AAPG AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, AN INTERNATIONAL ORGANIZATION

EXPLORER

MAY 2006

Fractures

Random?

See page 14

Vol. 27, No. 5
May 2006

AAPG EXPLORER

On the cover: A team of Canadian geoscientists, headed by University of Calgary geology professor Deborah Spratt, is studying fractures "from the micro-scale to the seismic scale to the mountain-building scale," trying to answer an important question: Is there a unifying way to predict fractures? See page 14. Cover shot showing a research team at work on Alberta's Moose Mountain courtesy of Spratt. Background image of fractured Mississippian carbonates in the Alberta foothills courtesy of Greg Feltham.

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PRESIDENT'S COLUMN

Membership to Vote On Global VP Idea

By PETER R. ROSE

This column follows up on a pivotal event at the 2006 Annual Convention in Houston, namely the approval by AAPG's House of Delegates of Bylaws amendments creating two vice presidents – one for U.S. Sections, one for International Regions.

The amendments passed by an overwhelming margin.

By now all Active AAPG members have been provided, by regular mail and e-mail, with necessary information and materials allowing them to vote on the Constitutional amendment that would add the additional officer to AAPG's Executive Committee.

Passage of this amendment requires approval by two-thirds of the members voting.

I urge all Active members to approve the Constitutional amendment because it will:

✓ Improve headquarters services to both U.S. Sections as well as International Regions.

✓ Allow equitable and long-overdue representation of Region members on AAPG's Executive Committee.

✓ Empower emerging Region geological leaders and communities.

✓ Help implement AAPG's Strategic Plan.

U.S. members should understand that AAPG's expanded global presence will increase their international contacts and create additional prospecting and consulting opportunities for American geoscientists.

If Active members approve the constitutional amendment, AAPG can move forward now as a bona fide global geological organization; if they do not, other professional associations will promptly take over AAPG's global role in Petroleum E&P. It is that simple.

I ask all members for their support on this issue, which is vital to AAPG's future.

* * *

In my March column I left readers in Beijing (Feb. 24-27). On February 28 I flew to Delhi, where I was welcomed as the first AAPG president to visit India in an official capacity.

James Peters, secretary of the Association of Petroleum Geologists (India), and his colleagues introduced me to senior officials of ONGC (the Indian national oil company) and organized several lectures before APG members in Delhi and, later, Mumbai. I was especially pleased to meet a number of independents and consultants who are now working in India.


Rose

I sincerely wish that all AAPG members could have the privilege of experiencing the warm and manifest respect that AAPG enjoys among international petroleum geologists.

On March 3, I departed Mumbai for APPEX London 2006, the emerging European exposition where international companies and national petroleum ministries meet to look over prospective deals and discuss current E&P events (see page 40).

Managed by AAPG, APPEX London was co-sponsored by the UK Department of Trade and Industry, the International Association of Oil and Gas Producers, The Energy Institute and the Geological Society of London.

Steve Veal (AAPG vice president), John Brooks (European Region president), Mike Lakin (European Region VP) and their colleagues knocked themselves out in organizing APPEX London 2006, with excellent results.

It is a pleasure to acknowledge the help of IHS (especially Pete Stark) for its Global Forum, the ABN-AMRO financial institution for their Financial Forum and the International Pavilion in arranging international exhibitors.

We hope APPEX London will become the international equivalent of NAPE.

After APPEX London, John Brooks and I spent a couple of days with Andrew Hurst and his colleagues and students at the University of Aberdeen. We were particularly

See **President**, next page

Ballots Headed for Members

The AAPG House of Delegates overwhelmingly approved a proposed Constitutional change, and now members will decide if the Association will have two vice president positions – one for U.S. Sections and one for international Regions.

Active AAPG members will soon be receiving information and a ballot and legal information concerning the proposal.

Online voting is also being made available. Members will – or already have – received e-mail information concerning the issue.

The proposal calls for changes to Article V of the Constitution, and will allow for seven members of the Executive Committee (the HoD Chair also is a voting member of the EC).

The Constitution amendment vote was passed overwhelmingly on a "stand-up" vote during the HoD meeting at the annual convention in Houston. A subsequent vote accepting a working adjustment in the Bylaws, which also must be changed to accommodate the Constitution revision, passed 178 to 5, with one abstention.

The Executive Committee previously had voted unanimously in favor of sending the proposal to the membership.

It will take a two-thirds majority of members to approve the Constitutional change, and it must be completed by June 29. ❑

President

from previous page

delighted to have a morning meeting with representatives of the very active community of independents now operating in the North Sea, out of Aberdeen.

On March 11, I returned home to Austin after an absence of four weeks – but two weeks later I flew to Bahrain for the GEO 2006 conference convened by AAPG, EAGE and Arabian Exhibition Management (AEM), under the patronage of H.H. Shaikh Khalifa bin Salman Al Khalifa, prime minister of the Kingdom of Bahrain.

More than 1,400 delegates attended about 290 technical papers and poster presentations.

Well-deserved thanks and sincere recognition to Abdulla Al Naim, Saudi Aramco, general chair; Ibrahim Al-Ghambi, technical program chair; Shivaji N. Dasgupta, oral sessions co-chair; Ralph M. Bridle, poster sessions co-chair; Pinar O. Yilmaz, management session co-chair; Robert Ley, short course co-chair; Bob Lindsay, field trip co-chair; Fernando A. Neves, judging co-chair; and Thereza Ward, guest activities co-chair.

Conference Liaison Hassan Al-Husseini served with special distinction and effectiveness in Bahrain. AAPG staff Sandy Hensley and Brenda Cunningham were instrumental in making GEO an outstanding success.

Voting Deadline Draws Near

Have you voted?

The voting deadline for 2006-07 AAPG officer candidates will arrive on May 15.

Members can mark and return the ballots that were mailed to them earlier this year, or electronic voting is available online at www.aapg.org.

The site contains the seven-person officer slate and all biographical information, plus the candidates' statements of why they are standing for office.

Electronic voting will remain available until voting closes and ballots are counted on May 15. ❑

* * *

When I began my term as AAPG's 89th president I was determined to "get out among the members." By the time June 30 rolls around I will have traveled more than 120,000 miles on AAPG's behalf, speaking to 18 professional audiences in all six U.S. Sections; 18 professional audiences in three International Regions; and 21 student groups in the United States, Europe, Middle East and Asia-Pacific regions.

I estimate that my AAPG messages during FY 2005-06 reached more than 4,000 professional geoscientists (at least 2,000 of them AAPG members) and more than 1,500 geoscience students.

Optimism is high among petroleum geoscientists for a sustained period of intense global E&P activity. It is gratifying to see smiles on so many faces, and excitement manifested in conversations and in meetings. The world needs our skills and talents, and skilled geoscientists are in short supply.

Reflecting on all this travel, all these meetings and conferences, all these warm welcomes and new friends, I realize that AAPG's high reputation results from fundamental values that make us unique among professional societies:

✓ We are a professional organization, not a trade association, and membership requires the approval of our peers.

✓ We are dedicated to practicing and sharing sound, responsible, state-of-the-art geoscience in the search for energy resources.

✓ Through the many conferences, exhibitions and publications that we facilitate, we acknowledge and celebrate the necessary marriage of geoscience with enterprise and commerce in the global business of bringing energy to the world.

As president of AAPG, I am enormously proud to represent such an organization.

* * *

Recommended reading: Two new books for Americans trying to understand where they came from, why they've been successful and where they're going, and for non-Americans trying to understand America.

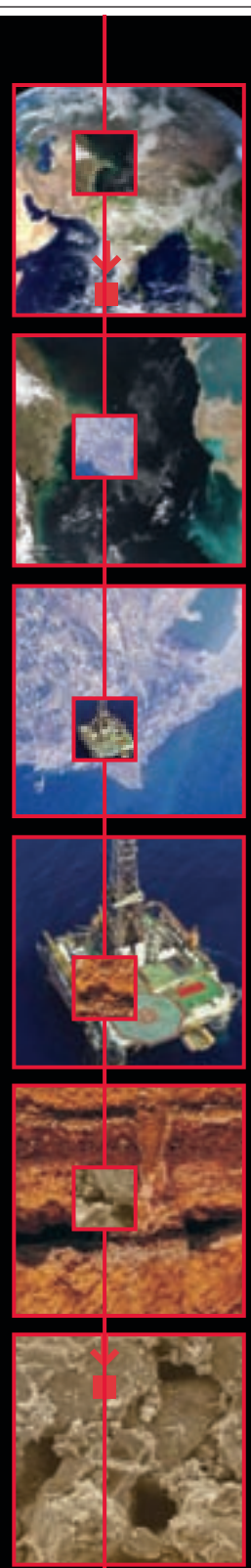
Best read in the order listed here.

❒ *The Victory of Reason: How Christianity Led to Freedom, Capitalism and Western Success*, Rodney Stark, 2005, Random House – The evolution of capitalism and the political and cultural conventions that nurture and sustain it.

❒ *Who Are We: The Challenges to America's National Identity*, Samuel P. Huntington, 2004, Simon & Schuster – The four tenets constituting the historical American identity and their fate in the 20th century by a distinguished American scholar.

Read them, you'll like them!

Onward!



Pacific Region, U.K. Venues Visited

Tour Unveils Opportunities

Writing the April President's Column from a hotel room in Beijing, China, AAPG President Peter R. Rose was in the middle of a nine-city, six-country tour that took him from Adelaide (Australia) to Aberdeen (Scotland), speaking to geologists there and in stops in between.

In making his second international tour in four months, the overall theme for the visits to the AAPG Pacific Region was "sponsorship for AAPG memberships and possible joint ventures – from meetings to publishing."

In November, Rose had returned from a four-week, eight-nation AAPG presidential tour in central and eastern Europe and the Middle East. The late winter trip to the Pacific Rim was book-ended by stops in London, which began with a lecture at International Petroleum Week, sponsored by the Energy Institute, and ended at AAPG's APPEX London prospect and property exhibition.

Talks to students at Aberdeen University in Scotland provided a capstone for the tour that saw Rose making numerous presentations – sometimes back-to-back lectures – over the course of 26 days.

Other venues included Perth, Australia; Kuala Lumpur, Malaysia; Beijing, China; and Delhi and Mumbai, India.

Among the groups with whom Rose met were the Petroleum Exploration Society of Australia, the Indian Association of Petroleum Geology Chinese senior technical managers (PetroChina, Sinopec and CNOOC) and the Kuala Lumpur Exploration Society. The Australia visit also included meetings with the organizers for the upcoming AAPG International Conference and Exhibition, to be held in Perth Nov. 5-8.

Dr. Jia Chengzao, vice president of PetroChina Co., presents Pete Rose with a Chinese watercolor scroll. Right: Pete Rose with Yazid B. Mansor, senior exploration manager, Carigali, and Robert Wong, senior manager-basin studies, Petronas.

Above: E&P Meeting – Pete Rose with Santos geoscientists in Adelaide, Australia.

Left: Geoscience students at a Pete Rose lecture, Malaya University, Department of Geology, Kuala Lumpur, Malaysia.

Additionally, Rose gave back-to-back lectures at two Chinese universities, the University of Malaya and Imperial College, London. At the University of Malaya, Professor Dennis Tan said a large group of students signed up for AAPG membership and a student chapter will petition for charter.

Rose also met with and made presentations to high-level industry executives at every stop, including meeting Mr. Subir Raha, chairman, and Mr. D.K. Pendes, director (exploration) of ONGC, the state oil company of India.

"In talking to the companies, there was full awareness that globalization is in full gallop," Rose said, "and there are abundant opportunities for international participation by companies and consultants."

After the Pacific Region tour, Rose wasn't finished for the month, however. Next on the agenda was a trip to Manama, Bahrain, site of GEO 2006 for the seventh annual Middle East Geoscience Conference and Exhibition, organized by AAPG and the European Association of Geoscientists and Engineers (EAGE) and hosted by the Dhahran Geological Society, which drew about 3,000 registrants.

"It's clear the Middle East is hungry for the kind of venues we can provide – and we have good partners, EAGE and AEM (Arabian Exhibition Management)," Rose said.

"We (AAPG) must follow through on these opportunities if we are to create a permanent and substantial overseas presence." ❑

Explorers Tap London Market

AIM Offers Venue for Financing

By LOUISE S. DURHAM
EXPLORER Correspondent

Have money, looking for oil and gas deals and young companies positioned to grow.

This statement no doubt would make for appropriate ad copy given the current highly charged state of the oil and gas industry.

In fact, the money folks are all over the landscape these days. And they're offering a mind-boggling array of financing vehicles – all of the usual and some not so well known.

One of the not-so-familiar sources of capital for smaller companies is the AIM (Alternative Investment Market) on the London Stock Exchange.

If you've been depending on private capital and project financing to grow your company, AIM may be the public vehicle to steer you to the money needed for your company's future. But bring along a good business plan, which will figure prominently in your success with investors once you're listed in the marketplace.

Unlike the U.S. Nasdaq, AIM is a self-regulated market. It offers small companies access to institutional investors and hedge funds that are comfortable with high-risk ventures such as exploration plays, recognizing this can lead to high rewards.

"The appetite for companies sub-$100 million U.S. is greater here," said Scott Richardson Brown, associate partner at Oriel Securities, a London-based corporate and institutional broker. "AIM takes companies of most any size, usually $10 million and above," Brown noted, "and I've seen companies as small as $2 million come to market."

Trusting the Nomads

Before you decide it's just too complex to go into the public venue, relax. Relatively speaking, the AIM process is fairly painless – and it's faster and reportedly about half the cost of listing on the Nasdaq.

Expediting the process is the group of financial advisers, otherwise known as nominated advisers, or "Nomads." They ensure all the rules are followed and, among other services, provide a sort of hand-holding service – albeit a sophisticated hand – for the listing company.

"The Nomads provide advice and guidance for the company," Brown said. "Also, they must do due diligence and regulatory work to ensure the company can pass the rules and regulations.

"Besides the Nomads, you need a broker to provide research and support and raise money for you as you need it," Brown said. "You can come to the market with a very small market cap, but afterward you need to build up liquidity and depend on your broker to keep investors in the market informed on how you're doing."

Brown emphasized it's important to justify why you're coming to London – particularly if the company is based in Houston, for instance, and maybe drills only in the Rockies and can't get funding in Houston or New York.

Be prepared to make a number of convincing speeches to advisers and Nomads.

Once listed, it's imperative for the company to deliver on what it said, and one of the drivers to help ensure this is not to overprice the issue, Brown cautioned. This leaves nothing on the table for the investors coming in and leaves the company hostage to fortune if it doesn't do as well as thought.

Trying Something New

The AIM market has attracted rising interest from E&P companies worldwide in the last couple of years owing to the dramatic increase in industry activity.

It caught the attention of Houston-based Frontera Resources, which has been around since 1996, doing deals via private equity and project financing.

That's all changed.

Recognizing the opportunity offered by public equity markets, Frontera launched an IPO on the AIM in March 2005.

"We raised about $88 million U.S.," said Steve Nicandros, CEO at Frontera. "It was a good experience, largely because we had a good business plan to take to the market, and we had a good underwriter in Morgan Stanley, which also is our Nomad.

"We went to the market to raise capital for our drilling program and found AIM to be the most efficient way to raise new capital," Nicandros said. "When you dig into the AIM market, it's a huge market with a lot of institutional investors looking for good business plans to invest in that have a significant amount of upside associated with them that maybe is not realized in the stock price.

"It's a very visible market for growing companies like us to access capital," Nicandros noted.

There's been talk that one reason to list with AIM is to avoid the time consuming, costly Sarbanes-Oxley, a 2002 corporate governance law.

Not necessarily so.

"You can't avoid this as an American

continued on next page

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company," Nicandros said, "and there are some good things in place there that are a good idea to follow. You're subject to certain elements of that requirement even on AIM."

Time for Good Ideas

This is not the case with Benchmark Oil & Gas, which operates close to Houston.

"We merged with a Swedish company in 2001," said Robert Pledger, president, "so we're taking a Swedish company public. Benchmark Oil & Gas AB is going to the market, which is our parent company.

"Sarbanes-Oxley in the U.S. doesn't apply to us," Pledger said, "but each country is beginning to adopt stringent and difficult reporting requirements. For instance, in Sweden where we sign our annual report, we are saying we have personal knowledge of what goes into that report regarding financials and so forth.

"There is no corporate shield in Sweden," Pledger said. "You are personally liable for your disclosures, and you must know what you're doing."

Benchmark is working with a brokerage house to get listed on a Swedish exchange. The brokerage is one of the founders of the AIM exchange, and Benchmark is considering the possibility of a dual listing. Pledger noted AIM opens up a much larger population to get exposure. Whether a single or dual listing, they will be located where market makers are interested in the company.

Pledger makes a good case for getting into the public venue.

"Most independents spend 80 percent of their time looking for money to do what they want to do and 20 percent of their time doing what they want to do, which is find oil and gas," he said. "With a company in the marketplace with underwriters and market makers, you can go with secondary offerings, you can float bond issues, you can put together joint ventures that give people the ability to have some collateral if they loan money to the company other than owning assets of the corporation.

" I've never met an independent who was idea restrained; they've always been capital restrained."

"This has taken a lot more effort than originally thought," Pledger emphasized. "But it will accomplish a goal I've had, which is to create liquidity and provide us the financing to do things we want to do.

"I've never met an independent who was idea restrained; they've always been capital restrained," Pledger said. "This gives us an opportunity to change that position."

Servicing the Servers?

Although the AIM market is attracting increasing numbers of E&P companies, this apparently is not the case with oil service companies. But this may be about to change, starting with Global Geophysical Services.

For now, Global is engaged in private equity placement on the domestic front, which reflects the early stage the company is in, having become operational early in 2005.

"We're considering AIM," said Craig Murrin, vice president, secretary and general counsel at Global. "When we have more earnings history and get to a point appropriate to consider ways to give existing shareholders liquidity as well as raising some more money, we will look at it very closely."

Mirren emphasized the important role of the Nomads for a company like Global.

"For our company where all our management is strong on the operational side but little experience talking to the markets," Mirren said, "it's something quite valuable.

"Going forward, an AIM listing would make it possible for us to set up an option plan and recruit people in the future with options and not by issuing shares," Mirren noted. "It will increase our business opportunities because we'll be publishing financial statements and people will be able to see our financial condition and know they're dealing with a substantial entity."

Line Up the Ducks

As with most things in life, a seemingly unlimited upside has a downside counterpart of one kind or another, and AIM is no exception.

"London is not a market that will invest in just anything," Brown cautioned. "You need a good story and need to provide assurance you can deliver what you say you will.

