AAPG AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, AN INTERNATIONAL ORGANIZATION

INTERNATIONAL roundup

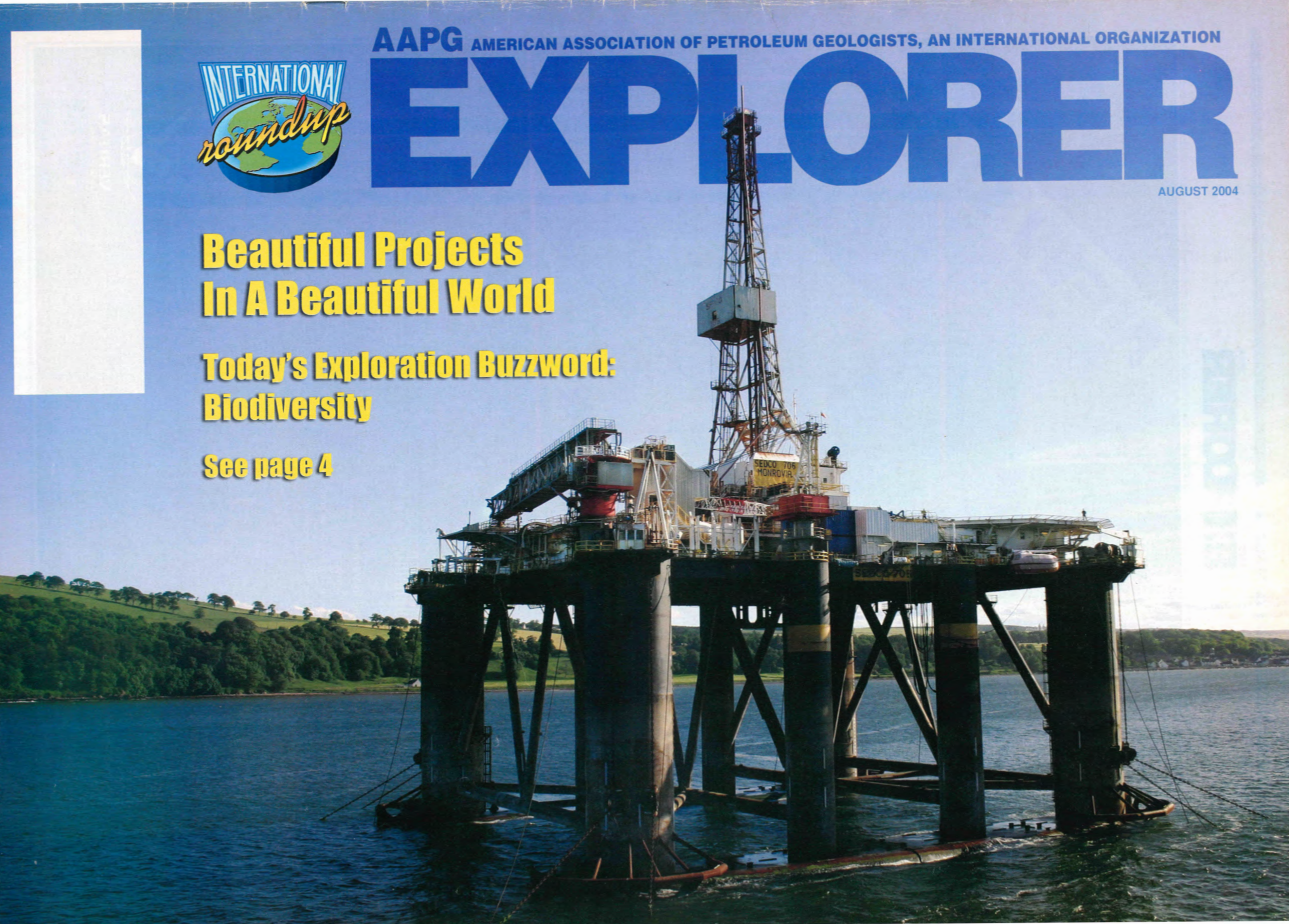
# EXPLORER

AUGUST 2004

## Beautiful Projects In A Beautiful World

## Today's Exploration Buzzword: Biodiversity

See page 4



Vol. 25, No. 8
August 2004

AAPG EXPLORER

Alaminos Canyon...

