

**INTERNATIONAL**  
**2006**



**AAPG** AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, AN INTERNATIONAL ORGANIZATION

# EXPLORER

OCTOBER 2006



**Sakhalin: Which Way Is It Going?**

See page 6

# illuminating innovations



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**On the cover:** The Lunskoye LUN-A platform, located 15 kilometers off the northeast coast of Russia's Sakhalin Island, is a drilling and production facility that operates in 48 meters of water. The big question surrounding Sakhalin operations is no longer whether there will be success, but who will best benefit. See story on page 6. Photo courtesy of Sakhalin Energy Investment Co.

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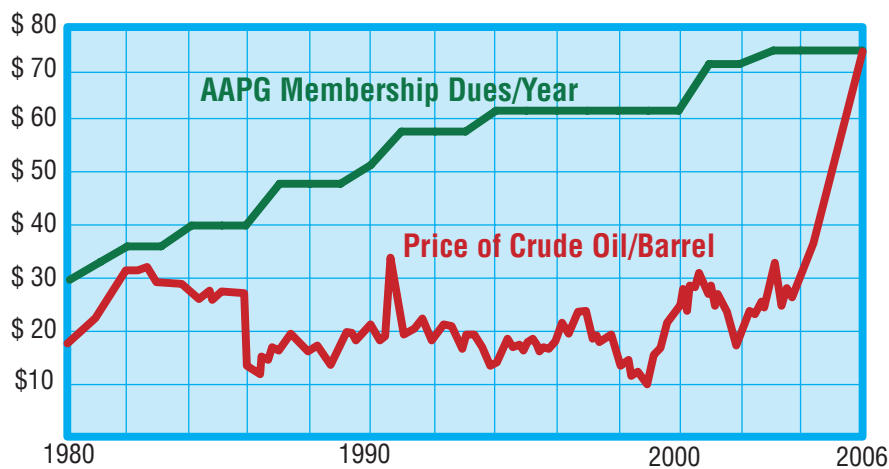
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**PRESIDENT'S COLUMN**

**Products, Services Benefit Members**

By LEE T. BILLINGSLEY  
In August I attended the North American Prospect Expo in Houston, also known as Summer NAPE (see related story, page 38). The show was a success with over 500 booths and 5,000 attendees, and it provided a great opportunity as president of AAPG and vice president of Abraxas Petroleum to visit with a wide variety of geologists.

I was surprised to receive a recurring comment from geologists and attendees: "Thank you for serving as president of AAPG."

Wow! Sometimes the leadership of AAPG and the staff focus so much energy on why geoscientists are **not** members that we forget about all the appreciative ones that **are** members. I felt very gratified and inspired by the appreciation.

I ask all readers of this column to thank someone who is serving on behalf of your profession. It will help them do a better job. That includes your local societies, House of Delegates members, committee chairs, AAPG staff, etc.

**Question:** What is free for the giver, but valuable to receiver; frequently gets returned; and everyone has an unlimited supply?

**Answer:** "Thank you."

\* \* \*

Reflecting on why geologists would thank me for serving AAPG, they obviously feel that their professional association is important. But what do we do that is so important?

First, we offer products and services that directly benefit members.

The direct benefits are expanding and improving so rapidly that one of our big challenges is to communicate the new benefits to members. I think most prospective member decisions to join are based on these direct benefits, such as BULLETIN articles, the EXPLORER, access to conventions, short courses, digital library and search capability,



Billingsley

Foundation Library, group insurance, certification, etc.

Any geologist or company that cannot derive at least the value of one barrel of oil per year per membership (approximate cost of our most expensive membership) is simply not using AAPG's available resources. If you

consider AAPG's entire revenue from dues of \$1.7 million divided by the price of a barrel of oil (about \$70), we only need to help members find an additional 24,000 BO/year to "payout" our entire dues cost.

With such a cost-efficient, productive organization, no wonder people are thanking me for serving.

Second, AAPG offers many indirect benefits that accrue both to current and future members.

If you look beyond your own personal needs, how does AAPG contribute to global energy supply? AAPG's areas of contribution include these specific examples:

- ✓ **Creator and curator of technical data** – BULLETIN, special publications, Datapages (digital publishing of all AAPG inventory plus an increasing volume of publications from affiliated societies), new and growing geospatial library.

- ✓ **Connecting professionals** – Annual North American and international conventions and exhibitions, the EXPLORER magazine, prospect expos (Winter NAPE, Summer NAPE and London APPEX), regional conferences (GEO in Baharain, recent European conference in Mallorca).

- ✓ **Continuing education** – Oral and

See **President**, next page

**Candidates' Bios, Responses Online**

Biographies, pictures and statements from all candidates for AAPG office are now available for viewing on the AAPG Web site, [www.aapg.org](http://www.aapg.org).

The candidates were given the opportunity to respond briefly to the subject: "Why I Accepted the Invitation to be a Candidate for an AAPG Office." Responses and biographical

information were provided by each candidate and edited only for grammar, spelling and format.

This information, which will remain online through the election period, also will be provided as hardcopy in the January EXPLORER.

Online balloting will be made available in the spring of 2007. Ballots will be counted on May 16. □

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## New Distinguished Instructor Program Unveiled

A new program designed to help in the dissemination of science is being offered to geological societies by AAPG.

The AAPG Distinguished Instructor program, intended to complement the Distinguished Lecture program, will comprise half-day, full-day and/or two-day short courses as opposed to one-hour lectures.

The program will feature annual domestic and international tours.

Although offered only to geological societies for its inaugural season, officials plan to eventually make it available to university departments, and to expand the program to include up to three speakers annually for both the domestic and international arenas.

The first Distinguished Instructors are:

□ **Frank Peel**, with BHP Billiton in Houston, will be the first domestic DI speaker. He received the George C. Matson Award for the best oral presentation at the 2003 AAPG Annual Convention in Salt Lake City.

The title and details of his course will be announced later.

□ **Vitor Abreu**, with ExxonMobil Exploration in Houston, will be the first international DI speaker, and he will offer a two-day short course on "Sequence Stratigraphy for Petroleum Exploration."

Abreu's course is a "hands-on" introduction to the concepts and practical applications of sequence stratigraphy. The course, using a mix of lectures and in-class exercises, covers:

- ✓ Basic concepts and terminology.
- ✓ The stratigraphic building blocks of depositional sequences.
- ✓ Recognition criteria for the identification of depositional sequences and their components in outcrops, cores, well logs and seismic.
- ✓ The application of sequence stratigraphy in non-marine, shallow marine and submarine depositional settings.
- ✓ Implications in petroleum exploration.

Details on the DI tours are yet to be announced. For more information contact Karen Dotts at AAPG, 919-560-2621; or e-mail [kdotts@aapg.org](mailto:kdotts@aapg.org). □

## President

from previous page

poster papers at conventions, short courses, field trips, research conferences.

✓ **Recruitment of new professionals** – Visiting Geoscientists Program, student grants, student job expos, AAPG student chapters, Youth Education Activities (educational materials and instruction for pre-college age).

✓ **Public education** – Public Outreach Committee and GEO-DC office.

The above list shows that AAPG is much more than the BULLETIN and EXPLORER, a member's most frequent, visible and direct benefits. Having a large, vibrant membership allows us to develop new products and services and to deliver them globally.

For example, many petroleum geoscientists view prospect expos like the one I just attended as one of their most important business venues. Professional associations, including AAPG, began all such expos.

Looking forward, AAPG can fulfill a critical role in supplying world energy by technically enhancing geoscientists worldwide and providing a medium for professional exchange. Our role applies to both current and future geoscientists.

Take heart, if the papers in last month's BULLETIN did not seem to apply to your current work project or you did not have time to read the EXPLORER; your dues were still being applied to the good of all mankind – and the profession.

\* \* \*

In my short time as president I have frequently received input in the form of questions and suggestions, and I have learned to ask the question, "What do you want me to do?" It is simply a method to distill requests into potential actions. To turn that around at the end of this column, even though you did not ask, I will answer that question.

If you are a member, I want you to recruit at least one new member.

If you supervise geoscientists, I want you to invite and encourage them to join and recruit at least one new member.

If you are a corporate manager, make it company policy to reimburse membership dues or recruit 100 or more members through our Corporate Membership category (contact AAPG Member Services for details).

If you are a member in academia, recruit a colleague and encourage all your students to join (membership fees for students will be reimbursed).

Anyone can print application forms off the Web site ([aapg.org](http://aapg.org)), or simply apply online.

Some geoscientists with low incomes do have trouble paying their dues. Within the next few months the Executive Committee will review a report from the ad hoc Graduated Dues Committee and prepare a recommendation on dues structure for consideration by the House of Delegates.

Last month I did recruit a former classmate of mine to join as an Active member. Welcome, Steve.

Who will be my next happy convert?

'Til next month,



P.S. AAPG-sponsored student job expos take place in early October in Laramie, Wyo., Buffalo, N.Y. and Houston (see page 34). Check AAPG's Web site for details – it might not be too late to sign up.

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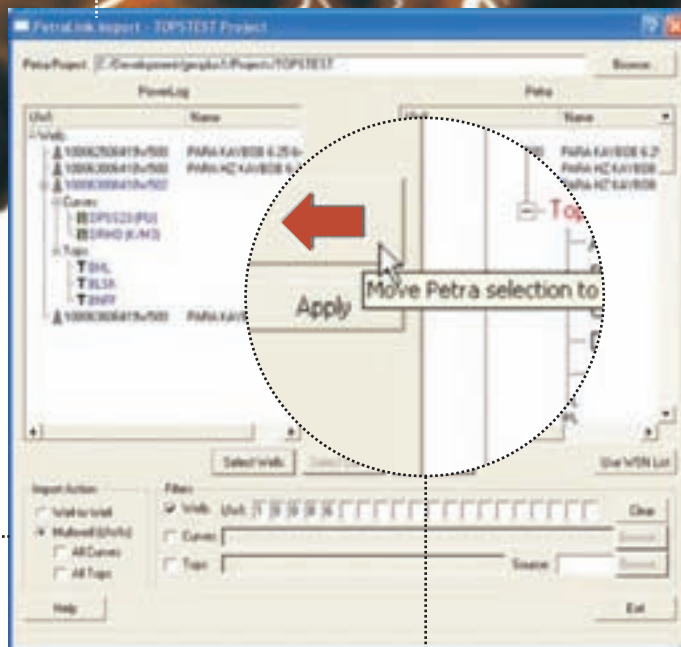
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Meanwhile Gas Flows, Drilling Continues

# Politics Pose Sakhalin Questions

By DAVID BROWN  
EXPLORER Correspondent

Call it a Russian miracle.

Despite political, environmental and economic pressures, Russia's Sakhalin oil and gas projects continue to advance.

The Sakhalin-1 project began exporting light, sweet Sokol crude oil to Japan in September.

Sakhalin-1 is expected to generate about 250,000 barrels of oil per day by mid-2007.

New oil sources and engineering improvements, combined with OPEC limits on Saudi output, have made Russia the world's largest oil producer.

The Sakhalin-2 project will add a major LNG export capacity for the country.

A loading platform and jetty were recently completed for Sakhalin-2, scheduled to begin LNG plant operations in 2008.

ExxonMobil holds a 30 percent interest in the Sakhalin-1 project consortium, and Shell currently has a 55 percent interest in Sakhalin-2.

But how much non-Russian companies will be allowed to benefit from Sakhalin development remains to be seen.

Russia's grip-tightening on its domestic oil and gas industry could alter the future for foreign participants.

AAPG member Gregory Ulmishek served for years as the U.S. Geological Survey's expert on Russian resources. When he retired and joined Direct Petroleum in Denver, he began looking at small plays in Russia.

His contacts and background give him a uniquely clear view of today's situation in the Russian oil and gas industry.

"It's my general feeling," he said, "that nobody knows, for certain, what happens now."

## Defining the Play

Sakhalin Island, narrow and elongated, stretches roughly north-south off Russia's southeastern coast. It sits at the south end of the sea of Okhotsk, just north of Hokkaido, the northernmost of Japan's main islands.

As many as nine major exploration and development projects are proposed for the Sakhalin area.

Negotiations for Sakhalin-1 and Sakhalin-2 development began in the



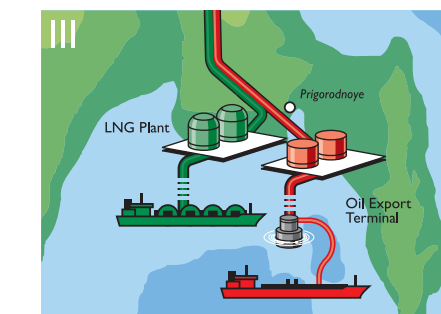
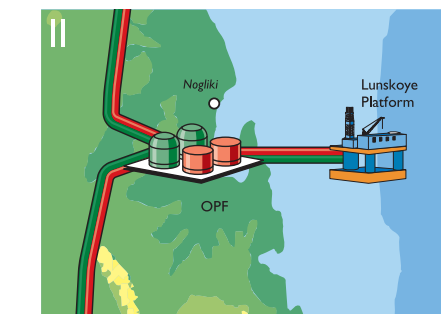
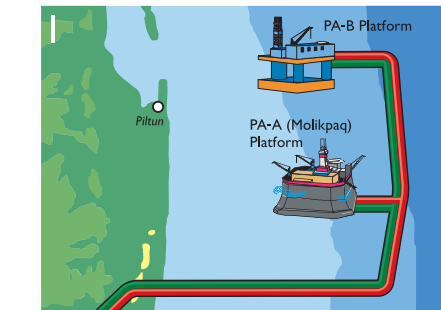
An overview of operations at Russia's Sakhalin Island, including platform locations.

1990s. Russia signed its first Production Sharing Agreement (PSA) for Sakhalin-2.

Sakhalin-1 includes the Chayvo, Odoptu and Arkutun-Dagi fields, with estimated recoverable reserves of 2.3 billion barrels of oil and 17.1 trillion cubic feet of gas. Production at Chayvo began Oct. 1, 2005.

Partners in the Sakhalin-1 consortium are operator Exxon Neftegas Ltd., 30 percent; Japanese company Sakhalin Oil and Gas Development, 30 percent; India's ONGC Videsh Ltd., 20 percent; and two affiliates of Russia's state-owned Rosneft – Sakhalinmorneftegas-Shelf, 11.5 percent, and RN-Astra, 8.5 percent.

The consortium recently commissioned a 24-inch, 140-mile pipeline that will move Sakhalin oil west to the new, year-round DeKastri loading



Graphics, photos courtesy of Sakhalin Energy Investment Co.

terminal in the Russian Far East.

Sakhalin-2 now draws most of the international industry's interest, for two reasons:

✓ First, work there has progressed fairly rapidly toward the beginning of commercial export two years from now.

✓ Second, some observers believe Russia is creating obstacles for the project in hopes of gaining more control for domestic companies.

China Petroleum and Chemical Corp. (Sinopec) has begun exploration drilling in the Sea of Okhotsk for the Sakhalin-3 project, under a Sinopec-Rosneft joint venture.

Sakhalin-4 and Sakhalin-5 offer exploration opportunities over several large structures, primarily in the island's northern waters.



Sakhalin-6 includes a tract offshore the island's east coast, with large, seismically defined anticlines. Seismic also has shown evidence of structural-stratigraphic traps in the Sakhalin-7 project area, southeast of the island.

Sakhalin-8 and Sakhalin-9, west and south of Sakhalin Island, remain largely undefined but may contain promising sand reservoirs.

## 'Projects ... Progressing Well'

Work at Sakhalin-2 now focuses on building out the project's LNG and processing facilities and developing the 18.2 Tcf Lunskeye gas field, which will produce most of the gas for the LNG operation.

Ivan Chernyakhovskiy is principal spokesman for Sakhalin-2 developer Sakhalin Energy Investment Co.

"Our Phase 2 development is 75 percent complete, consuming some 60 million man-hours per year, with approximately 17,000 people in Sakhalin employed on the project," Chernyakhovskiy said.

"All these projects are progressing well, even though such scope of work in a severe frontier environment is unprecedented for the world oil and gas industry," he noted.

Chernyakhovskiy said Sakhalin-2 development requires "simultaneous execution of several major multi-million dollar, complex-engineering mega-projects," including:

✓ A second production platform on the Piltun-Astokhskeye Field, in addition to tying in the existing Molikpaq platform for year-round production.

✓ A platform on Lunskeye, capable of producing up to 17 Bcm/year of non-associated gas.

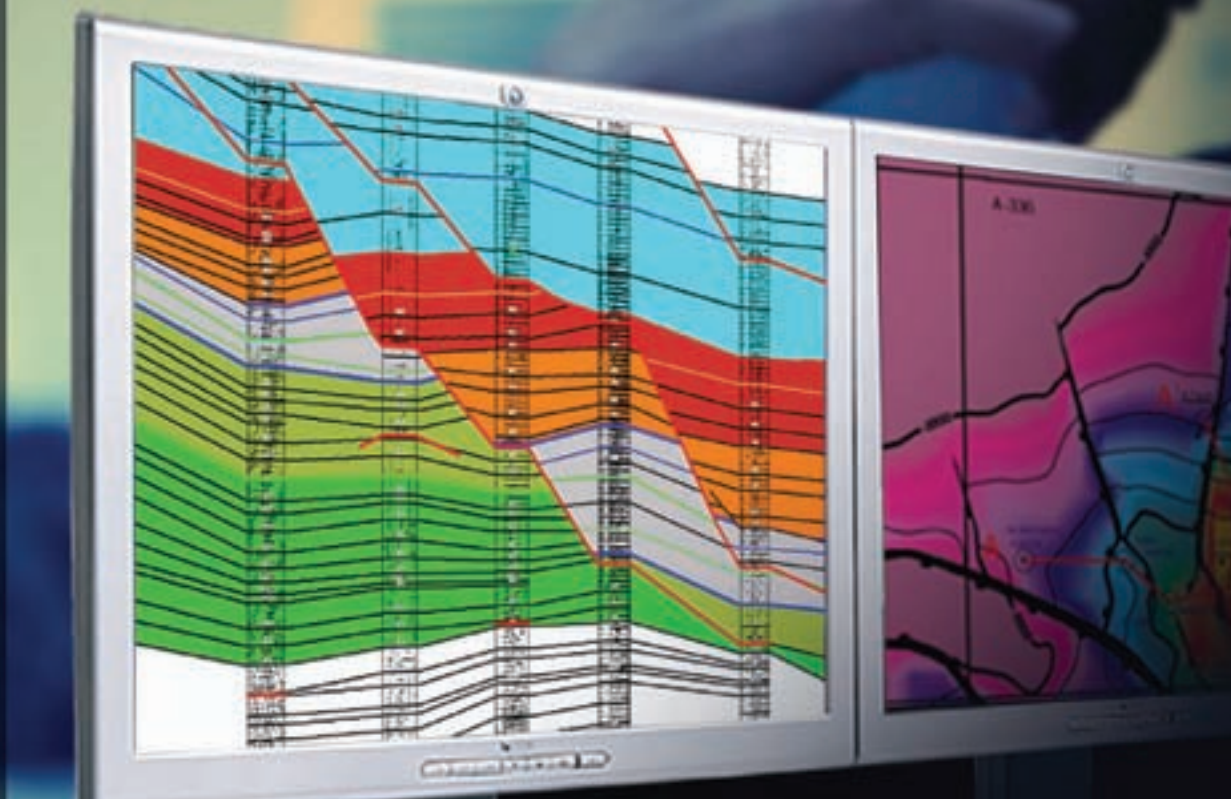
See **Sakhalin**, page 8



The view from above: The Sakhalin-2 LNG plant site at Prigorodnoye (left), at the southern end of Sakhalin Island; right, an onshore pipeline, winding through the countryside.

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## Sakhalin

from page 6

- ✓ An onshore processing facility for the gas and condensate from both fields.
- ✓ 300 kilometers of offshore pipelines.
- ✓ 1,600 kilometers of oil and gas pipelines to the south of the island, capable of delivering 18 bcm/year.
- ✓ An oil export facility.
- ✓ The first LNG plant and associated export facilities in Russia, including two trains (liquefaction units) with a total capacity of 9.6 million metric tons per year.

"And, of course, island infrastructure upgrades and construction required for implementing all the above in a frontier environment and severe conditions," he added.

Although the LNG plant is still under construction, most of its future capacity is already sold under long-term contracts, according to Chernyakhovskiy.

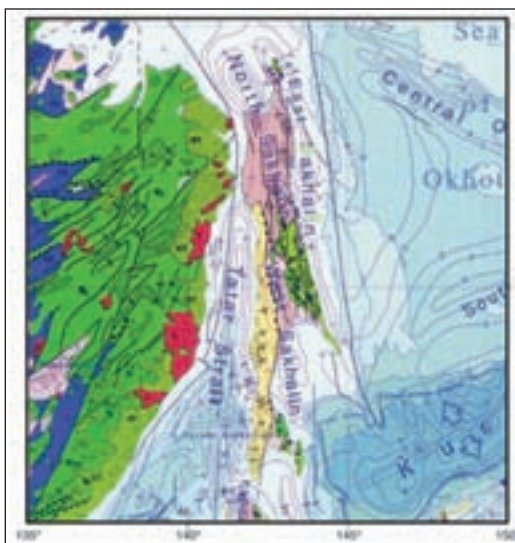
"The company anticipates signing binding Heads of Agreements for the remaining gas in the near future," he said. "First LNG shipments are planned for the summer of 2008."

Shareholders in Sakhalin Energy are Shell Sakhalin Holdings BV, 55 percent; Mitsui Sakhalin Holdings BV, 25 percent; and Mitsubishi Corp. subsidiary Diamond Gas Sakhalin BV, 20 percent.

### Bright Future

Russian environmental agencies have mandated several changes to Sakhalin-2 plans, including significant rerouting of pipelines, and have even called for suspension of development.

That may – or may not – represent Russian pressure for a larger domestic share of the project.



The geologic setting for two giant fields of Sakhalin Island. The basins are: North Sakhalin, East Sakhalin, West Sakhalin, Tatar Strait, Kurile (partial, bottom right), Central and South Okhotsk (right), Sea of Okhotsk (right) and Tempoku (bottom). Basin type most responsible for giants classified here as right-lateral strike-slip motion between the North American and Eurasian plates. Age of orogenic belts: purple (PM) = Pennsylvanian to Lower Triassic; green (M2) = Upper Jurassic to Upper Cretaceous.

Graphic from AAPG Memoir 78, *Giant Oil and Gas Fields Of the Decade 1990-1999*

"I'm sorry to say the situation looks to me in recent years more nationalistic," Ulmishek commented. "Not nationalistic in the full sense, but to try to keep outsiders out of the petroleum play in the country."

"They have put a lot of effort to make a state company, Rosneft, a principal player," he said. "It seems that Rosneft becomes stronger and stronger in that market. And rules, actually, in that market."

Russian giant gas company Gazprom reached an agreement with Shell to take a 25 percent interest in Sakhalin-2 in exchange for an interest in selected Siberian properties, but that agreement faltered when Shell doubled its cost estimate for Sakhalin-2.

"In 2005, we announced a revised cost estimate for Phase 2 of the order of \$20 billion for the full project to 2014. This cost revisions was, and still remains, our best estimate," Chernyakhovskiy said.

According to Chernyakhovskiy, overall development costs for Sakhalin-2 are

approximately \$5-6 per barrel, including capital expenditures for infrastructure upgrades, the LNG plant and export terminal.

"Assuming a forward oil price of \$34 per barrel, the project will generate some \$50 billion of benefits to Russia over its lifetime," he said.

"And since the current price of oil is much higher, there is potential to increase revenues even further," he added.

### Boom Times?

Barry Ickes serves as a professor of economics at Pennsylvania State University and finance director at the New Economic School in Moscow.

Helped by high prices for its petroleum exports, Russia has gone through an economic resurgence.

"Russia has a huge current account surplus and it's paying off its debts. The economy is doing quite well," Ickes noted.

However, oil production isn't booming

like it should, he observed.

(Yukos was once one of the world's largest oil companies, producing 20 percent of Russia's output. Its assets were acquired in controversial circumstances by the Russian government and was declared bankrupt in August.)

"It slowed down after 2003-2004, with the problems of Yukos," Ickes said. "The big problem with Russia is that all its new oil is in hard-to-get-to places."

Also, Russia still hasn't developed the technical and engineering expertise required for its extensive production operations and new projects.

"They need the technology – they should be more into petroleum engineering than they are," he said. "There's sort of a conflict between the need for the technology and assertion of control."

Ickes recently co-authored a paper describing how economic benefits, or "rents," flow into the Russian economy from its domestic oil and gas industry.

"The big point is that these rents are widely distributed," he said. "These companies paid a lot of their costs, so the rents are spread out."

### Balancing Act

Russia's petroleum industry supports or helps support many other domestic industries, like the machine-tool industry, Ickes noted. And Russia makes sure local economies and businesses benefit from major development work.

"In the Sakhalin-2 PSA, Sakhalin Energy undertook a commitment to achieve a level of 70 percent Russian content, including labor, materials, equipment and contract services, over the life of the entire project," Chernyakhovskiy said.

See **Russia**, page 43

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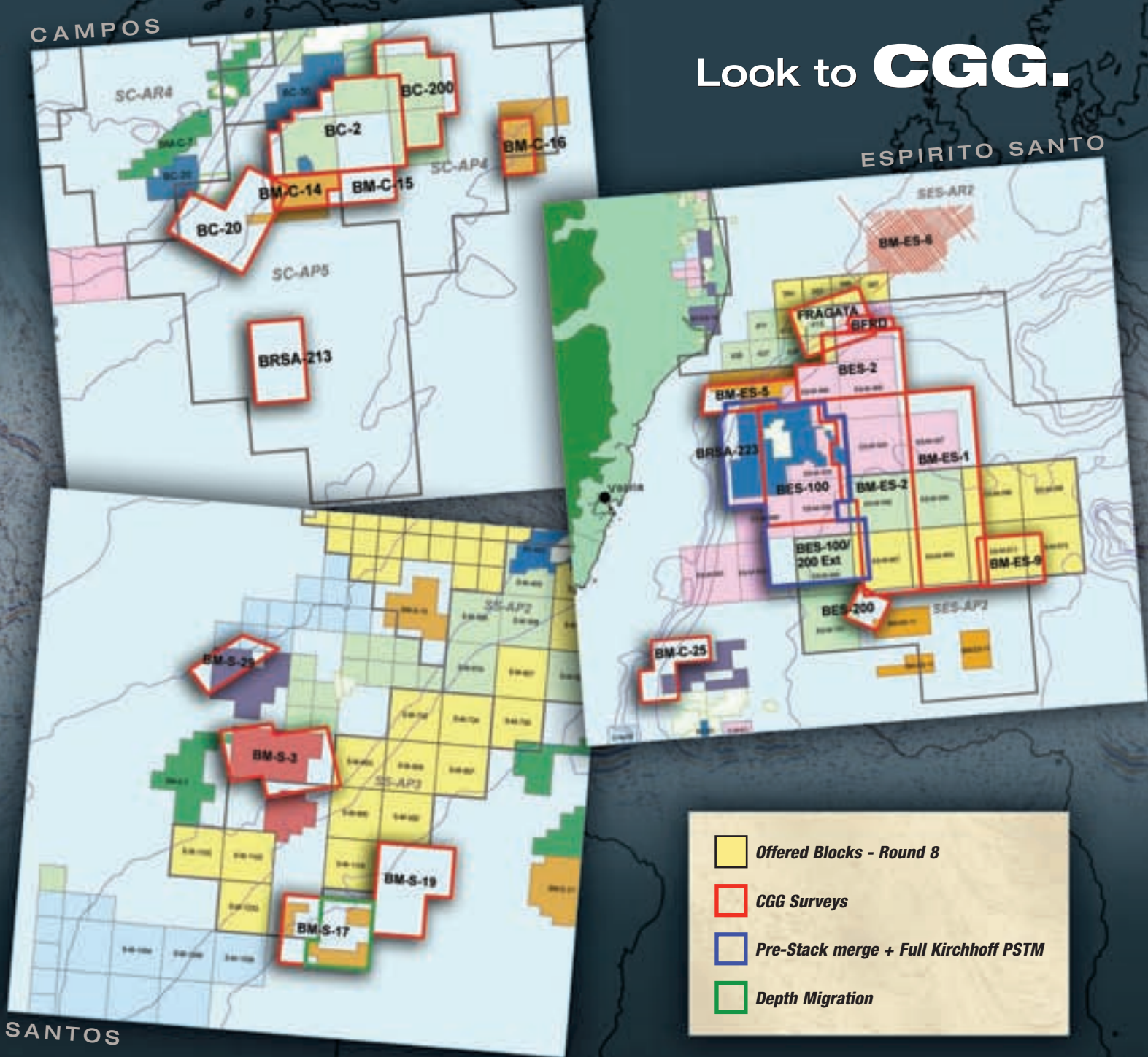
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*Doing Good to Avoid Grief for Others***Tragedy Stirs Volunteer Action**

By BARRY FRIEDMAN  
*EXPLORER Correspondent*

"It is DEADLY out there."

The e-mail came from Dave Blanchard, an AAPG member who tragically lost his daughter three years ago when she tried to cross a street in Cairo, Egypt.

But this wasn't a message from 2003. It was received last month.

Which is why ever since Deana Blanchard was hit by a bus on the Corniche, the infamous six-lane thoroughfare on the east bank of the Nile, her father has been trying to get the Egyptian government to build a pedestrian tunnel underneath it.

(The e-mail he sent refers to a fatality suffered by one of his Egyptian co-workers on the way from Alexandria a few weeks back, proving the situation is still dangerous.)

For Blanchard, who is with Devon Energy International in Cairo, this is a project that needs to be accomplished for a number of reasons – some civic, some personal.

"My family and I decided, within the first couple of days after the accident, that our daughter's death should not be in vain and that we had to do something to save lives along the Corniche," he said.

