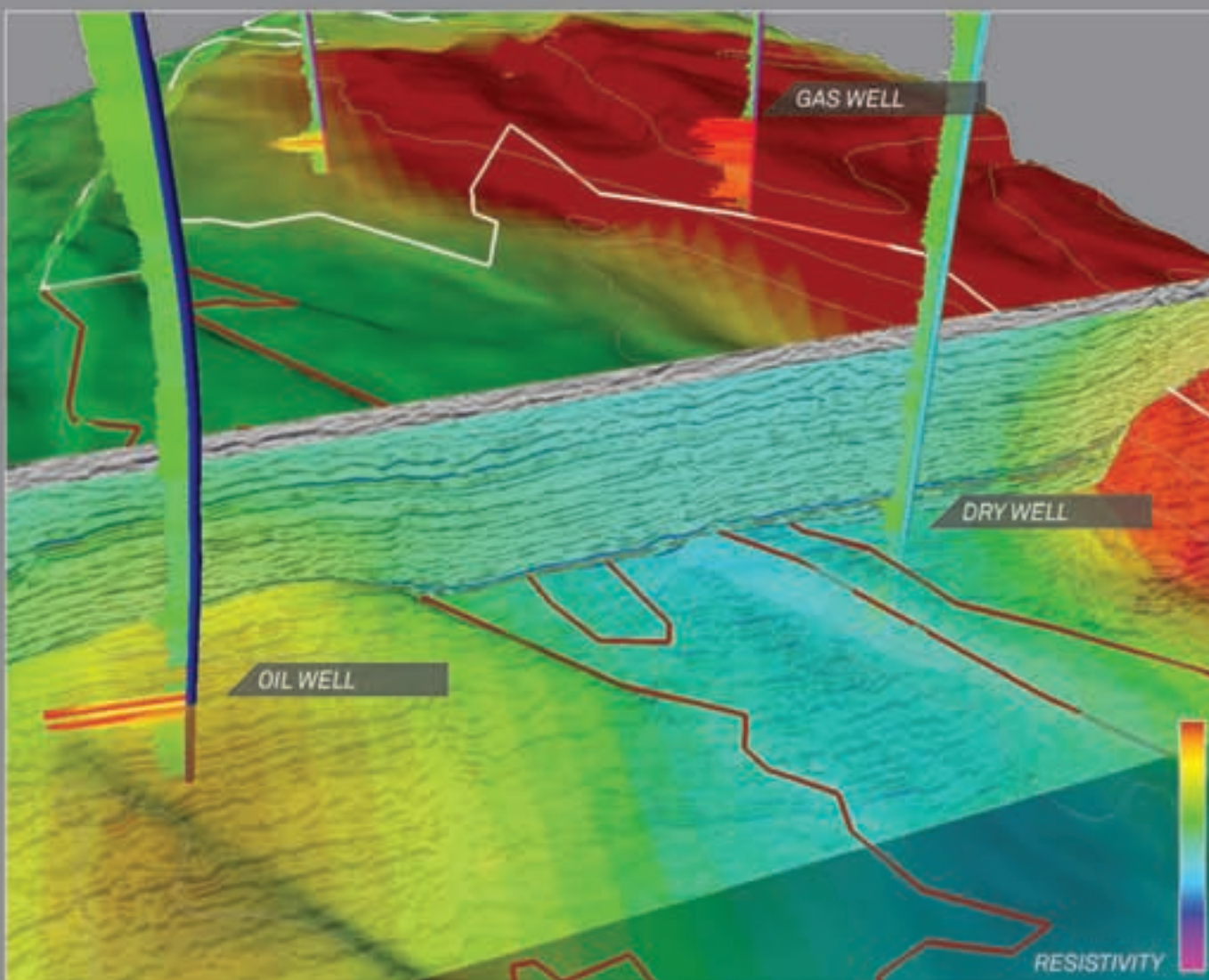
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A revealing Clearplay image from Norway's Troll Field.

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Data Integration Comes to Fruition

By KEN MILAM

EXPLORER Correspondent

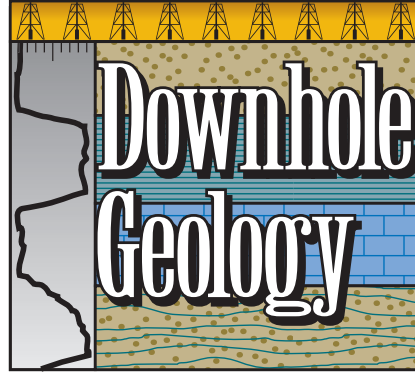
Technology for measuring rock properties downhole, especially in carbonate formations, becomes more sophisticated each year.

As it does, pulling together the different kinds of information becomes more difficult.

In June, Schlumberger commercialized a new product designed to help address some of the challenges presented by carbonate formations.

Petrophysicist Raghu

The analyst needs to understand the rock geometry, which in conventional formations is linked to mineral composition.



Ramamoorthy has been instrumental in developing the technical aspects of the system, Carbonate Advisor*, and introducing it in the Middle East.

Speaking by phone from Abu Dhabi, Ramamoorthy said the system integrates data from advanced and conventional logs. In the past, Ramamoorthy said, he would have to string together several software packages to assimilate information from borehole nuclear magnetic resonance, electrical imaging and other wireline readings.

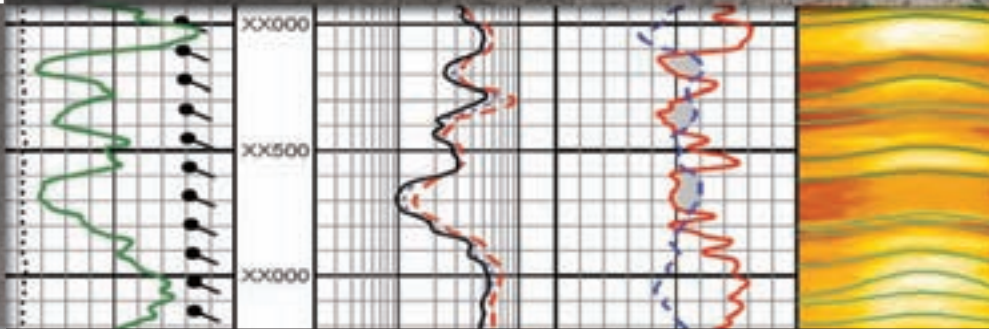
He said the product pulls together almost three decades of work and is based on an approach articulated by the late Gus Archie, an AAPG member known as the "Father of Petrophysics." The product integrates advanced and conventional logs to characterize the pore geometry.

The analyst needs to understand the rock geometry, which in siliciclastic formations is linked to mineral composition, Ramamoorthy said.

"In carbonate formations, the geometry is not necessarily linked to mineral composition," he said. "In sandstone, we may only need (conventional) log information to make a decision.

"But carbonates keep dissolving and redepositing," he added. "To really do petrophysics, we need those advanced logs."

Build better real-time knowledge.



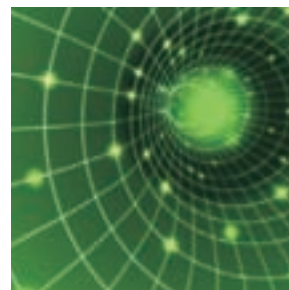
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'Greater Geological Insight'

Nick Heaton, the company's product champion for wireline services, said ever-more sophisticated measurements must be integrated to determine how fluids move and are produced.

Speaking from Paris, France, Heaton said Carbonate Advisor exploits the "jewels" from each kind of measurement.

Ramamoorthy said data from Source A and Source B "both bring something to the table," but the sum of the two adds "greater geological insight."

The final display "gives the best answer possible from each piece of information to arrive at the best single solution," he said.

Ramamoorthy said the product speeds and optimizes the analysis of various sources to help make short-term critical decisions, such as which rocks or fluids to sample, and longer-range decisions such as what zones to put on production today or tomorrow.

Heaton said Carbonate Advisor has been deployed in carbonate reservoirs in the Middle East (the largest), North and South America, India and the North Sea.

Schlumberger officials said the service is being run by both national and international oil companies.

Schlumberger estimates more than 60 percent of global oil reserves and 40 percent of gas reserves are held in carbonates. The Middle East holds 62 percent of the world's proved conventional oil reserves and 40 percent of gas reserves, the vast majority of that in carbonate reservoirs. □

(* - mark of Schlumberger.)

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Borehole data gives formation realities

Image Gets to the Core of the Issue

By LOUISE S. DURHAM
EXPLORER Correspondent

Mention imaging to folks in the E&P business, and they're likely inclined to think of seismic-derived images.

Yet there's a whole other world of imaging out there – it just doesn't get the ink devoted to seismic.

It's called borehole imaging technology, which evolved from dip-meter technology beginning in the late 1980s and continued to be refined through the decade of the 1990s – and beyond.

"In the early 21st century, this technology advanced significantly with the introduction of electrical borehole imagers that are capable of acquiring formation images through both salty fluids and non-conductive fluids in the wellbore," said AAPG member Paul Elliott, global product champion borehole imaging at Halliburton.

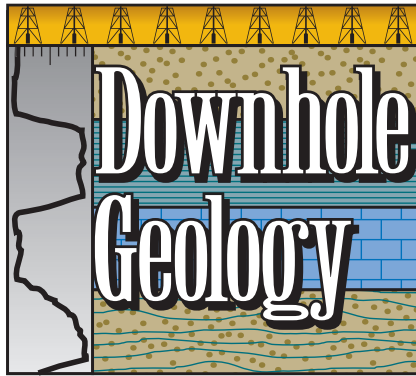
"Instead of three, four, maybe six points around the borehole using dipmeters, with our fresh mud imager we have 150 points around the borehole," Elliott said.

"That's what creates the image you see and work with."

The electrical borehole imager actually is a wireline tool with six arms, or calipers. Once it's down the hole where logging begins, the logging engineer opens the calipers, and the pads – or electrodes – have to touch the borehole wall.

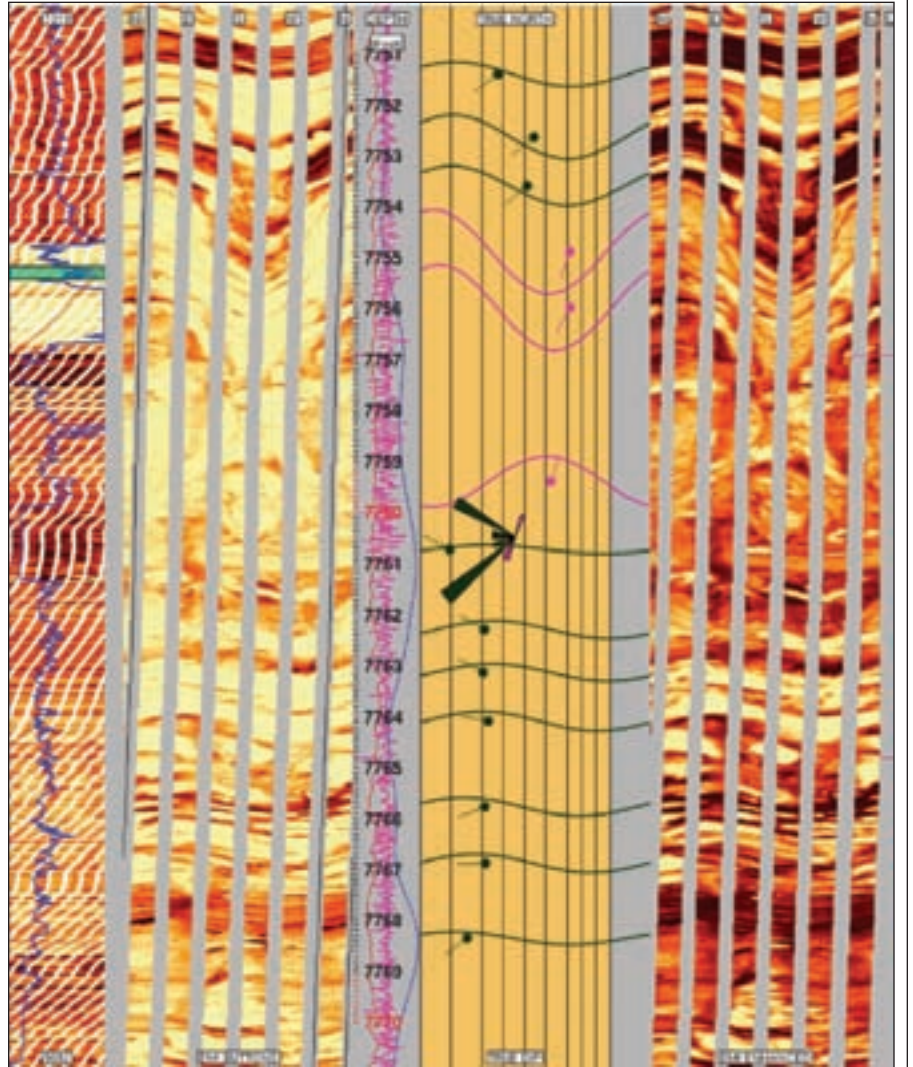
The imager acquires near-field measurements, meaning it takes very shallow measurements into the formation.

Fresh-mud imagers and oil-based mud imagers represent two different worlds,



Top: Outcrop Middle Miocene rocks at northern rim of the LA Basin. These strata lie within the same stratigraphic interval as the Moynier, Bradna, Nodular Shale and Sentous. Note scale, complexity and the fold that has been refolded.

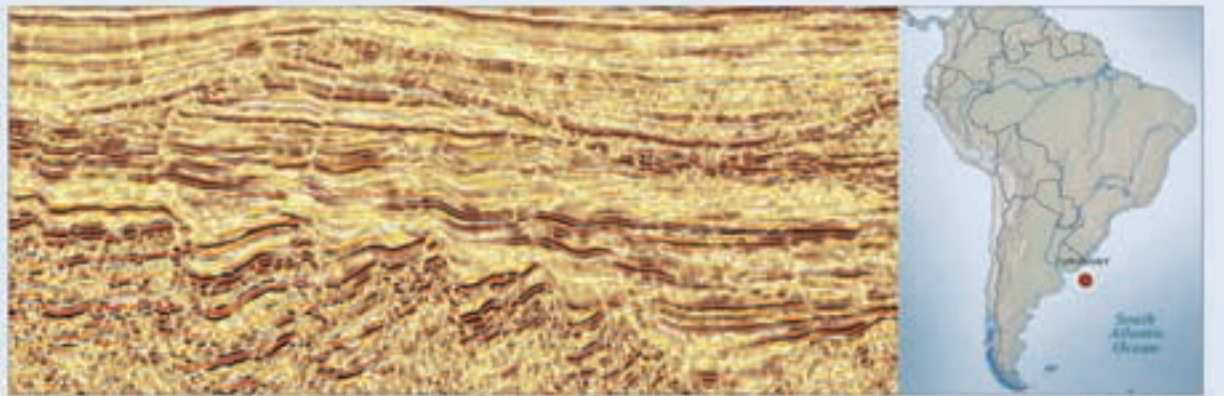
Right: A portion of an image log within the Nodular Shale. Nose of a small fold lies at roughly 7558 feet (one third distance from top). This is very analogous to the outcrop above.



Graphics courtesy of Halliburton

See **Imaging**, page 14

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Neftex Regions showing current lines of chronostratigraphy (large panels 3' x 4')

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- *Enhancing efficiency and competitive advantage*

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- *Thousands of interpreted digital wells*
- *Detailed chronostratigraphic charts (above)*
- *Global tectonic elements in GIS*
- *Cross-sections, depth and isopach maps*
- *Petroleum occurrence and play analysis*
- *Global leads & prospects*
- *Global portfolio of play schematics*

Region Modules

- *Base*
- *Outcrop*
- *Biostratigraphy*
- *Petroleum Systems*
- *Reservoir & seal*
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December 2008

Midland Valley Structure World

2008 has been a busy and exciting year for us. Project work around the globe; our 25th anniversary; and new software releases are just a few of the highlights that we will look back at in this month's column.



"From a personal perspective, working with our clients and academic community as well leading a fantastic team of enthusiastic professionals has made 2008 one of the very best - thanks to all! I hope you've enjoyed following the Structure World column and we look forward to continuing with the News in 2009"; Founding Director Dr Alan Gibbs.

OUR HIGHLIGHTS OF 2008...

Midland Valley's 25th Anniversary

To recognise this milestone in our history we held a Technology Conference in Glasgow, Scotland. The sessions across 2-days covered various topics in structural geology and included presentations and open discussion from industry and academic representatives.



"Thanks for organizing and delivering a productive, engaging conference. It was especially nice to be around a bunch of structural geology enthusiasts"; Professor George Davis, University of Arizona.

Explosion in Consultancy Projects

This year we experienced a huge increase in both the number of consultancy projects being carried out by the Geo Team at Midland Valley and also the technical scope involved in them. At all scales from exploration to production and in a wide variety of tectonic settings we have been making extensive use of the new integrated workflows in the Move toolbox.

In addition to strategic projects for the oil and gas industry we have also seen significant growth in projects from the mining world, and for gas storage and carbon sequestration.

We are looking forward to more challenging projects next year.

Investing in the Geologists of Tomorrow

Early in 2008 Midland Valley launched its **field mapping training and software initiative** to support the call from industry for better trained graduates, able to visualise in 3D and to think about the temporal evolution of palaeo-environments and structures. The initiative uses Move software to assist field based University teaching, which is under pressure from larger class sizes, increasing costs and risk wary management. Universities from the UK, Netherlands, Italy and Australia were



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chosen from numerous applicants to lead the initiative.

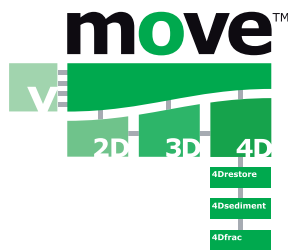
"The initiative is a most welcome breath of fresh air ... New generations of clever young people constantly think in new ways and make new observations... I enjoy being part of the new generation in discovery." Professor John Dewey, University of California at Davis.

The success of the initial phase of the initiative has led to our new **Academic Software Licence Agreement**; an initiative to provide free Move software to all academic establishments worldwide. "Free software means we can teach the next generation of geoscientists to be industry ready." "It really makes a huge difference for both the teaching and research aspects of the course" Professor Jan Kees Blom, Delft University.

The Knowledge Centre

2008 has seen the introduction of the Midland Valley Knowledge Centre - a dedicated client focused team charged with providing our client base with the knowledge you need to get the best value from us and our software. Over the year we have introduced a number of initiatives to improve access to us, as well as the quality of our technical communications. It's been a busy year, thank you for all your positive feedback which we will be using to improve this facility next year.

The release of Move2008 & Move2009

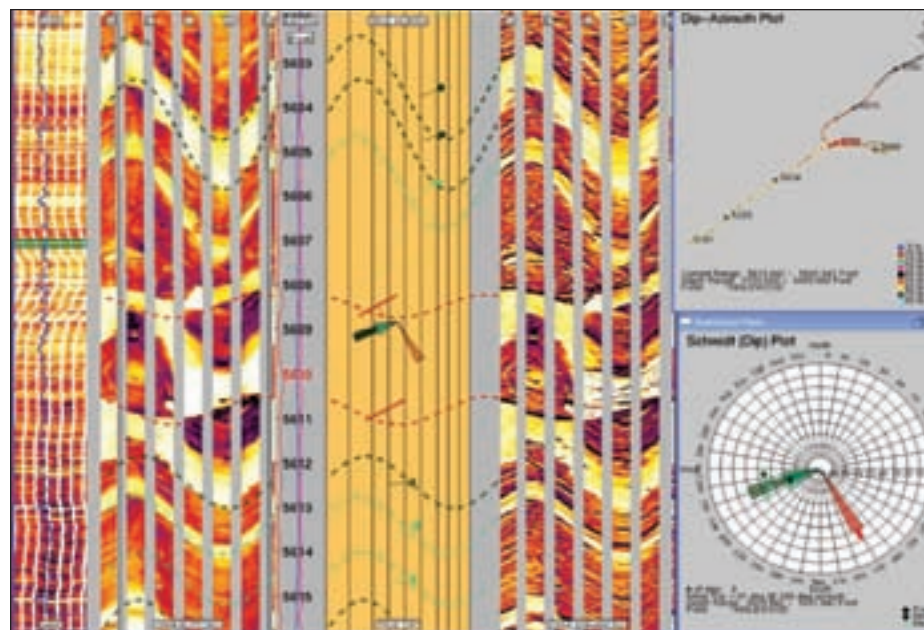


July 2008 saw the culmination of one of the biggest software developments in the history of Midland Valley with the integration of our 2DMove, 3DMove and 4DMove applications into one product, Move, providing the most complete structural modelling and analysis toolkit in the market-place. Benefits in the Move2008 release included the whole suite being available on both Linux and Windows; the ability to push models between components depending on where you are in your workflow and the ability to test your scenarios in 4DMove.

But our developers did not stop there and by the time you read this we will have shipped the Move2009 release.

Move2009 has several new features building on Move2008. The engineering team are excited about being able to offer native 64-bit support for both Windows and Linux for all of the components. For PC users this is a major step giving access to larger models and greater precision and accuracy and allows those leading the pack with scenario modelling to taking advantage of the multi-document handling to rack up several models on their desk top.

We hope that you enjoy your festive break and we'll see you next year!



Highly fractured interval interpreted as a fault zone extending from 5603 to 5613. Note the offsets visible at 5608.5 and 5610.5. Dips on these surfaces are 25-30 degrees; strikes are about N70E.

Imaging from page 12

according to Elliott, who noted fresh mud imagers won't work in oil-based mud, or vice-versa.

Imaging in the non-conductive fluid environment became a challenge to the industry when it opted to use oil-based mud in the 1990s, prompting development of new tools, including Halliburton's OMRI™ (oil-based reservoir imager), which debuted a couple of years ago. In contrast, the company's XRMI™ (extended range micro imager) for salty borehole fluids and highly resistive formations has been around for approximately seven years.

Among other commercial field applications, the XRMI recently was used in the 80-plus-year-old Inglewood Field in the Los Angeles Basin. The tool played a key role in operator Plains Exploration & Production Co.'s (PXP) large-scale development program targeting deeper horizons than previously produced, according to AAPG member Dalton Lockman, senior geologist at PXP (see related story, page 18).

"What I did with borehole imaging in the '90s was not near what I do today as far as geological applications, petrophysical applications, asset management and more," Elliott noted. "There's a lot of value there."