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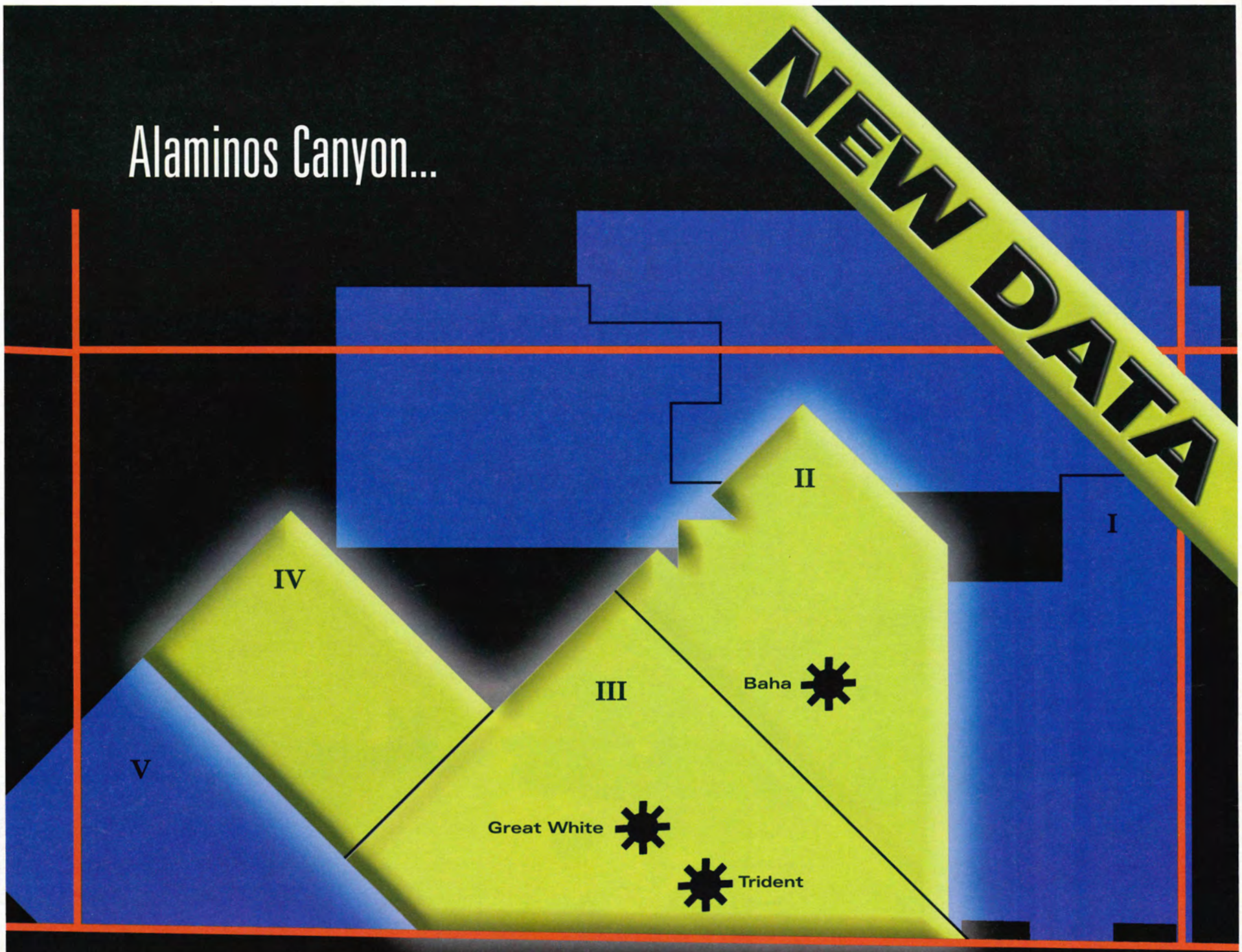


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**On the cover:** The challenge of finding new reserves is pushing explorationists into new areas – and often into locales that are environmentally sensitive. Can the two priorities co-exist? As shown here, an operation in Cromarty Firth near Invergordon, Scotland, the answer is yes. For a report on the oil industry's exploration efforts in such sensitive areas, see page 4. Photo courtesy of the Center for Environmental Leadership in Business at Conservation International.

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*Photo courtesy of Bill Ayrton*

Geologic beauty that rivals any on earth surrounds and dominates the site of the 2005 AAPG annual meeting, which will be held June 19-22 in Calgary, Canada – for example, this view of the Three Sisters, found at nearby Banff, is a magnet for geologists and nature lovers of all ages. The Calgary meeting's call for papers is now ready and can be found in a special insert at page 13 of this issue of the EXPLORER.

## PRESIDENT'S COLUMN

# VGPers Are Message Bearers to Students

By PATRICK J.F. GRATTON

AAPG has more than 80 committees, including standing, ad hoc and those of the House of Delegates, the divisions and the Advisory Council. There are over 800 "slots" for committee members, so our members literally cover the waterfront and more!

Looking at the committee structure, it is easy to recognize that many committees overlap and that their interrelationship has been unattended in many instances.

One topical area, student-focused committees, has needed oversight and coordination for many years. Attempts to make these committees coordinate better have been made over the last few years with limited success.

Major student-related committees include Academic Liaison, Grants-In-Aid, Student Chapters, Youth Educational Activities, Visiting Geologists, Student Expo, Student Job Fair and Virtual Student Expo. Nearby "cousin" committees are Future of Earth Sciences and Distinguished Lecture.

In order to harness the energy of these committees, I've established the Student Focus Coordinating Ad Hoc Committee, under the leadership of Denise Cox. This committee will work to deliver to colleges and other educational venues the full force and effect of AAPG's substantial educational commitment.

Gratton

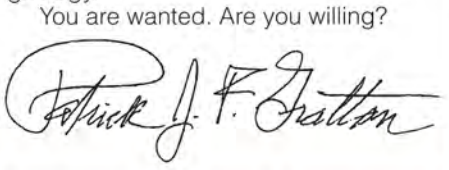
The Student Focus Coordinating Committee will directly interface with Mike Mlynek, student affairs coordinator on the AAPG staff.

If you would like to be part of this refocused and organized effort please contact Mike at students@aapg.org (telephone 918-560-2653) and discuss committee assignment opportunities. Mike will forward that information to me and I will discuss with the appropriate chair(s).