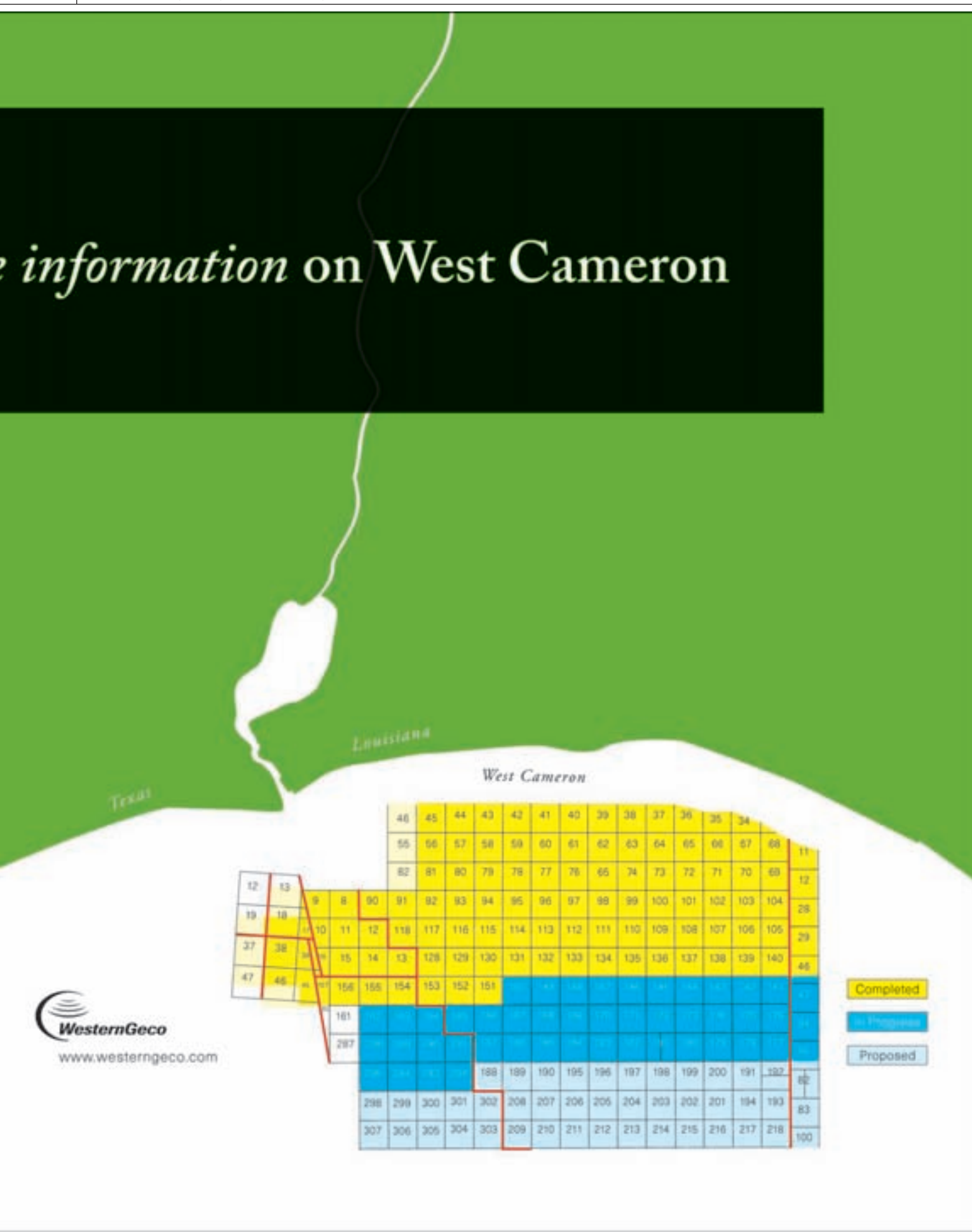
"Liquidity will be tight when you first come to market," Brown noted, "and your directors will be locked in, unable to sell any shares for 12 months – and they often own a large share of the company."

The savvy players know they must come into the market with all their ducks in a row.

For instance, Nicandros noted they were put through the rigor of a Nasdaq listing by Morgan Stanley to be able to put themselves into the marketplace.

Because there are no strict requirements for, say, "x" years of revenue and earnings, the occasional "overnight" listing does happen – and potential investors must do some serious homework before investing in companies on the AIM.

"There have been a couple of small traffic accidents on AIM in the last few years," Nicandros noted. "But those things slip through once in a while." ❑



News Handled Passively

GOM Quake Bolsters Theory

By BARRY FRIEDMAN
EXPLORER Correspondent

For those of you who missed it – and you weren't alone if you did –there was an earthquake in the Gulf of Mexico this past February.

That it may fuel ongoing debates on issues ranging from long-term geo-political concerns to safety of area residents to a new understanding of the geologic footprint of the entire region is one story.

That it happened at all is another.

What we do know is this: At around 10 p.m. on Friday, Feb. 10, a 5.2 magnitude quake, approximately 160 miles south of New Orleans, struck in the Gulf of Mexico. Its recorded depth was five kilometers.

What we don't know is why.

The quake, while noted by academia and those who get paid to notice such things, was barely mentioned in the mainstream media – it received a mere two paragraphs on MSNBC online.

Jack Reed, a retired Texaco geologist/geophysicist and something of a Don Quixote on the issue of active tectonic plates in the Gulf of Mexico, wasn't surprised by the quake or, for that matter, the reaction to it.

" These faults are moved largely because south Louisiana is very unstable ground. It's kind of oozing in the Gulf."

"It happened 123 miles offshore – who cares?" he said, reflecting the media and public's apathy rather than his own.

But according to Louisiana State University geologist Roy Dokka, who should care are the people of the region. Saying it was one of the most significant quakes to hit the region, Dokka told a local New Orleans television reporter that it should provide a warning to erosion officials that Louisiana's coastline is shifting fault lines throughout the region.

"These faults are moved largely because south Louisiana is very unstable ground," Dokka said. "It's kind of oozing in the Gulf."

An Active Topic

Reed, this time reflecting himself, has a more technical explanation.

"Simply stated, the linear Cretaceous shelf edge was the separation point of the Gulf of Mexico plate from North American plate," he said.

According to Reed, this movement started near the end of the Early Cretaceous and, to date, the plate has moved south. The exterior salt basin was formed in the ever-widening gap between these plates by allochthonous salt pressure forced from under the moving plate into the gap.

The trailing edge of this south moving plate is undergoing tensional forces accompanied by outward and upward moving salt into the basin, Reed explained, which creates fractures (faults) along the trailing edge of the plate. These fracture lines are filled with the highly pressurized salt.

This movement, in turn, separates fault blocks from the moving plate, which are then suspended in the ever-expanding exterior basin salt mass. This action, or something very similar, is the source of the earthquakes that occur in the northern Gulf, according to Reed, who noted how these quakes all cluster along the trailing edge of the south moving plate.

"This action, or something very similar, is the source of the earthquakes that occur in the northern Gulf," he said.

Moreover, for Reed the quake proves that "this is a new piece of evidence for a tectonically active Gulf.

"This MS=5.2 quake alone does not prove the Gulf is active," he said, "but when it is placed in line with other evidence, it's a major nail supporting the active Gulf structure."

Reed, who is retired and admittedly not an expert on earthquakes, has theorized for years there was an active tectonic plate in the region that, among other things, is the likely origin for the New Madrid Fault that parallels the Appalachians and connects with the St. Lawrence seismic center, located in Canada (see October 2002 EXPLORER).

Asked whether we will see a significant quake along New Madrid, he says, "It's not a matter of if, but when."

See **Earthquake**, page 21

From the 'Seam', Not the 'Bed'

Coal Gas Tapped in Louisiana

By LOUISE S. DURHAM
EXPLORER Correspondent

Given the revved-up drilling activity targeting tight gas deposits, oil shales, coal bed methane (CBM) and the like, unconventional hydrocarbons are increasingly becoming conventional.

In some instances, it's the locale that may be considered unconventional.

Consider coalbed methane drilling for example.

One day in the not-too-distant future, Louisiana may join the ranks of such noted CBM producing regions as the San Juan Basin and the Powder River Basin.

Indeed, there are a lot of believers – oil and gas folks and others – who think Louisiana may soon be a source of significant coalbed methane production.

"There's quite a lot of coal seam gas in the Gulf Coast area. It's just a matter of how to produce it."

But watch your language; those in the know call it coal seam natural gas (CSNG).

"For a lot of people, methane has a bad connotation," said Diana Chance, manager of Donner properties and a recognized longtime promoter of CSNG drilling in Louisiana. "In Louisiana, we're calling it coal seam natural gas, because that gas truly is like the gas that comes out of the other Wilcox wells in North Louisiana."

Coal has been mined at the surface since 1985 in central northwestern Louisiana in DeSoto Parish where the Wilcox Group (Paleocene-Eocene) crops out, according to Clayton Breland Jr., assistant research professor at the Louisiana Geology Survey Basin Energy Research Section (formerly the Basin Research Institute). He noted the coals are generally confined to the lower Tertiary Wilcox Group.

Coal beds in North and Central Louisiana are widespread, extending from Toledo Bend westward to the Mississippi River, according to Jim Welsh, Louisiana Commissioner of Conservation. Breland noted they comprise a portion of the Gulf Coast Tertiary Coalbed Methane Basin, which covers parts of seven southeastern states.

Analogous Factors

The first CSNG production in Louisiana occurred in 1989 in Caldwell Parish in a well that was plugged and abandoned the same year.

Interest in the potential to economically recover gas from the coal began heating up in the late 1990s, ultimately kick-starting some drilling activity, according to Chance. She noted that Devon, King Drilling and the late John Echols – a noted Wilcox authority at the former LSU Basin Research Institute – all drilled wells in 2002 to test the commercial potential of the CSNG.

Interest and activity in the coal escalated to the point that Mark V Petroleum spearheaded an effort to establish the first production units for CSNG in Louisiana. Fifteen thousand acres have been unitized in the form of three units of approximately 5,000 acres each in Caldwell Parish.

"In this part of the Wilcox from 1,850 to 3,200 feet, there are three coal seams," Welsh said, "and the area has been unitized as a whole zone.

"The lower zone is called the Reynolds coal seam, which is bituminous and about 30 feet thick," Welsh noted. "The seam is encased above and below by shale, which is different from the upper seams with sand above and below.

"We think the encapsulating shale will help in retarding the salt water from moving into the perfs."

It is noteworthy that the Louisiana coals are comparable in age to the rocks producing coal seam gas in the Powder River Basin in Wyoming.

"The testimony at the (unitization) hearing was positive, comparing the Louisiana area with a known successful area," Welsh noted. "The number crunching looked pretty good.

"There's quite a lot of coal seam gas in the Gulf Coast area," Welsh said. "It's just a matter of how to produce it."

When queried as to whether Mark V is in the forefront of the CSNG development in the state after successfully pushing for unitization, company president Frank Spooner replied wryly: "We're spending money."

In fact, Mark V has three wells on production and set pipe on a fourth hole in mid-March.

All wells are in the Reynolds coal, which Spooner noted has two to three times the gas content of the Powder River Basin coal. The wells range between 2,400 and 3,000 feet deep and cost $300,000 to drill, complete and frac.

See **Louisiana**, page 21

Students Integrate Maps, Data

Fractures: A Deal Maker or Breaker

By SUSAN R. EATON
EXPLORER Correspondent

Fractures in subsurface geological formations play a critical role in the development of permeability, enhancing deliverability of oil and gas to well bores. The detection and characterization of fractures – including their orientation, density and age of generation – represents not only an art form, but a rigorous study in structural geology.

In Alberta's Western Canadian Sedimentary Basin (WCSB), where oil and gas companies have shifted their exploration focus to tighter reservoirs in the foothills and the deep basin, the presence of open fractures can make – or break – a commercial well.

Despite the economic importance of fractures, most geologists working in Calgary's downtown oil patch practice "desk-top" geology, creating maps of the subsurface but rarely visiting the field to measure fractures in rocks outcropping at surface.

During the past two decades, the loss of in-house research and development capabilities in the global oil and gas industry has left a void in technical expertise in structural geology. However, a unique R&D partnership, based upon mutual synergies, is developing between the oil and gas sector and academic institutions across Canada.

Oil companies supply proprietary data sets and badly needed research money; in turn, universities procure masters and doctoral graduate students with professorial supervision.

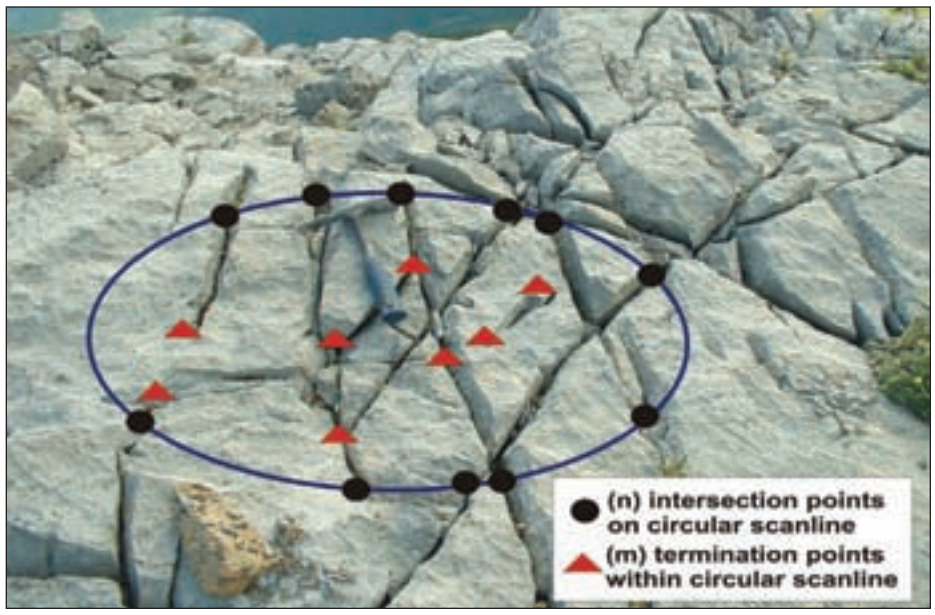


Photo by Greg Feltham, University of Calgary

Circular scanline and window method for eliminating orientation bias in fracture density and intensity determinations in the field, illustrated on fractured Mississippian carbonates in Alberta's foothills.

Deborah Spratt is a professor of geology at the University of Calgary's Department of Geology and Geophysics, specializing in structural geology and studying fractures from "the micro-scale to the seismic scale to the mountain-building scale."

Her academic research is focused, in large part, on predicting where open fractures will deliver oil and gas to well bores from subsurface reservoirs.

"A lot of oil and gas companies have given up on fractures," Spratt said, "because, with fractures, you really need time, which is what most oil companies don't have.

"Graduate students have time."

Freedom from Bias

Spratt's research in fracture characterization falls under the umbrella of the Fold-Fault Research Project (FRP), which she co-founded in late 1994 with Queen's University in Kingston, Ontario. Since its inception, the FRP has successfully attracted industry funding and participation – in 2005, the consortium included 15 international and Calgary-based oil and gas companies and five industry software companies.

Integrating field mapping with subsurface seismic and well bore data, Spratt is studying the role that fractures play in oil and gas exploration and production in the foothills. She's currently investigating the Pardonet, Baldonnel and Belloy formations in northeastern British Columbia, and in the Turner Valley Formation in central Alberta.

The academic environment affords both professors and graduate students the luxury of examining the big structural picture from an unbiased perspective.

Malcolm Lamb, one of Spratt's doctoral candidates, is in his third year of research. Lamb, an AAPG member, is a part-time graduate student – that's because his "day job" as the geology manager for Schlumberger keeps him very busy.

With one foot planted firmly in each camp, Lamb recognizes the value of the academic research being conducted by the FRP.

"Industry has been in a holding pattern for a long time," he said. "It's created a very competitive playing field between all companies – they don't like to share information."

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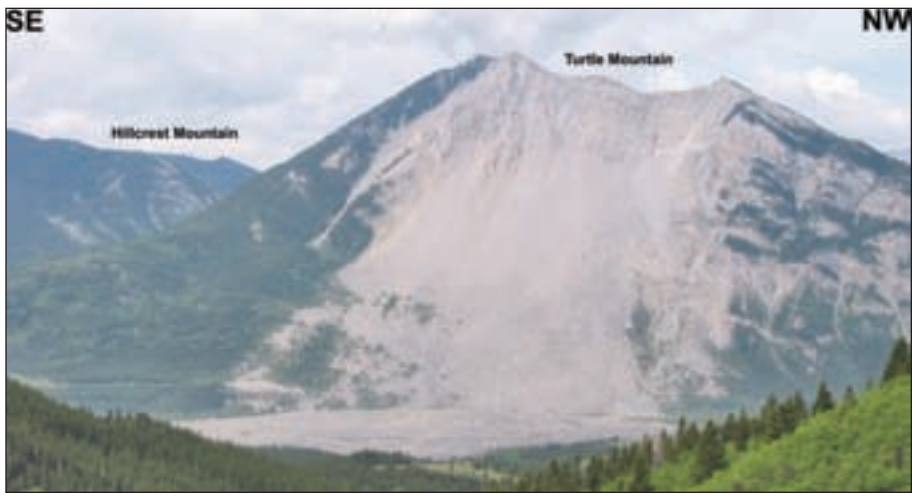
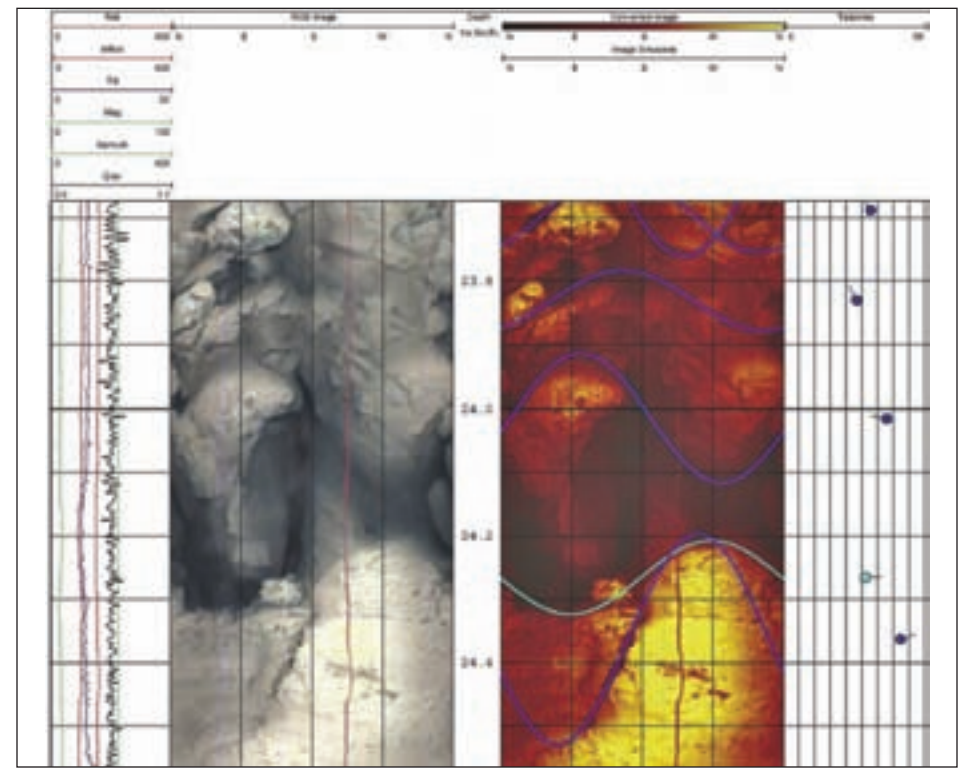


Photo, graphics courtesy of Deborah Spratt, University of Calgary

Above: Turtle Mountain Anticline, visible in Turtle Mountain and Hillcrest Mountain. Such steeply dipping to overturned eastern limbs and shallowly dipping western limbs are common in anticlines in southwest Alberta. On Turtle Mountain, most of the steep limb was removed by the "Frank slide."
Right: Example of the Turtle Mountain borehole camera image (left), converted image logs and dip vector "tadpole" plot (right). The image shows wide open "major fracture" (light blue) and other fractures (dark blue) imaged in a portion of the Turtle Mountain borehole.