"The loss of a child is an unfathomable event," he continued, "and there is an instinctive need to make some sense out of the unimaginable fear and pain that lies



Photos courtesy of Dave Blanchard

**Deadly crossings:** Pedestrians are vulnerable – often tragically so – on Cairo's Corniche.

silent in our inner most being.

"Without some way to rationalize our loss it would be difficult to wake in the morning and face the world."

#### **A Deadly Path**

The bus, which struck his daughter at 10 p.m., was speeding along the Corniche without lights – a typical occurrence in a city where crossing the street is to literally take your life in your

own hands.

Imagine crossing an interstate highway on foot to get to a bus stop or to a restaurant; now imagine doing so without traffic lights or speed limits or, for that matter, drivers who stay on their designated side of the road.

Welcome to Cairo.

According to the Egyptian Ministry of Transportation, 6,000 people die each year as a result of road accidents in Egypt and 30,000 more annually are

seriously injured or maimed in road accidents, adding untold suffering and incalculable economic loss.

And there's this from the U.S. State Department:

*"Driving in Egypt, a country with one of the highest incidences of road fatalities per miles driven in the world, is a challenge. Traffic rules appear to be routinely ignored by impatient drivers. Drivers should be prepared for unlit vehicles at night, few if any road markings, vehicles traveling at high rates of speed, vehicles traveling the wrong way on one-way streets, divided highways and connecting ramps, pedestrians constantly dodging in and out of traffic and a variety of animals ..."*

And then the warning ends:

*"Pedestrians should also exercise extreme caution when traversing roadways, especially in high-volume/high-velocity streets like Cairo's Corniche, which follows the east bank of the Nile River."*

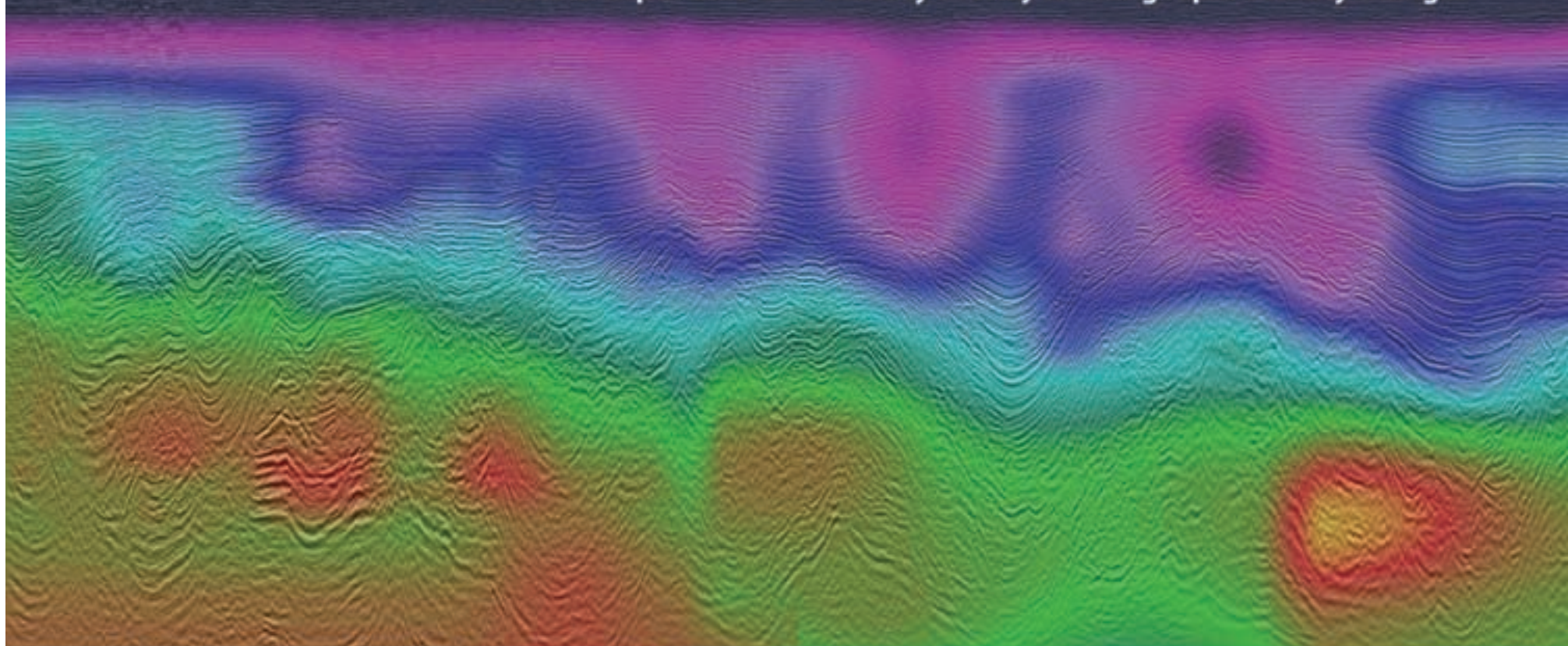
#### **He Has a Dream**

What Blanchard envisions for the Corniche is a pedestrian tunnel access, costing approximately \$250,000, at a particularly crowded congested intersection. It is where a passenger ferry brings workers across the Nile to the suburb of Maadi, a center of the oil

continued on next page

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continued from previous page

business in Cairo and where the governmental regulatory body, the Egyptian General Petroleum Company, is located.

And near the spot where his daughter was killed.

"Cairo is a nightmare," says John Dolson, AAPG vice president and a former Cairo resident who is personally involved in making Blanchard's dream a reality.

"People driving on the wrong side of the road, with lights off at night, in overcrowded mini-vans," he said. "I cringed every day of the eight-and-a-half years we lived there."

Blanchard said that even before his daughter's accident, he always carried a full EMS kit in his car that included neck braces, respirators and splints. He said the problem then, as now, is that "there are no working traffic lights along the Corniche, and so there are no safe pedestrian cross-walks and, as important, no natural breaks in the flow of traffic."

Something, clearly, had to be done, but who would do it? The Egyptian government?

"Honestly, the best and most useful thing the Egyptian government can do is to speed up the permitting process," Blanchard said, "and help with some minor imminent domain issues."

A fledgling NGO (non-governmental organization) safe road society, has been created as a result of his daughter's death to assist with moving the process forward with the authorities.

Both Blanchard and Dolson believe that industry, along with volunteers, must play the major parts.

**First Steps**

Blanchard also says that, at times, this hasn't always been easy.

"As expats we sometimes tend to work overseas for a few years and then return home without being involved with local community initiatives," he said. "Certainly in some countries it is perhaps not advisable to become too involved in local issues, but in general, we are the ground level ambassadors for our country and our society. I fully support our membership becoming involved in community projects."

"I know at Devon in the USA many, many employees and AAPG members are deeply involved with community initiatives," he said, "and I think that commitment to the community needs to be expanded globally."

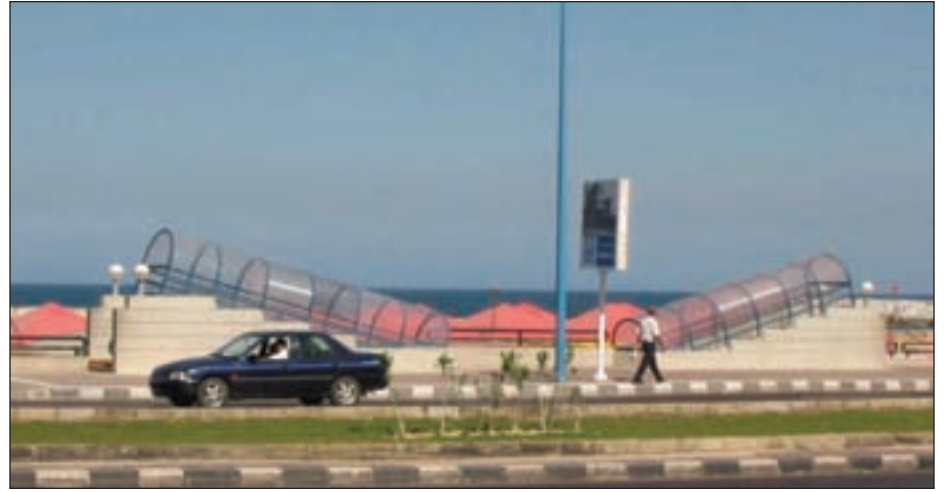
And it seems to be working. To date, Apache, BP, BG, Devon, IPR, ENI, Coca Cola and GM, as well as local businesses and private individuals, have pledged funds. Dolson expects the project to be completed within two years.

As for the Egyptian authorities, Blanchard says they are helpful, excited and overwhelmed, and doing what he says governmental officials always do: "Follow bureaucratic procedures."

"We certainly hope the pedestrian tunnel will be completed, not only for our own desire to make some sense of our tragedy, but to save lives," Blanchard said.

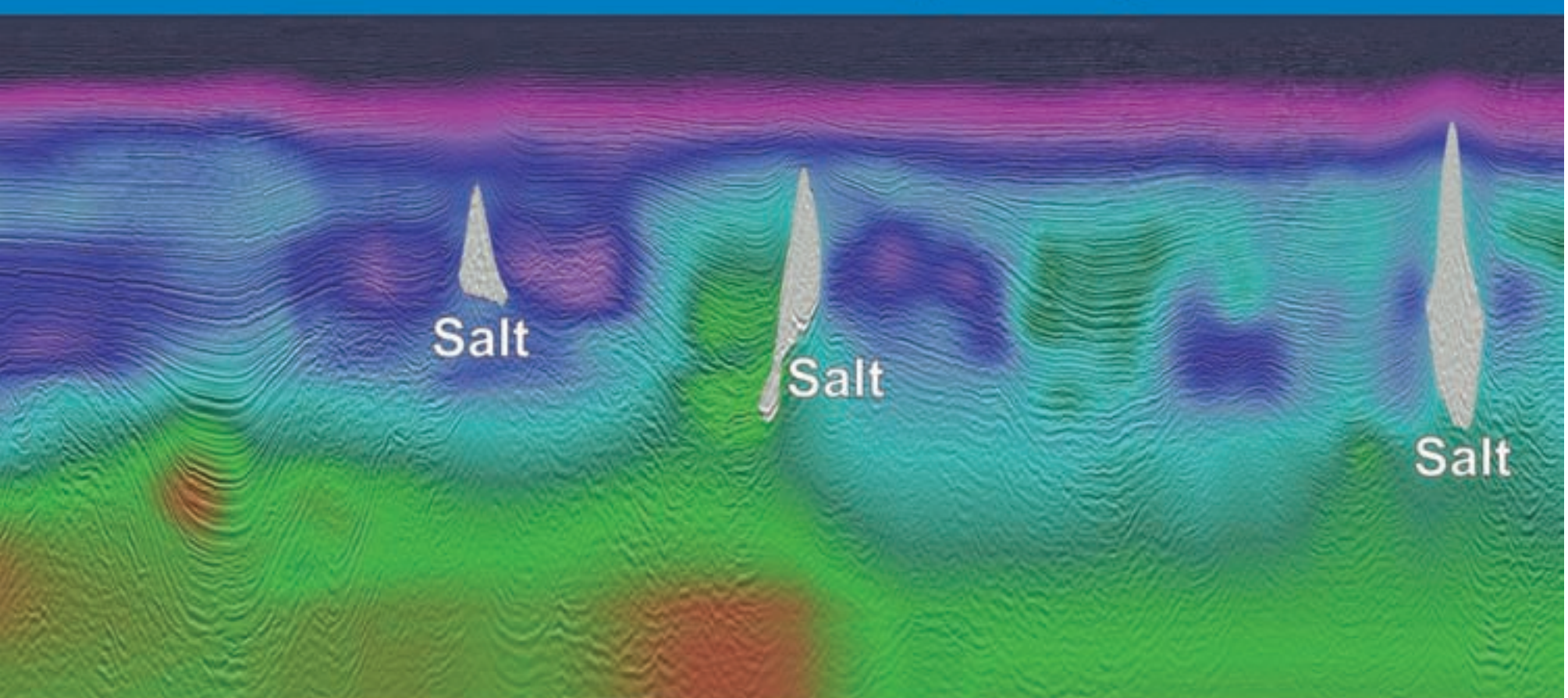
He then talks about 2007, when his son, along with many who knew his daughter, will graduate from a school in Cairo.

"It is our fervent hope that the tunnel will be built by then so that the last of Deana's high school friends will be able to cross the deadly Corniche road in safety." □



Dave Blanchard and other AAPG members are trying to get pedestrian tunnels built along the Corniche in Cairo, similar to that above. Otherwise, pedestrians take their lives into their own hands trying to cross the busy highway.

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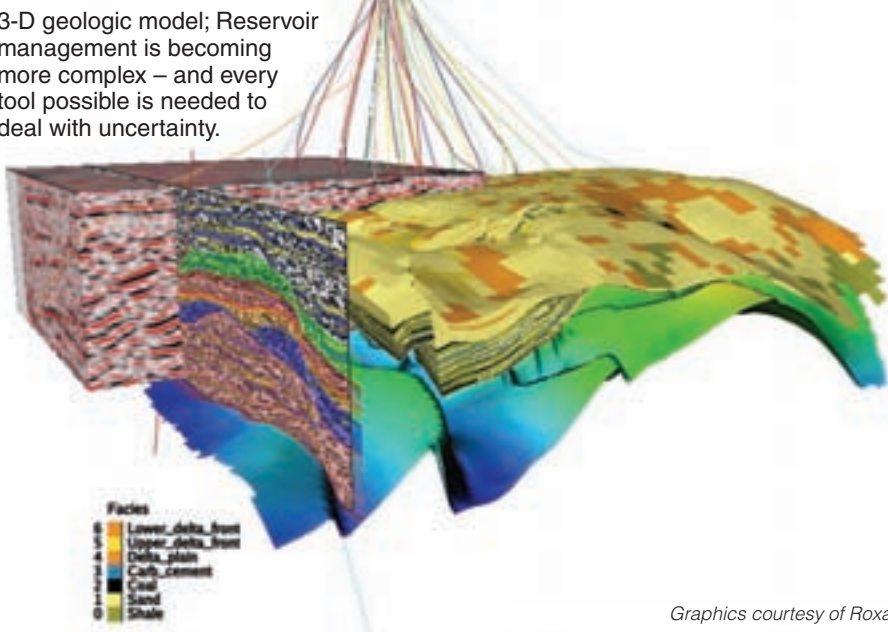


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3-D geologic model; Reservoir management is becoming more complex – and every tool possible is needed to deal with uncertainty.



Graphics courtesy of Roxar

## Top Down or Bottoms Up?

# Getting a Grip On Reservoirs

By LOUISE S. DURHAM  
*EXPLORER Correspondent*

When it comes to evaluating hydrocarbon reservoirs and predicting production performance, one thing is certain: Uncertainty.

This fact has long plagued geoscientists and engineers as they strive to quantify myriad uncertainties in the complex subsurface environs, such as porosity, permeability, structural

surfaces and more.

"Evaluating uncertainty is becoming more and more important," said Jan Inge Tollefsrud, technical manager responsible for uncertainty solutions at Roxar. "This is because new discoveries are getting smaller even though the number of discoveries is still high."

To begin at the beginning, it's imperative to understand the underlying factor that impacts your ability to quantify what the uncertainty is.

It's not the reservoir; it's you.

"Uncertainty is a function of your state of knowledge and not an intrinsic quantity of the physical world," said Mike Christie, professor of reservoir simulation at Heriot-Watt University in Edinburgh. "It's a function of your lack of knowledge of what's going on."

There is, in fact, a lot going on – across the board.

"In the case of fluid flow alone, you're looking at determining how much oil is there, the connectivity between wells," Christie said, "and the conductance, which is related to porosity and permeability. Relative permeability and capillary pressure can be big uncertainties.

"Even measured data are not necessarily that certain," he noted.

The problem is universal.

"Uncertainty exists across the workflow within all the disciplines," said David Hardy, product manager at Roxar. "Despite the rapid uptake of 3-D model technology, uncertainty isn't commonly considered part of the 3-D modeling process, even though everyone knows they should be doing something about it."

"Lack of time or available tools to do the job properly are blamed for the inattention."

### Bottoms-Up

A whole new attitude toward the problem is emerging today, as methodologies and tools are being developed to allow the complete uncertainty chain to be evaluated within the reservoir model.

"For the subsurface, this includes tools that work on the 3-D static and dynamic models geoscientists and engineers are building," Hardy said. "The integrated approach also allows the uncertainty to be handled across all the disciplines together, which is essential."

Industry interest in uncertainty modeling is evident at Heriot-Watt, where a number of major oil companies support an industry research group comprising two post-doctoral and four doctoral students looking at the mathematics and computational aspects of uncertainty quantification and also the geological aspects.

Regarding the geology, the idea is to be able to capture the uncertainties in the geology in the modeling process in a way that's as recognizable to a geologist as to a mathematician.

Early approaches to handling uncertainty in 3-D tended to focus on the reservoir simulation, in large part because the relatively small simulation models afford an easier place to start. The newer trend is to work back toward the geological models, Hardy noted,

See **Uncertainty**, page 14



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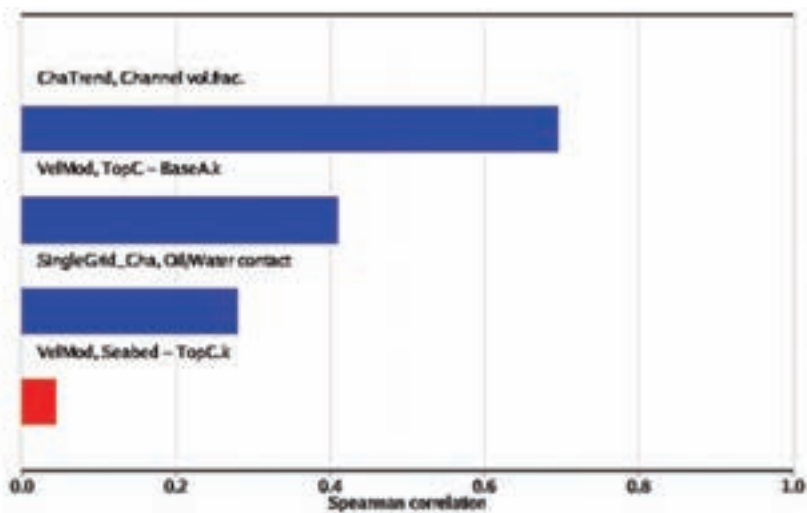


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Tornado chart showing reservoir uncertainties.



## Uncertainty

from page 12

which is where the problem needs to be addressed; after all, this is the source of the data input.

In fact, there currently are two principle approaches to modeling uncertainty: top-down and bottoms-up.

Basically, the top-down approach typically focuses on a simple reservoir model, which is not burdened with details of the geology; it begins coarse, and detail is added if and when needed.

Conversely, the bottoms-up approach to quantifying uncertainty utilizes a detailed model, which captures all the geological uncertainties.

Roxar's uncertainty management solution can best be defined as classic bottoms-up, according to Hardy. The

solution will be released early in the fall of this year as a module in the company's integrated reservoir management product.

This tool spans an expanded and integrated reservoir characterization workflow, and the uncertainty model will allow users to evaluate uncertainty across the entire workflow, which includes:

- ✓ Structural framework modeling.
- ✓ Fault seal analysis.
- ✓ Geological property modeling (porosity, permeability, water saturation, etc.).
- ✓ Reservoir simulation.

Ease of use is a goal of the tool.

"It's covering the whole workflow from static model to dynamic model, including flow simulation.

"What you don't know is what you're trying to capture," Tollefsrud noted. "You have to make estimates and then induce some screening of elements in building the models and then find which are the most critical.

"We try to find out the most important elements and then we focus on those and try to reduce that uncertainty," he said. "For example, if you find the velocity model in the overburden is the most critical element in defining the in-place volumes, you try to find ways to improve the velocity models."

### 'Transformational Technology'

An alternative approach to incorporate reservoir uncertainty in model construction and performance prediction is being used at BP.

It makes use of top-down reservoir modeling (TDRM) technology – a proprietary technology developed at BP.

"BP has developed a pragmatic approach to thinking about uncertainty over the whole workflow, which includes the tools and the philosophy," said Glyn Williams, technical manager in the development organization responsible for uncertainty solutions.

The philosophy is to initiate investigations with the simplest model and simulator suited to the business solution.

"BP uses the simplest appropriate model for the decision, and that's the key thing," Williams said. "It's not about building a large complex model with a mountain of information.

"Our approach covers the aspects from thinking about the uncertainties and which of these are key," he noted. "We design the appropriate model and calibrate the model in the sense of history matching to come up with alternative models that match the data. We use the alternative models to actually make decisions based on those uncertainties – and it works.

"It's a transformational technology, which has gone from an embryo – the research idea – to worldwide operations at BP," Williams said. "It's transformed how BP thinks about uncertainty," he noted.

The company has successfully applied TDRM technology in hundreds of cases, according to Williams. These include myriad types of reservoirs in all stages of development.

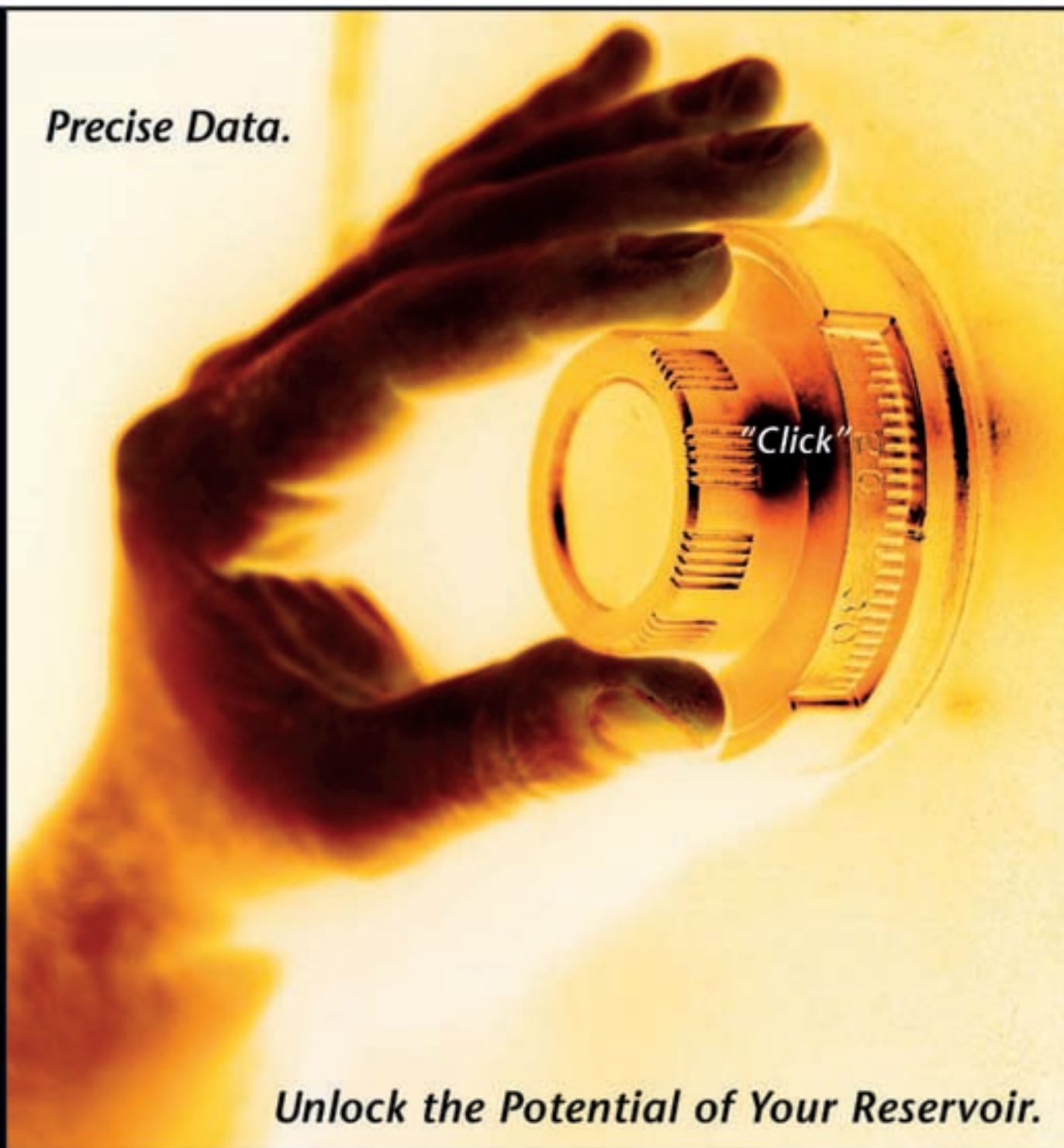
Benefits achieved through TDRM application include reduced risk via better understanding of uncertainty and faster work cycle time. The estimated NPV (net present value) for projects has been elevated by as much as 20 percent, Williams noted.

### Blurring the Boundaries

As uncertainty management tools and technology continue to evolve, the boundaries between top-down and

See **Reservoir Management**, page 16

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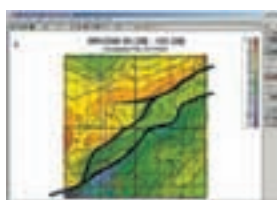
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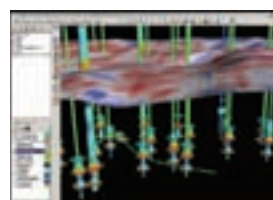
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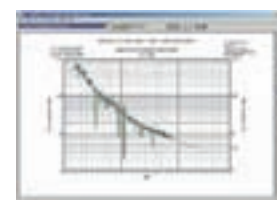
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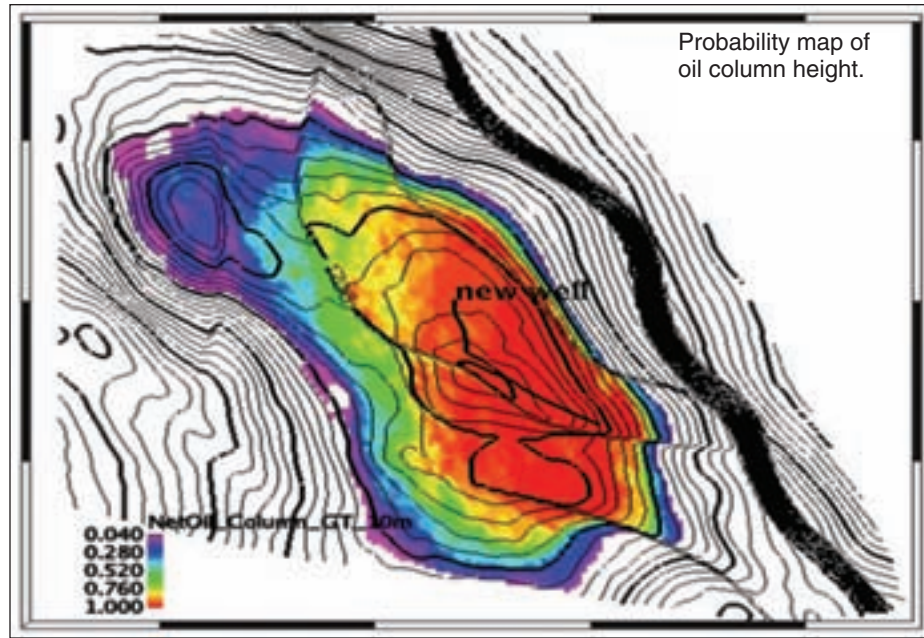
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## Reservoir Management

from page 14

bottoms-up applications appear destined to blur.

"Fundamentally, we're all trying to get at the same problem," Hardy said. "I think we'll be meeting in the middle and may pass each other in different directions."

"At the moment Roxar is focusing on geological uncertainty and the parameterization of that and allowing you to build multiple models," he said, "which we can then check against production history."

The top-down uncertainty management technique tends to move between the model and the reservoir

simulator, allowing some comparisons of simulated results versus historical production data. The information is fed back into the reservoir model in order to build it better and come closer to a solution.

Technology that focuses on improving results and accelerating reservoir simulation can be combined with the bottoms-up uncertainty management technique to make the most of both worlds.

For instance, automated history matching – which is a specialty focus at U.K.-based Energy Scitech – accelerates reservoir simulation and can be used to try to assess uncertainty at the simulation end, i.e., the coarse engineering end of the process. Hardy noted the two companies are working toward combining elements of Roxar's uncertainty approach with Energy Scitech's *EnAble* technology in a manner that will somewhat resemble the top-down uncertainty solution, at least in terms of the fundamentals of the approach.

"In effect, the net outcome is that we can create a shared earth model under uncertainty," said Neil Dunlop, director of engineering business at Energy Scitech. "Components in the two technologies allow you to do a shared earth modeling workflow."

"For a long time, the industry has been seeking a way to generate reservoir simulation models, which are themselves consistent with all known geological information," Dunlop said. "This workflow lets you do that."

"You can sensitize the geomodels," he said, "and if you have production data from a producing field, you can use that data to generate understanding of the distribution of production behavior and calibrate it based on actual observations."

In the case of a field under production, the users can take field information from that history period and project it into the future using the same geomodel they've matched it with. Combining the two constitutes a top-down uncertainty solution.

### Mitigating the Risk

Dunlop believes that in a pure exploration situation, there's only really a bottoms-up approach possible; no calibration or information is available.

"What we're doing with the Roxar system is we're adding new functionality not available before," Dunlop said. "That's to calibrate our understanding of the field in such a way that the reservoir simulation model and the geological model are coherent with each other – people have long complained their models never are."

Uncertainty evaluation, capture and integration is not a one-shot event.

Indeed, it must be conducted over the life of the reservoir, according to Emmanuel Gringarten, reservoir characterization engineer at Earth Decision Sciences.

Food for thought: Uncertainty quantification has no value *in its own right*, according to Hardy.

"It is improved decision-making that everyone is aiming for," he noted.

"Uncertainty management is all about making better, more informed decisions to help make plans to mitigate the risk."

