

AAPG AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, AN INTERNATIONAL ORGANIZATION

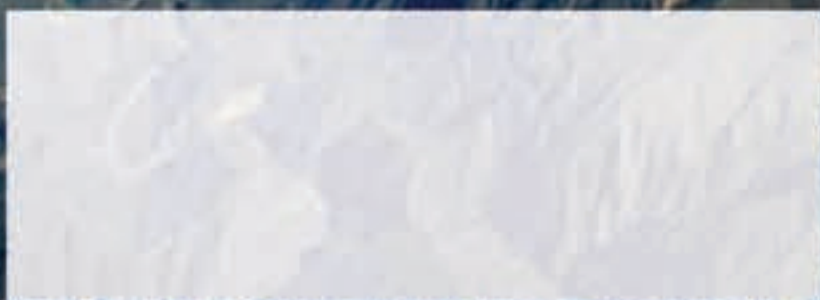
EXPLORER

SEPTEMBER 2009



Down Mexico Way
Complex geology ... surprising potential?

See page 10





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On the cover: A new day is dawning in Mexico, where governmental energy reforms have gone into effect that are designed to help increase the country's oil production. Onshore basins are once again getting serious study by geoscientists, including those found near the rugged and complex Sierra Madre Oriental mountain range, which runs nearly the entire length of the country. See story on page 10. Photo (snapped while on holiday) by EXPLORER graphics/production designer Matt Randolph.

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PRESIDENT'S column

Going Global

By JOHN C. LORENZ

Founded in 1917, AAPG started as a local society in Tulsa, in what was then one of the major centers of the American oil industry. Cushing Field alone, located just west of Tulsa and discovered in 1912, at one time supplied nearly a fifth of the total U.S. oil consumption.

Since 1917 the AAPG presence has expanded across the United States to include six Sections with numerous affiliated societies, and more recently into the international realm with affiliated societies in six Regions. Geologists and geological societies joined AAPG then as now because it helped them in their work, fostering and disseminating the scientific and conceptual tools that are the stock and trade of AAPG members, and offering opportunities for the networking that is so important in this business.



Lorenz

But an organization formed out of pre-existing local societies – instead of being composed of societies formed from scratch using a common blueprint – varies widely from region to association to country. Consequently AAPG entrained some awkward inconsistencies and inefficiencies as it grew. Local laws of incorporation vary considerably, and local societies were founded by ornery and independent-minded individuals with different ideas on how to set up and run a geological society. Moreover, many societies have morphed over the years. For example, the AAPG-affiliated Albuquerque Geological Society started with a membership composed predominantly of oil and gas geologists, but now consists in large part of professionals focused on environmental and ground-water issues. Such variability must drive AAPG headquarters nuts, yet it must be accommodated.

From this variability and compound history a need evolved to smooth out the inconsistencies and improve efficiency within our organization, and to accommodate an increasingly diverse global membership. Thus, AAPG is continuing to morph, and that morphing has recently come into focus under the term "Global Corporate Structure." It has many parts: We've recognized the reality that not all our members work for large companies by offering graduated dues. We've instated a vice president of Regions to represent the growing international component of our membership and to complement the vice president of Sections. We've opened several satellite offices in the Regions (London, Bahrain) with plans for others as conditions permit.

No longer haphazard growth, these changes are following an outline that was laid out several years ago under AAPG President Steve Sonnenberg and Advisory Council Chairman Dan Smith in a strategic plan for the Association (available online at <http://www.aapg.org/business/StrategicPlan/index.cfm>).

Changes are rarely comfortable and the strategic plan outlines some significant changes, but they can be beneficial when done right. As we change, it is important to retain those elements of our Association that have been the strength and identity of AAPG. We don't want to homogenize the organization: Each section has a different flavor with its own foibles, structures, strong personalities, hot plays, industry supporters and perspectives. These local organizations are the source of volunteers that, in conjunction with AAPG staff, drive our local, regional and international meetings to success. We must include

The strategic plan outlines some significant changes, but they can be beneficial when done right.

those organizations, volunteers and viewpoints as we change.

Yet it's all too easy to omit important details in pursuit of the larger goals. Thus your perspective is needed. Various entities and committees are wrestling with the nuts and bolts of the changes, working out a business plan, a protocol for interactions between headquarters and the affiliated organizations. They are addressing the changes that will need to be made in the Constitution and Bylaws and in the leadership structure. The committees are doing yeoman service, and it's important that you as an AAPG member feel that the issues important to you are being addressed. A Web site has been established to allow you to post your comments (see related story, page 4), at <http://discussion.aapg.org/corporatestructure>.

Please vote early and vote often.

ESW: Focus on Climate

"Understanding Climate" is the theme of Earth Science Week 2009, which promotes scientific understanding of our planet.

A poster promoting activities being held Oct. 11-17 is inserted in U.S. addresses of this issue of the EXPLORER, at pages 8-9.

Since 1998 the American Geological Institute annually organizes "a grass roots" effort for the geosciences community and publicizes the event,

distributes materials and provides guidance to those interested in participating in ESW.

Local geosciences and education groups plan events ranging from photography contests to providing earth science studies materials to teachers.

The program is supported by the AAPG Foundation, U.S. Geological Survey, NASA, the National Park Service and other geoscience groups. □

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Heine's talk draws big crowd

DL Program is Boffo in Bangladesh



AAPG Distinguished Lecturer Chris Heine, center, attracted a large audience for his talk on the Saudi Arabia's early Permian stratigraphy.

About 250 students, faculty and professionals heard Distinguished Lecturer Chris Heine's presentation at the University of Dhaka in Bangladesh in late July.

The Bangladesh talks were the first of the tour that extended into mid-August for Heine, of Saudi Aramco in Dhahran,

His talk, "Nature's Juggling Act – Glaciers, Sand Dunes and Limestone: A Post Glacial Sea-Level Rise Captures in Rock a Record of the Early Permian Stratigraphy of Saudi Arabia," described how climate controlled the deposition and preservation of the oil and gas – bearing ancient sandstone reservoirs, which is one of the major reservoirs in Saudi Arabia.

Other stops included universities and local societies in Port Moresby, Papua New Guinea and Australia, where he spoke in Brisbane, Wellington, Canberra, Melbourne, Adelaide and Perth.

During the tour Heine also spoke on "putting geology back into geostatistics."

Heine is one of six Distinguished Lecturers on the international roster and nine on tour in the United States during 2009-10. (See related story, page 32) □

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Corporate Structure Comments Invited

The House of Delegates' Constitution and Bylaws Committee is continuing its consideration of the Global Corporate Structure concept.

The concept was constructed following the 2004 AAPG Strategic Plan and deals with the legal, governance and structure issues, which would allow AAPG to operate worldwide while protecting AAPG assets.

The committee received the concept following a "sense of the House" offered at the meeting in Denver.

The timeline calls for the C&BL committee to submit the proposal for a vote of the House at the 2010 AAPG Convention in New Orleans. Assuming HoD approval, the measure would go to the AAPG membership for ratification.

If the timeline is met, implementation would be in 2011.

An area on the AAPG Web site has been activated for members to discuss and comment on the AAPG Global Corporate Structure proposal.

Also available on the site:

- ✓ Letters of explanation.
- ✓ Global Corporate Structure summary.

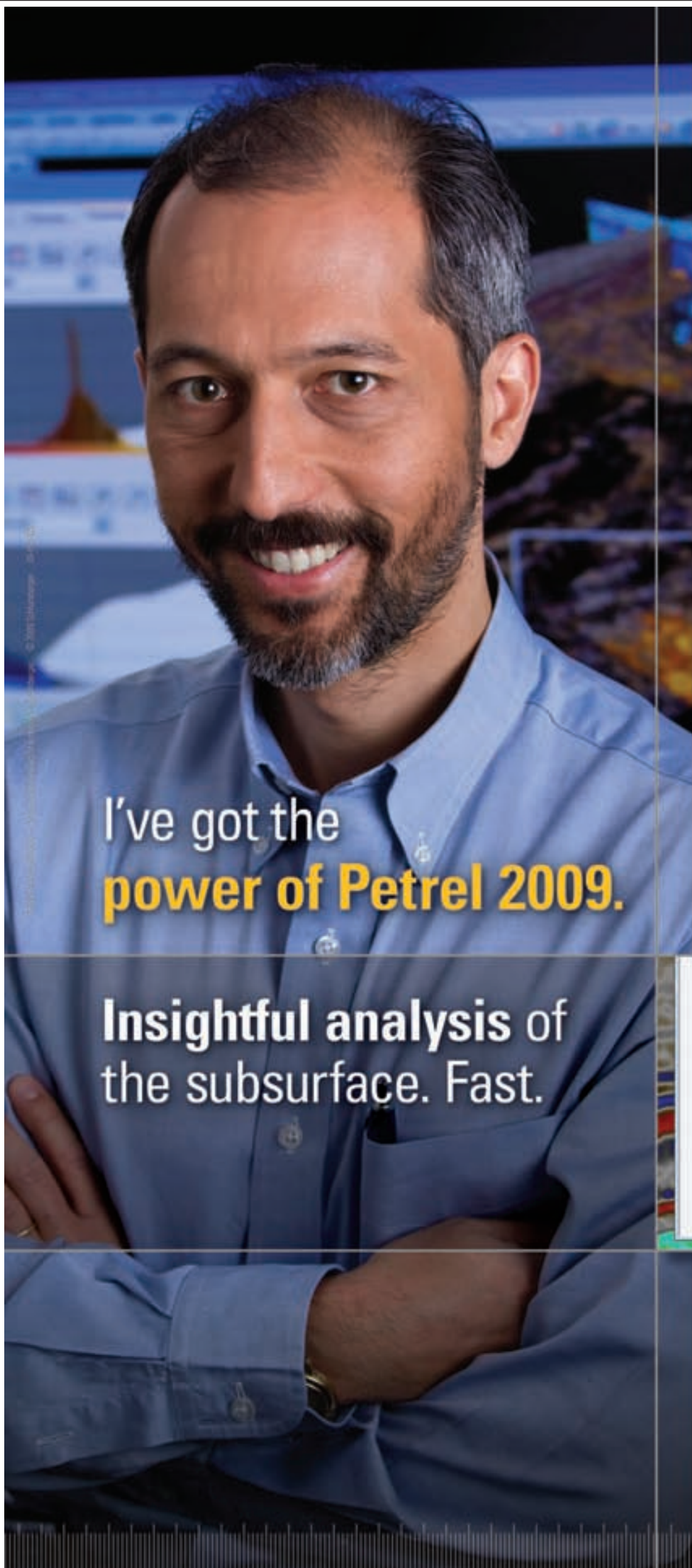
✓ Historic summary of AAPG global development.

✓ Corporate Structure White Paper.

✓ FAQ sheet on the new Global Corporate Structure.

✓ AAPG Strategic Plan Goal Area: Global Presence.

✓ PDF downloads of a flow chart and a legal review. □



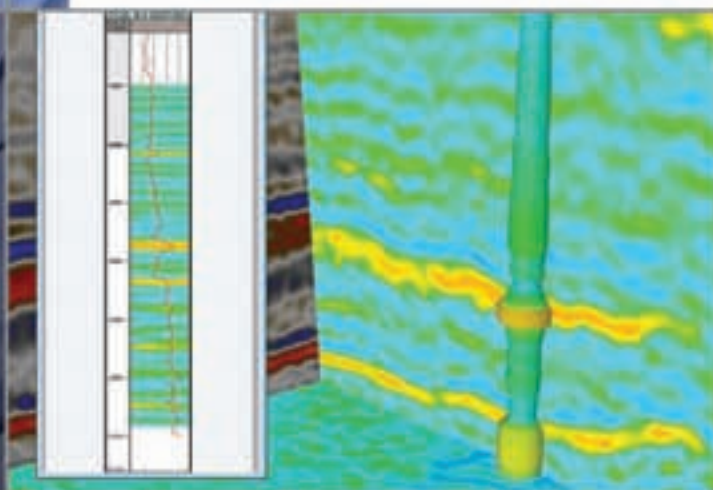
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Portfolios include oil, gas

Risk Capital Looks for Safe Harbors

By DAVID BROWN

EXPLORER Correspondent

Good news for exploration:

There's a lot of outside capital looking for investment opportunities in oil and gas.

Bad news for capital:

Today, it's not easy knowing where and how to invest in the oil and gas industry.

G. Warfield "Skip" Hobbs is managing partner of Ammonite Resources in New Canaan, Conn., where he has experience and expertise in both worlds.

Hobbs, an Honorary AAPG member and past Association secretary, serves as a consulting intermediary between institutional capital and emerging investment opportunities in the energy industry.

He said most fund managers and institutional investors now consider oil and gas an essential part of their portfolios. Investing in the industry brings some protection against both inflation and higher future energy prices.

"If you are a fund manager, you want to allocate a portion of that fund to exposure to natural resources," Hobbs noted.

"You want to hold oil," he said. "And maybe that's one of the reasons so many people were buying futures" last year.

Big investors tend to be conservative in capital deployment and look for steady but not necessarily spectacular returns, according to Hobbs.

"There's always the lure of the home run, but that's not why institutional investors invest," he said. "As one of my investment clients puts it, 'You want to invest in those guys who continually get on first and second.'"



Hobbs

Hobbs identified several current areas of interest for institutions that want to invest capital to invest in oil and gas.

"We're seeing a number of our clients look at alternative energy, particularly geothermal. We've had clients looking at heavy oil," Hobbs said.

But "right now," he added, "I'd say most of the capital is risk-averse and is looking at resource plays."

Shale, International Lures

Shale gas exploration and development is still a happening part of the industry. The catch is, it's been happening for a while.

"I think the smart money likes to get into these shale plays early, and right now it's hard to get into a shale play early,"

G. Warfield "Skip" Hobbs, managing partner of Ammonite Resources in New Canaan, Conn., will discuss "The Future of the Global Oil Industry" as the All-Convention Luncheon speaker at the Gulf Coast Association of Geological

Hobbs noted.

So capital is targeting experienced firms with good track records that hold positions in the best shale plays.

"You're seeing institutional money come into backing companies that already have the leasehold resources," Hobbs said.

One emerging opportunity could be in providing funds for management teams that acquire shale-play assets from small, over-leveraged independents.

In the Marcellus Shale play in the eastern United States, wells are going to cost \$3 million to \$4 million each, "and small companies just don't have that kind of capital," he observed.

"Another thing we've been seeing is tremendous interest in international," Hobbs said, including investments in Africa, Asia and elsewhere.

Societies annual convention in Shreveport, La.

Hobbs, an Honorary AAPG member and past AAPG secretary, will speak on Monday, Sept. 28. The meeting's dates are Sept. 27-29.

His Kuwaiti clients "see tremendous opportunity for well-capitalized small independents in the Middle East." Those would be home-grown companies, Arab independents with international financial backing, he said.

If that trend spreads, the importance and influence of non-U.S., non-Canadian independents could be a major story for the industry.

Hobbs said he sees some interest in Latin America, by Canadians and others, "but a lot of political problems (are) there." Investors are "a little bit gun-shy" of Canada itself because of lower natural gas prices, he added.

Oil sands projects still hold promise but capital is wary of their economic viability, Hobbs noted.

"The cost of material and labor went up because there were a dozen projects going on at the same time. It was just crazy," he said.

In his speeches about the future of the oil industry, "what I talk about is the resources that are out there globally – and we have plenty of resources," Hobbs said.

Recent industry woes have arisen more from infrastructure problems and geopolitics, he believes, and investment is needed to address infrastructure needs.

For institutional capital, "there are some huge midstream opportunities," he observed.

As one example, "you have a lot of pipelines through the Marcellus area, but they're all at capacity," he said.

See [Investment](#), page 8



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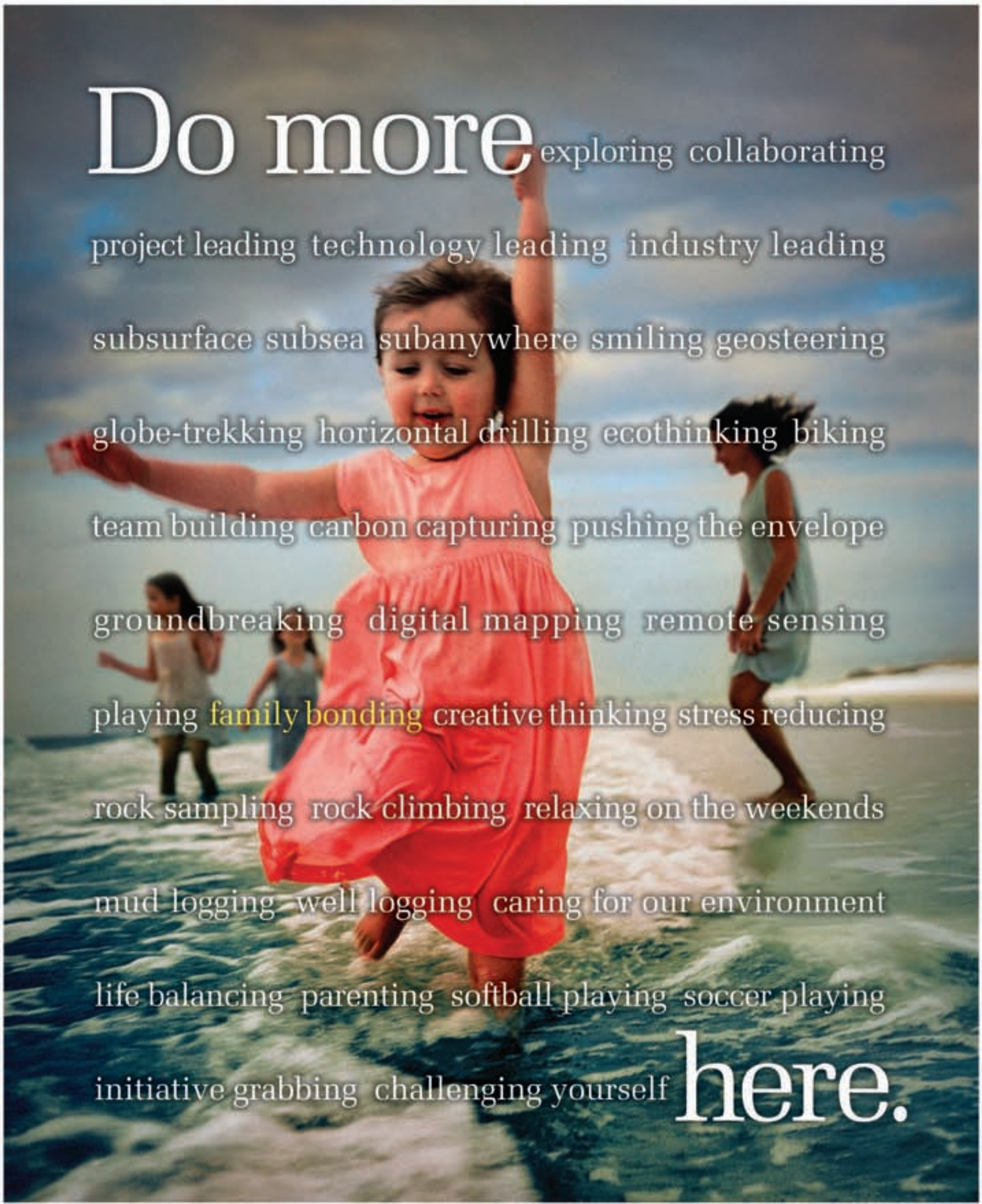
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Investment

from page 6

Potential Targets

Capital investment by the oil and gas industry itself has declined with falling prices for production, leading to reduced activity – but also to somewhat lower costs.

Michelle Foss serves as chief energy economist for the Bureau of Economic Geology at the University of Texas and head of the Center for Energy Economics in Houston. She tracks how and where the industry deploys its capital.

“The majority of energy investment around the world is coming from the oil and gas industry,” she said. “And that shouldn’t be a big surprise.”

It’s probably also no surprise that the industry invests most of its capital in

familiar, bread-and-butter areas and fairly little in experimental or alternative energy projects.

“Much of their investment is going back into their core business, because that’s where they have their competitive advantage,” Foss observed.

“Those patterns are well established and they aren’t going to change very much,” she said.

A contemporary twist on that story comes from the amount of money going into developing and prolonging production from known energy assets. Companies need to get all they can from what they have “as their more traditional oil and gas resources mature,” according to Foss.

“A lot of capital is going into the technology they need to better develop their resources,” she said.

For the global oil industry, today’s biggest resource-play story might be the expansion of interest outside of the



Foss

United States and Canada.

“People are looking at gas shales all over the place,” Foss said. “We’ve been hearing bits and pieces of news. Exxon Mobil is looking at shale gas plays in Europe, BG is looking in Asia, and whatever.”

Exploration and development work offshore continues to soak up capital, as those projects are less influenced by year-to-year price swings. They also tend to be oil-driven and oil prices are still reasonably attractive, she said.

“Offshore, people are there for a longer period, 10 to 15 years’ development time. It’s sort of a different ballgame,” Foss noted.

High costs and questionable economics have made the industry shy

away from ultra-heavy oil and oil sands projects – but the potential of heavy oil is too large for the industry to ignore.

“They need to figure out how to pursue that hydrocarbon source with a lower cost structure. They’ve also had to endure a lot of criticism on the environmental side,” Foss observed.

“People aren’t just going to walk away from that – it’s too big. And that extends to heavy oil plays all over the place,” she said.

Another, sometimes overlooked story is the industry’s increased commitment to investing in people.

“One of the prevailing things is, in spite of the lower gas prices, they are really trying to hold on to their people,” Foss said. “Companies are really trying to keep their employees through this cycle.”

Dealing With Volatility

In anyone’s list of investment risks in oil and gas, price volatility and price uncertainty would have to be close to the top. Oil prices have soared, collapsed and then doubled just in the past 18 months. Natural gas prices have produced a boom and then a bust in U.S. drilling.

“If you asked me right now, ‘Where are gas prices going?’ I would have to say I really don’t know,” Hobbs said.

He identified two likely scenarios for natural gas prices, leading to opposite results.

“We’ve seen a 50 percent decline in drilling – or more – in an industry that has a very high decline ratio. When the economy comes back, the gas won’t be there,” Hobbs said.

“The price could spike right up because of the decline in drilling. But the flip side is that these shale gas plays have tremendous production potential,” leading to a supply surplus and a depressed gas price, he said.

Foss thinks the industry will have to adapt to a low-to-medium natural gas price environment.

“It’s kind of hard to see how you get gas above \$6 unless you have a lot of things going on,” she said.

In the future, the emphasis in shale plays will be developing production without as many wells and as much capital investment, according to Foss.

“I would be surprised if the drilling rig count is going to be as high as it was before. People are really going to try to optimize that development without drilling so many wells,” she said.

The direction of oil prices is anyone’s guess. Hobbs predicted a demand rebound and a price jump.

“I think Asian demand is going to go up sharply and we’ll have another price spike,” he said. “You can’t turn off the Asian engine.”

Future Focus

For the future, investment could be looking to new unconventional opportunities. Foss believes more and more capital will be directed toward the potential of nano permeability and nanoporosity in complex reservoirs. It could dwarf the potential of shales.

“I think that’s where a lot of this is going, if people can crack that nut,” she said. “It’s incredible to think about.”

In the near-term, history matters.

Right now, capital is looking for a safe harbor. Institutional investors want a good industry position, a seasoned management team, a history of success.

Said Hobbs:

“The bottom line is having a proven, successful management team that knows how to explore successfully, and the opportunities will fall out. The bottom line is, right now there’s a lot of capital looking at proven management teams.” □



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A new emphasis on exploration expertise

Mexico Regulatory Rules Changed

By LARRY NATION

AAPG Communications Director

Mexico is experiencing a tectonic shift in its energy regimen, and AAPG Vice President-Regions Alfredo Guzmán is at the core of the vortex of change.

Energy reforms went into effect last November that are hoped to give the state-owned Petróleos Mexicanos (PEMEX) the flexibility it requires to halt an ongoing and alarming slump in production.

A key provision is the formation of a five-person "Comisión Nacional de Hidrocarburos" (CNH), a new federal agency under the secretary of energy's purview that has the expertise and authority to regulate and supervise exploration and production decisions.

Guzmán is one of the five, all appointed by Mexico's President Felipe Calderón.

"I had just hung up the phone hearing that I was elected as an AAPG vice president Cregious when the phone instantly rang again – it was from the (Mexico) Energy Ministry," Guzmán said, "telling me of the appointment."

The Task at Hand

The commission's charge will set technical exploration strategies and standards for Mexico oil and gas fields, including rules on reservoir management and production practices.

The new law confirms PEMEX's monopoly over the country's oil and gas, but the secretary for energy has seen broader authority over energy planning and policy.

Previously, decisions on projects have been based on the Ministry of Finance's assessments of the likely short-term revenues, since PEMEX provides about 40 percent of the country's budget revenues.

One of the aims of the energy reform was to improve regulatory supervision of PEMEX while focusing the company more on being an operator, with the CNH playing a significant role in attracting private companies as contractors.

The reform also has given the CNH a hugely significant tool – relaxation of the rules governing how PEMEX contracts for services.

While the law expressly bars production sharing agreements, risk service and other similar agreements, PEMEX now will be permitted to give incentives to contractors for achieving set goals such as cost



Photos courtesy of Ernesto Miranda, PEMEX

A closer view: A team of geoscientists take a moment to document their visit to outcrops (above and below) in Mexico's Eocene Turbidites facies in the Sierra de Chiapas.

savings or productivity improvements, and clauses to compensate for variations in market prices of supplies, equipment and the acquisition of new information.

This is a sea-change from the previous regimen, which shackled potential PEMEX project partners.

Spraberry Analogy

The reforms come none too soon. For instance, PEMEX has reported the offshore Cantarell Field in 2008 was producing 974,000 bod, slumping 37 percent from the previous year. Cantarell, discovered in 1976, was producing about 60 percent of the oil production of Mexico, the world's number six oil producer. At its peak in 2004, Cantarell was producing

2.193 million bod.

With 10 productive basins and two that are highly prospective – including the deep Gulf of Mexico – Guzmán is confident a turnaround is possible.

"Look at the Chicontepec Field onshore in central Mexico," Guzmán said.

"Geologically, the Chicontepec is highly analogous to the Spraberry Trend Field in the Midland Basin in Texas.

"The Spraberry was discovered in 1948 and, like Chicontepec (discovered in 1931), was considered to be uneconomic," he said. "The geology is similar, but the development histories are hugely different.

"Both are located in mature producing regions where numerous other fields, including fields with significantly less original hydrocarbon in place but with



better reservoirs, have produced millions of barrels of oil and billions of cubic feet of gas," he said.

Similarly, Guzmán continued, both Spraberry and Chicontepec are giant oil fields contained within extensive, low porosity and low permeability submarine fan reservoirs. Each field has a gross interval of approximately 1,000-1,500 feet, with multiple reservoirs less than 10,000 feet deep. Sand-prone intervals are laterally extensive and can be correlated regionally, but do have localized channeling. Both fields produce from solution-gas drive.

"Over 18,000 wells have been drilled in the Spraberry," Guzmán said, "and less than 2,000 in Chicontepec."