* * *

The ambassadors in this program will be the Visiting Geologists. AAPG has great need for more VGPers. Visiting Geologists bring the message of what it is like to be a professional geologist to students. VGPers are not Distinguished Lecturers; they are practicing folks capable of relating to those learning geology.

You are wanted. Are you willing?



## Abstracts Sought for Historic Conference

A call for papers has been issued for a new jointly sponsored oil and gas conference and exhibition with historic implications.

The International Petroleum Technology Conference will be held Nov. 21-23, 2005, in Doha, Qatar – the first meeting ever to be jointly sponsored by AAPG, the European Association of Geoscientists & Engineers, the Society of Exploration Geophysicists and the Society of Petroleum Engineers.

The IPTC will be a biennial event that will not only serve our traditional E&P sectors but also will cover midstream activities and have a significant focus on gas.

Abstracts will address four topical areas:

- ✓ Exploration.
- ✓ Production.
- ✓ Reservoirs.
- ✓ Midstream gas.

More information on the IPTC and the call for papers can be found in a special insert at page 32 in this month's EXPLORER. ❑

AAPG EXPLORER

## A Proactive Approach to Conservation

# Biodiversity: Breaking New Ground

By DAVID BROWN
*EXPLORER Correspondent*

Biodiversity issues may shape the future of global exploration for the oil and gas industry.

Proponents of the industry's current biodiversity initiatives believe two things.

First, that a significant number of future exploration prospects will be in environmentally sensitive areas.

Second, that the industry's ability to operate in those areas will depend not only on politics and economics, but also on its past success in protecting biodiversity.

Or, its failure to do so.

The petroleum industry has struggled with biodiversity since it emerged as a key concept more than a decade ago.

Today, efforts center on developing formal standards and processes for work in biodiversity-sensitive areas.

*Photo courtesy of Center for Environmental Leadership in Business at Conservation International*

**Who said oil and water don't mix? Companies involved in the global biodiversity initiative are pioneering ways to explore for resources in environmentally sensitive areas, such as this scene offshore Invergordon, Scotland – not far from Loch Ness.**

### Biodiversity Defined

For much of the oil and gas industry, biodiversity remains a hazy concept.

"The big point is, there's an increasing awareness of biodiversity," said Christopher Herlugson, a biodiversity specialist and senior adviser-environmental impact for BP International in Houston.

"I think a lot of people don't understand it, so they're afraid of it," he said. "It's about being smart in the way you operate."

Biodiversity can be difficult to define, even for those who deal with its day-to-day importance.

As a concept, it includes three main aspects, according to Patrick O'Brien, consulting environmental scientist for ChevronTexaco Energy Technology in Richmond, Calif.

O'Brien said biodiversity involves:

❑ Species diversity – the total number of species in life on Earth.

❑ Genetic diversity – "basically the complex of all genetic material available."

❑ Ecological diversity – "all interactions organisms have within their environment and with each other.

"It's a very, very broad concept," he said. "The difficulty is, how do you translate that world view down to what it means to drill an oil well in a particular area?"

While biodiversity involves a new, proactive approach to conservation, it also can be seen as an extension of past environmental efforts.

"We've been doing biodiversity for a long time, just under different names. Now the industry is getting more pressure to go beyond the letter of the law in doing things that will have a positive effect on biodiversity," Herlugson said.

No one should doubt that oil and gas operations in biodiversity-sensitive areas will have an effect, according to Herlugson.

"In the extractive industries, there's always going to be an impact," he said. "Some impacts are going to be very transitory, some are going to last 30-plus years."

### NGOs and Others

Identifying the major players in biodiversity can feel like swimming through alphabet soup. In the petroleum industry, two important coalitions operate through non-governmental organizations, known as NGOs.

One is the Energy and Biodiversity Initiative (EBI), convened and managed by the Center for Environmental Leadership in Business (CELB), itself a division of Conservation International (CI).

In addition to CI, the EBI's members are:

✓ Shell.
✓ BP.
✓ ChevronTexaco.
✓ Statoil.
✓ The Nature Conservancy.
✓ The Smithsonian Institution.
✓ IUCN-The World Conservation Union.
✓ Fauna & Flora International.

The other is the industry's Biodiversity Working Group, established by the International Petroleum Industry Environmental Conservation Association (IPIECA) and the International Association of Oil and Gas Producers (OGP).

These organizations working on approaches to biodiversity are both pro-environment and pro-development – good news for the petroleum industry.

"We don't want to put ourselves in a position that's oppositional to industry," said Assheton Carter, CI's director, energy and mining. "But we want to work on those issues that are common to both industry and conservation."

### Biodiversity Initiatives

Last fall, the EBI issued an initial report, "Integrating Biodiversity Conservation Into Oil & Gas Development," which made a dozen recommendations for melding biodiversity protection with oil and gas operations.

Carter said oil companies can evaluate the report's findings and begin to refine a more global approach to biodiversity conservation.

"Large multinational companies are more likely to work on one standard across their group of peer companies, because it's very difficult to have different standards," he said.

Kit Armstrong is adviser-global policy & strategy in ChevronTexaco's Health, Environment & Safety Department in San Ramon, Calif.

She's active in both the EBI and the Biodiversity Working Group administered by IPIECA.

"The working group's current work program has been largely focused on three areas," she said. Those are developing regional workshops; trying to share best practices in biodiversity management; and promoting consideration and uptake of the tools developed by the EBI.