"The better able you are to quantify the risk, the more you can improve the financial performance of the company." □

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## AAPG Heading Down Under

## Perth Promises Big Times



By VERN STEFANIC

EXPLORER Managing Editor

AAPG in November returns to Australia for the first time since 1992 for its annual International Conference and Exhibition, an event that promises to be one of the largest in Association history.

"Reunite Gondwana - Realize the Potential" is the theme for the meeting, which will be held Nov. 5-8 at the new Perth Convention Exhibition Centre.

Organizers have assembled a technical program that includes 720 oral and poster presentations - among the most ever offered at an international meeting; seven field trips; and eight short courses.

Registration for Perth to date is running about 30 percent above the pace set for the 1998 meeting in Rio de Janeiro, which ended up drawing 2,214, making it AAPG's largest-ever international event.

One reason for the large number of posters, meeting organizer's believe, is the new approach for Perth that ties oral and poster sessions together - in effect, oral sessions are used to "preview" the more detailed complementary poster sessions.

Perth, located at the heart of the Australian oil and gas industry and near to some of the world's oldest rock (dating to four billion years old), promises to provide a perfect setting, according to meeting chair Agu Kantsler, exploration director and chairman of Woodside Petroleum, Perth.



Australia offers a visual and scientific feast for geologists, such as these famous Miocene limestones known as the Twelve Apostles, near Melbourne.

Petroleum exploration in Australia dates to 1892, Kantsler said, but the first commercial discovery was made in 1961, when the Moonie oilfield was discovered in Lower Jurassic

sandstones of Queensland's Surat Basin.

Since then about seven billion barrels of oil-natural gas liquids and 170 Tcf of gas have been discovered, he added - much of the gas being located on

There's still time to save money by registering early for the AAPG International Conference and Exhibition in Perth - but the deadline date is drawing closer.

AAPG and PESA members who

register by Oct. 16 can save nearly \$200; for non-members the savings can be \$242.

For more information or to register, go to the AAPG Web site at <http://www.aapg.org/perth/index.cfm>

Western Australia's North West Shelf, which also is a major oil province.

"Australia is no different to any other nation in wishing to maximize the utilization of its hydrocarbon resources," Kantsler said, "and our industry is looking to its geologists to apply new technology, seek out new frontiers and structure new deals such that the goal of providing reliable and secure energy, both domestically and abroad, can be achieved."

Other meeting highlights will include:

✓ An opening session hosted by general chair Kantsler and featuring officials from AAPG, PESA and Western Australia. An icebreaker reception follows.

✓ A "featured speaker luncheon," offering this year's AAPG Distinguished Lecture on "The 'I' in Business Ethics."

✓ A students reception, offering the chance for students to meet with representatives of companies that are AAPG student sponsors.

✓ The Melbourne Cup Luncheon, when all of Australia comes to a halt for the annual Melbourne Cup horse race, which will be held Nov. 7. AAPG will join in the celebration with a complementary lunch in the exhibition hall.

For more information or to register, go to the AAPG Web site at <http://www.aapg.org/perth/index.cfm>. □

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*Geological Variety*

# Aussie Potential Being Tapped

By LOUISE S. DURHAM  
*EXPLORER Correspondent*

If you're looking to get in on some big-time E&P action, head "down under" to Western Australia – it's a rockin' scene these days.

Besides the potential to tap into some major hydrocarbon deposits, you'll find a welcoming environment.

According to the Western Australia Department of Industry and Resources (DoIR), the state ranks high in international surveys as a destination for exploration ventures. Low sovereign risk and the fiscal and legislative regime along with noted successes in offshore exploration are credited with making the locale attractive as an exploration target. Petroleum prospectivity has been demonstrated both onshore and offshore Western Australia.

The state is the major oil and gas producer in Australia from the Bonaparte, Canning, Carnarvon and Perth basins, with

Three technical sessions on the "Petroleum Prospectivity of West Australia Basins" will be held during the AAPG International Conference and Exhibition in Perth, Australia.

The first session, a 12-poster event, will be held Monday afternoon, Nov. 6.

Two consecutive oral sessions will be held on Tuesday morning, Nov. 7.

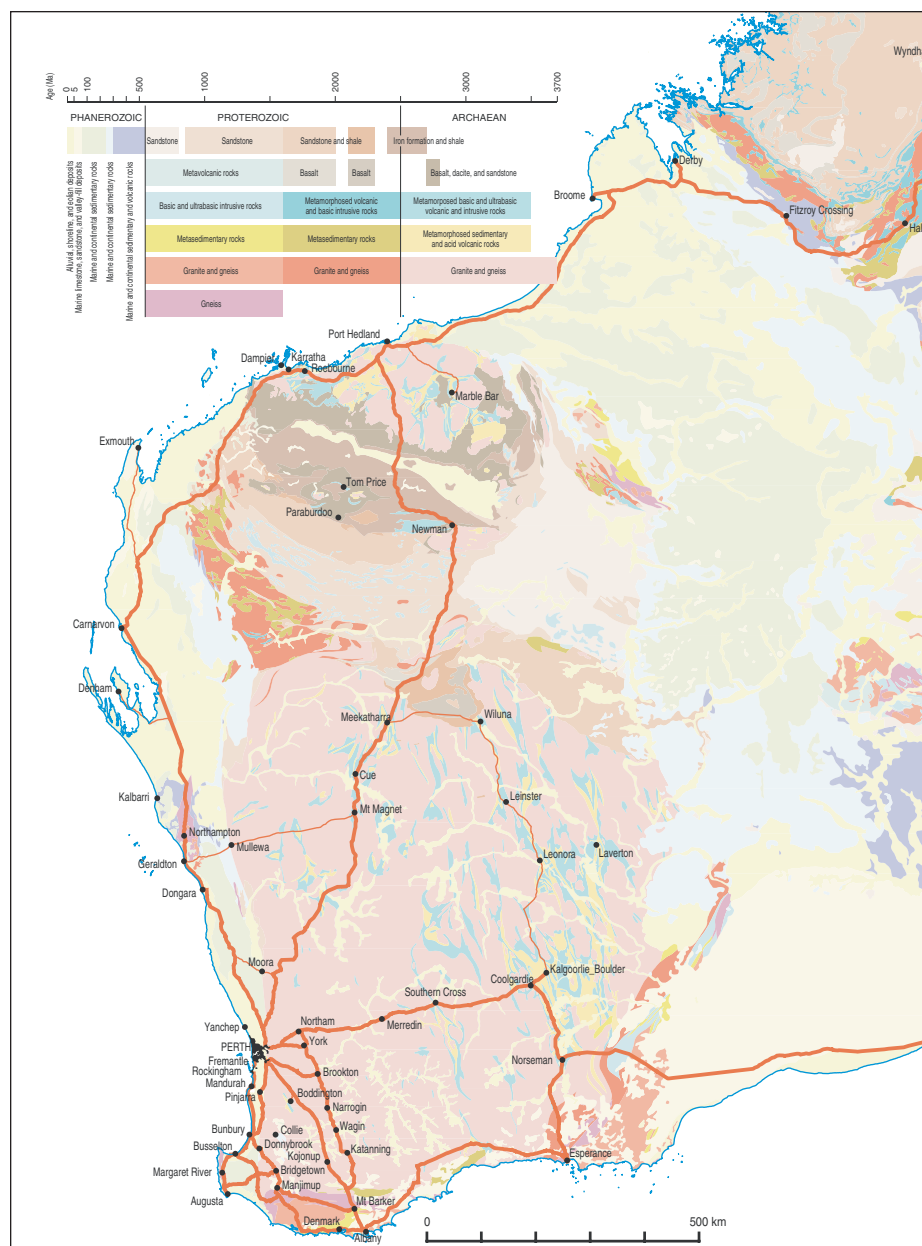


2004 reserves pegged at 135 giga-litres of oil, 282 giga-litres of condensate and 3,408 cubic gigametres of gas, according to DoIR. (A giga-litre equals one million kilolitres.)

The state boasts 66 producing oil and gas fields containing over 80 percent of Australia's natural gas resources. It leads the nation in gas and LNG production.

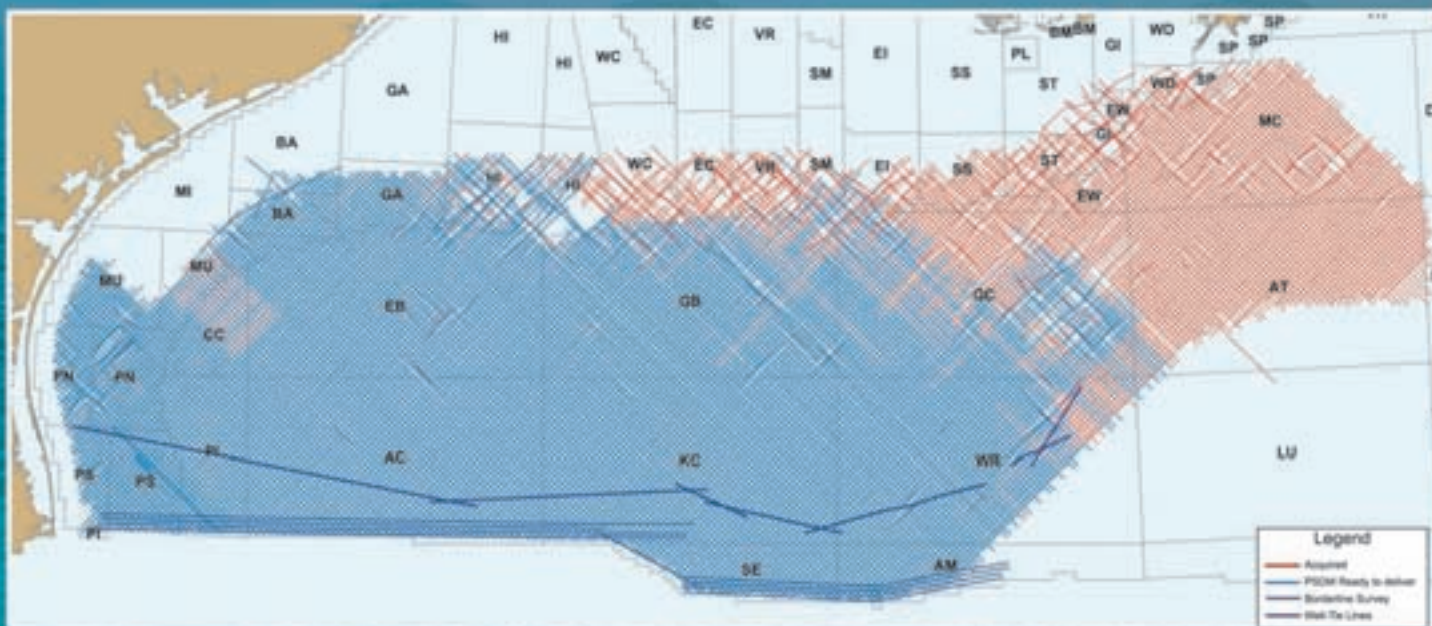
Western Australia's E&P activity goes back a number of years – in fact, it has been producing crude oil since 1967, and the first commercial quantities of natural gas went on production in 1971.

See **Basins**, page 22



Graphic courtesy of Western Australia Geological Survey

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## Weeks' Legacy: Australia Exploration

While Western Australia is the hot spot in the land down under these days, the Bass Straits on the opposite side of the continent keeps on producing, although in declining levels of years past.

It was the vision of the late Lewis Weeks that at one time provided 400,000 barrels of oil a day – 70 percent of Australia's petroleum needs.

In 1959, Weeks was president of AAPG and a consultant enjoying his retirement from Standard Oil of New Jersey (Exxon) when he received a call asking for some exploration help in oil-dry Australia.

And, help he did. After conducting some studies, Weeks met with the CEO of BHP, then described as the "U.S. Steel of Australia." He cut a deal where he was offered 2.5 percent royalty if he could help

them find oil.

"Come to your window," Weeks said. "It lies out there in the Bass Strait, and most particularly off the Gippsland Coast.

Weeks said he was aware of the potential in the Tertiary sediments since 1931, long before the offshore technology made possible exploring in the harsh Straits, where winds of 70 knots are not uncommon.

In March 1965, Australia's "elephant" was found.

Weeks donated the funds that provided the Weeks Tower at AAPG headquarters in Tulsa, and the estate of his late son, L. Austin Weeks and his widow, Marta, this year made a \$10 million endowment to the AAPG Foundation, the largest gift the association has received. □

## Basins

from page 20

### Basin Breakdown

If you decide this is the place for you to strike the big one, bone up real good on the geology in your area of interest.

The DoIR emphasized the vastness and variety of the geology in Western Australia challenges explorationists to apply new technologies when searching for hydrocarbons in a basically under-explored land.

"The oldest rocks on earth are found in Western Australia," said Peter Baillie, chief geologist Asia Pacific at TGS-NOPEC, who will co-chair both a poster session and one of the oral sessions on the petroleum prospectivity of Western Australia at the upcoming AAPG

international meeting in Perth.

"We have basins from the Archean to those currently forming," he said.

Of interest to the petroleum industry are the sedimentary basins with prospectivity from the Proterozoic through to the present, Baillie noted.

"There's a series of older basins that dropped within Gondwanaland and extend from Pre-Cambrian to Permo-Triassic age," he said, "and there's a younger set of basins related to the breakup of Gondwanaland. These are the basins that formed on what we call the North West Shelf, which is the northwest margin of the Australian continent where the major hydrocarbons are found."

There's some serious E&P action on the Shelf, particularly in the Carnarvon Basin, which is mainly offshore. This is one of Western Australia's five major basins, which also include the Perth, Canning, Browse and Bonaparte basins, according to DoIR.

DoIR noted the primary focus of petroleum exploration and development has been, and continues to be, the Northern Carnarvon Basin, where a range of production facilities already are in place. The basin is one of the more intensely explored areas of Australia.

The Northern Carnarvon Basin is the locale of the giant multi-field Greater Gorgon complex, which is currently being explored and developed. Baillie described Gorgon as "a major, major resource" of perhaps up to 5 percent of the world's natural gas supply.

He made the verbal observation that about half of Perth is employed there in one way or another.

"In the Gorgon Field complex, which is in water depths of 700 to 800 meters-plus, there's reservoirs that range in age from Triassic to Lower Cretaceous," Baillie noted. "The source is also variable and is either Triassic or Jurassic.

"In Western Australia, the normal thing is to find porosity below the regional seal, which is called the Muderong and is of Cretaceous age," he said. "Normally you go for the first porosity below that, which can be Lower Cretaceous, Jurassic or Triassic.

"Perhaps the best reservoirs are in the Triassic formation called the Mungeroo," Baillie noted. "It's a fluvial sandstone that can have multi-darcy porosity at four kilometers of depth.

"I call it the Mighty Mungeroo."

### LNG Potential

Industry activity in this region is not just about drilling wells.

LNG is a big deal and becoming even more so.

Chevron, for instance, is in the engineering phase for a natural gas project to be built at Gorgon, according to Bill Robinson, senior adviser Chevron Australia and oral sessions co-chair for the Perth meeting.

The \$11 billion-plus LNG project appears to be surmounting the final hurdles in the approval process. Chevron is operator with a 50 percent stake, while Royal Dutch Shell and ExxonMobil each hold a 25 percent share.

Robinson noted this is a 20-40 Tcf development, and construction possibly could begin early next year. Woodside Petroleum currently operates what reportedly is Australia's largest single LNG production facility, which is on the North West Shelf.

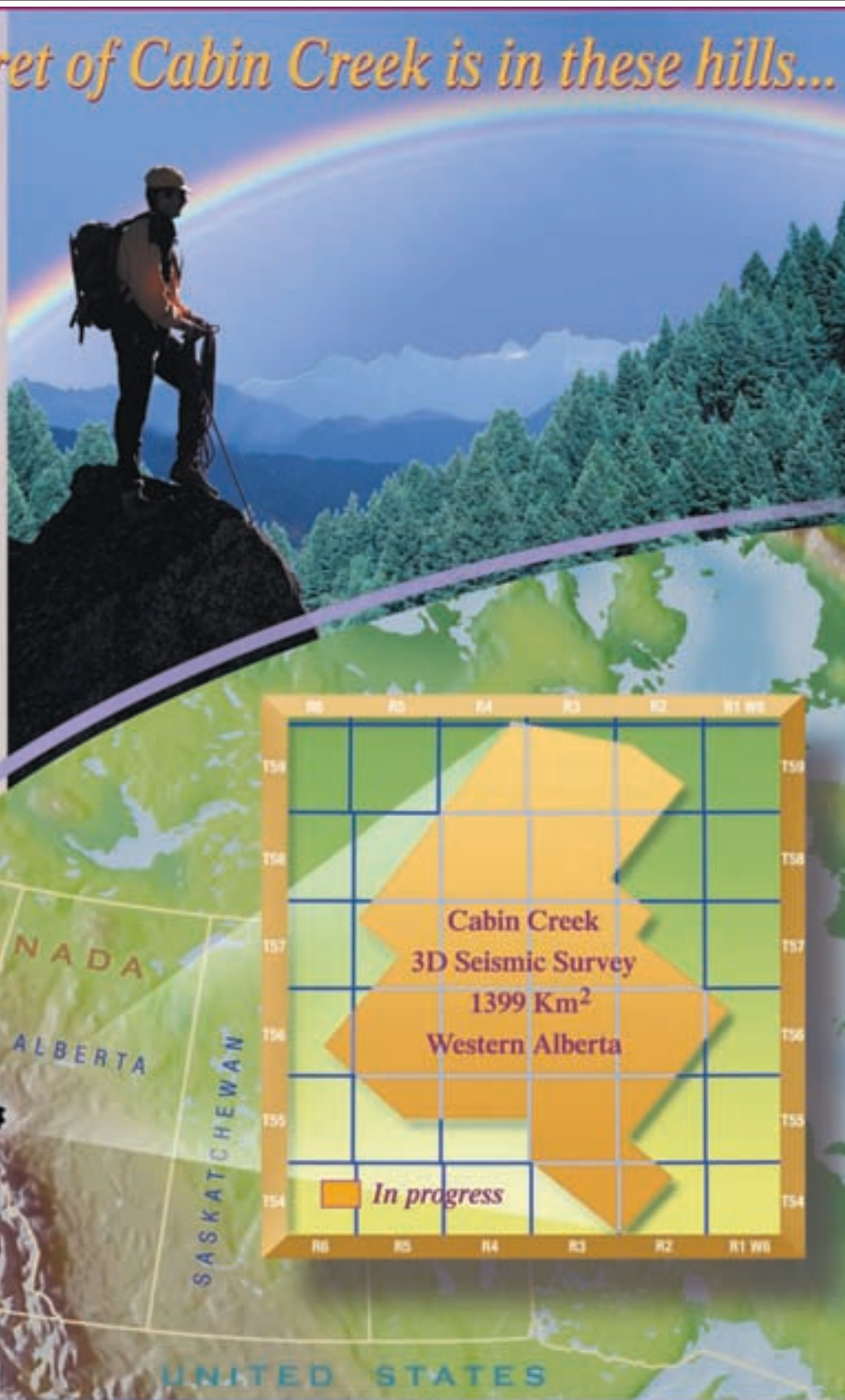
Besides the copious quantities of gas in this region, the Gorgon complex is unique in having a high CO<sub>2</sub> content – as much as 10-13 percent, according to Robinson.

"The plan is to compress and inject the CO<sub>2</sub> near the LNG plant on Barrow Island into a static aquifer on the island," Robinson said. "It will be the world's largest geo-sequestration project for CO<sub>2</sub> geo-sequestration." □

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Photo courtesy of Chris Uruski

Several geologists in New Zealand believe that beautiful surroundings and oil and gas exploration can co-exist just fine: Above, the Radnor-1A.

## Remoteness Has Charm, Risk

# Deep Kiwi Waters Hold Promise

By BARRY FRIEDMAN  
*EXPLORER Correspondent*

To hear long-time New Zealand geologist Dave Bennett describe it, understanding when and where to drill for oil is a lot like ... well, in this PC world, let him tell you.

"I always characterize oil and gas fields as female," he says. "They're so unpredictable."

And that may be part of the charm.

There has been a renewed buzz of late as to the mysteries and hydrocarbon potential beneath the deep waters of New Zealand, which is odd, considering it is a place that Bennett once said didn't really have an industry.

"We don't realize the potential that's beneath everyone's feet," he said a few years back.

Christopher I. Uruski, a geoscientist who is currently running the frontier basins section at the Institute of Geological and Nuclear Sciences in Lower Hutt, New Zealand, laughs when he is told what his colleague has said.

"Dave Bennett (whom he affectionately calls one of the 'oily characters down here'), another ex-patriot Welshman like

Christopher Uruski will present the paper "Could New Zealand Join OPEC?" at 8:20 a.m. on Tuesday, Nov. 7, at the AAPG International Conference and Exhibition in Perth, Australia.

His paper is part of a session titled "Exploration Potential of New Zealand."

Other papers in the session include:

✓ Hydrocarbon Charge Modeling of the Outer Taranaki Basin.

✓ Seismic Identification of Facies Within the Kapuni Group, Taranaki, New Zealand.

✓ The Canterbury Basin Petroleum System and Recent Exploration Results.

✓ Petroleum Potential of the Great South Basin, New Zealand.



myself, is right," Uruski said, "but the real potential is in deep water rather than beneath our feet."

Unfortunately, Uruski added, "New Zealand's oil companies definitely don't have the money to drill in deep water, so the general perception is probably true as well."

That may be changing, in part because the country may not have much choice.

According to the Ministry of Economic Development in New Zealand, the production of oil (condensate/naphtha) and gas hit record lows during 2005. Specifically, oil production dropped to below 1985 levels; net gas production dropped to levels not experienced since the mid-to-late 1980s.

Despite these numbers, recent discoveries in Pohokura, Maari, and Rimu and Kauri have some in the industry excited.

Mac Beggs, director of GeoSphere, a New Zealand-based and owned oil and gas consulting company, is one of them.

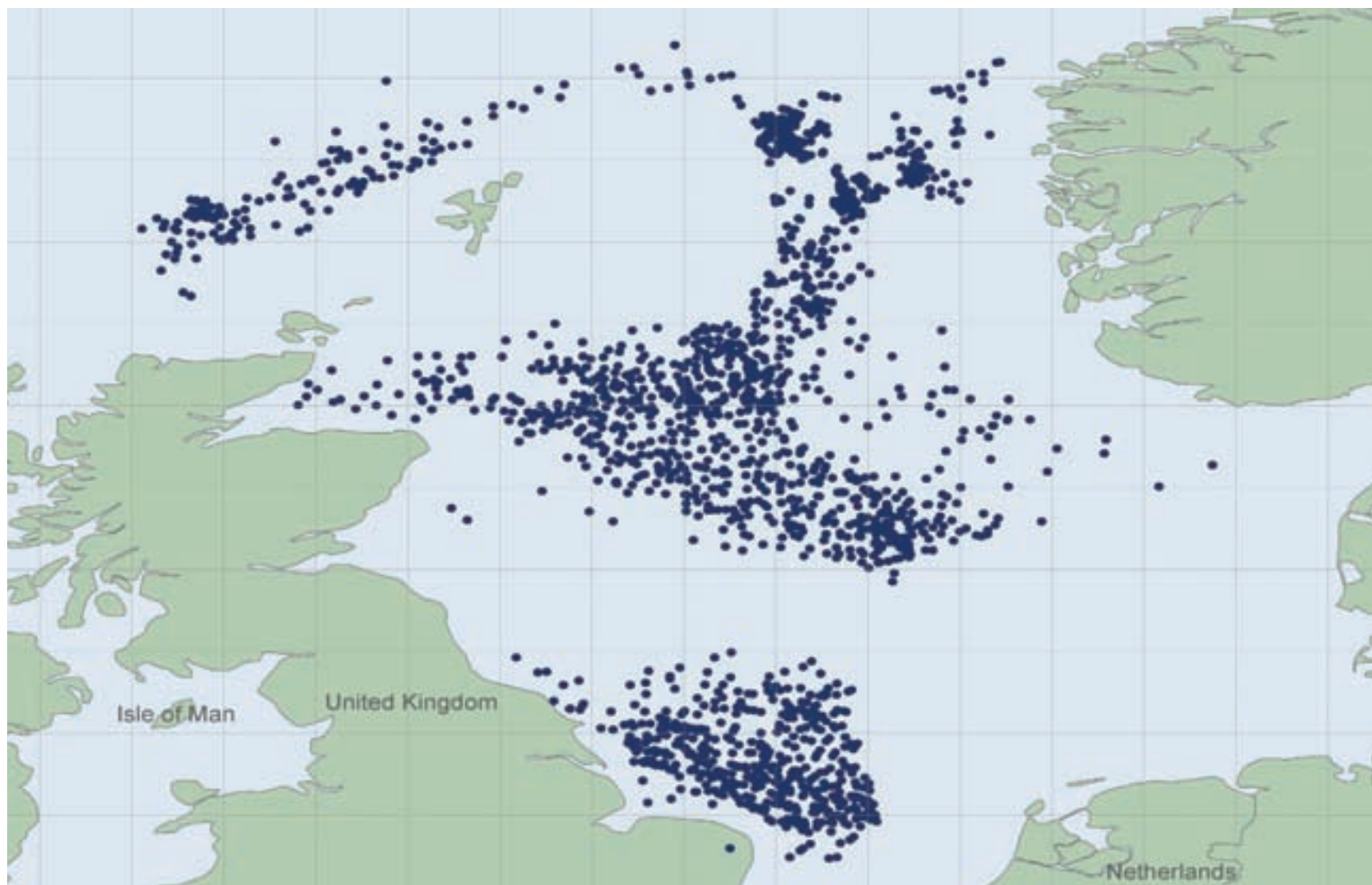
"It is deep water that represents most of New Zealand's big-upside prospectivity," Beggs said, "and if the economics stay positive, I expect it will be put to the test over the next few years."

### Bad News, Good News

Finding the oil and gas is one thing; what happens after is where the

See **New Zealand**, page 26





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## New Zealand

from page 24

headaches occur.

Eric Matthews, asset manager at Australian Worldwide Exploration, an oil and gas exploration company active in New Zealand, has said "deep water is a good place to look for oil and gas, forgetting the problems of getting the stuff out of the ground once you've started."

Still, Uruski is upbeat.

"New Zealand's small industry is consolidating," he said. "It's been quite an effort to get these fields developed, though pretty soon the companies will be enjoying a positive cash flow for a change. It's then that they'll start thinking about exploration again."

"Several operators in New Zealand are already well-positioned," Uruski added, "but I expect there to be some new

players here after next March when the Great South Basin round closes."

The New Zealand government currently is running a licensing round for the Great South Basin, offering 40 x 9,000 km<sup>2</sup> blocks. Uruski says major oil companies are taking a look at the data and interest is high.

"I think," Uruski said, "that the Maari, Tui, Amokoura and Pateke discoveries, also in the throes of development right now, will make a great difference to the way New Zealand is seen by the industry at large as they are all offshore oil fields."

Beggs believes that Tui and its satellites have affirmed the excitement, but says it is important to keep the potential in perspective, and points to a discovery made in 2000.

"Pohokura (a field in New Zealand's Taranaki Basin) ... pales in comparison to gas discoveries off Western Australia and elsewhere," he said.

As mentioned, the stability of the region

is key. New Zealand has strong political institutions, a well-educated population and a market-oriented mind-set.

There is something else, too: tranquility.

### Changing Perceptions

Still, for all the renewed, albeit cautious, optimism in New Zealand, a place some are saying could have the potential to join OPEC, there is the matter of the evidence.

On this matter, Uruski is optimistic.

"The body of evidence is growing rapidly and is partly responsible for the new air of confidence," he said. "The presence of large petroleum-bearing basins has been known for some time, but several factors have discouraged exploration."

Those factors include:

- ✓ New Zealand's small local market.
- ✓ A perception that New Zealand is gas-prone.
- ✓ The country's most attractive basins

lie in deep water.

Fortunately, that perception seems to be changing.

"The limited life of Maui, new scientific evidence on New Zealand's oil-prone coals, new oil discoveries and the present oil price have all helped to change the industry's previous thinking," Uruski said. "This has been combined with strong government-led promotion of New Zealand as an exploration venue to produce the new feeling of optimism."

Modeling studies at GNS Science suggest that some 20 billion barrels of oil may be trapped in deepwater Taranaki, Uruski said. "If 50 percent is ultimately discovered, perhaps five billion barrels may be produced from that basin."

"I think it is realistic to expect a couple of years of seismic surveying followed by drilling an initial batch of, say, 10 wells in that basin," he said. "I suppose we're talking about an investments of about \$US 1 to 2 billion."

"The Great South Basin probably has larger potential, so we're talking of perhaps 15 billion barrels," he said."

Uruski also says that since the basins investigated so far lie within New Zealand's Exclusive Economic Zone, he doesn't expect there to be challenges from any other country.

He is, though, somewhat dubious of the OPEC comparison.

"New Zealand is a net importer of oil, to the tune of about \$NZ 6 billion a year," he said. "It is likely that New Zealand would remain a relatively modest player on a world scale."

"For New Zealand, on the other hand, with a population of only around four million, the effect would be akin to the discovery of oil on Norway."

### Too Nice?

Uruski sees the usual road blocks: "The main barriers to exploration are financial and will," he said. "So far, explorers have played it fairly safe. Generally, exploration companies like to expand exploration efforts incrementally from land to shallow waters, further offshore, gradually getting deeper. New Zealand's potential lies mostly in deep water, so it needs someone with deep pockets to take the plunge."

Beggs, too, while optimistic, doesn't discount the hurdles.

"Certainly activity is up compared to the past 20 years," Beggs said, "and I have held the view throughout that the geological fundamentals are favorable, but remoteness from substantial markets and the industry service supply chain is certainly a big hurdle."

Eric Matthews' concerns also are pragmatic.

"Access to offshore drilling equipment was a pressing issue," he said, "and that the rig market is extremely tough."

Matthews also said in a recent interview that he didn't "believe it's suddenly going to get any better. New Zealand's a long way away from anywhere, and that just compounds the difficulty of getting a rig."

Uruski says the irony is what makes New Zealand so desirable for exploration is the very thing that makes it such an uneventful place for explorers.