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Lamb describes the FRP as "an awesome venue, a really good sharing environment," and institutions like the University of Calgary, he adds, play a huge role in dissemination of information to the oil and gas industry.

"There's a blend of academics advancing knowledge while serving industry needs and providing economic benefits," Lamb said of the balance that researchers continually strive to achieve.

Wearing his graduate student's hat, Lamb likes the artistic freedom to look objectively at a structural geology problem.

"I have absolutely zero stake in whether it works," he said. "I can be completely unbiased."

Random Investigations

Through joint ventures with industry, the FRP's researchers have access to all the tools available in the structural geologist's modern-day tool kit – downhole wireline logs, downhole optical sensors or cameras, cores, thin sections, outcrop studies, sophisticated visualization software, aeromagnetic data and 2-D and 3-D seismic data. These diagnostic tools have been developed by the oil and gas industry, but they are being used in a slightly different way by university researchers.

"We're not throwing out data," Spratt said. "Even if our data comes from a dry hole, you can learn something from it … If you only have two wells, you might think that fractures are random."

Spratt's investigations have led her to just the opposite conclusion; she doesn't believe that fractures are randomly distributed.

"We're looking for populations of orientations of fractures, and actually finding some that you wouldn't predict," she said.

Spratt describes discovering one extra set of fractures in the foothills of Alberta and British Columbia. In some cases, she says, this newly documented fracture set can be the dominant one in sedimentary strata, adding significantly to the permeability and commerciality of oil and gas-bearing reservoirs.

Related to deep-seated structures that pre-exist the formation of the Rocky Mountains, this extra set of fractures is not readily predicted with seismic data. But maps produced from aeromagnetic data indicate the existence of older, structural lineaments that parallel this extra set of fractures discovered by Spratt in the WCSB.

Can You Predict Fractures?

During the summer of 2004, Spratt and Lamb conducted field studies on top of Turtle Mountain, located in the Crowsnest Pass of southern Alberta. Infamous for spawning the "Frank slide" in 1903, Turtle

See **Fractures**, next page

Student Expo Sets Records

A record number of students and company sponsors participated in the recent AAPG/SEG Spring Break Student Expo at the University of Oklahoma.

The March event attracted 146 students from 25 states – plus one student from Venezuela – representing 41 universities. Helping to make the Expo possible were 29 company sponsors – including the AAPG Foundation – and five event sponsors.

The Expo featured formal employment interviews, poster competitions and energy industry exhibits, as geoscience students and energy industry representatives met to discuss energy career options.

Officials said that "everyone who attended" got the chance to talk to company recruiters during the Expo. Schlumberger alone interviewed more than 60 students.

Poster winners, who were honored at the closing awards ceremony, were:

Geology

❒ First place – **John Ceron**, University of South Carolina.

❒ Second place – **Nathan Boersma**, University of Idaho.

❒ Third place – **Khurrum Ahmed**, University of Buffalo.

Geophysics

❒ First place – **Ashwani Dev**, University of Texas at Dallas.

❒ Second place – **Ahmed Alahdal**, University of Oklahoma.

❒ Third place – **Heidy Correa**, University of Oklahoma. ❑

Fractures

from previous page

Mountain unleashed 82 million tons of highly fractured limestone, killing 70 people in the coal mining community of Frank.

In 2003 – exactly 100 years later – modern-day science was brought to bear when a chunk of rock fell off the highly fractured front face of the mountain. In response, the FRP initiated a geological and geophysical monitoring project designed to predict future slides.

"I've seen fractures on the top of Turtle Mountain … ones that you could drop a mini-van into," Spratt said.

To kick off the project, the FRP flew a drilling rig and well-logging equipment, via helicopter, to the top of the Turtle Mountain. Drilled with air and foam, the well was designed to reach a depth of 200 meters – but drilling was stopped at 61.3 meters, after encountering lost circulation into large, open fractures. According to Lamb, the researchers feared losing the drill rig into a void space.

The Turtle Mountain well bore was logged, using an Advanced Logic Technology Obi40 digital optical televiewer. The tool consisted of a directional device and an imaging device, providing a 360-degree, continuous picture of the borehole's surface with resolution up to 0.5 mm and 720 pixels of azimuthal resolution.

A multitude of fractures and vugs were documented in the well bore, including several large, open fractures.

The subsurface data from the well bore was correlated with seismic data and tied back to the surface, using field mapping, ground penetrating radar images and aerial photographs.

"It's unusual to drill holes into surface structures that don't produce (oil and gas)," Spratt said, describing the unique value of the data set collected from the Turtle Mountain project. The formations exposed at surface at Turtle Mountain – when buried at depth – produce prolific quantities of natural gas elsewhere in the foothills of southern Alberta.

By looking at the big picture – and by combining her surface field studies with "real life" well bores and seismic data – Spratt hopes to be able to predict the sweet spots for fractures.

"Rather than thinking of each well as its own case study," she said, "is there a unifying way to predict fractures?"

The Mystery Data Sets

Don Lawton, co-founder of the FRP and a professor of geophysics at the University of Calgary, is trying to answer the same question. Lawton, who holds the chair in Exploration Geophysics, is looking for "any diagnostic, robust signatures" in seismic data in the foothills that point to fractures.

"We would like to use Spratt's measurements and observations to validate what we see in the seismic," says Lawton, an AAPG member. "We can only see big things; she looks at small things. But, we can overlap our scales."

For example, a seismic wavelength is on the order of 100 meters; in contrast, Spratt measures fractures in zones ranging from less than one meter to 50 meters wide. According to Lawton, surface field measurements of fractures and subsurface measurements in well bores provide the necessary "ground truthing" for his seismic investigations.

"We see changes in seismic velocity with respect to a change in the orientation of fractures," Lawton said.

Velocity changes, he added, originate from changes in the orientation (azimuth) of fractures relative to the source and receiver layout for seismic data acquisition in the field. Additionally, Lawton has noted changes in seismic reflection strengths or amplitudes derived from fractured layers of rock.

He calls this phenomenon "AVAZ" or "Amplitude Variation with Azimuth."

Lawton and his FRP graduate students are testing their AVAZ theories on two "mystery" 3-D seismic data sets, acquired by the oil and gas industry somewhere in the foothills of the WCSB. A well-recorded 3-D data set, he explains, contains azimuthal information from 0 to 360 degrees. By extracting different azimuthal subsets (0 to 90 degrees versus 45 to 90 degrees), Lawton is attempting to correlate differences in seismic azimuths to fracture orientations.

To date, his research has yielded "tantalizing results."

"It's just at the beginning of the "S" curve of the AVAZ technology," Lawton said. "In theory, it should work. It's just a question of the magnitude." ❑

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There is a New Wind Blowing

Oilmen Looking at the Alternatives

By DAVID BROWN
EXPLORER Correspondent

Toby Carleton of Midland, Texas, spent over 50 years in the oil business.

Along the way, Carleton held a number of important industry positions and served as AAPG president in 1994-95.

Today, he's a director and part owner of a company that maintains and repairs large wind-power turbines, machines capable of producing a megawatt of electricity every hour.

Why did Carleton make the move to alternative energy?

"It's part of the future," he said simply.

President George W. Bush now apparently wants the United States to slash its dependence on oil imports, calling for a significant switch to alternative energy use.

Other experts see new energy as a necessary supplement to traditional, fossil-fuel energy sources. Growth in the oil-and-gas energy supply won't come fast enough to keep pace with the world's rapidly increasing demand, they say.

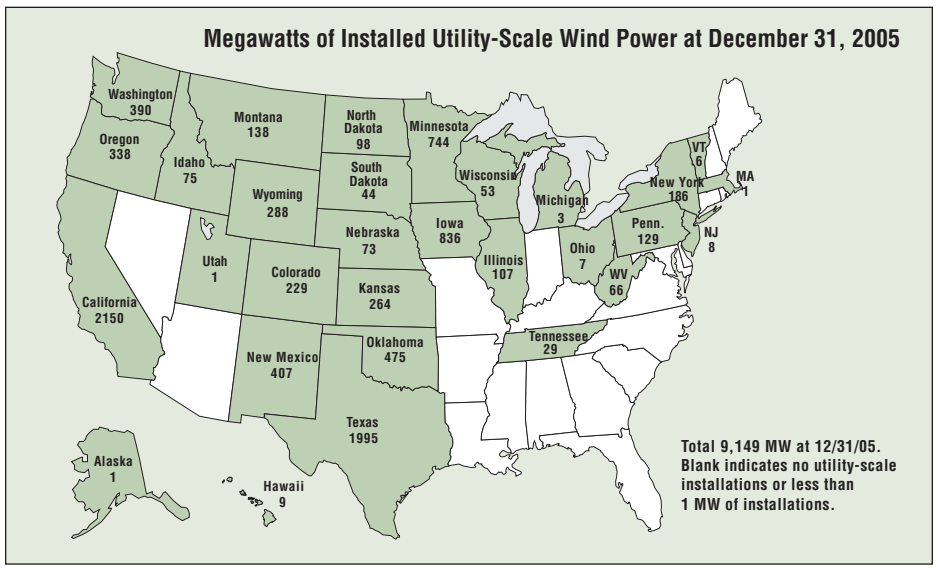
If we do live in a world where 15-20 percent of future energy use will be supplied by alternative sources, the oil industry itself may see a major transformation.

Steven Koonin, chief scientist for BP in London, looks for organic-feedstock biofuels to stretch the vehicle fuel supply.

And not in just a minor way.

Koonin said biofuels eventually could provide up to 30 percent of vehicle fuel consumption. But he also expects gasoline, diesel and other fossil fuels to be around for a long time to come.

"Liquid fuels are not going to disappear. The energy density is just too good," Koonin said.



"One statistic I like to quote is that when you fill up your gas tank, you're wielding 15 megawatts of power. That's a lot," he added.

There's also a proven economic path to market and an established delivery infrastructure for hydrocarbon fuels.

"That value chain has been optimized for 150 years," he noted, "and we're pretty good at it."

So Many Options

What Koonin foresees is a developing value chain for biofuels, based partly on better production methods, and partly on bioengineered plants that will contain more cellulosic material for processing.

He thinks those improvements will put biofuels within economic reach of fossil fuels.

"If we go to cellulosics and improve the efficiency (of processing), we can get down pretty close. It's not a crazy thing to be doing," he said.

Koonin divided future fuel needs into two areas: fuels for transportation, and fuels for power generation (see related story, page 19). Alternative energy sources can have a role in both areas, he observed.

"For power there are really only three things that matter, if you look at generation and heating. One is nuclear. The second is carbon sequestration – not quite proven yet, but very plausible," he said.

"The third, smaller in my opinion, is wind. And then you run out of these things that are in economic competition," he noted.

In that picture, wind power has several advantages over nuclear. For example:

✓ It's readily available.

✓ It's clean.

✓ It doesn't require a billion-dollar reactor.

✓ You don't have to dispose of the waste wind.

Carleton estimated that 3,000 to 3,500 wind-powered turbines are operating within 150 miles of Midland.

It's a promising development for his company, Global Wind Power Services, which also has worked on wind turbines in California, Iowa, Illinois, Tennessee, Colorado, Nebraska and Minnesota.

"We're in the heart of the wind-power industry here in Midland, Texas," Carleton said, "but we'll service them wherever they are."

Everyone Knows It's Wind-y

Carleton got into the service business through a company buyout, when he decided to inject capital into a debt-ridden firm but realized he didn't have enough cash to make it viable.

However, he found two investing partners – also oilmen – to join him in the venture.

"We went into the business thinking there's a big future in it," he said. "All of us have been in the energy business for more than 50 years, but that was fossil fuels."

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The company now has 11 employees, including Junior Yanez, a former wind-farm manager who serves as Global's vice president for operations.

Yanez said the wind-energy business began to boom with the introduction of larger, more efficient second-generation turbines in 1998.

More durable and reliable turbines with microprocessor control appeared a few years later, making wind power an acceptable generation supplement for utilities.

"The more modern turbines came along in the third generation, which were able to produce the reliability that the out-takers were looking for," Yanez said.

In 2005, the wind energy business grew by 35 percent, adding almost 2,500 megawatts of generating capacity and $3 billion worth of new equipment in 22 states, according to the American Wind Energy Association (www.awea.org).

AWEA projects 2006 will be even better, with the industry adding up to 3,000 megawatts.

"Most of the wind farms going in today range from 40 to 120 megawatts with a pretty comprehensive agreement with a utility or out-taker," Yanez said.

A typical new machine in the Midland area stands almost 290 feet tall and has a blade 110 to 130 feet long, Yanez said. Processors can control the pitch of the blade for wind direction and adjust turbine operation for wind conditions.

"What they really are is a big, giant robot, so they can do everything but fix themselves," he noted.

In the United States, wind power still receives tax breaks to improve its competitive position.

"One thing that's made it economic is that there's an investment tax credit of 1.9 cents per kilowatt hour," Carleton said. "That's good

See **Alternatives**, next page

A' Wasteful' Idea

Simple Twist on Old Tech

By KEN MILAM
EXPLORER Correspondent

In the search for alternative fuel sources, AAPG member Paul Comet says he has a low-tech answer.

In the process, the AAPG member thinks his idea could help ease a few other small problems.

Such as: global climate change, waste management and the United States' dependence on imported oil.

Comet (pronounced Ko-MAY) like some others, promotes synfuel generated from waste.

Any organic waste material will do, but Comet, who teaches environmental science at Houston Community College, says agricultural waste offers the best and most plentiful source.

Using the Fischer-Tropp method, dissolved organic waste is steam-heated to become synthetic gas, which in turn is passed over a cobalt iron catalyst and converted to diesel.

Comet says it's a simple twist on an old technology.

Germany used a similar process to convert coal to diesel during World War II. The German patents have been used in South Africa for years.

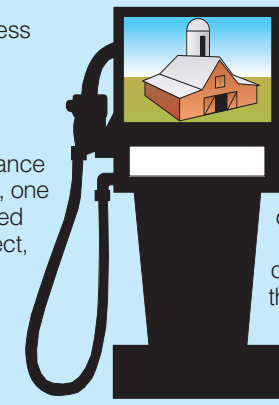
"It's extremely profitable, especially when oil is $20 or more a barrel," Comet says.

The problem with the original method is that coal adds to carbon dioxide emissions in the atmosphere.

"If we use waste, which is returned to the atmosphere anyway, there is no net increase in emissions," Comet said.

"There's less profit, but less damage."

A Workable Idea?



AAPG member David Vance of Arcadis in Lexington, Ky., one of several who have reviewed Comet's paper on the subject, says that "it could be a workable idea."

"It will kill two birds with one stone – waste management, which in its own right is an issue, and it does yield energy," Vance said.

Vance says some pilot projects in the eastern United States employ the same basic technology using poultry waste. That provides a richer, consistent feedstock, he added.

Both men acknowledge major obstacles would have to be faced, not the least of which would be persuading Americans to convert to synfuel.

The U.S. petroleum and automobile industries are pillars on the nation's economy, and both tend to be conservative and slow to change, Comet admits.

But Comet's vision is global.

For starters, he believes cars could be manufactured to be more energy efficient, while fossil fuels still could be used to manufacture plastics and other materials "which would stay on the ground instead of going into the atmosphere."

Should emission credits be used as an incentive, the United States could become proactive in reducing emissions, he said.

Comet is among those who believe global warming is a real possibility, and he believes that geoscientists "should err on the side of caution."

Importantly, Comet thinks the oil industry is the best source for the huge amounts of capital needed to realize the change.

Waste management is not as glamorous as using geology to search for oil and gas, and the technology is not new and exciting, he said, but "it is a valid path to pursue."

Vance points out, however, that infrastructure is a major problem for petroleum-industry involvement in such a vision.

In terms of expertise, the petrochemical industry may be better equipped to pursue Comet's ideas," Vance said.

But Comet is not dismayed.

"We could see something similar to the past, with gas works in each town," Comet said. "I have talked to some large waste disposal companies and they agree it's feasible.

"It's not crazy." he said, "it's do-able."

For more information on this subject, visit the AAPG Web site.

www.aapg.org

Alternatives

from previous page

for 10 years after it's granted."

Also, large turbines require winds in the range of at least 15 miles per hour to operate. Available wind power is proportional to the cube of wind speed, so production falls rapidly as wind speed declines.

And while a 50-megawatt wind farm can be built in less than six months, turbine production has not kept up with demand.

"The market is sold out until about 2008," Yanez said. "That's all the companies, like GE, Vestas, Mitsubishi – all the major companies that produce wind turbines."

Biofuels First Steps

Compared to wind power generation, biofuels production remains in its infancy.