The Price is Right

This value is particularly apparent when comparing borehole imaging to the pricey task of coring. In fact, imaging technology often is used in place of coring.

"I like to say borehole imaging creates a core-like image," Elliott said. "If you can't have the whole core on your hands, the next best thing is a high resolution image of the borehole."

The cost savings can be sizeable.

Consider, for example, a hypothetical scenario where an offshore rig is running a tab of \$800,000 daily. The cost for three days of coring would tally \$2.4 million - and this doesn't include the significant add-on cost to crate the retrieved core, ship it to a land location and on to a lab for analysis.

In contrast, many thousands of feet of borehole imaging can be run for the cost of a short interval of core. The wellbore can be imaged top to bottom versus acquiring only a section of core.

Even when acquiring a whole core, it's desirable to run imaging in order to calibrate that image back to the real core - or ground truth - and then apply this to offset wells so they don't require as

much core.

"For reservoir studies, you still like rock properties coming from cores, so people are still coring" Elliott said, "but never as much as the thousands of feet we run with image tools."

Declaration of Independents

The electrical borehole imagers are used worldwide both onshore and offshore, and their application is not limited to the Big Guys. Even the mom 'n' pop-size independents have latched onto this technology in a big way.

"There are plenty of independents that run imaging because they don't have the funds for the whole core, and they need to see the geometry of the sand, or whatever," Elliott said. "They know the value of getting an image log with everything else."

Image logs have proven especially popular in some of the unconventional resource plays, such as shales.

"It's probably unusual *not* to have to have an image log in any of the Barnett Shale wells," Elliott noted. "There are a lot of ways it's used to deal with these reservoirs, whether it's fracture identification or texture you're looking for, or other geological information the geoscience team might need."

"I'd say for smaller players there's a lot more imaging than not," he said, "especially with new plays where they'll need it until they get a better handle on what some of these real, real fine-grained reservoirs are capable of."

Identification of thinly laminated formations is another instance where the electrical borehole imagers rise to the occasion.

It's all about vertical resolution.

Elliott noted the fresh mud imager can measure down to 1/10 inch, while one inch or less is doable with the oil-based imager, making it possible to see thinly laminated formations.

"You get much greater vertical resolution than any conventional logging tool available," Elliott said. "This is as good as it gets for vertical resolution."

It's a given that asset managers always want to save money any way possible, in addition to making appropriate decisions. Borehole imaging can contribute significantly to this goal given that applications are not limited to geological and/or petrophysical interpretations.

For starters, the images can help refine perforation targets, fine-tune frac jobs, assist with decisions related to production facilities at the surface, and lower completion costs.

"These," Elliott said, "are a part of using imaging to its ultimate degree." ○



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IYPE

from page 4

annual meeting since 2007, but the recent Houston joint meeting of GCAGS/GSA/SSA et al. is the most significant and largest IYPE event held to date in the United States.

Next, 2009 will be the close-out year around the world of the IYPE triennium. Throughout 2009 more important meetings and other events and activities will be held under the banner of the IYPE in many countries.

I strongly urge everyone in the U.S. geoscience community to stay engaged and actively involved in the IYPE throughout the coming year. Thought is now being focused on the legacy of IYPE and perhaps the possibility of a

continuing initiative/organization to build on the great global network that the IYPE has built linking – the 400,000 geoscientists around the globe.

Please stay informed and continue to be a part of it. Realize your potential to make our world safer, healthier and more prosperous through organized application of our combined knowledge of the geosciences and their vast still under-utilized potential in formulating rational enlightened public policy and contributing to the solution of important societal problems.

I believe that this is one of the most significant challenges we face – but I also am fully confident that we in the U.S. geoscience community will successfully meet and overcome that challenge and make the IYPE subtitle “earth sciences for society” not just a slogan but a fully functional reality. □

Data has benefits

Downhole Look Getting Better

By LOUISE S. DURHAM
EXPLORER Correspondent

The fairly recent commercial availability of electrical borehole imaging tools enables operators to economically and effectively maximize their assets, without expensive coring in many cases.

These tools are marketed not just for the major players but for the small one- or two-well operators as well, according to AAPG member Paul Elliott, global product champion borehole imaging at Halliburton.

He noted they're especially popular in the unconventional resource plays, such as shales.

Tools compatible with fresh mud were the first of the borehole imager wireline units to come down the pike. Oil-based mud tools followed, once the manufacturers conquered the complexities indigenous to imaging in this medium.

In fact, detailed structural, sedimentological and petrophysical analysis using image data is now possible in wells drilled with oil-based muds, according to Grant Barton, product line manager for geology/support services at Houston-based Baker Atlas.

Elliott summarized how his company's imagers aid in lowering risk:

X-tended Range Micro Imager (XRMI™) tool for salty borehole fluids and highly resistive formations reduces risk by helping:

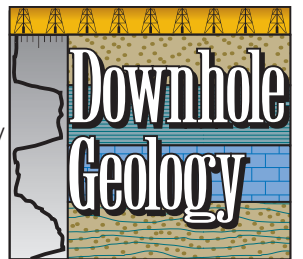
- ✓ Take the guesswork out of identifying the subsurface sedimentary sequence.
- ✓ Describe the reservoir facies just like cores, or the ground truth.
- ✓ Show bedding dips that help rationalize the choice of next drilling locations.
- ✓ Choose sidewall core zones, formation testing zones and perforation intervals accurately by integrating images with other open hole logs.
- ✓ Compute accurate high resolution net-to-gross.

Oil Mud Reservoir Imager (OMRI™) tool for oil-based muds helps:

- ✓ Identify important reservoir characteristics, such as structural and stratigraphic dips, sedimentary geometry and texture, borehole stresses and lithologic unit thickness.
- ✓ Recognize features beyond resolution of conventional logs, including permeability barriers, sand attributes, clasts, vugs and more.
- ✓ Complement or replace whole core.
- ✓ Quantify important reservoir characteristics such as lithology, porosity, water saturation, permeability, fluid profile and flow potential when integrated with other logs and well information.
- ✓ Identify and quantify thin bed pay.

Oil-based mud imaging also has a high profile at Baker Atlas. Barton noted the company's **Earth Imager® borehole imaging** tool provides high resolution resistivity images that offer an array of benefits:

- ✓ Provides information for a more accurate geological model.
- ✓ Helps determine reservoir permeability trends and drainage patterns.
- ✓ Optimizes development well placement and hydrocarbon depletion efficiency.
- ✓ Describes fracture aperture, connectivity and orientation.
- ✓ Reduces coring and associated costs.
- ✓ Acquires quality data in highly deviated and horizontal wells. □



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Old field gets new image**Deep Logging Key to Understanding**

By LOUISE S. DURHAM
EXPLORER Correspondent

The collective creative minds that abound in the vital oil and gas industry excel at overcoming the myriad challenges indigenous to this risky, high stakes business.

They're particularly adept at figuring out how to squeeze more hydrocarbons out of tired old fields.

A noteworthy example is the 1,200-acre Inglewood oil field along the Newport-Inglewood Fault trend in California's Los Angeles Basin. The field was discovered by Standard Oil of California (Chevron of today) in 1924.

Initial development at Inglewood was based mostly on drilling topographic highs and establishing production from the shallow Upper and Lower Pliocene zones, where the geologic structure was better understood.

Oil and gas production at the field was on the decline when Stocker Resources – a predecessor to current field operator Plains Exploration & Production Co. (PXP) – stepped in and acquired Inglewood in 1990 and began applying its expertise to ramp up production rates.

Since then the focus at Inglewood has centered on understanding the detail reservoirs, starting from the top and working down to the Sentous unit, according to AAPG member Dalton

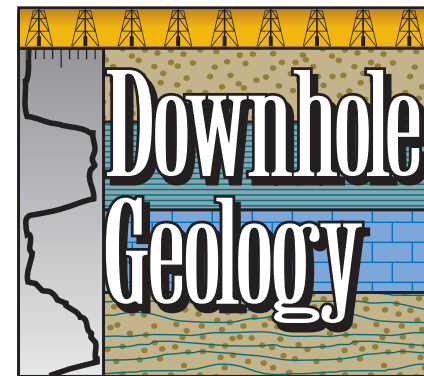


Lockman



Photo courtesy of Plains Exploration & Production Company

Squeezing more hydrocarbons out of an old field was the challenge. Effectively identifying new reserves in deeper zones was the solution.



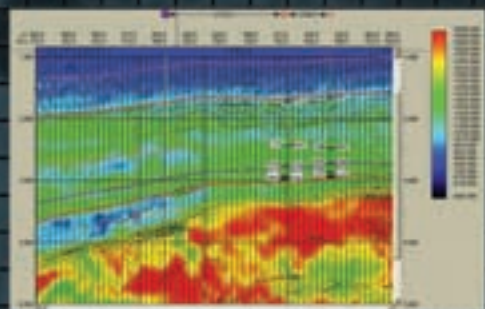
Lockman, senior geologist at PXP.

The Sentous occurs beneath the Moynier, Bradna and Nodular Shale units; the Nodular Shale has been a key horizon in mapping the subsurface.

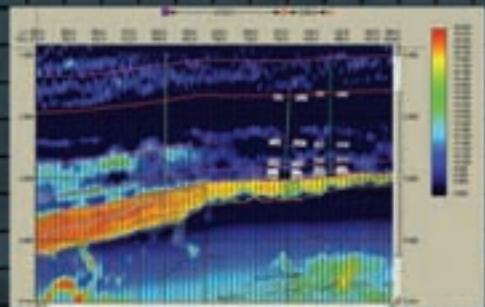
PXP revved up the action in the field in 2003 when it embarked on a development program targeting older, Middle Miocene zones. Prior to this time the field had produced 350 million barrels of oil from the original shallower target intervals.

"Results from recently drilled wells indicate that geologic structure is a dominant factor in accurately understanding and identifying deeper zones with new reserves in the field," Lockman said. "These lower zones are structurally complex reservoirs that present challenges both in characterization and subsequent development."

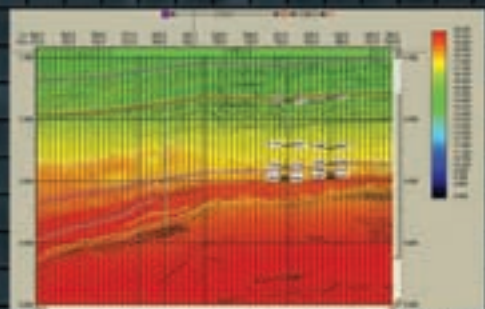
See **Inglewood**, page 20



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Inglewood

from page 18

The Goal is Met

In addition to conventional triple combo open hole logging suites used on 30 of the 40 development wells drilled to an average depth of 8,300 feet into the lowermost zones, it is noteworthy that electrical micro-image borehole logs also were acquired.

"We shot seismic over the field, and once we said 'here's our play' and started to drill we put together the formation evaluation program with image logs right at the front of that," Lockman said. "We needed to understand the geometries of the geologic structure, and that was the premise of running image logs up front."

The program employed Halliburton's X-tended Range Micro Imager (XRMI™) tool designed for fresh mud, as well as its predecessor – the EMI™.

Information provided by the borehole image logs acquired at Inglewood has been used to:

- ✓ Resolve thrust fault geometries in the Miocene.
- ✓ Interpret and re-map the subsurface below the Nodular Shale unit.
- ✓ Identify igneous units not distinguishable on conventional logs.
- ✓ Provide fracture characterization for use in successfully completing within igneous units.
- ✓ Refine the selections of intervals for perforation and stimulation within intervals of sand.

"The image logs gave us a way to evaluate the deep structure," Lockman noted. "There were over 1,300 traditional well logs in the field from wells dating back to discovery, with 50 or so to the Sentous reservoir, the target of our deep drilling program."

"The confidence developed through the use of image logging led to a new interpretation for faulting" – and new success at an old field.



"The issues were being able to map thrust features at those depths, because there's a lot of high angle beds with thickening and thinning shales," Lockman said. "The image logs let us take a look at the structure and interpret it differently than before."

"Going in, that was our main goal," he noted. "We were drilling in and around the Newport-Inglewood fault, a strike-slip feature that had been mapped down to the basement with complex folding on both sides of the fault."

A Deeper Understanding

The image logs, the company said, also proved invaluable to determine the best way to complete the wells and to look for re-completion opportunities.

As an example, Lockman cited a re-completion effort that took place in the last year in the Sentous zone:

"There are some igneous rocks, volcanic facies there that we were able to identify on the image logs, and we also identified they were highly fractured," he said. "We re-completed some of those wells in volcanics, which was not pay zone for us initially."

The wells drilled in Pxp' Inglewood deep development program underwent frac completions, which entailed shooting in perfs and fracing with a frac sand behind that.

"To pick these perfs we also used the image logs to pick intervals we felt would take the perfs and take the fracs the best and give us the biggest advantage," Lockman said. "We were sort of

optimizing the perfs, so to speak."

Lockman succinctly summarized the major role image logging played in successfully dealing with the geology of the deeper, Lower Pliocene and Upper and Middle Miocene strata of the Inglewood field.

"Conventional triple combo logs and traditional dipmeters hadn't been able to decipher this complex geology," he noted. "Image logging contributed with its capability to identify structural details, such as small folds, overturned beds, fractured intervals, thrust-faulted intervals, igneous rocks and thinly laminated reservoir rocks."

"The confidence developed through the use of image logging led to a new interpretation for faulting of the Inglewood Field at depth," Lockman said. □



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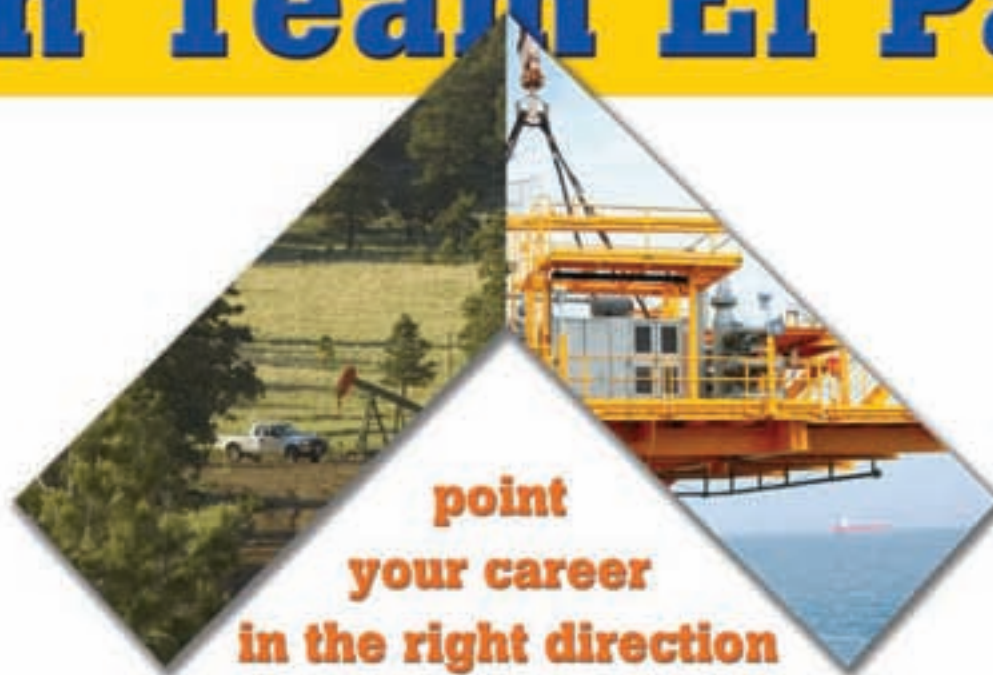
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Threading the formation 'needle's eye'

Navigating Becoming Less Tricky

By LOUISE S. DURHAM
EXPLORER Correspondent

Drilling wells that often penetrate a number of miles deep into the earth and, in many instances, angling the wellbore to ultimately attain a horizontal position is now so commonplace it's become kind of a ho-hum event.

Unless you're the party-in-charge.

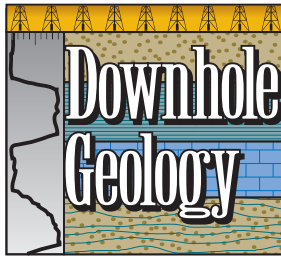
Indeed, wellbore placement can challenge even the best of the best.

It's a critical – and tedious – process, depending heavily on an in-depth understanding of the subsurface environment. It's not just a matter of staying on target and steering the drill bit through

what may be a really thin reservoir, it's also crucial to do this as quickly as possible, especially offshore where rig time can be particularly costly.

Advanced reservoir navigation and geosteering techniques are key to successfully drill and complete horizontal and multi-lateral wells with enhanced accuracy and with maximum pay exposure.

These techniques enable detection of remote boundaries in real time to allow the drilling team to upgrade the models that describe and predict the environment



laterally from the wellbore.

For so long, it's been difficult to determine whether a bed boundary being approached is above, below or even alongside the drilling assembly.

This can be blamed on limits in the types of resistivity measurements available for

reservoir navigation.

For instance, the deep-reading omnidirectional measurements failed to yield information to tie an approaching boundary, i.e., reservoir roof or oil-water contact, to a specific azimuth.

On the other hand, high-resolution resistivity images provided a 360-degree view of the wellbore in detail – but the depth of investigation was limited to only a few inches. Consequently, the value of these data in reservoir navigation applications ordinarily was limited.

Downhole GPS?

The AziTrak Deep Azimuthal Resistivity offering from Baker Hughes INTEQ is a new tool designed to resolve this problem. With its far-reaching depth of investigation, the multi-functioning AziTrak can detect, measure and visualize bed boundaries and oil-water contact zones long before they can be discerned with conventional sensors, according to Eric Hart, product champion resistivity and gamma ray services at INTEQ.

He noted the tool essentially is a GPS system for subsurface navigation.

The tool's surface system captures the data from the downhole MWD/LWD electronics package to immediately display navigational data and memory quality data for on-the-scene analysis by reservoir navigation experts.

"It's a bed boundary detection device," Hart noted. "As you're drilling horizontally through maybe a sand reservoir and you have shale encroaching from above or possibly water from below, and using forward modeling and resistivity responses we know how this should react but we lacked any directionality.

"What this tool does is it gives directionality so we can say, yes, there's a shale coming in from above us – even though it may be 15, 18 feet away.

"The well path can be altered to maintain the sweet spot in the reservoir," he said, "whether to the right, left, above or below."

'A Better Look'

Hart ticked off a few of the successful case studies using the tool:

✓ A leading international oil and gas producer in the North Sea utilized real-time deep-image and distance-to-boundary calculations from AziTrak to optimize its horizontal wellbore placement in an area of high seismic uncertainty by steering the well close to the roof of the reservoir, avoiding waterflood zones below.

Indications are that an added one million barrels were accessed.

✓ A major NOC in the Middle East used AziTrak to help drill more than 25,000 feet in three months, producing more than 90 percent net pay in the targeted reservoir sections.

✓ Real-time visualization of the deep-reading AziTrak data enabled a Middle East client to make on-the-spot decisions 150 feet prior to what would have been doable with conventional logging tools.

All of these case studies occurred during the development stage of AziTrak, which made its official industry debut this past June.

"It's been a proof-of-concept project for about four years," Hart said, "so we've been collecting all kinds of information and data.

"Its primary function is to optimize extended reach and horizontal well paths," he added. "It gives the geologist, reservoir engineer and drilling department a better look to see where in the reservoir do I really want to be.

"They want to stay in the reservoir and maximize production," he said, "with a minimal amount of unproductive wellbore." □

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Rocks give hints, but still veil secrets**Geology of Biblical Proportions**

(Editor's note: James E. Wilson, in addition to being a giant among petroleum geologists as well as one of the AAPG greats, was a prolific and award-winning writer who could easily bridge the world of geology with historical and popular culture.

He was a true Renaissance man, bringing knowledge, scholarship and wisdom to whatever subject he tackled. Whether probing geologic mysteries of ancient lands or the delicious connections between geology and a fine wine, Wilson's keen interest in the world made us all better for having read what he learned.

Shortly before his death in September he called about an article he had just finished on the Dead Sea being "a geological phenomenon of Biblical proportions."

The first part dealt with the region's basic geology; the second part with the role geology may have played in some of the Bible's more famous stories.

This month, the conclusion of Jim Wilson's final two-part series on geology and the Dead Sea.)

By JAMES E. WILSON

Documents that became known as the Dead Sea scrolls were found in the spring of 1947, and are without precedent in the history of modern archaeology.

These documents were not discovered by an enterprising archaeologist, but by a Bedouin shepherd boy looking for a lost goat on the west side of the Dead Sea graben near a place called Qumran, near the north end of the west wall of the Dead



Photos courtesy of Jim Wilson

Caves at Qumran, where the first Dead Sea scrolls were found.

Sea graben.

There are caves in the formations along this west wall; the Bedouin boy threw a stone into one of the caves to frighten his goat if it had hidden there – but rather than a bleat, he heard a breaking of pottery.

He was alone and frightened, and ran away.

The next day he returned with a companion, and they went into the cave and found several earthenware jars that contained oblong objects coated with a tarry-like substance. Inside were rolled manuscripts written on a peculiar type of paper or skin.

This Bedouin tribe – smuggling goats and other goods out of Transjordan into Palestine – took the material from the cave, unaware of its value. In Bethlehem they traded their goods to their regular Syrian merchant and then offered the material from the cave.

The Syrian merchant thought the language might be ancient Syriac, so he sent one roll to Archbishop Samuel at the St. Mark's Monastery. Samuel saw it wasn't Arabic, and thought it might be ancient Hebrew; he said he would buy the scrolls.

About this time war broke out between the Arabs and the Jews, and it wasn't

until several months later that the archbishop showed them to a visiting Dutch scholar named Father J. van der Ploeg, who identified one of the scrolls as Isaiah – but Archbishop Samuel was discouraged by the scholars of the school from pursuing the matter further. The archbishop next took the scrolls to the Patriarch of Antioch, who thought they could not be more than three centuries old, and suggested consulting a professor of Hebrew at the American University in Beirut. Unfortunately, the professor was away on vacation.

Several further attempts were made to find someone who could identify the importance of the scrolls. In his frustration the archbishop decided to study the problem himself. In February 1949, however, one of the archbishop's own monks, Brother Butros Sowmy, recommended contacting the School of Oriental Research, a branch of Yale University.