"Explorers have told me ... New Zealand is much too nice a place to find oil," he said. "Really, it is not proximal to anything much, apart from Australia and Antarctica, which also have small populations. Our remoteness is a definite disincentive, particularly for those who still think they are in danger of finding gas here."

Still for all the country's niceness and its less than stellar past in these matters, Uruski is one of the more optimistic of all the "oily" characters.

"I think New Zealand's time has come."

□

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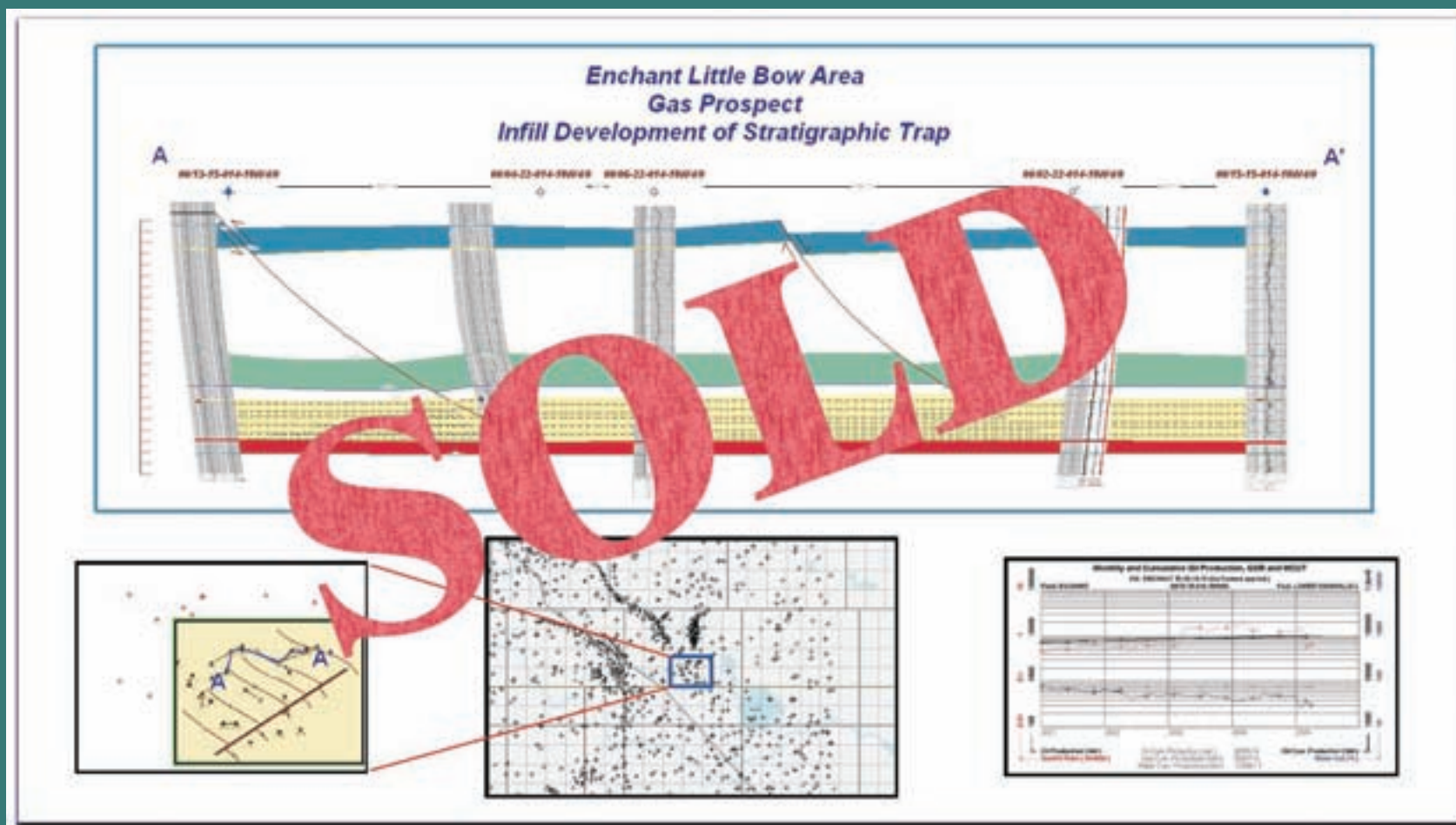
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# 4-D: The Exotic Getting Familiar

David Lumley will present the paper "Business Drivers and Technology Advances in 4-D Seismic Monitoring" at 8:20 a.m. on Wednesday, Nov. 8, during the AAPG International Conference and Exhibition in Perth, Australia.

The talk is part of the session titled "Seismic Innovation – 4-D and Acquisition."

Other talks in the session are:

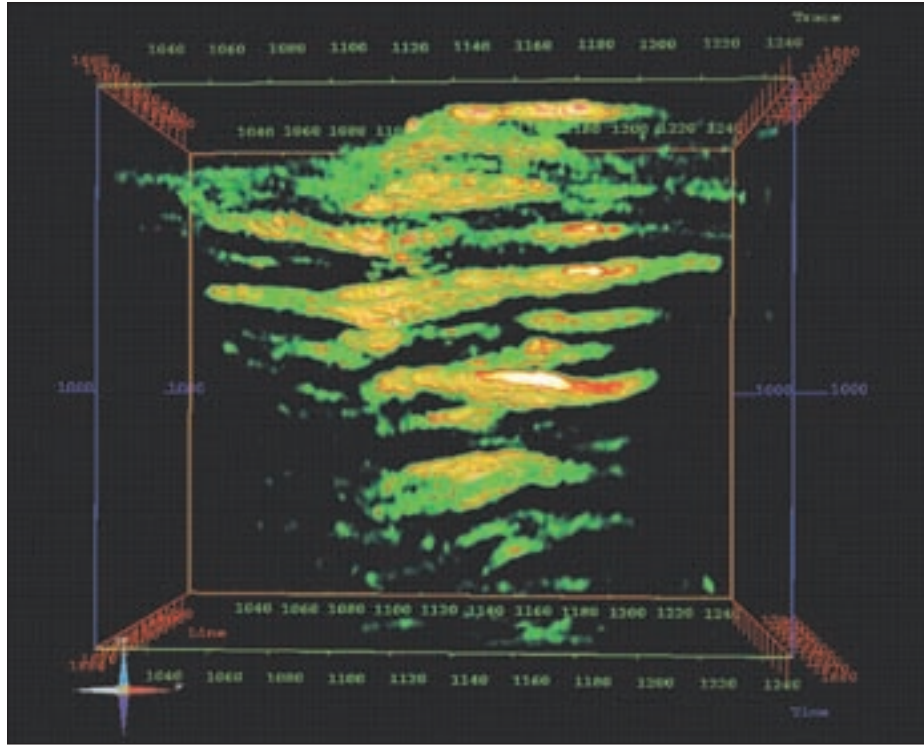
- ✓ A Decade of 4-D Monitoring in the North Sea.
- ✓ Is Repeatable Noise Acceptable in 4-D Seismic?
- ✓ Design and Acquisition of a 4-D Base Survey: A Case Study from the Pyrenees Oil Development, Exmouth Sub-Basin, Western Australia.
- ✓ Vertical Seismic Profile: Beyond Time-to-Depth.

By LOUISE S. DURHAM  
*EXPLORER Correspondent*

It was not so long ago that time lapse, or 4-D, seismic was a technology that kind of hovered in the background, being applied only in specific situations, such as when a reservoir began producing erratically rather than as predicted.

The application of 4-D, i.e., repeat 3-D surveys, to evaluate production and reservoir properties periodically over the life of a reservoir was considered an expensive luxury – if considered at all.

But in today's high commodity price environment, 4-D seismic is becoming



Graphic courtesy of Mark Meadows and Don Adams, 4th Wave Imaging

**Time travelers:** This 3-D subsurface image of injected CO<sub>2</sub> from a sequestration pilot project was made from 4-D seismic data – a valuable tool that's being increasingly used.

increasingly commonplace as a reservoir management tool to maximize economic return. In fact, 4-D is gaining a strong foothold in the mainstream of seismic applications.

The bulk of the 4-D activity is in the North Sea, where many of the earliest

surveys were undertaken, according to David Lumley, co-founder and current chief scientist of 4th Wave Imaging, Aliso Viejo, Calif., and a speaker at the upcoming AAPG International Conference and Exhibition in Perth.

He attributed this to the fact that oil is



regarded as a national resource in Norway and the United Kingdom. There's a pressing need for optimal recovery because the future of those countries depends on managing their oil wisely.

### Going Deep

On the domestic front, look for 4-D to become really big in the Gulf of Mexico.

The Gulf shelf was the locale of some of the early 4-D technical success stories, but these projects failed to measure up economically for the most part. The big companies who controlled the properties weren't particularly inclined to invest much capital in them, preferring to use them as cash cows to fund international E&P activity.

It's a different scene today.

See **4-D Drivers**, page 36

What's your exploration challenge,  
**complexity?**

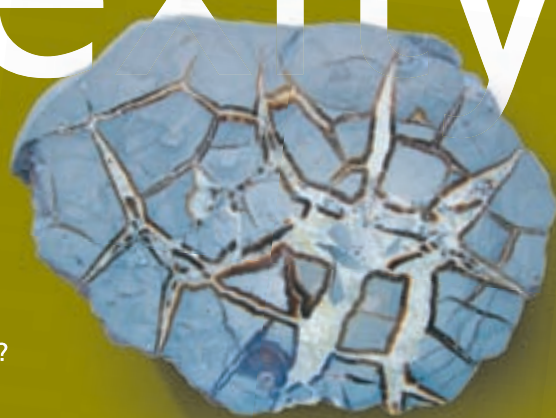
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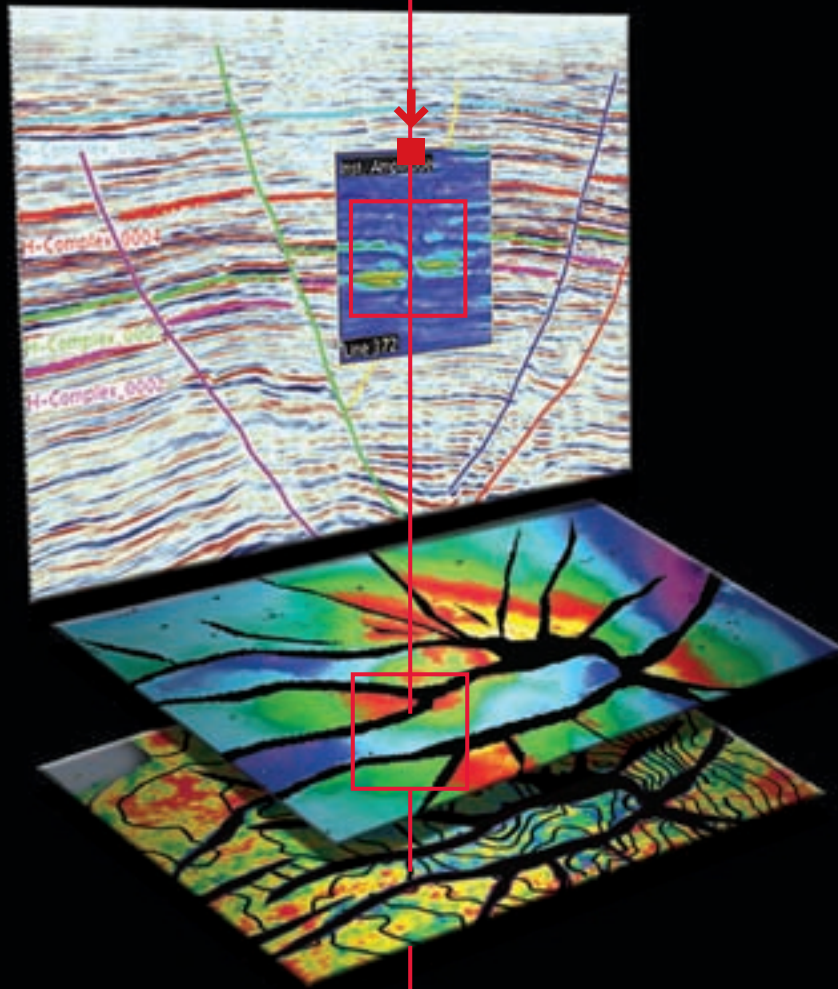
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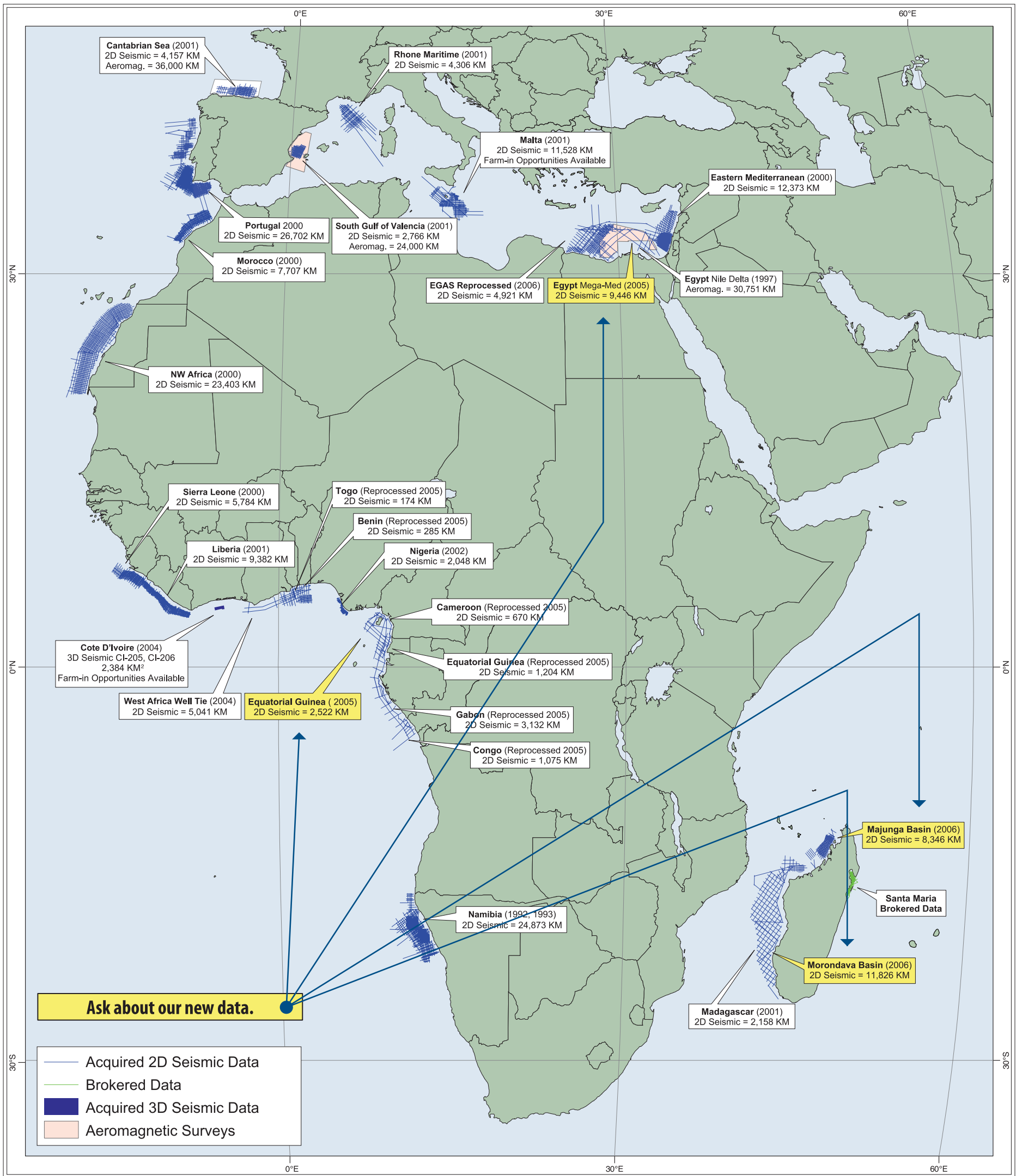
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*'Mother Continent' Protected by Treaty***Antarctica: Too Risky for Business?**

By LOUISE S. DURHAM  
*EXPLORER Correspondent*

The continent of Antarctica is distinctive in myriad ways, including its massive ice cap, mountain peaks and intriguing penguin population.

It also has the distinction of being the only continent in the world where an oil exploration well has never been drilled.

And because of myriad reasons, if the drill bits do begin turning in this remote locale, it won't be anytime soon.

But at least one geologist believes personal bias, politics or fears of hostile environments should *not* be the reason for the delay.

Let's talk geology, says David Macdonald, professor of petroleum geology at the University of Aberdeen, who will be doing just that at the AAPG International Conference and Exhibition in Perth.

In fact, the continent is protected from any mineral exploration – including oil – until the 2040s under the terms of the Madrid protocol to the Antarctic Treaty. The international treaty has been signed by most of the key countries capable of conducting oil exploration, according to Macdonald.

Given the huge ice sheet covering the continent, very little geology is exposed. Offshore geophysical data have been collected for scientific purposes but lack detail – at least the kind needed for oil exploration.

Typically the seismic lines are tens of kilometers apart.

David Macdonald, will present the paper "The Petroleum Potential of Antarctica" at 11:50 a.m. on Monday, Nov. 5, at the AAPG International Conference and Exhibition in Perth, Australia.

Macdonald's talk is part of a session on "Gondwana: Geology of the Break-Up." Other talks in the session are:

✓ Implications of Models for Opening of the South Atlantic on

Geometry and Timing of Salt Deposition.

✓ Break-Up Of Eastern Gondwanaland: Genesis of Bangladesh's Petroleum System.

✓ Oil From the South: Mesozoic Petroleum Systems, Proven and Potential, in Mid- to High Southerly Latitudes.

✓ Eastern Gondwana – Tasmanides Petroleum Systems.

**Gondwana Aftermath**

The general geology can be summarized in a relatively simple manner.

"If you look down on the South Pole, you have a continent that looks like a tadpole, and the head is called East Antarctica or Greater Antarctica," Macdonald said. "The geology is largely pre-Cambrian shield area where you have rocks going back to nearly 4,000 million years.

"This part of Antarctica is sort of the central remnant of Gondwana, as every other Gondwana continent was attached to this part of Antarctica at least a bit before migrating away," Macdonald noted.

"There are some sedimentary rocks in East Antarctica and some sedimentary basins," he said. "But they're not very big because the continental shelves of East Antarctica are extremely narrow, probably the narrowest in the world. They also tend to be more than 1,000 meters water depth and don't have the same sort of structures as other continental shelves."

Another oddity is that the shallowest part of the continental shelf around most of Antarctica is the outer part because the shelf actually slopes backward toward the continent. This is due in part to the weight of the large ice mass bearing down and depressing the center of the continent.

Another factor comes into play during periods of extreme glaciation. When sea level is lowered, the continental shelves are scoured by ice, and the scouring is more intense on the inner portion.

The tail of the "tadpole" is known as West Antarctica or Lesser Antarctica. It's largely a Mesozoic volcanic arc and is dominated by andesites, granodiorites and such.

The third major zone of the continent is a sort of low trough that separates the two bits of Antarctica. One side of the trough is the Transantarctic Mountains, which rise to 15,000 feet.

There are no exposed rocks on view within this central zone, but data offshore indicate the rocks are probably Mesozoic with some Cenozoic occurrence,



according to Macdonald.

The expression of the trough coming through the middle of the continent is the Weddell Sea in the Atlantic sector and the Ross Sea in the Pacific sector. Most of the "exploration thinking" has focused on these two large sedimentary basins, according to Macdonald.

"This is where the petroleum geology starts to come in," he said. "We know from the onshore geology in West Antarctica in the Antarctica peninsula area that there are black mudstones, which have source potential.

"There are source rocks of Jurassic age probably kicking around over a lot of this sedimentary basin area," Macdonald said. "We know they've got organic carbon content up to maybe 4 percent."

**A Few More Obstacles**

If you're tempted to pack your field clothes and long johns and call a meeting

See **Big Chill**, page 34

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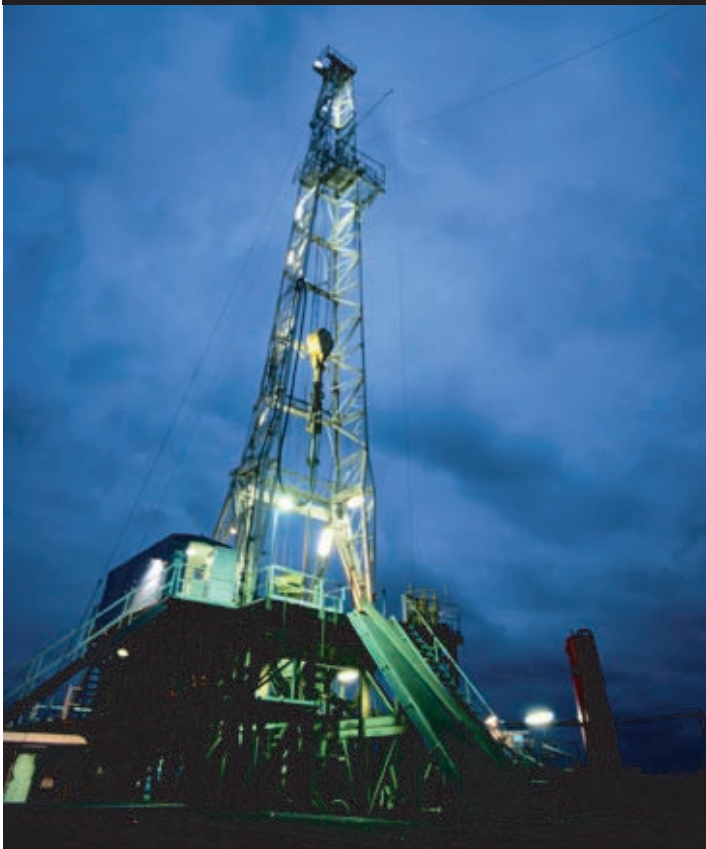
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## Students Grab Spotlight in October

Geoscience students once again are in the AAPG spotlight in October via three events designed to help them position themselves for jobs upon graduation.

The month starts with the Rocky Mountain Rendezvous of geoscience students and employers, held Oct. 1-2 at the University of Wyoming, Laramie, Wyo.

Slated after that:

✓ The Student Job Quest will be held Oct. 8-9 in Buffalo, N.Y., in conjunction with the Eastern Section meeting.

Students will be able to meet with company representatives from several major oil and gas operations, such as ExxonMobil and Occidental Oil and Gas. For information contact Katharine Lee

Avary at [avary@geosrv.wvnet.edu](mailto:avary@geosrv.wvnet.edu); or by telephone, (304) 594-2331.

✓ The ninth annual fall AAPG-SEG Student Expo will be held Oct. 9-10 at the George R. Brown Convention Center in Houston.

The Student Expo is another tool for linking geoscience students with industry recruiters – a showcase for students to present their work via poster sessions, network and interview with multiple employers.

Activities at the two-day Expo include field trips, an open poster session and Icebreaker on Monday, followed by a full day of poster presentations and interview on Tuesday.

On Tuesday, there will be an informal

reception where poster awards will be presented.

Expo corporate sponsors include Anadarko Petroleum, Apache, AWG, BHP Billiton, BP, Chesapeake Energy, Chevron, ConocoPhillips, Core Laboratories, Devon, Dominion, EnCana, EOG Resources, ExxonMobil, Fairfield, Hess, Houston Geological Society, Kerr McGee, Minerals Management Service, Nexen, Noble Energy, Occidental, Omni Labs/Live Oak Reserves, Pioneer Natural Resources, Samson and Schlumberger.

The annual AAPG-SEG Spring Break Student Expo is slated for March 15-17, at the University of Oklahoma, Norman, Okla.

More information is available online at <http://studentexpo.info/>. □

## Big Chill

from page 32

of investors, calm down.

It goes downhill considerably from this point.

"As to risk potential, you have to risk it extremely highly because of the large amount of volcanics," Macdonald cautioned. "Any sandstones we see of this age tend to be very volcanic-dominated and have very low porosity."

Maturation is another thorny issue.

There's been considerable volcanism in the area, so there's a possibility a lot of the source rocks are over-mature as a result, according to Macdonald. On the other hand, the younger source rocks are likely to be under-mature.

The likelihood of no trapping mechanisms adds still more risk to potential exploration activity.

"Since the start of the Tertiary, there's been little collisional tectonics or anything that would create structure," Macdonald said. "So in a lot of these things there's considerable risk of no traps."

"When you add up all the risks – particularly on reservoir maturation and structuring – you end up with something quite prohibitive," he noted. "And that's before you start looking at environmental factors like depths of continental shelves and the ice that covers the seas around Antarctica for nine months of the year."

The area produces some whopper icebergs.

"The icebergs are two to three orders of magnitude bigger than anything dealt with in other areas," Macdonald said. "The biggest icebergs they deal with at Hibernia Field off Canada wouldn't register on the radar in Antarctica."

### Taking an 'Honest Look'

The significant downside to exploring doesn't necessarily mean ignoring what may or may not be there hydrocarbon-wise.

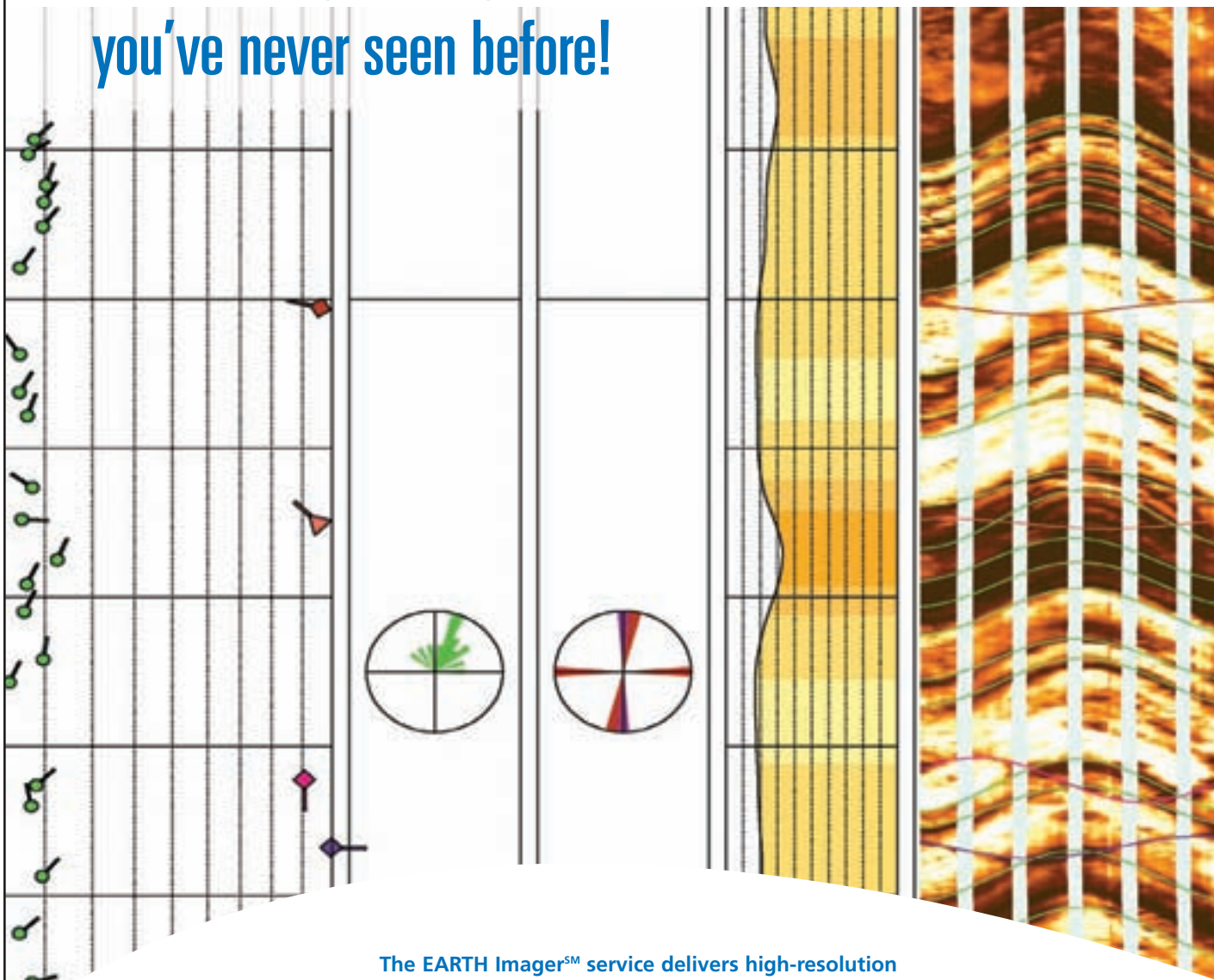
"My argument is Antarctica is a continent worth protecting," Macdonald said, "but it's worth protecting by doing an honest assessment of what the risks and likely returns for any oil exploration would be."

"The risks are so high no normal oil company would be tempted to try their luck there," he said. "The only reason anyone might drill a well there would be to make a political point rather than in hopes of any economic gain."

"My idea to assess it is just take an honest look at it instead of shying away and saying it's a protected continent, and we shouldn't even be thinking about it," Macdonald said.