Challenges Await

A 2002 paper Guzmán co-authored with AAPG member Chris Cheatwood of Pioneer Natural Resources, stated "Managing drilling costs, fracturing technology and controlling production costs along with economies of scale have allowed the Spraberry to be developed. Developing the Chicontepec field using similar methods would add significant reserves and production volumes for Mexico."

Chicontepec is estimated to contain 140 billion barrels of original oil in place and 35 trillion cubic feet of associated gas in a series of stacked Late Paleocene to Eocene-age reservoirs covering approximately 3,800-square kilometers.

Another AAPG member, Noel Tyler, wrote in a 2004 paper, "Like its close analog, the Spraberry Trend of the Permian Basin, the Chicontepec is pervasively saturated, and like the Spraberry, is considered a candidate for secondary recovery."

Both Guzmán and Tyler agree there are many challenges to be overcome before waterflooding can be initiated in the Chicontepec – including the indigenous population's small villages and diverse cultures that need to be approached in an appropriate manner, Guzmán said.

"To be sure, there is a lot of geology to be done," Guzmán said, "but with the right technology and the appropriate exploration and production plan, the Chicontepec is an example that Mexico can reach the potential that has been envisioned." □

Guzmán's Success Indicates Potential

As a member of Mexico's newly formed Comisión Nacional de Hidrocarburos, Alfredo Guzmán knows first-hand how high-level policies can affect exploration and production success.



Guzmán

As a member of the new commission, Guzmán will be sitting on a panel of five scientists that will be overseeing exploration and production decisions – and advising contracts – for PEMEX.

Guzmán is living in Mexico City and working long hours during the week, then making the two-hour drive home to Veracruz for weekends.

The tasks ahead are formidable.

As exploration vice president of PEMEX from 1999-01 and North Region

vice president in 2002-07, Guzmán knows the potential of the country's undiscovered resources.

He also has experienced the frustration of policies that blocked progress – and has an established track record in exploration and production success when progressive policies are applied.

In 1992, when he was PEMEX's

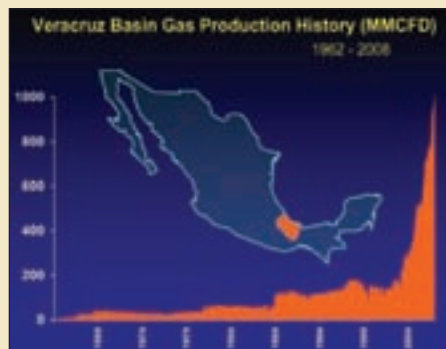
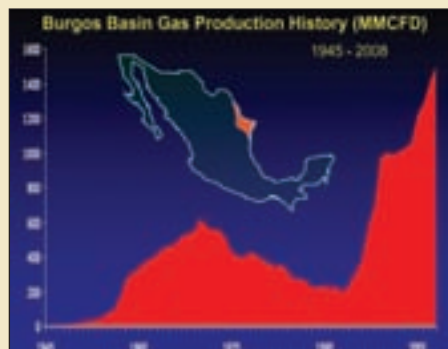
sedimentology studies superintendent in Northeast Mexico, gas production from the Burgos Basin was about 200 mmcf. Guzmán talked with upper management about how production could be improved through new processes and technology – and allowing explorationists to choose drill sites rather than others that would opt for "safe" and "economic" choices.

In 1994 Guzmán was named the Burgos Basin Integral Project team leader. Production began to climb dramatically as the ideas he brought to the table began to take hold (see accompanying graph), and in 1997 he was named exploration manager for the PEMEX northern region.

With that success, Guzmán was named PEMEX exploration vice president for all of Mexico in 1999. In 2002 as regional vice president Guzmán took the Veracruz Basin, which was producing less than 200 mmcf – but given some latitude and again applying new technologies and adapting new business models when allowed, the production began to climb.

When Guzmán retired in 2007, the Burgos Basin was producing at about 1,550 mmcf and the Veracruz at about 1,000 mmcf – a more than five-fold increase in production.

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Member assisted in NSF project**Geology Pamphlet Targets Public**

By BARRY FRIEDMAN
EXPLORER Correspondent

A new series of pamphlets on climate, the atmosphere, oceans and the earth has been created, and the reason why is simple to explain.

"There's a need for better science curriculum in America."

That's the feeling of AAPG member Bob Reynolds, a staff geologist and Research Associate at the Denver Museum of Nature and Science who was part of the team that created the pamphlets and is now part of the effort to ensure the pamphlets make an impact.

The series was funded by the National Science Foundation to foster science education for those, admittedly, who don't know much about it.

The Foundation believes this series is an effective tool to share basic scientific knowledge – and the latest pamphlet, Earth Science Literacy Principles, was designed specifically for the general public.

"For someone with not a lot of science background," added Reynolds, a former chair of the AAPG Public Outreach Committee.

To that end, Reynolds, an adjunct faculty member in the Colorado School of Mines' department of geophysics, carries the pamphlets around in his back pocket and literally hands them out on the street and actually leaves them in taxicabs.

He puts it this way:

"If I were standing in a polling place, on line, and turned around to the guy behind me, what would I want him to know about earth science?"



Reynolds

Big Ideas

By his own admission, Reynolds, who also has worked as a stratigrapher and has had stints with Exxon Production Research and Amoco Production in Houston and Denver, said he "loves this stuff" and

believes it's important – not just for the sake of science itself or even for those in college completing a basic liberal arts education, but for something more crucial: competition in the global market place.

"It is important that science education is nurtured in our society," he said.

And the need for that nurturing, he said, is crucial.

"The Chinese are graduating six million from college every year. Six million! And that's not even including what's happening in India and Europe," he said. "We (Americans) need to be competitive, especially in the sciences."

As for the earth science pamphlet, he says it's a "pretty logical thing."

The work is divided into what it calls the nine "Big Ideas."

- ✓ Earth scientists use repeatable observations and testable ideas to understand and explain our planet.
- ✓ The earth is 4.6 billion years old.
- ✓ Earth is a complex system of interacting rock, water, air and life.
- ✓ Earth is continuously changing.
- ✓ Earth is the water planet.

✓ Life evolves on a dynamic earth and continuously modifies Earth.

✓ Humans depend on Earth for resources.

✓ Natural hazards pose risks to humans.

✓ Humans significantly alter Earth.

The pamphlet was put together by "a bunch of passionate geologists writing about their art," and flows from a basic understanding of the age of the earth to the effects of climate change, which he says is causing textbooks to be re-written.

"We are literally throwing out the old ones and having to write new ones," he said.

Specifically, the pamphlet is a project of NSF-funded Earth Science Literacy Initiative (ESLI). Its purpose, according to the organization's Web site, is to gather and codify "the underlying understandings of Earth sciences into a succinct document that will have broad-reaching applications in both public and private arenas."

The group believes the concepts introduced in this pamphlet – and the corresponding "Big Ideas" – are principles with which Americans need to have some familiarity.

Additionally, ESLI has produced:

- ✓ Oceans Literacy Network – co-sponsored by the NOAA, the National

Geographic Society and the Marine Educator Association, it discusses, agreed-upon principles in ocean literacy and maps them to fundamental concepts and NSES content standards, to facilitate their integration into educational curricula for students K-12.

✓ Atmospheric Science Literacy Framework, funded by the NSF, which brought together scientists, educators and policy specialists to produce a draft framework composed of "essential principles" and "fundamental concepts" in atmospheric science and climate.

✓ The Climate Literacy Network, which serves as a framework for understanding and communicating about climate science and gives climate science teachers a set of principles to meet learning standards in their curriculum.

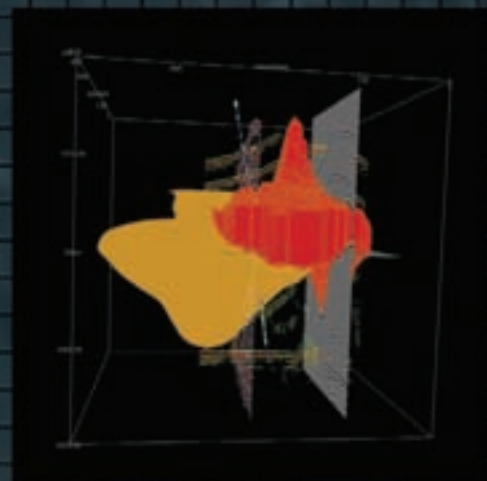
Reynolds said the goals and gestation of the pamphlets were similar.

"They were created by a team of geoscientists," he said, "with input from hundreds of colleagues through Web media, focus group meetings and public forums at professional meetings."

Reynolds said that while there isn't yet a formal mechanism to deliver these pamphlets, he wants them made available to everyone. The pamphlet is downloadable at www.earthscienceliteracy.org.

Science teachers, obviously, as well as state education departments would be the first step. Of that he says, "it's easy to hand it to the choir."

It's the cab drivers, he seems to be saying, who really need them. □



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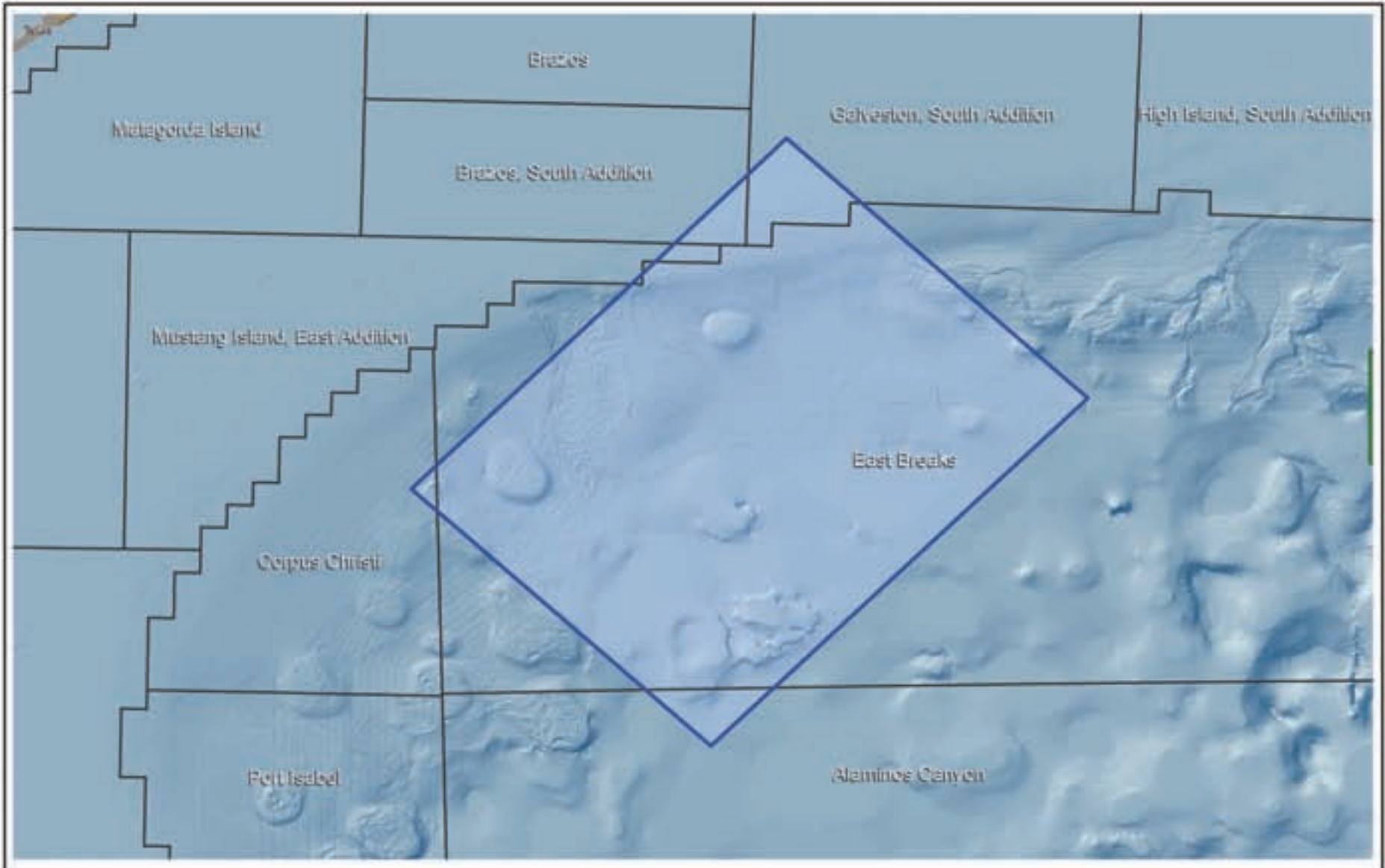
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Haynesville vs. Barnett**Is My Shale Better Than Your Shale?**

By LOUISE S. DURHAM
EXPLORER Correspondent

Action in the red-hot Haynesville shale play in North Louisiana continues on the fast track.

Operators find it darn near irresistible, given that recent wells have registered IP rates exceeding 20 MMcf/d.

"The tremendous production rates of some early wells are no doubt related to the higher formation pressures observed within the Haynesville section," said Kevin Ferworn, vice president at GeoMark Research in Houston. The company is a geochemical laboratory with considerable experience in oil and gas analyses.

It's a perspective that has led Ferworn to a conclusion: For a variety of reasons – including those geochemical – the Haynesville Shale has a bit of an edge on its Barnett relative.

"Typical Barnett shale downhole pressures are plus-or-minus 0.45 psi per foot, while Haynesville sections often exceed 0.9 psi per foot," Ferworn said.

"In situ oil/gas cracking and superior seal capacity are the big contributors to the increased pressures in the Haynesville," he noted. "Each can be identified using mud gas isotope geochemistry."

During oil analysis, researchers use high-resolution instruments to look at specific molecules in the oil called biomarkers, which live in the relatively heavy fraction of the oil. These biomarkers help to determine the nature of the source that generated the oil and gas.

In other words, the oil produced today contains diagnostic markers from the source.

"Gases are more difficult to type because there are so fewer molecules in gas," Ferworn said. "Important things we can measure are the stable isotopes of carbon and hydrogen molecules."

Wanted: Maturity

Methane is the lightest and most abundant of the many hydrocarbons that make up natural gas. A methane molecule consists of one carbon atom surrounded by four hydrogens (CH₄). The carbon atom itself contains six protons and either six or seven neutrons in its nucleus – these are the stable isotopes of carbon versus the unstable C14, which decays over time.

The ratio of how much C12 there is relative to C13 can be measured to reveal crucial information about the formation gas, according to Ferworn.

"That ratio changes with the type of organic material laid down in the source rock in the first place," he said, "and it's especially important with the thermal maturity of that source."

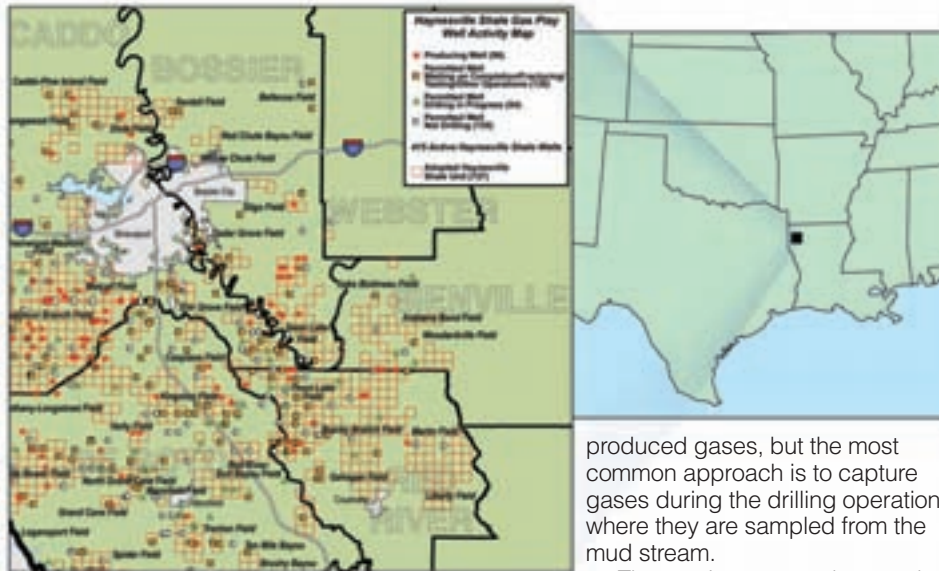
"When you get to shale plays, what's important from a geochemist's point of view is whether there is enough organic material in the shale in the first place," Ferworn said, "and did it get mature enough to break down into lots of gas."

"Isotopes help us answer that question," he noted.

The idea is, the longer and hotter an oil and gas source rock gets buried, the more mature it becomes. The first thing that starts to form is bacterial methane, which is similar to methane from rotting vegetation in a landfill.

Using a maturity marker scale based on carbon isotope ratios, one can see that as temperatures increase with deeper burial, the oil window is encountered before going into still hotter deep dry gas.

"If you get a sample of gas from a shale play and measure the carbon isotope, you may get a certain value on the maturity



produced gases, but the most common approach is to capture gases during the drilling operation, where they are sampled from the mud stream.

The gas is separated out and sub-sampled before going to the mudloggers gas chromatograph, which analyzes how much hydrocarbon gas is caught up in the mud stream.

In increasingly high maturity shale gas wells, ethane and propane isotopes show a reverse, or "rollover," shift on the analysis graph when it's thought they shouldn't.

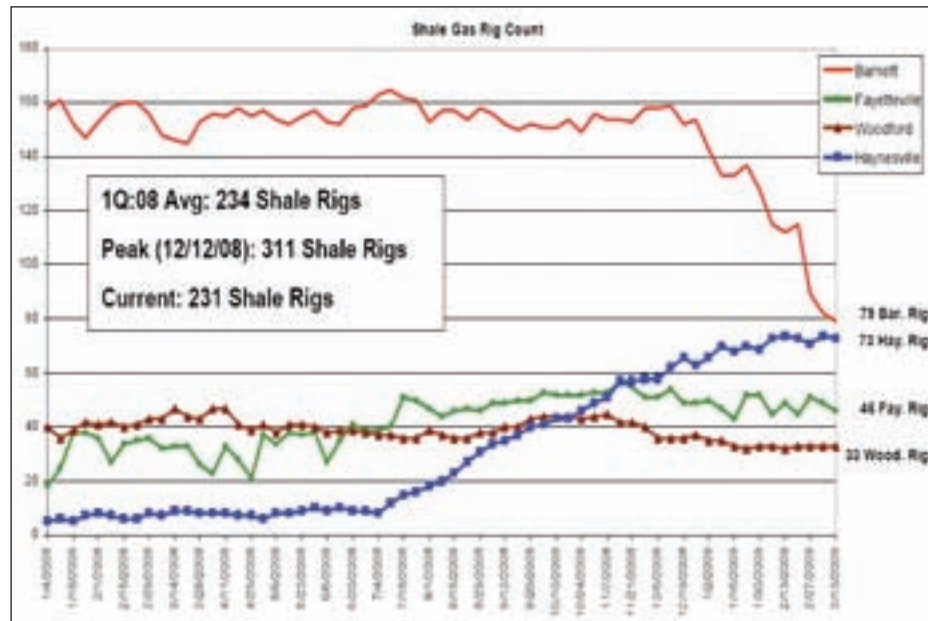
"We think this shift is caused by gas that stays trapped in the shale," Ferworn said. "The big gas molecules start cracking into more, smaller molecules, so things like ethane, propane, butane are

scale and track it down," Ferworn said, "finding the source left the oil window and moved into the gas window."

"Combined with actual source rock data, a calibration scale for all the different shale plays is developed" he said, "so the isotopes can be used to say if the shale got mature enough to make lots of gas."

An 'Effective' Seal

The samples that are analyzed fall into two different categories. One consists of

**GCAGS Spotlights Shales**

Kevin Ferworn will present the paper "Haynesville Shale Gas – Why Is It Better Than the Barnett," during a day-long symposium on the Haynesville and other shale plays set for the Gulf Coast Association of Geological Societies' annual convention.

The GCAGS meeting will be held Sept. 27-29 in Shreveport, La.

The symposium is set from 8 a.m. to 4:30 p.m. Sunday, Sept. 27, at the Shreveport Convention Center, featuring 17 talks on the Haynesville and other shale plays. Ferworn's talk begins at 11:10 a.m.

Other talks include:

✓ Martin B. Payne on "The Haynesville Play: A New Opportunity to Prove the Strategic Value of Natural Gas in Peak Oil Mitigation" (see related story, page 16).

✓ Roger M. Slatt on "Workflow for Stratigraphic Characterization of

Unconventional Gas Shales."

✓ Thomas E. Ewing on "Ancestral Basin Architecture: A Possible Key to the Jurassic Haynesville Trend."

✓ Robert G. Clarke on "Haynesville Remains Popular While Other Shales Slow."

✓ J. Daniel Arthur on "Hydraulic Fracturing Considerations for Natural Gas Wells of the Marcellus Shale."

The GCAGS meeting theme is "A Fusion of Geology and Technology," built around papers and posters dealing with the Wilcox Formation; seismic applications and salt tectonics; Gulf Coast sedimentation and coastal subsidence; old fields and new plays; shale resource plays; and visualization, geochemistry and interpretation of geologic systems.

To register or for more information go to the convention's Web site at www.gcags2009.com.



breaking down into more methanes.

"This makes for drier gas," he noted, "and more small molecules in the same space make the pressure go up. You see this kind of behavior in a nice mature section of the Barnett."

"In looking at a single well in the Haynesville play, once we break into the Haynesville, it's about 99 percent methane gas – the bigger molecules have broken into lots more methanes," Ferworn said. "At that point the well encountered a significant overpressure."

"The one important thing we see inside the Haynesville versus the Barnett is the magnitude of the shift of the ethane isotopes," Ferworn noted. "It's the biggest of any shale play we see."

"This is telling us that whatever the seal is – whether in the shale itself or something on top of the shale – it's the most effective seal we've seen in any of the shale plays," he said.

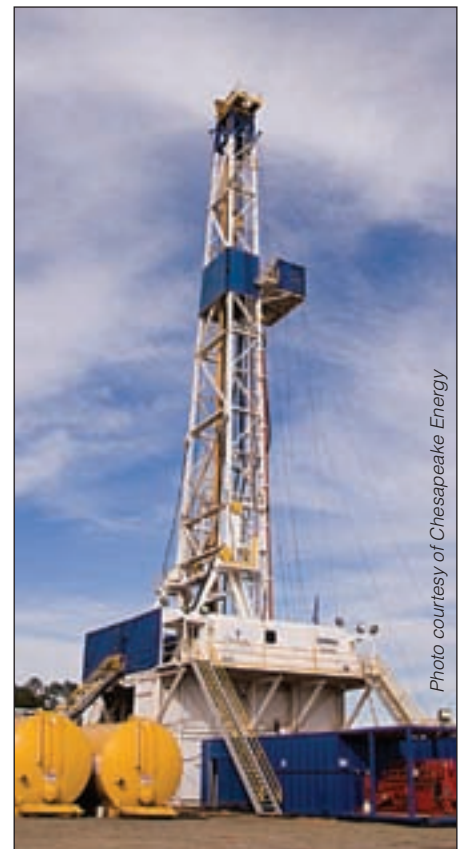


Photo courtesy of Chesapeake Energy

Activity in the Haynesville play.

Haynesville vs. Barnett

The integrity of the seal is strikingly obvious when evaluating hydrocarbons in wells that tapped into reservoirs above both the Barnett and Haynesville.

The Barnett leaked considerably, which was documented by identifying Barnett-sourced oils in younger, shallower reservoirs.

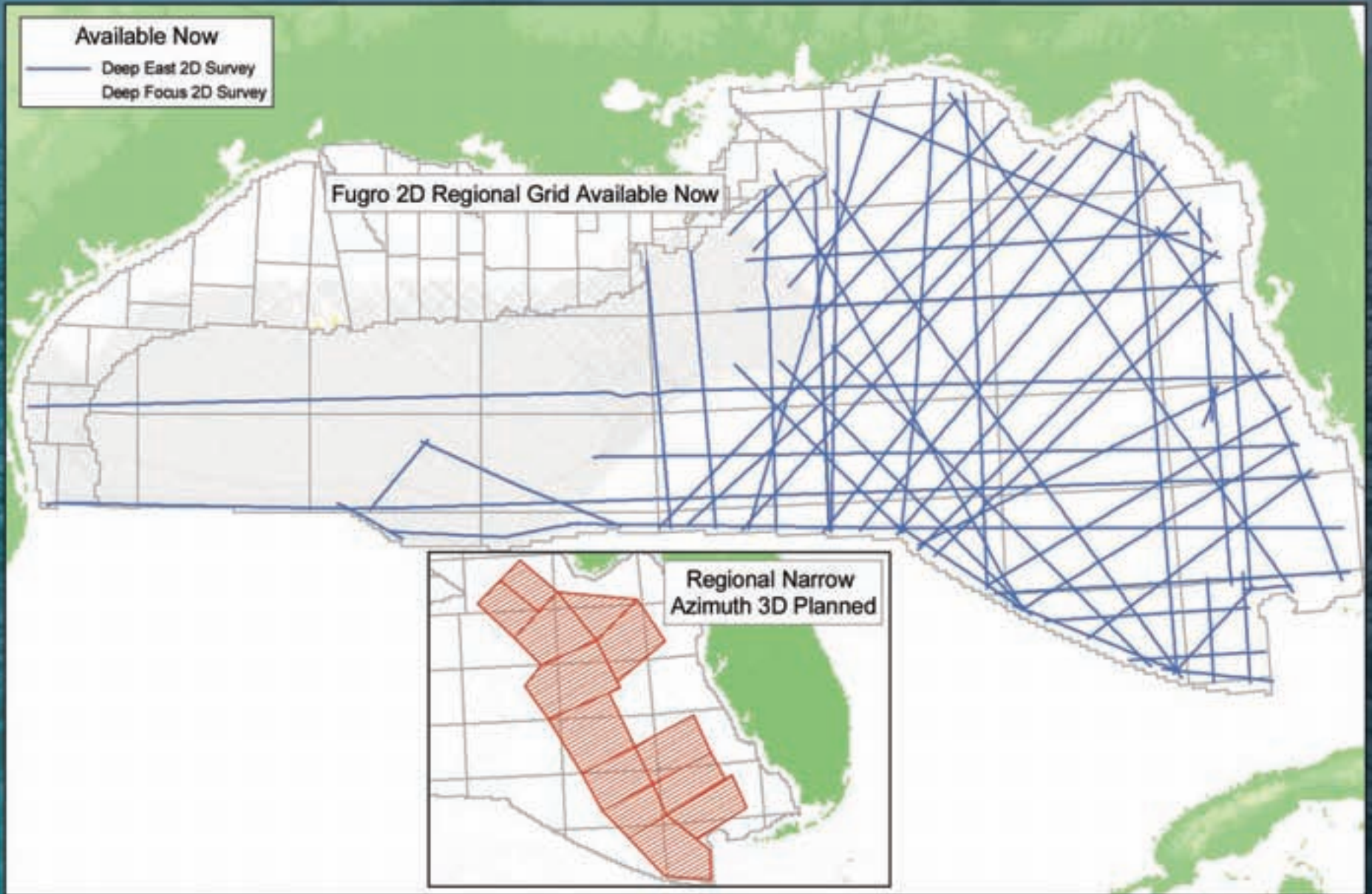
Not so for the Haynesville.