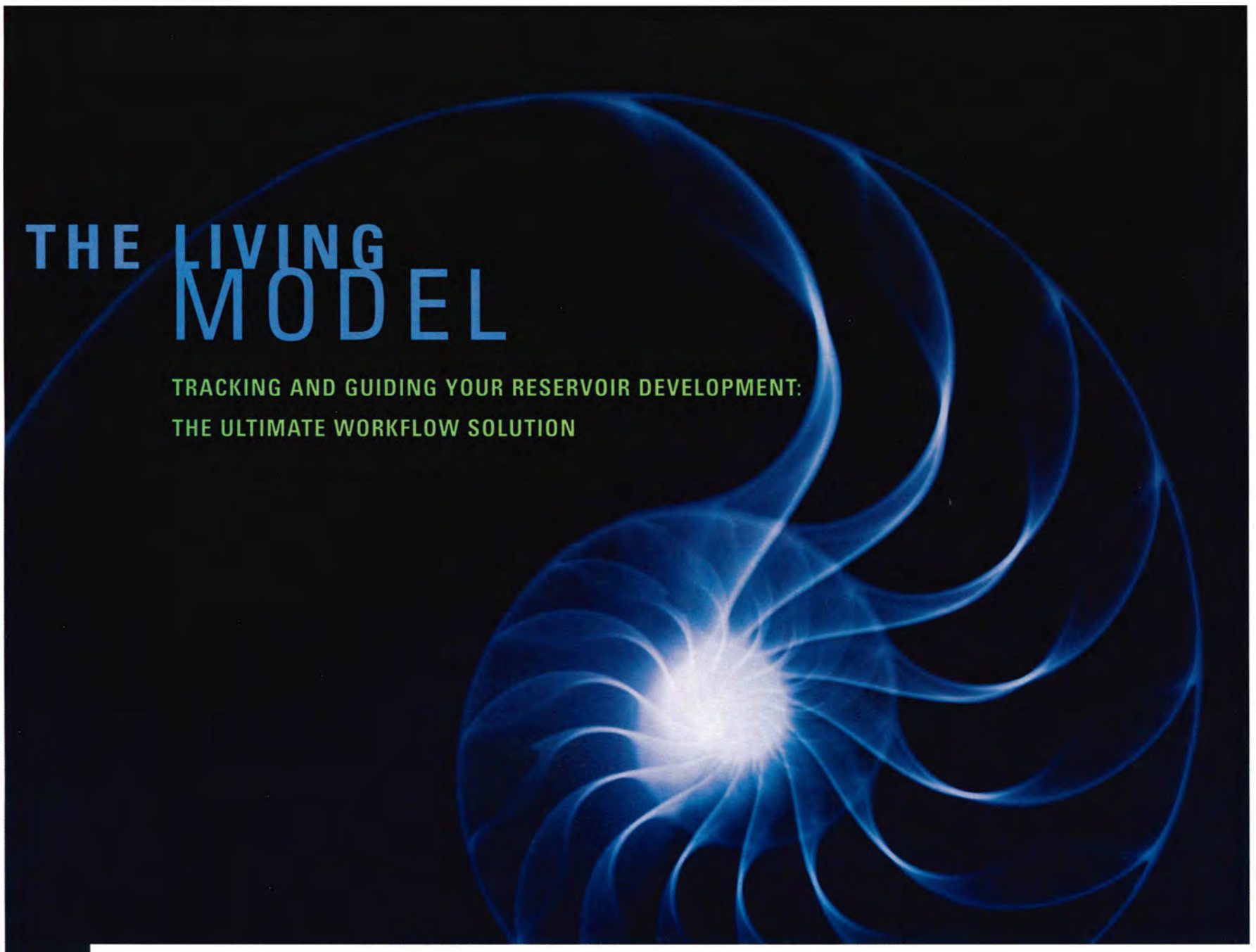
Herlugson agreed that oil companies need a more formal approach to protecting and fostering biodiversity.

"We are trying to put some processes in place that the industry can call on," he said. "Our stakeholders want to understand how we make decisions that will have environmental consequences."

See **Biodiversity**, page 6

**OPTIONS FOR BENEFITING BIODIVERSITY CONSERVATION**

| MOST OUTSTANDING BIODIVERSITY NEEDS/CHALLENGES | POSSIBLE OPPORTUNITIES FOR BENEFITING BIODIVERSITY CONSERVATION |
|---|---|
| Lack of resources/structure to manage protected areas | • Trust fund, financial contribution to protected areas management<br>• Support for creation of a new protected area |
| Important, threatened and unprotected ecosystems or species | • Manage concession as protected area<br>• Sponsor campaign to protect ecosystem by using charismatic, endangered flagship species<br>• Support conservation easements |
| Lack of government/scientific capacity to study and manage biodiversity | • Support for scientific research and analysis<br>• Support for technical capacity-building and training<br>• Support for managerial capacity-building in government agencies |
| Lack of public awareness of, or involvement in, conservation | • Support for environmental education and awareness building<br>• Support for integrated conservation and development |

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# Biodiversity

from page 4

At this point, the industry is beginning to envision an overall approach to biodiversity through studies, reports and analysis of projects in sensitive areas.

"The next stage is to make that more systematic," Carter noted.

"Over the next few years, we should start to develop biodiversity measures, metrics and performance indicators," he added, "and work out how best to report that."

### Showcase Projects

Instead of relying on theoretical approaches, some companies support demonstration projects that bring biodiversity issues into the development process.