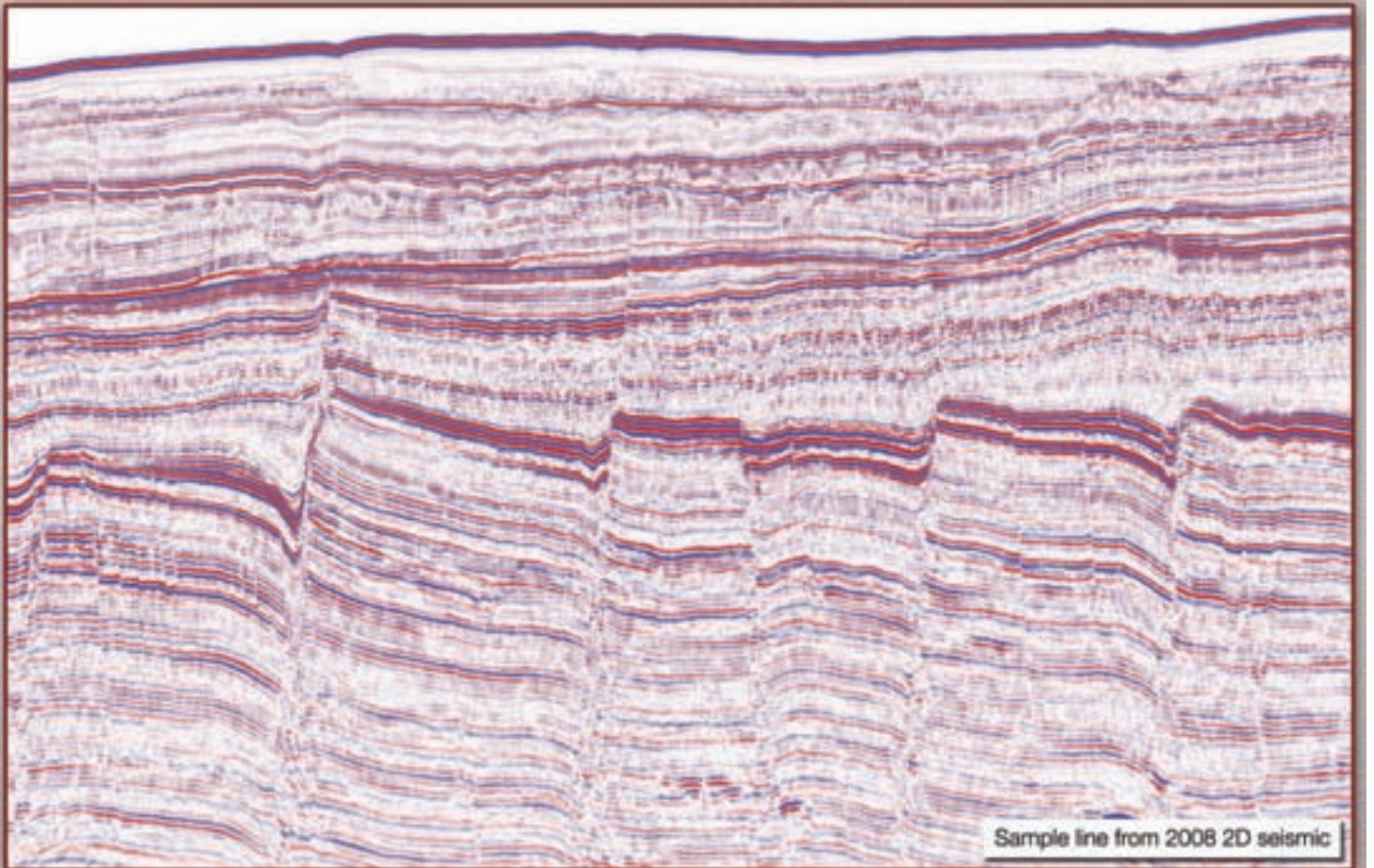
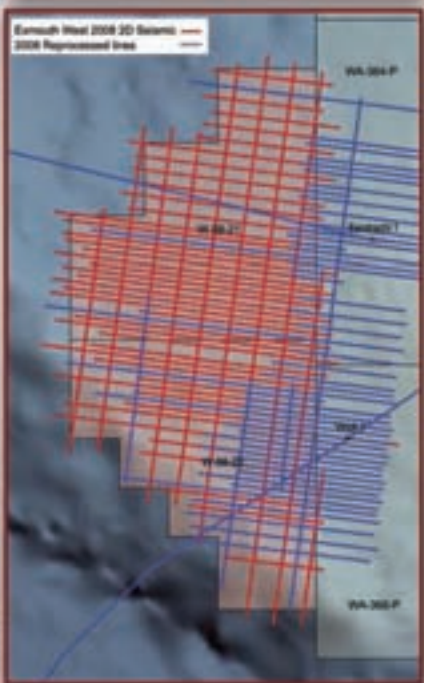
The young, less-experienced acting director there, Dr. John Trever, was not able to determine the manuscripts' probable age – but he recalled some photographs he had taken in the British Museum, and noted the similarity of the script in the scroll with a papyrus of a very old age in his photograph. This so-called Nash Papyrus had been written in an archaic script, and had been regarded as the oldest Hebrew manuscript in existence.

Trever became exhilarated when he saw that "the similarity of the script in the

See **Dead Sea**, page 26

Searcher Seismic with partners Fugro and Gardline have acquired 4,321km of 2D seismic data over the Australian gazettal blocks W08-21 and W08-22. In addition, 4,268km of existing data has been reprocessed and integrated with the newly acquired data. Bidding closes on April 9th 2009 for these blocks.

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from page 24

papyrus and the scrolls was striking." Trever and the archbishop queried one another and asked, "How could we be right?"

For more information they sent prints of the scroll to Dr. W.F. Albright of Johns Hopkins, who at the time was one of the ablest living biblical archaeologists and an authority on the Nash Papyrus (discovered in 1898 and the oldest Hebrew manuscript known at the time), which he had studied intensively over a period of years.

They quickly heard from him, as he had written back the same day: "My heartiest congratulations on the greatest manuscript discovery of modern times! There is no doubt in my mind that the script is more archaic than that of the Nash Papyrus ... I should prefer a date around 100 B.C.E. What an incredible find!"

At last the Dead Sea scrolls were in expert hands.

When the significance of the Qumran scrolls was recognized, a search began of the other caves. All together there turned out to be 11 hiding places, most of them containing scrolls or pieces of scrolls. It became like a jigsaw puzzle piecing the scraps in original order.

The scrolls were distributed to several scholars for translation. The results were slow in forthcoming (apparently there was some jealousy and disagreement among the scholars). It has been determined that these writings were likely by the Essenes, a small fundamentalist Hebrew sect that once lived on the upland above the west wall of the graben. Among the manuscripts were rules of this order and the entire Hebrew Old Testament (with the exception of the Book of Esther).

The recovery of these manuscripts has enabled scholars "to push back the date of a stabilized Hebrew Bible to before 70 A.D., to reconstruct the history of Palestine from the 4th century B.C to 135 A.D. and to clarify the relationship between early Christianity and Jewish religious traditions."

For the average visitor to the Dead Sea, Qumran is a point of interest. There is a small security office just off the highway that prevents visitors from going up to see the caves visible in the cliff side beyond; however, one may buy a flier with a brief about the discovery story.

The Fall of Jericho

"Jericho, Jericho ... Go blow them ram horns, Joshua cried ... and the walls came tumbling down."

This line is from a popular spiritual of generations ago. This refrain may have popularized the name Jericho and its walls, but according to the Bible and geology, where was Jericho and what was the occasion for the tumbling?

Jericho is a few miles northwest of the north end of the Dead Sea. It was located there because of the fresh water spring that came from the fault zone involving the Cretaceous limestones.

Archaeological evidence indicates it is one of the oldest continuous settlements in the world and can be traced to Paleolithic and Mesolithic times.

The occupants of Jericho at the time of Joshua were Canaanites. Canaan, an ancient name for the modern Israel and the Palestinian territories, was the civilization that made the leap from hunting and gathering to farming. The agriculture can be inferred from the types of wheat and barley that have been found in excavations.

According to the Hebrew Bible, Joshua was the leader of a group of Israelites that



The west wall of Tel Jericho, made of mud bricks, early Iron Age.

had been led by Moses out of bondage in Egypt, and were seeking to occupy what God had told them was the "promised land." Confronting him were the walls of a Canaanite settlement. The size of this Jericho wall suggests a settlement of 2,000 to 3,000 people. The walls and a tower had been built because of enemies in other biblical tribes.

According to the biblical account in the book of Joshua, the Lord commanded Joshua and his men to circle the city once each day for six days with the priests blowing ram-horn trumpets. On the seventh day the priests made a long blast, the people made a loud shout and the wall fell down.

And so it happened. Joshua's troops destroyed everything in the city and then they burned it – but took the gold, silver and bronze.

Geologists and archaeologists have interpreted that a strong earthquake occurred about the time of Joshua's attack, about 7,000 years ago. The tumbling of the wall may have been due to the earthquake and simply been coincidental with the blast by the ram horn trumpeters.

The original site of Joshua's Jericho was essentially obliterated with earthquakes, fire and time. Old Testament Jericho, along with the accumulation of walls and structures of several towns, has been identified in a mound that rises 70 feet above the surrounding plain. This corner of the rift zone is and has been seismically active since soon after the formation of the rift. The ancient structures were of mud bricks. This material in combination with earthquakes has spelled disaster.

Modern building in this area has continued with expansion on occupancy of the West Bank of the Jordan River. Seismic activity has likewise continued. Toward the end of 2003 and extending into mid-2004 in the Jericho area there was an earthquake "swarm" in the Dead Sea fault system of 4.9, which was felt as far away as Syria, Egypt and the northern part of Saudi Arabia.

The stories and legends of ancient Jericho have lived a very long time; as long as the fresh water spring continues to flow, there will be modern Jerichos, which will be subject to potential earthquake destruction.

Sodom and Gomorrah: What Happened?

It was about 10,000 years ago that the

continued on next page

continued from previous page

polar ice cap began to melt and recede. There followed a cycle of cold/dry and warm/wet periods of varying duration.

In about 7800 B.C.E., during an extended warm period, many people moved into valleys of the Nile, Tigris and Euphrates and the Jordan Valley of the Dead Sea rift, where the land was fertile and agriculture expanded.

Viewing the landscape of the Dead Sea graben today, it is difficult to imagine that the area south of the Dead Sea in the early Bronze Age of 7800 B.C.E. was similar to our greenbelt climate of today.

The nature of the climatic cycles from that period to the present have been interpreted by Drs. David Neev and K.O. Emery from electronic probes and detailed examination of samples from core holes. The duration of these cycles of dry and wet are determined by microscopic and palynological examination of rates of sedimentation.

It was in this green valley of the long ago wet cycle that the five "villages of the plains," including Sodom and Gomorrah, existed.

They calculate that the valley floor at the time of Sodom and Gomorrah now lies some 35 feet below the present surface. It's been difficult for some archaeologists to accept that any possible ruins lie this deep below ground, and, therefore, disappointed to have no surface or near surface evidence to explain the disappearance of Sodom and Gomorrah after the destruction as described in the Bible (Genesis, chapter 19).

Among the Hebrews who came out of Egypt was the biblical patriarch named Abraham, and he had a nephew named Lot. They had a dispute about the area for grazing their flocks, and they decided



North side of Mt. Sedom, where many see a feature (center) identified as "Lot's wife."

to part company, taking their followers with them.

Lot took an eastern route, which proved an unfortunate choice.

He and his followers arrived in an area near the settlement of Sodom. They had been dwelling there temporarily when, according to the Bible, an angel appeared to Lot telling him that the Lord was going to destroy Sodom as punishment for its wicked ways. He was commanded to escape with his family to the mountains and warned to "look not behind thee" as they fled.

Lot and most of his family arrived safely in the mountains, but according to the Bible, "his wife looked back from behind him and became a pillar of salt."

The biblical descriptions of billowing smoke and fire seemingly falling from

heavens over Sodom have been interpreted as evidence that the city was destroyed by an earthquake, which would have ruptured pockets of gas and light hydrocarbons mixed with considerable sulfur. The explosion sent the material high into the air, which caught fire and fell back, as if it were indeed raining fire from heaven.

I'm offering an explanation that not all of my Israeli friends agree for the fate that befell Lot's wife. The trail to the hills that he and his family would have taken ran closely along the shoreline of the Dead Sea. In looking back at the city, Lot's wife may have stumbled and fallen. It is possible that the earthquake generated a small tsunami or a strong surge of the super saline water that covered her form. In the very dry air of this area, salt crust

quickly forms over any weighted object. Salt could have rapidly encrusted her nostrils and mouth, asphyxiating her, and in time would have covered her entire body.

The north side of the salt diapir, Mt. Sedom, had been eroded in such a way as to somewhat resemble a human form. This is pointed out as "Lot's wife." There have been some interpretations that the Sodom earthquake may have been the same that "tumbled" the walls of Jericho. It is a well known phenomenon of earthquakes that the quaking or sharp movements of unconsolidated material is momentarily "turned to jelly," thus the foundations of mud brick buildings and even those of stronger material come "tumbling down."

In the late 1970s, while I was observing the seismic work that was being conducted at the south end of the Dead Sea, there was an axial north/south profile that began a quarter of a mile in the water on a dike that was part of an evaporation pond of the Dead Sea Works. The line extended about the same distance inland.

When I saw the printout of this north/south line, and saw the numerous fault lines that came to the surface toward the southern end of the line, I exclaimed to my associates that this was the evidence that it was indeed an earthquake that had destroyed Sodom and Gomorrah!

Even at the time of Sodom and Gomorrah, there had been considerable sedimentation from rivers and unconsolidated outwash during wet periods since the formation of the Dead Sea rift from the early Miocene.

Because of the archaeological level of Sodom and Gomorrah buried under 35 feet of more recent sediment, the saga of what happened to Sodom and Gomorrah will continue. □

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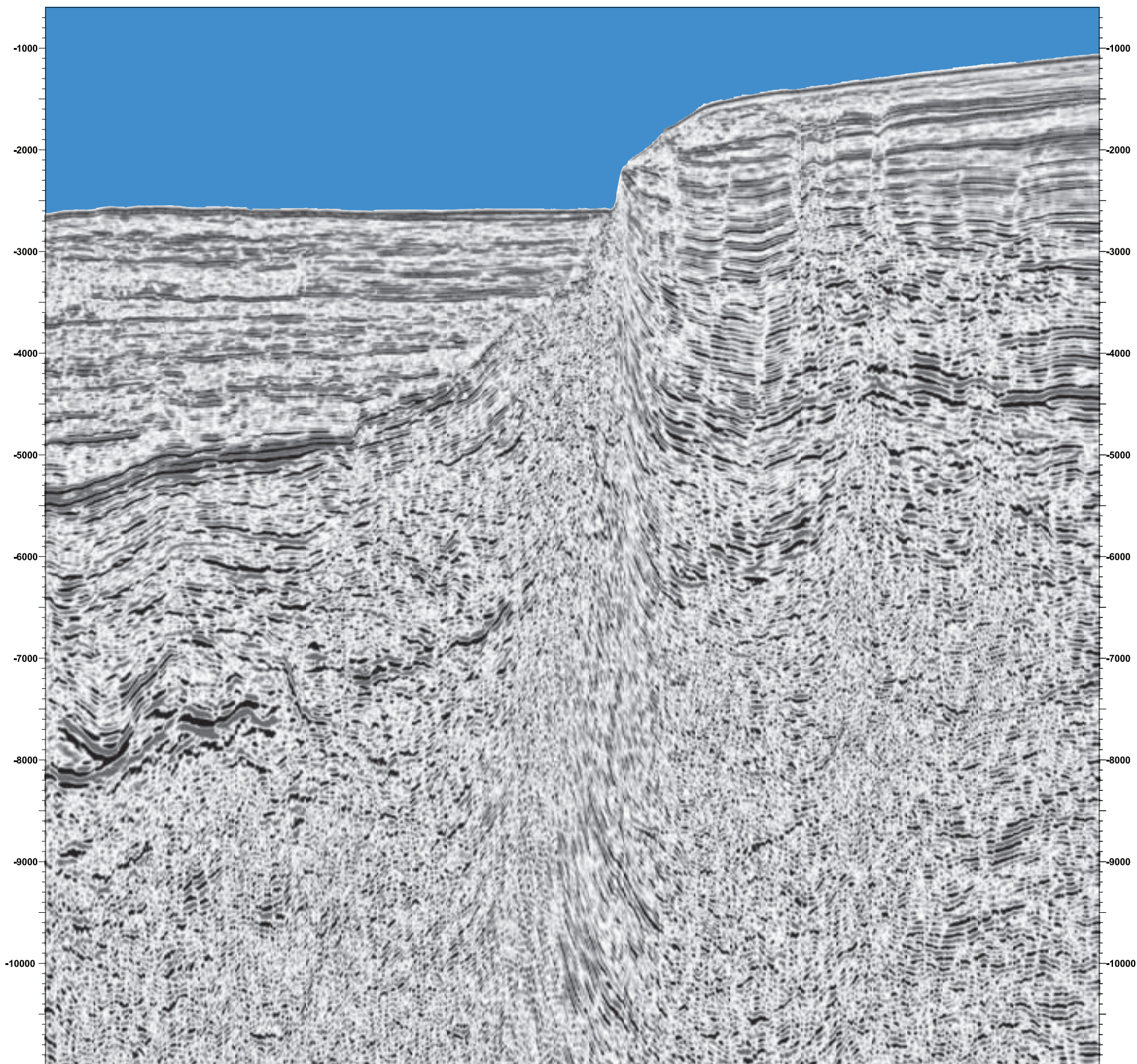
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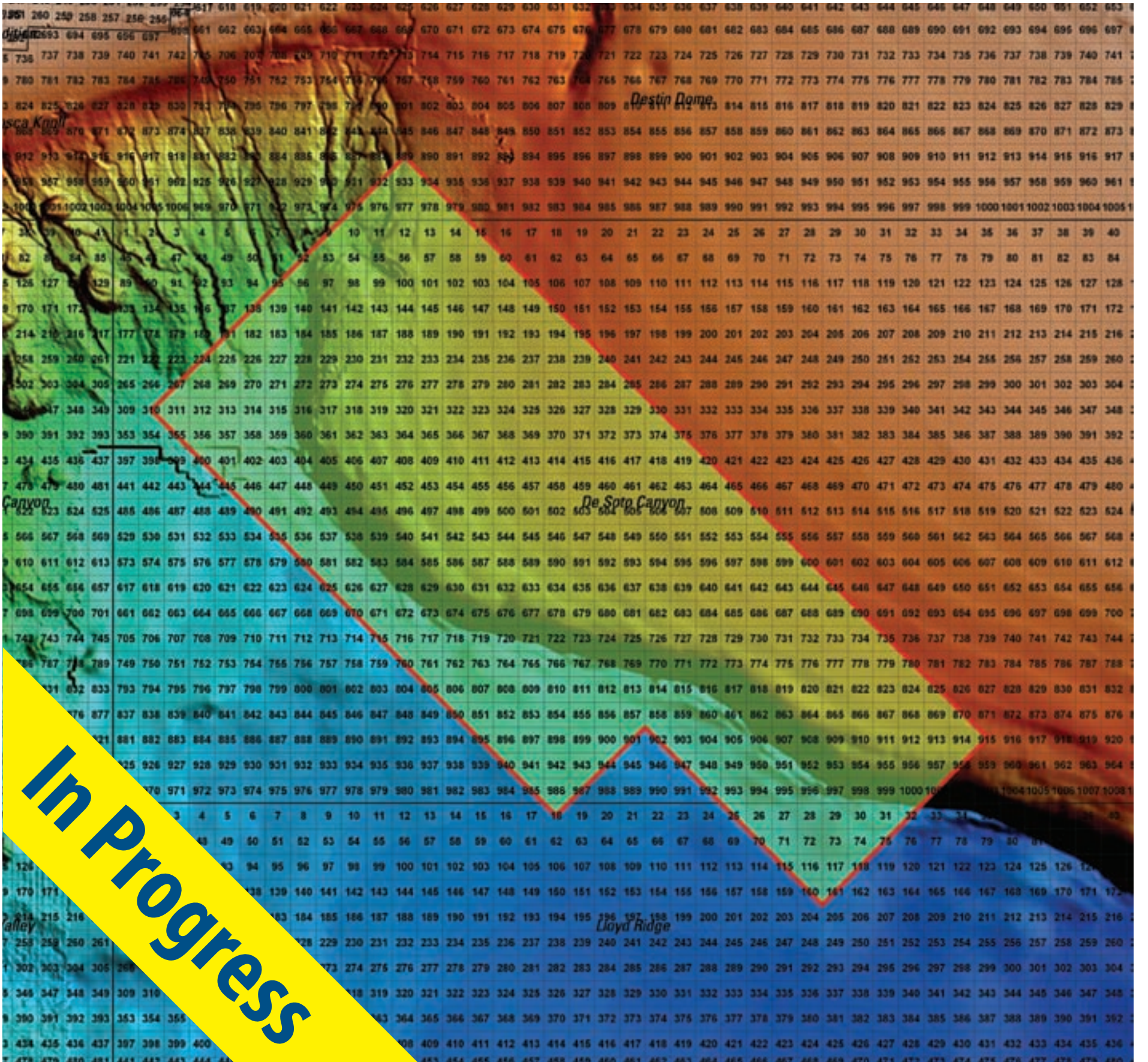


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*Cape Town diverse in program, participants***Special Events Make ICE a Success**

By VERN STEFANIC
EXPLORER Managing Editor

AAPG's first-ever International Conference and Exhibition (ICE) in South Africa proved to be a winner on many fronts, but there was perhaps one main reason for the success:

It brought a diverse group of people together for a scientific, cultural and professional exchange of ideas that was electrifying.

"The 2008 ICE can be counted as one of the most successful ICE's ever," said Jeff Aldrich, the meeting's general vice chair. "We packed into the convention more special events than anyone expected."

The variety of special events may have been the reason for the diversity of people who attended from around the world. Total attendance figures was 1,955 from 64 countries, including more than 250 people who took advantage of free registration for special events and activities such as educator-student visits and the forum on global climate change, which was open to the public.

The late October meeting, held at the Cape Town International Convention Center, was the first ICE held in Africa since the 2002 meeting in Cairo, Egypt, which drew about 1,650 people.

"The Committee worked to bring all parts of Africa together and the African Region held an important leadership meeting there," Aldrich said, adding that EMD, SPE and the SAMRAC code committee were among those who used Cape Town as a meeting venue.