Hundreds of oils in the GeoMark collection that have been chemically typed were used as a reference point to determine there were no Haynesville-sourced oils in any shallower reservoirs

See **Haynesville**, page 16



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Peak Oil – maybe; Peak Gas – no way**Shales Changed Conversation**

By LOUISE S. DURHAM
EXPLORER Correspondent

Along with the near-unbearable summertime heat in northwest Louisiana, the region's Haynesville shale gas play is sizzling hot.

Given early estimates of perhaps 250 Tcf of recoverable gas, the play truly is a big deal.

What may surprise you is that some folks consider the Haynesville to have a potential role to play in the mitigation of Peak Oil.

"Many oil supply analysts, myself

included, believe the worldwide rate of liquid fuels (crude-plus-condensate-plus-NGL) production has passed a level that will never again be exceeded," said Martin Payne, general manager of Anvil Energy LLC in Austin, Texas. "This condition is sometimes referred to as Peak Oil."

Payne emphasized the current temporary decline in liquid fuel demand



worldwide is masking global production declines. Many analysts believe the current relatively slim excess supply will last no more than a couple of years, resulting in a liquid fuels shortage.

"Those of us in the Peak Oil community are concerned because there's not a ready substitute for what we've built our country around, which is cheap gasoline and cheap diesel," Payne said. "It doesn't look like any of the

renewables or biofuels are going to be able to replace that to any great extent.

"When you believe the maximum rate of oil production is near or occurred in 2008, as many of us do believe, then pretty quickly we'll have a liquid fuels problem," he said. "This is without bringing up geopolitical and economic issues that might accelerate that."

Step On the (Natural) Gas

Payne is convinced that clean, low-carbon natural gas can play a key role in mitigating the anticipated shortfall given that natural gas offers the only current alternative to gasoline and diesel as a transportation fuel.

Another huge plus is that the manufacture of new natural gas vehicles, the conversion of existing vehicles (using existing technology) and the creation of a natural gas fueling infrastructure would provide immediate, badly needed jobs.

"The shame of it is the policy makers are concerned there's not enough natural gas," Payne lamented. "The challenge to producers is to try to make policy makers and the public aware that shale gas, unconventional gas is a wonderful transition fuel at the very least.

"The Haynesville is a very good example of this," he noted. "If you look at gas reserves as of 2007 (determined by the EIA), there are no reserves for the Haynesville – or the Marcellus – because they didn't really exist then.

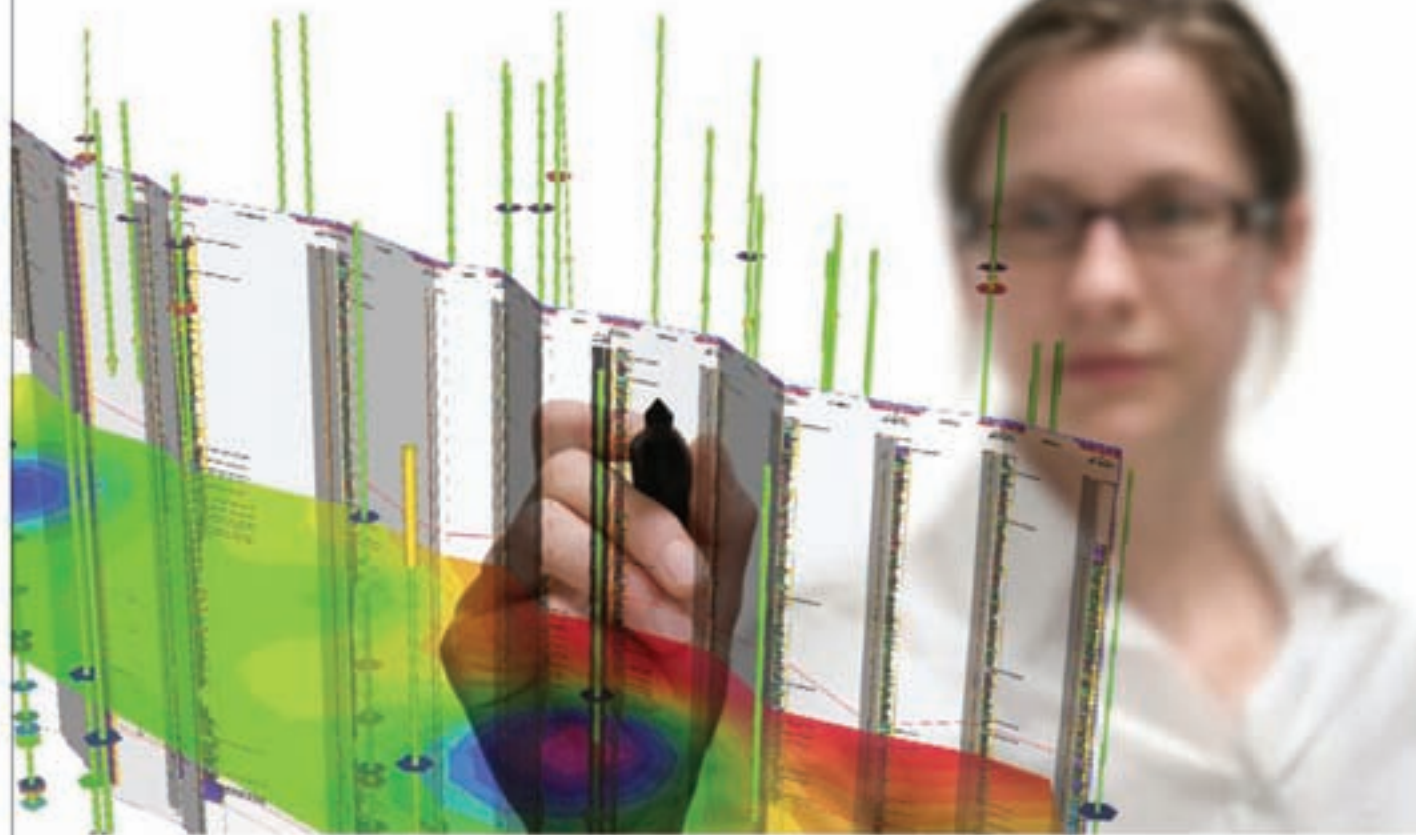
"Some believe they could contain over 1,800 Tcf (reserves), which is incremental on top of existing gas reserves of just two years ago," Payne emphasized. "With a 50 percent recovery factor, these reserves could triple the proved U.S. gas reserves calculated through the end of 2007."

Payne noted the Haynesville alone stands to potentially dwarf the remaining reserves for the rest of the "lower 48," perhaps even including Alaska.

"It's huge, and it's all new and incremental," Payne said. "So if we had a sufficient amount of gas in '07, this is all new since then – and you can toss the Marcellus in on top of that.

"Our big picture goal," he added, "is to convince the policy makers that plentiful, abundant American natural gas is a viable option." □

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Haynesville from page 14

across the play.

"This makes you think more of the hydrocarbons generated in the Haynesville stayed in the Haynesville," Ferworn said. "In the Barnett, you're getting residual hydrocarbons that were not expelled into other reservoirs.

Another favorable aspect of the Haynesville is the presence of increased amounts or reservoir rock type minerals.

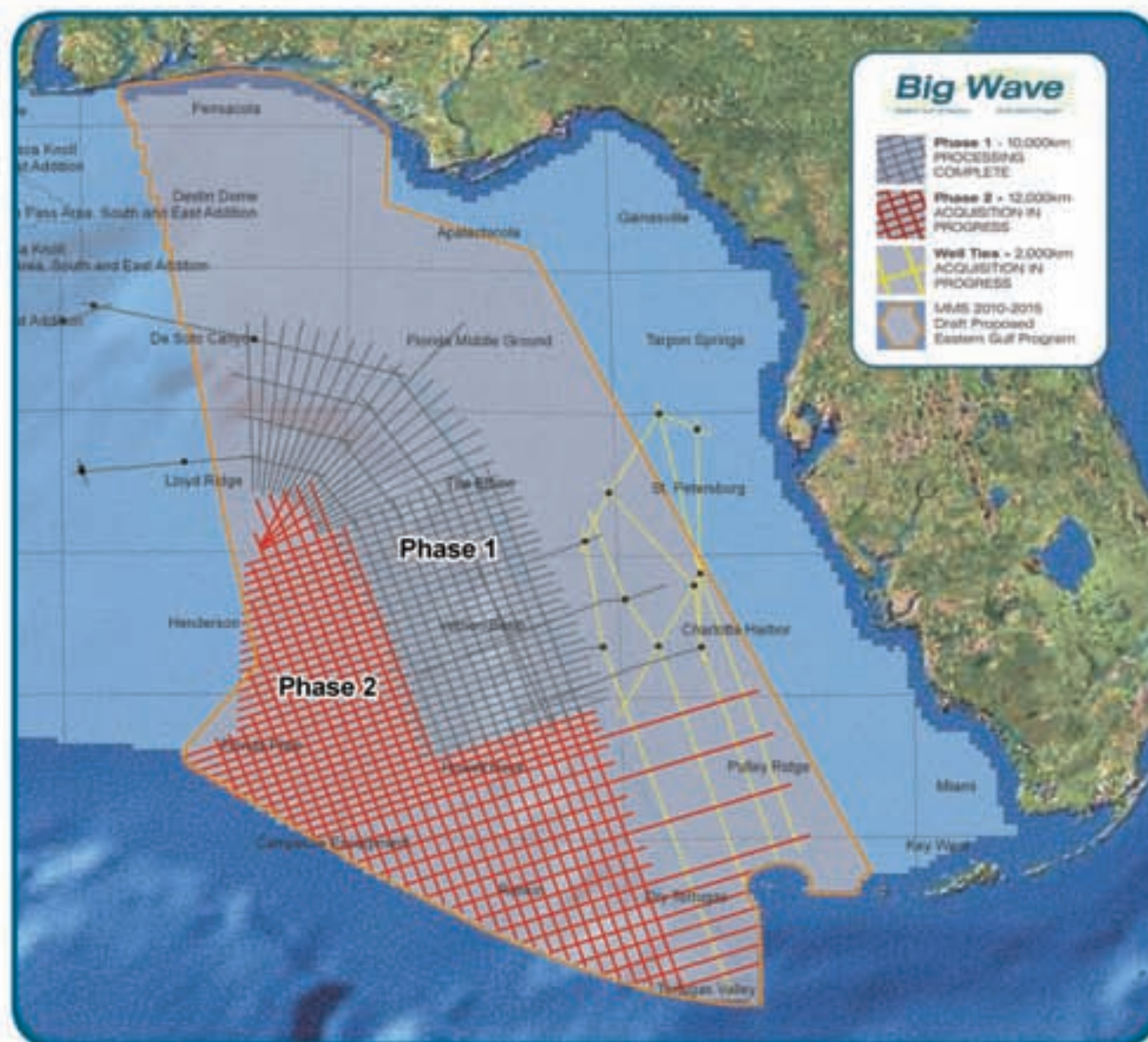
"You have more shale in the Barnett relative to the Haynesville," Ferworn said, "and shale has very low permeability. Neither are 100 percent shale, but the Haynesville has more reservoir rock mixed in.

"When you get some reservoir rock mixed with the shale," he said, "it enhances the permeability, providing pathways for the gas to escape. Even where you have fractures, the gas still has to migrate through the formation to get to them." □

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Deepwater Gulf Coral Study Begins

By BARRY FRIEDMAN
EXPLORER Correspondent

A \$3.7 million, four-year study of deepwater corals in the Gulf of Mexico – focused on the relationship between them and the oil and gas industry – began its second year of work in late August by the Minerals Management Service (MMS).

The study, which is a collaboration of three federal agencies, four academic institutions and a private company, is concentrating on deepwater coral communities that have formed on natural hard bottom areas, oil and gas

platforms and on abandoned and sunken ships.

The operation is using remotely operated vehicles, including the ROV Jason II from Woods Hole.

Gregory Boland, biological oceanographer for MMS in Herndon, Va., said the need to study deeper coral areas in the Gulf began to surface in the 1990s, as oil and gas activity pushed into deeper waters and when a moderate-sized coral community at about 1,500 feet was discovered.

"MMS realized that as the discoveries were occurring deeper, we



needed to start a study to explore and protect them," he said.

"Basically, the exploration and

understanding on these biological habitats and deepwater corals allows MMS to avoid and protect these sensitive communities from oil and gas activities through revised regulatory policies."

Echoing that point is Liz Birnbaum, director of MMS, who said, "This study will provide MMS with an in-depth understanding of these vital deepwater communities and how we can best protect them. As more of our activities move into deeper water, this information is necessary for us to serve as stewards of the marine environment."

Pushing Deeper

According to Boland, the program – sponsored by the National Oceanographic Partnership Program (NOPP) – has three main areas of interest:

✓ The Natural Hard Bottoms.

Three quarters of the emphasis will be in finding out how many areas of the Gulf have thriving deepwater communities.

There are 8,000 potential sites in the GOM where these habitats can be explored.

"If there is something on them, what is it?" he asks. "And which ones require environmental protection? Which don't?"

✓ The Deepwater Platforms.

What happens to them? Should they be completely removed (which is present policy)?

"It will be interesting to see if these artificial reefs procedures should change," Boland said. "Some environmentalists feel the platforms should be pulled up because of the scenic blight; others feel that due to the coral communities that have formed, they should stay. Industry interests, seemingly, would be more inclined to leave the abandoned structures where they are due to cost concerns."

Boland says another sub-section is the biological communities that can be explored on shipwrecks.

"World War II wrecks are already forming coral, demonstrating that substantial coral habitats can develop in a relatively short time."

✓ The Star Trek Metaphor.

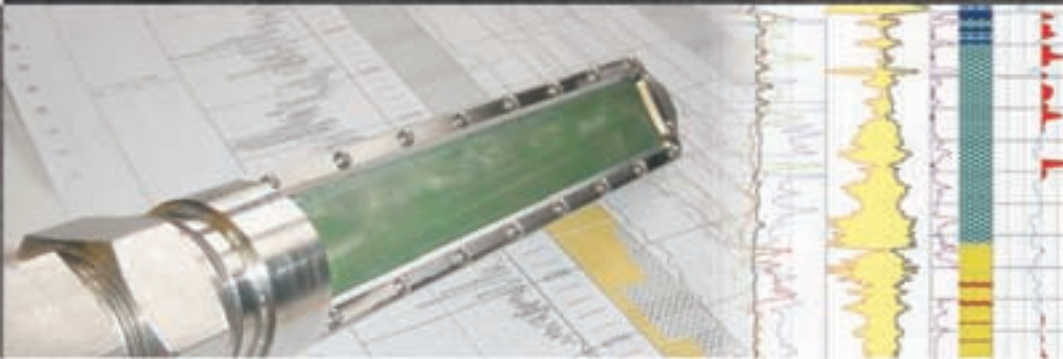
New technology allows scientists to go where they've never gone (and deeper than ever) before. With both manned and unmanned vessels, exploration can now adapt to the changing conditions and challenges in the Gulf.

Research vessels and underwater vehicles for the project are provided by the National Oceanic and Atmospheric Administration's office of Ocean Exploration and Research.

The research team includes scientists from Louisiana State, Pennsylvania State, Texas A&M-Corpus Christi and Temple universities, plus from Woods Hole Oceanographic Institution, C&C Technologies, the Smithsonian Institution and Dauphin Island Sea Lab. The contract went to a private firm, TDI Brooks International, located in Bryan, Texas.

A Web site offering daily updates can be found at oceanexplorer.noaa.gov/explorations/explorations.html. □

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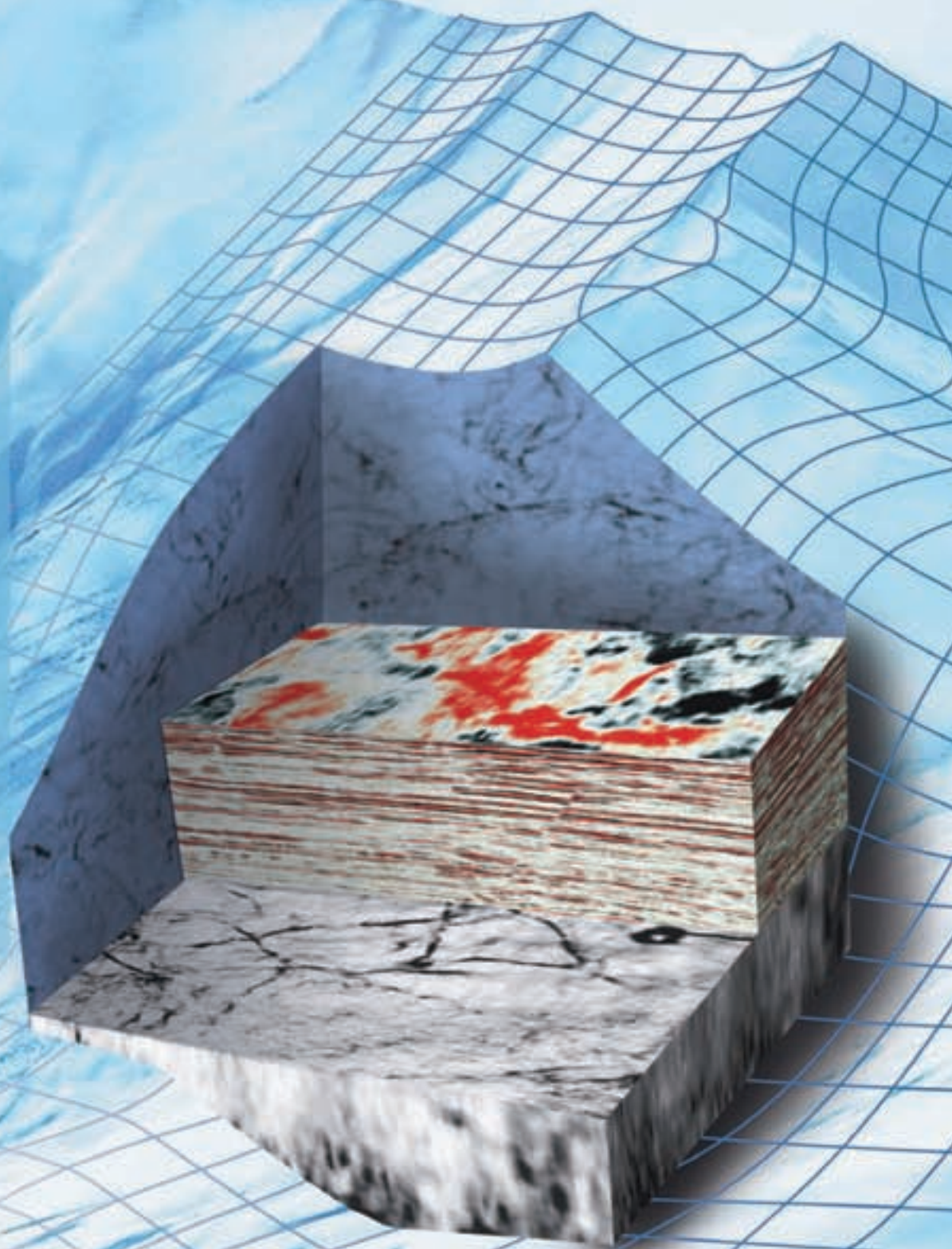
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Potential lies untapped**Western GOM Busy; East Waits**

By LOUISE S. DURHAM
EXPLORER Correspondent

Probably the only certainty about oil prices is uncertainty.

On top of the trauma-inducing, wicked price plunge that began last year, one could experience whiplash just by watching the crude oil price swings over the past few months.

This unpleasantness makes it all the more reassuring that activity continues to rock 'n' roll in the Gulf of Mexico, which remains the heart of U.S. energy production.

Deepwater projects are very much the trend in the GOM. During the three MMS lease sales in 2008, 73 percent of the tracts receiving bids were in the deepwater areas.

These projects require years from concept to actual production. Not surprisingly, business-as-usual is the operators' mantra despite the cyclical peaks and valleys in commodity prices and the fluctuating product demand.

The MMS recently released its forecast that GOM oil production will increase substantially over the next several years, possibly attaining 1.8 MMbo per day.

"With continued interest and activity in deepwater areas of the Gulf of Mexico, we anticipate that oil production will continue to be strong, with a large portion of production coming from projects in deeper water depths," noted Lars Herbst, GOM regional director at the MMS.

As for natural gas production, the agency forecasts a continued decline over the next four years owing to aging projects in shallow water. Future increases in the Gulf hinge on successful development of undiscovered resources.

In 2008, Congress allowed the 25-year-old ban on offshore drilling along most of the nation's continental shelf to lapse.

"Even though Congress discontinued their annual appropriations moratoria as of Oct. 1, 2008, there are areas that remain under Congressional restrictions," said Caryl Fagot, public affairs specialist at the MMS.

"The majority of the eastern Gulf of Mexico and a small portion of the central Gulf within 100 miles of Florida are under restriction until 2022, pursuant to the Gulf of Mexico Energy Security Act of 2006," Fagot said. "Unless the law is changed by Congress, nothing can happen (there) until 2022."

Eastern Promises

These areas have tremendous potential to supply American-sourced hydrocarbons for this energy hungry nation. The U.S. Geological Survey reportedly estimated that resources for

"It's okay to have a 500-mile-long gas pipeline in a six-foot wide trench from Mississippi to Tampa Bay. There's never been any fuss over that, but people go crazy over drilling – by that, I mean the politicians that want to get re-elected."



the eastern Gulf area tally 3.06 Bbo and more than 11 Tcf of natural gas.

A striking example of untapped major reserves beneath these waters is Destin Dome. This legendary geologic entity is a large west-northwest trending anticlinal feature lying 25 miles south of the town of Pensacola in the Florida Panhandle.

It's been estimated that as much as three Tcf of dry natural gas are trapped in the depths of this geologic structure awaiting the drillbit. Plus, there's a pipeline already in place within 30 miles.

Exxon drilled a well at Destin Dome Block 162 in 1974, kicking off the initial exploratory activity in the eastern Gulf. Following a number of dry holes, exploration halted and the area quickly became known in some circles as "Dusty Dome."

Chevron made the initial hydrocarbon discovery on the structure in 1987 after acquiring leases prior to the leasing moratoria off much of the Florida coast. Follow-up drilling to the discovery ran headlong into impenetrable obstacles, constructed principally by the state of Florida.

Today, political pressure is building to encourage rather than discourage drilling off the Florida coast.

It no doubt is a golden opportunity – both in the economic sense (new jobs, royalty revenue, tax revenue, etc.) and new energy supply.

Political Dynamics

The near-irresistible lure of tapping into that estimated three Tcf of natural gas at Destin Dome as well as other promising areas beneath now-off-limits eastern Gulf waters has triggered a battle of sorts in Congress.

An amendment has been passed by the Senate Energy and Natural Resources Committee that would reduce the area of no-drilling zones in the eastern GOM – to the delight of some of the lawmakers and the chagrin of others. The amendment was tacked onto a huge energy bill being tackled by Congress.

In accordance with the amendment, the buffer zone for Florida offshore drilling created by the 2006 bill reportedly would be scaled back to 10 miles from 125 miles off the Panhandle and to 45 miles from 235 off Tampa and coastal communities to the south.

As usual, the mere hint of drilling, no matter the proximity to the coastline, has stirred up Florida-based environmental groups, a cadre of angry residents and certain elected state officials.

Some residents reportedly oppose drilling even as far away as 100 miles from the coastline because it may despoil the view from their high-rise-condominium-congested beaches and kill off tourism.

In a bit of irony, the Cuban government recently announced it had signed contracts with Russia that will allow Russia to explore for oil and natural gas in the GOM – perhaps within 45 miles of Florida turf. The area lies in Cuba's economic zone, so it's calling the shots.

Cuba reportedly is also in talks with the Chinese and Brazilians.

Long Time Coming?

The eastern Gulf conundrum is a highly emotional issue, and at least one high-profile expert involved in one way or another in the years of back-and-forth wrangling over drilling offshore the Sunshine State isn't optimistic about the potential for change.

"Don't hold your breath," admonished AAPG member Gene Shinn, courtesy professor in the College of Marine Sciences at the University of South Florida at St. Petersburg.

Shinn, who is a recognized pioneer in carbonate sedimentology and coral reef ecosystems, also serves on the MMS Science Advisory Committee. He was formerly affiliated with the USGS for 31 years as a research geologist following a stint at Shell Oil in the 1960s as a carbonate geologist.

"I've been fighting this (Florida drilling) battle a long time," Shinn noted. "This is déjà vu for me all over again."

"It's okay to have a 500-mile-long gas pipeline in a six-foot wide trench from Mississippi to Tampa Bay," he said. "There's never been any fuss over that, but people go crazy over drilling – by that, I mean the politicians that want to get re-elected."

Shinn noted he recently hosted former Shell Oil president John Hofmeister, who commented publicly that the United States can never have an energy policy because of the two-year election cycle – members of Congress have to be re-elected back home. Hofmeister emphasized that only a grass roots effort can make it happen.

Immediate Concerns

But hope springs eternal – indeed, it's a must in this business.

Spectrum Seismic recently announced it has acquired and processed 38,000 kilometers of modern seismic data in the eastern Gulf that allows oil companies to evaluate the prospectivity of this region. Some of these data were acquired in partnership with TGS.

The data acquisition took place between 2006 and 2008 as part of Spectrum's "Big Wave" multi-client seismic program.

The company reported that analysis of Big Wave Phase 1 data along and outboard the Florida escarpment revealed a number of possible hydrocarbon accumulations on the platform area and also in the deeper waters. Big Wave Phase 2 kicked off in July.

Meanwhile, the western Gulf was the MMS focus *du jour* in August as the agency prepared for the Western Gulf Lease Sale 210, which encompassed about 3,400 unleased blocks covering approximately 18 million acres in the western GOM offshore Texas (see tables).

The blocks are located from nine to about 250 miles offshore in water depths of 16 to more than 10,978 feet.

The MMS estimates that Sale 210 ultimately could result in the production of 242 to 423 million barrels of oil and 1.64 to 2.64 Tcf of natural gas, according to Fagot. □

Company	Total High Bids	Sum of High Bids
BP Exploration & Production Inc.	37	\$50,634,191
Chevron U.S.A. Inc.	26	\$9,075,343
ConocoPhillips Company	22	\$15,172,500
Exxon Mobil Corporation	17	\$8,587,021
Focus Exploration, LLC	15	\$4,732,858
Anadarko E&P Company LP	5	\$4,367,544
Entek USA General LLC	5	\$755,050
Petrobras America Inc.	4	\$10,000,000
Byron Energy Inc.	4	\$916,800
Castex Offshore, Inc.	3	\$1,912,000

Top ten companies based on total number of high bids submitted.

Company	Protraction Name/Block	Water Depth	High Bid Amount
BP Exploration & Production Inc.	Keathley Canyon/96	800-<1600	\$28,133,843
Petrobras America Inc.	Keathley Canyon/223	800-<1600	\$9,122,000
BP Exploration & Production Inc.	Keathley Canyon/180	800-<1600	\$5,133,843
ConocoPhillips Company	Alaminos Canyon/476	800-<1600	\$3,060,000
BP Exploration & Production Inc.	East Breaks/875	800-<1600	\$2,933,843
ConocoPhillips Company	East Breaks/406	400-<800	\$2,550,000
Anadarko E&P Company LP	East Breaks/729	800-<1600	\$2,249,351
BP Exploration & Production Inc.	Garden Banks/841	800-<1600	\$1,933,843
Chevron U.S.A. Inc.	Alaminos Canyon/774	>2000	\$1,462,076
Anadarko E&P Company LP/ Nexen Petroleum Offshore U.S.A. Inc.	Garden Banks/448	400-<800	\$1,415,200

Companies submitting top ten single highest bids.