Herlugson said BP has a detailed Biodiversity Action Plan for its Tangguh LNG project in and around Bintuni Bay in Papua, Indonesia.

"Berau Bintuni Bay is a biologically diverse and physically dynamic environment located on the southern edge of the Birds Head peninsula. An old-growth mangrove stand area – globally considered as the most extensive, best developed and least disturbed in Southeast Asia, and currently proposed as a strict nature reserve by the Indonesian government – is located 80 kilometers to the east of the Tangguh site," Herlugson said.

In the 1990s, exploration found two super-giant gas fields in Papua, Wiriagar Deep and Vorwata.

When BP assessed an LNG project in Papua, it considered biodiversity effects across the Bintuni area, according to Herlugson.

The company identified several biodiversity concerns, including impacts from illegal logging and prawn fishing to the extensive mangrove stand, well outside the area influenced by Tangguh.

"It's one of the largest intact mangrove ecosystems in the world, a world-class ecosystem that's in the vicinity of our project," Herlugson noted.

He said BP has worked through the Conservation Training and Resource Centre in Bogor to develop appropriate management and protection measures for this important area.

Carter sees this extended approach as a vital part of biodiversity planning for oil and gas companies.

"It's thinking how their entry point into an area is going to affect the biodiversity linkages in the entire ecosystem. That means they have to think outside their concession," he said.

Several other oil companies are involved in projects, programs and special studies that focus on biodiversity issues.

For example, the Shell Foundation has funded a $2.8 million biodiversity project in Gabon, conducted by the Smithsonian Institution's Monitoring and Assessment of Biodiversity Program.

### Biodiversity Issues

Evolving issues related to biodiversity also affect the oil and gas industry.

The most controversial might be the concept of "no-go" areas, where exploration and development of any type would be permanently prohibited.

"The problem for companies is that the protected-area system is not well-defined in terms of geography or the criteria it uses," Carter said. "Not all of these areas were set aside for biodiversity.

"At the same time," he added, "there are areas that aren't protected that are extremely valuable for biodiversity."

Companies don't want to begin exploration activity in a region, only to have it declared off-limits later because of biodiversity concerns, Carter acknowledged.

"What we've come up with in the EBI is what we call 'site selection,' a decision-making tool so companies can ask the right questions about biodiversity before entering an area," he said.

Another issue involves secondary impacts from oil and gas operations.

"Those tend to be the consequent effects that happen because an oil and gas activity is in the area," Armstrong said.

A development project may cause a large number of outside workers to relocate to an area, disrupting the local society and infrastructure.

"What some people call 'boom towns' can get created," she added. "You have people looking for food. They may be poaching. There may be deforestation."

That type of indirect effect could be secondary in occurrence but primary in importance for biodiversity planning.

The third issue reflects friction between agencies and organizations devoted to conservation and those that support development.

"There's a growing resistance to development, just because it's development," Herlugson said. "We need to educate the public."

Public agencies, NGOs and oil companies can fall into the trap of thinking that biodiversity and development are opposing choices, according to Carter.

"They see a division between human and economic development, especially at the community level, and the conservation of biodiversity – thinking that it's one or the other, that there's a trade-off," Carter explained.

"But, really, you're pushing at the same results, because the poorest people on Earth depend enormously on their natural resources," he said.

### Biodiversity Scorecard

How effective is the industry's effort to deal with biodiversity concerns?

"I would say that it's beginning seriously," Carter said. "A year or two ago, I would have said it's just beginning. Now the oil companies realize they have to get serious."