"Maybe a lot of people will relax when we take an honest look at it." □

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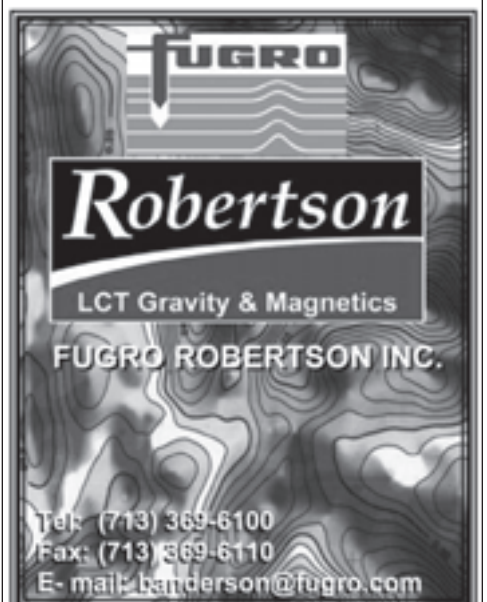
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## Levorsen Winners Announced

A.I. Levorsen Award winners, honored for presenting the best paper at Section meetings, have been announced for two recent events. The winners are:

### Southwest Section

Robert G. Loucks, with the Bureau of Economic Geology, Austin, Texas, for the paper "Depositional Setting, Lithofacies and Pore Networks of the Mississippian Deepwater Barnett Shale Facies in the Fort Worth Basin." Loucks previously won the 2001

AAPG Wallace E. Pratt Memorial Award, presented for the best article published in the AAPG BULLETIN. The Section's 2007 meeting will be April 22-24 in Wichita Falls, Texas.

### Rocky Mountain Section

Geoff D. Thyne, with the Colorado School of Mines, for the paper "Evaluation of Potential Impacts to Water Resources from Petroleum Drilling, Grand Mesa, Colorado." The Section's 2007 meeting will be Oct. 7-9 in Salt Lake City. □

## 4-D Drivers

from page 28

"Over the last decade a lot of independents have bought those mature fields and are successfully drilling new wells, and they're thinking about 4-D," Lumley said. "They're not quite there yet because they're more conservative about trying expensive new technology than the majors, but they're looking at it as a return on investment to 'sharpshoot' bypassed oil."

"Apache has done a very similar thing in buying the old Forties Field in the UK and doubling its production in a few years with the help of 4-D," Lumley said.

He predicts a gradual resurgence of 4-D on the shelf and said 4-D in deep water is really starting to kick off in both the GOM and Brazil, noting "if you're drilling \$50 million wells, it's costly if you make a mistake where you put one; optimal placement is essential."

"There's interest in monitoring reservoirs using 4-D seismic at the very beginning of a field's life in this high expense environment," he continued. "That way, you can anticipate a problem before it becomes irreversible."

"It's risk reduction, like going to the doctor for an annual checkup rather than waiting for something bad to happen."

### Seeking the 'Holy Grail'

Notable advances are occurring in 4-D acquisition technology to improve repeatability of surveys, which is crucial. Highly accurate positioning of sources and receivers is key to achieving the required level of repeatability.

Lumley noted there also have been advances in navigation systems and location positioning of cables. Steerable streamers that can be put in the same place as previous surveys are being refined as well.

Another acquisition technique being employed is to oversample the streamer receiver array by towing more cables and extracting the repeatable data.

"The Holy Grail, of course, is semi-permanent installations where receiver arrays are laid down semi-permanently on the seafloor," Lumley said. "This could be nodes or ocean bottom cable. The biggest field test of this technology is currently BP's permanent array project at Valhall Field."

Regarding the source repeatability aspect of 4-D acquisition, new technology is being developed to tow more source arrays and have the closest source to the baseline shot position fire.

"Instead of towing two source arrays, you might tow three or four and select which ones fire," Lumley said. Statoil is taking the lead to develop this high fidelity source technology."

There's a push going on to improve 4-D interpretation tools owing to the need to integrate the geology, rock and fluid

physics, seismic and flow simulations to perform an accurate 4-D interpretation.

"Sometimes today we see anomalies



Lumley

but aren't sure how to interpret them and don't know what they mean," Lumley said. "To develop these integrated tools to sort out those anomalies and help update the reservoir model, we

have to get the geologists, geophysicists and petroleum engineers to work together in an integrated work space."

### Eco-Friendly Benefits

Finding bypassed oil is high on the list of business drivers pushing 4-D advances, but this is only the tip of the iceberg.

Injecting various materials, e.g., CO<sub>2</sub>, water, steam, into the reservoirs to enhance production or maintain pressure is a pricey undertaking. It's essential to be able to monitor where the injected material goes and if it's doing the job it's supposed to do; 4-D can prove invaluable in these situations.

Carbon dioxide storage is anticipated to be a major target of 4-D seismic monitoring technology. Because this greenhouse gas is not beneficial when released into the atmosphere, injecting it into the ground appears to be a good solution.

"CO<sub>2</sub> production is a big problem at some fields – in Norway and Canada, for instance," Lumley said, "and it's going to be a big challenge at the Gorgon Field in Australia, for example, where they're producing it as a by-product of the gas field. They'll have to re-inject it and store/sequester it in deep geologic formations so it doesn't escape."

"There will be a monitoring challenge there," Lumley noted, "but if they can inject the gas and store it for a long time, it will have a big positive impact – both financially and environmentally."

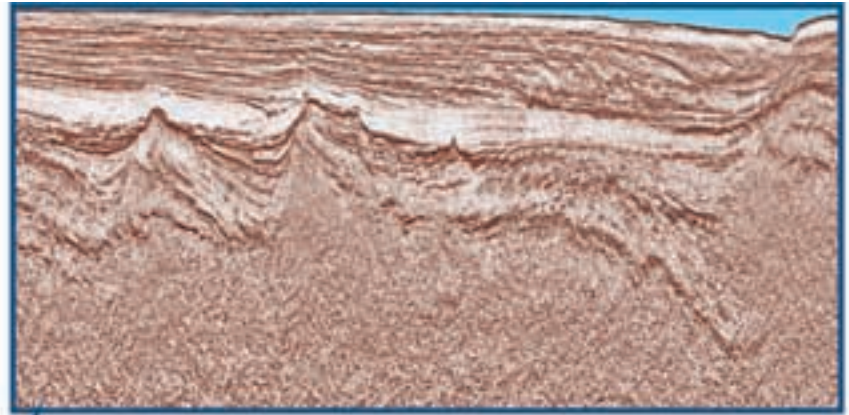
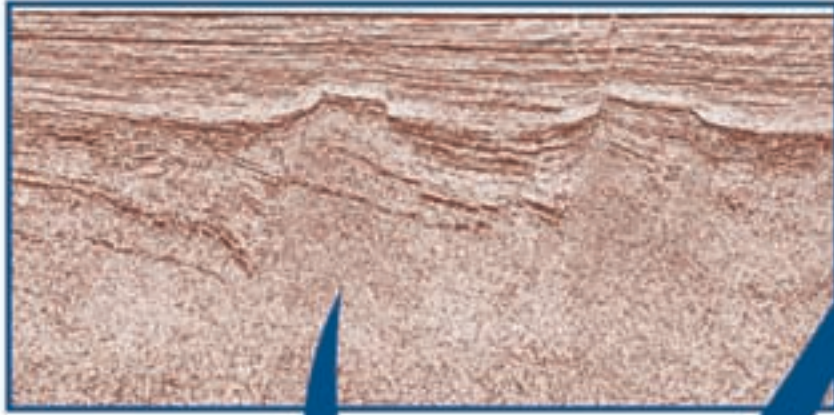
It is noteworthy that other industries generate CO<sub>2</sub> and are seeking a place to contain it.

"A new business sector will be created over the next decade or two where some will want to get rid of CO<sub>2</sub>," Lumley said, "and some will offer to receive and inject it into the ground for long-term storage. It will have to be monitored, and 4-D seismic is one of the tools that will be used to be sure it's in the right place in the ground and not leaking out."

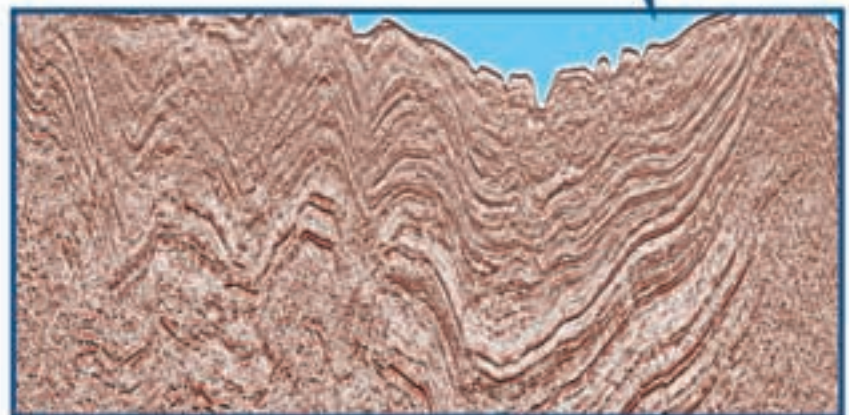
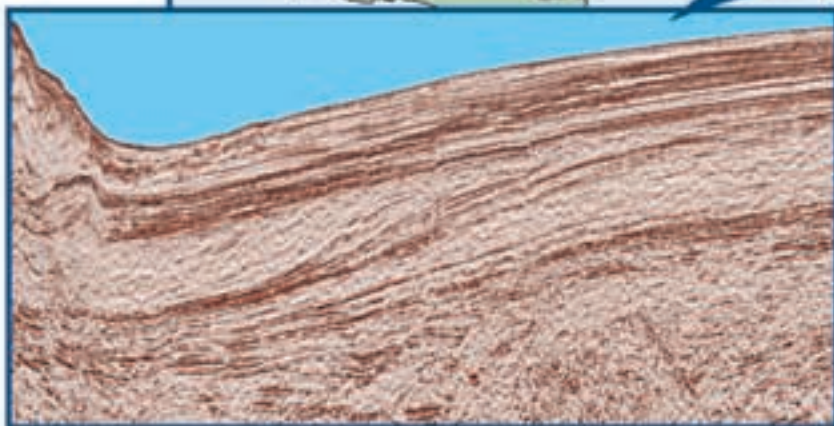
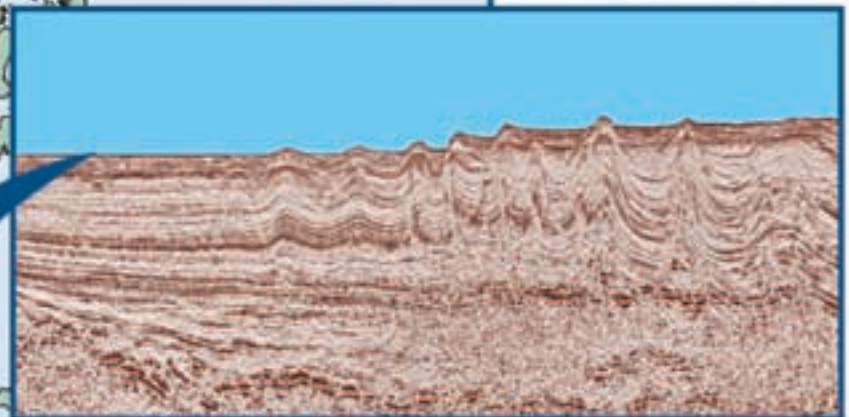
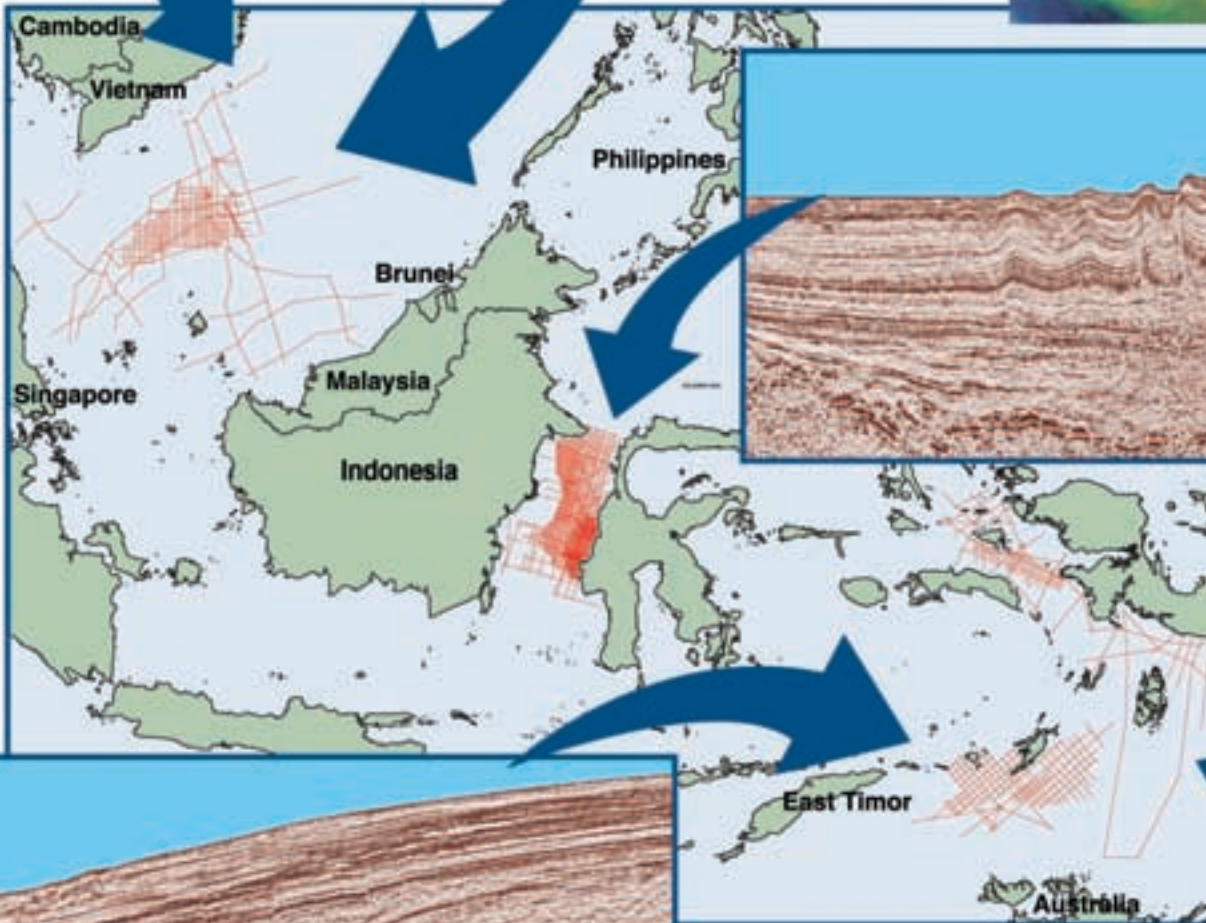
"Governments worldwide are getting serious about CO<sub>2</sub> sequestration technology," he added, "and are starting to invest heavily in its research." □

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## Global Prospects Shown

## Summer NAPE Draws Over 5,300

By LOUISE S. DURHAM  
EXPLORER Correspondent

Summer NAPE was a sizzlin' event at the George R. Brown Convention Center in Houston – which was sizzlin' in a whole different way during the "dog days" of late August.

The action at the popular prospect expo was so intense there were viewers huddled in deep conversation with exhibitors up until the very last minute as the booths were being dismantled around them.

Summer Nape was created and produced by NAPE Expo LP, which is a partnership comprised of the AAPL, AAPG, IPAA and SEG. The former AAPG-sponsored APPEX summer prospect expo was rolled into the NAPE affair when AAPG joined the NAPE partnership.

"This year's Summer NAPE was a wildly successful event," said Rick Fritz, executive director of AAPG. "This thing has grown by 40 percent, so it's clearly successful."

"There were skeptics who said you couldn't do one at this time of year," Fritz noted, "and it's clearly proven those skeptics wrong."

Indeed, the numbers increased dramatically over the 2005 summer event, which also was deemed a success story.

The booth count was up 40 percent to 525 this time around, and the attendance was up 33 percent to 5,300, according to Robin Forte, executive vice president of AAPL, where NAPE originated as a late winter-only event that continues. Even the evening icebreaker hit a record, at 2,000.

"There were very good vibes from people who were selling," Forte said, "and

*Tight shales spotlighted as the "hot plays" in North America.*

obviously the people buying were happy, too. One guy said he had shown his deal to people he hadn't thought would be interested and probably wouldn't have gotten in to see – but here, they came to him.

"We couldn't be happier with the results," Forte said. "It's doing what it's supposed to do – providing networking, prospect exchange and marketing – and doing it very well."

The confab kicked off with an E&P forum – "Perspectives on North American Oil & Gas Plays" – sponsored by IHS Energy. The morning session featured talks dealing with hot North American plays, with shale plays such as the Woodford and the wildly active Barnett taking center stage.

The Rocky Mountains also justifiably grabbed its fair share of the spotlight given the region's emerging shale plays, tight gas sands and coalbed methane deposits. Presentation themes included approaches to help characterize shale reservoirs in the United States, shale fracturing and well completion case histories, among others.

The presentations were followed by an industry luncheon, featuring a presentation by John Richels, president of Devon Energy, and an afternoon prospect promotions session.

**'They're Having Fun Again'**

In what appears to be a trend, small company booths dotted much of the landscape in the convention center. A sustained period of high commodity prices and company mergers apparently have inspired a lot of entrepreneurial types to put together their own shops to generate prospects, along with other ventures.

In fact, the exhibitors were promoting a lot more than just prospects.

The folks at the ShaleQuest booth, for example, were promoting a recently completed geological and petrophysical study of the Fayetteville shale. The ShaleQuest partners staffing the booth included Barnett shale veteran geologist Kent Bowker, whose mantra these days is "shale good."

In fact, he's predicting the Neal/Floyd shale in Alabama is next in line to see some serious action.

Two-year old Circle Oil Plc, an Irish company traded on the London AIM exchange, was at NAPE to acquaint viewers with opportunities rather than to sell anything.

Circle's vice president of exploration, Bob LoPiccolo, noted the company generates prospects in Oman, Panama

and Namibia, and he had high marks for the NAPE event.

"It's definitely worthwhile being here," he said, "and we'll likely return in the winter."

United Kingdom-based ENVOI is a regular at NAPE get-togethers with an attendance track record of seven years – winter and summer. The organization specializes in advisory services, which include how to market a deal.

ENVOI's director Mike Lakin, who serves as vice president of the AAPG European Region, said he sees increasing interest from domestic players wanting to go international.

"They have more money, and they're having fun again," Lakin noted, "and they have an increased appetite for risk."

Summer NAPE viewer Gerritt Wind of Wind & Associates commented on the enthusiastic crowd at the event and the steady flow of traffic.

"Some people said traffic has been so good, they don't even know what their neighbors have," Wind said. "They haven't had a chance to get out of their booth."

The folks at Summer NAPE newcomer Dorado Energy, which operates in East Texas in the Cotton Valley in Panola County, were pleasantly surprised at the experience.

"It's bigger than we thought it would be," said Tom Schaefer, senior vice president of Dorado, "and we've had a lot more attention than we expected."

"There's good energy and people," Schaefer noted. "It's been busy and functional." □

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## WashingtonWATCH

## Issues Call for Active Roles

By DON JUCKETT  
GEO-DC Director

This month's comments are a reminder for AAPG members of rights (and responsibilities) with regard to getting involved in issues that impact your professional lives, the longevity of the profession and quite possibly our financial future.

Over the next few months the Government Affairs Committee will be issuing several "Action Alerts" (more on that below) covering the Outer Continental Shelf (OCS) and R&D budget issues as the 109th Congress resumes its final few days of this session.

*Editor's note: Don Juckett, head of AAPG's Geoscience and Energy Office in Washington, D.C., can be contacted at [djuckett@aapg.org](mailto:djuckett@aapg.org); or (703) 575-8293.*

When taking the position as GEO-DC director, it was not envisioned as having cheerleading responsibilities – but that role has evolved, because all of us need to be reminded occasionally of our responsibilities and rights in an open democratic society.

In a recent e-mail exchange involving about 40-50 AAPG members, the following was offered:

\* \* \*

Strategically, if you want to change the perceptions in Washington and begin to swing issues to the point where science and logic prevail here are some general "rules of thumb" that AAPG members need to consider. These rules obtain whether we are addressing climate change, OCS access, Endangered Species Act reform or any of the other issues that impact the personal, professional and business futures of the AAPG membership.

These rules also will help us to effectively engage those issues that are difficult and sometimes unpopular and reverse the damaging perceptions created by those who (ab)use the system by purveying "bad science."

✓ We will not make a difference in public policy as long as we expend all of our energies in dialog among ourselves.

*Get involved in the public aspects of the debate!*

The late Thomas P. "Tip" O'Neill, the venerable U.S. Congress Speaker of the House, expressed it most eloquently when he said "all politics is local." Getting involved means that in Virginia where I reside, for example, it is necessary to organize locally to visit and dialogue with the state offices of U.S. Sens. George Allen and John Warner. I tell their staff what I believe and why; they have time to listen. More importantly, I am a constituent – I vote in Virginia!

The same obtains with my congressmen.

You can rely on the local staff to communicate with your elected representative to let him/her know what the "voters think." That is not to suggest that you ignore what goes on in Washington, only that you understand the front lines in the battle to win the hearts and minds of your elected officials is not that far from home.

✓ You need to study your opponent – and where he is successful, study his tactics well!

*You can use those same tactics effectively!*

This was recently elegantly illustrated during the preliminary comment period for the MMS Five Year Plan 2007-2012. Those comment periods for the past two decades have been dominated by a well-organized coalition of groups led by the Sierra Club and others, and had overwhelmingly saturated the MMS process with "don't even think about drilling there" messages.

This past comment period marked a sea change when the pro-development coalition – including AAPG – got better organized and worked the process very effectively. We were delighted when we discovered that we dominated the comment period process by swamping the anti-drilling commenters by almost two to one.

The final comment period for the 2007-12 OCS Lease Sale Plan began in August. The GEO-DC link on the AAPG Web site takes you to the "Action Alert" with information for members on timing and "how to" to participate in the process.

✓ Accept the proposition that you will need to work with the media.

This implies that you will need to write letters to the editors of local, regional and national newspapers; you will need to go face-to-face with sometimes clever and possibly biased reporters; and you better have your story well thought out and articulated effectively. Practice on your family and friends.

*The main difference between "truth" and good science is that good science is not self-evident; it takes commitment, patience and dedication to make itself known. The scientists themselves need to be the principal advocates and articulators of the story.*

Don't despair, there are some pretty outstanding coaches out there to help –

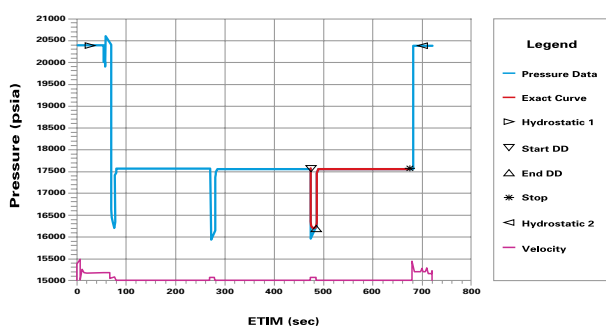
See **Washington**, page 47

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## GEOPHYSICAL CORNER

## S-Wave Analysis of Fracture Systems

(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 A. HARDAGE  
and MICHAEL V. DeANGELO

Most rocks are anisotropic, meaning that their elastic properties are different when measured in different directions.

For example, elastic moduli measured perpendicular to bedding differ from elastic moduli measured parallel to bedding – and moduli measured parallel to elongated and aligned grains differ from moduli measured perpendicular to that grain axis.

Because elastic moduli affect seismic propagation velocity, seismic wave modes react to rock anisotropy by exhibiting direction-dependent velocity, which in turn creates direction-dependent reflectivity. Repeated tests by numerous people have shown shear (S) waves have greater sensitivity to rock anisotropy than do compressional (P) waves.

Slowly the important role of S-waves for evaluating fracture systems, one of the most common types of rock anisotropy, is moving from the research arena into actual use across fracture prospects. Examples of S-wave technology being used to determine fracture orientation have been published in past Geophysical Corners (e.g., Gaiser, April and May 2003 EXPLORERS).

It seems timely to introduce one more example.

\* \* \*

The prospect considered here involves two fractured carbonate intervals at a depth of a little more than 1,800 meters (6,000 feet). A small 5.75-km<sup>2</sup> (2.25-mile<sup>2</sup>) three-component 3-D seismic survey (3C3D) was acquired to determine whether PP (compressional) and PS (converted-S) data could be used to determine fracture orientation for optimal positioning of a horizontal well.

Figure 1 shows a PP and PS azimuth-dependent data analysis done in a superbin near the center of this survey. At this superbin location, common-azimuth gathers of PP and PS data extending from 0 to 2,000-meter offsets were made in narrow, overlapping, 20-degree azimuth corridors.

In each of these azimuth corridors, the far-offset traces were excellent quality and were summed to make a single trace showing arrival times and amplitudes of the reflection waveforms from two fracture target intervals A and B.

To aid in visually assessing the character of these summed traces, each trace is repeated three times inside its azimuth corridor in the display format used in figure 1.

Inspection of these azimuth-dependent data shows two important facts:

✓ PS waves arrive earliest in the azimuth corridor centered 50° east of north (the fast-S mode, S1) and latest in an azimuth direction 140° east of north (the slow-S mode, S2).

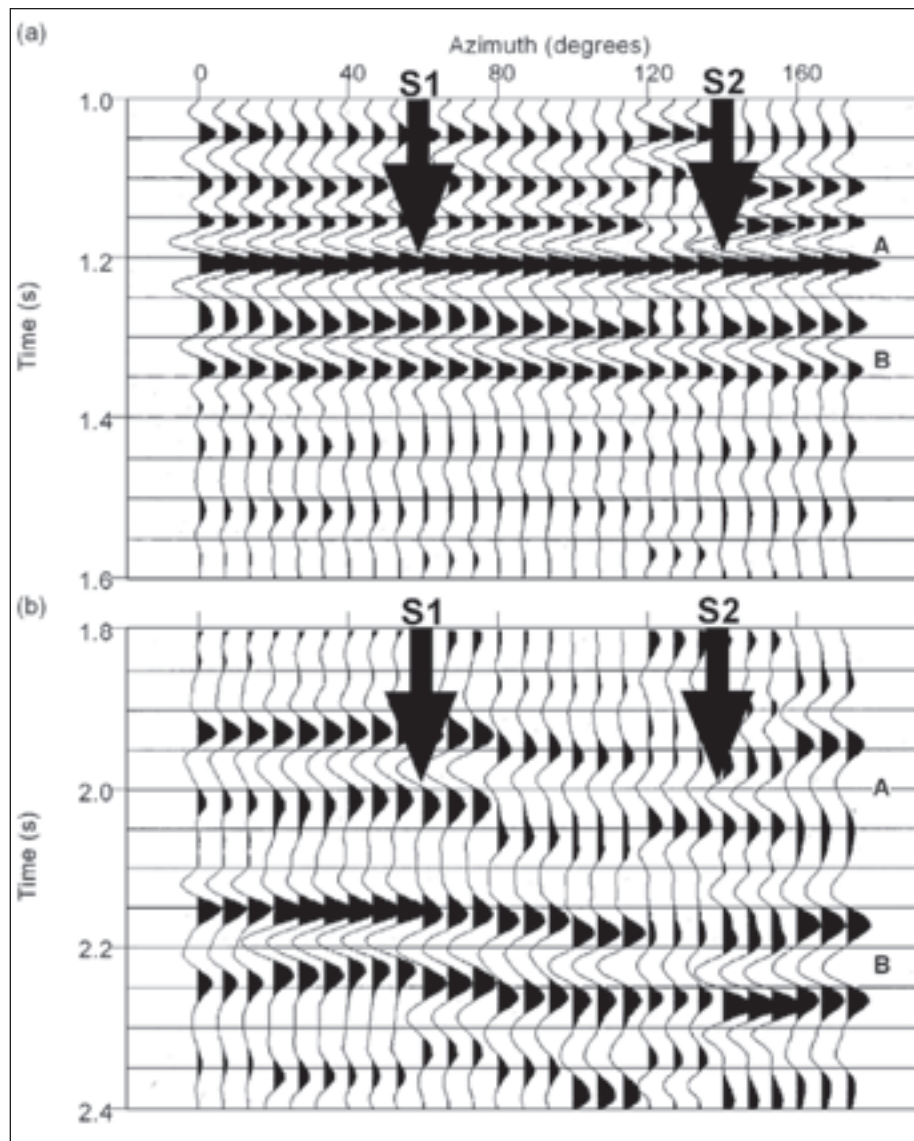


Figure 1 – (Top) Azimuth-dependent PP arrival time and reflectivity from fracture targets A and B. (Bottom) Azimuth-dependent PS arrival time and reflectivity from the same targets. PP reflectivity changes little with azimuth; PS reflectivity varies significantly. PP arrival time changes by 4 ms between azimuths 50° and 140°, whereas PS arrival time changes by 50 ms. Azimuth 50° is the fast-S mode (S1); azimuth 140° is the slow-S mode (S2).

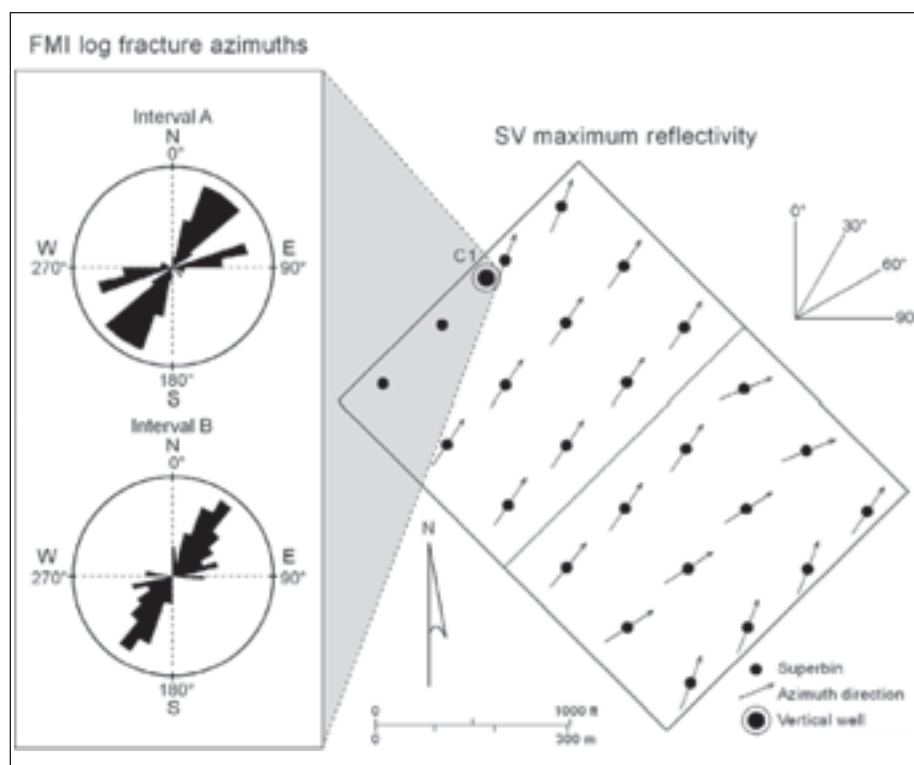


Figure 2 – An azimuth-dependent analysis of PS data similar to that shown in figure 1 was done at each location having a solid circle with an accompanying short arrow. Each arrow shows the local azimuth in which PS reflectivity from interval A was a maximum. The rose diagrams show the fracture azimuths across intervals A and B as interpreted from FMI log data acquired in well C1. The S-wave-based fracture azimuths agree closely with the FMI-based fracture azimuths and allow fracture orientation to be extended across seismic image space.