Data courtesy of MMS



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- *Petroleum occurrence and play analysis*
- *Global leads & prospects*
- *Global portfolio of play schematics*

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- *3D exploration*
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*Law of the Sea ramifications huge***Hedberg's Impact Still Being Felt**

By DAVID BROWN
EXPLORER Correspondent

No matter where you go in petroleum geology, you are likely to find the footprints of Hollis Hedberg.

Hedberg strode through life as a visionary who sharpened the science of geology and extended the reach of exploration.

Today his work is helping to guide the debate over access to Arctic resources.

By the time of his death in 1988, Hedberg was a near-legend in the industry, a Gulf Oil Corp. executive and consultant who became a professor at Princeton University ...

Who had been instrumental in opening exploration in South America and offshore Africa ...

Who had done more than any other single person on the planet to define stratigraphy and stratigraphic nomenclature ...

Who had been both a pioneer and proponent of deep offshore exploration ...

Who had received the AAPG Sidney Powers Medal, the Geological Society of London's Wollaston Medal, the Geological Society of America's Penrose Medal and many other honors ...

And who had contributed basic concepts that helped form the international Law of the Sea.

'It's No Problem'

AAPG member Georges Pardo was a colleague of Hedberg who became a friend and biographer. He traced Hedberg's interest in offshore exploration



Hedberg

back at least to the 1940s.

"As chief geologist for Gulf Oil (international exploration), Hedberg said 'There's a whole continent we know nothing about,'" recalled Pardo, who is now retired and living in Naples, Fla.

"He said, 'Goodbye, I'm going to be out of the office for three months' and he took off alone on a trip to Africa."

Hedberg found oil seeps and favorable outcrops in several locales near the African coast. Out of that trip, Pardo said, came a Gulf Oil program that acquired a number of coastal concessions.

When limits were considered on offshore resource rights, Hedberg analyzed the likely effects on the oil industry, according to Pardo.

"He realized that the United States was going to give away a vast amount of territorial area that was prospective for oil and gas. He was very indignant," he said.

As a result, Hedberg became almost a solitary voice pushing for extended rights based on the extent of offshore sedimentation, and testified before Congress.

Hedberg's genius allowed him to see that exploration for subsurface resources would become a key part of this question in the future.

One objection at the time was that continental extension would be difficult to define.

"I remember, he had maps all over the place and he'd say, 'It's no problem at all!'" Pardo said.

Into the Fray

When introducing Hedberg at AAPG's first Hedberg Research Conference, Pardo gave the following background:

"Hollis Dow Hedberg was born May 29, 1903, in a Swedish farming community in Kansas on the second floor of a small stone house during one of the worst floods in the region," Pardo recounted.

"It happened while nearly everything that the Hedberg family owned – furnishings, cattle, crops – floated away," he said.

Pardo recalled his first field trip with Hedberg and humorously called himself a long-time "victim" of Hedberg's penchant for lengthy jaunts and long paces.

"He proceeded to walk with enormous strides. His legs appeared to open up

from somewhere in the middle of his chest, and without ever stopping he would describe the outcrops, knock samples, bag them, write notes, etc.," Pardo recalled.

"Little I knew at the time how well I was going to become acquainted with and, in many ways, become a victim of that relentless walking machine," he added.

When Hedberg entered the debate on offshore exploitation rights, he joined a discussion long in progress.

The first definition of national offshore limits was proposed by Cornelius van Bynkershoek, a Dutch legal theorist. He suggested a territorial limit of three nautical miles from shore, purportedly based on the fact that a large cannon could fire that distance.

The simple concept was, you controlled what you could defend.

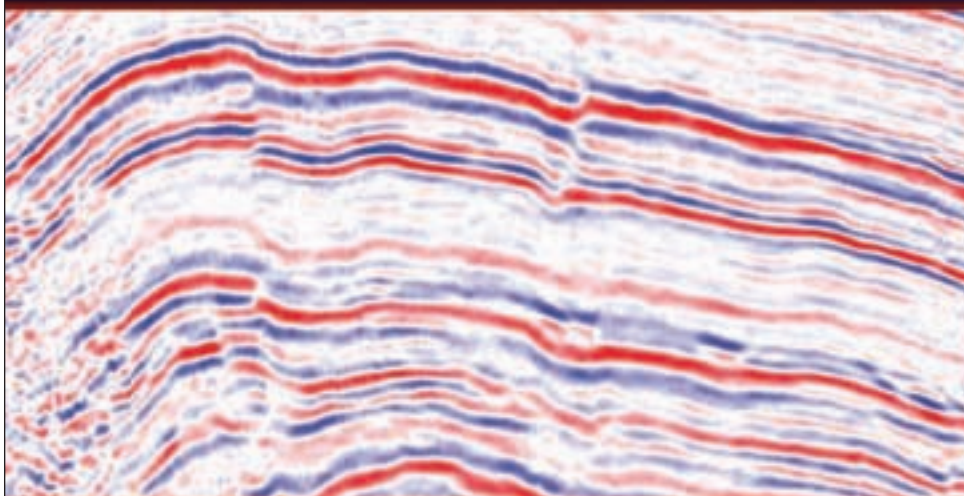
Offshore extent then became a question of coastal security, control of shipping and action against smuggling and pirates. Later, attempts to protect commercial fishing began to push the claimed boundaries outward.

Hedberg's genius allowed him to see that exploration for subsurface resources would become a key part of this question in the future.

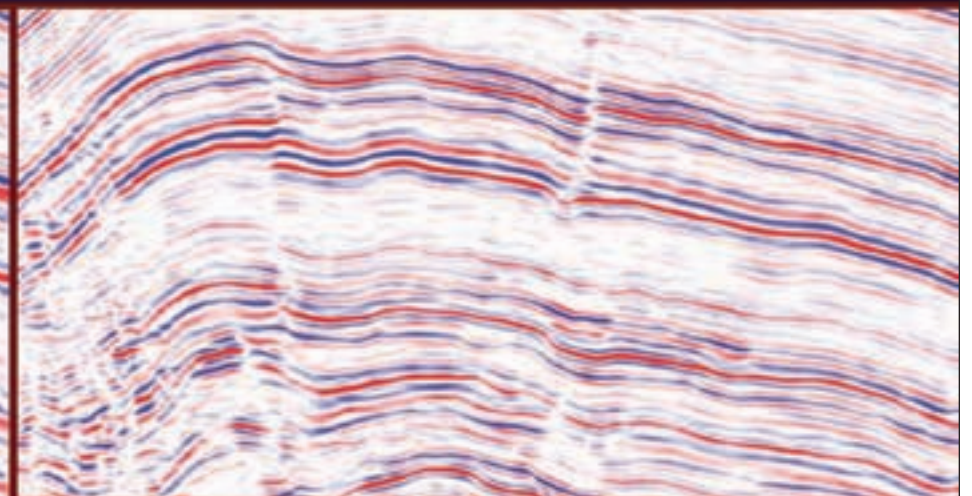
By the middle of the 20th century, most nations recognized a 12-mile offshore extent of national rights, and some countries wanted even more area. In a series of conferences, the United Nations attempted to standardize an international Law of the Sea.

See [Hedberg](#), page 24

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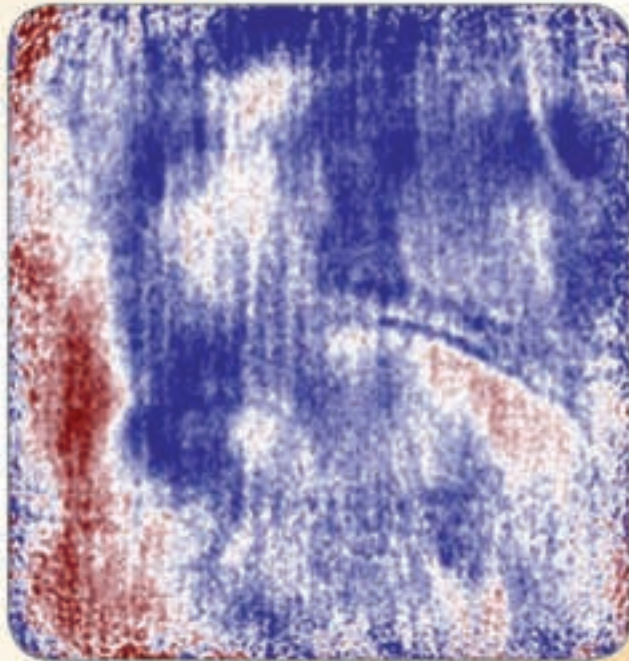
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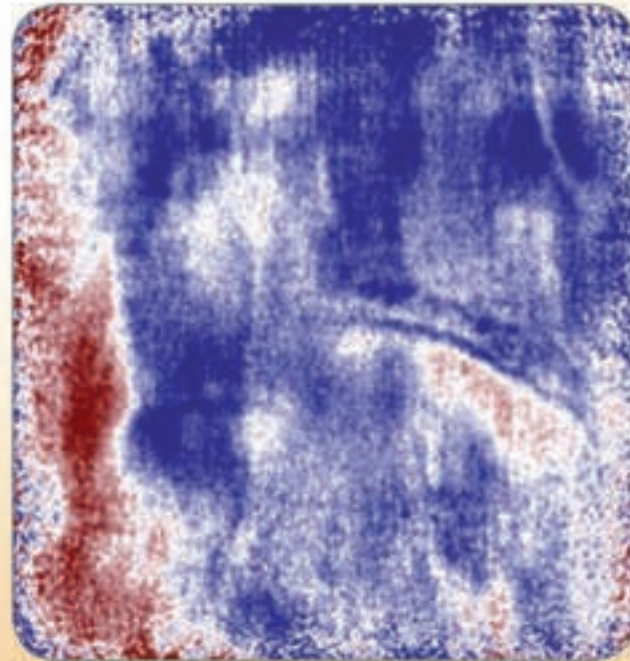
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*Data courtesy of Apache Egypt

2009-10 AAPG Officer Candidate Bios Online

Biographies and individual information for all AAPG officer candidates for the 2010-11 term are now available online at www.aapg.org.

The president-elect winner will serve in that capacity for one year and will be AAPG president in 2011-12. The vice president-Sections and treasurer winners serve two-year terms, and the elected-editor serves a three-year term. Ballots will be mailed in spring 2010. The slate is:

President-Elect

- ☐ Ernest A. Mancini, University of Alabama, Tuscaloosa, Ala.
- ☐ Paul Weimer, University of Colorado, Boulder, Colo.

Vice President-Sections

- ☐ Marvin D. Brittenham, EnCana Oil & Gas (USA), Denver.
- ☐ Charles A. Sternbach, Star Creek Energy, Houston.

Treasurer

- ☐ James S. McGhay, Mid-Con Energy, Tulsa.
- ☐ James W. Tucker, Saudi Aramco, Dhahran, Saudi Arabia.

Editor

- ☐ Ashton F. Embry, GSC, Calgary, Canada.
- ☐ Stephen E. Laubach, Bureau of Economic Geology, University of Texas at Austin.

Hedberg from page 22

The Hedberg Formula

The current offshore limits in the U.N. Convention on the Law of the Sea (UNCLOS) are based on principles drawn up during the third UNCLOS conference, held 1973-82.

In general, nations have a 12-nautical-mile zone of territorial waters plus a 12-nautical-mile contiguous zone, and a 200-nautical mile Exclusive Economic Zone with exclusive rights for exploiting natural resources.

However – and mostly thanks to Hedberg – those rights can be extended under UNCLOS Article 76.

The U.S. Arctic Research Commission explained it this way in its annual report for fiscal year 2004:

“There are three systems for determining the extent of the continental shelf beyond the 200 nautical mile limit.

“The first requires the determination of the base of the continental slope. The boundary is then placed 60 nautical miles seaward of this line.

“This is known as the Hedberg Formula after Hollis Hedberg who was a petroleum geologist.

“He looked at all the margins of the world and calculated that most oil and gas was within 60 miles of the base of the slope where the thickest sediments lay.

“Ireland submitted a proposal for an even broader margin and developed the Irish Formula.

“The Irish Formula starts at the baseline and proceeds to a point where the thickness of the sediments is less than one percent of the distance from the baseline.

“It is a relationship between the distance seaward and the thickness of the sediments and is designed to pick up most of the potential oil and gas in sediments.

“The third formula draws the limit 100 nautical miles seaward from the 2,500 meter isobath on the continental slope. The isobath is a depth contour.

“The absolute limitation is 350 nautical miles from the baseline.”

The Impact Remains

Deborah Hutchinson, a research geologist for the U.S. Geological Service in Woods Hole, Mass., said the United States is actively working to define its offshore rights areas in the Arctic and other margins.

“Right now there is an interagency task force chaired by the State Department,” Hutchinson said. “They have started to set up priorities for mapping to determine where our continental shelf limits are, based on Article 76.

“We have developed a collaboration in which the Canadians are collecting multichannel seismic and we are collaboratively collecting multibeam bathymetry data” on the northern margins, she added.

Additional, two icebreaker programs are planned in that effort for this and next year’s summers, Hutchinson said.

The Chukchi Plateau is among the areas where data will be used to define and support U.S. rights under Article 76 in the future. Establishing sediment extent is often essential.

“For most of the U.S. margins the 350 nautical miles is the constraint line, but in the Arctic the constraint is the 2,500-meter isobath plus 100 nautical miles, Hutchinson said.

The importance of Hedberg’s concepts for extending resource exploitation rights now is widely recognized.

“That has certainly moved in the direction Hedberg envisioned,” Hutchinson noted.

And much of the credit goes to his foresight, as well as his famous persistence.

Pardo told this story:

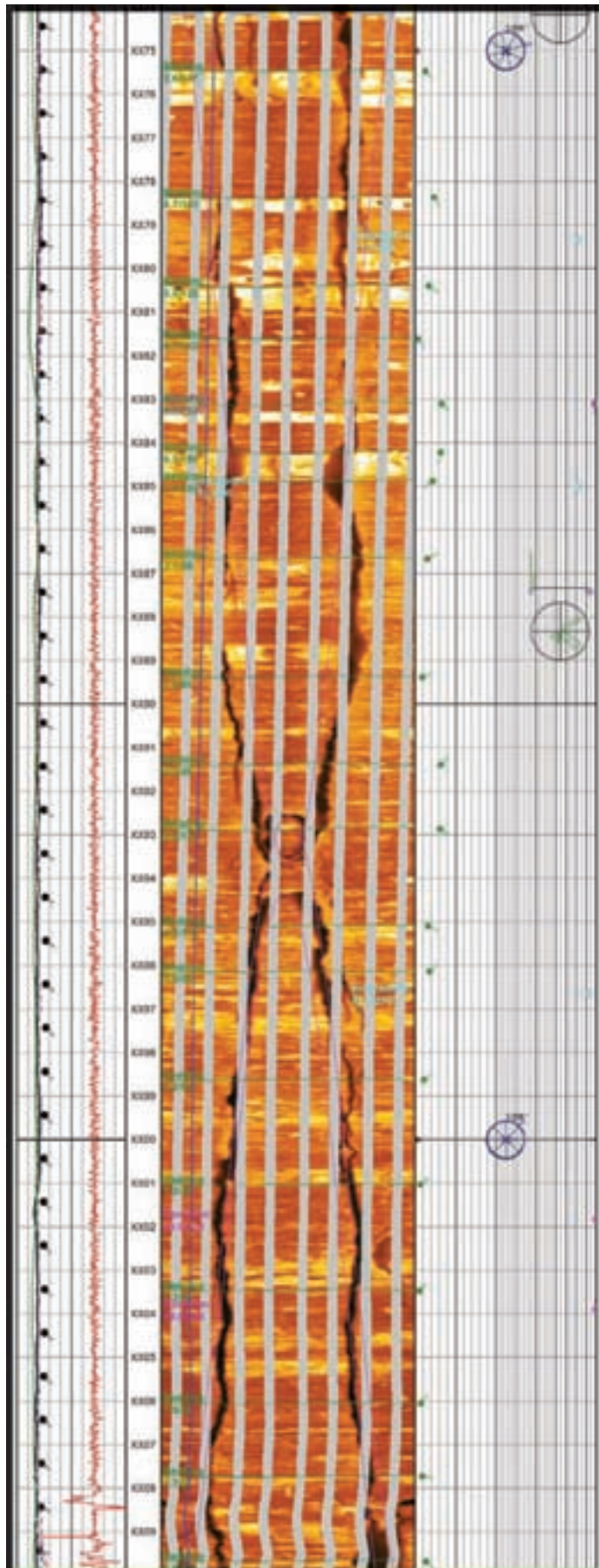
Hedberg was alone on a field trip collecting samples in the Misoa River area east of Lake Maracaibo in Venezuela. As he filled his sample bags he tied them to his belt.

Making his return, he slipped and fell into deep running water. The immediate choice was either to get rid of the samples and as much else as possible, or to face the likelihood of drowning.

For him, it was an easy decision.

He crawled along the riverbed underwater until he found the boulders that marked the bank.

Hedberg walked out of the river, his samples intact, victorious. ☐



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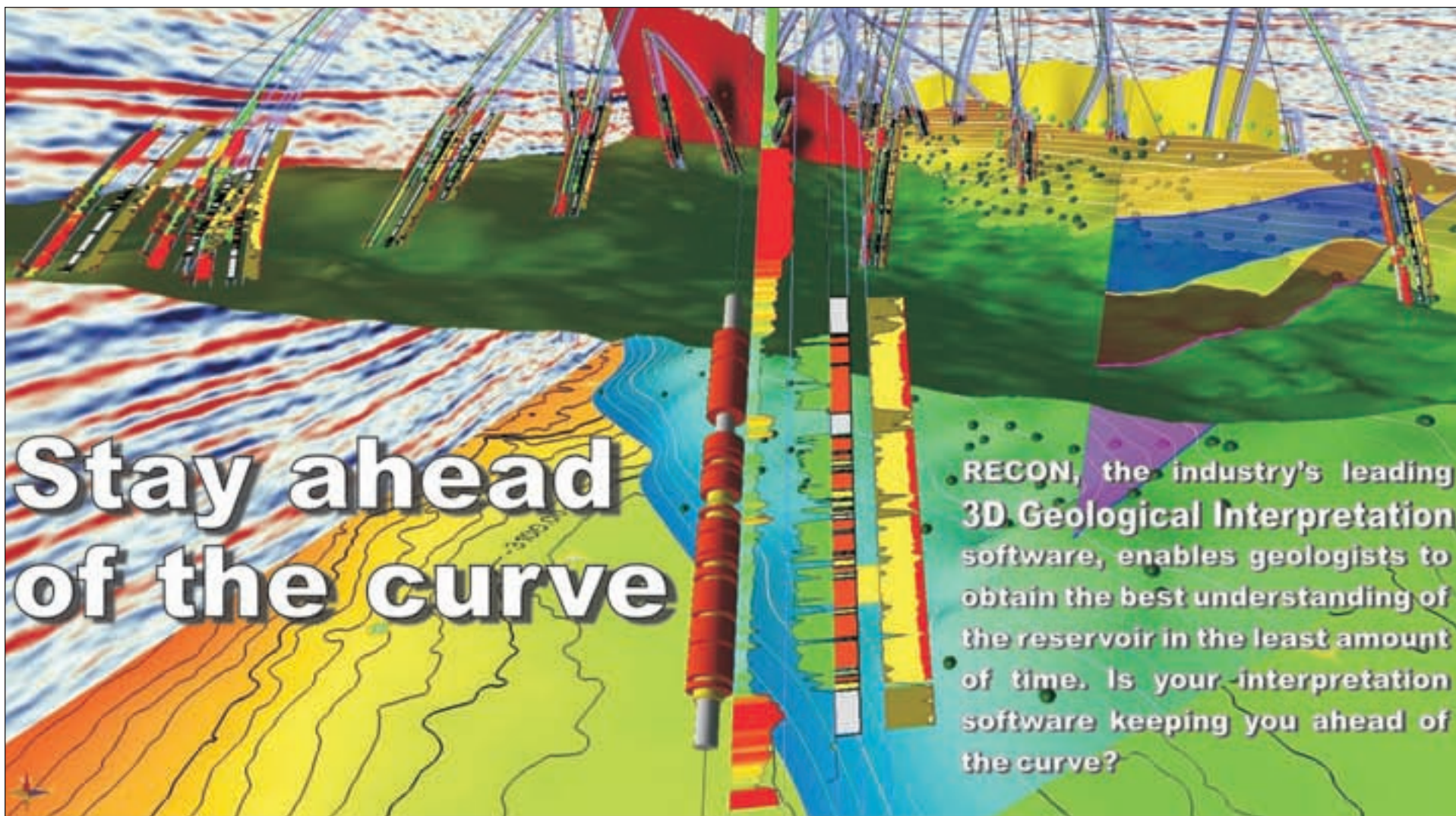
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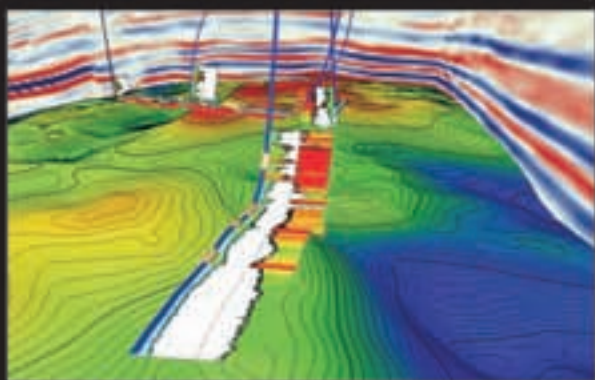
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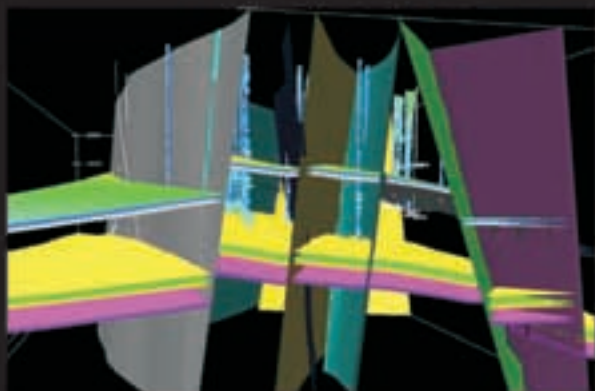
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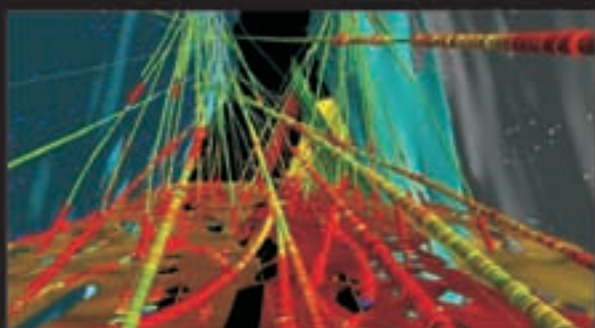
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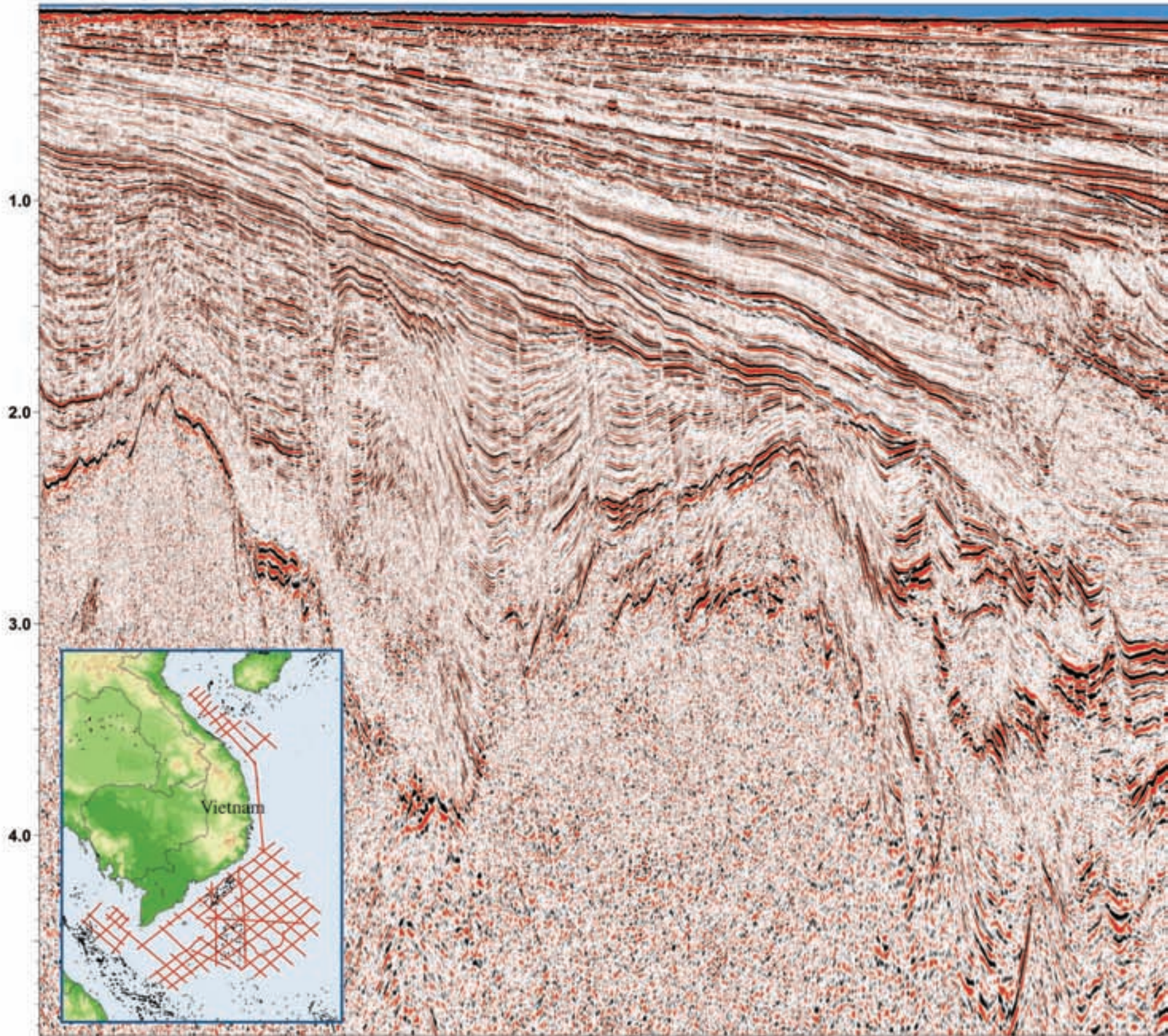
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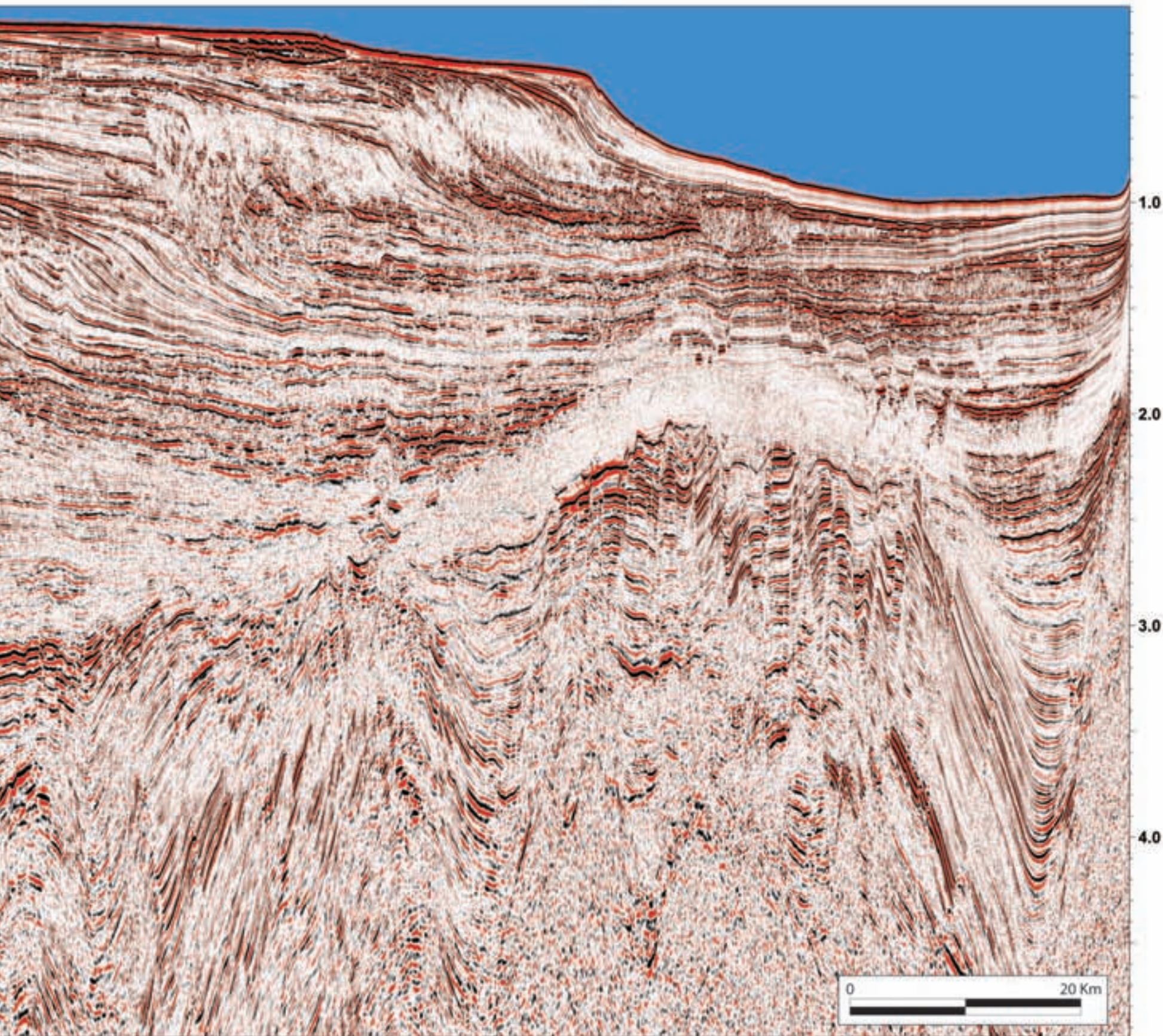
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SPOTLIGHT on...