"These conventions accomplish three big things," he said:

- ✓ Education through training, listening and interaction.
- ✓ Advancing the profession through various meetings and contacts.
- ✓ Creativity through the sparks created "when bright minds rub against each other."

Aldrich also cited the "acclaimed" three-day African deepwater core workshop (about 500 meters of turbidite cores from four African countries were on display), the deepwater oral sessions (standing room only in a 600-seat auditorium) and the Lusi mud volcano forum (see related story, page 32) as other meeting highlights.

The meeting began with a colorful and rousing opening session, featuring a performance from the South African Youth Choir that Aldrich described as "an event of pure joy," and ended with a four-hour musical dinner party featuring live bands at the Sundowner.

The opening session also featured remarks from Siphon Mkhize, the meeting's general chair, who said the meeting's goal was "to ensure we create the conditions for a new generation of geoscientists to take on the task of exploration and production."

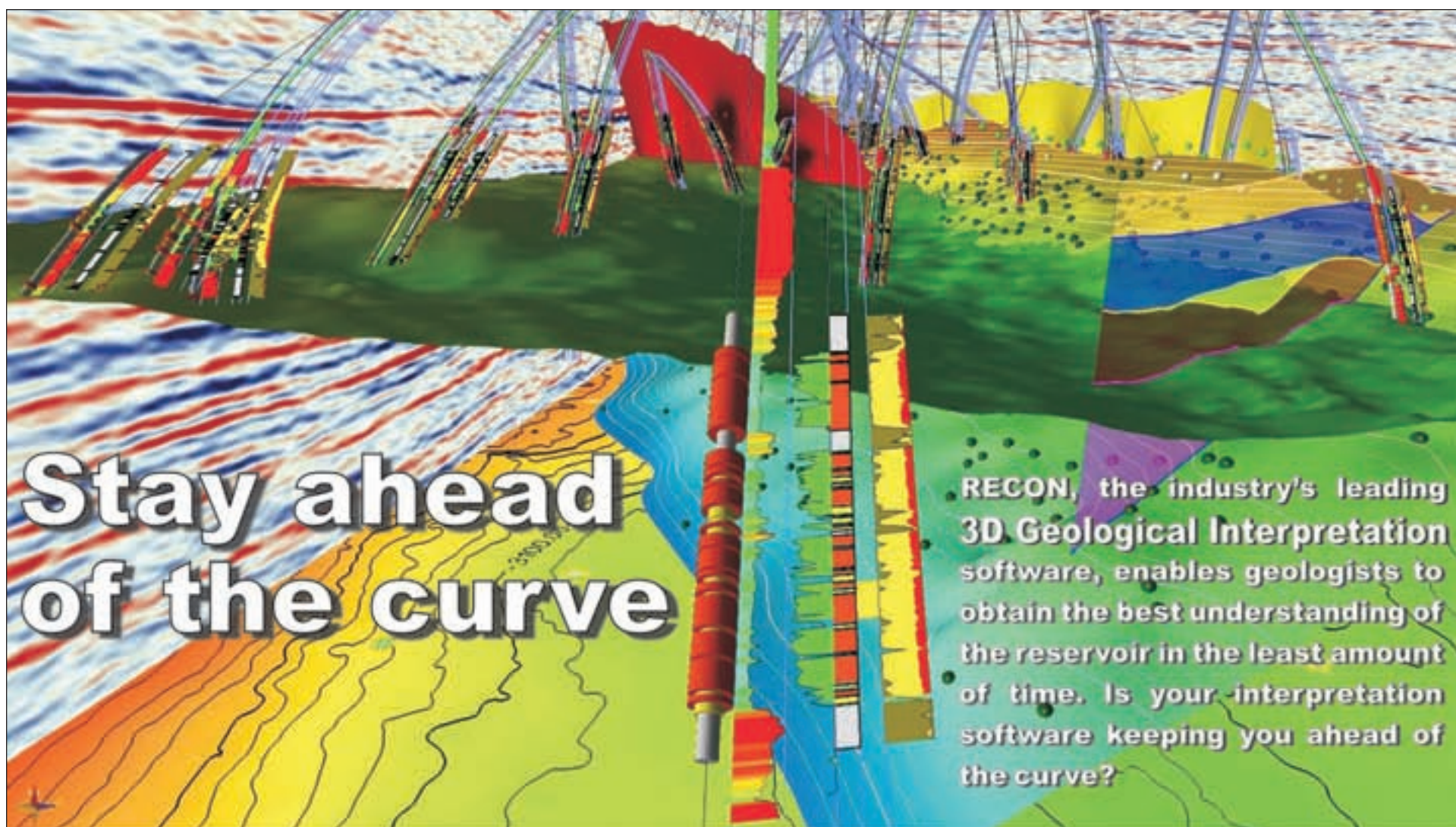
"Africa has thousands of potential geoscientists," he continued. "It is people who are the resource that should be tapped by AAPG members."

Also speaking at the opening session was AAPG President Scott Tinker, who spoke of one of his favorite topics, geoscientists' need to build bridges – not walls – to ensure energy security; and keynote speaker Duncan Clarke, who offered a realistic portrait of African energy potential as well as a challenge for all to find new and better ways in the future for its development.

His talk will be available on *Search and Discovery*. □

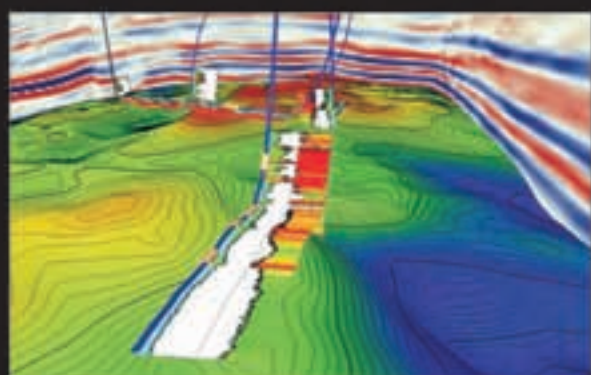


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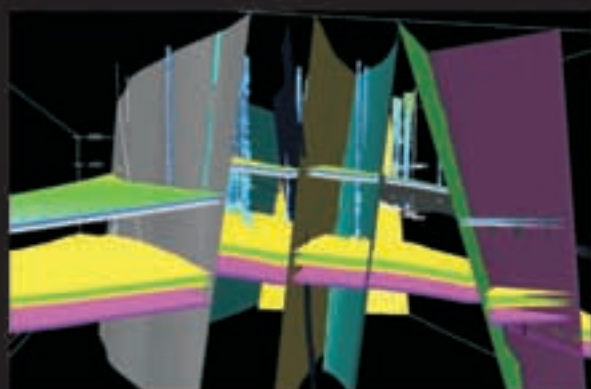
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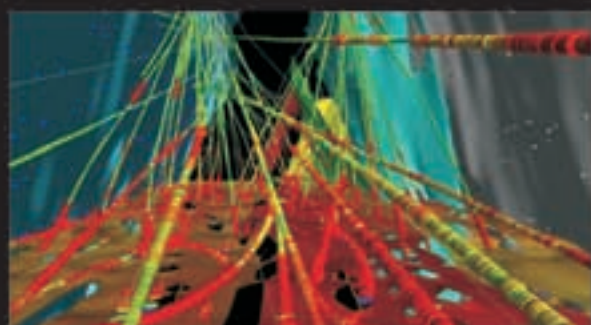
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Opposing views 'refereed' in Cape Town

Mud Volcano Cause Discussed

By JOHN UNDERHILL

The LUSI mud volcano came into being in northeast Java on May 29, 2006, and since its initial eruption it has turned the Sidoarjo region in Porong into a scene of devastation, flooding over seven square kilometers and leading to the evacuation of well over 25,000 people from the villages affected by the unconstrained mud flow.

While efforts to stem the mud flow have been tried and have failed, geoscientific debate has raged as to what triggered the disaster. Was it perhaps the natural consequence of a magnitude 6.3 earthquake centred on Yogyakarta, around 175 miles (280 kilometers) away, that occurred a couple of days before the eruption, or was it caused by an unnatural, man-induced occurrence resulting from the drilling of a gas exploration borehole, Banjar Panji-1, being drilled by Lapindo Brantas, only 200 meters or so away from the resultant eruption?

When the technical program for the AAPG meeting in Cape Town arrived over the summer, I was intrigued that a special session on the causes of the LUSI mud volcano was listed among the conference offerings, with all the main protagonists for the competing theories to present their scientific evidence and perhaps for the one and only time in a public arena populated by industry experts.

Knowing about and being interested but essentially lacking specialized knowledge of the factual geoscientific details behind the arguments, I immediately highlighted it as one to attend and then thought little more of it – that is, until AAPG co-technical chair John



The destructive and far-reaching LUSI mud volcano of northeast Java, still a controversial subject for scientists, politicians and industry officials, was in the spotlight in a Cape Town special forum.

Photos courtesy of Ikonos Satellite Image, Durham University



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It is a stated policy that AAPG neither endorses nor recommends any products or services that may be available in any way cited, used or discussed in AAPG copyrighted publications or in presentations at events associated with AAPG.

The voting process during a session at the AAPG International Conference and Exhibition held in Cape Town was a

decision by the moderator and only reflected opinions of a group of individuals in the session room at that time.

The action in no way should imply the endorsement of the Association, nor should it be considered a scientific validation of the comments made one way or the other during the session. □

Sneddon tracked me down in Murchison Falls National Park, where I was on a pre-conference field trip, to say that the original session chair, John Gluyas, was now unable to attend and wondered if, given my independence, I might fulfil the role?

Having been so keen to attend anyway, I readily agreed to taking on what I saw as a fascinating and challenging task as a facilitator with a front-row seat.

The Cape Town session drew the attention of the global media and was widely reported.

When the day and time for the debate arrived it was immediately clear that this would be unlike any previous AAPG session that I had chaired. Evidently and inevitably, it would call upon skills honed in another world entirely – namely the numerous football (soccer) stadiums where I had refereed. The participants were tense and the hall full. It passably resembled a competitive match atmosphere like some I had indeed witnessed during matches in my international and national football career.

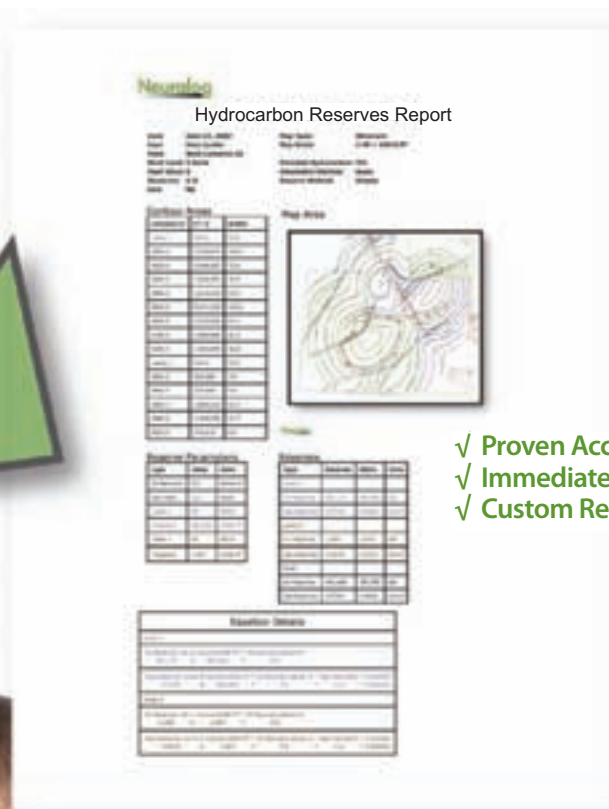
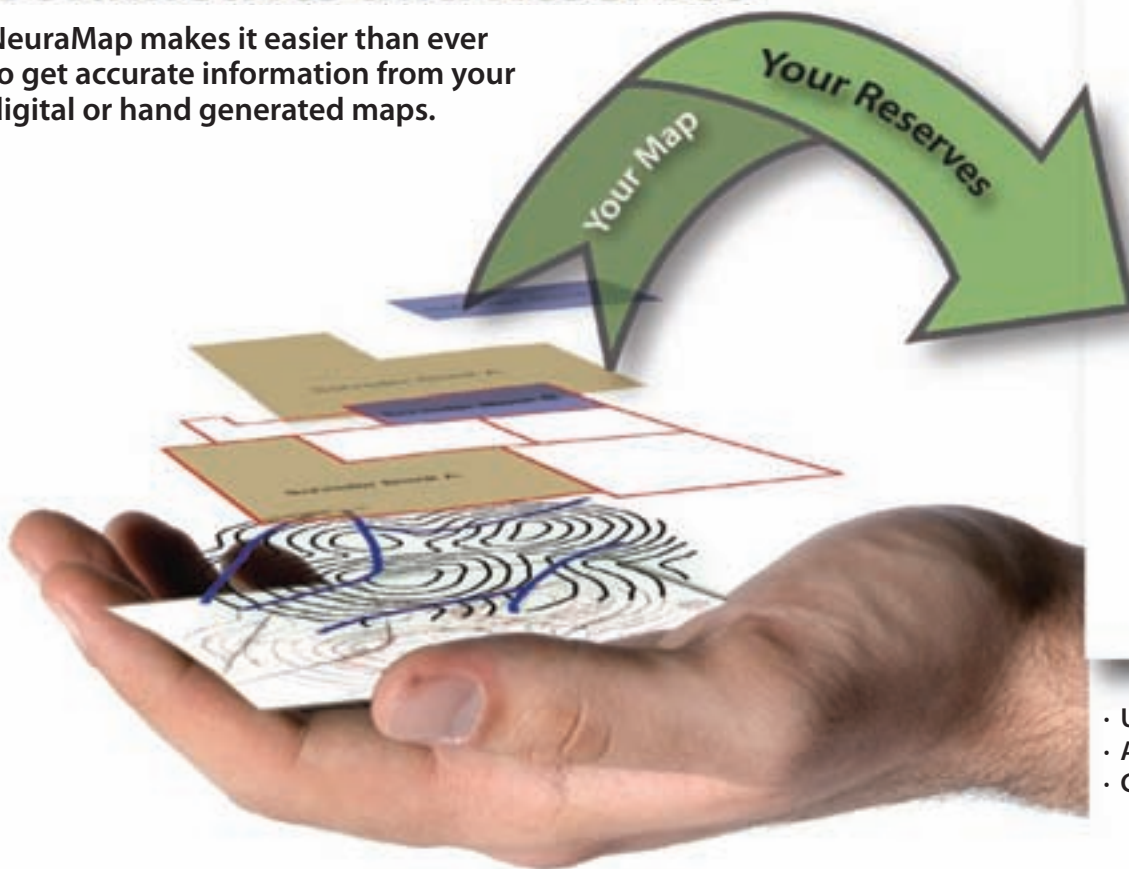
I saw my role very much as a conductor of proceedings as anything and had a wish simply to keep a "light touch on the tiller" so as to allow each of the speakers the best opportunity to present their cases, while also to maximize audience participation and discussion. I wished to follow the old (and in my view, correct) adage that "the best referees are the ones that you do not notice."

Consequently, I set about outlining the debating rules so as to avoid distracting

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interjections from protagonists in much the same way that a referee imposes authority on a game in the early stages. In doing so, each of the talks went well: two were given for the earthquake cause, by Adriano Mazzini and Nurrochmat "Rocky" Sawolo, the drilling engineer on the well itself, followed by two of the main champions for the drilling cause, Mark Tingay and Richard Davies. Susila Lusiaga, an independent drilling engineer and one of the experts interviewed by the Indonesian police after being provided access to all the drilling data, also presented key data during Davies' talk.

Informed questions came from members of the audience at the end of each talk, each of whom, as I had requested, identified themselves and their affiliations, to ensure full participation beyond the main combatants to encourage and ensure independence.

Having heard all the main presentations, I then invited all the principal speakers to join me on the top table to field queries from the audience in a question-and-answer session and to debate the issues with each other. A lively debate ensued. As it did I increasingly wondered whether the high quality and highly dignified and professional nature of the debate had led to the drawing of conclusions, and at the end of an hour question-and-answer session offered the AAPG session audience the chance to vote.

In doing so, I made clear that the vote should be based on the arguments that they had presented to them during the session and formulated the question as:

"On the Basis of what you have had presented to you today, do you think that the most likely cause of the LUSI mud volcano was:

- ✓ An earthquake?
- ✓ Drilling of the Banjar Panji-1 exploration well?
- ✓ A combination of earthquake and drilling?
- ✓ The arguments presented are inconclusive.

Of the 74 members of the audience that voted, 42 decided that the evidence was sufficiently clear that drilling was the trigger. Three opted for the earthquake cause alone, 13 thought that a combination of earthquake and drilling was the probable cause and a further 16 thought the evidence still inconclusive.

The fact that 55 voters (74 percent) voted for drilling having some if not the only cause suggested that the AAPG session attendees felt that, irrespective of what the final outcome might prove to be with more raw data on the table, the earthquake cause was less likely and that there was still a strong and clear case for

the drilling company to answer.

Being an unusual occurrence more reminiscent of 19th century geo-meetings and Oxford Union debates than most geological conferences – and given the extensive media coverage and PR build-up to the session – its outcome was subsequently widely reported in the world media, respected geoscientific journals, university press offices and blogs.

It is inevitable that holding any vote runs the risk of being interpreted as there having been "winners" and "losers" of course and criticism of the chair arising from "loosing parties" having perceived to have done so, but that is just the sort of post-match analysis that I was used as a referee!

* * *

Irrespective of the pros and cons of calling a vote, the key thing for me is this: If the show of hands becomes the catalyst for further understanding and eventual agreement and closure on the causes of the devastation being suffered in Java, the debate and its vote will have been a good thing. As expressed by more than one audience member, it is all well and good understanding the triggers of the mud volcano, (but) a priority should be to help disadvantaged locals who are struggling to cope with their loss of home and livelihood as a result.

That the main speakers are now intending to meet in the New Year to do just that is a testament to the success of the AAPG session. It is a very welcome thing, and I wish them every success in resolving the current inconsistencies between their respective positions. Should that not succeed, open, independent and binding geo-arbitration might be the only recourse to avoid "Erin Brockovich-type" protracted litigation.

If the debate should go anyway to effecting a speedy conclusion to the geoscientific understanding of what happened when it did, where it did and provide a proper basis for any meaningful and legitimate compensation claims, AAPG will, in my view, have done a significant public service in holding and facilitating the debate at one of their highly prestigious annual international conference sessions and demonstrated their commitment to people and the environment, both of which are firmly implanted in the AAPG mission. □

(Editor's note: Underhill is a professor at the Grant Institute of Earth Science, School of Geosciences at the University of Edinburgh, Scotland. He also is a past AAPG Distinguished Lecturer and was the featured luncheon speaker at the 2007 AAPG international conference in Athens, Greece.)

Referee: A Practitioner Of Both Art and Science

This May, at the end of the Scottish Premier League (SPL) season, AAPG member John Underhill (who in his "spare time" is professor of stratigraphy in the University of Edinburgh's School of Geosciences) blew his final whistle as a national and international FIFA soccer referee.



Underhill

Fourteen of his 27 years were spent at the top levels of Scottish and European football; and his final two games were both at Fir Park, Motherwell, where fans saw now-defunct Gretna beat Hearts 1-0, and Motherwell

clinch a place in Europe – while also thwarting Rangers' chances for the championship in a 1-1 draw that was transmitted around the world on live TV.

Since beginning his refereeing career (while still a geology undergraduate at Bristol University) John has handled around 1,500 games – including 132 SPL matches, over 40 international appointments (including several Champions League and World Cup games) and four national cup finals. He now plies his refereeing trade on the Masters Football Circuit. □

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CO₂ Statement Adopted by AAPG

By DAVID CURTISS
GEO-DC Director

You may be saying to yourself, "Enough already with the carbon sequestration!"

After all, we have covered it repeatedly in these pages over the past year. And during the campaign season politicians talked about it as a new and breakthrough technology to enable ever-cleaner use of global coal resources – even though our colleagues in the Permian Basin have been doing it for more than three decades under the guise of enhanced oil recovery (EOR).

There are differences between CO₂ flooding for EOR and long-term geological carbon sequestration. Sequestration requires injecting large volumes of CO₂ through the smallest number of wells possible, and ensuring the CO₂ remains confined over long periods of time. The technical challenges are issues of scale.

The fundamental geological and engineering principles still apply: AAPG members are the experts.

* * *

As a scientific and professional association, AAPG has prepared statements on a variety of issues. These statements express the views of the Association, based on our expertise, and are reviewed and revised periodically.

Each statement is prepared under the auspices of the DPA Government Affairs Committee, reviewed by the DPA and approved by the AAPG Executive



Curtiss

Committee.

The latest statement approved by the AAPG Executive Committee is on carbon sequestration. It specifically "urges the expansion of funding for scientific research on permanent carbon storage and for scientific research

related to reservoir performance." The complete statement is available on the DPA Government Affairs Committee Web page and linked from the GEO-DC Web page.

Carl Smith, who chairs the DPA Government Affairs Committee and

shepherded this statement through the approval process, is pleased with the result, writing:

"Carbon sequestration is a cross-cutting issue that calls upon the expertise of the entire Association and its three divisions. It also demonstrates to society-at-large how the geosciences positively affect their lives. Special thanks to Jim Drahovzal, the principal author of the statement, and to the many reviewers who contributed helpful comments and suggestions."

* * *

AAPG is not alone looking at carbon sequestration:

✓ In October 2008 the World

Resources Institute (WRI), a Washington, D.C.-based environmental think-tank, issued a 148-page report outlining guidelines for safely and effectively conducting carbon capture and storage operations. They looked at all parts of the chain: carbon capture, transport and sequestration.

WRI invited a diverse group of stakeholders to participate in the process, including industry, NGOs and government representatives (as observers). The report is wide-ranging, offering specific guidelines for policy makers, regulators and project developers and operators.

A copy of the report is available for download on the WRI Web site.

✓ On the government front, the U.S. Environmental Protection Agency (EPA) issued a draft rule on how it proposed to regulate long-term carbon sequestration. It posted this draft rule and requested public comment. EPA is now reviewing the comments received, and will use these to revise the rule.

✓ The U.S. Department of Energy's seven regional carbon sequestration partnerships across the country are currently in their second phase, designing and testing medium-scale sequestration technologies. DOE has also awarded several large-scale sequestration projects for phase 3, with the goal of injecting up to one million tons of CO₂. These projects are currently in the planning phase.