✓ PS waves exhibit a greater variation in arrival times and amplitudes than do their companion PP waves.

For example, PP reflectivity from interval A is practically constant in all azimuth directions, whereas PS reflectivity varies significantly with azimuth. Likewise, PP arrival time of event A changes by only 4 ms between azimuth directions 50° and 140°, but PS arrival times change by almost 50 ms, an order of magnitude greater than the variation in PP arrival times.

\* \* \*

Azimuth-dependent trace gathers like these were created at many locations across the seismic image space, and the azimuths in which PS reflection amplitudes from fracture intervals A and B were maximum were determined at each analysis location to estimate fracture orientation for each interval.

A map of S-wave-based azimuth results for interval A in the vicinity of calibration well C1 is displayed as figure 2.

Shown as rose diagrams on this map are fracture orientations across the two reservoir intervals as interpreted by a service company using Formation Multi-Imaging (FMI) log data acquired in well C1. S-wave estimates of fracture orientations are shown as short arrows at analysis sites near the well. This S-wave-generated map indicates the same fracture orientations interpreted from the FMI log data.

On the basis of this close correspondence between FMI and S-wave estimates of fracture orientation, the operator used S-wave estimates across the total seismic image area to position and orient a horizontal well trending perpendicular to seismic-based fracture orientation. This well found the S-wave estimates of fracture orientation to be accurate across its drilled lateral distance of approximately 1,000 meters, and serves as a good real-world example of the value of S-wave seismic data for evaluating fracture prospects.

In this instance, S-wave data provided fracture information that could not be extracted from P-wave data (figure 1).

We conclude that application of S-wave seismic technology across fracture prospects should be considered by operators when possible.

\* \* \*

A post-mortem comment on this particular horizontal drilling: The well was not placed in production – even though the well bore intersected a high population of fractures trending perpendicular to the well axis – because too many of the fractures were plugged with cement.

That problem sets the stage for next month's article, in which we will describe S-wave attributes that can be used to indicate fracture intensity and openness.

Acknowledgment: This research was funded by sponsors of the Exploration Geophysics Laboratory at the Bureau of Economic Geology.

(Editor's note: Hardage and DeAngelo are both with the Bureau of Economic Geology in Austin, Texas.) □

## Russia

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The consortium has easily surpassed that target, he stated.

"Since 1996, over 100 million Russian man-hours of services have been expended, representing some 72 percent of the total. Material and equipment supply exceeded 6.2 million metric tons, some 89 percent of the total by the end of 2005," he said.

"We also recognize the importance of maximizing Russian content performance in terms of value. Since construction activities commenced in 1996 on Phase 1, Russian contractors and subcontractors have won thousands of contracts worth up to a total of \$7.2 billion," he added.

Foreign participation in Russia's oil

and gas sector has been a puzzle, problem and perplexing dilemma for Russian President Vladimir Putin and his energy advisers.

The petroleum industry reportedly accounts for more than half the government's revenues.

Russia wants to maintain some control over its domestic industry without discouraging outside investment. It wants access to Western technology and expertise without opening the oil sector to foreign influence.

Those desires have led to policies and actions that often appear conflicted, and reflect a growing nationalistic stance.

"In this time of uncertainty, there is no equilibrium. It's all unstable now," Ulmishek said. "I think maybe in a year or two an equilibrium will be reached."

Meanwhile, against all odds, Russia's Sakhalin mega-projects go right on moving forward. □



The Sakhalin-2 onshore LNG processing facility at Prigorodnoye.

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## 30 Tons of Pubs Shipped 'Network' Yields Book Dividends

The AAPG Publications Pipeline Committee invested some sweat last summer in furthering the aims of AAPG, along with a lot of equity – 30 tons of it, in fact.

Committee members filled a shipping container with donated geoscience books and journals from those who no longer need them and forwarded the publications to universities in Bangladesh.

The shipment marks the largest single donation by the committee and brings the total amount of publications donated by the committee to over 51 tons of much needed books and journals for universities abroad.

"Key elements that make the committee tick include generosity, an active network and a lot of help from our friends," said committee chairman Rick Wall.

The story of the Bangladesh shipment began when committee member Nahum Schneidermann, of Chevron International in San Ramon, Calif., contacted a colleague in Chevron's Bangladesh office in Dhaka and told him of the mission and the activities of the Publication Pipeline Committee.

Unocal Bangladesh (Chevron International) chief geologist and AAPG member A.H.M. Shamsuddin then contacted the committee and inquired further about how our program works and how local universities could apply for a donation.

With this information, Shamsuddin facilitated the application process with the local universities and took the additional step

of seeking Chevron management approval to underwrite the shipping of the publications from the committee's warehouse facility in Houston (which is generously donated to the committee by Robbie Kane of the J.A. Green Development Corp.) to the requesting universities in Bangladesh.

Committee members had previously sorted the donated publications and gathered on a Saturday to pack the goods. Those assisting included Wall, Mike Bryarly, Chuck Caughey, Garland Bryarly (independent drilling consultant and Mike's dad) and Martin Cassidy, past Pipeline Committee chairman.

But the committee's work continues, thanks to more help from friends.

Wall said Claren Kidd of the University of Oklahoma got the word out about the Publication Pipeline via the Geoscience Information Society newsletter.

This information reached Linda Musser of Penn State University library system – and also the program director of the Alliance for Earth Sciences, Engineering and Development in Africa (AESEDA). AESEDA assists partner institutions in Africa with building geosource libraries.

As a result of Claren's proactiveness, the AAPG Publication Pipeline and AESEDA have agreed to work cooperatively to get publications to universities in Africa that are in need of them.

— LARRY NATION



Publication Pipeline Committee Vice Chairman Mike Bryarly loads a pallet of publications into a container at the J.A. Green Houston warehouse facility.



Mike Bryarly, Chuck Caughey, Garland Bryarly (Independent Drilling Consultant and Mike's dad) and Martin Cassidy take a break from loading 30 tons of publications bound for Bangladesh.

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## Pipeline Would Like Even More Friends

The AAPG Publications Pipeline Committee needs your help.

The committee collects unneeded geoscience books and journals and forwards them to overseas universities and libraries.

"We execute our mission by collecting most of the material from retired and deceased geoscientists and also downsized company libraries," said committee chairman Rick Wall, of Houston. "We inventory, box and store the books and journals for shipment until a need for them is identified. Then through the assistance of companies with overseas operations, we send them to overseas universities and other libraries that require these valuable resources."

Wall said membership can help the committee in five ways:

✓ Help them identify universities overseas in need of publications. "Consider acting as an ambassador for our cause," he said.

✓ Recommend to your company that they sponsor a shipment of publications overseas to needy universities in the host country of your operations. Experience shows that is a win-win activity for all involved.

✓ Join the committee. "Help is especially needed in Houston," Wall said, "to work with us in handling donations and arranging distributions."

✓ Keep the committee and its work in mind if you decide to dispose of your library; international universities often do need both books and periodicals.

✓ Funding. "AAPG provided us with a \$4,000 budget this last year," Wall said, "but to be most effective we need at least \$22,000 a year."

Donations can be made to the AAPG Foundation marked for the Publication Pipeline, either endowment or operating funds.

To assist, contact Wall at [rwall1@hotmail.com](mailto:rwall1@hotmail.com). □

## AAPG Datapages Library Expands

### Indonesia, Kansas Data Added

By SANDRA PASKVAN

AAPG Publications Department

The AAPG/Datapages-hosted online library continues to expand, with the latest additions being the publications suites of the Indonesian Petroleum Association (IPA) and the Kansas Geological Society (KGS).

About 2,600 documents will be added with the addition of KGS and IPA, resulting in over 76,000 searchable documents in the archive.

The completed KGS collection contains the publications from 1929 to 2003, comprising oil and gas field reports, field guidebooks, conference proceedings and road logs. All are available online.

IPA publications are currently being digitized and individual volumes are being uploaded to the AAPG/Datapages Combined Publications Archive database. They are available as they are completed – to corporate and university subscribers and to the entire community – via Datapages' transactional Web site Pay-Per-View, at <http://payperview.datapages.com>.

These IPA publications include annual conference proceedings, special publications and field trip guidebooks. Those currently available online are the Annual Convention Proceedings of 1972-81, 1983-86 and 1990, with expected completion of the entire project this fall.

The purpose of Datapages, the digital arm of AAPG, is to acquire, aggregate, compile and convert legacy and current data, both published and public domain, from the upstream petroleum industry into digital formats; and to provide fingertip access to those digital data through the Internet or disc, using various formats, including GIS, word and geographic search-and-retrieval and streaming media.

Datapages currently hosts an

extensive archival collection of all AAPG publications (BULLETIN and Special Publications) as well as the Gulf Coast Association of Geological Societies Transactions, Canadian Society of Petroleum Geology Bulletin, Journal of Sedimentary Research, Journal of Petroleum Geology (UK) and publications of the New Orleans, Lafayette, Houston, East Texas, Fort Worth, Oklahoma City, Tulsa, Panhandle (Amarillo, Texas), Ardmore (Okla.) and Wyoming geological societies, in addition to those of Kansas and Indonesia.

Publications of other AAPG-affiliated societies and sections are being processed, with the goal to have all publications of AAPG-related/affiliated groups and of interested upstream societies or publishers in this library.

A great benefit to all explorationists and all geoscientists is access to the entire archive for search and retrieval. Each paper and abstract is fully indexed and includes a link to a downloadable Acrobat PDF copy of the paper.

AAPG Active and Associate members have access to the archival BULLETIN at no charge. Company and institutional subscribers have access to a part (or all) of the holdings, depending on the terms of individual subscription.

Contact [aapgdata@aapg.org](mailto:aapgdata@aapg.org) for information about access and subscription.

The entire petroleum community is invited to search the AAPG/Datapages online library on a transactional basis (on our pay-per-view Web site). The search is free, and payment is due only for the articles downloaded. Password registration (free) is required.

Visit the Pay-Per-View to register and search at <http://payperview.datapages.com>. □



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## PROFESSIONAL NEWS BRIEFS

**Allen E. Berlin**, to senior geological adviser, Energy XXI, Houston. Previously senior geological specialist, Kerr McGee Oil and Gas, Houston.

**Matthew W. Boyd**, to senior geologist, Southwestern Energy, Houston. Previously geologist, Southwestern Energy, Houston.

**James Burns**, to president and chief executive officer, Essential Energy Services Trust, Calgary, Canada. Previously chief operating officer-energy, Avenir Diversified Income Trust, Calgary, Canada.

**Elizabeth S. Cochran** is recipient of the 2006 Geological Society of America's

Subaru Outstanding Woman in Science Award. Cochran is a post-doctoral researcher, Cecil H. and Ida M. Green Institute of Geophysics and Planetary Physics, University of California-San Diego.

**James E. Corthay II**, to geoscience/site investigation-technical team lead, ExxonMobil Development, Houston. Previously operations geology/site investigation specialist, ExxonMobil Exploration, Houston.

**John M. Coss**, to president, Broad Oak Energy, Dallas. Previously vice president-business development, Pioneer Natural Resources, Irving, Texas.

**Allen K. Cregg**, to chief geologist, Santos USA, Houston. Previously senior geological adviser, Occidental Oil and Gas, Houston.

**Ken Dickerman**, to chief geophysicist, Broad Oak Energy, Dallas. Previously senior geophysical adviser, Apache Corp., Tulsa.

**Dennis Keith Duval**, to Mid-continent exploration and development geologist, Kirkpatrick Oil, Oklahoma City. Previously independent geologist, Kempner, Texas.

**Don A. Edwards**, to geoscientist, Broad Oak Energy, Dallas. Previously geoscientist, EnCana Oil and Gas, Dallas.

**Marc Edwards**, to explorationist, Hydro Gulf of Mexico, Houston. Previously consulting geologist, Houston.

**Henry I. Halpern**, to research science consultant-geochemistry unit, Research and Development Center, Saudi Aramco, Dhahran, Saudi Arabia. Previously science specialist-geochemistry unit, R&D Center, Saudi Aramco, Dhahran, Saudi Arabia.

**Robert D. Hatcher Jr.** has received the 2006 Geological Society of America Penrose Medal for his work "to decipher complex mountain systems." He is a Distinguished Scientist and Professor-tectonics and structural geology, University of Tennessee, Knoxville, Tenn.

**Larry Kellison**, to chief operating officer, Eden Energy, Denver. Previously vice president and general manager, Black Hills Exploration and Production, Golden, Colo.

**Harvey Klingensmith**, to president and chief executive officer, Stone Mountain Resources, Alberta, Canada. Previously president, El Paso Production, Alberta, Canada.

**Thomas B. Layman**, to geoscience manager, Chesapeake Energy, Oklahoma City. Previously development supervisor, ConocoPhillips, Midland, Texas.

**Dan Maguire**, to geophysical adviser, Hess Egypt West Mediterranean, Cairo, Egypt. Previously senior adviser, earth science, Unocal/Chevron Indonesia, Jakarta, Indonesia.

**Abhi Manerikar**, to exploration manager-Alaska, Talisman Energy, Calgary, Canada. Previously principal, Tiger Exploration Consulting, Calgary, Canada.

**Jarvis "Jay" Moore**, to regional geologist, XTO Energy, Fort Worth. Previously senior geologist, Encore Acquisition, Fort Worth.

**Javier Alejandro Morelos**, to senior geochemist, ExxonMobil, Houston. Previously vice president, Geoplicaciones, Houston.

**Dave Pivnik**, to senior geological adviser, Apache Energy, Perth, Australia. Previously senior geological adviser,

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continued from previous page

Apache Egypt Companies, Cairo, Egypt.

**Eric Radjef**, to senior geologist, Brigham Exploration, Austin, Texas. Previously senior geologist, BP, Houston.

**Frederico Ribeiro**, to senior geophysicist, BG Group, Rio de Janeiro, Brazil. Previously senior geophysicist, Siptrol International, Cairo, Egypt.

**Jesus Manuel Rodriguez-Gomez**, to graduate student, University of Houston, Houston. Previously geologist, PDVSA, Maracaibo, Venezuela.

**Louis Rothenberg**, to technical systems manager, Santos, Adelaide, Australia. Previously chief technology services, Chevron (Indonesia), Jakarta, Indonesia.

**John B. Thomas**, to senior geologist, EnerVest Operating, Charleston, W.Va. Previously vice president-exploration, Belden & Blake Corp., North Canton, Ohio.

**Andrew Tipton**, to associate geologist, Chesapeake Energy, Oklahoma City. Previously student, University of New Orleans, New Orleans.

Larry Wickstrom, to assistant state

## Washington from page 40

you just need to find them and court them.

Above all, don't become discouraged; remember that you are working to reverse many, many years of successes by those who not only have a different agenda, but have had time to get well organized and spent much effort and money to polish their messages.

*That is why it is important to learn how they did it and not repeat their learning experience, but jump ahead.*

\* \* \*

I recommend that members spend a few dollars and a little time getting better acquainted with the principals of advocacy (not lobbying) and your rights protected by the First Amendment of the Constitution. Consider reading one of the following to get better acquainted with a couple of approaches: *The One-Hour Activist* by Christopher Kush, or *All Politics is Local; and Other Rules of the Game* by Tip O'Neill, both available at modest prices (less than \$10 online). □



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geologist and assistant division chief, Ohio Geological Survey, Columbus, Ohio. Previously supervisor, Energy Resources Group, Ohio Geological Survey, Columbus, Ohio.

**Andrew Zolnai**, to sales director-Eastern Hemisphere, Petris Technology, London, England. Previously independent consultant, Cambridge, England.

*(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](mailto:smoore@aapg.org); or submit directly from the AAPG Web site, [www.aapg.org/explorer/pnb\\_forms.cfm](http://www.aapg.org/explorer/pnb_forms.cfm).)* □

## Lange Promoted to CFO For AAPG, Foundation

David Lange has been promoted to AAPG's chief financial officer, responsible for oversight of all financial activities for both the AAPG Association and AAPG Foundation.

Executive Director Rick Fritz said Lange was promoted due to his outstanding work on managing AAPG's information technology department in the installation of the new



Lange

association management information system, and due to his work on developing new overhead and budget review processes, and new rules and procedures for operation.

Lange manages AAPG's business directorate, which includes accounting, membership, information technology and office services. □



### Masters programme in Petroleum Geophysics 2007

The University of Cape Town, South Africa, is hosting a Masters Programme in Petroleum Geophysics.

The University of Houston, USA, will provide the 18 months course and award the degree. This Masters programme will start on 05 February 2007 and continue until June 2008. This programme targets current and future oil-industry employees from the whole of Africa and elsewhere.

Only 26 candidates will be accepted. Entrance requirements include an undergraduate degree (or equivalent) in an applicable subject.

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## San Antonio Committee Seeks Program Input

San Antonio will be the site of the 2008 AAPG Annual Convention, and meeting organizers want members to have a say in the technical program's content.

The meeting is set for April 20-23 (during the city's annual Fiesta celebration) with the theme "Deliver the Conventional: Pursue the Unconventional."

The Organizing Committee is seeking member suggestions for oral and poster sessions, session chairs, short courses, field trips, instructors and trip leaders – and the committee is especially interested in receiving suggestions of a "global nature that will appeal to the vast majority of attendees."

Organizers said they want the technical program to cover a broad spectrum of geological interests, including:

- ✓ Current and emerging unconventional resources.
- ✓ Structural geology – with applications to resource development.
- ✓ Sedimentology and sequence stratigraphy.

- ✓ Reservoir characterization and modeling.
- ✓ New and expanded plays in domestic and global basins.
- ✓ Hydrocarbon systems and basin analysis.
- ✓ Carbon dioxide sequestration.
- ✓ Water resources related to resource development.
- ✓ Geoscience and public policy.

Organizers said they hope to link many of the sessions to recent advances in the exploration for conventional and unconventional emerging resources with global applicability.

Send suggestions via e-mail to general technical program co-chairs Andrew R. Scott at [andrew@altuda.com](mailto:andrew@altuda.com); and Tucker F. Hentz at [tucker.hentz@beg.utexas.edu](mailto:tucker.hentz@beg.utexas.edu) – and include contact information with your recommendations.

Note that submittal of a suggestion does not guarantee inclusion in the program.

The deadline for submitting suggestions is Dec. 15. □

## Program Preparation Continues; Exhibitor 'Points' Deadline Looms

Abstracts are in hand and the final technical program is now being compiled for the AAPG Annual Convention, set April 1-4 in Long Beach, Calif.

The theme is "Understanding Earth Systems – Pursuing the Checkered Flag," which organizers plan to explore in as many as 12 areas ranging from deepwater reservoirs to global exploration, to structural innovations and applications, to unconventional reservoirs and resources to

hydrocarbon systems and basin analysis.

Online registration is expected to be available in mid-December. Immediate concerns include the Oct. 13 priority point deadline for exhibitors.

Several sponsorship opportunities also remain open.

More information on the meeting and technical program can be found on the AAPG Web site, at [www.aapg.org](http://www.aapg.org). □

## 'TOTY' Deadline Due Nov. 1

The nominations deadline for the 2007 AAPG Teacher of the Year award is nearing. All AAPG Sections must submit their nominations by Nov. 1.

The award, presented annually by the AAPG Foundation, honors excellence in the teaching of natural resources in earth sciences for grades K-12.

The winning teacher receives an award of \$5,000 that is split – \$2,500 goes to the teacher's school for educational use under the teacher's

supervision, and \$2,500 goes to the teacher for personal use.

An expense paid trip to the 2007 annual meeting in Long Beach, Calif., also is included. The award is presented during the All-Convention Luncheon.

For more information go online to [www.aapg.org](http://www.aapg.org) (use the shortcut pull-down menu to K-12 Teacher of the Year Award); or contact Rebecca Griffin at 1-888-945-2274, ext. 644, or by e-mail to [rgriffin@aaop.org](mailto:rgriffin@aaop.org). □

## INMEMORY

Walter R. Berger Jr., 85  
Midland, Texas, July 24, 2006

David Keith Davies, 65  
Kingwood, Texas, Aug. 3, 2006

George C. Hale, 84  
Tulsa, June 21, 2006

William Louis Hiss, 75, Albuquerque, N.M.  
April 12, 2006

William Wilson Hortin, 82  
Columbus, Ohio, Aug. 2, 2006

Daryl V. Lovvik, 64  
Babngon, Philippines Republic  
July 22, 2006

Jack Donald McClelland, 76  
Fair Oaks Ranch, Texas  
July 26, 2006

Lee Wayne Moore, 92  
Midland, Texas, July 29, 2006

Z.W. "Zeke" Rogers Jr., 62  
Manvel, Texas, July 11, 2006

John E. Thomas, 77  
Columbia, Mo., July 2006

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



107 Authors, 30 Chapters  
**Carpathian Memoir  
A Thorough Volume**

AAPG's newest Special Publication – a memoir five years in the making – is intended to provide a valuable source of information on the entire spectrum of regional and applied geology of the Carpathian.

Memoir 84, *The Carpathians and Their Foreland: Geology and Hydrocarbon Resources*, contains 30 chapters authored by 107 geologists and geophysicists from Austria, Czech Republic, Hungary, Poland, Romania, Slovakia, Ukraine, United Kingdom and the United States.

It is edited by Jan Golonka and Frank J. Picha.

It provides a comprehensive and understandable account of geology and hydrocarbon resources of the entire Carpathian system from northeastern Austria to southern Romania, including the Neogene foredeep, the foreland platform both in front and beneath the thrust belt, the Carpathian thrust belt and the late and post orogenic intermontane basins.

Principle chapters on regional geology are supplemented by thematic contributions on geodynamic reconstructions, regional geophysical investigations, hydrocarbon systems and case studies of major oil and gas fields.

To date, nearly seven billion barrels of oil and more than 53 trillion cubic feet of natural gas have been produced from the entire Carpathian system.



Additional new reserves may be found, especially at deeper structural levels below the Neogene foredeep and the thin-skinned Carpathian thrust belt.

Seventeen chapters of Memoir 84 have been printed in full; the remaining chapters have been printed as abstracts only, with the full paper for all 30 chapters as pdf files on CD-ROM in the back of this publication for ease of key word searching.

To order or for more information contact the AAPG Bookstore online at [www.aapg.org](http://www.aapg.org).

– BEVERLY MOLYNEUX

**SPOTLIGHT ON EDUCATION**

With this EXPLORER you also received the 2007 Education Catalog, featuring all our course offerings for the upcoming year.

Several new short courses and field seminars have been added this year, along with the list of past favorites.

Seats in many of these fill up fast, so register early to make sure you get your spot reserved – and get a discount for signing up prior to the deadline date specified for each course.

\* \* \*

The cornerstone of the 2007 program is the fourth annual **Winter Education Conference**, set Feb. 12-16 in Houston. Five of its 12 courses are new, and two are expanded versions of previous events.

- The new offerings include:
- ✓ Introduction to Coalbed Methane (taught by Tom Moore).
  - ✓ Seismic Amplitude Interpretation – Lithology and Pore Fluid Estimation (Fred Hilterman).
  - ✓ 3-D Seismic Attributes for Prospect Identification and Reservoir Characterization (Kurt Marfurt).
  - ✓ Seismic Geomorphology and Seismic Stratigraphy – Extracting Geological Insights from 3D Seismic Data (Henry Posamentier).
  - ✓ Advancements in Petrophysics and What to Do with Them (Dave Marschall).

Returning favorites include:

- ✓ Essentials of Subsurface Mapping (Dick Banks).
- ✓ Introduction to Computer Mapping (Hannes Leetaru).
- ✓ Practical Mapping of Surfaces, Properties and Volumes for Reservoir Characterization (Jeffrey Yarus).
- ✓ Rock Properties of Tight Gas Sandstones (Alan Byrnes).
- ✓ Risk and Economic Evaluation and Assessment of Unconventional Reservoirs (William Haskett).
- ✓ Basic Openhole Log Interpretation (Dan Krygowski).
- ✓ Introduction to DSTs for Geologists (Hugh Reid).

Tuition for the full week is \$1,295 for AAPG members and \$1,395 for non-members, and badges are transferable. Courses also are individually priced for those not wanting to sign up for the full week.

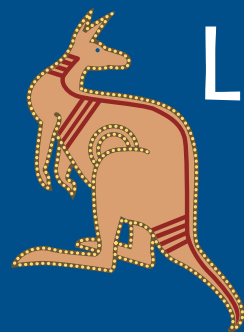
Refreshments, buffet lunches and an AAPG mini-Bookstore will be available each day.

The conference will be held at the Hilton Houston Westchase Hotel, and a special AAPG group rate is available.

More than 150 people attended last year's conference. Class sizes are limited.

See the AAPG Web site for complete course descriptions and registration information, or contact the AAPG Education Department at 1-918-560-2650; or toll-free (in the United States) at 1-888-338-3387; or e-mail at [educate@aapg.org](mailto:educate@aapg.org); or fax at 1-918-560-2678. □

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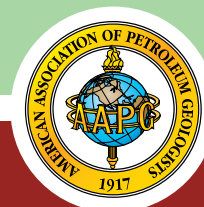


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# REGIONS AND SECTIONS

(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 U.S. Sections.

News items, press releases and other information should be submitted to the *EXPLORER/Regions and Sections*, P.O. Box 979, Tulsa, Okla. 74101.

Contact: Carol McGowen, at 1-918-560-9403; or e-mail to [cmcgowen@aapg.org](mailto:cmcgowen@aapg.org).

This month's column has two parts, the first written by Deborah Ajakaiye, president of AAPG's Africa Region.)

A major thrust of the Africa Region in recent years has been the membership drive to encourage geoscientists in Africa to become AAPG Active members and fully utilize the many benefits provided by the Association for the enhancement of their professional skills and development of the petroleum industry in Africa.

Recent AAPG reports affirm these efforts, with the Africa Region accounting for 24 percent of all new member applications for all classes of AAPG membership from both Sections and Regions during this past June and July.

Currently 11 student chapters in the region account for 24 percent of all student membership (the highest) in AAPG.

\* \* \*

AAPG's Africa Region also focuses on supporting regional O&G activities

and conferences of interest to its members, such as the 24th annual international conference and exhibition of the Nigerian Association of Petroleum Explorationists (NAPE), planned Nov. 13-18 in Abuja, Nigeria.

The conference theme, "Exploration Trends and the New Gas Challenges," will address major issues of exploration, development and portfolio management in the production and sustenance of gas resources.

With increasing regional acceptance and focus on gas exploration and development – as evidenced by planned CNG and West Africa Gas pipeline initiatives, and LNG trains in Nigeria and parts of West Africa – it is

apparent that the gas commodity market has the biggest growth opportunity for the regional upstream industry.

The opening ceremony (Nov. 14) will feature key personnel from the oil and gas industry, including the Edmund Daukuru, president of OPEC and minister of petroleum. Following will be a management session on "Surging Global Demand for Oil and Gas; Challenges and Opportunities," with invited papers delivered by top management staff from the industry and the governor of the Central Bank of Nigeria.

Technical presentations will run in parallel sessions from Nov. 15-17.

Other meeting highlights include a pre-conference workshop on "Nigerian Content: Capacity Building and Utilization" in the Nigerian oil and gas industry, and post-conference field trips to the Southern Bida Basin (Campano-Maastichtian sequences), Anambra Basin (Campano-Maastichtian facies) and Middle Benue-Keana Basin (Turonian-Coniacian sequences).

Exhibition spaces already are sold-out and substantial high quality papers have been received including several from exploration managers in the industry. NAPE has made security arrangements in addition to discount accommodations with local hotels to ensure a smooth conference for the expected large turn-out of both local and international participants.

AAPG members are encouraged to attend what promises to be a technically stimulating conference. For more information, contact [nape@hyperia.com](mailto:nape@hyperia.com), or visit [www.aapg.org/international/africa](http://www.aapg.org/international/africa).

\* \* \*

Other future major conferences in the region include:

✓ Third conference on the Petroleum Potential and Investment Opportunities in East Africa, set March 7-9 in Arusha, Tanzania (see [www.eac.int/EAPC2007](http://www.eac.int/EAPC2007) for more information).

✓ First international conference of the Moroccan Association of Petroleum Geologists (MAPG), Oct. 28-31, in Marrakech, Morocco ([www.mapg.org](http://www.mapg.org)).

□

## MEETINGS OF NOTE

### 2006 U.S. Meetings

Oct. 8-11, Eastern Section, AAPG, annual meeting, Buffalo, N.Y.

### 2006 International Meetings

Nov. 5-8, AAPG International Conference and Exhibition, Perth, Australia.

### 2007 U.S. Meetings

April 1-4, AAPG Annual Convention, Long Beach, Calif.

April 22-24, Southwest Section, AAPG, annual meeting, Wichita Falls, Texas.

Sept. 9-11, Mid-Continent Section, annual meeting, Wichita, Kan.