In January, the journal *Science* published a review on the future of biofuels and biomaterials. It reflected the studies of a research team led by Art Ragauskas, as assistant professor in the School of Chemistry and Biochemistry at the Georgia Institute of Technology.

"If you look at where we are as a society, we take very few crops – mostly corn and sugarcane – and just use a portion of that for ethanol," he said.

A better idea is to biorefine high-potential crops for a variety of end products, including biofuels, according to Ragauskas.

"The biorefinery is going to operate like an oil refinery," he said. "You're going to take out selected parts for selected applications."

One common response to development of alternative energy sources is, "We tried all that in the early 1980s and it didn't work." This attitude truly irritates biochemists, who counter, "We haven't been sitting on our hands for 25 years."

A key idea in biorefining is that scientists can modify some plants to produce more mass for biofuel conversion. If that's true, tomorrow's genetically altered green plants will be much more useful than today's crops.

"You should be able to bioengineer the plants to give you more biomass that's amendable for processing into fuel," Ragauskas said.

"And you'd do this in part by improving the efficiency of photosynthesis," he added, because it's not an especially efficient process.

A 2 percent increase in the efficiency of photosynthesis would create an "enormous" addition to plants' usefulness for biofuels, he noted.

In biorefining, Ragauskas said, the food component of a plant would be captured first. Then any part of the plant that could be used for value-added chemicals would be recovered.

"Once you have those materials out, the rest of this biomass has to be targeted for biofuels," he said.

Just as in standard refining, the leftover biomass would be fractionated for reduction. That can happen through either an enzymatic process or a chemical process, Ragauskas noted.

"In reality, I think the two processes will complement each other in the future," he said.

After refining a plant's biomass, even the irreducible residue can be put back into the energy-generation system, Ragauskas believes.

"That's the part that you will probably gasify to get a syngas, and then use that for power generation or further processing for fuel," he said.

Upward limits for biofuel production would be determined by the amount of biomass available from the genetically altered plants, and the amount of plant

See **Wind Power**, page 28

A Mighty Wind? 'It Is Energy'

For long time oilman Paul Strunk, wind energy wasn't much of a stretch from hydrocarbons.

"It is energy," he noted.

Strunk, a past AAPG treasurer and president of American Shoreline Inc. in Corpus Christi, Texas, said the idea of getting into wind farming came to him in a gust.

One day he was visiting the company's production facilities near the Gulf Coast city with Patrick Nye, American Shoreline's vice president of exploration.

"We went over there and the wind was blowing really hard," Strunk recalled. "We said, 'Maybe we should look into wind energy' as kind of a joke."

No joke. The pair developed the initial plan for the proposed Penascal Wind Farm, a 400-megawatt generation facility on a 191,000-acre lease in Kenedy County, Texas.

First, Strunk said, they obtained wind velocity readings to make sure the plan was feasible.

"It's like wildcatting," he said. "We knew the wind blows down here, but we didn't know the velocities."

Then the company began working with environmentalists and arranged for an avian-risk assessment, prior to even applying for a development permit.

Scottish Power subsidiary PPM Energy, a major wind-energy developer, later joined the project, which should begin setting up the first of its 260 generator units next year, according to Strunk.

"I was born and raised down here," Nye said. "One of the worst things going is the coal-fired generating plants," because of the effects of pollution on the Gulf.

"We think maybe in our own small way we're contributing to cleaner energy for this area," he added.

Strunk thinks wind energy will continue its rapid growth as an alternative energy source.

Would his company consider another wind project?

"We're just getting started," he said.

– DAVID BROWN

Louisiana

from page 12

"The future looks good if the wells perform decently," Spooner said. "If we can get them up to 100,000 a day, we'll have a very economic deal. With coalbed, the longer they produce, the better the production gets.

"To get the gas to come out of the coal, you have to de-water it," Spooner noted. "The longer you get water off there, the more you lower the bottom hole pressure, and the gas absorbed in the coal starts coming out of the coal when you lower the pressure."

The lengthy process to reach optimal production explains why the early wells are still considered to be in the testing phase, Chance noted. Even so, they've already served a critical role in this emerging potential new play.

"In North Louisiana, the contention was all the coal was lignite, which we were mining," Chance said. "All thought it was the same coal all across Louisiana, but the early wells tested and proved two significant things":

✓ It's a sub-bituminous, biogenic coal.

✓ Significant amounts of gas are in the coal.

There's also plenty of water to deal with, but that's not tempering the enthusiasm.

"What they're working on now is how to get that gas out of the ground more effectively and less costly," Chance said. "The gas is there, and they're going to make it work.

"Companies have leased or optioned 300,000 to 400,000 acres total," Chance noted, "and I think we'll see a huge massive new play here in the near future."

Given the current struggles of the Bayou State where the budget was battered along with the coastal area by the devastating 2005 hurricanes, a whole new resource play would be very meaningful, providing a badly needed economic boost in a number of ways.

"To develop coal seam natural gas, the spacing is very dense, so this has the potential for thousands of wells," Welsh said. "This would result in many good paying construction jobs in the northern and central portions of our state.

"If the new energy source is economically viable over the long haul, permanent production facilities will be constructed, resulting in new permanent highly skilled jobs," Welsh added. "Service companies … for the oil and gas industry will also thrive, expand and prosper." ❑

Earthquake

from page 10

He is the first to admit, though, that his theory is in stark contrast to others – and still something of a novelty.

"I developed the active tectonic theory – I had to call it something – that is opposite from the passive theory, and, therefore, have had an uphill battle," he said. "Very few people like to admit they are wrong. I know I wouldn't."

Other Theories

This quake may indicate he doesn't have to.

Other explanations are still being formulated, a fact of which Reed became aware when geologists at the University of Texas were, as he put it, "running around like chickens with their heads cut off" trying to come up with an explanation.

There was a report circulating immediately following the quake that since the activity occurred near the huge salt domes where much of the oil and gas is being extracted, Shell Oil helped cause it with its drilling activity in and around its Brutus Field. One report, published in *Pure Energy System News*, attributed the quake to the unsettling of rock formations as a result of extraction of massive quantities of oil, gas and brine.

Reed laughs off this suggestion.

"I think it is nothing more than a theory cooked up by environmentalists," he said. "Of all the thousands of wells drilled, both onshore and offshore, not one has caused anything like an earthquake. Why should it happen now? A 5.2 quake is a significant tremor that releases a large amount of energy and the shift would cover several miles or more.

"There is no way a small, insignificant drilling platform could cause the release of this force," he said, "even though the rig is named Brutus."

For years, Reed has been espousing a view that the Gulf's region resembled the active areas found in the Pacific, and when asked if the current quake proved him right, he said, "Gee, I hope so!"

The conventional wisdom up to this point is that, unlike the Pacific, the Atlantic and the Gulf were passive regions.

February's quake may restart the debate again.

An active Gulf, some maintain, suggests the conditions there are eerily similar to those that brought about the earthquake and tsunami in Aceh, Indonesia.

Reed dismisses this argument, regardless of which theory is ultimately proved true.

"If the passive theory (no tectonics) is correct, then there are no significant lateral or vertical forces to cause earthquakes, he said. "Again, I am talking about the Gulf of Mexico, not the Caribbean," where he does see some similarities.

Reed says the Aceh quake was compressional.

"If the active theory (tectonics) is correct, the forces acting are mostly tensional and not compressional," he continued. "Tensional forces of the trailing edge of a moving plate are considered much weaker than compressional forces of the leading edge." ❑

MORONDAVA BASIN

OFFSHORE MADAGASCAR

- The Office des Mines Nationales et des Industries Strategiques, Madagascar (OMNIS) announces the opening of a new License Round over the Morondava Basin, offshore west Madagascar

- Bid Round closes September 25, 2006

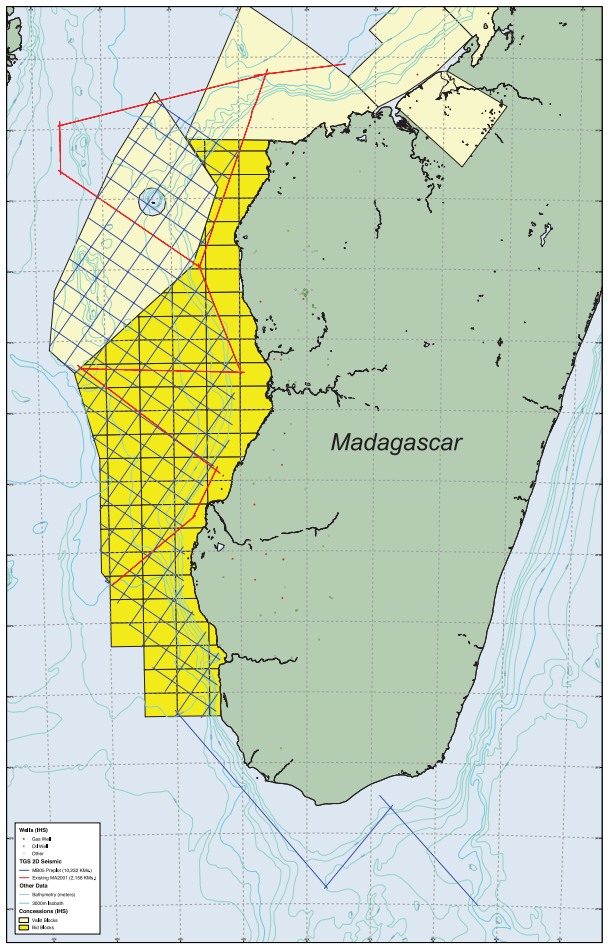
- 10,300 km of new data available April 2006

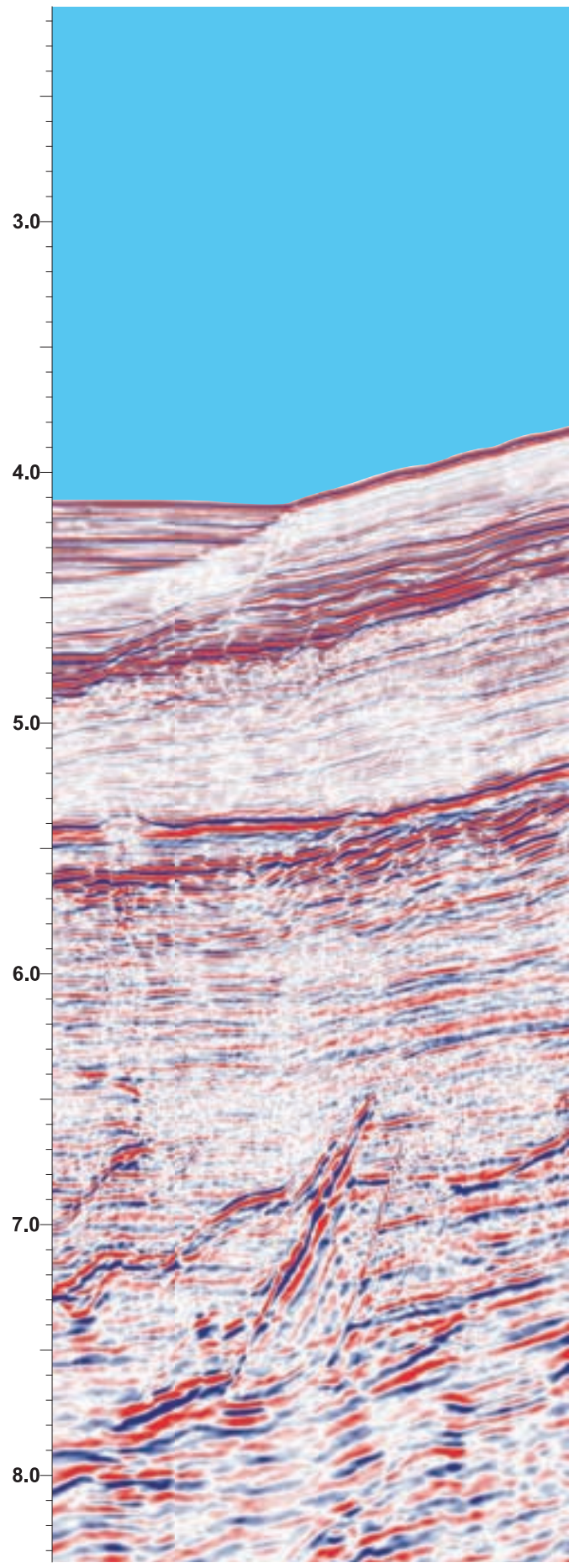
- Well Logs available

- License Round Roadshows

  London May 23, 2006
  RAF Club

  Houston May 25, 2006
  Hilton Westchase





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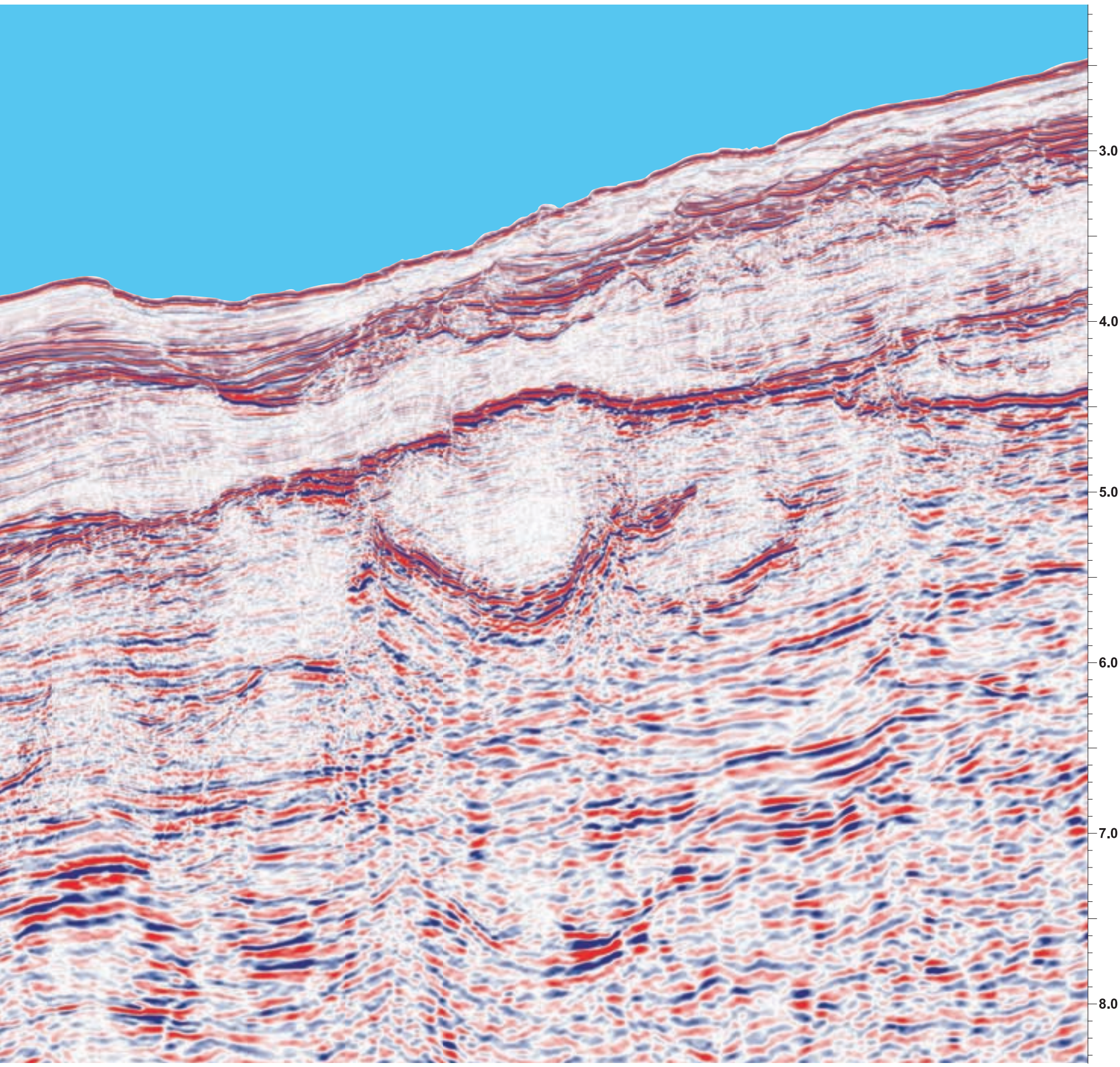
NEW DATA COVERING BID ROUNDS IN PROGRESS



GEOPHYSICAL CORNER

Hydrate System to be Monitored

(The Geophysical Corner is a regular column in the EXPLORER, edited by Bob A. Hardage, senior research scientist at the Bureau of Economic Geology, the University of Texas at Austin. This month's column is titled "Seafloor Observatory Will Monitor Deepwater Gas Hydrate System.")

By TOM McGEE
and BOB A. HARDAGE

A project to design, construct and deploy a seafloor monitoring station across a deepwater hydrate mound in Mississippi Canyon Block 118 (MC 118) has been initiated by the Gulf of Mexico Hydrates Research Consortium, which comprises 15 universities, five federal agencies and several private corporations.

The consortium is managed by the Center for Marine Research and Environmental Technology at the University of Mississippi. The monitoring station project is funded by the Minerals Management Service of the Department of the Interior, the National Energy Technology Laboratory of the Department of Energy and the National Undersea Research Program of the National Oceanographic and Atmospheric Administration of the Department of Commerce.

The monitoring station will have three types of seafloor observation systems:

✓ Geochemical.
✓ Microbial
✓ Seismic.

A representation of the station and its component systems is shown as figure 1. The data recovery system ("Big M") shown in the background is an interim option for downloading data to a ship.

Eventually, the station will be connected to shore by an optic-fiber cable.

Geochemistry Data

Geochemical observations will be made within seafloor sediments, at the sea floor and in the lower water column.

Geochemical sensors include:

✓ Pore water samplers to measure salinity and concentrations of hydrocarbon gases at various depths below the seafloor.
✓ Chimney samplers to measure the composition and quantity of gas passing through the seafloor.
✓ Arrays to measure conductivity, temperature, density and composition of dissolved gas at various levels in the lower water column.

A mass spectrometer will do chemical analyses on the seafloor.

Microbiology Data

The microbial observatory will monitor various aspects of:

✓ Microbial activity including abundance, diversity, temporal variability and dynamics of microbial communities.
✓ Rates of methane oxidation and sulfate reduction.
✓ Relationships between microbial products and hydrate formation.

Monitoring sensors will include retrievable, pressurized seafloor test cells and bioreactors, high-surface-area sampling plates of different materials, low-light digital cameras and devices to retrieve samples under in-situ conditions.