Dark Horse Becomes Contender

By BARRY FRIEDMAN
EXPLORER Correspondent

At this year's Imperial Barrel Awards, the annual prospect/exploration competition for universities held during AAPG annual conventions, Moscow State University won first prize.

But the school that came in second caused almost as much excitement.

And that was the University of Nebraska-Lincoln – not exactly the first school most think of when it comes to the traditional Oil Patch powerhouse universities.



Fielding

Making the award even sweeter is this was the first year UNL even competed in the IBA.

“Performance at an international competition of this caliber is remarkable.”

“I don't follow basketball,” said the team's academic adviser, Christopher R. Fielding, who is the Coffman Chair in

Sedimentary Geology, Department of Geosciences, at the university, “but ... yes, indeed, it is like a major underdog making the finals, say like Baylor playing in the Big 12 football final!”

And the Big 12 analogy is a good one. To get to the finals, UNL, which represented the Mid-Continent Section, won its regional competition in April, defeating a team from last year's IBA – winning school, conference foe the University of Oklahoma.

The second place finish, which garnered the university the Selly Cup, \$10,000 and individual medals for those participating, all agreed, was something of a geological coup.

“The team's performance at an international competition of this caliber is remarkable,” said David Manderscheid, dean of UNL's College of Arts and Sciences. “It is a testament to the determination and intelligence of our students, and also highlights the excellence of faculty in our department of geosciences and the quality of graduate students they attract.”

Turning Things Around

And perhaps the most important member of that faculty is AAPG member Fielding, even though he says he merely acted as the IBA team's “mentor and facilitator.”

One gets the feeling it was much more than that, and while he had confidence in his program and his students, he enjoyed the underdog status.

“Everyone we spoke to along the way expressed surprise that we were even competing let alone capable of winning the regional event.”

And that was because the University of Nebraska is not known as one of the “heavy hitters” in the geosciences, a fact Fielding readily admits.

“We have not been thought of as a major competitor among the universities that train geoscientists for industry, although we have been working hard over the past few years to redress that,” he said.

In fact, Fielding was brought to Lincoln precisely to turn that perception and reality around.

“I was hired seven years ago, primarily to raise the profile of applied geology teaching and research in the department, and have been seeing evidence of gradual gains over the past few years.”

He has had help, he says, namely from what he calls a “... a large cohort of very supportive and generous alumni.”

They include many who made their names and fortunes in the oil industry (among them this year's Sidney Powers medalist Marlan Downey and two other 2009 AAPG awardees, James Lowell and Larry Jones) who have contributed generously to the university's geosciences programs.

“Some of these individuals,” Fielding says, “endowed the chair that I now occupy, and I consider it my mission to make these people proud of us while they are still around to see the fruits of their generosity.”

The Watershed

Fielding, who has been teaching since 1986 and also has worked four



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continued on next page

Student Expos Set in Houston, Other Locales

The 12th annual AAPG-SEG Fall Student Expo, offering students a chance to network and showcase themselves to potential employers, will be held Sept. 21-22 at the George R. Brown Convention Center in Houston.

Activities will include field trips, an Icebreaker and a full day of poster presentations, short courses and tips on how to build effective resumes – plus company interviews and the involvement of 20-plus oil and gas companies.

Also coming soon are other regional student events, including:

✓ The Student JobQuest, set Sept. 19-20 (in conjunction with the Eastern Section meeting) at Evansville, Ind.

✓ The AAPG-SEG West Coast Student Expo, set Oct. 1-3 at California State University, Northridge.

✓ The Rocky Mountain Rendezvous of Geoscience Students, set Oct. 2-5 at the University of Wyoming, Laramie.

Information on all student events can be found via the AAPG Web site at <http://studentexpo.info>.

continued from previous page

years with BP Exploration, says the IBA was a watershed for the university and the department.

"So achieving second place, actually even just making the finals, was a great boost to our program," he said. "It raised the morale and self-confidence of our students, our profile within the university, and within the professional and scientific community at large."

Fielding said that one of his goals was to get his team to believe it could win.

"I impressed upon my students that they had every chance of doing well," he said. "I knew that they had prepared thoroughly, and I knew they would be competitive. One can only prepare to the best of one's ability, then it is down to how everyone else performs relative to you. I told them that, and they performed with commendable maturity throughout the competition."

Specifically, he says he made himself available throughout the data analysis period to provide direction and advice.

"Otherwise I kept away from the work program," he said. "I encouraged the students to budget their time at the outset, and to have weekly milestones that they should ensure they met. In short, I acted as a line manager in a company environment would have done, and the students did the rest."

Some of his students claimed individual honors in Denver as well. Finishing first and second in the Student Poster Awards were team members Matt Corbett and Brian Blackstone, respectively.

Of the team, Fielding gives the ultimate praise:

"They acted in a highly professional manner," he said, "and were I in the recruiting business, I would have had no hesitation in employing any and all of them." □

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*Italy top geothermal producer***Europe Takes a Look at ‘Steam’**

By BARRY FRIEDMAN
EXPLORER Correspondent

It was a July night in 1904 in Larderello, Italy, in southern Tuscany. As dusk approached and families, one imagines, sat down for a typical dinner of bistecca al fiorentina, rosticciana and deep-fried corgettes, lights were being turned on all over the region.

This is a story about five of those lights – for they were powered by steam emerging from nearby vents in the ground.

It was the first – and perhaps still the most practical – demonstration of geothermal power.

Years later, in 1911, in an area known as Valle del Diavolo (“Devil’s Valley”), the world’s first geothermal power plant was built in Larderello.

These two developments started if not a trend then at least a promise for powering Europe.

It is now almost a hundred years since that plant was built – one hundred years, and the devil, at least as it pertains to geothermal energy in Europe, is still in the details.

Not long ago only specialized groups of geoscientists talked much about geothermal energy, even though, as they often said, it is quite literally the energy below our feet.

Today, geothermal is an increasingly hot topic around the world.

“The United States is the largest producer worldwide of electricity generated from geothermal energy (2,544

Increased interest in geothermal potential is, on one hand, easy to understand; unlike conventional sources, it can be found everywhere.

MWe installed capacity in 2005 generating, 17,840 GWh/y) and has the greatest installed capacity for direct use,” said AAPG member Joel Renner, who also is chair of the EMD Geothermal Committee.

Italy leads European production with 790 MWe and 5430 GWh/y, Renner said, and Germany and Austria produce 1.5 and 3.2 GWh/y, respectively. Iceland reports 202 MWe and 1406 GWh/y. Increased interest in geothermal potential is, on one hand, easy to understand; unlike conventional sources, it can be found everywhere.

But like conventional sources, the problem is how to harness it, how to mollify its critics, and how to change a society’s perception of it.

The Europeans

Renner, who is with the Idaho National Engineering and Environmental Laboratory in Idaho Falls and has written extensively about the geothermal possibilities in Europe, says that the

continent has some built-in advantages.

“European activities, particularly the German developments, are aided by large subsidies for renewable energy,” he said.

One such project is an area near Munich, a comprehensive study of water-bearing formations in the Upper Jurassic, from between 3,000 and 3,800 meters. Some experts believe this region in the Molasse Basin, between the Danube and the Alps, is central Europe’s largest geothermal energy reservoir for providing and generating electricity.

Renner added that developments are not just occurring in Germany and Italy (still far and away Europe’s biggest producer of geothermal energy) but other countries as well.

“In Europe, primarily France and Germany have led in development of technology to utilize hydraulic stimulation of hot rocks with little natural permeability to produce geothermal energy,” he said.

(The technology is referred to as

enhanced geothermal systems, or EGS, and the U.S. Department of Energy has re-directed its geothermal research program to similar studies and hopes to have power from EGS online in several years.)

Geothermal activity also “is ongoing in both Poland and Hungary,” he said, “and some interest in Greece.”

There was activity in and around Bern, Switzerland, Renner said, until the hydraulic stimulation induced a small earthquake. The same induced seismicity also has delayed a planned power production test at Soultz, as well.

The increased potential of seismic activity appears to be the biggest concern with the exploration of geothermal.

“The foremost sensitivity,” Renner said, “is induced-seismicity associated with geothermal systems that need to be stimulated, generally by hydraulic stimulation, to achieve sufficient productivity.”

“The visual aspects are minor, and since most European sites are not associated with surface manifestations such as geysers the impact is low,” he said. “Surface manifestations such as geysers and hot springs may be affected by over-production of geothermal resources.”

He adds that geothermal in places like Italy, even Larderello, may produce H₂S but “it can be mitigated.”

See **Europe Geothermal**, page 36

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EMD Web Offers Geothermal Insights

AAPG's Energy Minerals Division offers many opportunities to learn about or be active in the area of geothermal energy research and development.

Joel Renner is chair of the EMD Geothermal Committee, which has a separate Web page devoted to information and contacts. The site can be found at emd.aapg.org/technical_areas/geothermal.cfm.

Below are excerpts from the site.

Geothermal energy refers to thermal or electrical power produced from the thermal energy contained in the Earth ...

Some granitic rocks in the upper crust contain abnormally high concentrations of radioactive elements

resulting in enhanced heat flow towards the Earth's surface. Advective heat flow, associated with the movement of magma and hot water in the subsurface, can be superimposed on the regional conductive-type of heat flow resulting in very high temperatures near the Earth's surface. These areas are the primary targets for geothermal exploration and development.

Although geothermal energy is present everywhere beneath the Earth's surface, this energy must be concentrated to be an effective power source. Conversion of geothermal energy into power is possible only when:

- ✓ Located at shallow drilling depths,

usually less than three kilometers, but possibly as deep as six to seven kilometers.

- ✓ Economics are improved at shallow depths where drilling costs are lowered.

- ✓ Porosity and fracture permeability are sufficiently high to produce large quantities of thermal waters.

- ✓ The hot geothermal fluids can be efficiently transported (typically less than a few tens of kilometers) to a power generating facility.

The accessible geothermal resource base in the United States at depths less than seven kilometers is estimated to be 17,200,000 x 10¹⁸ joules, although this estimate reflects the large volume of rock involved rather than actual

recoverable resources. The U.S. Geological Survey has estimated identified and undiscovered convection hydrothermal resources in the United States to be 2,400 x 10¹⁸ joules, which is the energy equivalent to 430 x 10⁹ barrels of oil.

Additionally, resource estimates for geothermal-geopressed parts of the northern Gulf of Mexico range from 270 x 10¹⁸ to 2,800 x 10¹⁸ joules.

The use of geothermal energy may increase in other countries as other sources of energy are depleted and become more expensive, and as additional information is collected on the geometry of individual geothermal systems. □

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*Heading around the world***DL Program Ready for New Season**

By VERN STEFANIC

EXPLORER Managing Editor

AAPG's Distinguished Lecture program is reloaded and already off to a fast start for a season that will send speakers around the world, in some cases, to places never before traveled by the program.

One international speaker already has started the 2009-10 season with a successful tour of central Asia that attracted large crowds (see related story, page 4), but that's just the start.

This year's DL program, funded largely by the AAPG Foundation, will feature nine domestic and six international speakers.

The program is the Association's flagship initiative for spreading the latest in science, technology and professional information.

This year's roster will offer talks that vary widely in subject content, from such traditional topics as petroleum systems, carbonate platforms and deepwater sedimentary processes to more unusual fare such as paleoclimate change, ethics and human evolution.

Two domestic tours – for Gail Ashley and Harris Cander – begin in September (next page).

Last year's speakers (both domestic and international) appeared at 107 events, reaching more than 6,300 people.

This year's program, as in past years, offers speakers from both



Ashley



Cander



Cumella



Hart



Heine



Howell



Hughes



Issler



Kaldi



Martinsen



Perlmutter



Peters



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Simo



Vanbuchen

continued on next page

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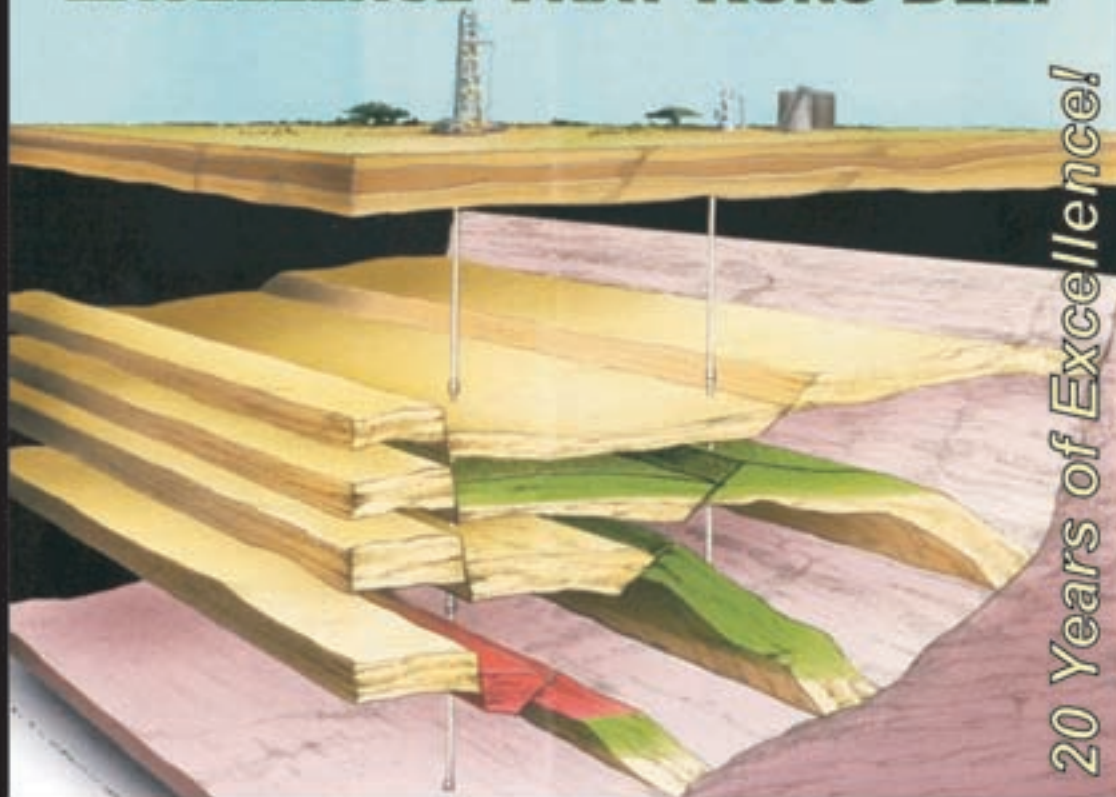
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continued from previous page

industry and academia.

It also features the return of the intersociety lecturer focus – the eighth year for the cooperative program that presents an opportunity for cross-discipline lectures.

This year's AAPG-SEG Intersociety Lecturer is **Bruce Hart**, director of the Shale, Seal and Pressure Group at ConocoPhillips in Houston (see August EXPLORER).

Hart is offering two talks:

- ✓ "Reservoir-Scale Seismic Stratigraphy: A Call to Integration."
- ✓ Basin-Centered Gas Accumulations: Revisiting the Type Areas with Integrated Datasets."

Hart will tour eastern North America from Nov. 9-20, and western North America from Jan. 25-Feb. 5.

Other specially designated lecturers this year include:

□ **Steve Cumella**, geologist with Bill Barrett Corp., in Denver, who is this year's Haas-Pratt Distinguished Lecturer.

The Haas-Pratt lecture is a domestic tour provided by contributions from the late Merrill W. Haas, in honor of famed geologist (and Haas' mentor) Wallace Pratt. The funding is granted for a lecture of an applied nature dealing with the exploration and discovery history of a field, or a subject having economic implications.

His lecture will be "Geology of the Giant Continuous Gas Accumulation in the Mesaverde Group, Piceance Basin, Colorado."

Cumella will tour eastern North America Oct. 26-Nov. 6, and western North America Feb. 22-March 5.

□ **John Howell**, professor at the University of Bergen, Bergen, Norway, this year's Allan P. Bennison Distinguished Lecturer.

The Bennison DL is an international lecturer who makes a U.S. tour, funded by contributions from the late Allan Bennison, a long-time Tulsa geologist.

- Howell will be offering two talks:
- ✓ "Laser Scanning and Geological Modeling: From Outcrop to Flow Simulation."
 - ✓ "Building an Oil Company – How Hard Can It Be?"

Howell will tour western North America Nov. 30-Dec. 11, and eastern North America Jan. 25-Feb. 5.

□ **Lynn N. Hughes**, a U.S. District Court judge serving in Houston, who returns for a second consecutive season as the year's AAPG Distinguished Lecturer on Ethics.

Hughes will be available by request throughout the season. His lecture topic is "Dilemmas of Trust."

□ **Ole J. Martinsen**, vice president, exploration research, StatoilHydro Research, Bergen, Norway, this year's Roy M. Huffington lecturer.

The Huffington lecture is an international tour provided by contributions from the Huffington family to honor the late oilman-geologist.

Martinsen will be available for Asia-Pacific tours, offering two talks:

- ✓ "Sequence Stratigraphy 25 Years Down the Road: Technology Dependencies, Current Practices and Evolving Methods for Prediction of Petroleum Systems."
- ✓ "Deepwater Sedimentary Processes and Systems: The Role of Internal vs. External Controls on Lithology Distribution and Stratigraphy."

□ **Toni Simo**, research associate for ExxonMobil Upstream Research Co., this

year's J. Ben Carsey lecturer.

The Carsey lecture is an annual domestic tour provided by contributions from J. Ben Carsey Jr. of Houston, to establish a named lecturer in memory of his father, who served as AAPG president in 1967-68.

Simo's talk will be "Isolated Carbonate Platforms and Mounds (ICPM): Initiation, Growth and Demise."

He will tour western North America Jan. 11-22, and eastern North America Feb. 15-26.

□ **Frans S. Van Buchem**, lead geologist for Maersk Oil Qatar, this year's Dean A. McGee lecturer.

The McGee tour, provided through a gift from Kerr-McGee Corp., features a North American lecturer speaking to an international audience on a topic directly applicable to petroleum geology. The endowment was made to honor the company's founder, who was also a Sidney Powers medalist.

Buchem will offer two talks:

- ✓ "Barremian/Aptian Carbonate Systems of the Eastern Arabian Plate – A Global Sequence Stratigraphic Reference Model."

✓ "Stratigraphic Patterns in Carbonate Source Rock Distribution – With Special Attention to Cretaceous Intraself Basins of the Southern Arabian Plate."

He is available to the Middle East Region.

This year's list of domestic Distinguished Lecturers also includes:

□ **Gail Ashley**, geological sciences professor at Rutgers University, New Brunswick, N.J.

Her first tour, of western North America, is Sept. 28-Oct. 7. She'll tour eastern North America March 1-5.

She'll offer two talks:

- ✓ "The Paleoclimatic Framework of Human Evolution."
- ✓ "The Sedimentary Record of Human Evolution."

□ **Harris Cander**, exploration and technology group, BP America, Houston.

He will make four tours this season, visiting western North America Sept. 21-26 and April 12-17, and eastern North America Oct. 12-16 and March 29-April 2.

His talk is "Granite to Grass Roots: Understanding the Geologic History of Unconventional Resource Basins from Bottom to Top."

□ **Martin Perimutter**, team leader and research scientist, Chevron, Houston.

He will tour western North America Oct. 26-Nov. 6, and eastern North America April 5-16.

He offers two talks:

- ✓ "High Frequency Paleoclimate Change: Impact on Exploration Strategy and Climate Research."
- ✓ "The Influence of High Frequency Climate Variability on Paleoclimate Interpretation."

□ **Guy Plint**, University of Western Ontario, London, Canada.

He will tour eastern North America Feb. 8-12, and western North America April 5-10.

He will offer two talks:

- ✓ "The Evolution of a Cenomanian Delta Complex in the Western Canada Foreland Basin: Paleogeographic and Stratigraphic Responses to Tectonic and Eustatic Forcing."
- ✓ "Evolving Flexural Depocentres in the Middle Cretaceous of the Western Canada Foreland Basin."

This year's list of international Distinguished Lecturers also includes:

See DL Program, page 43

September 2009

Midland Valley

Structure
World

Our 2009 Technology Meeting is upon us...



It's September which means our 2009 Technology Meeting, Structural Geology for Uncertain Times, takes place this month in the Glasgow Science Centre (UK). Depending on when you receive this there still might be time for you to sign-up.

The Meeting will include speakers from industry and academia presenting on a range of structural geology topics including:

Speakers, in alphabetical order (at time of going to press)

- Roland Baumberger, Swiss Geological Survey
- Claudia Guargena, Aker Exploration
- Sean Kelly, Maersk Oil
- Alan Roberts, Badleys Geoscience
- John Wheeler, University of Liverpool
- Simon Stewart, BP/Heriot Watt University

Tuesday Sessions

- Setting the Structural Challenge
- Integrated Workflows in Structural Geology
- Training and Support Initiatives for the Next Generation
- Structural Systems Approach to Mineral Resource Development and Exploration

Wednesday Sessions

- Geometric and Geomechanical Algorithms
- The Next Move...
- Establishing Best Practice for Structural Geology in Carbon Capture Sequestration (CCS) and Rad-Waste
- Adding Value to Data Investment

Additional Activities that will be taking place around the Meeting are:

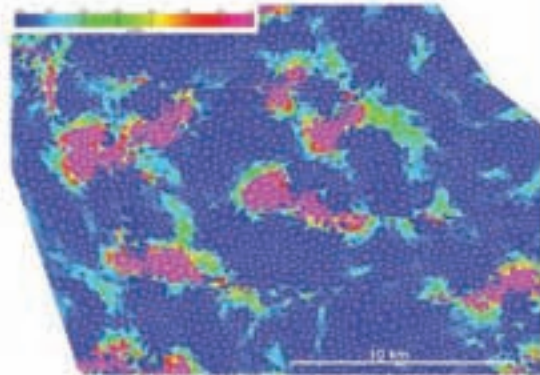
- Workshop - Structural Systems Analysis for the Mineral Industry, Monday 14th Sept.
- Ice-breaker, Monday 14th Sept.
- Field Trip - Basin Margins and Faults, Solway Firth, Thursday 17th Sept.
- Structural Surgery, Thursday 17th and Friday 18th Sept.

One of the highlights of the meeting will be on Wednesday in Session 3 - CCS and rad-waste focus with keynote speaker Sean Kelly (Lead Geologist, Maersk Oil).

Midland Valley have already opened their CO₂ portfolio working on the In Salah CO₂ storage project for the StatoilHydro, BP, Sonatrach joint venture. Over 3 million tonnes of CO₂ have been injected at the site since 2004. The joint venture and partners are running a series of monitoring and evaluation projects designed to prove through short term monitoring the long term feasibility of an industrial scale CO₂ storage site. These projects include InSAR analysis, 4D seismic, micro-seismics, tiltmeters, experimental rock deformation and more. Midland Valley are analysing the evolution of the reservoir structure by combining regional information from 2D seismic lines and well data with local 3D seismic.

Understanding the evolution of the structure through time will allow Midland Valley to create scenarios for fracture generation in the reservoir and to use these scenarios to predict fluid flow. Once the final structural model has been created and validated through restoration the structural evolution is forward modelled. During the forward modelling strain is captured in the reservoir volume and used as one of several potential inputs for fracture density and orientation in the fracture modelling. Multiple fracturing scenarios are created by changing the assumptions of the controlling factors such as the dominance of the in situ stress field and the influence of early structures on fracturing. These fracture scenarios and their predictions for CO₂ mobility will then be tested against well injection data and information collected from the other monitoring projects including InSAR and 4D seismic.

The image shows part of a restored reservoir surface with strain intensity colour mapped (hot colours = high intensity). This strain information can be used as a proxy to determine fracture intensity in potential CO₂ storage sites.