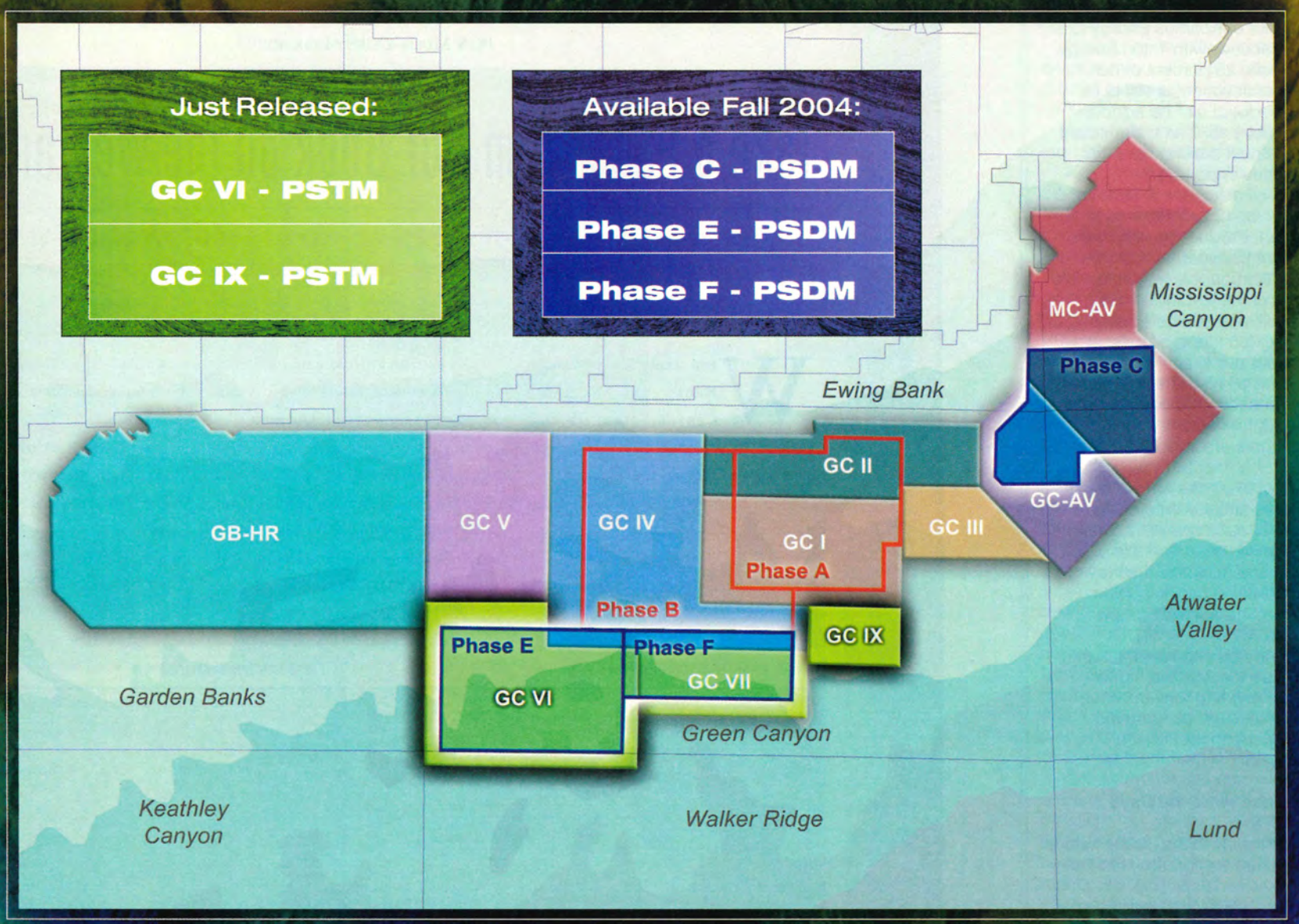
"It's too early to say that the industry has moved to a more systematic approach," Armstrong agreed.

"I see some folks in the industry who decided a number of years ago that biodiversity was going to be a key corporate issue.

See **Scorecard**, page 18

# Fresh from the GoM Gulf

GULF OF MEXICO

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## Maxted Says There's Lots of Oil Left to Find

# Explorers Facing Critical Decades

By KATHY SHIRLEY
*EXPLORER Correspondent*

Brian Maxted, one of his generation's most successful oil finders, has looked around the world and says plenty of work remains for companies and professionals willing to take on the challenges of exploration.

Maxted's remarks came during his Michel T. Halbouty lecture at the recent AAPG Annual Meeting in Dallas, when he reminded the audience that total discovered global liquid reserves are estimated at 1.9 trillion barrels, and that petroleum today accounts for about 60 percent of the earth's energy needs.

That trend will continue through about 2050, he said, when natural gas and associated liquids will increasingly be the fuels of choice.

"World oil yet to be found is estimated at 600 billion barrels, suggesting an ultimate potential resource base of 2.5 trillion barrels," said Maxted, who is founding partner of Kosmos Energy LLC and former executive with Triton Energy.

"On this basis, 25 percent of our worldwide oil endowment is still to be found – this is a lot of oil," he added. "Thus, the industry still has a significant future, with the next several decades being particularly important."

Of the total oil discovered, about 850 billion barrels – or 48 percent – have been produced. Production increased about 2 percent per year through the 1990s to 28 billion barrels a year in 2000.

By the end of the last millennium, conventional oil reserves had declined to approximately 1.05 trillion barrels, at a rate of 3 percent per year.

Extrapolating this trend suggests global oil production will peak between 2020 and 2030, he noted.

Two paradigms are important here, he said:

✓ While a lot of oil has not yet been found, "we have already entered the mature phase of our industry," he said. "Our challenge will be to find this oil in order to defer and minimize the inevitable decline in production capacity, which is caused by demand outpacing new discovery."

✓ Supply may be expected to tighten and there will be a sustained higher commodity price going forward – "and commodity price is the overarching driver of the upstream petroleum industry," he said.

### Those Were the Days

Exploration trends in the 1990s hold a harbinger of future exploration, Maxted said.

Through the 1990s, total petroleum found in giant fields of greater than 500 million barrels of oil equivalent was 156 billion barrels of oil equivalent in 77 fields. Three times more gas than oil was found, and 60 percent of the new fields were in the Middle East.

Also, 40 percent of the giant fields discovered during the decade were in deep water, and 30 percent of new oil was found in Africa.

"Two other perspectives are important to recognize about exploration in the 1990s," he said:

❑ The oil found in new giant fields during the decade was only approximately one-third of the total discovered in the 1980s.

"This continued a prevailing trend that was established in the 1970s," he said. "The 1960s was the peak decade for giant new discoveries ... by the 1990s the new giant oil fields represented only 25 percent of the total production."

❑ The increasing importance of fields with a stratigraphic component to their traps; during the past 50 years, new finds with stratigraphic traps have increased from 10 percent to almost 40 percent.

Global oil and gas discoveries in the 1990s may be rationalized into four "business opening" themes, he said. These include:

✓ **New technology** – including 3-D seismic and advances in drilling and production, which allowed the global exploration of the Tertiary deepwater delta systems.