Sept. 16-18, Eastern Section, AAPG, annual meeting, Lexington, Ky.

Oct. 6-9, Rocky Mountain Section, annual meeting, Snowbird, Utah.

Oct. 21-23, Gulf Coast Association of Geological Societies, annual meeting, Corpus Christi, Texas.

### 2007 International Meetings

March 20-22, AAPG International Property and Prospect Exhibition (APPEX), London, England.

Nov. 17-20, AAPG European Region, Athens, Greece. □



## WEST TEXAS GEOLOGICAL SOCIETY

2006 FALL SYMPOSIUM  
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### Resource Plays in the Permian Basin: Resource to Reserves

Celebrating the 80th Anniversary of WTGS

The Fall Symposium continues a long-standing tradition of excellence with a strong technical program targeting concepts applied to active exploration and development of resource plays in the Permian Basin. The 2 days of technical sessions feature both oral and poster sessions presented by noted authors on the diverse aspects of resource plays. The symposium offers an opportunity for geologists, geophysicists, and engineers to meet with the researchers and service providers operating in the Permian Basin and dedicated to continual learning for resource development.

#### Technical Sessions:

- Permian Basin Carbonate and Clastic Resource Plays
- Reservoir Aspects of Shale Gas Plays
- Petrophysics of Resource Plays
- Geophysics of Resource Plays
- Drilling and Completion of Resource Plays
- Resource to Reserves

#### Saturday Field Trip to Wink Sink.

The Fall Symposium will be held in the Midland Center, Midland, Texas with technical sessions and poster sessions taking place on **October 25 – 27, 2006**. Symposium will begin at 8:30am on Wednesday October 25, with registration beginning at 7:30am. For more information contact Paula Mitchell at the WTGS office at 432.683.1573 or General Chairman Greg Hinterlong 432.687.7211. For information on technical sessions contact Denise Cox at [denisemcox@msn.com](mailto:denisemcox@msn.com) 303.526.9602. The Ethics Luncheon Presentation will take place on Wednesday at the Midland Petroleum Club. The presentation will be given by Arlen Edgar. This presentation meets the Texas Registration requirement for Geologists and Engineers.

To register please send the completed form below with payment to: WTGS P.O. Box 1595, Midland, TX 79702. Credit card payment may be faxed to (432) 686-7827. **Pre-registration and cancellation deadline is October 16, 2006.** A block of rooms has been reserved at the Midland Hilton. The phone number is (432) 683-6131. Remember to ask for the special WTGS symposium rate.

\_\_\_\_ Symposium Pre-Registration \$125.00      Symposium On Site Registration \$150.00  
\_\_\_\_ Ethics Luncheon Presentation\* \$25.00      Saturday Field Trip \_\_\_\_\_ \$40.00

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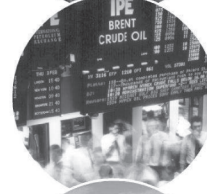
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- Drilling and Borehole Technologies
- Reservoir Development & Production Showcases
- Field Monitoring and Management Technology



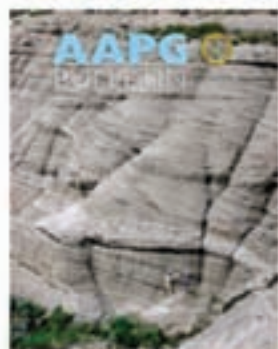
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**EBP NOTES**

**Gravitational sliding on the Mid-Atlantic Ridge Transform: Implications for submarine basin-degradation and deformation**  
*Dengliang Gao*

**Jointed deformation bands may not compartmentalize reservoirs**  
*S. E. Tindall*

**GEOHORIZON**

**A scale-independent approach to fracture interval average spacing measurement**  
*Orlando J. Ortegon, Randall A. Marrett, and Stephen...*

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(67.3 Mb)



(57.5 Mb)

57.5 Mb of GIS files for the February 2006 Issue

**ARTICLES**

## GIS Added to Digital BULLETIN

Something new is coming to the AAPG's digital BULLETIN, in the form of GIS files.

The first quarter from the 2006 BULLETIN has been georeferenced – including all the figures and articles in compressed zip files for the members to download alongside the issue and articles.

"We'll continue doing this as a value-added service to the digital BULLETIN," said AAPG Geoscience Director Jim Blankenship, "and we're looking forward to improving the service based on member feedback."

"The program is brand new and will certainly evolve over time," he added.

The accompanying figure illustrates the link to the downloadable zip file on the AAPG Web site for that issue's GIS files. Once uncompressed, a readme.txt file spells out the pertinent details on how to use the GIS files.

Over the course of the next several months AAPG members can expect more announcements regarding GIS, such as streaming videos on how to use these new tools, and much more.

– GERALD BUCKLEY  
*Geosciences Products Manager*

## MEMBERSHIP AND CERTIFICATION

The following candidates have submitted applications for membership in the Association and, below, certification by the Division of Professional Affairs. This does not constitute election, 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. (Names of sponsors are placed in parentheses. Reinstatements indicated do not require sponsors.)

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

### For Active Membership

**Illinois**

Richards, Bradley Kent, Illinois Oil & Gas Association, Mount Vernon (S.R. Gustison, C.R. Wiles, J.E. Blumthal)

**Oklahoma**

Stephens, Crystal Michelle, RKI Exploration & Production, Oklahoma City (M.A. Goss, N. Osborn, M.L. Huhnke)

**Texas**

Bhokare, Amitkumar R., Swift Energy, Dripping Springs (D.W. Harris, J.W. Hogarth, J.C. Branca); Fly, D'nese Joy, William M. Cobb & Associates, Dallas (D.L. Bailey, J.F. Sarg, B.A. May); Kalil, Bill, independent, Midland (W.R. Green, A.T. Carleton, A.H. Smith); Luo, Hongjun, BP America, Houston (D. Nummedal, W.C. Riese, R.J. Steel); McCollum, James Scott, ConocoPhillips, Midland (T.B. Layman, G.A. Wilson, D.H. Brown); Njumbe, Emmanuel Sone, ExxonMobil, Houston (D.O. Hurtubise, A.B. French, T.W. Jones)

**Wyoming**

Finley, Graeme David, Goolsby, Finley & Associates, Casper (J.E. Goolsby, B.L. Larson, M. England); Thompson, Alan Dean, Goolsby, Finley & Associates, Casper (J.E. Goolsby, A.K. Finley, B.L. Larson)

**Australia**

Thornton, David Anthony, Coogee Resources, Perth (reinstate)

**Indonesia**

Chen, Zhiyong, CNOOC SES, Jakarta (N. Guritno, W. Peikang, X. Ye)

**New Zealand**

Salo, Jonathan Peter, New Zealand Oil & Gas, Wellington (D.A. Cooke, S.C. Lang, J. Kaldi)

**Nigeria**

KunleDare, Mojisola A., ConocoPhillips, Lagos (R.C. Laudon, R. Martinussen, C.C. Parry); Yussuph, Isiaka Wale, Geoscience Solutions, Lagos (B.A. Koledoye, N. Omorodion, R.A. Sadare)

**Russia**

Drabkin, Dmitry, JSC TNK-BP, Moscow (E.C. Cazier III, J.C. Dolson, K. Lemley); Tarasov, Sergey V., TNK-BP, Moscow (E.C. Cazier III, J.C. Dolson, K. Lemley)

**Saudi Arabia**

Al-Hawaj, Mohamed Faris, Saudi Aramco, Dhahran (J.A. Richard, G.S. Adcock, I.A. Al-Ghamdi); Li, Ning, Saudi Aramco, Dhahran (I.A. Al-Ghamdi, G.S. Adcock, H. Xiao); Zarea, Mohammed Ahmed, SaudiAramco, Dhahran (I.A. Al-Ghamdi, M.O. Al-Amoudi, A.Q. Hameda)

**Venezuela**

Rieser, Robert Bernard, Schlumberger, Maracaibo (reinstate)

### Certification

The following is a candidate for certification as a petroleum geologist by the Division of Professional Affairs.

**Kansas**

Recoy, Harold Kenneth, Quest Resource, Chanute (reinstate)

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- Petroleum potential, Cretaceous Atane Formation, W Greenland

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For more information contact: Prof. A.S. Alsharhan, P.O.Box: 17325, Al-Ain, United Arab Emirates, E-mail: [sharhana@emirates.net.ae](mailto:sharhana@emirates.net.ae)

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## FOUNDATION UPDATE

Two new funds have been established by the AAPG Foundation Trustees – one in support of an historic oil industry site, the other in support of students at annual conventions.

The new funds are:

✓ The Glenn Pool Museum and Education Center Fund.

The newly proposed facility, located about 14 miles south of downtown Tulsa, is at the site of the Ida E. Glenn well discovery site of Nov. 22, 1905 – a discovery that started Oklahoma's golden era of oil exploration.

The facility will provide a historical look at how the field was discovered and developed, plus its impact on Oklahoma

and the entire world.

The museum is scheduled to open in 2007, during the Oklahoma centennial celebration.

✓ The James A. Hartman Student Fund.

This fund, started by Hartman, provides \$25 AAPG Bookstore gift certificates to student paper presenters at the AAPG annual conventions. (Ten students received gift certificates at the most recent convention in Houston.)

To contribute or for more information on these funds contact the AAPG Foundation office in Tulsa, or go to the Web site at [foundation.aapg.org](http://foundation.aapg.org).

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I. Philip Buch  
Benjamin C. Burke  
Brian S. Cabote  
Lorraine H. Carey  
Toby and Corinne Carleton  
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Don Forrest Carlos  
*In memory of Gardner Pittman*

Timothy Robert Carr  
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Steven Carroll  
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John Gary Chapman  
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Luis Fernando Cierra  
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Kellam Colquitt  
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Steven Courteney  
Robert D. Cowdery  
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James Michael DeGraff  
Peter Diebold  
Rebecca Dodge  
Lynn E. Duncan  
Byron Fred Dyer Jr.  
*In memory of Robey Clark*  
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Catherine Elliott  
Peter John Evans  
James Derek Fairhead  
Mark D. Falk  
John C. Fitzmaurice  
Stephen G. Franks  
Christopher Mark Fratton  
Lawrence W. Funkhouser  
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Deva P. Ghosh  
William E. Gipson  
*In memory of James O. Lewis Jr., George H. O'Brien Jr. and Clarence E.S. Bellows III*  
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Elias Gomez  
Mark Gregory Gorski  
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## AAPG Foundation Energy Resources Library “What’s In It for Me?”

The AAPG Foundation Energy Resources Library is but one of many programs supported by the AAPG Foundation. This valuable service was established in Tulsa at AAPG headquarters in 1978 and was created to help fulfill one of the Foundation’s principle purposes:

*“To disseminate information relating to the geology and associated technology of petroleum, natural gas, other subsurface fluids and mineral resources.”*

Part of the AAPG Foundation Library’s mission is to assemble a collection of books and resources for the practicing petroleum geologist, as well as the development of publications covering those areas of interest to our divisions: Division of Environmental Science (DEG); Division of Professional Affairs (DPA); and Energy Minerals Division (EMD).

Many of you are familiar with our services and contact us throughout the year for data research, literature searches, document delivery or for help navigating the Web. But we realize there are still some of you who haven’t had an opportunity to take advantage of our assistance. If you’re within that group you may ask, “What’s in it for me?”

In short, a lot! With crude oil prices hovering around \$70 per barrel, new exploration ventures and rediscovering old areas are becoming more attractive to the explorationist. When confronted with a new project, where should a geologist begin? Obviously, well logs, production information, seismic lines, cross sections and base maps are necessary, but one of the most important questions is, “What’s the history of the area?”

By utilizing the AAPG Foundation Library you can quickly become familiar with a prospective area, saving costly time and redundant work. Our resources, collection and services have grown at a rapid rate, permitting us to respond to thousands of research requests and handle well over ten-thousand transactions per year. What all this means to you is fast, easy communication and proven results with many services offered free-of-charge.

The library collection includes:

- All AAPG publications.
- Relevant publications from other domestic and international geological organizations.
- Most of the published material from AAPG’s affiliated societies and sections.

- Various state geological surveys, maps and many pertinent trade publications.

In some cases, we hold rare copies of fieldtrip guidebooks. We specialize in providing geologic information on hydrocarbon exploration areas, mature petroleum producing areas, subject searches, field/case studies and bibliographic searches.

Sometimes the answer to “What’s in it for me?” is the measurable economic value it brings to the user and his or her company. In other instances it’s more abstract. Regardless of your need or objective, our goal is to help you by

providing the desired information

in a timely manner. To that end, our focus is on helping refine your questions, determine what sources are best to use, and perfecting our search strategies and systems to educate those who prefer to do it themselves.

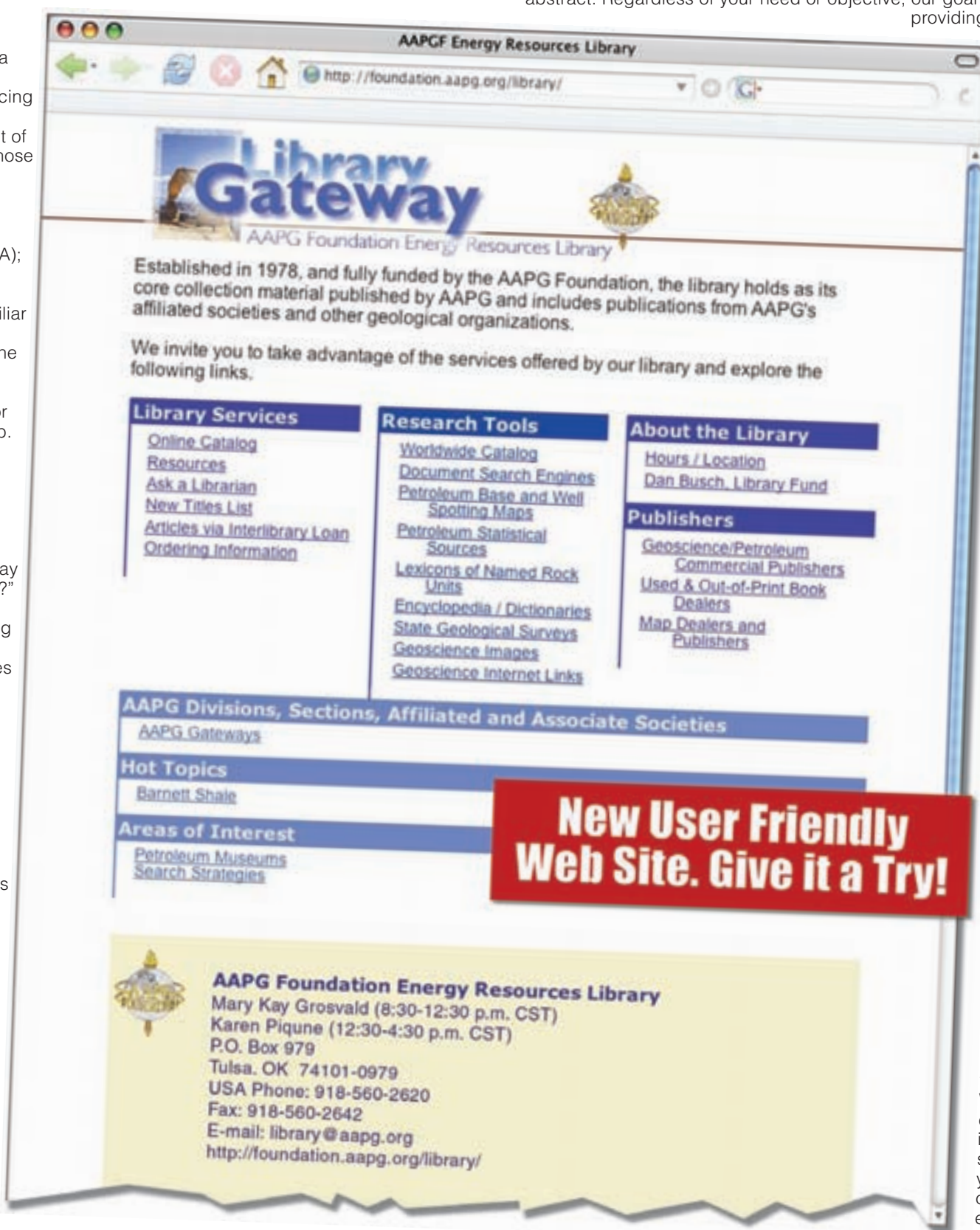
We serve a wide range of customers from around the world. As previously mentioned, many benefits are easy to access and offered free of charge. For example, in September the new AAPG Foundation Library Gateways Web site <http://foundation.aapg.org/library/> was launched.

It’s designed for easy access and navigation, directing you to helpful sites such as petroleum statistical sources, lexicons of named rock units, petroleum geoscience publishers, used book dealers and map publishers. A special section, “Hot Topics,” is now available on our Web site – currently it’s a link to information on the Barnett Shale. Updates and future links are planned, such as searching tips on Google and AAPG Datapages.

From our new Web site you can also search the AAPG Foundation Library collection, order interlibrary loans or send a message directly to one of the librarians by using the “Ask a Librarian” link. We are able to acquire documents from anywhere in the U.S., including some foreign literature. As you may know from your own experience, not everything is available on the Web. In fact, you’ll find

some Web retrievals provide incomplete or even inaccurate information. We encourage you to check with us to discover easy, fast alternatives.

It will be a pleasure to serve you whether via the links provided on our new Web page, by phone or personal visit. And of course, your comments and suggestions are always welcome and appreciated. ●



If you’d like to support our ongoing activities, contributions to the AAPG Foundation Library may be made by check or credit card, and are tax deductible for persons subject to U.S. income tax. The Web address for online giving is: <http://foundation.aapg.org/contributions.cfm>



## READERS' FORUM

## Back Off

I am a 54-year member of AAPG and I have always been proud of my affiliation with your organization. After all, my first scientific paper was published in your journal back in 1961, and this publication was essentially the beginning of a productive career involving the oil industry, NASA and the U.S. Geological Survey.

I am writing to you today because I am extremely disturbed by the AAPG's stated position on global climate change and global warming. The proposed Public Outreach "card" is an abomination and should never see the light of day.

It is difficult for me to understand why the AAPG must take a formal position on the issue of global warming. There is obviously a diversity of opinions within the membership, and it seems to me counterproductive to alienate all of those who are convinced that global warming is a significant problem and that the activities of humankind are important factors in causing global climate change.

I urge AAPG to back off and leave the question of global climate change to the scientists who are responsible for its study, and who have the experience and tools to study its issues.

Keith Kvenvolden  
Palo Alto, Calif.

## Reflection on Reflections

The article on reflection seismic "Tipper points" (Geophysical Corner, September EXPLORER) pinpoints a longstanding conundrum: Are seismic reflectors fundamentally chronostratigraphic or fundamentally lithostratigraphic horizons?

As seismic reflection depends upon acoustic impedance (seismic velocity times rock density), the short answer is

*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.*

lithostratigraphic, because only changes in lithology can produce contrasts in the physical rock properties that control acoustic impedance.

The potentially chronostratigraphic value of reflectors depends upon the progradation or lateral migration of sedimentary environments at a pace that is rapid in comparison to the intervals of time for which correlation is sought. Given that relationship, a laterally extensive lithologic horizon with common physical properties can form within the requisite interval of time targeted for correlation.

The "Tipper point" discussion highlights the additional interplay of stratal thickness (per unit time) versus seismic wavelength for sensing the subsurface configuration of correlative strata. In general, if stratal thickness per unit time is reduced, with seismic wavelength held constant, the span of time for which a valid chronostratigraphic correlation can be established from reflection profiling is bound to increase. Rapid sedimentation allows for more precise chronostratigraphic correlation than slow sedimentation, but reflectors are never chronostratigraphic in any absolute sense.

Many discussions of reflection profiles in the literature do not take this truism into account.

William R. Dickinson  
Tucson, Ariz.

**California Earthquakes (Duh!)**  
Regarding your story "L.A. Quake

Predictions Get Yawns" (August EXPLORER): Only its second part should have been published.

The problem with the first part of your story is that it spoke almost entirely of the San Andreas fault, San Andreas fault, San Andreas fault. Probably millions of Californians are unaware that there's any other large fault in the state.

I agree with Don Clarke's obvious skepticism about this preoccupation with the San Andreas, which has been a boondoggle for otherwise unemployed governmental and academic geologists and geophysicists.

That brings us to the dismal fact that earthquake forecasting is a very dangerous game, and should be abandoned. Not only is it a waste of government money, but a precise prediction of an earthquake would create a disaster.

How so? Think of what the prediction of Hurricane Rita did to Houston, namely produce the worst traffic jam in history, stranding people on all highways out of town. Now think about 12 million people trying to get out of the mountain-bounded L.A. basin on five highways. ABSOLUTE CHAOS!

Clarke is right in telling about the dangers posed by faults other than the San Andreas that have already produced destructive quakes, e.g., Santa Barbara in 1925, so-called Long Beach (should have been Compton) in 1933, San Fernando in 1971 and Northridge in 1994. Clarke also

is right in saying "The region is ill prepared to take on a major disaster," and there is where the real social and economic problem lies. It is not earthquakes themselves, but people's preparation for them that is critical. It's safe to say that: "The longer it's been since the last one, the nearer we are to the next one." So people should heed the Boy Scouts' maxim: BE PREPARED!

Clarke said that there is now "little coordination between public agencies." He didn't say so, but that means that police and fire and highway and water and power departments should have proper training and equipment, and be on speaking terms with construction companies that have large cranes, loaders and bulldozers.

Quake insurance isn't the answer for the public. The day I moved into my present home, I bought L-braces at a hardware store and tied my tall bookcases to the walls with them. I put valuable art objects on flat places where I hope they won't be broken when a quake hits. I won't go on, but you get the idea. Families should also know just who is going to do what when a quake hits. The worst thing to do is what people are first inclined to do: Get in their cars and drive like mad to home or school. I won't go any further, other than to say that:

✓ The quake-forecasting people at Cal Tech and the U.S. Geological Survey should be given early retirement.

✓ Don Clarke should be put in charge of earthquake preparedness in southern California.

Robert H. Paschall  
Bishop, Calif.

See **Forum**, page 56



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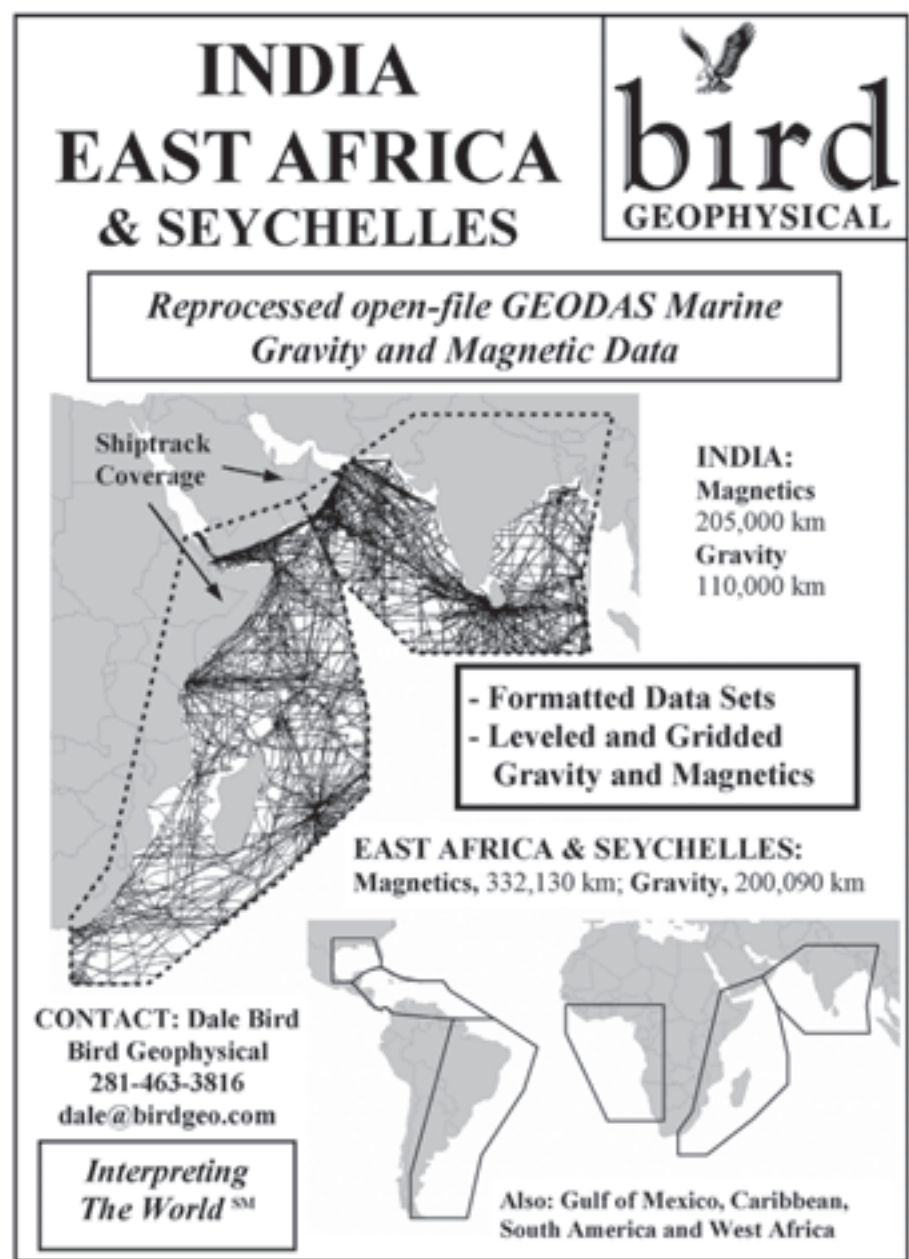
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# CLASSIFIED ADS

## POSITION AVAILABLE

**Geophysicist/Seismic Interpreter and Stratigrapher/Sedimentologist positions at the Jackson School of Geosciences (JSG) Bureau of Economic Geology The University of Texas at Austin, U.S.A.**

The State of Texas Advanced Resource Recovery (STARR) program, an established research program within the Bureau of Economic Geology, JSG, is seeking **(1) a geophysicist/seismic interpreter and (2) a stratigrapher/sedimentologist**. Geophysical and geological investigations are carried out both in regional scale, onshore and offshore U.S., and in field scale. We are particularly interested in candidates with strengths in one or more of the following: seismic interpretation, sequence stratigraphy, clastic sedimentology, reservoir characterization, seismic modeling, and attribute analyses. Successful candidates will participate in scientific research, publish in peer-reviewed scientific articles, participate in national and international scientific forums, prepare technical reports and presentations, and liaise with industry partners. Candidates with an advanced university degree and some industry experience are preferred.

The JSG offers an excellent working environment with challenges and possibilities for professional development and advancement. Salary is negotiable depending on qualification. Please refer to the following website for further information regarding the particulars of the STARR program.

(<http://www.beg.utexas.edu/resprog/starr/index.htm>). **For further information or to e-mail a resume, please contact Dr. Robert Loucks (bob.loucks@beg.utexas.edu) or Jenny Turner (jenny.turner@beg.utexas.edu).**

The University of Texas at Austin is an Equal Opportunity/Affirmative Action Employer. All positions are security-sensitive; conviction verification conducted on applicants selected.

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**Pevehouse Chair in Geosciences An Endowed Position in Petroleum Geology and Geophysics Texas Tech University**

The Department of Geosciences at Texas Tech University invites applications and nominations for the Pevehouse Chair in Geosciences. The purpose of this endowed position is to support education regarding the origin, exploration, and recovery of hydrocarbons. A Ph.D. in geosciences or closely allied field is required. Applicants should have post-doctoral research experience in the petroleum industry or

academia as demonstrated in a record of publications. Their research should concentrate in geosciences, geophysical or other analytical techniques that are relevant to exploration and production of hydrocarbons. The chair holder is expected to conduct an externally-funded research program that involves collaboration with the petroleum industry. He/She will teach graduate and undergraduate courses, and mentor graduate student thesis research. The position is expected to be filled at the tenured full professor level.

Texas Tech is one of the four largest, state-supported, graduate research-oriented universities in Texas, with over 29,000 students enrolled. The Department of Geosciences consists of nineteen tenured/tenure-track faculty, thirteen in solid earth sciences and six in atmospheric sciences. About 70 undergraduate student majors and 40 graduate students are currently enrolled. The department computer labs have various GIS, geologic mapping/modeling, and seismic processing/interpretation software packages. Experimental facilities include laser ablation ICP-MS, TEM, SEM, XRD, heat flow, stable isotope labs, and remote sensing spectroradiometers. More detailed information on the department can be found at website <http://www.gesc.ttu.edu>.

In addition to the Geosciences, the chair holder will have opportunities to work with the Department of Petroleum Engineering which maintains experimental and analytical facilities in petrophysics, drill fluids, cement, enhanced recovery, and reservoir simulation. The department also has a nuclear magnetic resonance imaging lab and an artificial lift research lab with a 4100-ft test well with circulation equipment and automated well control equipment.

Lubbock is a community of over 200,000 people, located on the Southern High Plains of Texas, in proximity to major oil industry in the Permian Basin. The altitude and semi-arid climate of the region are conducive to outdoor activities. Lubbock frequently hosts musical, theatrical, and sports events, and offers numerous options for shopping and dining. The town also offers the best healthcare facilities in the region, including the university's Health Sciences Center. The cost of living is low compared to national norms.

Applicants must first go to the employment website of the university at <http://jobs.texastech.edu>. There, go to "Search Postings", search for requisition number 62209, and fill out necessary forms in applying for the position on-line. Then, applicants should submit a letter of application, curriculum vitae, a statement of teaching and research interest, names and contact information (including e-mail address) of at least 3 professional references. These documents can either be uploaded to the employment website or be mailed to: Dr. Seiichi Nagihara, Pevehouse Chair Search Committee, Department of Geosciences, Texas Tech University,

Box 41053, Lubbock, TX 79409-1053.