A full Technology Meeting Prospectus and registration information can be found on our website www.mve.com or by emailing Sarah, events@mve.com. Watch out for a round up of the meeting in November's column.



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The structural geology experts

GEOPHYSICALcorner

Frequencies are fault finding factors

Looking Low Aids Data Interpretation

(The Geophysical Corner is a regular column in the EXPLORER, edited by Bob A. Hardage, senior research scientist at the Bureau of Economic Geology, the University of Texas at Austin. This month's column deals with looking low for faults.)

By BOB HARDAGE

Numerous examples have circulated among the geophysical community that illustrate how some geologic targets can be better seen by constraining the reflected seismic wavefield to a particular narrow range of frequencies.



Hardage

The exact frequency range that produces an optimal image of a target varies, depending on target size, depth, thickness and impedance properties.

The data discussed here document an example where frequency-constrained seismic data provided improved images of deep fault systems.

* * *

These seismic data come from a 3-D seismic survey acquired in West Texas. The principal objective was to image deep gas reservoirs at depths of approximately 20,000 feet (6,000 meters).

The seismic grid traversed an area where the exposed surface layer had large variations in impedance and thickness caused by the dissolution of exposed salt and anhydrite and the infill of younger, unconsolidated sediment.

This variable-velocity surface layer made static corrections of the seismic data difficult. Because of this static-calculation issue and the great depth of the targets, seismic data quality was not as good as desired for reservoir characterization and drill site selection.

Across the study area, the deep reservoir interval was traversed by numerous faults, making accurate fault mapping one of the keys to exploiting the reservoir system.

One example of a seismic profile crossing a key structural feature is shown as figure 1:

✓ The display on panel (a) shows the image that was created by attempting to preserve the maximum frequency bandwidth of the data.

✓ The display on panel (b) shows the data after the post-migration image was filtered to preserve only the first octave of the illuminating wavefield (8 to 16 Hz).

✓ Panel (c) is added to show several of the faults (not all faults) that can be interpreted from the frequency-constrained data (panel b) and that are more difficult to recognize on the broad-frequency image (panel a).

In all profiles that traversed the study area, it was found that deep faults were consistently better defined by data that were frequency constrained to emphasize only the low-frequency response.

To illustrate this point, a second

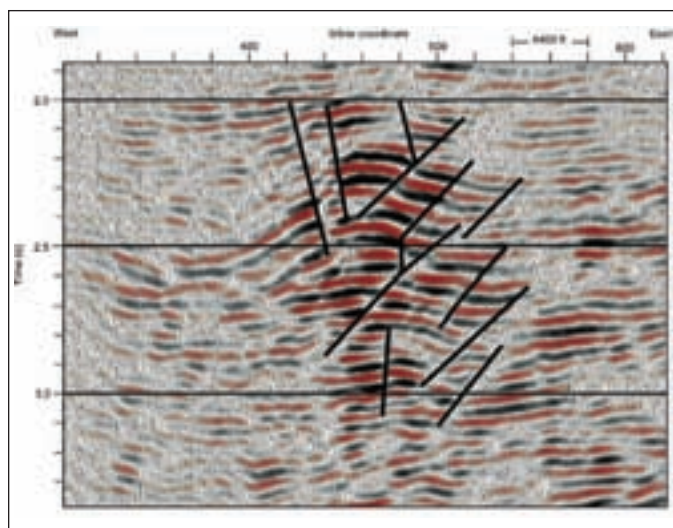
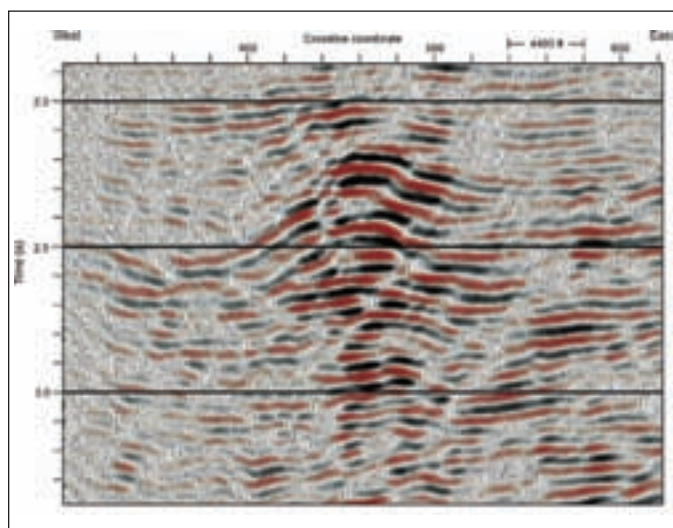
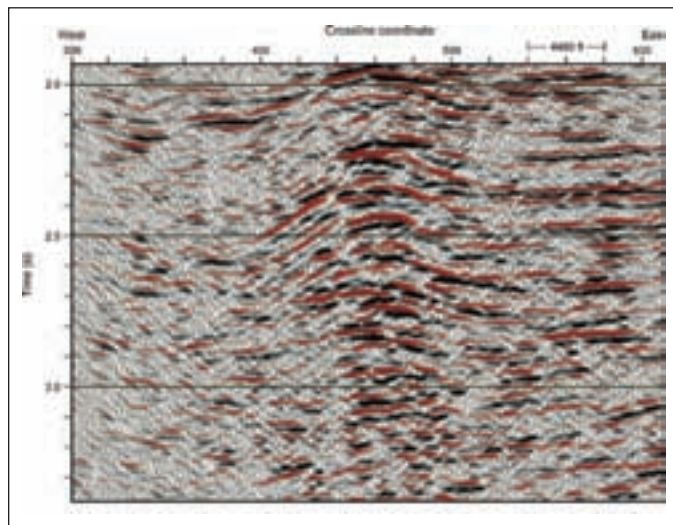


Figure 1 – Data example 1: (top) Image utilizing the full frequency range (8 to 80 Hz) of the illuminating wavefield; (middle) Image when the frequency content is restricted to the first octave (8 to 16 Hz). The fault system traversed by this profile is better seen with the frequency-constrained data (bottom).

profile across the geologic target is shown on figure 2, using the same sequence of data panels used in figure 1.

Again, the low-frequency image is a better depiction of the deep faulting pattern.

West Texas setting provides a telling example of how frequency-constrained seismic data can lead to improved images.

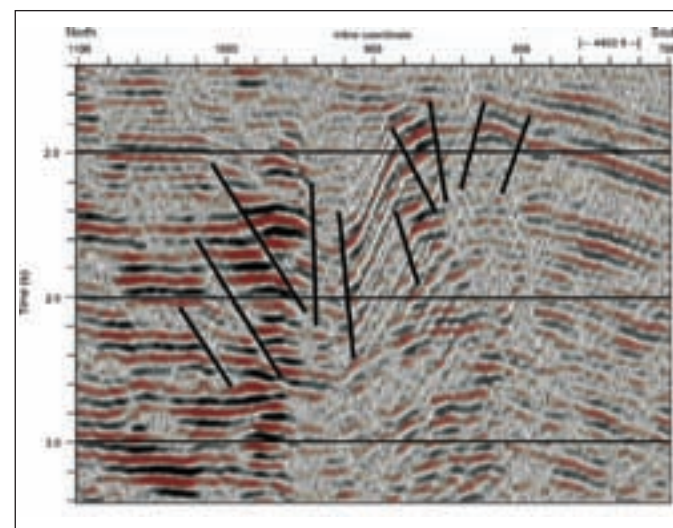
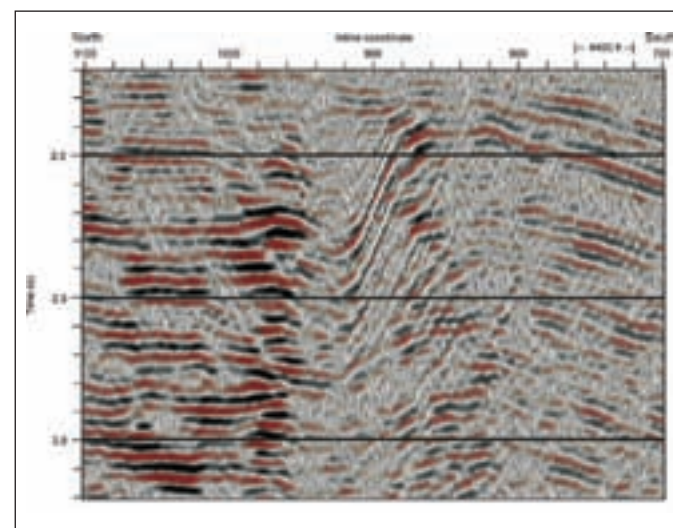
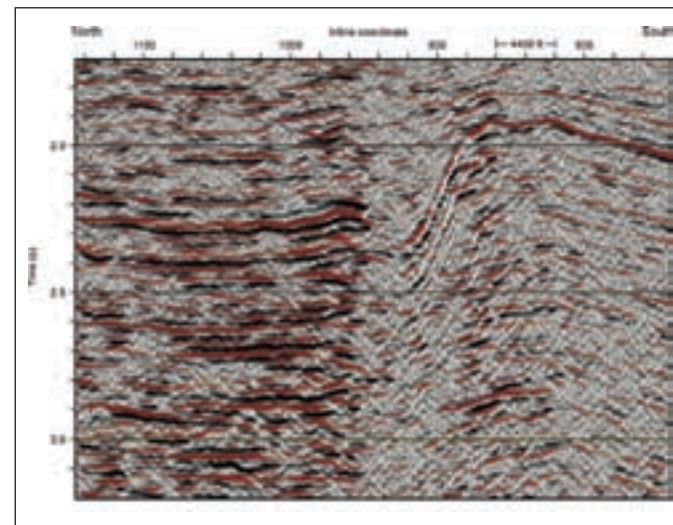


Figure 2 – Data example 2: (top) Image utilizing the full frequency range (8 to 80 Hz) of the illuminating wavefield; (middle) Image when the frequency content is restricted to the first octave (8 to 16 Hz). This fault system is better seen with the data that are constrained to the lowest frequency octave (bottom).

* * *

What is the message? If you are confronted by the problem of interpreting faults in limited-quality seismic data, try viewing the fault system with the low-frequency portion of

the data bandwidth.

If the fault throws are significant – as in these examples – data that are constrained to the first octave of the frequency spectrum may allow the faults to be better seen and interpreted. □

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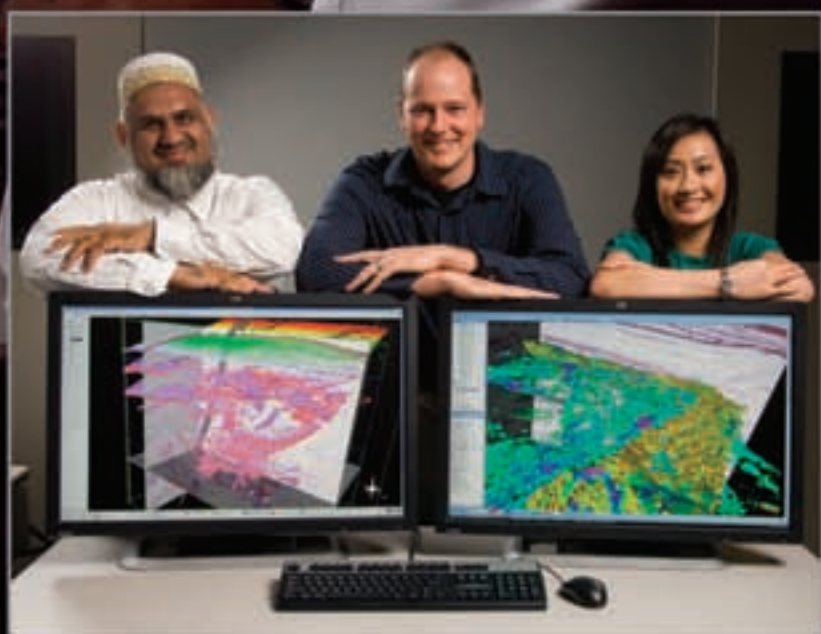
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Geothermal Courses Still Available

A new AAPG online course called "Geothermal Energy Basics: A Renewable Energy Certificate Course" was launched in September for those looking to learn about current trends, technologies and applications of geothermal energy – particularly as integrated with oil and gas.

The course is taught by Mike Sullivan, with Groundwater Services International in Harrisburg, Pa.

The four-session course is offered on the first of each month; participants can sign up at any time and begin the full program.

That program includes:

- ✓ Unit 1 – Scientific and Technology.
- ✓ Unit 2 – Exploration and Development.



- ✓ Unit 3 – Investment Models and Benefits.
- ✓ Unit 4 – Integration Techniques.

For more information go to the Web site at www.aapg.org/education/online/details.cfm?ID=172.

AAPG also offered an online live e-symposium in August titled "Geothermal Energy in the Oil Field: Development and Opportunities" – but you can still take advantage of the program that was presented.

The event was recorded and archived, so those who missed the live offering can register now, get a link to review the webinar, get the course materials plus supplemental readings and still earn CEUs.

For more information on this program go to the Web site at www.aapg.org/education/online/details.cfm?ID=166. □

Europe Geothermal from page 30

Reasons for Support

Renner can't say how much geothermal potential Europe holds, but in terms of providing heat, 920,000 Europeans were powered by geothermal in 1999, according to the European Geothermal Energy Council.

The conference projected that this number could increase to 12 million by the year 2020.

"Today, geothermal power plants exist on every continent, at any place were reservoirs of steam or hot water can be found," he said. "They produce, with conventional technology, 820 MW of electric power in the EU, around the clock."

Specifically, some of the benefits of geothermal include:

- ✓ The earth is full of energy – Virtually any temperature level in the underground can be used directly. Presently, through deep boreholes, almost 4,500 MWth already are installed in Europe – just a small fraction of what is possible.
- ✓ It's lucrative – Literally, everyone is standing on it and it will provide heat and power 24 hours a day throughout the year – everywhere.
- ✓ Environmental concerns – It contributes to the reduction of CO₂.
- ✓ Aesthetically pleasing – Geothermal projects have low visual impact, meaning its footprint is unobtrusive and can be hidden beneath the ground.
- ✓ Reliability – It's not dependent on climate conditions, and it is a safe and controlled technology.
- ✓ One size fits all – Geothermal is an answer to electric power, heating, cooling, hot water.

Of course, realizing geothermal's full power and potential still may be a long way from fruition.

Noted scientist Immanuel Friedlander said of it:

"I believe that in time to come the greatest of all sources of power will be found in the subterranean storehouses of volcanic regions, where the internal heat of the earth can be reached at a relatively shallow level. The limited supplies of coal and oil in the earth will be exhausted in the comparatively near future. The waterpower available in rivers is already to a large extent taken up. Water-power from the tides will probably prove costly to utilize, and the same is likely to be true of any method now in sight of using direct solar energy ... On the other hand, no insurmountable obstacles seem to exist to tapping the earth's internal heat on a vast scale."

He said this in 1928. □



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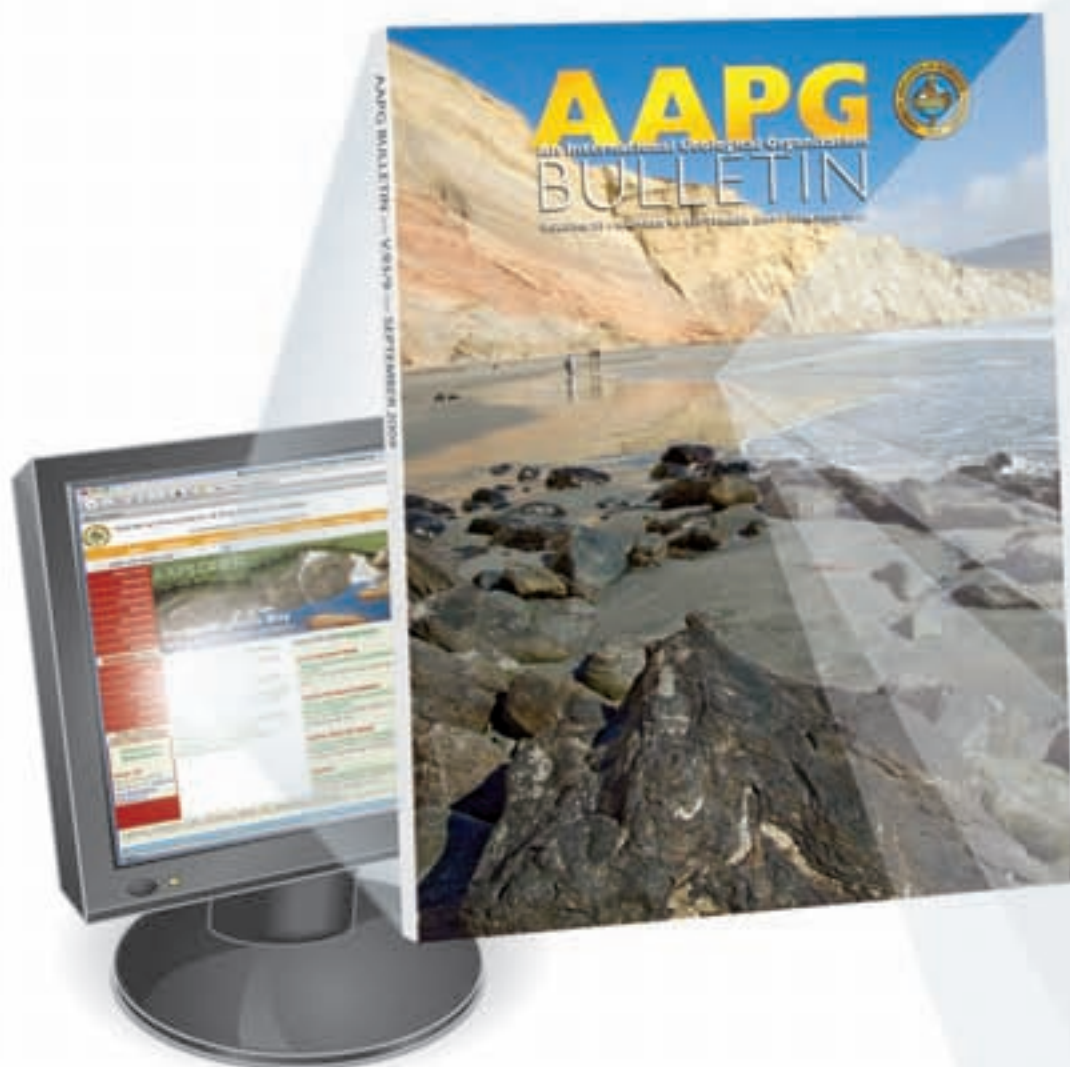


InMemory

- Harris G. Clarke Jr., 75
Shreveport, La., July 4, 2009
Fred P. Drew, 58
Denver, July 1, 2009
Spencer B. Knecht, 22
Spring, Texas, June 19, 2009
Marcus Nelson McElroy, 72
Bartlesville, Okla., March 6, 2009
Mark L.J. Noble, 42
Calgary, Canada, June 21, 2008

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

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The AAPG Bulletin is a technical journal that is recognized in the industry as the leading peer-reviewed publication for information on geoscience and the associated technology of the energy industry.

The link below takes you to the Members Only login page where, with a few key strokes, you can click on a link for the Bulletin Online, the current issue, or for the Bulletin Archives, all issues of the Bulletin to date. Online as searchable html and .pdf files, the current issue is always available by the first of every month.



Members may access the AAPG Bulletin online at:
www.aapg.org/september_bulletin



Also, submit your next paper for consideration via www.aapg.org/bulletin.

Article highlights include:

New Technology Is The Key

Stephen A. Sonnenberg
and Aris Pramudito

ESP Note



The Elm Coulee field of the Williston Basin is a recent oil discovery in the middle Bakken Formation and illustrates the enormous potential for future oil discoveries there. Horizontal laterals and fracture stimulation have resulted in the development of this new giant field.

Clinoforms And Fluid Flow Part 1 & 2

Gary J. Hampson, Matthew D. Jackson,
and Richard P. Sech



The 3-D facies architecture of a shoreface-shelf parasequence reservoir analog exposed at outcrop in the Book Cliffs, Utah is reconstructed and modeled. This study will help better understand the impact of clinoforms on flow during production from these types of reservoirs.

Source Rock/Reservoir Relationships

Karsten F. Kroeger, Rolando di Primio,
and Brian Horsfield



The gas proneness of a mature petroleum system is largely a function of expulsion efficiency and timing. By integrating individual styles of deformation and introducing a sequence stratigraphic approach to reproduce the stratal architecture, temporal and spatial relationships between sources and reservoirs were identified.

Critical Steps In Hydrocarbon Prospect Evaluation

Y. Zee Ma, Andrew Seta, and Ernest Gomez



Probability and statistics were used to help establish a linkage between facies analysis and modeling in the Judy Creek, a mature field with good data. Integration with well data is critical in building realistic subsurface models and evaluating hydrocarbon resources for depositional environments.

WASHINGTONwatch

OCS Access
Debate ContinuesBy DAVID CURTISS
GEO-DC Director

Curtiss

The U.S. Court of Appeals for the District of Columbia Circuit has ruled that while it remained concerned about environmental assessments performed for the 2007-12 five-year program, those concerns were restricted to the lease sales planned for the Arctic Ocean and Alaska outer continental shelf (OCS).

The July 28 ruling came in response to a U.S. Department of Interior query. "I am pleased with the Court's decision," stated Interior Secretary Ken Salazar. "Consistent with the department's request, the court clarified that its prior ruling only applies to the Chukchi, Beaufort Sea and Bering Seas. We are moving forward with the planned Aug. 19 Gulf of Mexico lease sale."

Earlier in July the Interior Department had announced it would proceed with the August lease sale of approximately 3,400 tracts offshore Texas, but only if the D.C. court clarified the intent of its April 17 ruling before the sale date.

In that ruling, the court found that the Minerals Management Service (MMS) had performed inadequate scientific and environmental impact assessments, specifically in the Arctic region. Consequently, it vacated – essentially suspended – the 2007-12 five-year program.

The wording suggested the court was applying it to the entire five-year program, rather than specific lease sales. This left the Interior and MMS with no mechanism to lease the nation's OCS – and companies holding leases from previous sales under the program in legal limbo.

But the new ruling clarified that the court's decision applies only to Arctic and Alaska regions, permitting MMS to resume leasing in other areas as planned under the 2007-12 five-year program.

At the same time, however, it is working on a new and overlapping 2010-15 five-year program, which is now in the first of several public comment phases.

For more than two decades much of the OCS was off-limits to oil and natural gas exploration and production. Other than the central and western Gulf of Mexico, and recently some parts of Alaska, the OCS was either under a Congressional moratorium or a presidential withdrawal for all exploration and production activities.

During this period, AAPG articulated its support of access to the nation's OCS for responsible resource development, issuing two statements on the topic:

- ✓ Atlantic Outer Continental Shelf Resources.
- ✓ Offshore OCS Access.

Both statements can be found on the Division of Professional Affairs page at <http://dpa.aapg.org/>.

The lack of access for exploration and production caused great consternation for the industry, but at

least it was predictable: Nothing was going to happen outside those few areas open for leasing.

But the summer of 2008 changed all that. As crude oil prices approached \$150 per barrel, then – U.S. President George W. Bush removed the presidential withdrawal from OCS leasing. High gasoline prices and election year politicking successfully pressured Congress to permit its moratorium to lapse, which it did Sept. 30, 2008.

For the first time in many years there were now no external forces preventing leasing of the nation's OCS. But by law such leases occur only within the context of a five-year program developed by MMS. These programs are created through a proscribed process that takes several years and provides multiple opportunities for comment from interested stakeholders.

Thus, in order for MMS to lease any acreage previously under moratorium, that acreage would have to be included in a five-year program.

On this past Jan. 16, just four days before leaving office, the Bush administration issued a proposed five-year program draft for 60 days of public comment. The proposed program would cover years 2010 to 2015 and include lease sales of the previously excluded areas.

In early February, newly confirmed Interior Secretary Salazar extended the public comment period to six months. This bought the Obama administration time to consider its options. He ordered the U.S. Geological Survey and MMS to report within 45 days the expected resource potential on the OCS, and held four town hall meetings across the country with elected leaders and the public to solicit their views on OCS development.

Now the MMS is collecting comments from all interested stakeholders, and the deadline is Sept. 21.

* * *

The United States currently is debating access to federal lands for development of many types of resources: oil, natural gas, coal, uranium and other minerals. While this MMS comment period is about the OCS, it is actually about the broader principle of access, which affects all resource developers.

AAPG's view on this issue is clear: As an Association we support access to federal lands for exploration and production of petroleum and mineral resources.

It must be done safely. It must be done responsibly. But it must be done. These resources are the foundation of our economy and our society.

If you have not already commented on this issue, I would encourage you to do so immediately. Visit the GEO-DC Web page to link to a prepared letter that you can modify and send to MMS through the Consumer Energy Alliance.

Now is the time to act.

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

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Edith Allison, Exploration Program Manager, U.S. Department of Energy

Keynote 2 - **Unconventional Gas - Challenges for Pipelines and Markets**
Lyne Mercier, Board Member, National Energy Board

Keynote 3 - **The Future Of Shale Gas In North America**
Richard Moorman, Manager Strategic Analysis, Southwestern Energy Company

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Conference technical sessions will focus on tight gas, shale gas and natural gas from coal and will address geology and engineering aspects of these unconventional natural gas resources. An important panel discussion will be part of the program.

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Technical short courses are offered on **Friday, November 20** and have been designed to compliment the conference technical sessions. Special pricing is available to conference delegates.