✓ **New geography**, which provided ideological change – particularly the opening of the former Soviet-bloc countries and the advent of international participation in OPEC countries.

✓ **Increasing oil prices** – this could lead to the reopening of former exploration areas as well as new ones, including those in remote interior basins of continents or offshore rift/passive margins in high latitude regions.

✓ **Emerging gas/LNG markets** – which

continued on next page

INTERNATIONAL roundup

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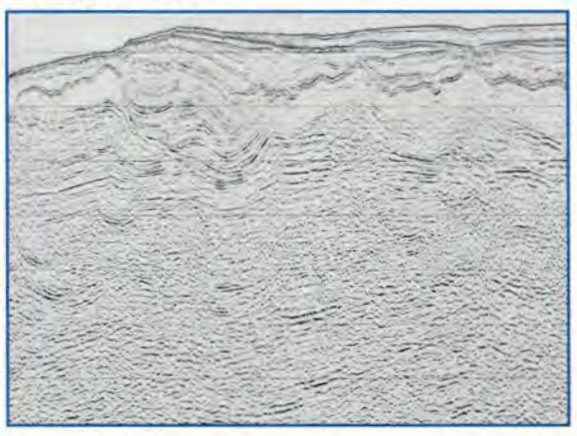

▽ Pre-Stack Depth Migration

4

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Oilfield Technology Solutions

continued from previous page

has stimulated worldwide exploration for gas.

Also, new geology may through secondary exploration develop new plays and fairways in established petroleum provinces or open new areas, he added.

### The Price Is Right?

So what does the future of exploration hold?

"We may have entered a new era with different characteristics relative to previous phases," Maxted said.

❒ Strengthening oil prices in the late 1990s will likely continue, and the industry should plan its business on the assumption of strong, long-term commodity prices.

❒ There has been a change in the relationship of oil prices, the stock market and E&P company share prices – E&P sector stock prices are not rising in line with recent oil price increases, he said.

"A disconnect is evident," he said. "I believe there are concerns about the potential for profitability due to cost pressures and continued anticipation of a price pull-back and company growth due to opportunity constraints and reinvestment ratios.

"So, should commodity prices remain high, and should the industry be able to manage costs, then its future will hinge on the ability to invest in new opportunities for reserves and production growth," he continued. "If we successfully achieve this, then E&P stocks should be robust.

That scenario will not be easy to achieve, he added. From a growth perspective, reserves and production for a large number of U.S. companies have been generally flat over the last five years and neither is expected to increase dramatically going forward – in fact, companies will continue to face the challenge of simply replacing reserves and production.

*"Exploration performance means finding what we say we are going to find and meeting expectations by delivering on predictions."*

In the last six years, industry production costs have risen by more than 30 percent from an average of $10.65 per barrel of oil equivalent to $13.95, despite a major focus on reducing costs.

"Costs of current production may be expected to continue to rise," he said. "New, cheaper sources of reserves and production are required to dilute these average total unit costs."

### World Vision

Of the 650 billion-barrel-USGS-estimate of global yet to find volumes of oil, 90 percent is outside North America. One third of the future finds are expected to be in the Middle East and North Africa with one fifth in each of the Former Soviet Union and South and Central America.

West Africa is expected to host one tenth of the world's undiscovered oil.

"Major oil and gas finds in the coming decade and beyond may be expected to be primarily focused in presently proved, developing and emerging petroleum provinces and their extensions," he said.

"Based on results to date, the current decade may potentially be a time of greater exploration success than the 1990s."

Again, the four themes that defined the 1990s will come into play, he said:

✓ Technology will allow the ultra-deepwater fairways of the established Tertiary to Recent delta systems on the continental passive margins to be explored with success. These include the Mississippi, Niger, Congo and Nile delta systems. Also, new delta systems may be proven – the Amazon, for example. New deepwater continental margins may emerge as well – notably East Africa, India, northeast South America, the Caribbean, circum-Mediterranean and Australia/Southeast Asia for either oil or gas/LNG.

✓ New geographies will continue to evolve and yield new giant fields, including OPEC countries like Libya and former disputed zones such as the Nigeria-Sao Tome Joint Development Zone in West Africa.