Research goals include:

✓ Documenting the stability and persistence of gas hydrate outcrops.
✓ Determining whether methane oxidation and sulfate reduction occur within hydrates without dissociation.
✓ Characterizing the structure and functions of microbial communities.
✓ Identifying biochemical controls on and ecological roles of certain bacterial mats.

Fine-grained magnetic sulfides that originate with magnetotactic bacteria and then accumulate in gas hydrates will be monitored as possible locators of hydrate deposits.

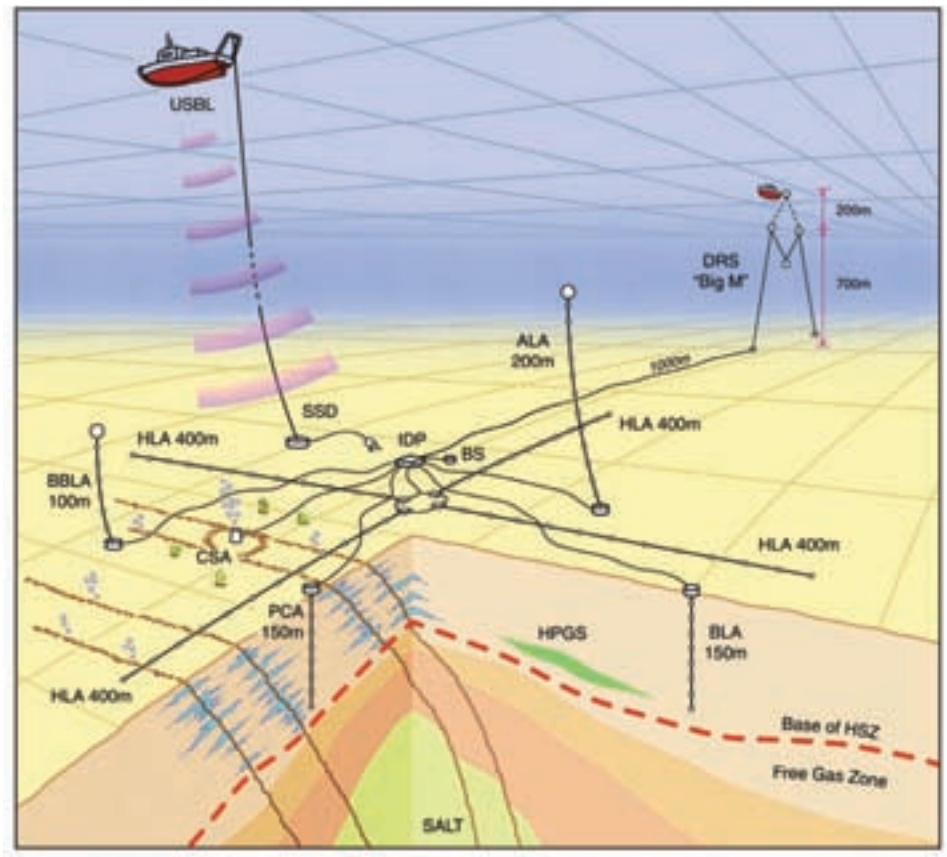


Figure 1 – Deepwater hydrate monitoring station and its component systems.

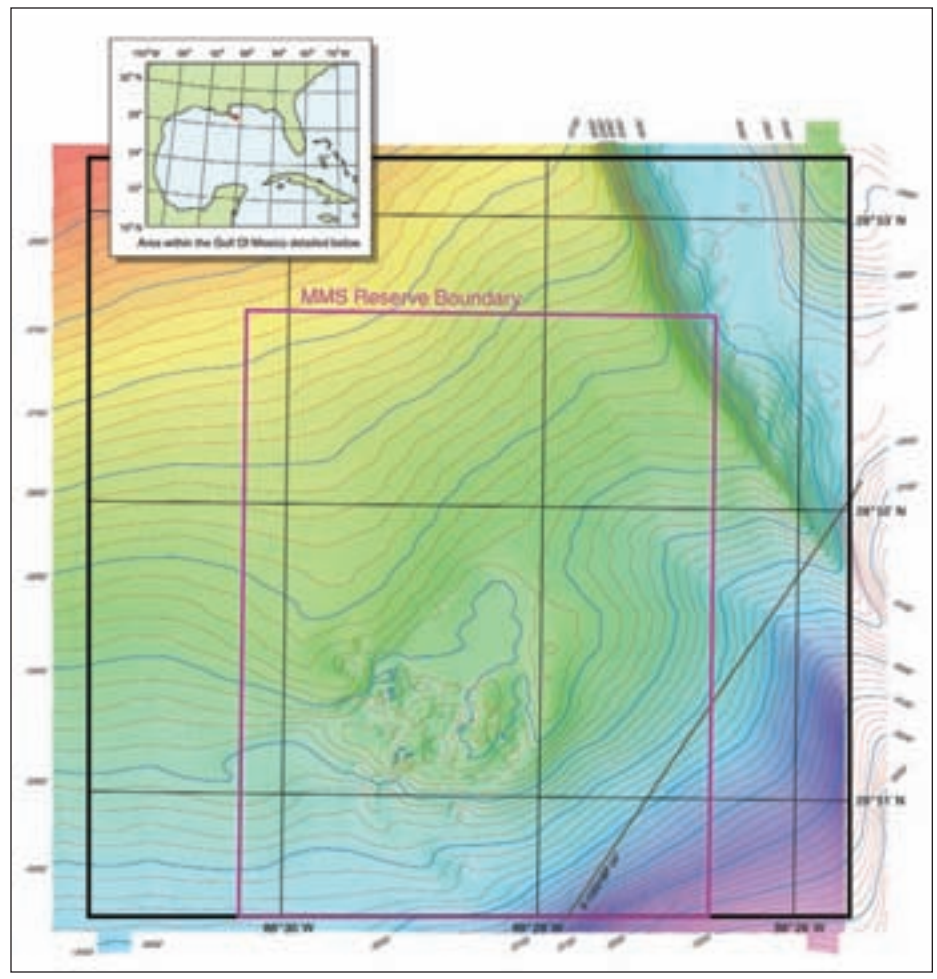


Figure 2 – Bathymetric image of Block MC 118. The MMS Reserve Boundary defines the area reserved by the Minerals Management Service for exclusive use of the seafloor monitoring station and its associated research programs.

Seismic Data

Seismic data will be collected with six linear sensor arrays; two vertical and four horizontal.

One vertical array of hydrophones, inclinometers and compasses will extend from the seafloor to a height of 200 meters into the water column. A second vertical array of hydrophones and 3-component (3-C) accelerometers will be in a borehole and extend 150 meters below the seafloor.

Each horizontal array of hydrophones and 3-C accelerometers will be 400 meters long. Four horizontal arrays will be deployed in an orthogonal cross to create arm lengths equal to water depth (~800 meters).

Deployment

The monitoring station is being deployed near a hydrate mound in water more than 800 meters deep in Block MC 118 (figure 2). The mound is located inside the distorted bathymetry contours in the lower part of the figure.

The Minerals Management Service has reserved a large portion of Block MC 118 (the area inside the "MMS Reserve Boundary" in figure 2) for exclusive use of the monitoring station and associated research.

Pre-installation surveys began in January 2005. The first observing systems, a pore-fluid sampler and an array of sub-bottom thermisters were installed in May 2005. Installation is continuing in stages until the monitoring station is complete.

Completion is expected in 2007.

Seismic Monitoring

When fully operational, the observatory will generate about nine gigabytes of data per hour. Almost all of this data flow will come from seismic sensors operating in continuous acquisition mode.

A conventional image of the mound will be created by inverting data acquired using conventional seismic sources. Monitoring will consist of comparing this conventional image to subsequent images obtained using ambient noise as the energy source.

A procedure for imaging the mound using the noise of nearby ships is under development. This technique will utilize the station's hydrophone data and is based on an established technique known as Matched Field Inversion.

Attempts will be made to obtain images using other types of ambient noise, particularly the noise of wind-driven waves at the sea surface and the background noise of micro-seismic events.

The mound will be re-imaged with conventional seismic sources from time to time.

(Editor's note: McGee is with the University of Mississippi.)

Offices Being Repopulated

Industry Gives Big Boost to NOLA

By LOUISE S. DURHAM
EXPLORER Correspondent

For any companies still on the fence trying to decide whether to move operations back to New Orleans after fleeing Hurricane Katrina, Frank Glaviano Sr., vice-president of the Americas at Shell, has some practical advice:

"Until you make a decision, your energy is spent on considering the pros and cons and not solving the problems," Glaviano said. "You have to face up to it, make the decision and act on it."

It worked for Shell.

And Shell's commitment to New Orleans is just one example – others are there, too – of how the oil industry is stepping up to help the city and region recover from last year's disastrous hurricanes.

Usually, the efforts are without much fanfare. The public praise likely will come later.

"Given the situation, it was obvious if we were going to leave (New Orleans) this would be the time," Glaviano noted. "We made a conscious choice to return after discussing the pros and cons. We announced we were returning November 7, and the first 250 people moved back January 30."

The exploration unit from New Orleans remained in Houston, which was a pre-Katrina decision. All 1,000 remaining employees originally based in the Crescent City have returned. They're once again ensconced in the towering Shell building downtown, which escaped Katrina's wrath.

"The building would have accommodated the relocation before January," Glaviano said. "We wanted to give time to the city to establish basic services, such as enough hospital beds, 911 service, postal service, communications. Today, it's a busy workday downtown, although there are still signs of damage.

" We thought the single best thing we could do for New Orleans was to bring 1,000 high paying jobs back to the city."

"We thought the single best thing we could do for New Orleans was to bring 1,000 high paying jobs back to the city," Glaviano said. "We ran an ad in the local paper upon moving back that included the statement 'A community needs a commitment, and New Orleans has ours' – that's how we summed it up to the people and the city."

Shell employees lived throughout the city and surrounding areas, so many of them lost homes or had severely damaged dwellings.

The company quickly stepped up to the plate and spent $32 million to purchase 120 units – single family and apartment complexes – in New Orleans and toward Baton Rouge to lease to homeless employees at cost. Today, most all employees are in stable situations, either permanent or temporary.

Building Toward Tomorrow

Unlike Shell, Dominion Exploration & Production is unable to return staff to its downtown domicile following a six-month stay in Houston. The Dominion Tower suffered extensive storm damage, and the company relocated to a nearby building. The first 60 employees who are scheduled to return arrived early in March.

"People are going back on a staggered schedule, based on individual needs and individual housing needs," said David Auchter, Dominion spokesman. "The company is assisting with their need."

About 200 employees will be back by mid-April. Auchter said the number will rise during the summer to include new-hires because Dominion is actively recruiting geologists and geophysicists.

Chevron has relocated 700 employees back to its downtown New Orleans building, which suffered some flooding and window damage. Although readied for occupancy, some repair work continues.

To ensure the safety of its people in the still-struggling city, the company keeps a paramedic and an ambulance on site. In fact, the paramedic performs daily checks of several emergency rooms within driving distance to determine who has the most available beds and most accommodating response time in the event of an emergency.

Besides providing temporary housing for some of it still-homeless employees, Chevron is among the companies who have made significant additional monetary contributions to assist those impacted by the storms.

"Up to this time, we have given $5.5 million to non-profit and government agencies in Louisiana, Mississippi and Texas," said Matt Carmichael, public affairs representative. "In Louisiana, we gave more than $1.2 million to several groups." These included United Way and Project Rebuild Plaquemines Parish.

Prior to Katrina, Chevron made a $1 million donation to the Orleans Parish school system, which has now been re-directed to assist in rebuilding schools. Dominion is also actively involved in revamping the educational system in the city. The company is facilitating individual grants via the Dominion Foundation grants and is making other grants directly.

Chevron also pre-paid $2.5 million in property taxes in hurricane-affected areas where it operates: Orleans, Plaquemines, Vermilion and Cameron parishes.

"These municipalities ran out of

See **Recovery**, page 30

Concession to be Tested

Israel Continues Reserves Search

By BARRY FRIEDMAN
EXPLORER Correspondent

It takes faith to explore for oil. Anywhere.

But in Israel, which produces almost no oil and imports nearly all its oil needs, the premium is put on science – along with a little faith, too.

About 470 wells have been drilled in the country since the 1940s but the Heletz field, discovered in 1955, is the only producing field and produces less than 100 barrels a day, according to the U.S. Energy Information Agency. Israel has sizeable deposits of oil shale, perhaps 600 million tons recoverable, with average production of about 9,000 barrels a day. Most of Israel's shale oil resources are located in the Rotem Basin region of the northern Negev desert near the Dead Sea.

So for decades, Israel has had to augment its supply by importing approximately 240,000 bbo/day from Russia via the Black Sea and from Egypt.

Sensing the situation would only grow worse, the Israeli government commissioned a study in 1981 to determine the potential of hydrocarbons in the country. AAPG member Stephen Pierce was the project geologist at the time for U.S.-based Superior Oil and in charge of that study.

"I wrote the report for the Israeli government," Pierce said. "All her neighbors had oil; Israel wanted to know how much she had."

Israel's Petroleum Commission has estimated that the country could contain two billion barrels of oil reserves, most likely located underneath natural gas reserves. Geologically, Israel appears to be connected to the oil-rich Paleozoic petroleum system stretching from Saudi Arabia through Iraq to Syria.

Specifically, Pierce concluded that an area around Kibbutz Ma'anit had a major "gravity high" that could prove to be a regional paleo high, indicating it might be a potential energy bonanza to the country.

In 1994, Eliezer Kashai – current vice president of exploration for Zion Oil & Gas but then with Sdot Neft Ltd. – independently came to the same conclusion and actually did some drilling on this gravity high at Ma'anit. The well got to 2,335 meters, but because of volcanics-caused complications and other operational delays, the company ran out of money before it could drill any deeper.

Dallas-based Zion Oil and Gas then picked up concession and resumed drilling. The Zion concession – is to the west of Jerusalem, specifically south of Haifa and northeast of Tel Aviv.

According to Pierce, who now has been hired as the project geologist for Zion, "We have successfully tested that (gravity high) hypothesis."

Further, he added, the company now has a well that can test two important areas:

✓ The Um-Al-Fahm anticline (the gravity high underlying Kibbutz Ma'anit).

✓ Test fracture plays in the Triassic.

"The well is important for another reason," Pierce added, "as the major gravity paleo high allows the possibility of testing deeper Permian targets, a relatively new play in this part of the Middle East. If this opens up, it could positively affect the exploration direction in the region.

"If successful," he said, "the Ma'anit area play can significantly upgrade their national reserves."

Divine Inspiration

How long would a project like this take to develop and implement?

And now Pierce sounds more like a politician than a scientist: "As long as it would take – but there is another facet to this."

Perhaps it's best at this point to let the company's Web site explain:

From its inception, the calling of Zion's Web site is filled with biblical verses and prophecies, has set up two charitable trusts totaling 6 percent of royalties to support "projects for the restoration of the people and land of Israel.

According to Pierce, while the company's founder is a born-again Christian who dreams of finding oil for the state of Israel, he, Pierce, approaches the endeavor purely scientifically.

"His (company founder and chairman John Brown) is based on the Bible; my rationale is strictly technical."

Actually Pierce is understating the contrast. Brown has been quoted as saying, "God sent me for one purpose: to help Israel with oil. I believe God talked to me."

"We're engineers, geologists," Pierce said, reiterating his motivational drive, even if his owner gets his inspiration elsewhere. ❑

For more information on this subject, visit the AAPG Web site.

WashingtonWATCH

AAPG Joins In Congress Visit Day

By DON JUCKETT

By all accounts, Congressional Visits Day (CVD) was a success – not only in the overall number of participants in the events, but in the responses from the many visits that AAPG representatives made to the offices of the Congressmen and Senators.

AAPG President-Elect Lee Billingsley, DPA President-Elect Richard Green and AAPG-AGI liaison G. Warfield "Skip" Hobbs trekked back and forth across Capitol Hill to visit with Congressional staff and elected representatives as well as with the Senate Energy and Natural Resources Committee staff and the House Energy and House Resource Committee Staff.

The theme for this year's CVD was "Science, Engineering & Technology: Fueling America's Innovation," and the AAPG delegation took full advantage of that theme to promote the Association's contributions to sustaining science and innovation in the geosciences.

The delegation also reinforced the overarching theme for CVD with their statements of support for federally funded research in the petroleum geosciences.

Under the auspices of AAPG (for the first time), AGI, GSA and AGU, more than 70 geoscientists participated in CVD. This brought the geoscience association sponsorship for CVD to more than 10 percent of the non-corporate sponsorship. This presence has and will continue to heighten the awareness and appreciation among policy makers of the contribution that the geosciences and particularly petroleum geosciences make in global economics, education, science and technology.

* * *

During their day on Capitol Hill, the AAPG participants visited the offices of approximately a dozen members of the House and Senate and met with the staff of both the House and Senate committees with natural resource and energy jurisdiction.

In each office, they spoke to the theme of the CVD activities and stated their case for federal funding for the sciences and geosciences. In every office, they left a packet of material that included a one-page flier explaining the activities and functions of the AAPG – and extended an offer to provide additional information, data-related material for the use of the House member or Senator.

In several instances, those offers were welcomed with an immediate request for additional statistics, written material or further briefings.

And what did our members learn?

From my observations and discussions with the AAPG delegation as we made our visits on Capitol Hill I extracted the following sentiments about the process:

✓ Their understanding of the process of policy making and formulation of law is far more complex than they understood it to be before they participated in CVD.

✓ Policymakers need access to good, scientific-based information – but in and of itself good, scientific-based information is insufficient to guarantee that good policy will emerge from the process simply because policy makers have access to good science.

✓ Much of the important analysis in any policy debate is brought together by individual office staff and committee staff and often, the Senate or House members may not even see the actual information that establishes their position on a given issue.

✓ To ensure that good geoscience information and data finds its necessary place in the formulation of sound and favorable energy policy – that policy which will impact the very future of the petroleum industry not only in the United States, but globally – some fraction of the petroleum geoscience community will have to convey that information and data into the office of their policy makers.

What is more, those who choose to participate also will have to take the additional steps of explaining and defending the quality and integrity of the science.

* * *

continued on next page

Wind Power

from page 20

material that can be harvested.

"How much biomass do we have to leave on the land to protect the productivity of the soil? I think most people agree that we can't just strip the land," Ragauskas said.

Looking at the future development of biorefining, he sees "a multifaceted time frame. What we're living now is the first generation of biorefineries."

In five to 10 years, he expects to see a variety of bioengineered plants much more amenable for processing into biofuels.