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SHORT COURSES

Risk, Uncertainty and Decision-Making in Unconventional Resource Plays

October 10 - 11 / Tulsa, OK, with AAPG Mid-Continent Section Meeting

Instructor: William Haskett, Decision Strategies, Inc., Houston, TX



Optimizing Horizontal Well Applications - The Asset Team Approach

November 2 - 6 / Dallas, TX

Instructor: Bob Knoll, H-Tech. Petroleum Consulting Inc., Calgary, AB, Canada



Fluvial Stratigraphy

November 14 - 15 / Rio de Janeiro, Brazil, with the AAPG International Conference & Exhibition

Instructor: John Holbrook, University of Texas at Arlington, TX



Getting Started in Fluvial Stratigraphy

December 1 / Dallas, TX

Instructor: John Holbrook, University of Texas at Arlington, TX



FIELD SEMINARS

Lacustrine Basin Exploration

September 13 - 20 / Begins and ends in Salt Lake City, UT

Leaders: Alan Carroll, University Of Wisconsin, Madison, WI; Meredith Rhodes Carson, Geofuels LLC, Madison, WI



Sedimentology and Sequence Stratigraphic Response of Paralic Deposits to Changes in Accommodation: Predicting Reservoir Architecture, Book Cliffs, Utah

September 24 - October 1 / Begins and ends in Grand Junction, CO

Leaders: Keith W. Shanley, Consultant, Denver, CO; J. Michael Boyles, Shell International E&P, Houston, TX



Modern Terrigenous Clastic Depositional Environments

September 30 - October 7 / Begins in Columbia and ends in Charleston, SC

Leader: Walter J. Sexton, Athena Technologies, Inc., Columbia, SC



Applied Stratigraphy of Paleozoic Carbonate Platforms; Facies, Cycles, Sequences, Reefs, Reservoirs

October 4 - 7 / Begins and ends in the Las Vegas airport

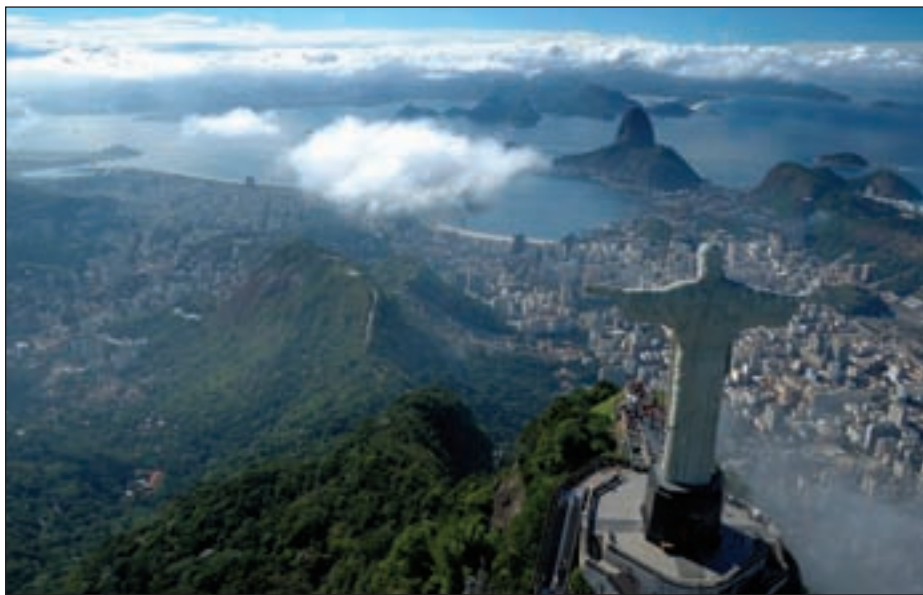
Leader: John E. Warme, Colorado School of Mines, Golden, CO



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Exciting and beautiful Rio de Janeiro is the setting for the next AAPG International Conference and Exhibition.

Rio 'Early Birds' Can Save Money

An important deadline is near regarding the AAPG International Conference and Exhibition.

Register on or before Sept. 9 and you can save hundreds of dollars off your registration fees.

Registration is open and the entire technical program is now available online for this year's ICE, which will be held Nov. 15-18 in Rio de Janeiro, Brazil.

The technical program is built on the theme "Broader, Further, Deeper," with the Associação Brasileira de Geólogos de Petróleo serving as the host society, and Haroldo Lima, director general of Brazil's

ANP (National Petroleum Agency) the general chair.

Registration fees are on a tiered format, with price savings available for those who register early. For example, for an **AAPG member** the registration fees are:

- ✓ On or before Sept. 9 – \$645.
- ✓ On or before Oct. 21 – \$725.
- ✓ After Oct. 21 – \$900.

Organizers have prepared a program that includes more than 300 oral and poster presentations, 14 short courses and five field trips.

Also included are two special sessions:

- ✓ A plenary session on "Opportunities in a High-Stakes Environment."
- ✓ A panel on "Giant Fields of the Decade – E&P Challenges."

Appropriately, the conference will focus largely on offshore activities as well as offering sessions on upstream areas.

Primary themes the technical program will feature include:

- ✓ Regional Geology, Paleogeography and Tectonics.
- ✓ Technology Application to E&P Environmental Solutions.
- ✓ Stratigraphy – Clastics and Carbonates.
- ✓ Reservoir Characterization – Outcrop Analogs, Surface and Subsurface Integration in Reservoirs, Reservoir Diagenesis, EOR and Field Development Studies, Fault Networks and Fractured Reservoirs.
- ✓ Structure – Traps and Seals.
- ✓ Basin Modeling – New Concepts and Innovative Technologies.
- ✓ Petroleum Systems – Geochemistry, Source Rocks, New Technology Applications.
- ✓ Formation Evaluation and Drilling Innovations.
- ✓ Salt Basins – E&P Challenges.
- ✓ Deepwater Environments – E&P Challenges.
- ✓ Geophysics – Advances in Subsurface Imaging, Seismic and Non-Seismic Methods, 4-D Seismic Case Studies, Visualization Technology Advances, Imaging Below Salt, Integration.
- ✓ Risk Analysis and Assessment – Economic Analysis.
- ✓ New and Emerging Regions – New Ways to Look at Old Plays, New Opportunities in Frontier Basins.
- ✓ Unconventional Resources – Oil Shale, Shale Gas, Tight Gas, Heavy Oil, Coalbed Methane.
- ✓ Industry's Crew Change – Impact on Hiring, Training and Retaining Skilled Resources.

To register or for more information go to www.aapg.org/rio. □

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K-12 Program Info Detailed State-by-State

State-by-state information on the status of K-12 earth science education in the United States is available on the Web.

Compiled by the American Geological Institute, the "Pulse of Earth Science: National Status of K-12 Earth Science Education" site includes enrollment numbers, teacher certification requirements, course requirements, science content standards, textbook adoptions and the state stance on teaching evolution.

The site is:

www.agiweb.org/education/statusreports/2007/index.html.

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Exhibit, sponsor opportunities, too**Deadline Near for N.O. Abstracts**

Wanting to submit an abstract for the next AAPG Annual Convention and Exhibition?

You're running out of time.

The deadline for abstracts, accepted online through the AAPG Web site, is Sept. 15.

The 2010 annual meeting will be held April 11-14 in New Orleans at the Ernest N. Morial Convention Center. The theme is "Unmasking the Potential of Exploration and Production."

Now is also the time for potential exhibitors and sponsors to move toward being part of a meeting that promises to continue the momentum generated at

the recent highly successful AAPG meeting in Denver.

Exhibit space and sponsorship opportunities remain available.

Regarding the technical program, the topics that have been selected to explore the meeting's theme are:

- ✓ Technology and Techniques – 14 proposed specific sessions, ranging from reservoir modeling to innovative interpretation and use of seismic data, evolving technologies and geophysical integration.
- ✓ Sedimentation and Stratigraphy – 15 sessions.
- ✓ Resource Assessment – three

sessions.

✓ Evolving Plays and Significant Discoveries – 11 sessions that cover the earth, plus sessions on Discovery Thinking and the History of Petroleum Geology.

✓ Structural Geology: Styles and Processes – 10 sessions.

✓ Tectonics and Sedimentation – four sessions.

✓ The Gulf of Mexico: Regional to Local, Mesozoic to Recent – eight sessions.

✓ Unconventional Resources: Shales (Oil and Gas), Oil Sands, Gas Hydrates, Uranium, Coal – eight sessions.

✓ Expanded Applications of Geosciences – five sessions.

✓ U.S. Energy – four sessions.

✓ Global Climate Change – three sessions, including the Global Climate Change Forum.

✓ Student Poster Sessions – two sessions, for both AAPG and SEPM students.

Details on all topics and sessions are available online at www.aapg.org/neworleans.

But remember: Potential exhibitors and sponsors should start plans now on being part of the excitement. And for members, the deadline for abstracts is Sept. 15. □



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Plenary Session

- Results of the U.S. Geological Survey Circum-Arctic Resource Appraisal (CARA)
- Regional Geological Context of Arctic Frontier Basins
- Geology and Petroleum Systems of the Russian Arctic Sedimentary Basins

Arctic Alaska/U.S. Chukchi Sea/Beaufort Sea/Canadian Arctic

- Petroleum Potential of Banks Island Segment, Canadian Arctic Passive Margin: Results from a New Regional Deep-Seismic Survey
- The Petroleum Geology of Umiat Oil Field, North Slope, Alaska
- Evolution of the Eastern Sverdrup Basin: Insights from New Field Studies and Sediment Provenance Analyses

Arctic and Circum-Arctic Petroleum Systems, Plays and Assessments

- Cretaceous Palaeogeography and Paleo-Earth Systems Model Results for the Arctic: Climate Proxies and Model/Data Comparisons
- Uncertainty in USGS Estimates of Undiscovered Arctic Petroleum Resources
- Polar Petroleum Potential: Regional Effect of Ice Cap in Optimizing Petroleum Potential in Polar/Arctic Region

Arctic Environmental and Exploration Challenges

- Strategic Advancement by Usage Metering System: Saving Dollars While Increasing Productivity
- Holistic Approach to Reduction in the Environmental Footprint of Arctic Offshore Seismic Surveys
- Production Methods for a Light Oil in a Cold Reservoir Below Freezing Temperature: Umiat Field, National Petroleum Reserve, Alaska

Baffin Bay-West Greenland

- Assessment of Undiscovered Oil and Gas Resources of the West Greenland-East Canada Province
- Cenozoic Seismic-Stratigraphy, Depositional Systems and Fluid-Flow Features in NE Baffin Bay, West Greenland
- Cretaceous-Paleogene Basin Development and Prospectivity in the NE Baffin Bay, West Greenland

Eastern Barents Sea

- Evaluation of the Late Cretaceous-Cenozoic Uplift and Petroleum System Modeling of the Russian Barents Sea Basin
- Offset and Curvature of the Novaya Zemlya Fold-and-Thrust Belt, Arctic Russia
- Geological Structure of South-Western Laptev Sea Region

High Arctic Tectonics and Petroleum Potential

- Mendeleev Ridge Ambiguities and the Need for Drilling
- Circum-Arctic Petroleum Systems Defined Using Biomarkers, Isotopes, and Chemometrics
- Petroleum Assessment of the Eurasia Basin, Arctic Ocean

North Atlantic Conjugate Margins

- Dreki Area – Jan Mayen Ridge: First Licensing Round on the Icelandic Continental Shelf
- Late Mesozoic-Cenozoic Evolution of the Conjugate Lofoten-Vesterölen (Nordland VI-VII) and NE Greenland Continental Margins: Implications for the Potentially Developed Petroleum System
- Jameson Land (East Greenland Onshore): Interpretation of Devonian and Carboniferous Subsurface Sediments Using New Reprocessing Seismic Data and Gravimetric-Magnetic Studies

Northern West Siberian-South Kara Sea

- Yamal-Gydan Source Rocks and Oils
- Geological Development and Hydrocarbon Potential of the Yenisei-Khatanga Trough, Russian Arctic
- Petroleum Systems of the Western Yamal Shelf

Siberian Arctic: Laptev, East Siberian and Russian Chukchi Seas

- Some Features of Geological Structure of the Sedimentary Basins in the East Siberian Sea and Western Chukchi Sea
- Tectonic Structure and Geological History of Russian Chukchi Sea and East Siberian Sea Shelf
- Evolution of the Laptev Continental Rifts as Revealed by 2-D Gravity Modeling, Plate Reconstructions and Palaeogeographic Mapping

Tectonic Evolution of the Arctic Mesozoic-Cenozoic

- Cenozoic Evolution of the Eurasia Basin Based on Analysis of Potential Field and Bathymetry Data
- Origins of the Amerasian Basin: A New Model
- Arctic Magmatism: Distribution, Age and Implications for Basin Development and Petroleum Systems in the Barents Sea

Tectonics Evolution of the Arctic: Late Proterozoic-Paleozoic

- Is the North Slope a Displaced Part of the Caledonian Orogenic Belt?
- Tectonic Heat Flow During the Pangaeon Permo-Carboniferous Orogenic Collapse: Implications for the Arctic
- A Paleozoic Northwest Passage and the Timanian, Caledonian and Uralian Connections of Some Cordilleran Exotic Terranes

Western Barents Sea

- Chemostratigraphy: A New Approach for the Subregional Correlation of Triassic / Jurassic Sequences of the Barents Sea
- Triassic Source Rocks of the Barents Sea and Svalbard
- Jurassic Seismic Sequence Stratigraphy and Paleogeography of the Norwegian Barents Sea

Poster Sessions

- Geology and History of Discovery of the Point McIntyre Field, North Slope, Alaska
- Ellesmerian Tectonism: A Critical Appraisal from a Circum-Arctic Perspective
- Platform-Margin Deltas in the Early-Middle Triassic in the Norwegian Barents Sea

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**FOUNDATION
update**

Online applications are now being accepted for the 2010 AAPG Foundation Grants-in-Aid Program, which was created to foster research in the geosciences.

The Grants-in-Aid Committee will select the "most deserving geosciences applicants" and award \$203,000 in grants, ranging individually from \$500 up to a maximum of \$3,000.

Grants are intended to provide financial assistance to graduate students (currently enrolled in master's or Ph.D. programs) whose thesis research has application to the search for and development of petroleum and energy-mineral resources, and/or to related environmental geology issues.

Grants are based on merit and, in part, on financial need.

Factors weighed in selecting successful applicants include:

✓ The qualifications of an applicant as indicated by past performance.

✓ Originality and imagination of the proposed project.

✓ Support of the department in which the work is being done.

✓ Perceived significance of the project to petroleum, energy minerals and related environmental geology.

The application process is open until Jan. 31, but students can apply now at aapg.gia.confex.com/aapg_gia/2010/index.html; or contact Angela Taylor at ataylor@aapg.org for additional information.

* * *

In other Foundation news:

✓ The 32nd annual **Foundation Trustee Associates** meeting will be held Oct. 7-11, at Ponte Vedra Beach, Fla.

Meeting highlights will include a geological field trip of the area, the election of new officers, a presentation by Robert Esser on the U.S. natural gas market and a report by the Foundation's investment manager.

✓ **Chesapeake Energy Corp.** has pledged \$250,000 over the next five years toward the AAPG PetroGrant Program.

This new initiative provides a unique opportunity to expand the geosciences work force over time, develop viable new geosciences research and improve the relationships among industry, academia and government.

Your support of AAPG programs is important and may be directed toward your choice through the AAPG Foundation Funds. For a complete list of fund descriptions visit foundation.aapg.org/fundsdescription.cfm; or if you have any questions, contact Rebecca Griffin at rgriffin@aapg.org, (918) 560-2644. □

PROFESSIONALnewsbriefs

Steven M. Brown, to Petrel product champion lead infrastructure project, Schlumberger Information Solutions, Oslo, Norway. Previously product analyst, Schlumberger Information Solutions, Oslo, Norway.

Burns Cheadle, to the Bill Bell Chair in Petroleum Geology, University of Western Ontario, London, Canada. Previously president, Outrider Energy, Calgary, Canada.

Mike Faust, to vice president-exploration, ConocoPhillips Canada, Calgary, Canada. Previously offshore exploration manager, ConocoPhillips Alaska, Anchorage, Alaska.

Eric A. Foster, to geoscience adviser, PetroSkills, Houston. Previously managing consultant, PetroSkills, Houston.

Fred Haerberle has been elected an Honorary Member of the Ohio Geological Society. He resides in Delaware, Ohio.

Steve O'Hara, to chief geophysicist, BHP Billiton, Houston. Previously section leader-Colombia exploration, BHP Billiton, Houston.

Kenneth E. Peters is the recipient of the 2009 Alfred E. Treibs award from the Organic Geochemistry Division of the Geochemical Society. Peters is business development manager-integrated services for exploration, Schlumberger, Mill Valley, Calif., and consulting professor, Stanford University. He also is an AAPG Distinguished Lecturer for this season (see box below).

Tom Schroeder, to principal petrophysicist, StatoilHydro North America, Houston. Previously senior staff geologist, El Paso E&P, Houston.

Yusak H. Setiawan, project leader, Hess Semai V, Jakarta, Indonesia. Previously geophysicist adviser, Hess Oil and Gas Sdn bhd, Kuala Lumpur, Malaysia.

Ione L. Taylor, to senior executive, U.S. Geological Survey, U.S. Department of the Interior, Reston, Va. Previously chief scientist-Eastern Region, U.S. Geological Survey, Reston, Va.

Qingming Yang, to vice president-exploration, Approach Resources, Fort Worth. Previously geosciences adviser/technical lead, Pioneer Natural Resources, Irving, Texas.

(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, smooore@aapg.org; or submit directly from the AAPG Web site, www.aapg.org/explorer/pnb_forms.cfm.)

Eastern Section Meets This Month

"Forging the Future From the Past" is the theme of this year's Eastern Section annual meeting, set Sept. 20-22 "in the heart of the Illinois Basin" at the Centre in Evansville, Ind.

The technical program – offering 76 papers and posters – emphasizes unconventional natural gas resources, including sessions on Devonian black shales, coalbed methane and two unconventional reservoir analysis workshops. New carbon sequestration research will be presented in a Division of Environmental Geosciences session.

Three field trips also are planned, as are three workshops: "Geophysics and Geology Applied in Industry" (student workshop), "Appraising Shale Gas Reservoirs" and "Appraising Coalbed Methane Reservoirs."

For more details go to the meeting Web site at www.esaapg2009.org.

DL Program
from page 33

☐ **Christian J. Heine**, senior geological consultant, upstream ventures, Saudi Aramco, Dhahran, Saudi Arabia.

Heine is available for central Asia and European Region lectures, offering two talks:

✓ "Where Does Up-Scaling Begin? Let's Put Geology Back into Geostatistics."

✓ "Nature's Juggling Act – Glaciers, Sand Dunes and Limestone: A Post

Glacial Sea-Level Rise Captures in Rock a Record of the Early Permian Stratigraphy of Saudi Arabia."

☐ **Dale R. Issler**, research scientist, Geological Survey of Canada, Calgary, Canada.

Issler is available for Asia-Pacific tours, offering two talks:

✓ "Integrated Thermal History Analysis of Sedimentary Basins Using Multi-Kinetic Apatite Fission Track Thermochronology: Examples from Northern Canada."

✓ "Quantitative Analysis of Petroleum Systems of the Beaufort-Mackenzie Basin, Arctic Canada: An

Integrated Approach."

☐ **John G. Kaldi**, professor, Australian School of Petroleum, University of Adelaide, Australia, continues his season on the international DL roster, and is available for European Region talks.

He offers five talks:

✓ "Carbon Capture and Geological Storage: What are the Big Issues and Opportunities?"

✓ "CO₂ Storage Capacity Estimation and Site Selection."

✓ "Evaluating Seal Potential for Hydrocarbon Accumulations."

✓ "Pore-Level Reservoir

Characterization."

✓ "Geological Applications of Capillary Pressure: Taking the Mystery out of Basic Rock Properties."

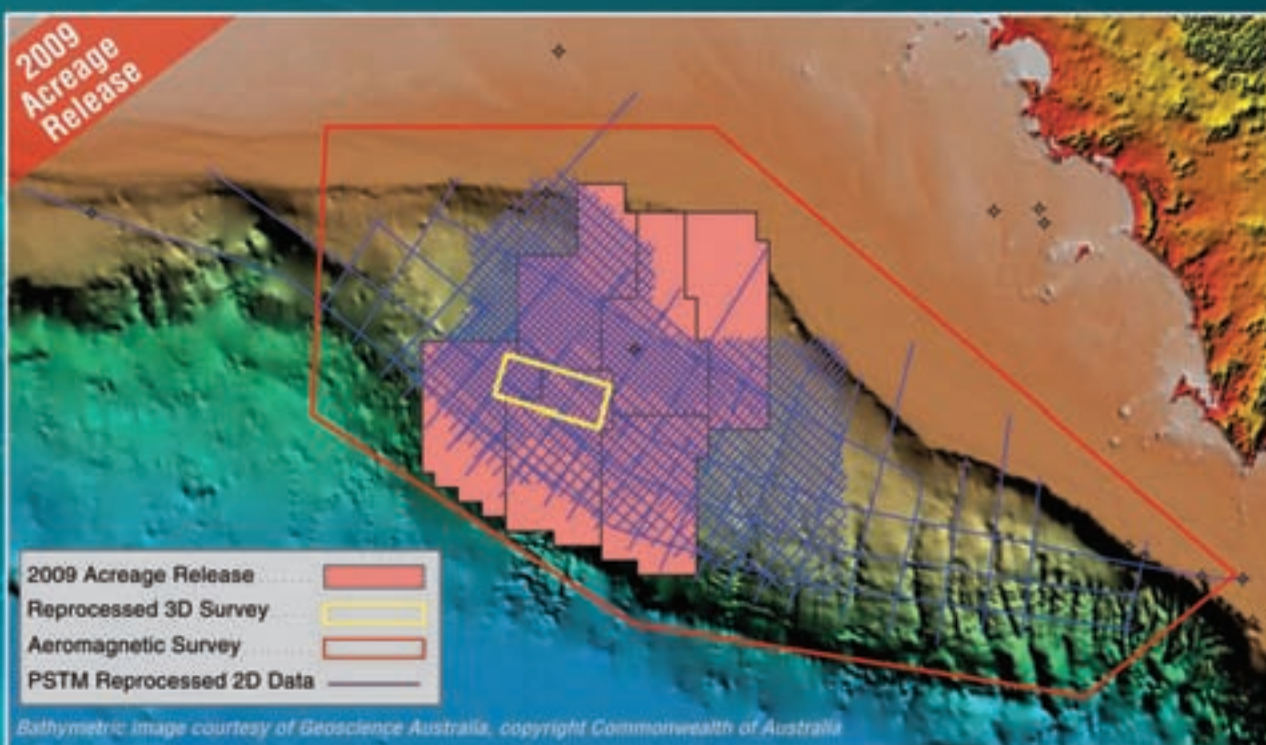
☐ **Kenneth E. Peters**, business development manager-integrated services for exploration, Schlumberger, Mill Valley, Calif., and consulting professor, Stanford University.

Peters will be available for European Region tours, offering two talks:

✓ "Establishing Petroleum Systems: Biomarkers, Isotopes and Chemometrics."

✓ "Exploration Paradigm Shift: The Dynamic Petroleum System Concept." ☐

Great Australian Bight Project
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To these people, and to those who have generously made donations in the past, we sincerely thank you.

With your gifts, the AAPG Foundation will continue its stewardship for the betterment of the science and the profession of petroleum geology.



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The AAPG Foundation K-12 Education Endowment will allow us to sponsor, train and support teachers in their efforts to bring more geology-related topics to the classroom, sparking the early interest of students and encouraging more of them to enter a geoscience field.

Currently, the AAPG Foundation provides support to successfully established programs, such as Earth Science Week, More! Rocks-in-your-Head workshops and the Bookout Initiative.

There is a need for additional outreach to students, teachers, parents and the general public, to educate them about the invaluable role of geosciences in major issues such as global climate change and world energy needs.



How can YOU help?

You may direct your tax-deductible contribution toward the AAPG Foundation "K-12 Education Fund."

The Foundation has an established Operating Fund; therefore 100% of your gift will go to your selected fund. No overhead expenses will be deducted from your contribution, not one penny!

A gift may be made online at foundation.aapg.org/donate.cfm, through the mail or by phone. Should you wish to receive a 5-year pledge commitment form or further details about the K-12 Education Fund, please contact Rebecca Griffin, 918-560-2674, rgriffin@AAPG.org or Alison Robbins, 918-560-2674, arobbins@AAPG.org

NOW is the time to expand the K-12 Education programs!

Your involvement is essential to increase outreach and awaken young students' appreciation of geosciences and energy.

REGIONS&sections

Oil Flavored 'Hot' Colombia Simposio

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

By CAROL MCGOWEN
Regions and Sections Manager

Cartagena, Colombia was hot, hot, hot during the successful Simposio Bolivariano Petroleum Exploration in Subandean Basins conference.

The meeting, held July 26-29 and built on the theme "Learning from the Past, Looking to the Future," attracted 900 participants from 20 countries, plus 86 students (many for the event's first-ever student poster session) and 41 exhibitors. There were 100 technical talks, featuring simultaneous Spanish/English translation.

The Asociación Colombiana De Geólogos Y Geofísicos Del Petróleo (ACGGP), an AAPG affiliate, organized the conference, the tenth symposia since its 1982 debut in Bogotá.

The conference highlights hot technical topics and is held every three years at venues in either Venezuela or Colombia. This year's technical program was more petroleum-oriented than past symposia.

"The symposium format itself really contributes to the success of the conference," said Tomas Villamil, president of the Simposio. "Attendance is



AAPG President-elect Dave Rensink takes his turn in the AAPG booth at the successful Simposio Bolivariano Petroleum Exploration event in Cartagena, Colombia.

capped at a manageable size ... so everyone can fit into one room for the technical talks.

"The beauty of the symposium format," he added, "is that there are no internal competing events. Everyone participates in the technical talks, the poster sessions and the social events as one group."

The conference also marked AAPG President-elect Dave Rensink's first international trip since taking office. Rensink and the AAPG delegation were warmly welcomed to Colombia by conference organizers – and for Rensink, attending the conference and spending time in the AAPG booth presented the opportunity to meet students and

geoscientists from Colombia and other Latin American countries.

"By the end of the conference I had a much better awareness of some of the issues faced by geoscientists doing business in Colombia and other parts of Latin America – issues of heavy oil and offshore drilling environments," he said.

* * *

Colombia's hot prospects are attracting international operations from around the world – evidenced by over 85 international companies from countries such as Canada, Russia, China, Korea and India, which are now active in

Colombia and whose representatives attended the Simposio Bolivariano.

Three significant actions by the Colombian government have contributed to the current level of industry activity:

- ✓ Colombia's President Alvaro Uribe has made it clear that Colombia welcomes the world – especially outside investors.

- ✓ Beginning in 2004, government contracts enabled investors to obtain a more attractive return on investment.

- ✓ Over the past five-six years, the government has improved security conditions by increasing the number of soldiers and police on duty throughout Colombia.

According to Villamil, the reaction to these industry changes was at first gradual.

"But as companies shared stories of their success, and word spread about this new, stable and predictable business environment, investment and exploration activity in Colombia snowballed," he said.

* * *

In addition to the excellent technical program and exhibitions, AAPG's participation in the Simposio Bolivariano provided the opportunity to strengthen relations between AAPG and the ACGGP officers. Many initiatives for future collaboration and for bringing AAPG services to Colombia were discussed.

In his remarks during the closing ceremony, Rensink acknowledged the hard work contributed by many

continued on next page

AAPG - SEG
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Fall
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UPCOMING
REGIONAL WORKSHOPS

9/23-24 Rocky Mountain: Reservoir Engineering for Petroleum Geologists - Golden, CO.

9/24 Texas/SE New Mexico: Water/Gas Shutoff and Conformance Control—Knowing What To Do/Where (Midland College PPDC) - Midland, TX.

9/26 Central/Eastern Gulf: Sequence Stratigraphy and Its Application to Petroleum Exploration in Onshore Mesozoic Salt Basins, Gulf Coastal Plain (GCAGS) - Shreveport, LA.

10/15 Rocky Mountain: Water/Gas Shutoff and Conformance Control—Knowing What To Do/Where - Casper, WY.

10/20 Texas/SE New Mexico: What Is Your Bottom Line (Midland College PPDC) - Midland, TX.

10/20 West Coast: Property Taxes - Long Beach, CA.

10/21 West Coast: Property Taxes - Bakersfield, CA.

10/27 Rocky Mountain: Chemical Enhanced Oil Recovery - Golden, CO.

10/27 Midcontinent: Fundamentals of Waterflood Design - Wichita, KS.

10/28 Midcontinent: Waterflood Systems and Operations - Wichita, KS.

For further information, view PTTC's online calendar at www.pttc.org/national_calendar.htm

Reminder to all members: You must pay your dues now to avoid losing your membership benefits – including uninterrupted mailing of the EXPLORER. You can renew online, at www.aapg.org/dues.