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AAPG Issues CO₂ Storage Statement

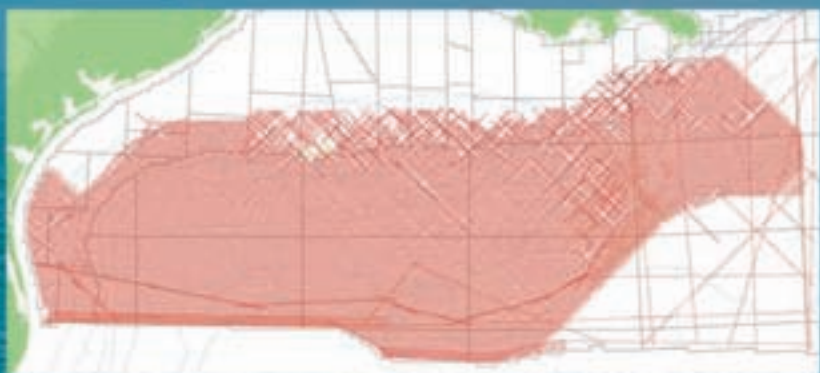
Geologic CO₂ storage represents an important technology for mitigating increased atmospheric CO₂. Just as industry experience in CO₂ EOR and EGR benefits geologic carbon storage activities, research and technology development for carbon storage will also increase understanding of subsurface processes occurring in CO₂ EOR and EGR operations. This should result in increased efficiency and broader opportunities for the production of incremental oil and gas.

Therefore, AAPG urges the expansion of funding for scientific research on permanent carbon storage and for the scientific research related to reservoir performance.

For "Issue" and "Background" information see AAPG Positions Statements on the AAPG Web site.

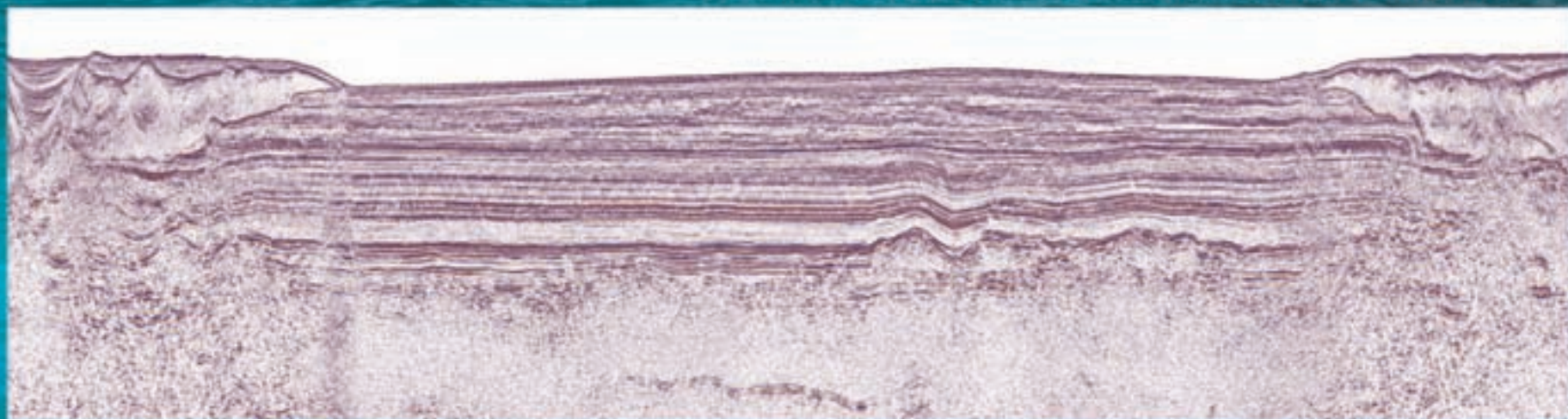


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✓ Finally, the Emergency Economic Stabilization Act of 2008, which the president signed into law on Oct. 3, provides a new tax credit for carbon sequestration operations. Designed to stimulate carbon sequestration activities, the provision provides a \$20 per ton credit for capturing carbon dioxide from an industrial source and sequestering it in a secure geological storage unit. When the storage unit is an oil and gas reservoir (i.e., EOR activity) the tax credit is \$10 per ton of sequestered carbon.

This raises an important point: Carbon sequestration will occur only if there is a reason to do it. In his November 2008 EXPLORER column, AAPG President Scott Tinker suggested that an

international energy policy should, "[S]et a transparent, predictable, economy-wide global carbon price that is reasonably stable, avoids waste, uses revenues wisely and is coordinated with major developing and developed nations ..."

The Democrat leadership in Congress has indicated they would like to address the issue of carbon price within the context of climate change legislation. But it is not clear how this would dovetail with a coordinated international effort.

It also is unclear what impact the current financial crisis will have on these efforts.

Stay tuned. The 111th Congress convenes January 2009. □

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

Officer Candidates' Bios, 'Why I' Answers Now Online

Biographies and individual information for AAPG officer candidates for the 2009-10 term continue to be available online at www.aapg.org.

The information also will be inserted in an upcoming EXPLORER.

The president-elect winner will serve as AAPG president in 2010-11. The terms for both vice president-Regions and secretary are two years.

Ballots will be mailed in spring 2009. 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.

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REGIONS&sections

Planning Time Begins for 2009 IBA

(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.)

By CAROL MCGOWEN
Regions and Sections Manager

By now, most EXPLORER readers are familiar with the AAPG Imperial Barrel Award Program – the basin analysis and prospect presentation competition for integrated technical teams of five graduate students and one faculty adviser.

In 2009 university teams from all over the world will once again compete in local Section or Region IBA competitions for the opportunity to attend the June AAPG Annual Convention and Exhibition in Denver – all travel and lodging expenses paid – where they will participate in the global IBA finals competition.

Last year, 34 teams participated in the 2008 IBA program. Expectations are high for the 2009 competition with at least 40 schools expected to sign up. While all interested schools are encouraged to apply, in some cases, Section and Region qualifying competitions will be limited to the first five schools that apply.

While there is no denying that participation in the IBA program means extra work for students and faculty, these efforts can launch a career, secure a job, showcase a university, enhance a



The University of Oklahoma's 2008 IBA winning team.

geoscience department and discover a new star recruit.

✓ Students receive valuable feedback from the industry judges and can post globally recognized IBA experience to their résumé.

✓ Faculty and universities gain industry insight, retain the IBA dataset to use as a teaching tool and, for the top three winning teams, receive large cash prizes for their university departments.

✓ Judges and sponsoring companies gain first-hand access to view the team presentations, attend the student reception and recruit the best and brightest job candidates.

* * *

For the last several months the IBA Committee, chaired by Connie Mongold, has been busy evaluating last year's program and implementing program improvements to ensure to the extent possible a fair and level playing field for 2009.

Improvements can be found in five areas – datasets, software support, judging, sponsorship and student peer mentoring.

Datasets

✓ The 2009 IBA competition will feature new datasets from basins around the world. The choice of which data set will be sent to which university will be made at the discretion of the IBA Committee, and universities will not be permitted to select their own dataset.

Seasoned explorationists know that data is sometimes incomplete or erroneous. Just as in the real world, IBA datasets contain imperfections – some intentionally.

✓ Datasets will be released to each

participating university eight weeks prior to the local Section or Region competition date. This will ensure all teams have equal time to analyze the data and prepare a 30-minute PowerPoint presentation.

✓ Datasets will be sent in a format compatible with the participating university's software.

✓ To minimize shipping problems and expedite timely delivery, datasets and competition instructions will be sent to each university team in the form of a computer memory stick.

✓ Seeking contributions of datasets! As the program grows, so grows the need to add new datasets to the IBA library.

The definition of a dataset includes a 3-D survey (400 km² – 1000 km²); 2-D survey lines (1000 km² – 5000 km²); and a full suite of wireline logs from four-six wells, with formation and time picks.

To contribute a dataset, contact Steve Veal at dcxresources@btinternet.com.

Software Support

Schlumberger will donate Petrel seismic to simulation software to IBA teams, according to donation guidelines.

Judging

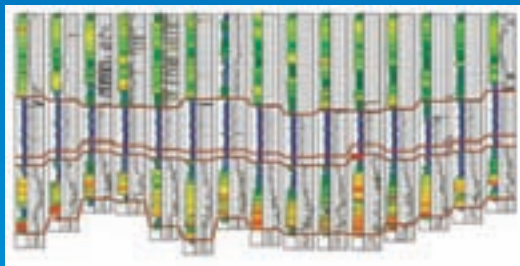
✓ All 2009 judges will be new to avoid any possibility of bias from previous IBA competitions.

✓ The IBA judging form and criteria

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will be uniformly applied in all Section and Region qualifying competitions and in the global finals competition.

✓ Panels of three industry judges will be selected and assigned to judge teams from universities other than the alma mater of the judges.

✓ No two judges on any one judging panel may be alumni of the same university.

Individuals or companies interested in serving as a judge may contact Bob Stewart, IBA Judging Sub-Committee chair, at bob.stewart@exxonmobil.com.

Sponsorship

✓ For maximum exposure, industry companies are encouraged to sponsor both the local Section or Region competition plus the global finals competition.

✓ Sponsors of a Region or Section qualifying competition may also attend the global competition. In fact, sponsoring companies are encouraged to send recruiters to the local qualifying competition and the global competition.

✓ Companies interested in financially sponsoring the 2009 IBA program are invited to contact Erik Mason, IBA Sponsorship Sub-Committee chair, at erik.mason@shell.com.

Student Peer Mentoring

✓ The IBA experience made such a positive impact on participating students last year that several students have formed the IBA Student Advisory Sub-Committee, to provide support and peer-to-peer mentoring of university IBA teams.

✓ Teams seeking this service may contact Cameron Campbell, formerly of San Diego State University, at cameron.campbell@exxonmobil.com.

✓ Other past IBA participants interested in serving on the IBA Student Advisory Sub-Committee may also contact Campbell.

All IBA teams traveling from outside the United States are strongly encouraged to apply now for a visa. Although the global finals competition held during the AAPG convention in Denver is months away, the visa approval process can take considerable time. Waiting to apply for a visa until after the qualifying IBA competition in your Region may be too late.

For the general timetable and more information about the 2009 competition, go to www.aapg.org/iba, or contact Carol McGowen at cmcgowen@aapg.org, or Mike Mlynek at mmlynek@aapg.org. □

Work Force Survey Hits Second Stage

Preliminary results are in for AAPG's Work Force Retention Survey, a Web-based effort designed to determine why many women geoscientists leave the energy industry.

The survey's first step, gathering the data from respondents to the AAPG Web site, was completed Sept. 30. Follow up interviews with selected individuals are now being completed.

The final analysis is expected to be completed for review by the AAPG Executive Committee and Corporate Advisory Board at the annual convention in Denver, set for June 7-10.

Some preliminary survey results include:

□ There were 2,048 responses; of that number:

✓ 27 percent were either in the 21-

30 or 31-39 age group.

✓ 23 percent were 50-59.

✓ 21 percent were 40-49.

✓ 2 percent were 60 or older.

□ In terms of experience:

✓ 61 percent have been continuously employed in the energy industry.

✓ 13 percent are no longer employed in the industry.

✓ 12 percent were never employed in the industry.

✓ 10 percent left and then returned to the industry.

□ Asked to name the most rewarding aspect of being part of the industry:

✓ 27 percent said it was the

industry's intellectual nature.

✓ 26 percent said it was the scope of the work.

✓ 24 percent said it was the monetary rewards.

✓ 7 percent said it was either education or advancement.

✓ 6 percent said it was travel.

□ Regarding challenges that need to be addressed:

✓ 25 percent said career and family.

✓ 21 percent said advancement.

✓ 17 percent said the dynamics of a dual career household.

✓ 15 percent cited the need for female mentors.

✓ 12 percent said establishing a professional network.

✓ 8 percent said compensation. □



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FOUNDATION Update

Grant Honors James E. Wilson

The AAPG Foundation Board of Trustees recently approved the establishment of a new Named Grant-in-Aid to benefit graduate students and honor past Foundation Trustee Chairman James E. Wilson.

The James E. Wilson Memorial Grant will be awarded annually through the Grants-in-Aid Program.

Wilson, who in addition to his leadership of the Foundation was a prominent geologist, longtime AAPG leader and Powers Medalist, consultant, oil executive and award winning author, died Sept. 15 of natural causes at his home in Cherry Hills Village, Colo. He was 93 (see November EXPLORER).

Wilson was AAPG president in 1972-73 and served as chairman of the Association's Foundation from 1977-89. He received the Sidney Powers Medal, AAPG's highest honor, in 1987, and Honorary Membership in 1977.

Wilson spent the greater part of his retirement blending two of his passions: geology and wine. He was a member of – and was honored by – several prestigious international wine organizations, and became an award-winning author with the book *Terroir: Geology, Climate and Culture in the Making of French Wine*.

Even after losing his sight he continued to write memoirs covering his war years, experiences at Shell and his consulting career. He also continued to contribute articles for AAPG publications, including the

EXPLORER. The last of a two part-series he recently completed for the EXPLORER on "The Dead Sea is a Geological Phenomenon of Biblical Proportions," can be found in this EXPLORER on page 24.

The Foundation's Named Grants Program was initiated in the 1970s when friends of the late Hugh Miser established a memorial fund in the Foundation to award an annual grant. Since that time 70 Named Grant endowments have been created and



Wilson

provide a way to give a gift that will renew itself indefinitely, and at the same time honor either the donor or someone of his choosing.

Grants are awarded annually in amounts ranging from \$500 to \$3,000.

All Foundation contributors have the opportunity to

make a long-term investment, not only in the future of a well-qualified student, but also in the future of petroleum geology as a science and profession.

To contribute to the James E. Wilson Memorial Grant contact Rebecca Griffin, Foundation manager, at 918-560-2644.

* * *

In other Foundation news, West Texas Geological Society members were invited to join AAPG President Scott Tinker and Executive Director Richard Fritz for an informal AAPG/Foundation Midland Town Hall Forum and Reception in early November.

The program also featured a review of the Foundation programs by William Fisher, chairman, Rebecca Griffin, Foundation manager and Alison Robbins, corporation relations development coordinator. Earlier in the day a luncheon for Trustee Associates and guests was held at the Petroleum Club of Midland to discuss Foundation programs and developments.

AAPG and the Foundation are planning similar luncheons and/or town hall meetings around the country throughout 2009 with confirmed dates for Fort Worth (Feb. 19) and Denver (Feb. 25).

Watch the EXPLORER and AAPG Web site for other cities as they are announced. □

Foundation Contributions and Gifts

Foundation (General)

Michael L. Allred
Rebecca D. Bailey
William J. Barrett
Daniel Bean
Janet Sue Brister
Ross Anthony Brunetti
Robert James Bunge
Mary C. Carr
Peterclever Cheta
Edward Alan Clerke
Paul Lloyd Decker
Jennifer Noel Flight
Leon Horace Gerlich
Ian Glynn Halstead
Donpaul Henderson
James Michael Hill Sr.
William Allan Hunter
Crandall Davis Jones

In memory of Douglas L. Bostwick
Jerome Paul Kelly

Erlene D. Kirschner

In memory of Charles Kirschner

Kelly L. Knight
Leslie Blake Magoon III
Martin Matesic
James Clifton Musgrove
Larry Nation
George Flory Pritchard
Barbara J. Radovich
Alicia Maria Rosales
Sandra Weil Rushworth

In honor of Susan Landon

Steven Schamel
Robert L. Scott
Arun Kumar Sethi
Jack C. Threet
Joshua Creviere Turner
Volker C. Vahrenkamp
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[continued on next page](#)



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Earth Science Week Activities Reach 10 Million People Globally

An estimated 10 million people worldwide learned about earth science through program promotions, education efforts and media coverage during Earth Science Week held in October, according to the American Geological Institute.

With a theme of "No Child Left Inside," a number of outreach events were held, from individual teachers and classes conducting playground science projects to open houses at



major U.S. Geological Survey field stations.

AGI said Earth Science Week activities were promoted and covered by scores of newspapers, television stations, Web sites and other media outlets worldwide.

AAPG Foundation support included the distribution of promotional posters via the EXPLORER and the Association providing information for the teaching packets that included activities throughout the year. □

2009 Open Enrollment Course Schedule

Risk Analysis, Prospect Evaluation & Expl. Economics

Houston, Texas	January 12 - 16
Houston, Texas	March 30 - April 3
Aberdeen, Scotland	April 20 - 24
Calgary, Alberta	April 27 - May 1
Denver, Colorado*	August 17 - 21
Calgary, Alberta	September 28 - October 2
Houston, Texas	October 19 - 23

An Overview of Exploration Play Analysis

Houston, Texas	May 4 - 5
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DHI Interpretation and Risking

Houston, Texas	May 6 - 7
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* includes material on unconventional resource assessment

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GEOPHYSICALcorner

Results Shine for New Technology

(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.)

By **BOB HARDAGE**

One technical barrier plaguing hydrocarbon exploration is the inability to see geologic targets below distorted salt layers that span large areas of numerous depositional basins. The complex geometrical shapes of most salt bodies distort trajectories of seismic raypaths to such an extent that uniform illumination of sub-salt targets cannot be achieved with conventional seismic technology.

If there is no uniform illumination of a target, a seismic image of that target cannot be correct.

A new technology that addresses this problem of non-uniform illumination of sub-salt targets is a concept called multi-azimuth data acquisition.

* * *

As shown in figure 1, a hypothetical salt trend is imaged with three cable tows that traverse the area in three different azimuth directions. In this manner, sub-salt geology is imaged with overlapping layers of data, each data layer representing a different azimuth in which the data-acquisition template moves across the geologic target area.

The objective is to create a uniform illumination of any target that is below the image-distorting salt layer.

There are several options for the geometrical configuration of the source/cable system that is towed along each of these traverses:

✓ One possibility is shown as figure 2a. In this option, data are acquired with a narrow-azimuth geometry that involves 10 or 12 parallel hydrophone cables spaced to form an acquisition template approximately one kilometer wide and perhaps 10 or 12 kilometers long.

Several arrays of air guns are distributed across this cable spread.

✓ A second data-acquisition scheme, illustrated in figure 2b, involves multiple vessels that generate wider-azimuth data in a single tow. Here the center vessel tows a narrow-azimuth data-acquisition system, but its companion source vessels increase the source-to-receiver azimuth aperture by a factor of three or more compared to the azimuth range of the system described by

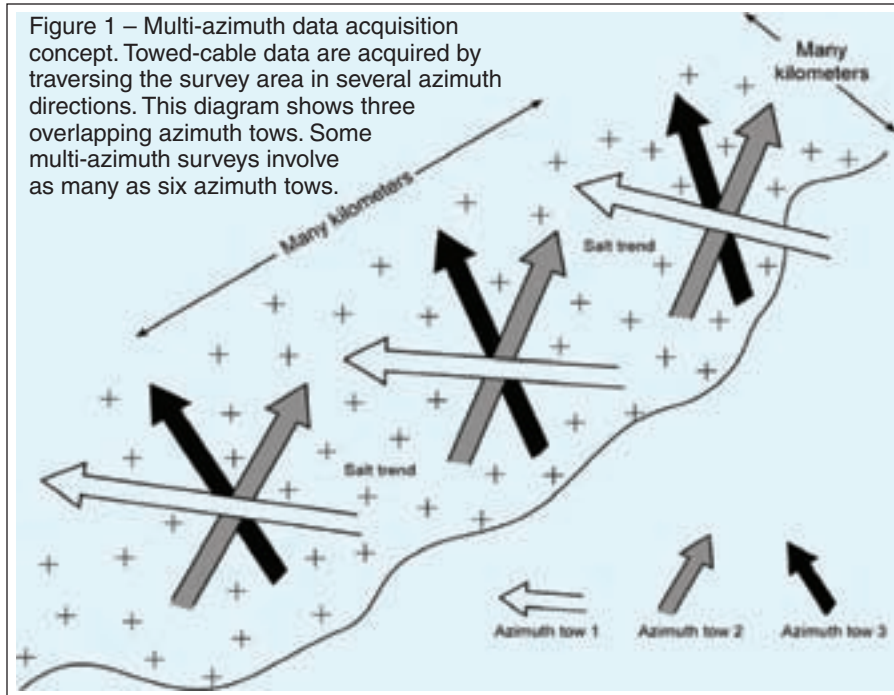


Figure 1 – Multi-azimuth data acquisition concept. Towed-cable data are acquired by traversing the survey area in several azimuth directions. This diagram shows three overlapping azimuth tows. Some multi-azimuth surveys involve as many as six azimuth tows.

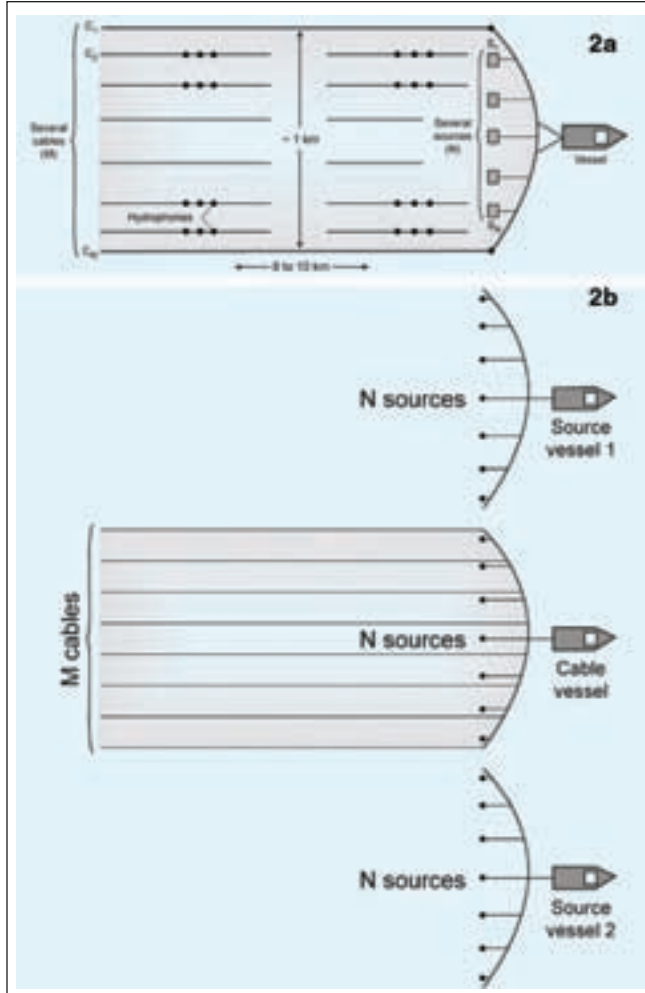


Figure 2 – (a) Narrow-azimuth marine data acquisition; (b) Wide-azimuth marine data acquisition. Source Boat 2 may be removed in areas where there are congested production facilities, or it may be moved to travel behind Source Boat 1 near the tail-end of the cable spread.