For instance, plants could be modified to produce the enzymes useful in biorefining, he said.

Like wind-generated electricity, current production of biofuel benefits from government subsidies. Eventually, Ragauskas expects biorefining to become economic without subsidies.

"I think in the end it has to be," he said. "If you take a longer view, we only have a fixed amount of fuel and our usage continues to go up ... Biofuels will supplement the wedge between the two."

Koonin sees a future where private vehicles are fuel-electric hybrids, with biofuels a significant contributor to power.

"Hybrid biofuels are where we're going to end up, I think, probably plug-in hybrids," he projected.

In that vision, the hybrid owner would recharge the vehicle's batteries overnight for an electric-power range of 30 miles or so.

If the daily commute is less than 30 miles, no fuel would be used, Koonin said. Overall vehicle fuel efficiency could top 100 miles per gallon.

Looking ahead 20 years, can the United States really reduce its need for imported oil by two-thirds? Can Sweden stop using oil completely?

Development of alternative power sources faces many challenges, making some goals appear out of reach.

Ragauskas had a thought along those lines.

"If you asked 10 years ago, 'Can you have a remote-controlled rover on Mars?'" he noted, "people would have said, 'It's impossible.'" ❑

Director Takes New Strategic Analyst Post

Brenda Cunningham has changed positions to become AAPG senior strategic analyst, a new position.

Joining the Association's headquarters staff in 2003, Cunningham previously served as global development director, responsible for overall convention department activities as well as involvement in several new global projects, such as GEO 2006, held in Doha, Bahrain, in March.

"Evolution within the Association has led to changes in the directorate whereby Brenda and I agreed that her talents were better used in this new position," said Executive Director Rick Fritz. "This is a change that Brenda requested, and that we both believe is positive for her and the Association."

In the new post, Cunningham will be responsible for in-depth evaluation of many of AAPG's functions and will report to the executive director.

A search for a meetings director has been initiated.

continued from previous page

The AAPG members also learned that two increasingly important issues in the Association's policy position portfolio are front and center in energy discussions in this Second Session of the 109th Congress. Those issues are:

✓ Opening a larger portion of the OCS for exploration and development.

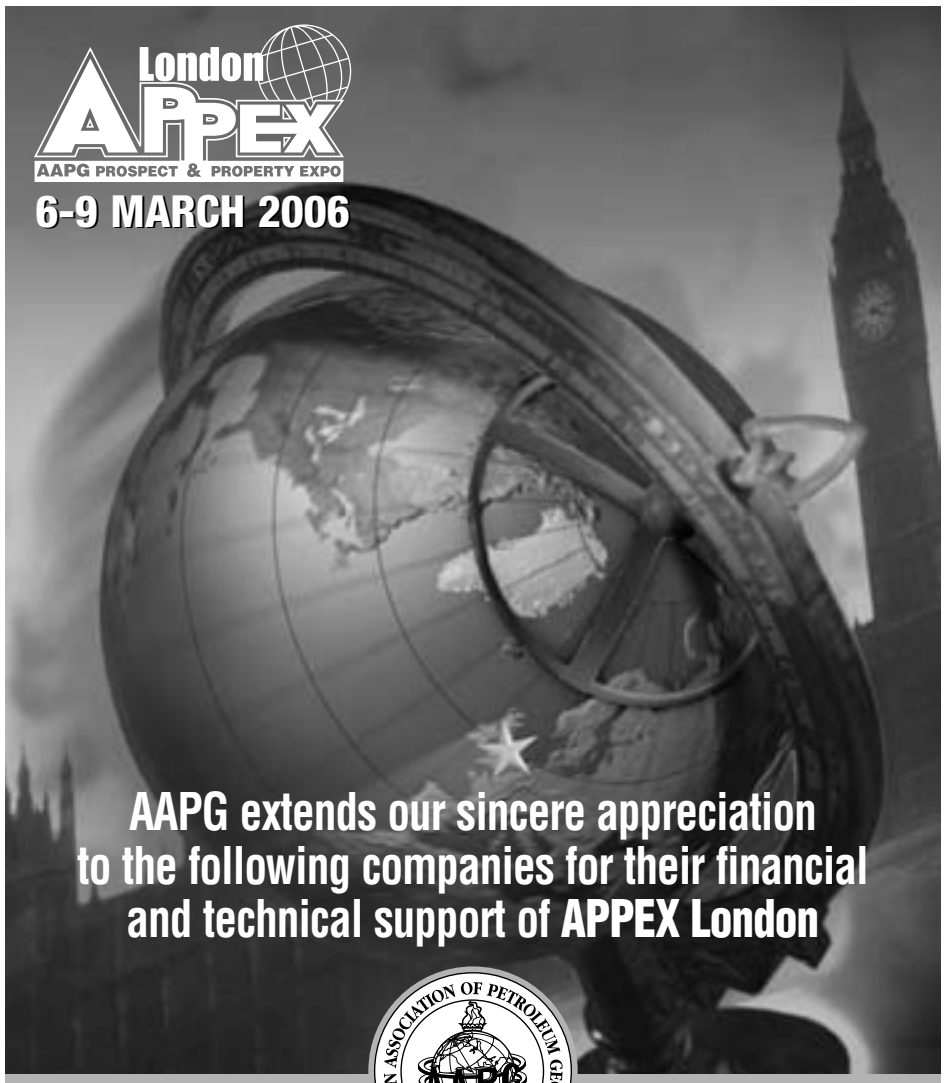
✓ Work force training and education.

They also learned that their input in Washington and in their home districts can influence the outcome of these issues in Washington.

These are my impressions and should not be seen as other than that. However, the next time you have occasion to talk to Lee, Richard or Skip, ask them what they thought. I hope they will convey the same interest and commitment that I sensed as we worked through CVD 2006.

I also hope that their impressions and excitement will be enough to encourage more of you to participate next year and in subsequent years. As Association members, your participation will make a difference!

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



DEG Picks Groat as President-Elect

Results of the 2006 DEG officer candidate election have been announced.

Those elected were:

❒ President-Elect – **Charles G. (Chip) Groat**, University of Texas, Austin, Texas.

❒ Vice President – **Michael A. Jacobs**, Pioneer Natural Resources, Midland, Texas.

❒ Editor – **Gerald (Jerry) R. Baum**, Maryland Geological Survey, Baltimore, Md.

The new officers will join the DEG Executive Committee July 1 that will be chaired by President **Jane McColloch**, West Virginia Geological & Economic Survey, Morgantown, W.Va. Also on the committee is **Nancy S. Dorsey**, EPA R6, Dallas, secretary-treasurer.

Recovery

from page 26

money after the storm," Carmichael said. "On January 1, there was money in the bank they could immediately start to spend."

Recognizing that less tangible cultural issues also play a key role in restoring life to the city, Dominion is continuing its longtime support of such organizations as the Audubon Nature Institute and the Louisiana Endowment for the Humanities, among others. This support will assist in the recovery and rehabilitation of the arts in South Louisiana.

The myriad fans of the acclaimed New Orleans Jazz and Heritage Festival will be happy to hear the festival will celebrate its thirty-seventh season this spring, thanks to Shell, which came on board as the first-ever presenting sponsor when the event's fate was in doubt for this year. The festival generates $250 million worth of economic activity for the area, which will significantly pump up the near-empty city coffers.

It's not just the big folks who are stepping up to help out in the aftermath of the disastrous hurricanes. Many smaller, independent companies are making a difference through the Louisiana Independent Oil & Gas Association (LIOGA).

The organization established two separate funds to assist victims of Hurricanes Katrina and Rita.

Some of the money has been used to enable a number of families to successively occupy a fully furnished apartment in Lafayette provided by LIOGA. Funds also have been provided for displaced children from New Orleans, in addition to numerous other LIOGA efforts.

The LIOGA Katrina Industry Relief Fund has a balance of approximately $600,000 and is the larger of the two funds. The Community Foundation of Acadiana oversees the fund, which will have a sizeable impact on the community where the funds are ultimately directed.

Midst the continuing hardship in this part of the world, the occasional light note is essential to help lift spirits and keep the morale intact.

With that in mind, Auchter noted at press time Dominion was planning a celebration in April, welcoming all its employees back with – you guessed it – a crawfish boil, the gustatory affair synonymous with south Louisiana. ❑

Field Seminars!!

Deep-Water Siliciclastic Reservoirs, California *New!!*

Leaders: Stephan Graham and Donald R. Lowe, Stanford University, Stanford, California
Dates: September 17 (Sunday at 5:00pm) – 22 (Friday – mid-afternoon)
Location: Begins and ends at the airport in San Francisco, California
Tuition: $2,675 (increases to $2,775 after 8/17/06), includes lodging, transportation during the seminar, lunches, guidebook and group dinner (1 night)
Limit: 20
Content: 5.5 CEU

Who Should Attend
Geologists, geophysicists, reservoir engineers, managers and anyone working with deep-water reservoir systems.

Be among the first!

Fractures, Folds, and Faults in Thrusted Terrains: Sawtooth Range, Montana

Leaders: Steven E. Boyer, Consultant, Tacoma, WA; William Hansen, Jireh Consulting Services, Great Falls, MT; Charles F. Kluth, Kluth & Associates, Littleton, CO; James Sears, University of Montana, Missoula, MT
Date: September 11-16, 2006
Location: Begins and ends in Great Falls, Montana
Tuition: $2,600 (increases to $2700 after 8/14/06), includes lunches, transportation, guidebooks, admission to Glacier National Park, and some additional meals.
Limit: 20
Content: 4.2 CEU

Who Should Attend
Geologists, geophysicists, log analysts, engineers and exploration managers who want a thorough understanding of the geology and complexity of exploring in thrust belts.

Modern Deltas *Returning Favorite!*

Leaders: Harry H. Roberts, Gregory Stone and Samuel Bentley, Coastal Studies Institute, Louisiana State University, Baton Rouge, LA
Date: September 11-15, 2006
Location: Begins in Baton Rouge and ends in New Orleans, Louisiana
Tuition: $2,500 (increases to $2600 after 8/14/06), includes 5 nights lodging, bus and boat transportation, field lunches, and guidebook
Limit: 25
Content: 4.0 CEU

Who Should Attend
Geoscientists who need to understand the sedimentary architecture of deltas, internal characteristics of constituent sediment bodies, and sequence/seismic stratigraphic relationships with surrounding facies.

Sign up early—this one fills up fast!

Back to School with AAPG Education!

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

Leaders: Keith W. Shanley, Consultant, Denver, CO; J. Michael Boyles, University of Wyoming, Laramie, WY
Date: September 21-28, 2006
Location: Begins and ends in Grand Junction, Colorado
Tuition: $2,100 (increases to $2300 after 8/10/06), includes ground transportation, lunches, and guidebook
Limit: 20
Content: 5.6 CEU

Who Should Attend
Geologists, geophysicists and reservoir engineers working in exploration and production settings.

Ancient Clastics: Book Cliffs and Canyonlands, Utah *New Date!!*

Leader: John K. Balsley, Consulting Geologist, Indian Hills, CO
Dates: September 11-19, 2006
Location: Begins and ends in Moab, Utah
Tuition: $2,100 (increases to $2,200 after 4/17/06), includes 4-wheel-drive transportation and course notes on CD
Limit: 15
Content: 6.0 CEU

Who Should Attend
Exploration and production geologists, geophysicists, log analysts, engineers, and exploration and development managers who want a thorough working knowledge of clastic depositional systems directly associated with energy resources.

Short Course!!

Practical Mapping of Surfaces, Properties, and Volumes for Reservoir Characterization: Principles, Methods, Case Studies, and Workflows

Date: September 30 – October 1, 2006
Location: New Orleans, Louisiana (with SEG Annual Meeting)
Tuition: $590, AAPG members; $690, non-members (goes up to $690/$790 after 9/1/06), includes course notes and refreshments
Content: 1.5 CEU
Instructor: Jeffrey Yarus, Quantitative Geosciences, Houston, TX

Who Should Attend
The course is intended for geologists, geophysicists, and engineers considering or engaged in reservoir modeling projects who wish to understand more about the geostatistical methodology.

AAPG Geoscience Education

For further information, please contact the AAPG Education Department
Phone: 918-560-2650; Fax: 918-560-2678; e-mail: educate@aapg.org
Or log on to www.aapg.org/education/index.cfm

FOUNDATION UPDATE

AAPG member David C. Worthington has endowed a new Grant-in-Aid for a graduate student who is studying paleontology.

The David Worthington Family Grant will be awarded annually through the AAPG Foundation Grants-in-Aid Program.

In other Foundation matters, **Michael W. Strickler**, of Katy, Texas, has joined the Foundation Trustee Associates.

Foundation Donors

The names that appear here are of those who have made donations to the AAPG Foundation in the past month – predominately through adding some additional monies on their annual dues statement.

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

The AAPG Foundation will continue its stewardship for the betterment of the science and the profession of petroleum geology, thanks to you.

The AAPG Foundation Trustees

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PROFESSIONAL NEWS BRIEFS

Ann Anderson, to associate geologist, Chesapeake Energy, Oklahoma City. Previously graduate student, Texas A&M University, Corpus Christi, Texas.

Jeffrey Atteberry, to associate geologist, Chesapeake Energy, Oklahoma City. Previously graduate student, Clemson University, Clemson, S.C.

Pratt Barndollar, to president, Napa Energy, Calgary, Canada. Previously exploration portfolio manager, Devon Energy, Houston.

Matthew Boyd, to geologist, Southwestern Energy, Houston. Previously geologist, Marathon Oil, Houston.

Michael Buckner, to associate geologist, Chesapeake Energy, Oklahoma City. Previously graduate student, East Carolina University, Greenville, N.C.

John Chadwick, to senior geologist-East Texas district, Chesapeake Energy, Oklahoma City. Previously senior geologist-North Louisiana, Matador Resources, Dallas.

Steve Charbonneau, to vice president-exploration, Vital Energy, Calgary, Canada. Previously senior staff geologist, Apache Canada, Calgary, Canada.

John Day, to associate geologist, Chesapeake Energy, Oklahoma City. Previously hydrogeologist, Oklahoma Water Resources Board, Oklahoma City.

Chris J. Donofrio, to senior geological adviser, Occidental Permian Services, Houston. Previously senior exploration geologist, ExxonMobil, Houston.

Quentin C. Enns, to vice president-exploration, Sahara Energy, Calgary, Canada. Previously with Canadian Natural Resources, Calgary, Canada.

Sherman Formhals, to senior geologist, Chesapeake Energy, Oklahoma City. Previously geologist, Energas Resources, Oklahoma City.

Gregory Gromadzki, to associate geologist, Chesapeake Energy, Oklahoma City. Previously graduate student, Oklahoma State University, Stillwater, Okla.

Brent Huntsman, to exploration geologist, Manti Resources, Tulsa. Previously geological manager-Louisiana district, Chesapeake Energy, Oklahoma City.

Rhodri Johns, to general manager, Santos International Operations, Bishkek, Kyrgyzstan. Previously manager-exploration portfolio development, Santos, Adelaide, Australia.

Doug Johnson, to geological manager-Permian South district, Chesapeake Energy, Oklahoma City. Previously senior geologist, Chesapeake Energy, Oklahoma City.

John Kapchinske, to vice president-geoscience (southern division), Chesapeake Energy, Oklahoma City. Previously vice president-geoscience (northern division), Chesapeake Energy, Oklahoma City.

Michael Lentini, to head of new ventures, OMV Exploration & Production, Vienna, Austria. Previously senior staff geologist, Shell, Houston.

Bob LoPiccolo, to vice president-exploration, Circle Oil, Houston. Previously president, eSeis, Houston.

Alex Maftei, to exploration geologist, Chevron, Perth, Australia. Previously senior field development adviser, Department of Industry and Resources, Western Australia.

C. Daniel Mancini has formed Faldeos Consulting, San Martin de los Andes, Neuquen, Argentina. Previously managing director, Addax Petroleum, Lagos, Nigeria.

Joe Peterson, to senior geologist, Chesapeake Energy, Oklahoma City. Previously staff geologist, Chevron, Lafayette, La.

Scott Sachs, vice president-geoscience (northern division), Chesapeake Energy, Oklahoma City. Previously worldwide exploitation manager, Marathon Oil, Houston.

Yoscel Suarez, to associate geophysicist, Chesapeake Energy, Oklahoma City. Previously geophysics intern, Schlumberger, College Station, Texas.

Nicholas Terech, to associate geologist, Chesapeake Energy, Oklahoma City. Previously graduate student, University of Buffalo, Buffalo, N.Y.

Debbie Vader, to geologist, Chesapeake Energy, Oklahoma City. Previously geologist, Newfield Exploration, Tulsa.

Marco Vignali, to associate geophysicist, Chesapeake Energy, Oklahoma City. Previously geophysicist, PDVSA, Maracaibo, Venezuela.

Michael B. Walen, to senior vice president and chief operating officer, Cabot Oil & Gas, Houston. Previously senior vice president-exploration and production, Cabot Oil & Gas, Houston.

Robert J. Weimer has been named the 2006 Legendary Geoscience Award recipient by the American Geological Institute, presented to honor his long history of scientific achievement and exceptional service to the geoscience profession. Weimer, an AAPG past president, is professor emeritus at the Colorado School of Mines, Golden, Colo.

James G. Work, to general manager, IPR Transoil, IPR Energy Red Sea and IPR Energy Suez, Cairo, Egypt. Previously general manager, Western Desert Operating Petroleum, Alexandria, Egypt.

Rob Yorke, to new chief executive officer, 3DGeo Development, Houston. Previously president-U.S. operations, Paradigm Geophysical, Houston.

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

MEMBERSHIP AND CERTIFICATION

The following **candidates** have submitted applications for membership in the Association and, below, certification by the Division of Professional Affairs. This does not constitute election, but places the names before the membership at large. Any information bearing on the qualifications of these candidates should be sent promptly to the Executive Committee, P.O. Box 979, Tulsa, Okla. 74101. (Names of sponsors are placed in parentheses. Reinstatements indicated do not require sponsors.)

Membership applications are available at www.aapg.org, or by contacting headquarters in Tulsa.