MEMBERSHIP & certification

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

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

Information included here comes from the AAPG membership department.

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

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Certification

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

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Mark Broaddus, geosciences consultant, Arcadia (reinstatement)

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Jose I. Guzman, consultant, Katy (W. Fisher, J. Helwig, S. Ghosh)

continued from previous page

volunteers to make the Tenth Simposio Bolivariano such a success, and then invited geoscientists and students from around the Latin American Region to continue the hot conversations started in Colombia and to join him in November for the Rio AAPG International Conference and Exhibition.

* * *

Following the close of technical presentations, conference attendees traveled by bus and car to the Castillo de San Felipe – a huge fort built over the 17th and 18th centuries by slaves of the Spanish to defend the port from land-based attack. From high atop the old fort, with spectacular views of La Boca Grande, conference goers enjoyed a traditional Colombian meal accompanied

by hot Latin music with a Caribbean beat.

Striking contrasts of past and present abound in Cartagena. Founded in 1533, Cartagena became the shipping port of the Spanish overseas empire, where precious cargo from the New World awaited shipment to Spain.

The 400-year-old stone walls encircling the city are surprisingly intact and stretch for more than two miles. The old city inside the wall has been designated a UNESCO World Heritage site.

Today, just over the old stone walls, miles of modern high rise office and apartment buildings cover the landscape all along the Caribbean coast. Cartagena is Colombia's largest port and an important industrial center specializing in petrochemicals. The port of Cartagena is the terminus of a pipeline leading from the oilfields of the Magdalena Basin. □

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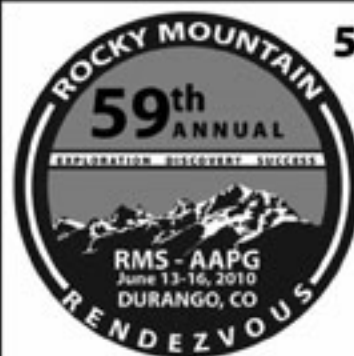
Gil Mull: History of Exploration of the North Slope

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- New Insights into the Paradox Basin
- San Juan Basin – Mature Basin?
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- Uranium Geology in the Rockies
- CO₂ Sequestration - What Have We Learned So Far?
- Geothermal Energy – From Hot Springs to Produced Water
- Advances in Completion Technologies & Microseismic Monitoring
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- Multi-scale Observations and the Application of Remote Sensing and Lidar to Rocky Mountain Petroleum Exploration
- Sedimentology and Stratigraphy of Rocky Mountain Basins
- Structure of Rocky Mountain Basins
- Student Papers

FIELD TRIPS

- Pennsylvanian Hermosa Fm., from Shelf to Basin
- Upper Cretaceous Reservoirs of the San Juan Basin
- From the San Juan Basin to the San Juan Mountains:
 - Pt. I: Paleozoics of the Animas Valley North
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As the lead-off program of the conference, the **SEG Forum Series** has become a do-not-miss event. This year's program is:

The State of Energy R&D

The Forum will address the current state of industry R&D, its intersections with the significant changes, and new investments occurring on the larger energy landscape. This year's SEG Forum speakers will come from across the energy spectrum, including oil and gas companies, technology and service companies, government agencies, universities, and venture investments.

This year's panel will feature:



John McDonald
Vice President and Chief Technology Officer,
Chevron Corporation



Donald Paul
Executive Director, USC Energy
Institute and William M. Keck Chair
of Energy Resources



C. Michael Ming
President, Research Partnership to Secure
Energy for America, RPSEA



Bob Pavey
Partner, Morgenthaler Ventures
and Past Chairman of the National
Venture Capital Association



Raymond Lee Orbach
Director of the Energy Institute at U.T. Austin
and recent Director of Science at DOE



Bob Peebler
Chief Executive Officer, IOV

READERS'forum

Sarcasm (We Think)

David Curtiss's article on the first-ever AAPG Congressional Visits Day (July EXPLORER) had me trying to figure whose first-ever day was represented. I'm still mulling that over.

In order to really get the congressional leaders' rapt attention, I'm sure the group made the point that the AAPG applauds congressional desires for the United States to reduce its dependency on foreign oil, and voiced their enthusiasm for Congress's recent tax break and royalty reductions, acts designed to curb oil company efforts to explore for hydrocarbon here in the United States. Curbing those efforts would discourage oil companies from indulging in unwanted, politically dangerous, costly and environmentally risky exploration, and that the really best way would be to eliminate the use of oil entirely, thereby avoiding CO₂ contamination of the atmosphere, the only true avenue to the salvation of the globe.

Just in case the Congressmen mistakenly assumed the letters AAPG meant Association for Accumulating Political Gratuities, the group did explain to the congressmen that the letters were for petroleum geologists, didn't they?

As to the three bullets the group addressed on future work force needs, they must have assured them that:

- ✓ We were always ready and available to provide members for oil spill clean-ups and blow-out damage.
- ✓ We were available for retraining of unemployed geologists and geophysicists to teach kindergarten classes about the perils of climate change.

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.

✓ We had folks available for interpreting any studies done by the MMS and the U.S. Geological Survey and various state geological surveys to quantify possible reserves in offshore waters and federal lands, assuring them that we have all potential environmental damages understood and well in hand.

As for the request for an additional \$500 million, I assume that was just tossed in to cover any overlooked contingencies, like the environmental impact study on the abandonment of the Guantanamo prison.

David Callaway
Houston

Step on the Gas

What is the holdup in the United States developing engines to power our vehicles with compressed natural gas?

Is Big Oil holding up this development?

Natural gas is clean-burning and plentiful in the United States. This change would lessen our dependence on foreign oil by over 50 percent.

Is compressed natural gas more dangerous in a tank than gasoline? Probably not.

It is time to get a move on to get-done!

Marvin E. Frankamp
Wichita, Kan.

Mid-Continent Sets Energy Forum

A free public forum dealing with energy challenges and opportunities will be featured as part of the Mid-Continent Section's annual meeting, set Oct. 11-13 in Tulsa.

The meeting's theme is "Resources for the Generations," and the program includes more than 80 technical presentations, short courses, field trips and an All-Convention Luncheon featuring past AAPG president Scott Tinker speaking on "Developing New Intellectual Resources in Geosciences: Mentoring, Educating, Planning and Beyond."

The public forum, "America's Energy Heartland, America's Energy Future" will be held from 1-4 p.m. Tuesday, Oct. 13, moderated by David Curtiss, director of AAPG's GEO-DC office and

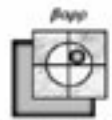
columnist for the EXPLORER's monthly Washington Watch. Panel speakers are:

- ✓ Arthur "Art" Green, retired chief geoscientist for ExxonMobil Exploration.
- ✓ James L. Smith, who holds the Cary M. Maguire Chair in Oil and Gas Management at Southern Methodist University and is a research associate of the MIT Center for Energy and Environmental Policy Research.
- ✓ Pete Stark, vice president of industry relations for IHS in Englewood, Colo.
- ✓ Rod Nelson, vice president of communications and innovation and collaboration for Schlumberger.

For details go to the Section's Web site at www.2009aapgmidcon.com.

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**Director, Enhanced Oil Recovery Institute
University of Wyoming**

The University of Wyoming invites nominations and applications for the position of director of the Enhanced Oil Recovery Institute (EORI). As the only public baccalaureate and graduate degree-granting institution in Wyoming, UW plays a prominent role in the state, through its involvement in energy-related issues and as a national research university. Wyoming's geology and oil producing history, together with a record of strong support from state officials, make EORI an extraordinary vehicle for internationally visible research and outreach.

The director of EORI is responsible for promoting research and service that advance the viability of enhanced oil recovery (EOR). Reporting to the director are 15 full- and part-time staff members, funded through Wyoming's Enhanced Oil Recovery Commission, appointed by the Governor of Wyoming and confirmed by the Legislature. With funding from the commission, totaling about \$3 million/year, the institute facilitates research and outreach by affiliated faculty from several UW departments, including Chemical and Petroleum Engineering, Geology and Geophysics, and Economics and Finance. The director reports to the director of UW's School of Energy Resources. The mission and other information are available at the institute's web site, <http://eori.gg.uwyo.edu/>.

We welcome applicants and nominations from industry, academia, and government. Preferred qualifications include an earned doctorate or commensurate professional credentials, a distinguished record of contributions to a field related to EOR, demonstrated understanding of the challenges in implementing EOR, sensitivity to the mission of a research university, and evidence of strong leadership skills. We also encourage candidates with industry experience and/or a positive industry working experience and relationship.

The director is housed in EORI's offices on UW's main campus in Laramie, a city of 28,000 in a scenic valley between the Laramie and Medicine Bow Mountains. Laramie is a two-hour drive from Denver, Colorado. For more information about the university and its setting, see <http://www.uwyo.edu>.

Complete applications include a cover letter, curriculum vitae, names and contact data for at least three professional references, and a brief narrative summarizing the candidate's leadership experience and interest in the position. The search committee will begin screening in September, 2009; however, applications will be accepted until the position is filled. Please send nominations and applications to Dr. Myron B. Allen, Provost and Vice President for Academic Affairs, University of Wyoming, Dept. 3302, 1000 E. University Avenue, Laramie, WY 82071. We encourage electronic applications, sent to Ms. Wilma Varga at wilmav@uwyo.edu.

The university adheres to principles of affirmative action and welcomes applications from qualified individuals of any race, color, religion, sex, national origin, disability, age, veteran status, sexual orientation or political belief. We welcome applications from underrepresented groups, including women and people of color.

Carbonate Geologist

The Enhanced Oil Recovery Institute (EORI) at the University of Wyoming invites applications for a senior research scientist to work in technical development. (Position # 4970)

Carbonate rocks form the second-most productive reservoirs within the State of Wyoming, and contribute to the internal architecture of the most productive eolian reservoirs state-wide. As such, the Enhanced Oil Recovery Institute at the University of Wyoming is looking to hire a carbonate geologist to work in a team environment with geologists and engineers to study subsurface issues with Wyoming reservoirs, as well as carry out individual research of value to the overall mission of the Institute.

Education: MS and 10+ years or PhD and 5+ years experience in carbonate reservoir studies or equivalent technical field.

Knowledge of: All types of carbonate depositional environments, with extensive experience of both outcrop- and subsurface-based analysis and interpretation of carbonate reservoirs and reservoir rocks.

Expected duties: Reservoir analyses based on wire-line log, core, thin-section, and seismic data, and outcrop-based studies in order to gain better knowledge of internal reservoir architectures. The candidate must have the ability to work in both a unified team environment and solo on individual research projects.

Additional skills: Experience of reservoir modeling using industry-standard software such as Petrel, RMS, GoCad, etc, experience with lidar acquisition and interpretation as a tool for outcrop research, and knowledge of clastic reservoir systems.

Application materials required: University of Wyoming application (<http://uwadmnweb.uwyo.edu/hr/hrformspage.asp>), resume, and contact information for three work related references

Contact Information: Julie Hamilton, Project Coordinator Sr.
Phone: 307-766-2791; E-mail: julieh@uwyo.edu
Website: <http://eori.uwyo.edu>

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DIRECTOR'S Corner

Vision Quest: Delivering the Goods

BY RICK FRITZ

Last month my wife, Mary, and I took the kids to Disney World in Orlando, Fla. It was hot, overcrowded and extremely expensive. It was so packed it's hard to believe there is a problem with the economy – especially with everybody buying \$15 cheeseburgers that you can buy outside the park for less than \$5.

On the morning of the last day the lines were so long Mary and I told the kids to search for something to ride while we found a place to cool off. We were at the Hollywood Studios part of the park and we noticed a marquee that said, "The Life of Disney." Ironically, it was not crowded, so we went in to cool off.

Inside it showed the struggles Walt Disney encountered in making his dreams into reality. He reminded me of a geologist who would go boom and bust several times in their career looking for oil and gas. I was especially interested in some of the technology he developed to make his cartoons more 3-D and colorful. Sound familiar?

At the end of the tour they showed a movie about his life with clips of Disney talking. In one clip he mused on his vision of a theme park where parents could have a great (affordable) experience with their kids.

It's funny how "visions" can sometimes be lost – even with success.

* * *

Headquarters staff has been in the process of reviewing AAPG's strategic plan in preparation of updating our business plan. It was good to see that AAPG members and staff have been very successful in reaching many of the goals set in the original strategic plan.

Nevertheless, it is important to keep



Fritz

focusing on the primary goal of developing, finding and delivering "the best science" to our membership and the professional community – and keeping it affordable.

AAPG's Constitution and Bylaws Committee is working on that vision and the ultimate design by considering AAPG's future corporate structure. Please be sure and read their regular updates in the EXPLORER (in this issue on page 4) and you can be part of the discussion online at discussion.aapg.org/corporatestructure/.

In the meantime, everybody is working diligently on the "science" – we have a number of new books that will be distributed this fall that I will discuss in my October column.

In addition, the committees, divisions and staff are developing many excellent educational opportunities, including new Geoscience Technology Workshops.

The AAPG Fall Education Conference will be held in Houston Sept. 21-25. This year's topic is on the Business of Petroleum Exploration, with a focus on developing unconventional reservoirs.

By the time you read this article the first Hedberg of this fiscal year will have been held. Held in Vancouver, this was a joint AAPG, SPE, SEG workshop on Geological Carbon Sequestration.

It is important to keep focusing on the primary goal of developing, finding and delivering "the best science" to our membership – and keeping it affordable.

AAPG's next Hedberg is scheduled for Oct. 4-9 in Tirrenia, Italy, on the theme "Deep Water Fold and Thrust Belts."

Of course, the second half of the calendar year is a big opportunity to be part of the dissemination of science as stated in the bylaws.

The Sections start first:

✓ The Eastern Section meeting will be held in Evansville, Ind., on Sept. 20-22.

✓ The GCAGS meeting in Shreveport, La., will be held Sept. 27-29.

✓ The Mid-Continent Section meeting will be held in Tulsa Oct. 11-13.

All have great science with programs on regional plays especially shale gas. Also, Section meetings are a great value in regard to cost.

And coming soon:

✓ AAPG's new Polar Petroleum Potential conference, or "3P," will be held in Moscow Sept. 30-Oct. 3. With the European Region as host, this new meeting will explore the geoscience of the Arctic and examine the challenges in exploring in this new play.

✓ A short time after the 3P conference, on Nov. 23-24, the European Region will hold its annual meeting in Paris.

✓ The grand finale for this calendar year is the AAPG International Conference and Exhibition (ICE) at Rio de Janeiro, Brazil, on Oct. 15-18.

This will be a fantastic event and I encourage all members to consider it a great opportunity to learn and discuss global science and E&P. Of course, the new sub-salt plays of offshore Brazil will be a key topic at this meeting. And the Brazilian climate and hospitality are some of the best in the world.

Like all major AAPG ICE meetings there are opportunities for professional development through short course, field trips and special session.

A full e-version of the RIO ICE 2009 technical program announcement and exhibition guide can be viewed at www.aapg.org/rio/.

* * *

Walt Disney's vision seems to have been lost a little once Mickey Mouse became a publicly-traded entity.

At AAPG, we are doing everything possible to follow the vision set by the membership – and still keep it affordable.

Divisions to work together

DEG Initiates Renewables Group

By MICHAEL A. JACOBS
DEG President

I recently attended a meeting in Houston with some of the other elected officers from the DEG, EMD and DPA, along with AAPG Executive Director Rick Fritz and Divisions manager Norma Newby.

The main topic was how the three AAPG Divisions can work together to develop more joint activities, such as sessions, workshops and short courses. One of the action items that came out of the meeting was the need for the AAPG to form a Renewable Energy Committee.

It was agreed that the DEG would initiate the formation of this committee, and it was voted into existence July 22.

* * *

Some may wonder why AAPG should be interested in renewable energy.

Charles G. "Chip" Groat, a past DEG president and one of the founding members of the AAPG Global Climate Change Solutions Committee, observed in one of his EXPLORER columns that AAPG members are willing to commit considerable energy and personal time through the AAPG to the consideration of topics that some do and some don't feel are mainstream to the profession of petroleum geology.

I have found, like Chip did, that many of



Jacobs

the companies, agencies and universities that AAPG members work for are engaged in research and projects – such as renewable energy – that may seem to be outside of the domain of mainstream petroleum geology but do fall in the domain of the DEG, EMD or DPA.

As Chip noted, if we don't engage ourselves in these activities and issues as well we will limit both the AAPG as an organization and also the impact of our profession as geoscientists.

So, as I pondered on the task of forming this committee I asked myself just how much interest might there be among AAPG members, and others, in the topic of renewable energy. I decided one way to find out was to do a little research on my own via the Internet to see what level of interest in renewable energy might be among the energy companies that employ many of AAPG members. I purposefully excluded government agencies and universities from my research.

I was very surprised to find out the majority of the major oil companies, both domestic and international, had very aggressive renewable energy programs,



and also that many of the larger independent companies had active renewable energy programs. ExxonMobil, Chevron, BP, Shell, TOTAL, Petrobras, StatoilHydro, Devon, Apache and Anadarko all have very active renewable energy programs.

Most of the programs are centered on the development of bio-fuels; however, there are many companies involved in wind energy, fuel cell research and solar projects. Chevron remains very active in geothermal energy.

I also noted that those companies that had viable renewable energy projects also were actively discussing climate change and the potential effects that greenhouse gas (GHG) emissions may have on the environment. Most discussed the need to balance an ever-increasing demand for energy with the need to lessen the carbon footprint the industry leaves on the

environment. How to achieve this balance may be the greatest challenge facing the energy industry today.

Discussing these challenges as well as renewable energy research and progress will be the main purpose of the DEG/EMD/DPA Renewable Energy Committee.

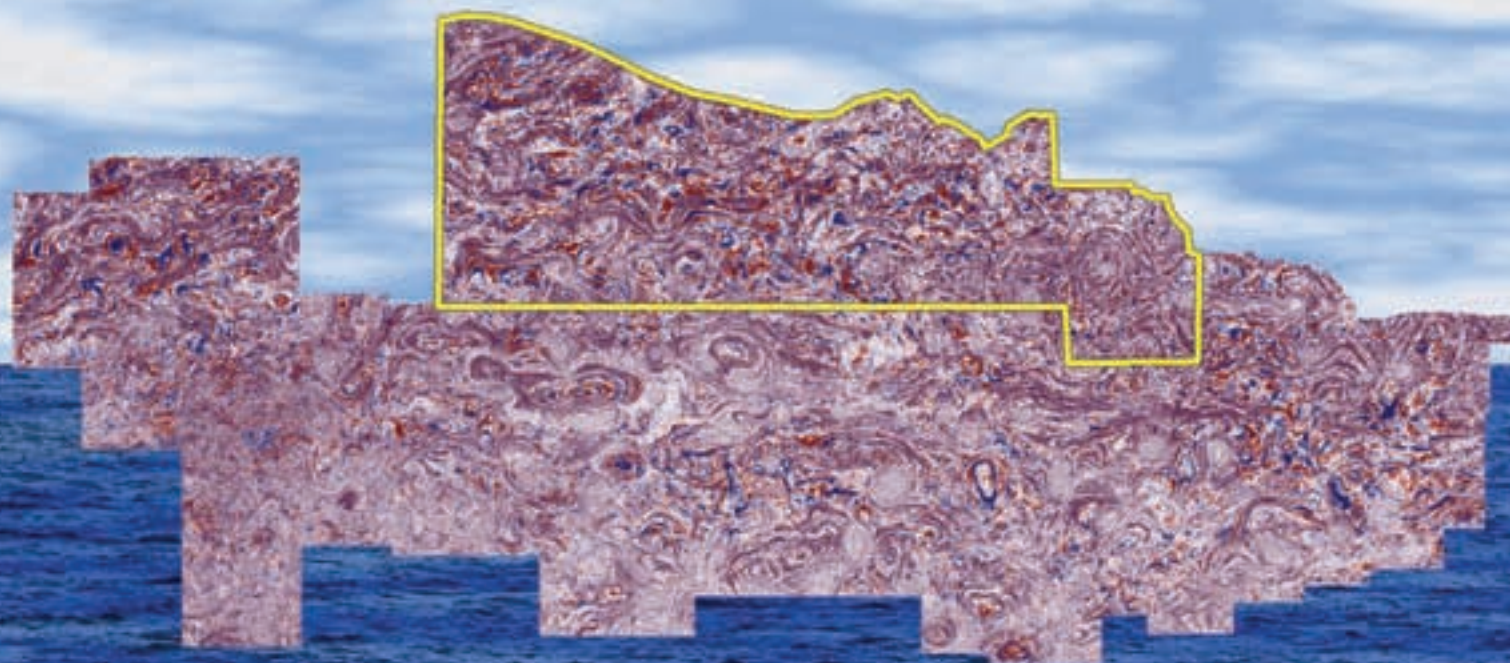
* * *

One subject area the DEG remains very active in – and one that will help to mitigate the effects of CO₂ emissions – is carbon capture and sequestration.

The DEG will soon be publishing the first of two special issues of Environmental Geosciences dedicated to the subject of geological carbon sequestration. The first is a great example of geological work being performed on three different geological targets within the Michigan Basin.

CO₂ sequestration, renewable energy, GHG emissions and other climate change-related issues are very important to us all and are part of the American Clean Energy and Security Act recently passed by the U.S. House of Representatives. This act, if it becomes law, will impose the first federal restrictions on CO₂ emissions, establish a market structure for trading CO₂ and promote investment in, and transition to, cleaner-energy technologies. □

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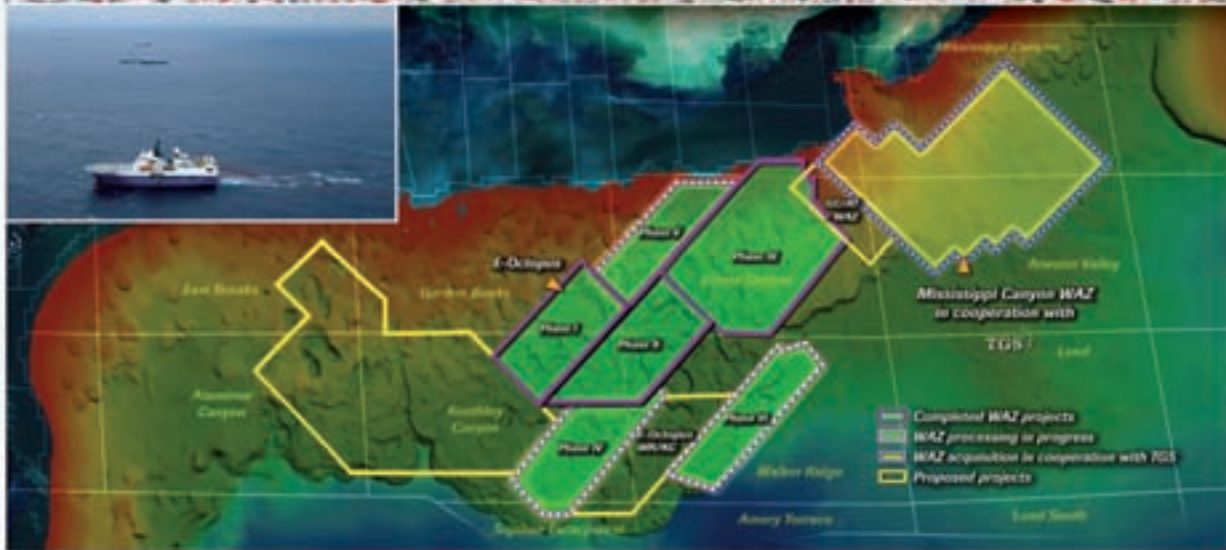
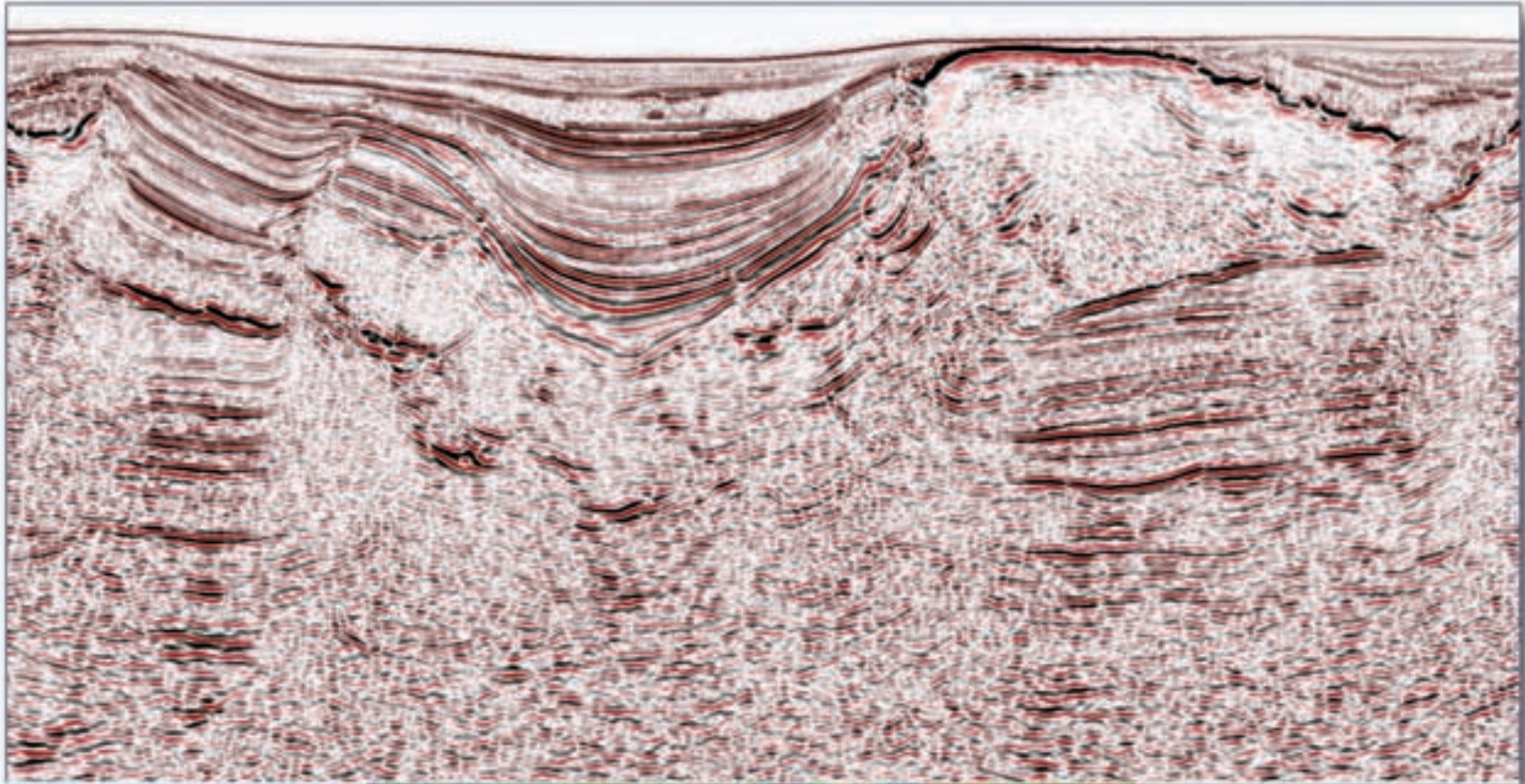


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