E-mail questions regarding the position are received at [seiichi.nagihara@ttu.edu](mailto:seiichi.nagihara@ttu.edu). Review of applicants will begin November 1 and continue until the position is filled.

Texas Tech University is an equal opportunity/affirmative action institution.

\*\*\*\*\*  
**ASSISTANT PROFESSOR IN NEAR-SURFACE GEOPHYSICS DEPARTMENT OF GEOLOGY UNIVERSITY AT BUFFALO**

The University at Buffalo Department of Geology invites applications for a tenure-track assistant professor position in near-surface geophysics. We seek a scientist who will integrate with our existing departmental strength in geohazards (contaminant hydrogeology, volcanic hazards, climate change, and seismic hazards). Of particular interest are researchers with expertise in hydrogeophysics or inverse methods.

We expect faculty to develop, maintain and publish an innovative, extramurally funded research program. The successful applicant must have a Ph.D. degree at the time of appointment and demonstrated potential to perform teaching duties. Teaching duties will include undergraduate and graduate level courses in the candidates' specialties. More information about our department can be found at: <http://www.geology.buffalo.edu>.

Send applications to Dr. Matthew Becker, c/o Robyn Wagner by email [rlwagner@buffalo.edu](mailto:rlwagner@buffalo.edu) or post to Department of Geology, 876 Natural Sciences Complex, University at Buffalo, Buffalo, NY 14260. Applications should include, a CV, statement of research goals and teaching experience and interests, selected reprints, and contact information for at least three references. Applications should be complete by Nov. 1, 2006, when we will begin our review of candidates.

The University at Buffalo is an Equal Opportunity Employer/Recruiter.

\*\*\*\*\*

**U.S. Geological Survey Mendenhall Postdoctoral Research Fellowship Program**

The U.S. Geological Survey (USGS) invites applications for the Mendenhall Postdoctoral Research Fellowship Program for Fiscal Year 2008. The Mendenhall Program provides opportunities to conduct research in association with selected members of the USGS professional staff. Through this Program the USGS will acquire current expertise in science to assist in implementation of the science strategy of its programs. Fiscal Year 2008 begins in

October 2007.

Opportunities for research are available in a wide range of topics. The postdoctoral fellowships are 2-year appointments. The closing date for applications is November 15, 2006. Appointments will start October 2007 or later, depending on availability of funds. A description of the program, research opportunities, and the application process are available at <http://geology.usgs.gov/postdoc>. The U.S. Geological Survey is an equal opportunity employer.

\*\*\*\*\*

**The Ohio Geological Survey (OGS)** seeks applications for the position of Supervisor, Energy Resources Group. The successful candidate will be a highly motivated geoscientist with a thorough understanding of the energy industries (especially oil, gas, and coal), and a proven record of research, publishing, project management, and supervision. The candidate should also have experience in securing research grants and working with the public and industry associations. A Master's degree (minimum) in geosciences, publications record, and petroleum industry experience preferred. The complete job posting is available on the ODNR Website ([www.ohiodnr.com/jobs](http://www.ohiodnr.com/jobs)). The Ohio Department of Natural Resources is an equal opportunity/affirmative action employer.

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**Executive Director American Geological Institute**

The Search Committee invites applications for the position of Executive Director for the American Geological Institute (AGI). Interested applicants should be broadly educated scientists who have demonstrated leadership and vision in the earth sciences; have an established record of success as an earth scientist; have proven senior management and budgetary experience and interpersonal skills; and have a record of success as a not-for-profit fundraiser. The applicants must have the ability to communicate effectively with the scientific community, academia, industry, government and the public.

A Ph.D. in an earth science or related discipline is required. The successful candidate must be willing to locate in the Washington, D.C. area and be prepared to maintain a demanding travel schedule.

The Executive Director conducts the affairs of the Institute, with direction from the Executive Committee, including administering all planning and standing policies, supervising AGI staff, and coordinating the various activities, projects, and programs of the

See **Classifieds**, next page

## FACULTY POSITIONS AVAILABLE

### The Department of Petroleum and Geosystems Engineering The University of Texas at Austin

The Department of Petroleum and Geosystems Engineering seeks outstanding applicants for two positions: a) department chair, and b) Assistant Professor. The successful applicant for chair will be appointed at the rank of Professor with tenure. The Assistant Professor will hold a tenure track position. For both positions, a Ph.D. in Petroleum Engineering or a closely related discipline is required and the applicant must have an outstanding record of research accomplishments and a strong interest in undergraduate and graduate teaching in Petroleum Engineering. Applicants for the departmental chair position should be an internationally recognized expert in one or more research areas related to petroleum engineering.

Two or more years of experience in the exploration and production industry is strongly preferred, especially for those without a degree in Petroleum Engineering. Successful candidates are expected to teach undergraduate and graduate courses, develop a strong research program, collaborate with other faculty, and be involved in service to the university and the profession. Applications from women and minorities are encouraged.

The Department of Petroleum and Geosystems Engineering at the University of Texas is the #1 rated graduate program in the US (in the latest US News and World Report ratings) and has had the largest Ph.D. program in the US for many decades. We are also currently the largest undergraduate Petroleum Engineering program in the US with more than 400 undergraduates. We offer faculty salaries and benefits that are competitive with the E&P industry.

Interested persons should submit a detailed resume including academic and professional experience, statements regarding their teaching and research interests, a list of peer reviewed publications and other technical papers, and three or more references to:

Larry Lake, Chairman  
Department of Petroleum and Geosystems Engineering  
The University of Texas at Austin  
1 University Station, C0301  
Austin, TX 78712-0228

The University of Texas is an Equal Opportunity/ Affirmative Action Employer. Security sensitive position; background check conducted on applicant selected. Please visit [www.pge.utexas.edu](http://www.pge.utexas.edu) for more information about the Department of Petroleum and Geosystems Engineering



The Department of Geosciences at Trinity University invites applications for the **Gertrude and Walter Pyron Professor of Geosciences**. Appointment to this endowed position is at the rank of Professor with tenure. The position includes a reduced teaching load, a yearly stipend and staff support.

We seek candidates whose research program is widely recognized, extramurally funded, and provides opportunities for meaningful involvement of undergraduates. Demonstrated dedication to and success in undergraduate education are required. The successful candidate will be expected to teach courses related to petroleum geology and contribute to the department and university core curricula. We are open to a wide range of research specialties, including but not limited to marine geology, carbonate geology, global geochemical cycles, paleoecology and paleoclimatology.

Trinity University, founded in 1869, is one of the nation's top private undergraduate institutions. The attractive campus overlooks downtown San Antonio, a city rich in heritage and ethnic diversity with a population of approximately one million. The Department has granted degrees in the geosciences for over 40 years and is a member of the Keck Geology Consortium. Further information about the department and this search can be found at <http://www.trinity.edu/departments/geosciences/>.

Applications or letters of nomination should be sent to Dr. Glenn Kroeger, Department of Geosciences, Trinity University, One Trinity Place, San Antonio, Texas 78212-7200. Completed applications must include a cover letter, curriculum vitae, a detailed statement of undergraduate teaching experience and philosophy, documentation and/or evaluations of teaching effectiveness, a description of research plans, and the names and contact information of four professional references. Review of completed applications will begin January 8, 2007. *Women and minority candidates are strongly encouraged to apply. Trinity University is an Equal Opportunity Employer.*

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## Forum

from page 54

### Peak Oil

I am so impressed that you should publish in the July EXPLORER such an excellent, fair-minded article on peak oil, which is a misunderstood yet important subject.

As you stress, we are not about to run out of oil, but we do reach the end of the first half of the Age of Oil. Most of the giant fields have been found, and it will take ever more skill by petroleum geologists to identify the smaller and more subtle prospects of the future.

While oil companies tend to dismiss any mention of peak and decline as the raving of doomsayers, professional petroleum geologists have nothing to hide, as they will be in ever-greater demand.

The AAPG itself owes it to the public to come forth with realistic estimates of the status of depletion. If proper reserve information were in the public domain, the situation would be self-evident; as it is, the

reporting of reserves is much confused for financial, commercial or political reasons, which, while valid enough in their own contexts, give a misleading impression.

The issue of so-called reserve growth is one of the principal causes of confusion. In discovery terms, all the oil ever to be produced from a field under whatever economic and technological conditions is attributable to the date of the original successful wildcat. Accordingly, reserve revisions have to be backdated.

On that basis, the peak of world discovery was passed about 40 years ago, so it is hardly surprising that the corresponding peak of production is now imminent.

You have to find oil before you can produce it, and finding it is primarily a matter of geology.

Let us hope that your article will mark a turning point on the discussion of this important topic. It would help to have unambiguous definitions of the *conventional* and *non-conventional* categories, terms used in widely different senses. There is a great difference between a free-flowing well and digging up a tar-sand with a shovel.

C.J. Campbell  
Ballydehob, Ireland

## Classifieds

from previous page

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Interested persons are invited to submit a resume, a letter stating qualifications, and a list of 5 references. Review of applications will begin October 20, 2006.

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### Illinois Basin Prospects Wanted

I am interested in oil prospects in the Illinois Basin. These drilling prospects can be leased or unleased. No partial interests. All contacts confidential. If you have any prospect, please contact us.

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**DIRECTOR'S CORNER**

# Tour Gives Close Look at Region

By RICK FRITZ

Earlier this summer I traveled through Europe with then President-elect Lee Billingsley and European Region President John Brooks. We were taking a tour that started in Oslo, Norway, then headed to Moscow and ended in Vienna for the EAGE annual meeting.

✓ The first stop was an invitation from past-European Region president, Sigrunn M. Johnsen, for an excellent intersociety field trip on a boat to look at the geology along the fjords near Oslo. The field trip gave Lee, John and me a chance to talk to a number of members to discuss their needs and concerns.

✓ In Moscow we had a most excellent tour sponsored by TNK-BP with students from the Moscow University and Gubkin Russian State University of Oil and Gas. Everywhere we go the students are great! They are very open and interested in AAPG and the professional development and opportunities we offer.

The next day we met with a contingent of Russian scientists from Russian industry institutes and universities. We formally agreed to the first Russian translation of AAPG Memoir 86, *Global Resource Estimates from Total Petroleum Systems*, by Tom Ahlbrandt, et al. This translation is being sponsored by a generous company donation and will be distributed in Russia and surrounding countries.

President Billingsley also plans to form a "Translation Committee," which will translate BULLETIN articles into Russian for posting on the AAPG Web site.

We also agreed to the basic concept of a petroleum geoscience conference in Tyumen, Russia, in the late spring or early

*Our tour was a great opportunity to observe first-hand the activities of the European Region ...*

summer of 2007. This is an exciting opportunity for geoscientists and engineers to come and hear about Russian oil and gas techniques and opportunities.

✓ In Vienna we enjoyed a very good EAGE conference and had several talks with SPE, SEG and EAGE officials and staffs concerning joint ventures and opportunities.

We also were asked to visit OPEC for a tour and to make presentations about AAPG programs. Lee and I both gave talks to OPEC officials and staff concerning AAPG activities. They were especially interested in AAPG's digital geology products through Datapages and our new map search and delivery system – GIS-Upstream Digital Reference Library (GIS-UDRIL).

\* \* \*

Our tour was a great opportunity to observe first-hand the activities of the European Region, which is gearing up to develop products and services and will be a model for other AAPG Regions.

For example, last spring the European Region held its first field conference in Mallorca (see June EXPLORER). Now we are planning the first joint AAPG/AAPG European Region meeting in Athens in November 2007.

Athens is a great location and, as it is a crossroads, the technical program will include talks and posters from at least two other AAPG Regions – Middle East and Africa.

AAPG also opened its first non-U.S. satellite office this year in London. The focus of AAPG's European office is to provide membership and educational services.

Steve Veal is the new director of the office and its contact information is: AAPG, Room G22, Royal School of Mines, Department of Earth Science & Engineering, South Kensington Campus, Imperial College, London, SW7 2AZ; e-mail: europe@aapg.org.

Finally, you may have noticed a new addition to AAPG staff – Carol McGowen as Regions and Sections manager. Her job is to improve communication and coordination among the Association, Sections, Regions and affiliated societies. In addition, she is charged with helping the Sections and Regions drive major programs, such as the AAPG European office in London.

\* \* \*

Clearly, there is a lot going on in the European Region; our next step is to help energize the other Regions. In the end, developing membership worldwide is all about providing products and services.

Those efforts to date include:

✓ In the Middle East Region, AAPG was secretariat to the successful GEO conference in Bahrain. AAPG plans to hold several education events in the Middle East Region this year and is evaluating opening an office in Bahrain.

✓ In September, the Latin America Region was involved in the development of the IX Simposio Bolivariano Petroleum Exploration in Cartagena, Colombia on the Subandean Basins, sponsored by Colombian Association of Petroleum Geologists and Geophysicists.

✓ In the Africa Region, AAPG is endorsing the NAPE conference in Abuja, Nigeria (see page 50). AAPG also endorsed the Geo-Asia meeting held in June in Kuala Lumpur, Malaysia and the India Association of Petroleum Geoscientists GOA, India, conference.

✓ Of course, AAPG is holding its first International Conference jointly with the Petroleum Exploration Society of Australia in Perth on Nov. 5-8. Already, this conference is drawing record registration for an AAPG international meeting.

This is an exciting time to be an AAPG member. Incidentally, we have just restructured our committees. If there is any area in which you would like to serve, please let us know. You can review opportunities online at [www.aapg.org](http://www.aapg.org).



## DPA Will Not Go Quietly

# Complacency Can Be Very Costly

By RICHARD G. GREEN  
DPA President

As a volunteer for AAPG and the Dallas Geological Society it has been clear to me that the "90/10" rule holds with geologists as with all other organizations and professions. That is, 90 percent of people simply want to be left alone to do their jobs and 10 percent volunteer to get involved in professional societies, mentoring, politics or other pursuits.

This is perfectly normal and the comfortable path for most.

However, let's recall some recent history and what can happen if we choose to be inactive or complacent.

In the United States during the 1970s, a Windfall Profit Tax, tiered oil pricing, restrictions on natural gas usage and other misguided legislation were passed. The 1980s saw environmental laws passed that discouraged development of resources. These events created a bureaucratic maze that as a result closed much of our mining, steel and refining industries, and many public and most private oil companies.

Also, the U.S. administration colluded for a low commodities price in a successful attempt to bankrupt communism. This cost over 20,000 domestic geology jobs and virtual collapse of an oil industry weakened by overtaxation and regulation.

The 1990s saw continued passage and expansion of regulations that slowly

strangled the oil industry in the United States to the point of damaging national sovereignty. This, coupled with the extraordinary removal of public acreage onshore and offshore from industry access, artificially decreased the domestic supply of energy.

We also saw litigation by environmental extremists that slowed or stopped drilling for oil and gas, refinery and power plant construction, nuclear plants, some LNG facilities and many pipelines. Surplus supply capacity was squandered in a climate of regulatory excess and low commodity prices without consideration of the future these policies guaranteed.

The contraction in our industry continued for 15 years, and the United States lost experienced personnel, enormous amounts of data and most undergraduate geology majors. Geologists and our sister professional societies chose to remain silent and non-controversial through it all.

If geologists had acted differently and more forcefully, we may not have changed any of this history. But the point is *we did not act* proactively or in an organized manner.

\* \* \*

Today, one reality is high commodity prices, little excess capacity, shortages of materials, manpower and rigs and sharply increasing demand. For geologists, this



means jobs, increased compensation and ready customers for our skills and products.

Most geologists are busy and under pressure to produce. As a result, there is more of an excuse to not volunteer or give back to your profession.

Another reality is the petroleum industry is again seen as a revenue source by government and an easy target by those politicians who would bait Americans using class warfare. Proposed legislation to heavily tax and punish your industry has once again surfaced.

Enviro-extremists have launched a propaganda campaign concerning climate change armed with junk science and championed by unscrupulous political hacks or misinformed believers. The energy industry is often portrayed as evil, or "old technology," and our scientists are lumped with those of the tobacco industry by the public media and litigators. Our science is even under

attack by religious extremists who wish to end teaching of the geologic time scale and theory of evolution and substitute creationist theology for science.

\* \* \*

All these realities could cost you your job, reduce your income or restrict your ability to find hydrocarbons. All of these attacks from both the extreme left and right rely on our apathy and the ignorance of our science in the media, government and public.

Sadly, some members of our own leadership do not wish to be controversial or cause us to receive criticism from anyone or anything.

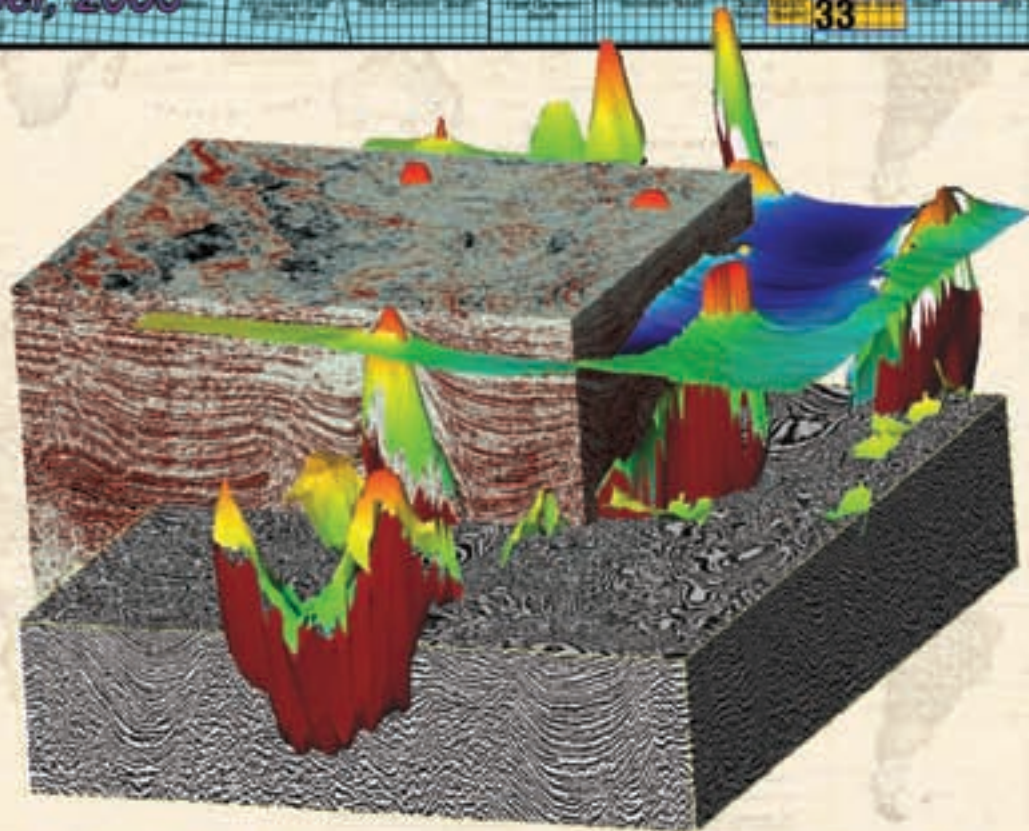
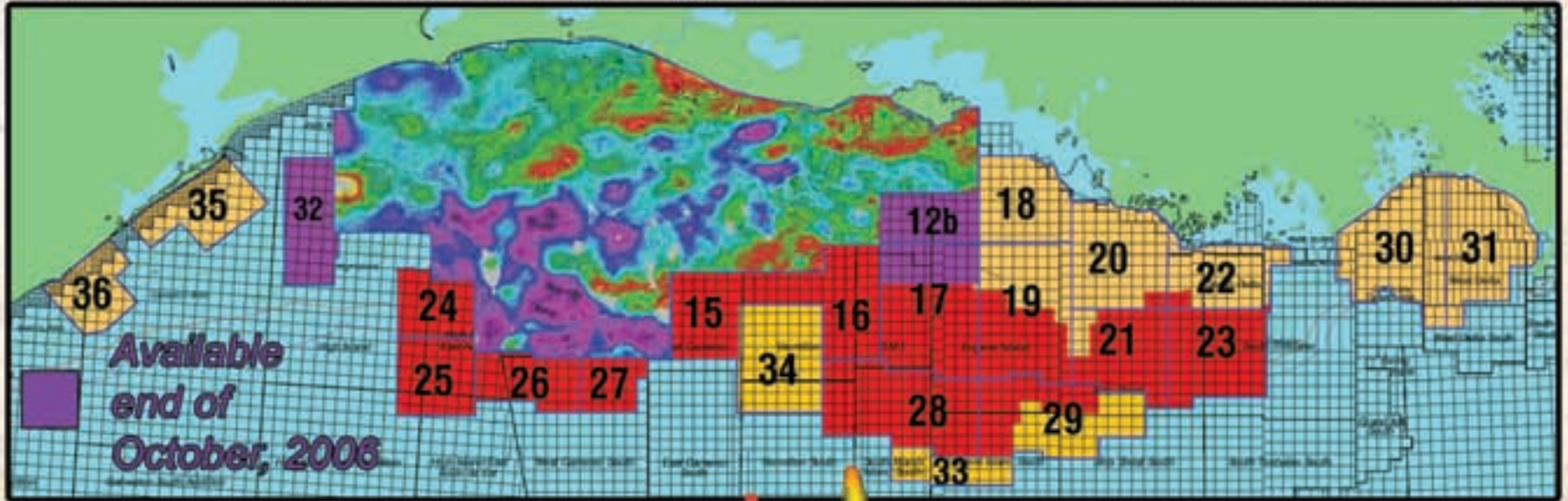
If we stand for our science and for our industry, we will be criticized and we will be controversial, because we stand for something. If we do nothing, we stand for nothing and deserve our fate.

Whether you agree with these opinions or not, I appeal to you as AAPG members and geologists who understand the earth history and processes to get involved in politics in the coming election cycle. Inform yourself on broader issues such as climate change, inform your neighbors and friends about your science and volunteer at some level somewhere.

Part of our mission in DPA is to inform the public and public policy makers concerning our science. DPA will not go quietly this time. □

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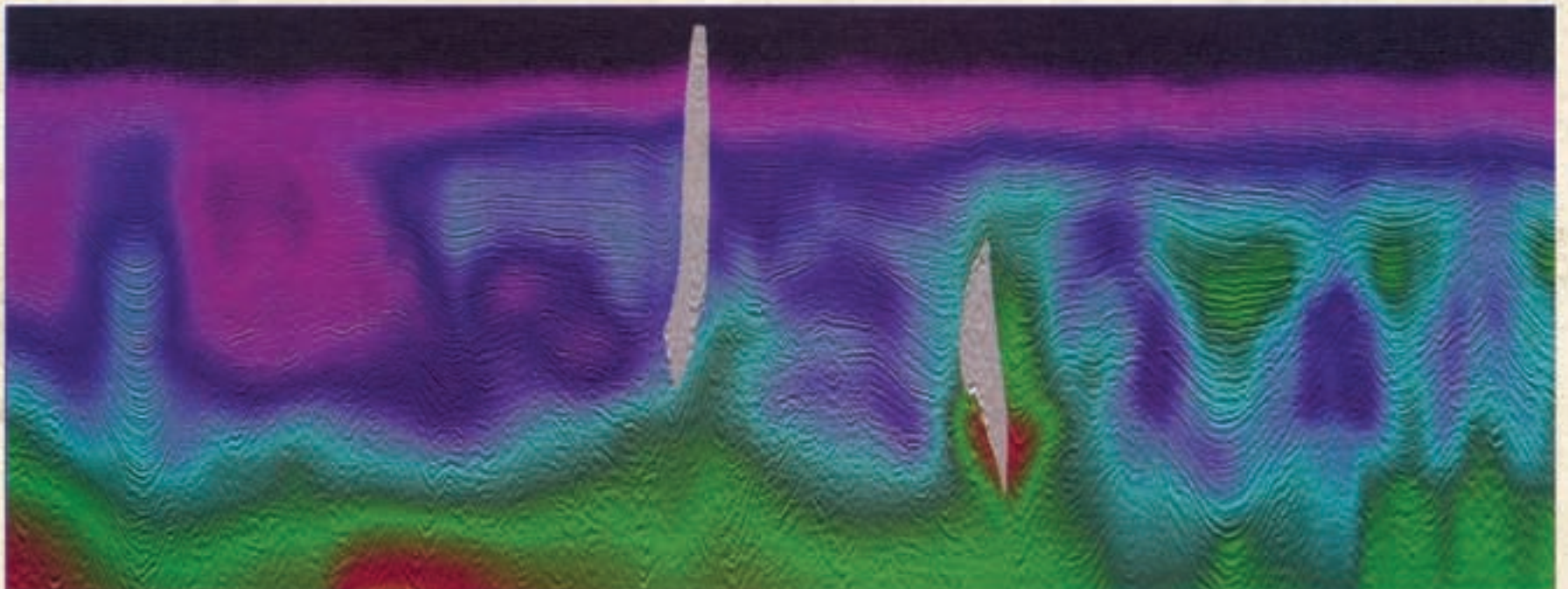


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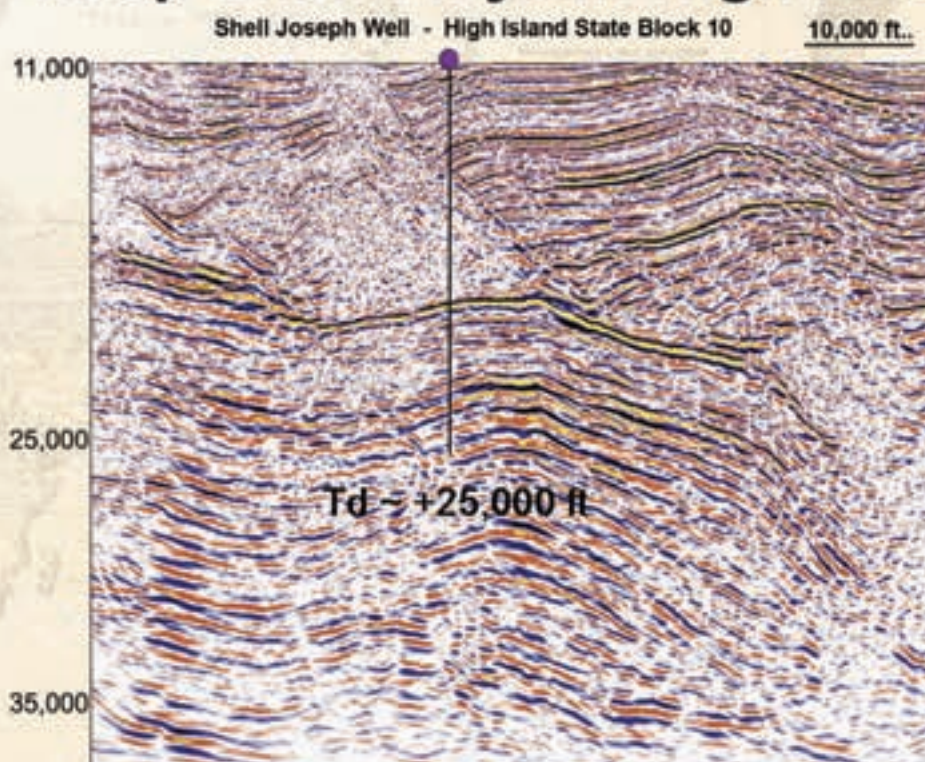
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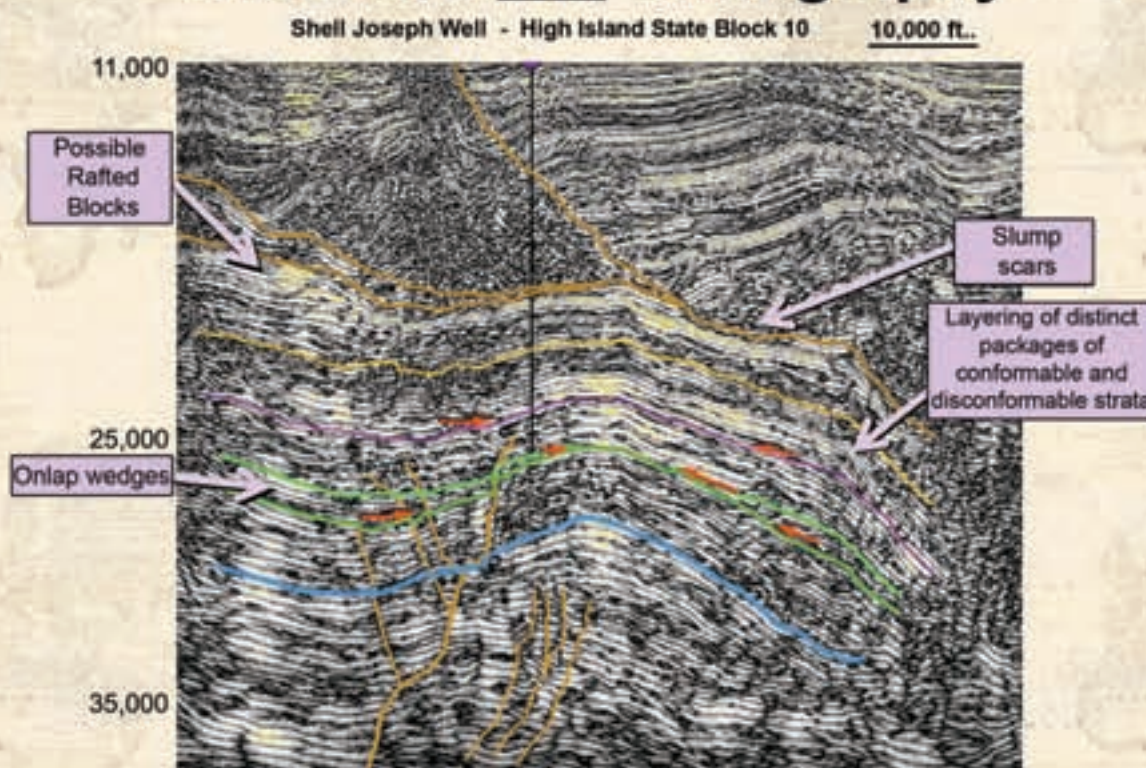
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