For Active Membership

Alaska
Pitcher, Jason L., Halliburton Energy Services, Anchorage (P.J. Perfetta, J.G. Beck, G.F. Carpenter)

Colorado
Egenhoff, Sven Olaf, Colorado State University, Fort Collins (E.A. Erslev, F.G. Ethridge, B.R. Pratt); **Harris, Charles William**, Gustavson Associates, Denver (R.J. Wallis, K.W. Grove, R.C. McCullough); **Roesink, John Garner**, Noble Energy, Denver (P. Weimer, M.J. Pranter, W.A. Bond)

Minnesota
Poppendeck, Mark Charles, Northwoods Consulting, Plymouth (reinstate)

North Carolina
Hill, John A., self-employed, Raleigh (reinstate)

Texas
Auberty, Frederic, Toreador Resources, Dallas (H.L. Brewer, M.J. Fitzgerald, E. Ramirez); **Ballentine, Dorothy E.**, Burlington Resources, Houston (L.P. Scott IV, J.D. McCullough, E.B. McWilliams); **Dischinger, Joseph Dennis**, ExxonMobil Upstream Research, Houston (D.G. Campbell, R.G Charles, J.M. Forgotson Jr); **Duan, Ling**, Schlumberger, Houston (N.E. Biles, K.S. Glaser, J. Dai); **Guo, Mengdong**, Landmark Graphics, Houston (S. Zhang, J.K. Ellis, H.E. Darnell Jr.); **Jones, Jessy Lamar**, Chevron, Houston (W.C. Dawson, W.R. Almon, A.R. Thomas); **Kerscher, Ilsa Mae**, ExxonMobil, Houston (A.V. Anderson, D.A.Yurewicz, J.F. Hopkins); **Olumuji, Oladipo Ezekiel**, Nigeria Petroleum Development, Houston (S.S. Boettcher, D.L. Erlandson, R. Dyer); **Rice, Wendell Ralph**, Quintana Minerals, Houston (E.A. Hoover, J.M. Watkins, L.G. Knudtson); **Richard, Rene'**, Samson, Houston (M.S. Coffield, S.A. Sandberg, G. Sowell); **Thomas, Joy Griffin**, Marathon Oil, Houston (G.E. Guthrie, W.E. Galloway, M. Titus); **Warren, Leslie**, Schlumberger, Houston (D.R. Paddock, M.A. Bagge, K.D. Hemsley); **Whitaker, Amy E.**, Chevron, Houston (T.M. Laroche, G. Kristiansen, W. Narr); **Whitehead, Richard E.**, Anadarko Petroleum, The Woodlands (G.E. Drake Jr., R.P. Sorenson, J. DeJarnett)

Australia
Heugh, John Phillip, Central Petroleum, Perth (reinstate)

Canada
Klatt, Tyler Sean, EnCana, Calgary (M.J. Monea, M.C. Baker, A. Gaze); **Thorkelson, Michelle E.**, Tasman Exploration, Calgary (C. Williams, R.C.M. Gunn)

France
Sassi, William, Institut Francais Du Petrole, Rueil-Malmaison (F.M. Roure, B. Colletta, P.M. Lloyd)

India
Paul, Piyal, ONGC (India), Bharuch (D.D. Gaikwad, D. Das, S.K. Prasad)

Kuwait
Iqbal, Afzal, LMK Resources Dubai (U.A.E), Kuwait (M.R. Feit, J.R. Weston, D.W. Ware)

Oman
Idiagbor, Cletus Harry, Petroleum Development (Oman), Muscat (R.V.D. Pal, B.I. Jev, O.A. Fatoke)

Saudi Arabia
Al-Shehab, Ahmad A., Saudi Aramco, Dhahran (M.O. Al-Amoudi, I.A. Al-Ghamdi, A.Q. Hameda)

Scotland
Lawrence, Mark John Frederick, Baker Atlas Geoscience, Aberdeen (A.K. Sapru, D.J. Prosser, C.P. North)

Thailand
Rittipat, Aree, Chevron Thailand E&P, Chatuchak, Bangkok (C.A. Oglesby, J.W. Turner, N.F. Hurley)

United Arab Emirates
Lokier, Stephen William, The Petroleum Institute, Abu Dhabi (D.M. Bliefnick, R.D. Winn Jr., G. Edwards)

Certification

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

Petroleum Geologist

Louisiana
Applegate, James K., Applegate Exploration, Lafayette (Society of Independent Professional Earth Scientists)

Maryland
Baum, Gerald R., State of Maryland, Baltimore (D. Sacrey, M. Milling, W. Harrison)

Texas
Mason, Eric Herbert, Houston Pipe Line, Houston (R.S. Coook, R.W. Crockett, J.R. Handley)

West Virginia
Edmonds, Craig A., Dominion E&P, Jane Lew (R.E. Goings, D.M. Reif, T. Carpenter)

REGIONS AND SECTIONS

(Editor's note: Regions and Sections is a regular column in the EXPLORER offering news for and about AAPG's six international Regions and six domestic Sections.

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

Contacts: For Regions, Dana Patterson Free, at 1-918-560-2616, or e-mail to dfree@aapg.org; for Sections, Donna Riggs, at 1-918-560-2612, or e-mail to driggs@aapg.org.

This month's column was provided by Herman Darman, president of AAPG's Asia Pacific Region.)

AAPG's Asia Pacific Region, geographically the Association's largest, covers 16 countries, including the world's first, second and fifth most populated countries (China, India and Indonesia).

The region extends from Pakistan in the west to Japan in the north and New Zealand in the southeast. The world's highest peak (Mount Everest) and deepest sea (Mariana Trench) also are located in this region.

Considering the oil industry activities and members' enthusiasm, it's apparent this region has a large potential of growth for AAPG.

All geoscience departments in Indonesia have established their AAPG student chapters, which continually report excellent quality activities, including seminars, courses and field trips. (Thanks to the Student Chapter Oversight Committee in Jakarta, which helps students in organizing the activities.)

Malaysian and Indian geoscience departments are starting to establish and/or reactivate their student chapters as well, and the committee plans to continue its involvement in establishing student chapters throughout the rest of the Region.

The Visiting Geoscience Program also contributes significantly to the success of student chapter activities in the Region. Last year there were about 20 VGP talks at universities.

* * *

In other Region news and activities:

✓ Communications and networking among members are very important in this Region – and electronic communications have become the key to bridging what would otherwise be a huge challenge; it is a quick, reliable and low-cost tool. The Region will continue to utilize this approach to facilitate members' needs.

✓ The Region's Web site has been updated to cover the recent activities and news for members, thanks to volunteers who work together with AAPG headquarters to maintain the site.

✓ AAPG President Pete Rose recently visited the region (see page 6) – in late February he visited China, India, Malaysia and Australia. The AAPG members in these countries got the opportunity to listen to his talk and discuss a range of issues regarding the geoscience communities.

✓ This year the Asia Pacific Region will host this year's AAPG International Conference and Exhibition in Perth, Australia, Nov. 5-8. Most countries in the Region are contributing to the sessions of this conference. The core committees in Australia are working hard to organize one of the most important geoscience events in the world.

✓ One of the roles of the Asia Pacific committee is to represent the Region in AAPG forums. In February, Region President Herman Darman attended the AAPG Leadership Conference in Galveston, where he attended a number of related committee meetings. Also, two editors from the Region helped on the BULLETIN editorial board.

The Asia Pacific Region Executive Committee is still looking for new volunteers, including younger members to become active participants – such as helping on the Membership Committee to promote AAPG and recruit new members.

There is nothing complicated if we can work together. ❑

Perth Program Will Be Available in May

The final announcement for this year's AAPG International Conference and Exhibition in Perth has been completed and will be mailed to members and be available online in late May.

"Reunite Gondwana – Realize the Potential" is the theme for this year's meeting, which will be held Nov. 5-8 at the Perth Convention Exhibition Centre. It will be the first AAPG international conference in Australia since the 1992 session in Sydney.

Included in the announcement will be information about the entire technical program, exhibitors, related meeting activities and registration details (a tiered-deadline structure will offer money-saving potential).

READERS' FORUM

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.

AAPG at the Crossroads

Regarding the March President' Column (AAPG at the Crossroads, Part II): I want to compliment the president's effort and foresight at trying to integrate properly the international Regions into the scheme of things and give them adequate representation at the decision-making level. It's a good step in the right direction.

Just as the executive director (Rick Fritz) has said, this program truly has something for everyone. It is indeed a great educational opportunity … However, we from the Regions hope that America will be flexible in the issuance of visas for such international programs, to enable us (to) attend and network with our counterparts in diaspora. I hope the AAPG executives note this.

Andrew Derrick Idenyi
Lagos, Nigeria

I support this move to encourage increased involvement of international experts in the AAPG.

In the modern world of globalization, international joint ventures and stake holdings, the need of a broader scope for AAPG is essential. Those who fear a losing of focus on the energy industry in America should think about the global scope for business and knowledge through this initiation.

I fully support this brave move.

Manoj Vallikkat Thachaparambil
Doha, Qatar

Workstations and Geology

I applaud your article about Cindy Yeilding and workstation use affecting the practice of geology (February EXPLORER). When I started in the "oil patch" as a petrophysicist, the geologists with whom I worked all had drafting tables in their offices, for map making and sliding logs (when they weren't hung on the wall). With the advent of computers, the drafting tables went away and geologists began to squint at the same data on small screens.

For several years now I have envisioned the return of drafting tables, but in the form of very large touch screens, on which the geologists could do their work with a keyboard, mouse or stylus. As with the drafting table, the large screen could be positioned at any angle and height.

Your article is correct about the lack of essential interpretive tools in current software. As with petrophysical software, the vast majority of geological software development companies seem to focus on adding more and more increasingly esoteric functionality, which is used by fewer and fewer people. This is done even when current users are frustrated by inefficient interfaces that limit the interpretive process and discourage new users from proficiency in a reasonable length of time.

Perhaps it is time for software users and purchasers to demand more of the vendors so that the necessary tasks that we perform will make our jobs easier and more successful.

Daniel Krygowski
Spring, Texas

Recognition

In the February EXPLORER Jean-Marie Masset, chairman of last year's AAPG International Conference and Exhibition in Paris, the Conference Chairman, praised the AAPG administration and the organizing committee for the conference's success, especially for the quality of the technical and management programs. Technical excellence is, of course, the aim of the AAPG conferences.

AAPG President Peter Rose, in one of his EXPLORER columns, recognized the importance of sponsorship – and, moreover, the logos of our 40+ generous sponsors were displayed on two full pages of the December EXPLORER.

In fact, more than $400,000+ in sponsorship was raised, which contributed for more than 25 percent of the conference budget. The other contributions are the exhibition and registration fees.

As the Paris sponsor chair, I know how difficult it is to raise money. One of the things I shared with AAPG and the Perth (conference) committee was the importance of attending conferences where direct contacts with people can be very useful. I attended Dallas, Mexico (Cancun) and Calgary AAPG conferences; SEAPEX in Singapore; and APPEX in London. I also attended conferences organized by Global Pacific & Partners.

All executives and most geoscientists know of these very interesting conferences. They are more focused on NOC and IOC strategy than on technical matters, but they mostly combine a good mix and an excellent opportunity for networking.

I was in Cape Town, Singapore, London, Rio de Janeiro, Dakar, The Hague – invited by GP&P, either as a moderator, a speaker or a participant. My estimation is that, thanks to their invitations, I managed to raise about $50,000.

This is late recognition – but "better late than never."

André Coajou
Boulogne-Billancourt, France

Weeks: For the Record

I enjoyed very much the tribute to

continued on next page

continued from previous page

Lewis Weeks in the February EXPLORER. Lewis Weeks was a close friend of my late father, L.T. Barrow, who was a close associate through the former Standard Oil of New Jersey.

There are, however, a couple of minor corrections you might wish to make.

Esso Standard Oil Australia in 1964 was only a downstream marketing company and had no personnel who could have negotiated with BHP. The deal was made in New York by the headquarters staff of the Standard Oil Co. of New Jersey.

Subsequent to this, they formed a new company, Esso Exploration, whose assignment was to explore in areas of the world outside of the areas of responsibility of then-producing affiliates. Australia fell in this category.

I was privileged to be named executive vice president of this new company and was transferred from New Orleans to New York. Since I was the only executive with any offshore exploration experience, I had to make the recommendation as to which geophysical prospect should be drilled first.

My initial recommendation met considerable opposition within the company's upper management, because of the cost of building a platform for that depth of water. It would have to be built in California and towed across the Pacific Ocean to the south coast of Australia.

Fortunately, I was very familiar with the Global Marine Drilling Co. from my experience in offshore southern California in the early 1950's. By bringing across a floating vessel we were able to drill faster and cheaper.

But some of Lewis Weeks' visions have not been so well recognized as his role in the development of the Bass Strait. Several years prior to his retirement from the Standard Oil of New Jersey he recognized the potential of the British and Dutch North Sea offshore. Following an agreement with Shell, it was decided to conduct geophysical surveys off the coasts of both countries.

Recognizing the need for secrecy, he arranged that a special task force be assembled in Humble's research facility in Houston. To hide its purpose, it was always dubbed "The Playboy Club," and it took a special pass to gain admission. When I was named executive VP of Esso Exploration, I received such a pass and became familiar with the data.

Shell and Esso disagreed strongly on some of the prospects. However, when I suggested that Shell allow Esso to take 100 percent of the play and drill it with 100 percent operating ownership, Shell quickly relented and joined Esso in drilling the first major English gas field.

Lewis Weeks also made a significant contribution to Esso Exploration successes in pointing out the importance of looking carefully at major rivers around the world. As a result of this advice, Esso Exploration recognized the possibility of an offshore basin extending from the north end of the Gulf of Thailand to the north coast of Borneo.

A water well in Bangkok, Thailand, had sedimentary rocks outcrop on Borneo. Many of these have strong deltaic features.

I spent the fall of 1964 shuttling back and forth from Kuala Lumpur to Bangkok. I was successful in obtaining a large concession off the east coast of Malaysia, where several significant large oil fields have been found – but the Thai acreage was awarded to Union of California, which already had a small onshore concession in the northeast portion of Thailand.

Lewis Weeks was a true visionary!

Thomas D. Barrow
Houston

SPOTLIGHTONEDUCATION

Several new education opportunities have been added to the AAPG calendar – for both the classroom and beautiful outdoor settings – and now is the time to add them to your schedule in the next few months.

❒ First up is our new course on "Application of Structural Geology in Prospecting in Thrusted and Extended Terrains," taught by Charles Kluth and Ronald Nelson.

The spectacular outcrops in and around Jackson Hole, Wyo., provide the backdrop for this exciting new course, being held July 31-Aug. 4. One full day will be spent in the field to illustrate the various structure patterns discussed in class.

Full course details can be found at www.aapg.org/education/shortcourse/details.cfm.

❒ Following the great success of our Winter Education Conference, we've added a Fall Education Conference, with courses centered around the theme of "Deepwater Exploration." This five-day conference will take place in Houston on Sept. 11-15, and includes six courses to choose from, including:

✓ Interpretation of 3-D Seismic Data.
✓ Risk Analysis of Deep-Water Exploration Prospects.
✓ Deepwater Salt Tectonics.

For the complete list of courses, descriptions and registration details, go to www.aapg.org/education/fec.cfm.

❒ Another new field seminar also scheduled for September is on "Deepwater Siliciclastic Reservoirs."

This seminar will be led by Stephan Graham and Don Lowe, from Stanford University, and is based on a trip originally held as an AAPG Hedberg Field Conference.

The dates for this trip are Sept. 17-22, and you can find out all the other specifics on our Web site at www.aapg.org/education/fieldseminars/details.cfm.

❒ Several online courses remain available during the coming holiday season. Details on the IOL modules and our other online courses can be found at www.aapg.org/education/online/.

(And check out the list of all the September courses and field seminars available in our Education ad in this issue.)

❒ If some of your support staff need to know a little more about geology before diving into those fall projects with you, they can take advantage of the Aug. 29-31 offering in Houston of Norman Hyne's popular course on "Basic Petroleum Geology for Non-Geologists," co-sponsored by AAPG and the University of Tulsa's Continuing Engineering and Science Education (CESE) Department.

Get more information at www.aapg.org/education/shortcourse/details.cfm.

So, enjoy the summer – but remember that AAPG has plenty of education opportunities when you return! Call us at 1-888-338-3387 (toll-free, U.S. only) or 1-918-560-2650; or send an e-mail to educate@aapg.org if you have questions about these or any of our other education offerings. ❑

Laws Can Sometimes Create Hurdles for Editorial Material

(Editor's note: The following is a statement regarding AAPG's stance on the ability to publish certain materials submitted for editorial consideration.)

AAPG is an international professional and scientific organization, and many of our members live internationally and work on some of the most interesting geology spanning every continent.

AAPG also is a U.S. corporation, and as such must comply with U.S. regulations on all matters of business such as tax, personnel law and even publications. This recently came to light over several manuscripts that were submitted for the BULLETIN.

A number of U.S. laws have been passed and regulations issued since 2004 that deal with this issue, and in fact do allow for the publication of scholarly works published by Iranians and on the subject of Iran. AAPG has consulted with experts in this area of the law as well as the U.S. Treasury department who administers the process to gain guidance.

However, one of those regulations, which was issued in December 2004, provides a caveat that "parties to the transaction" cannot include the government of Iran or any of its branches.

It is obviously up to AAPG and its legal advisers to make the best interpretations and decisions on this, and up to now we have had to reject two publications – not on technical merit nor on political grounds, but based on our interpretation of U.S. laws and regulations, and our intention to comply with them.

As Iran is a major petroleum province – and an understanding of its geology has much to offer to the science of petroleum geology – we feel it important to continue to pursue clarification of what AAPG may and may not publish in this regard. Additionally, U.S. laws and regulations also place restrictions on our ability to publish in connection with other international regions.

As of this writing we are attempting to meet with U.S. government representatives in Washington, D.C., on this very issue. As we gain additional information we will pass it along. ❑

INMEMORY

Robert Harwood Alexander, 77
Columbus, Ohio, Feb. 26, 2006

Louis George Arrington (EM '51)
Houston

Joseph M. Battle Jr., 53
Sunset, La., March 2006

Thomas Wayne Campbell (EM '54)
New Orleans

George Corning Fraser III, 83
Abilene, Texas, Feb. 8, 2006

Robert Reid Lamb (EM '49)
Plano, Texas

James Edwin Vause, 77
The Woodlands, Texas
Feb. 27, 2006

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

EMD

from page 41

companies submitted most of the nominations, and a majority of the Colorado nominations were for testing in situ technologies.

A team consisting of personnel from the Department of Energy, appropriate agencies of the three states and the BLM ranked the 20 nominations by their merits. The results were forwarded for final approval by the Department of the Interior (DOI). The DOI will announce the results this spring after completing a comprehensive Environmental Impact Statement.

* * *

Relatively small oil shale industries are operating in Europe, South America and Asia.