Hardage

figure 2a. If this wide-azimuth concept is used to acquire the overlapping data layers in figure 1, the azimuths of the raypaths arriving at each subsurface imaging point are almost uniformly distributed around the complete 360-degree azimuth circle, and there is a greater likelihood that uniform target illumination is achieved.

Examples of the increased geological information provided by multi-azimuth seismic imaging are illustrated as figures 3 and 4.

The data in figure 3 come from a deep-water area of the Nile Delta where a thick, rugose anhydrite layer complicates the imaging of deeper targets. One of the target objects below this image-distorting layer is shown in this data comparison.

The improvements in target details seen in the six-azimuth image are significant compared to what can be seen in the traditional single-azimuth image.

The example in figure 4 is across Mad Dog Field in the Gulf of Mexico. The improvements in data quality and in image detail when multi-azimuth technology is used are impressive.

* * *

Industry interest in multi-azimuth seismic technology is growing because the technique creates such dramatic improvements in the images of complex, hard-to-see, sub-salt targets.

Both theory and data-processing tests have shown that compared to single-azimuth data, multi-azimuth data can:

- ✓ Improve the overall signal-to-noise ratio of sub-salt data.
- ✓ Allow better removal of diffraction noise.
- ✓ Create a more uniform illumination of targets below layers that distort raypath distributions.
- ✓ Increase lateral resolution of data.
- ✓ Produce more accurate amplitude attributes.
- ✓ Provide better attenuation of multiples.

Any one of these factors is a significant improvement in seismic technology. Collectively, this list forms a compelling reason to implement multi-azimuth tows of wide-azimuth arrays to define sub-salt drilling targets. □

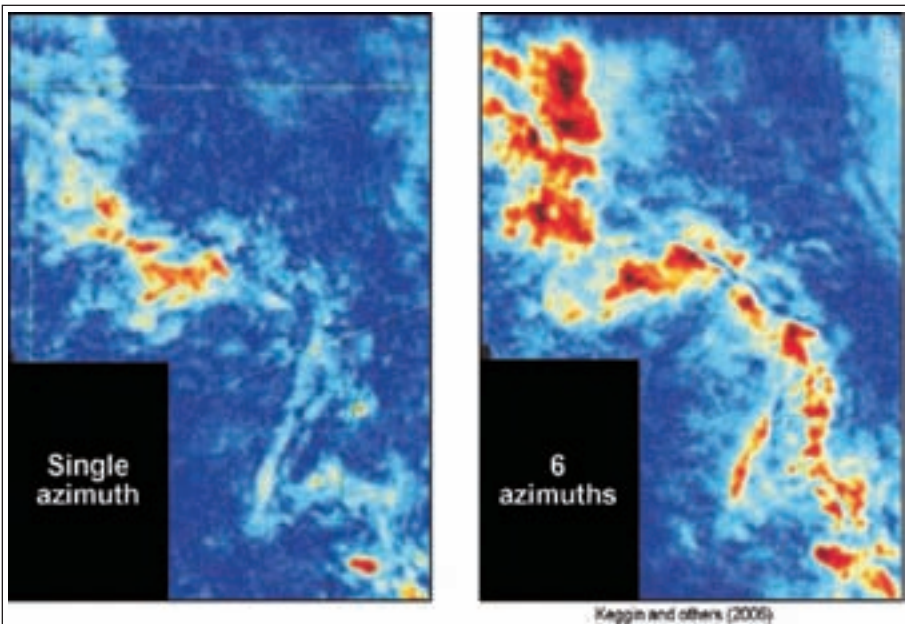


Figure 3 – Left, multi-azimuth data example 1, Nile Delta, (from Keggin and others, 2006).

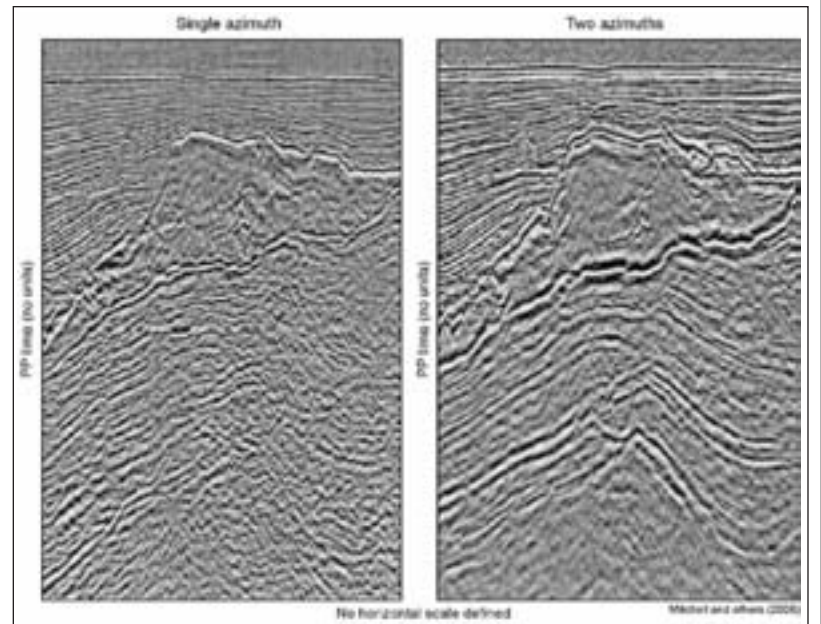


Figure 4 – Right, multi-azimuth data example 2, Gulf of Mexico (from Michell and others, 2006).

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IRA and the possibilities to either increase your support or make a special gift to the Foundation.



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On behalf of the AAPG Foundation Board of Trustees and Staff, we wish you a Happy Holiday Season and a New Year of Health, Happiness and Prosperity!

WWWupdate

Check Out the AAPG Blog Zone

By JANET BRISTER
and JAMIE EDFORD

The Internet may be the fastest evolving technology there is. It seems like every few months there are new codes, new methods, new features that have been added to already cool, hip, “really neat” sites – creating envy among developers and users alike.

It's enough to make one's head spin, but once the newness wears off not all those “really neat” features make the grade and have lasting power.

Blogs, however, are one of the not-so-recent additions that probably are here to stay.



As David Curtiss discussed in the EXPLORER's November “Washington Watch” column, the word “blog” is short for “Weblog,” which once was a glorified diary – and sometimes still is.

Today it has evolved into a means to extend audiences for writers, developers

and anyone who has a voice they want to exercise.

The audience also has a voice, however, as they can comment on blog posts and have an almost real-time dialogue with the writers – a wonderful way to receive feedback and share

opinions.

Successful blogs reach out to readers, viewers and listeners who do not subscribe to the print-media, radio or television broadcast in which they would have traditionally shared their information.

Because blogs reside on the Internet and can be accessed 24-7, information is distributed immediately and “news” can be published as it happens. No waiting for the next issue!

Developers are sharing new features, tips and tricks, answering questions and proposing ideas through which their clients comment and offer feedback. This has helped them offer stronger service to their client base.

That said, let us introduce you to some blogs AAPG is providing.

Get in The Zone

You may already have discovered these through the link on the top navigation bar of the AAPG Web site – but for those who haven't, our three blogs are located at blog.aapg.org or by accessing from the aapg.org page. They are:

✓ The **Geo-DC blog**, written by David Curtiss, director of the AAPG Geoscience and Energy Office in Washington, D.C.

As President-elect Obama moves forward with appointing his cabinet and energy issues ramp up in the United States, David's posts have increased with comments on all of these issues and much more.

The GEO-DC home page, www.aapg.org/geoDC/, has an RSS feed of the blog, plus you may subscribe to that feed to stay on top of David's most current postings.

✓ The **Student Outlook**, written by Mike Mlynek, AAPG's assistant manager of member services.

One of Mike's responsibilities is to communicate with AAPG Student Chapters. His newsletter to those chapters, *Student Outlook*, has now become a blog.

The student-focused Web site, students.aapg.org, has an RSS feed of this blog. And, like the GEO-DC blog, you may subscribe to the *Student Outlook* blog's feed.

✓ As an extension of this column, the **wwwUpdate blog** is where additions to aapg.org and ideas for new features and services will be announced by your Web site team.

Since all these sites are new there's not yet a tremendous amount of content, but we are confident these will become a great resource.

All the blogs in the AAPG Blog Zone support comments. Anyone who reads these blogs can make a comment; however, it doesn't post immediately on the blog site – instead it is submitted to the owner of the blog and they have the right to reject or accept your comment. No comments will be made anonymously.

Of course, one of the most important desires of any blogger is to get other people to link to their blog.

So, that's the next question: Have you got a blog? Do you have a site to which you could link to AAPG's Blog Zone?

Good browsing! ☐

(Editor's note: Brister is editor and Edford the assistant for the AAPG Web site.)

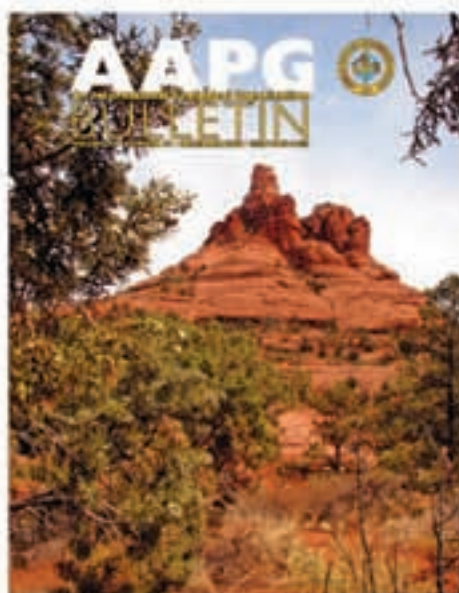
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The December 2008 cover of the AAPG Bulletin

More science than you can shake a pick at.

Structural evaluation of column-height controls at a toe-thrust discovery, deep-water Niger delta

Olga V. Kostenko, Steve J. Naruk, Willem Hack, Manuel Poupon, Hans-Jurg Meyer, Miguel Mora-Glukstad, Charles Anowai, and Margaret Mordi

Due to no-seismic-image zones, the reason for unexpectedly low hydrocarbon column heights in the deep-water Niger Delta play remains controversial. Interpretation of an integrated, geometrically and kinematically balanced cross section through a recent toe-thrust indicates that column height is controlled by access to thermogenic charge.

Sequence stratigraphic analysis of Jurassic and Cretaceous strata and petroleum exploration in the central and eastern Gulf coastal plain, United States

Ernest A. Mancini, Jamal Obid, Marcello Badali, Kaiyu Liu, and William C. Parcell

An integrated sequence stratigraphic and biostratigraphic framework is fundamental to the development of an effective petroleum exploration strategy for the interior salt basins of the Gulf coastal plain, United States. A case study of Jurassic and Cretaceous strata is presented.

Hydrocarbon migration detected by regional temperature field variations, Beaufort-Mackenzie Basin, Canada

Zhuoheng Chen, Kirk G. Osadetz, Dale R. Issler, and Stephen E. Grasby

Significant petroleum discoveries are often associated with areas of anomalously high temperature, indicating petroleum migration along thermal networks. Characterization of regional temperatures within the Beaufort-Mackenzie Basin, Canada, reveals areas with promising petroleum potential.

2008 Annual Report

The 2008 Annual Report includes reports from the president, treasurer, editor, Foundation, and AAPG divisions, sections, standing committees, and special committees.

2008 Index

The index of volume 92 (2008) is presented in this issue. Papers are listed by title, author, and key word.



Members may access the AAPG Bulletin online at http://www.aapg.org/December_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 & certification

For Active Membership

California

Hovadik, Joseph M., Chevron, San Ramon (D.K. Larue, F.W. Harris, S. Bombarde); Lowe, Donald R., Stanford University, Stanford (S.A. Graham, S.J. Uchytel, D.D. Pollard)

Colorado

Johnston, Joel Phillips, Delta Consultants, Loveland (F. Ethridge, E.A. Erslev, R. Allison)

Louisiana

Yawn, Brenda Kay, Minerals Management Service, New Orleans (R. Altobelli, R.D. Ivey, E. Batchelder)

Oklahoma

Wetwiska, Steven Hendrick, Okland Oil, Oklahoma City (R.S. Harris, J.C. Thompson, E.J. Heald)

Pennsylvania

Dreibelbis, Kelly A., Range Resources,

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, or by contacting headquarters in Tulsa.

Canonsburg (W.A. Zagorski, J.M. Wolpert, J.R. Morris)

Texas

Bateman, Mary Lindsey, Newfield Exploration, Houston (S. Black, S. Royer, B. Brown); Boice, Anard Erik, ExxonMobil, The Woodlands (W.A. Espegren, S.M. Mitchell, P.A. Sivon); Fischer, Cornelius, Rice

University, Houston (R.H. Gaupp, H. von Eynatten, S. Luning); Hart, Suchit S., Weatherford Labs, Houston (M.J. Styzen, A.E. D'Agostino, J.M. Rine); Jason, Margaret H., XTO Energy, Fort Worth (S.P. Weiner, W.R. Gibson, L.C. Ways Jr.); Joy, James David, self-employed, Austin (reinstatement); Kaiser, Mary L., Meridian Resources, Houston (J.K. Edwards, L.E. Maxwell, B.A.

Wright); Li, Yujia, Texas Tech University, Lubbock (G.B. Asquith, C. Barnes, P.F. Holterhoff); Manuel, Ela Lita, Baker Hughes, Houston (F.P. Hearn, C.M. Young, T.L. Wright); Matthews, Jeffrey M., ExxonMobil Exploration, Houston (A.B. French, D.O. Hurtubise, W. B. Gardiner); Tittle, Wayne, Devon Energy, Kingwood (R.J. Smith, W.T. Louder, S.R. Bird); Yacob, Ezra, EOG Resources, Flower Mound (S.K. Yacob, W.R. Thomas, J.A. May)

Canada

Buck, Christian M.E., Brasoil/Caltor, Calgary (M.R. Junghans, D.K. Allan, R. Porto); Lloyd, Tim J., Total E&P Canada, Calgary (S.R. Hill, B.M. Wright, C. Morin)

Colombia

Acevedo, Javier Andres, Schlumberger, Bogota (C. Arango, F. Corredor, V.O. Ramirez); Herrera, Maria Camila, Halliburton, Bogota (D. Valencis-Caro, J.A. Pavas, V.O. Ramirez)

England

Dickinson, Julie Anne, RPS Energy, Woking (A. Lever, M.J. Lester, J. Weston); Hassan, Shehzad, IHS Energy, Tetbury (I. Blakeley, J.J. Lambiase, J. Benton); Henniche, Messaouda Dalila, RPS Energy, Woking (A. Lever, M.J. Lester, N. Sabaou); Speh, Charles Robert, Milestone Exploration, Oakley (J.R.V. Brooks, J.W. Lund, D.C. Rusk)

India

Das, Kamal Kumar, ONGC, Gujarat (M.K. Ghosh, S. Mahanti, H.J. Singh); Madabhushi, Ramakrishna, ONGC, Chennai (reinstatement); Nair, Saritha Sadasivan, Shell Technology India, Bangalore (A.J.H. Carnell, B.P. Ratha, J. Varghese)

Italy

Enilolobo, Debo Olugbemiga, ENI International Resources, Milan (H. Shimano, A.E. Enemuoh, A. Odusina)

Mexico

Grajales-Nishimura, Jose Manuel, Instituto Mexicano del Petroleo, Mexico (C. Bartolini, E. Cedillo-Pardo, A.E. Oviedo-Perez)

New Zealand

D'Ath-Woodd, Michele Annette, Todd Petroleum Mining, New Plymouth (N.H. Smith, J. Harris, G.P. Thrasher); Styles, Kim Leslie, GeoSphere, Lower Hutt (J.M. Beggs, J. Salo, G.H. Browne)

Norway

Bullimore, Scott Alan, StatoilHydro, Bergen (R.J. Steel, T.M. Loseth, B.A. Tocher); Samuelsson, Jorgen, Gaz de France Norge AS, Stavanger (D. Lundqvist, B.A. Tocher, M. Larsen)

People's Republic of China

Liu, Yunsheng, Anadarko Petroleum, Beijing (J.D. Gordon, G. Xue, Z. Qin)

Poland

Poszytek, Anna Agnieszka, Warsaw University, Faculty of Geology Warsaw, (R. Kudrewicz, P. Krzywiec, T.M. Peryt)

Republic of Croatia

Mirošević, Marin, INA, Zagreb (T. Malvic, J. Bubnic, B. Uroš)

Certification

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

Petroleum Geologist

California

Strider, Mark H., Chevron, San Ramon (T. Tankersley, G. Jacobs, M. W. Campbell)

Texas

Webster, Robert E., R. E. Webster Inc., Irving (Society of Independent Professional Earth Scientists)

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In 1970, we imported 24% of our oil. Today, it's 70% and climbing.



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My name is T. Boone Pickens, and I've been an oil man all my life. But this is one emergency we can't drill our way out of.

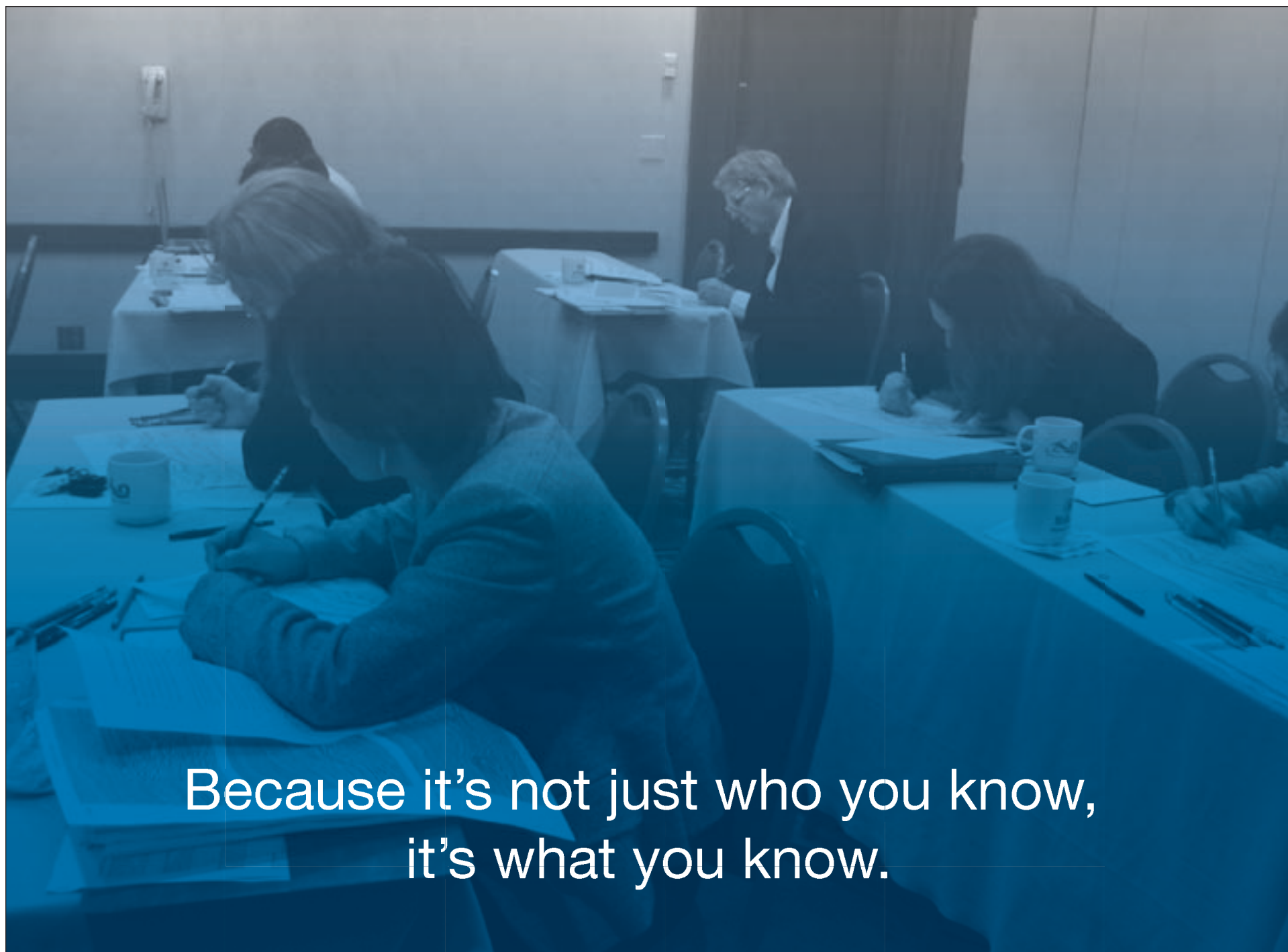
The Pickens Plan will reduce our dependency on foreign oil by more than one third—and it will do it within 10 years.

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PROFESSIONAL news briefs

Robert G. Font is the recipient of the 2008 Martin Van Couvering Memorial Award, presented by the American Institute of Professional Geologists. Font is president and owner of Geoscience Data Management Inc., Plano, Texas.

Eric Frodesen, to geological adviser-exploration new ventures, Hess Corp., Houston. Previously geological consultant, Anglo-Suisse Offshore Partners, Houston.

Stuart Hirsch, to senior geologist-eastern division, Chesapeake Energy, Charleston, W.Va. Previously senior geologist, Cabot Oil & Gas, Charleston, W.Va.

Joseph Hovadik and **David Larue** received the EAGE Norman Falcon Award at the recent EAGE meeting in Rome, Italy, for the paper "Static Characterizations of Reservoirs: Refining the Concepts of Connectivity." Hovadik is an earth scientist with Chevron-San Joaquin Valley business unit, San Ramon, Calif.; Larue is with Chevron-San Joaquin Valley business unit, San Ramon, Calif.

Paul A. Kapp received the 2008 Young Scientist Award from the Geological Society of America, presented to honor scientists 35 or younger for their research to advance the earth sciences. Kapp is an assistant professor at the University of Arizona, Tucson, Ariz.

Bobby Long, to exploration manager, Access Exploration, Houston. Previously technical director, Sunrise Energy Resources, New York, N.Y.

Jeff May, to chief geologist, EOG Resources, Denver. Previously chief stratigrapher, EOG Resources, Denver.

Ken D. Pfau, to chief geologist, Forest Oil, Houston. Previously senior staff geologist, Apache Egypt, Cairo, Egypt.

Rob Prentice, to director of marketing and business development, Gustavson Associates, Boulder, Colo. Previously

Middle East marketing and business development manager, Walsh Environmental Scientists and Engineers, Boulder, Colo.

Brian Russell has been awarded SEG Honorary Membership, its second highest honor, for distinguished contributions SEG and its Foundation. He is vice president of Hampson-Russell Software, Calgary, Canada.

Wolfgang E. Schollnberger was awarded the Hans Höfer Medal by the Austrian Society of Petroleum Sciences, for his contributions to the advancement of science and to the Austrian petroleum industry. Schollnberger is an independent energy adviser in Potomac, Md.

Mark Weber, to president-global

See **PNBs**, page 48

SPOTLIGHT on...

L. Frank Brown Jr., emeritus professor of the University of Texas at Austin and researcher at the Bureau of Economic Geology there, was honored at the ICE opening session in Cape Town with a Special Award for his groundbreaking work in South Africa.

The award, given by the Geological Society of South Africa, was presented by citationist Eric Jungslager and GSSA president Matt Mullins.

"This is in recognition of his contribution to the earth sciences in South Africa, and especially his contribution to the application of seismic and sequence stratigraphic techniques to the study of the offshore sedimentary basins of South Africa," Jungslager said. "It is also in recognition of his mentorship of South African geoscientist – and his guidance, which prompted many studies and publications together with South African petroleum geoscientists."

It was in Cape Town in 1987 that Brown first taught South African geoscientists how to apply the latest



Brown

concepts and principles of the seismic sequence stratigraphic approach of Peter Vail in the search for petroleum. "Ever since the publication of AAPG Memoir 26 in 1977, seismic profiles of the earth's crust had become the outcrops as it were of petroleum geoscientists – and seismic stratigraphy the preferred tool to unravel the geology they depicted," Jungslager said. "Frank contributed to this seminal publication with William L. Fisher (past AAPG president), also of the Bureau of Economic Geology, and their concept of the 'linked depositional systems tract' became an integral part of the rapidly evolving new field of time-based sequence stratigraphy."

As a result of his involvement in Memoir 26, Brown taught in the AAPG Seismic Stratigraphy School from 1977

to 1987. Cape Town was the next stop. "Petroleum exploration in South Africa in the mid-1980s had reached the point where new and riskier targets in the form of turbidites in basin floor settings were becoming the new focus of oil exploration," Jungslager said. "The management of Soekor (precursor of present-day PetroSA) fully supported Frank and their team of geoscientists for strategic guidance in applying the new stratigraphic approach to petroleum exploration.

"In 1988 and 1989, several teams of South African geoscientists worked under Frank's supervision at the Bureau of Economic Geology in Texas," he added. "This work significantly improved the interpretation and understanding of the offshore Mesozoic basins of South Africa.

"Thank you, Frank, for all that you have done for the study of geology in South Africa," Jungslager concluded, "and what you have meant to the careers of many local geoscientists who remain your faithful friends." □

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Challenges and the Way Forward

19-22 April 2009 – Muscat, Oman

Exploring for oil and gas is getting more challenging as we run out of map-able subsurface structures. Advancements in techniques and methodologies to explore for hydrocarbon accumulations are tremendous. However, still there are limitations which prevent explorationists from finding more complex, higher risk and more rewarding hydrocarbon accumulations.

This workshop can act as a venue for knowledge exchange between professionals in hydrocarbon exploration. Different aspects, methodologies, techniques, human resources and challenges will be presented and discussed.

Main Topics

- Non Conventional Traps
- Risk/Potential
- Technology
- Basin Modelling
- Case Histories/Lessons Learned
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Participating publishers and societies are as follows:

AAPG Bulletin
 AAPG Special Publications
 Ardmore Geological Society
 Canadian Society of Petroleum Geologists
 East Texas Geological Society
 Fort Worth Geological Society
 Gulf Coast Association of Geological Societies
 Houston Geological Society Bulletin
 Houston Geological Society Special Publications
 Indonesia Petroleum Association
 Journal of Petroleum Geology
 Kansas Geological Society
 Lafayette Geological Society
 New Orleans Geological Society
 Pacific Section AAPG Special Publications
 Petroleum Abstracts Discovery Database
 Oklahoma City Geological Society
 Society of Sedimentary Geology JSR
 Tulsa Geological Society
 Wyoming Geological Society

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AAPG Short Course Set in Bahrain

The first short course presented through AAPG's new Middle East office will be offered Jan. 18-22, taught by two successful and popular AAPG authors.

"Integrated Petrography and Geochemistry of Carbonate Rocks and Its Application to Reservoir Studies" will be presented at the Sheraton Hotel and Towers in Manama, Bahrain, taught by Peter Scholle and Dana Ulmer-Scholle.

The two are authors of AAPG Memoir 77, *A Color Guide to the Petrography of Carbonate Rocks*, which was designed to aid geologists' understanding of the importance and value of petrography – what Scholle calls one of those dying arts of fundamental geology.

The course will be a lecture and

discussion class, with practical thin section laboratory exercises. It is designed for geologists and engineers interested in carbonate reservoir characterization, including understanding the depositional setting, diagenetic history and origin and timing of porosity development or destruction in limestone and dolomite reservoirs.

Course specifics include:

- ✓ Recognition of constituent biotic and non-biotic grains and diagnostic sedimentary fabrics to establish or refine interpretations of depositional environments.

- ✓ Classification of carbonate rocks.
- ✓ Recognition of types of diagenetic alteration (replacement, inversion,

dissolution, cementation, etc.) and interpretation of their origin and timing.

- ✓ Recognition of basic porosity types and their origin.

- ✓ Fundamentals of geochemical analysis (mainly cathodoluminescence, fluid inclusion microscopy and carbon/oxygen and strontium isotopic analysis) and discussion of their application to the interpretation of carbonate rock diagenesis.

- ✓ Discussion of time- and cost-effective integration of petrography and geochemistry.

The registration deadline is Jan. 11; for more information contact Lara Bell at lbell@aapg.org; or telephone, +973 17553043; or fax, +973 17553029.

Canich Approved As New DPA Vice President

A new vice president has been appointed to fill an unexpected vacancy for the Division of Professional Affairs.

Michael Canich, with Equitable Production Co. in Pittsburgh, has accepted the position of DPA vice president and was approved by the DPA Council and Executive Committee at their October mid-year meeting in Houston.

Canich replaces Dan Reynolds, who resigned for personal reasons.

PNBs

from page 46

business development, Fugro Gravity and Magnetic Services, Houston. Previously president, Fugro Robertson, Houston.

Bill Wescott, to adviser, geologist-international business development, El Paso Exploration and Production, Houston. Previously senior geological adviser-international unconventional resources, Devon Energy, Houston.

Matt Williams, to exploration manager-North American exploitation business unit, Southwestern Energy, Houston. Previously senior staff geologist, Southwestern Energy, Houston.

Bruce A. Wright, to geological adviser, Devon Energy, Houston. Previously senior staff geologist, Meridian Resources Corp., Houston.

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

INmemory

Thomas A. Bay Jr. (EM '54)
Houston

Henry L. "Hank" Cullins, 76
Houston, Sept. 12, 2008

Tom Harland (AS '07)
Dhahran, Saudi Arabia

Ronald M. Hedberg, 73
Woodbridge, Conn.
Sept 24, 2008

Erwin K. Krause (EM '50)
Houston

Richard M. Riggs (AC '52)
San Antonio

Robert Stoneley, 79
London, England, Sept. 15, 2008

Jeffery F. Weber, 51
Broken Arrow, Okla.
June 24, 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.)

American Association of PETROLEUM GEOLOGISTS Annual Convention & Exhibition

7-10 June 2009
Colorado Convention Center
Denver, Colorado USA



Destination... Denver

A passion for the West lives on. Are you in?

Production is growing faster in the Rocky Mountain area than anywhere else in the United States, experts say. Not since the early 1980s has there been so much oil and gas activity, and Denver is reemerging as an energy epicenter. That means geoscientists are heading West — and you'll want to do so as well for the AAPG Annual Convention & Exhibition (ACE).

The American Association of Petroleum Geologists and its Divisions, along with SEPM (Society for Sedimentary Geology) and your host, the Rocky Mountain Association of Geologists, invite all energy industry professionals to attend this world-class event, 7-10 June 2009.

AAPG ACE highlights include:

- 950+ papers and posters for the Technical Program
- 25+ field trips and short courses
- Networking events
- 200+ exhibitions

The excitement is building...
make plans to head West!



www.AAPG.org/Denver

READERS' forum

Climate Change Forum

At the AAPG International Convention and Exhibition In Cape Town, South Africa, the AAPG Climate Change Committee hosted a public forum on climate change. Just over 160 AAPG members and spouses as well as Cape Town residents attended to hear the panelists offer their views on climate change.

And, like the forum held in San Antonio last June, each and every panelist presented the view that the latest trend of warming is human caused, no ifs, no ands and no buts.

We in AAPG recognize that there are many ifs, ands and buts. There are equally compelling arguments against a human cause for climate change, particularly when you exclude the use of computer models as scientific "proof."

So why did the Climate Change Committee assemble a panel of climate experts that deliberately excluded any panelists who do not advocate a human cause?

I cannot answer that question, as I resigned from the committee last year. The reason I resigned is that I felt a minority of committee members who feel strongly about human-caused global warming exert an overly strong influence on the committee. I am confident that these committee members would argue that by having a panel of like-minded thinkers they have served AAPG's best interests by showing society that AAPG is "open-minded" on the subject of human-caused global warming.

I would argue that not only did they fail to serve AAPG's best interests, they harmed them.

First of all, an "open-minded" forum should have had a balance of those who believe in human causes and those who argue for natural causes. Even one "skeptic" would have been more "open-minded."

Second, in a climate survey of the members of the Division of Professional Affairs (the Climate Change Committee would not approve of a survey of the membership as a whole), 48 percent of DPA members felt that climate change was due to earth's natural climate variation. An additional 37 percent felt that it was part natural and part man-made. Only 6 percent felt that climate change was human-caused. So in assembling a panel of supporters of human-caused climate change, the Climate Change Committee ignored the opinions of the majority of AAPG members.

Third, and most importantly, through these forums AAPG has helped to show the public that the energy industry is to blame for global warming. This opens the door for punitive legislation and possibly a tobacco-style lawsuit.

In my opinion, the AAPG Executive Committee should take one of two actions: direct the Climate Change Committee to present both sides of the argument in any future public forums or discourses, or disband the committee.

Bob Shoup
Kuala Lumpur, Malaysia

Map Quest

The caption of the picture of Scott Tinker next to the famous Pseudonodules in the Psammites du Condroz (page 64, November EXPLORER) has a serious geographic error.

The Psammites du Condroz crops out in eastern Belgium and Luxemburg. France and Germany are nearby, but Switzerland (as the caption stated) is at least 300 kilometers to the south!

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.

If AAPG truly aspires to be a global society, it behooves its staff to check world maps for accurate location before rushing to print. That way AAPG will be perceived as global rather than provincial.

George Devries Klein
Sugar Land, Texas



Challenge. Explore.

The University of Stavanger (UiS) has currently 8,000 students and 1000 staff and offers a variety of academic, research and development programs. UiS is located in the most attractive region in Norway with a dynamic labor market, inviting residential areas and exciting opportunities for leisure and culture. Stavanger has been designated by the EU as a European Capital of Culture for 2008.

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APPEX 2009 ▶ 3-5 March ▶ London

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Mark your calendar to attend the 8th annual APPEX London Prospect and Property Expo, 3-5 March 2009, at the Business Design Centre in London. APPEX is the perfect place to meet and network with a truly international audience of key industry senior managers and government representatives. APPEX brings together a who's who of host governments, NOCs and independent oil companies to speak and exhibit, so why make cold calls when you can network in person to form mutually beneficial business relationships?

The revised 3-day program includes:

- ▶ More Prospect Forum sessions
- ▶ More networking opportunities with longer breaks
- ▶ New themed speaker sessions to complement focused regional sessions

Day One: 3 March 2009

- ▶ Regional: NW European Session
- ▶ Prospect Forum
- ▶ Lunch
- ▶ Prospect Forum
- ▶ Finance Forum
- ▶ Sponsored Reception

Day Two: 4 March 2009

- ▶ Theme: Unconventionals Session
- ▶ Prospect Forum
- ▶ Lunch
- ▶ Prospect Forum
- ▶ Regional: Far East Session
- ▶ Sponsored Reception

Day Three: 5 March 2009

- ▶ Theme: Global Carbonate Potential
- ▶ Regional: Africa/ME Session
- ▶ Lunch (exhibition closes)
- ▶ Short Courses/Seminars
- ▶ Farmout Presentation
- ▶ Conference Closes

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POSITION AVAILABLE

**Chevron Energy Technology Company
Structural Geology Specialist**
www.chevron.apply2jobs.com

Chevron Energy Technology Company, headquartered in Houston, Texas, provides energy technology solutions and services to all Chevron operations and affiliates. Chevron is accepting online applications for the position of **Structural Geology Specialist**, located in San Ramon, California with expertise in characterization of fractured reservoirs or research experience with natural fracture systems. The Structural Geology Specialist will be working closely with engineers and earth scientists in reservoir management.

The qualified individual will possess a Ph.D. in Structural Geology; have experience with fractured reservoirs or considerable field experience with natural fracture systems, the willingness to learn image-log interpretation tools and UNIX-based work station interpretation systems and applications and have broad-based, general knowledge of petroleum structural geology. We are looking for applicants who have the willingness to engage fracture interpretation of cores, ability to integrate work with all disciplines, especially reservoir engineering, and contribute to team dynamics. Familiarity with oil-field reservoir management and aptitude to transfer knowledge and skills is essential. For full position information and application procedures, visit our website at www.chevron.com or apply online at www.chevron.apply2jobs.com.

**Chevron Energy Technology Company
Trap and Seal Analyst**
www.chevron.apply2jobs.com

Chevron Energy Technology Company, headquartered in Houston, Texas, provides energy technology solutions and services to all Chevron operations and affiliates. Chevron is accepting online applications for the position of **Trap and Seal Analyst**, located in Houston, Texas. The Trap and Seal Team supports exploration and production projects throughout the corporation.

The qualified individual will possess a M.Sc. or Ph.D., preferably with a focus on structural geology, stratigraphy, basin analysis, or fluid flow. We are looking for applicants who have a minimum of 5 years of petroleum industry experience, including experience evaluating trap integrity, geologic risk and fault or top seals. The qualified applicant will have the

ability to work independently and collaboratively with technical and operations teams and possess strong communication and presentation skills. This individual will have the opportunity to conduct independent project work and consult with business unit personnel as well as evaluate and design new technology solutions. For full position information and application procedures, visit our website at www.chevron.com or apply online at www.chevron.apply2jobs.com.

**Hires in Energy Geoscience
Jackson School of Geosciences
The University of Texas at Austin**

The Jackson School of Geosciences is expanding its program in Energy Geoscience by seeking outstanding scientists able to collaborate across disciplines and having expertise in one of the two following fields:

- **Rock mechanics or rock physics.** This research could be applied to exploration and development of unconventional hydrocarbons, the role of fluids in natural rock deformation, or improving seismic modeling. Approaches include experimental determination of stress-strain relations, microacoustic properties of stressed rocks, or the relationship of rock properties to their seismic P- and S-wave response.
- **Interpretive reflection seismology.** This research on sedimentary basins at either basin-scale or reservoir-scale would use industry or academic 2D and 3D seismic data. We seek individuals to span the gap between detailed mapping of seismic data and theoretical analysis to improve understanding of reservoir systems or sedimentary basins and their hydrocarbon systems.

Appointments include both faculty and research scientists. However, we are particularly interested in those seeking research scientist positions in either the Bureau of Economic Geology or the Institute for Geophysics. For more information on the school and its hiring program, visit us online at www.jsg.utexas.edu/hiring.

A Ph.D. is required at the time of appointment. An application should note the title of the advertisement you are responding to and include a cover letter, CV, list of publications, list of references, statements of research and/or teaching interests, sent to Randal Okumura, Office of the Dean / Jackson School of Geosciences, The University of Texas at Austin / PO Box B, University Station / Austin, TX78713 or

jobs@jsg.utexas.edu.

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**Alberta Geological Survey
www.ags.gov.ab.ca****Surficial Geologists Career Opportunities**

Alberta Geological Survey (AGS) provides geoscience information and expertise to government, industry and the public to support exploration, development, conservation and regulation of Alberta's energy, mineral and groundwater resources. Within the AGS Mapping Section, two additional geologists are needed to map and interpret the surficial geology of Alberta.

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Please visit www.ags.gov.ab.ca/employment.html for full job descriptions and for qualification and application details.

**The University of Iowa
Sedimentary Geology**

The Department of Geoscience at the University of Iowa invites applications for a full-time tenure-track position in Sedimentary Geology at the Assistant Professor level. The appointment will begin in August 2009. We seek an outstanding researcher and teacher whose approach is quantitative, integrative, and preferably field-based. Areas of interest might include but are not limited to: sequence stratigraphy, basin analysis, quantitative stratigraphy, clastic or carbonate sedimentology, petroleum geology, and depositional environments.

The Department and the College of Liberal Arts and Sciences are strongly committed to gender and ethnic diversity; the strategic plans of the University, College and Department reflect this commitment. Emphasis will be placed on the applicant's

potential to establish a successful, externally funded research program that complements existing strengths within the department (including climate change, geochemistry, paleontology, structural geology, tectonics, and natural resources) as well as interdisciplinary initiatives across the University. In addition to attracting and mentoring high quality graduate students, the successful candidate will be expected to teach at the undergraduate and graduate levels, including teaching a large general-education lecture course for the interdisciplinary Environmental Sciences BS program. Applicants should have a Ph.D. in hand by August 2009.

Women and members of underrepresented minorities are especially encouraged to apply. The University of Iowa is an affirmative action / equal opportunity employer.

Only online applications will be considered. Applicants should apply online at <http://jobs.uiowa.edu> (requisition number: 56283). Attachments to the application should include cover letter, curriculum vitae, and contact information for three letters of recommendation. Screening of applications begins January 9, 2009, and will continue until the position is filled.

**U.S. Geological Survey (USGS)
Positions Available
Research Geologist**

The USGS, Central Energy Resources Team, is soliciting interest from qualified individuals for two Research Energy Geologist positions in Lakewood, Colorado. Successful applicants will have qualifying education and expertise in one or more of the following: stratigraphy, sedimentology, structural geology, or basin evolution. He/she will conduct fundamental geologic research to evaluate and characterize the geologic framework and occurrence of a variety of geologic energy resources, including conventional and unconventional oil and gas, coal, and uranium. Research topics also address environmental effects of energy resource production, including impacts on hydrology and ecosystems. Candidates must be able to work as part of a multidisciplinary team of geologists, geochemists, geophysicists, and engineers. Excellent skills in writing and oral presentation of scientific findings are also required.

Applications (resume and application questions) for this vacancy must be received on-line via USAJOBS BEFORE midnight Eastern Time (Washington, D.C. time) on the closing date of this announcement. If you fail to submit a complete on-

continued on next page

**Petroleum Technology Transfer Council****2009 in the Rockies — A Power-Packed Year in Denver**

- CERA Natural Gas Conference - Calgary, Alberta, CA (Feb. 23-24)
- SPE Rocky Mountain Petroleum Technology Conference (April 14-16)
- Pennwell: Rocky Mountain Unconventional Resources Conference & Expo (April 14-16)
- AAPG's Annual Meeting (June 7-10)
- Rocky Mountain Energy Epicenter Conference (July 7-9)
- Enercom's The Oil & Gas Conference (Aug. 9-13)
- IADC Well Control Conference of the Americas & Expo (Aug. 25-26)

The AAPG-Powered PTTC is on the scene in the Rockies and across the U.S. delivering E&P-related technology information. Industry sponsors provide a foundation for the non-profit PTTC to continue and expand its services. Be a part of the Solution!. Contact Mark Stansberry (gtdmark@telepath.com), PTTC's Business Development, to see how your company can get involved. PTTC will work with you creatively to make good things happen.

For more information about PTTC, visit our website at www.pttc.org.

**PUBLICATIONS AVAILABLE
FROM THE PACIFIC SECTION AAPG**

- GB79 *Deep-Water Sandstone, Submarine Canyon to Basin Plain, Western California, 2004*, D. Lowe, This is an 11" X 17" spiral-bound book with color figures, 80 p. (3rd reprint). \$54
- MP47 *Stratigraphic Architecture of a Sand-Rich, Deep-Sea Depositional System: The Stevens Sandstone, San Joaquin Basin, California, 2003*, M. A. Louie, K. S. Kim, & S. A. Graham (eds.) (This is a 12" X 15" spiral-bound book with color and B/W illustrations) \$35
- MP49 *Tertiary Sequences of the Central San Joaquin Basin, California: Age Control and Eustatic Versus Tectonic Controlling Factors, 2005*, C.L. Johnson, R. B. Block & S. A. Graham, Color Poster 36 X 40". \$20
- MP50 *Reflections on the San Andreas & San Gabriel Faults—Striking Contradictions to Large Lateral Offsets, 2007*, R. H. Paschall & H. Waldron, 112 p. \$22
- CDW1 *Collection of Papers about the Oil, Gas and Solvent Rock Geochemical Investigations carried out in the San Joaquin, Santa Maria, Santa Barbara, Ventura and Los Angeles Basins, California; 1980-1995*, I. Koppal (ed), 4600 p. \$39
- CDW4 *Geology of Central California, 2007*, Ron Crane. \$39

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Additional information available at www.pisa.aapg.org

Search and Discovery Adds 77 Articles

Search and Discovery, AAPG's electronic journal, posted 77 articles during the month of October, including new regional articles on the Caribbean and subjects such as salt tectonics and shale gas resources.