The largest is in Estonia, where high-grade marine oil shale (kukersite) of Ordovician age has been mined for many years (figure 2, page 41). About 12 million metric tons of oil shale is mined yearly in several underground and open pit mines. About 85 percent is burned as fuel in several large electric power plants in northeastern Estonia and the remainder is retorted for shale oil, which is used in the manufacture of fuels and petrochemicals.

Although the Estonian oil shale industry has been a major source of airborne and water pollution in the past, burning the shale in new circulating bed combustors that are being installed in two electric power plants has significantly reduced air pollutants.

In Brazil, oil shale in the marine Permian Iratí Formation, mined by open pit near the town of Sáo Mateus do Sul in the state of Paraná, is retorted for shale oil, liquefied petroleum gas, sulfur and fuel gas.

Shale oil is produced from Tertiary shale of lacustrine origin at Fushun in the province of Liaoning, China. Until 2005, Australia was producing shale oil from the Stuart oil shale, a lacustrine deposit of Tertiary age, in eastern Queensland. The shale was retorted in an Alberta Tacuik Processor, a horizontal retort. Over a million barrels of low sulfur shale oil have been produced and marketed.

The operation is currently closed for economic evaluation.

Although these oil shale operations represent only a small fraction of the world fossil energy market, potential resources of oil shale are huge. In 2003, an inventory of the world's resources by the U.S. Geological Survey (included 39 countries) was estimated to be about 3.3 trillion in-place barrels of shale oil, but the ultimate resource is undoubtedly much larger.

An estimated l.7 trillion barrels are in the Green River deposits in Colorado, Utah and Wyoming, of which one trillion barrels are in Colorado. How much of the Green River resource is recoverable using today's mining and retorting technologies has yet to be determined, but likely it will exceed several hundred billion barrels.

Another potential resource of shale oil in the United States is the Devonian-Mississippian marine black shales of Kentucky, Indiana, Ohio, Alabama and Tennessee. The best of these shales contains an estimated 189 billion barrels in near-surface beds amenable to open-pit mining.

* * *

The world is thus well endowed with oil shale resources. The question is: Can shale oil be recovered economically to compete with petroleum?

Estimates of the lead-time to construct a 50,000 barrel-per-day oil shale plant are in the range of 10 to 20 years. If world petroleum production peaks within the coming decade, it would be advantageous for the government and industry to move soon on a plan of action. The Department of Energy and some major oil companies have taken steps in planning for an oil shale industry, and the BLM has started leasing research and development sites in the western states.

Historically, energy sources have moved from wood to coal to oil and gas. Possibly shale oil will become the bridge between the impending shortage of petroleum in coming years and a transition to hydrogen and renewable energy sources.

(Dyni and Johnson are both with the U.S. Geological Survey, Denver. All trade, product and firm names are used for descriptive purposes only and does not imply U.S. government endorsement.) ❑

EMD Announces Election Results

The Energy Minerals Division has announced election results for 2006-07 officers.

New officers are: **Douglas G. Patchen**, West Virginia Geological and Economic Survey, Morgantown, W.Va, president-elect; **Jack C. Pashin**, Geological Survey of Alabama, Tuscaloosa, Ala., vice president; and **Elizabeth B. "Betsy" Campen**, Campen Consultants, Billings, Mont., secretary.

Councilors are: **Charles M. Boyer II**, Bridgeville, Pa. (Eastern); **M. Ed Ratchford**, Little Rock, Ark. (Mid-Continent); **James G. Clough**, Fairbanks, Alaska (Pacific); and **Laura L. Wray**, Denver (Rocky Mountain).

They join on the EMD Executive Committee **William A. Ambrose**, Bureau of Economic Geology, Austin, Texas, president; and **Kerry David Newell**, Kansas Geological Survey, Lawrence, Kan., treasurer.

University of Houston

Petroleum Geophysics Summer Short Course Program May 1 - September 8, 2006

Registration at: http://www.geosc.uh.edu/summer2006geophysics.php
Location : Rm 207, SR 1 Bldg.

Course #	Dates	Course Title and Instructor(s)	Course Fee
1	May 1 - May 12 8 - 12 Noon	**Geophysical Data Processing** Dr. Hua-Wei Zhou	$2,000
2	May 15 – May 26 8 - 12 Noon	**Seismic Amplitude Interpretation** Dr. Fred Hilterman	$2,000
3	May 29 - June 9 8 - 12 Noon	**Rock and Fluid Physics** Drs. John Castagna & De-Hua Han	$2,000
4	June 12 – June 23 8 - 12 Noon	**Reservoir Geophysics** Dr. John Castagna	$2,000
		Current Topics In Geophysics Series (1 Day Courses)	
5a.	26-Jun 8:00 a.m. - 5 p.m.	**Time Lapse Seismic Analaysis** Dr. David H. Johnston	**Now closed**
5b.	27-Jun 8:00 a.m. - 5 p.m.	**Pore Pressure Prediction with Seismic** Dr. Alan Huffman	$525
5c.	28-Jun 8:00 a.m. - 5 p.m.	**Seismic Velocity Model as an Interpretation Asset** Dr. Phillip S. Shultz	$525
5d.	29-Jun 8:00 a.m. - 5 p.m.	**Seismic Anisotropy in Exploration and Exploitation** Dr. Leon Thomsen	$525
5e.	30-Jun 8:00 a.m. - 5 p.m.	**Responding to Pressing Seismic Challenges: Depth Imaging Beneath an Ill-defined Overburden** Dr. Arthur Weglein	$525
		Discount for all four open courses	**$2,000**
Course Break	**July 3 - July 14**	**Recess - Two Weeks**	
6	July 17 - July 28 8 - 12 Noon	**Seismic Wave and Ray Theory** Dr. Fred Hilterman	$2,000
7	July 31 - Aug 4 8am – 4:45pm	**Application and Interpretation of Converted Waves** Drs. James Gaiser & Robert Stewart	$2,000
8	Aug 7 - Aug 19 8 - 12 Noon	**Seismic Migration** Dr. Hua-Wei Zhou	$2,000
9	Aug 21 - Aug 25 8am – 4:45pm	**Seismic Modeling** Dr. Kurt Marfurt	$2,000
10	Aug 28 - Sept 8 8 - 12 Noon	**Use of Gravity and Magnetic Data in Exploration** Dr. Stuart Hall & Dr. Dale Bird	$2,000

ceri

26th Oil Shale Symposium

Announcement and Call for Abstracts

The Colorado Energy Research Institute (CERI) at the Colorado School of Mines is pleased to announce the **26th Oil Shale Symposium** to be held at the School of Mines campus **October 16-18, 2006**, and to invite submission of abstracts for presentations and posters. The meeting will be followed by field trips on **Oct. 19-20, 2006**. CERI will also conduct a workshop on **Oct. 19, 2006** to define environmental issues and related research needs associated with oil shale, as part of the path forward for commercialization of alternative fuels.

The Symposium will address oil shale development worldwide, including research & development, impact analysis, regulatory framework, and project & program status. Abstracts must include title, authors names (presenter denoted by *), affiliations and contact information. Abstract must be written in clear English, must not exceed 250 words, and will be reviewed by technical program teams in four areas: Technology & Projects, Resource Evaluation, Environmental Impact, and Policy & Socioeconomic Impact. **The deadline for submission is June 30, 2006.** Electronic submission is strongly preferred. Submissions may be made at the Website:

http://www.mines.edu/research/ceri/form1.html

Notification of acceptance will be made by **August 1, 2006**. Additional information will be posted at:

http://www.mines.edu/research/ceri/

For further information, please contact:

Dr. Jeremy Boak, Symposium Co-Chair
Colorado School of Mines,
1500 Illinois Street, Golden CO 80401
1-303-384-2235 jboak@mines.edu

Challenges, Opportunities Explored at APPEX London

In the ongoing high price environment there are some major, looming challenges, an APPEX London gathering of about 300 was told in March.

APPEX London, which ran over three days in March, is operated by AAPG with endorsement from the Geological Society of London, the Energy Institute and the International Association of Oil and Gas Producers. It included an international prospect expo that drew 33 exhibitors and information forums.

IHS coordinated the APPEX Global Perspectives Forum, with ABN-AMRO sponsoring the Finance Forum.

Challenges cited by speakers include:

✓ Heightened political uncertainties, as free market politics give way to leftist "populist" governments with increasing state control of resources.

✓ A more competitive landscape, as national oil companies begin competing outside the country boundaries and with each other.

✓ E&P costs are rising at a double-digit pace while the discovery size is shrinking.

All this while a manpower crisis is looming as companies look to replace half of its work force that will retire in seven-10 years from a populace which, according to an October 2005 Harris Poll, ranks the petroleum industry reputation at less than that of the tobacco industry.

Despite these obstacles, however, there are opportunities, including:

✓ Expanded capacity expansion plans.

✓ Growing investment.

✓ More drilling in mature areas.

✓ New technology.

✓ New frontiers becoming available.

The program also looked at the opportunities in specific geographic areas. A Latvia official at the meeting told *Upstream* magazine that a second offshore licensing round was forthcoming. *Upstream* also included a report on a talk on reservoir evaluation by President Pete Rose. ❑

CLASSIFIEDADS

POSITION AVAILABLE

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DIRECTOR'S CORNER

Legalities Can Bring Complications

By RICK FRITZ

As a U.S. 501(c)(6) non-profit corporation, we have strict U.S. laws and tax guidelines that we must follow.

Spring skiing in the Wasatch Mountains of Utah is one of my favorite recreations. I usually take my family each spring break and join Tom Chidsey (convention chair for our 2003 annual meeting in Salt Lake City) and his family for a little R&R.

In past years, Tom and I would have to stop and wait for our kids to catch up. Now if we stop to take a rest our kids fly past us and head for the bottom of the hill.

This year, late on the first day, a storm came in and we had some rough conditions. My son, Ian, fell in front of me, and while I was watching him I fell pretty hard and it knocked the air out of me. It was the first time I had the experience of looking up to see several concerned talking-heads asking me if I was "OK?!" (Most already had their cell phones out.)

I couldn't speak so all I could do was groan and wave. Tom skied down and told everyone not to worry – I think he said that I was from Oklahoma, and that explained everything.

* * *

The experience made me think about risk and how we sometime find ourselves suddenly in complicated conditions. AAPG is experiencing a set of complicated business conditions and we are constantly evaluating the risk of operations.

When considering risk it is important to understand that the difference between the Winter Olympics and the Summer Olympics is that one is "slippery." In other words, usually you can be assured that an Olympic swimmer will come close to their best time once they hit the water; in the Winter Olympics, even the best Olympian can slip and fall at the end.

U.S. snowboarder Lindsey Jacobellis found that out the hard way in the recent winter games when she had the gold medal assured, but decided to take the risk and add one extra flip at the end of her run. Now she wears silver; not that there's anything wrong with that!

In the past century, surrounding basic business conditions for our Association were sound and "not so slippery." Now, due to dynamic world events and litigious trends we see major changes – especially in areas of insurance, safety, security, legality and world politics. All of these are intertwined and increasingly complicated.

For example, AAPG is one of the world leaders in developing and promoting field trips. In the past we had a blanket insurance policy that covered all of our field trips. No problem – we talked to our insurance agent once a year and that was that.

Now we are required to present each field trip to the underwriter for evaluation and coverage. The result is several new layers of bureaucracy with required procedures.

Safety is another important issue on which we spend an increasing amount of time, especially for field trips. Thanks to ExxonMobil, which donated their field safety manual, we now have available to the geoscience community a comprehensive field trip safety guide, portions of which ultimately will be applied to our field seminars. AAPG has published the guide in hardbound, and we are distributing it to all AAPG Regions and Sections and making it available for all affiliated societies and student chapters.

Certainly, safety and attention to insurance procedures are good for participants, but it does increase the cost of doing business. I assure you that we are doing everything possible to make our field trips safe and secure with not overly complicated legal procedures. AAPG is dedicated to being a leader in providing good field trips worldwide.

* * *

Security is another area of increasing attention by AAPG staff and consultants. All possible scenarios must be considered for any major event. Since 9/11, security costs have doubled at most events.

Also, each year there are a multitude of legal considerations. I am often asked why we cannot take some action and, in many cases, it is because, as a U.S. 501(c)(6) non-profit corporation, we have strict U.S. laws and tax guidelines that we must follow.

Sarbanes-Oxley procedures will be required for most U.S. non-profit corporations in the near future, and we already are preparing for that event – one more layer of complexity.

As we grow internationally there are a multitude of new legal obligations. As we de-centralize and open offices around the world there are tax implications and local rules and procedures that we must understand and follow.

Finally, legal issues and world politics often clash. As a scientific society we often say that "geology has no borders." Recently, however, we were restricted from publishing articles from a U.S. sanctioned country, because much of the data in the article came from the national oil company of that government (see page 38).

Why am I writing about these complexities? I'm not complaining (well, maybe a little). As a member, I find it's always good to let other members know how we spend some of their dues and "why" there is overhead. We also want to assure you that we are doing everything possible to take care of business.

* * *

When Tom and I stopped to catch our breath on the mountain, we laughed and said the good news is that we are the oldest guys on the mountain (at 250 pounds, I also can be one of the fastest guys down the mountain).

The good news for AAPG in this new business climate is that we are vibrant and still have great opportunities for growth and development worldwide.

Energy Minerals Division

Will Oil Shale Be a Major Player?

By JOHN R. DYNI
and RONALD C. JOHNSON

The recent increases in petroleum prices have spurred renewed interest in the development of oil shale resources worldwide, including the vast deposits of the Green River Formation in Colorado, Utah and Wyoming.

Oil shale has been a difficult commodity to exploit economically. Since the early 1900s, many attempts have been made to wrest shale oil from the Green River deposits, but with little success. The higher costs of mining oil shale, the lack of a viable technology to economically recover oil from the shale and the cost of environmentally acceptable disposal of waste rock have been limiting factors in developing an oil shale industry.

Shell Oil Co., for one, hopes to resolve these constraints with its in situ retorting technology being field tested in the Piceance Creek Basin in northwestern Colorado. This process involves placing an electrical heating element in a heater hole, which is surrounded by a number of closely spaced production wells (figure 1).

The shale must then be heated for several years to reach a temperature at which the organic matter decomposes into hydrocarbons for recovery by the production wells.

One major advantage of this method is that the inert mineral fraction, which amounts to 75-85 percent by weight of the raw oil shale, remains in place. The in situ process may not require mine workings or large surface plant facilities to crush and retort the shale, and it avoids the necessity of removing overburden and waste shale to dumps with its consequent environmental problems.

Photo courtesy of Shell Oil

Figure 1 – Array of heater wells and producer wells with pumping jacks at the Shell Oil Mahogany Project site in the Piceance Creek Basin, Colorado.

Photo taken in 2005 courtesy of Heikki Bauert, Tallinn, Estonia

Figure 2 – Panoramic view of a room-and-pillar oil shale mine in northeastern Estonia. The thickness of the mined oil shale (kukersite) is about 2.5 meters. Oil shale is also mined by open pit at several nearby localities.

However, factors that need to be determined prior to in situ commercial production are:

✓ The cost of the energy required to heat the oil shale.

✓ The amount of surface area that will be disturbed.

✓ The disposal of produced water.

✓ The potential for groundwater pollution.

In addition, protection or recovery of potentially valuable sodium carbonate minerals commingled with oil shale – including nahcolite ($NaHCO_3$) and dawsonite [$NaAlCO_3(OH)_2$] – in the deeper part of the Piceance Creek Basin must be considered.

* * *

The U.S. government has tasked the Bureau of Land Management (BLM) with augmenting a research and development program for the Green River oil shale deposits on federal lands in Colorado, Utah and Wyoming.

Twenty nominations for 160-acre RD&D (Research, Development and Demonstration) tracts on federal oil shale lands were initially received by the BLM in 2005. Ten were in Colorado, nine in Utah and one in Wyoming. Major energy

See **EMD**, page 39

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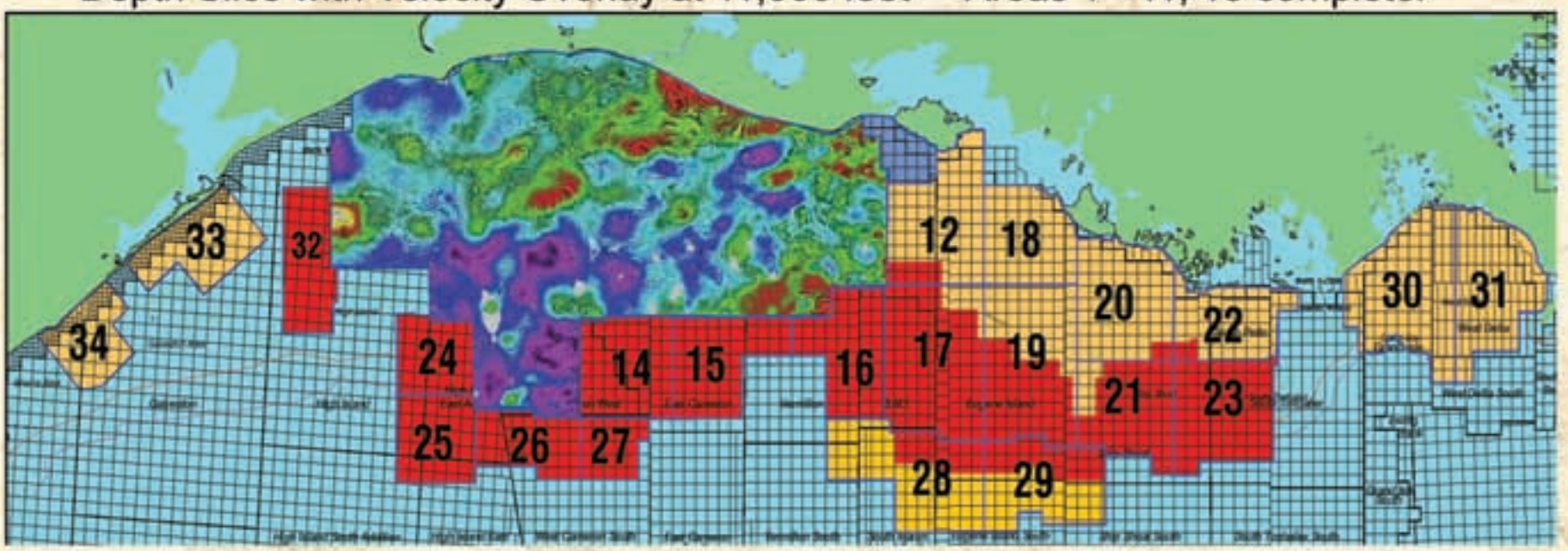

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