Example articles on those three topics are:

- ✓ **Recent Activity in the Floyd, Neal and Chattanooga Shale Plays, Black Warrior Basin, Alabama and Mississippi**, by Kent A. Bowker.
- ✓ **Hydrocarbon Exploration Plays in the Great Caribbean Region and Neighboring Provinces**, by Alejandro Escalona, Paul Mann and Lisa Bingham.
- ✓ **Salt Tectonics in the Atlantic Margin of Morocco**, by Gabor Tari and Haddou Jabour.

Also, a complete listing of short abstracts from three October meetings have been posted. Those are:

- ✓ AAPG's just completed **International Convention and Exhibition**, held in Cape Town, South Africa. (And thanks to Mitch Harris, eight expanded abstracts presented in Cape Town were made available in advance and also are now accessible on the site.)
- ✓ The recent AAPG Eastern Section meeting, held in Pittsburgh.
- ✓ The recent AAPG Gulf Coast Association of Geological Societies meeting, held in Houston.

Check all of them out via the AAPG Web site, or just go directly to searchanddiscovery.net.

continued from previous page

line resume, you will not be considered for this position. Requests for extensions will not be granted. If applying on-line poses a hardship for you, please speak to someone in the Servicing Personnel Office listed on the announcement PRIOR TO THE CLOSING DATE. For assistance and questions contact the Office of Human Resources at 303-236-9586 or hdorsey@usgs.gov.

Effective November 21, 2008, USAJOBS can be accessed at <http://www.usajobs.opm.gov>. Announcement numbers are CR-2009-0074 and CR-2009-0075. These are full time permanent positions (Research Geologist, GS-1350-12/13) with a salary range of \$69,845-\$107,979 depending upon qualifications. The closing date is December 15, 2008.

U.S. Citizenship is required. USGS is an Equal Opportunity Employer.

Director of Science Services Integrated Ocean Drilling Program Texas A&M University

The College of Geosciences of Texas A&M University invites applications for the position of Director of Science Services for the Integrated Ocean Drilling Program (IODP) and, as appropriate, Professor in one of the departments in the College of Geosciences. We seek an individual who has a strong record of scholarship and research, experience with scientific project and program management, and exceptional organizational leadership skills. The successful candidate will have responsibilities for leadership within the IODP and the College of Geosciences. Screening of applications will begin on 1 December 2008 and continue until the position is filled.

Qualifications: Requirements for this position include a Ph.D. in the physical sciences with 15 or more years of experience in research and academic leadership. Desirable qualifications include: success in scientific program management, a general knowledge of and experience with the modern tools of program management, systems engineering and organizational leadership, familiarity with IODP and national and international program planning procedures and execution, a vision for enhancing cooperation between IODP and other national and international scientific programs, demonstrated ability to cooperate and achieve results across a broad array of cultures and educational levels, and experience with academic-industry partnerships. The position involves extensive national and international travel.

Application Information: Please submit a resume or CV with the names and contact information of five individuals from whom letters of recommendation can be obtained. Please send electronic submissions to mccannon@iodp.tamu.edu or by mail to:

IODP Director Search Committee
Integrated Ocean Drilling Program
Texas A&M University
1000 Discovery Drive
College Station, TX 77845

Texas A&M University is an equal opportunity, affirmative action employer committed to diversity.

GEOPHYSICIST FACULTY POSITION

The Department of Geology and Geography at West Virginia University invites applications for a **geophysicist** at the assistant to associate professor level depending on qualifications. The area of geophysical specialty is open but should complement ongoing departmental research and the WVU Advanced Energy Initiative. Department research interests include geologic carbon sequestration investigations of active pilot sites, reservoir characterization, and the influence of fracture systems on fluid flow and seismic response. The successful applicant will contribute to teaching at the undergraduate and graduate levels, and is expected to develop a vigorous externally-funded

research program. Visit <http://www.geo.wvu.edu/files/Geophysics08.pdf> for a full description of the position. Review of applications will begin January 15, 2009 and will continue until the position is filled. The anticipated start date is August 15, 2009. Please see www.geo.wvu.edu, www.wvu.edu, and www.morgantown.com for additional information. West Virginia University is an Equal Opportunity/Affirmative Action employer. Women and minority candidates are encouraged to apply.

Petroleum Geoscientist Position

The Department of Geological Sciences at the University of Texas at El Paso (UTEP) has a tenure-track faculty position in the broad area of the petroleum geosciences. Fields of specialty could include, but are not limited to sedimentary geology, geochemistry, geophysics, or reservoir characterization. We expect to hire at the assistant professor level, however, candidates with exceptional qualifications, including industry experience, may be considered for a higher rank. The successful candidate will have a PhD in the geosciences or closely related disciplines and will be expected to establish a funded research program, to mentor undergraduate and graduate students in research, and to teach introductory earth science as well as higher-level courses in the candidate's specialty.

THE DEPARTMENT: The Department of Geological Sciences has a faculty of 15 and enrollment of more than 100 graduate and undergraduate students. The department is housed in an attractive, 90,000 sq. ft. building that contains faculty and student offices, laboratory and classroom space with analytical facilities that include: Electron Microprobe, MC-ICP-MS, ICP-MS, ICP-OES, INAA gamma detector, UV spectrophotometer, TOC/TN analyzer, class 100 clean room, and geophysical equipment/computing facilities. More information about the activities and facilities in the department can be found at our web site: <http://www.geo.utep.edu>. The department also participates in interdisciplinary PhD programs in Materials Science Engineering, Environmental Science and Engineering and Computational Science.

APPLICATION PROCEDURE: Review of applications will begin in January 2009 and continue until the position is filled. Anticipated appointment date is Fall 2009. Applicants should submit (electronic submission only) a letter of application, detailed curriculum vitae, names of at least three references, and a statement of teaching and research to: Please submit electronic application to: miller@utep.edu. **Include "Faculty Position Application: YOUR NAME" in the "Subject" block in your e-mail submittal.**

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See **Classifieds**, next page



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AM Session:
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PM Session:
Practical Applied Methods of Characterization

Tuesday, February 10
AM Session:
The Haynesville/Bossier - A major US Gulf Region Mudstone Systems under Investigation
PM Session:
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Classifieds

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Plano office. There could be some travel required. This position will report to the Manager of Geology for the Louisiana, Texas, and Jackson Dome Geological Group. This geologist will be teamed with a Senior Geologist within Denbury who is responsible for the exploration and development of CO2 reserves and who in turn is on the Jackson Dome team which is responsible for the deliverability of CO2 to Denbury's oil fields. Preferred candidate should possess a diverse background of research and industry experience.

GENERAL REQUIREMENTS:

1. Strong geological mapping and data management skills for handling regional and field scale work.
2. Must be detailed oriented and generate accurate work.
3. Must be able to achieve results.
4. Needs to possess good communication skills, presentation skills, and work within a team that includes reservoir and operation engineers, geological and engineering technicians,

geophysicists, and landmen.
5. Duties include well site geology.
6. Self-motivated, creative.

EDUCATION / INDUSTRY REQUIREMENTS:

1. Minimum of B.S. in Geology, M.S in Geology a plus
2. Minimum of three to six years of industry experience.

QUALIFICATIONS:

1. Gulf Coast Mesozoic and Jurassic exploration and / or development experience a must.
2. Carbonate experience in Mississippi, South Arkansas, and North Louisiana would be a plus.
3. Has good understanding of depositional environments.
4. Worked with the Geographix program.
5. Has the ability to do basic seismic interpretation in the SMT Kingdom program.
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General Duties:

- Mapping and data management skills at the large field level

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Education/Industry Requirements:

- Minimum BS degree in Geology
- 8+ years active exploitation (production geology) experience

Qualifications:

- Gulf Coast experience a must
- Mississippi Interior Salt Basin experience a plus
- Proficient in Geographix (geoatlas, cross-section, prism and well base)
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- Possess good analytical, communication (verbal & written) and presentation skills

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Evolution of Sedimentary Systems
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The Department of Earth and Planetary Sciences at McGill University invites applications for up to two tenure-track positions in evolution of sedimentary systems. One of the hires will be appointed the T.H. Clark Chair in Sedimentary and Petroleum Geology. Our preference is to make the appointment at the Assistant Professor level; however, outstanding candidates at higher ranks are encouraged to apply.

Applicants with interdisciplinary research interests, including but not limited to sedimentology, geophysics, tectonics, landscape processes, earth surface dynamics, basin architecture and evolution, quantitative geomorphology, and paleoenvironments, are encouraged to apply. We particularly seek individuals who employ integrative approaches to sedimentary systems through fieldwork, laboratory experiments, and/or numerical modeling, as well as individuals who address the complex interactions and feedbacks among physical, chemical, and biological processes of sedimentary systems.

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McGill University is committed to equity in employment and diversity. It welcomes applications from indigenous peoples, visible minorities, ethnic minorities, persons with disabilities, women, persons of minority sexual orientations and gender identities and others who may contribute to further diversification. All qualified applicants are encouraged to apply; however, in accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada.

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- Perform prospect identification, evaluation and ranking.
- Generate new exploration concepts, formulate exploration program and identify target markets or assets for exploration and development strategy.
- Provide technical expertise/counseling to management and colleagues within/outside new ventures department.
- Assist manager in planning and monitoring departmental work plans/budget as well as maintain appropriate work procedures and methodology for efficiency and capability development. Also ensure the high capability and update of technology on exploration geology.
- Take part in technical meetings with partners where joint studies are performed.

- Coach, motivate and develop junior staff in order to improve their skills to fulfill their job requirements. Conduct technical training to explain geological concepts and share technical knowledge with the team.

Qualifications:

- Bachelor's degree or higher in Petroleum Geology or a related field.
- 10-15 year's experience in petroleum geology in a new ventures or hydrocarbon exploration work environment.
- Specific work experience in S.E. Asian, N. African, Middle East and CIS basins preferential.
- Good command of both written and spoken English (Minimum TOEIC Score Requirement : 750)
- Ability to operate workstation software (application to petroleum exploration & production)
- In-depth knowledge of a particular discipline & broad knowledge of other disciplines.
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Assistant or Associate Professor in Hydrocarbon Geoscience



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Chairs of the Hydrocarbon Geoscience Search Committee
Geology and Geophysics Dept., University of Utah
135 South 1460 East, WBB 719
Salt Lake City, UT 84112

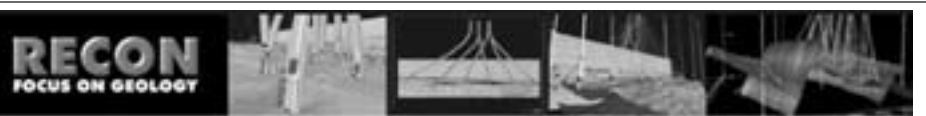
Complete applications may also be sent in PDF format by email to Kristin.Christensen@utah.edu. Questions can be addressed to [Cari Johnson \(Cari.Johnson@utah.edu\)](mailto:Cari.Johnson@utah.edu) or [Ray Levey \(RLevey@egi.utah.edu\)](mailto:Ray.Levy@egi.utah.edu).

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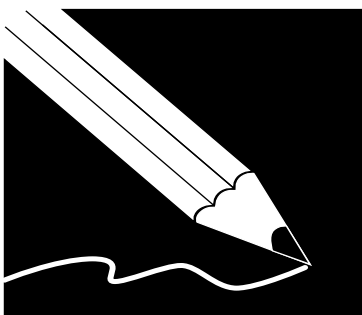
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DIRECTOR'S CORNER

Cape Town Inspired New Ideas

By RICK FRITZ

I travel quite a lot each year, and there always are a few places in the world that are especially unique and attractive. I found one of those places when I traveled to Cape Town, South Africa, in October for the 2008 AAPG International Conference and Exhibition (ICE).

Cape Town is exceptional in its geological and geographical setting – and most of all, in the hospitality of its people.

Over 1,950 participants came to Cape Town, and by all accounts the technical program was special, offering a broad selection of papers. In addition, the committee added several new programs, including forums on work force, global climate change and a socio-technical debate on the Indonesian Mud Volcano (see related story, page 32).

One of the best results of any ICE is the effect that they have on the Region where it was held. AAPG's Africa Region, led by James Agbenorto, of Ghana National Petroleum, has started a new phase of development.

The diversity of its officers speaks to its newly installed leadership: They include vice president Haddou Jabour, of ONHYM; president-elect Nosa Omorodion, Schlumberger; and secretary/treasurer Adedoja Ojelabi, of Chevron Nigeria.

* * *

Also key to any meeting is capturing those new ideas generated by the networking of people who may have different perspectives on the society and the world in general.

One of these ideas was expressed in Cape Town during the President's Council meeting – a new council developed by



Fritz

AAPG President Scott Tinker that meets at AAPG's major meetings to discuss strategic issues and major tactical programs. Invitees to each council meeting include Executive Committee members, Division presidents, Region and Section presidents plus special invited committee chairs or other guests.

In Cape Town several expressed concern that AAPG's Corporate Group Membership may not be affordable for smaller companies and institutions – especially in developing countries. The Corporate Group Membership is a three-year contract for dues plus discounts on AAPG's digital products and educational service.

The minimum number of members for the Corporate Group Membership is 50 and, although there is no upper limit, the maximum number of members has been by PetroChina and Petronas at 200 total.

The reality is many small companies and especially government institutions in developing countries are not large enough to qualify, and at least initially cannot afford full dues and the digital data.

AAPG doesn't want to miss opportunities for new "groups" of members, so it was suggested that a new "group" membership be formed.

Key to any meeting is capturing those new ideas generated by the networking of people who may have different perspectives on the society and the world in general.

The concept is that for groups of five to 50 members AAPG would provide a group membership based on graduated dues. The term of the agreement will be for three years. In this case there would be no discount on AAPG digital products or services.

The council agreed to send AAPG names of companies and institutions plus their respective contacts for the proposed new program. The AAPG Executive Committee will need to vote to form the new "group" membership.

A second major idea came from conversations with Nahum Schneidemann and others concerning AAPG operations and relationships with affiliated societies. It was noted that often volunteers try to start AAPG "grassroots" activities with great interest from a core of six to seven local AAPG members. When asked how to form a grassroots organization the answer has been to "start an affiliated society or work with an affiliated society."

But many times an affiliated society is not available. And when a core group tries to organize new affiliated societies they often run into multiple roadblocks, including significant legal restrictions and numerous approvals from the government and even companies. In addition it can be

costly to incorporate. Efforts have died due to lack of funds or just too much trouble.

As a result the discussion focused on developing local "technical groups" where affiliated societies are not available. These groups could organize quickly to hold local talks and be the catalysts for workshops and other educational opportunities.

Once organized they could also work with staff to develop Distinguished Lecturer and Visiting Geoscientist tours, plus provide concepts for new publications.

These two ideas have been sent to the AAPG Executive Committee for consideration. If you would like comment on the concepts please feel free to write me or drop Scott Tinker a note.

* * *

Once again I thank the Cape Town Organizing Committee – led by general chair Siphon Mkhize and general vice chair Jeff Aldrich – for their hard work and support. I especially thank PetroSA for its sponsorship of the meeting and the Geological Society of South Africa for hosting the ICE 2008.

I also thank the people of South Africa for their hospitality and kind spirit to all "we" geoscience travelers around the globe.

As always, we appreciate those ideas that help improve and advance our Association.

Most pressing environmental problem?

Perspectives from the Freshmen

By REBECCA L. DODGE
DEG President

This semester, for the first time, I am teaching a freshman-level environmental science class for a diverse audience. My previous environmental science classes have been taught for those intending to be K-5 teachers.

This semester's majors comprise 46 percent business administration, 21 percent fine arts, humanities and social sciences, and 13 percent human services. Ten percent each fall into "undecided" and science/math fields, respectively, with 9 percent being environmental science majors.

The first assignment on day one was to write what they believed was the most pressing environmental problem facing the world today. Much to my surprise, global warming did not "win." In fact, approximately 30 percent of the class cited "pollution" as the most significant issue. Air, water and landfill pollution and their impact on plants, animals and humans were all cited.

Global warming did come in second, with slightly less than 20 percent of my students identifying that issue as most important. Sea level rise and impacts on animal populations were cited as resulting dangers.

Depletion of our natural resources, in particular petroleum resources, was the top concern for 10 percent of the class. Renewable energy sources were cited as



Dodge

the solution for this depletion. Habitat loss for plants and animals ranked equally with resource depletion.

Hunger, overpopulation and water resource problems garnered one vote each; ignorance was cited by two students.

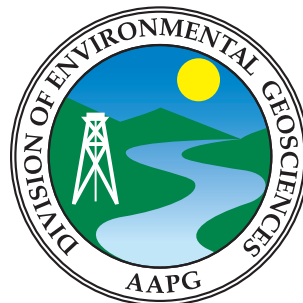
I was reassured by these results. Perhaps the incessant media focus on the horrors of global warming has not drowned out our ability to recognize the real environmental challenges facing our world.

I will share with you two of the more cogent of my students' comments:

✓ One of my environmental science majors held that "acting on environmental changes (making major decisions to counteract or react to the environment) without being informed enough and without being confident in those decisions is at the forefront of environmental problems."

✓ Another student stated that "some say global warming is the biggest problem, but even that's debatable. Human ignorance is worse."

I believe that the students in my class have shown, through their identified concerns, that they are not uninformed – and that they are not simply accepting what (scientists in) the media propose as the top environmental problem facing our



planet. They recognized other real issues even before taking the environmental science class, and I hope to broaden their horizons further during this semester.

* * *

I suspect that many of you reading this column may have been as surprised as I at the range and ranking of issues cited by my class, especially given the largely non-science-majors population in the course.

Perhaps it's related to location – Midwestern State University is in the "oil patch" (Wichita Falls, Texas), so perhaps the local geosciences community focus on practical resource extraction filters out into the general community? I'd like to think so, and like to facilitate that through my teaching and outreach.

I recommend that you do so as well – share your environmental focus issues with your community through any available venue. As a resource exploration

geoscientist, you have unique knowledge – about the potential for renewable resources to replace hydrocarbon resources (any time soon), about the costs and time frame to bring new resources into distribution, about the economic risks of restricting exploration and development and also about the fact that climate change is a natural process with a billion-years-long history that is not "caused" by human activity alone.

Finally, I urge you to Google "top ten environmental problems;" this should take you to a blog posting from 2006, based on a survey of ecology graduate students, in which global climate change is number nine of 10 (with one being the most significant). What is missing from this really rather rational list is **energy**, and the threat to economic security that a reduction in energy availability poses.

Without economic strength and stability, for which energy availability is a cornerstone, we cannot address any of these environmental problems effectively. The link between energy and the environment receives primarily a negative spin, when in fact energy availability will enable environmental protection.

Share this perspective with your community! □

(Editor's note: Rebecca Dodge is associate professor of geosciences at Midwestern State University, Wichita Falls, Texas.)

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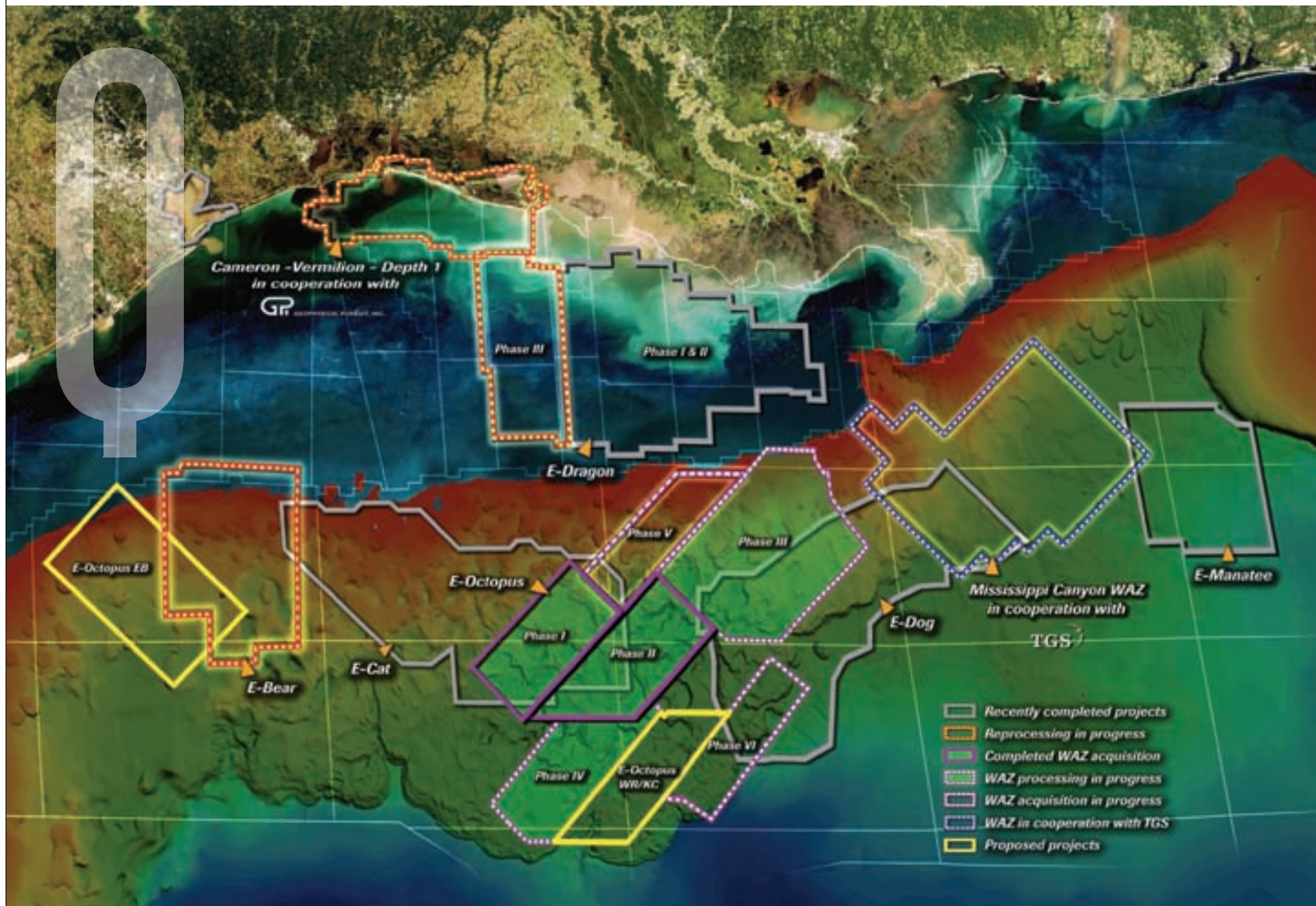
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