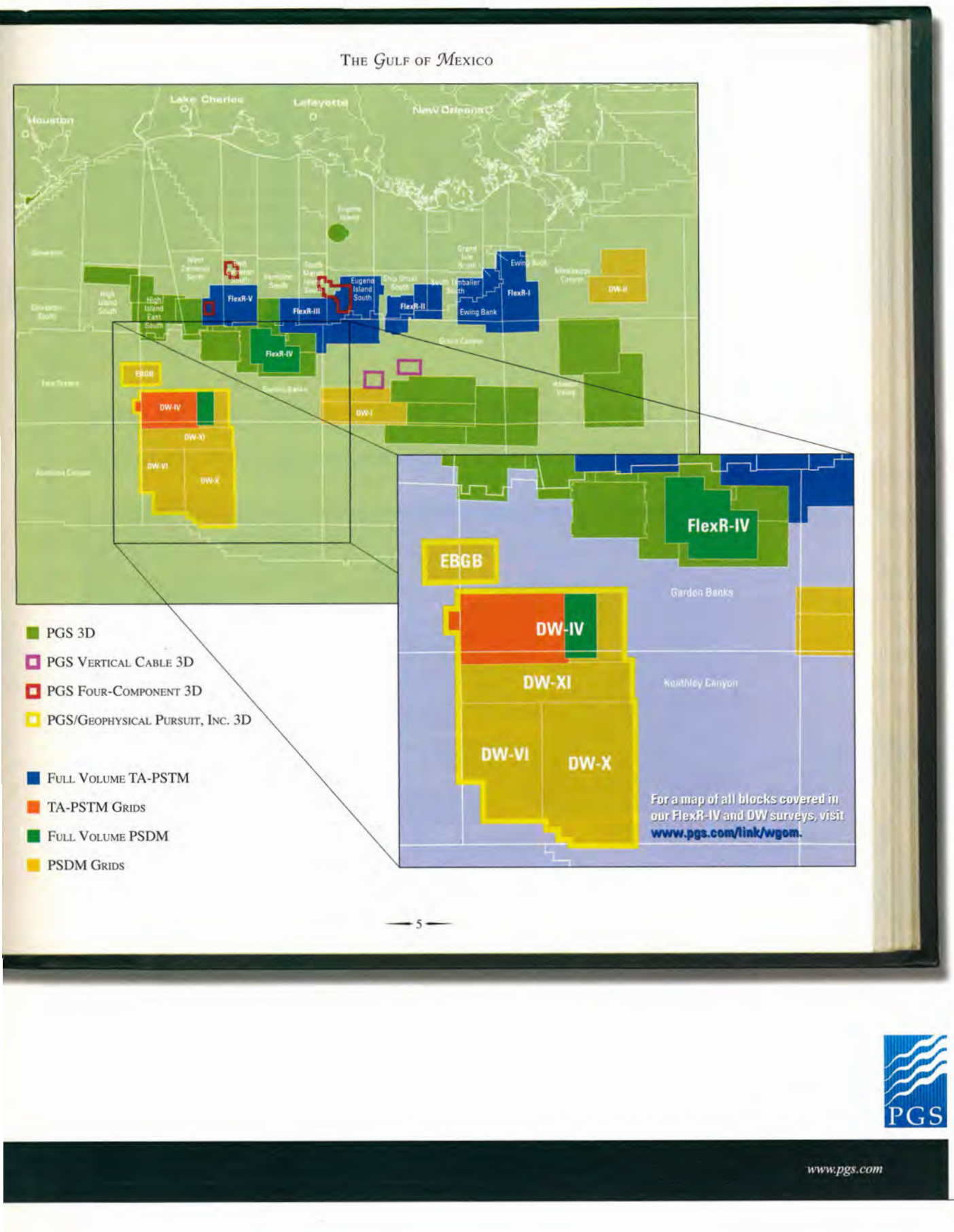
✓ Higher prices could open additional new geography in such areas as continental passive/rift margins in the higher latitudes of the Arctic, northern Norway and northern Russia, as well as the interior, intra-cratonic rift basins of Africa and the fold/thrust/foreland basins of western South America, he said.

✓ And then there's "new geology."

"(This) theme, in combination with one or more of the other primary themes I mention, has the most potential to impact future oil and gas finds by developing new plays and fairways in existing hydrocarbon systems and by opening new petroleum provinces," Maxted said.

"The growing challenge for the upstream petroleum industry continues to be consistent delivery and enhancement of value for company shareholders, partners and host governments by replacing and increasing reserves and production, and being able to do it at a competitive cost," he maintained. "For the exploration sector, the challenge is to establish a track record of successful performance, which will re-establish corporate and investor belief in the role and importance of exploration to establish, sustain, renew and build E&P companies.

"Exploration performance means finding what we say we are going to find and meeting expectations by delivering on predictions." ❑

## Cancun Session Looks at Where, How

# Resources Lurking in the Deep

By KATHY SHIRLEY
*EXPLORER Correspondent*

For 10 years deepwater has been the global exploration mantra, for good reason.

Scores of massive fields have been uncovered from primarily three main regions – the Gulf of Mexico, offshore Brazil and offshore Angola and Nigeria in West Africa.

However, as with any oil or gas province, maturity is a fact of life – which begs the questions:

How much deepwater potential remains, and where will the big new discoveries come from?

The answer, according to experts who will be sharing their information during the AAPG International Conference and Exhibition in Cancun, Mexico, is – a lot.

"A very significant resource base remains to be found, perhaps as much as what has already been discovered," said Chandler Wilhelm, who is co-chairing a session in Cancun on global deepwater operations and potential.

But what is left behind will present new challenges, Wilhelm believes, and often involve different plays than what industry already has harvested.

"Some of these plays are unproven, so we still have much to learn about the deepwater," he said.

Wilhelm is manager of exploration-new business development (America's region) for Shell Oil. His co-chair is Adan E. Oviedo-Perez with Pemex.

Of course, there are challenges – not only in discovering new volumes, but also in commercializing deepwater resources that already have been found.

"Low cost development solutions, stranded gas solutions, effective appraisal and shortening the time from discovery to market are all keys to commercializing the existing undeveloped deepwater reserves," Wilhelm warned.

### Gas Problems

These are no small challenges. While a large discovered but undeveloped resource base remains to be commercialized, the costs associated with that effort are equally large.

"The money involved and staff requirements to take discovered volumes, get them appraised, identify the optimal development solution and reach development sanction usually exceeds what it takes to actually find the discovery," Wilhelm said.

Another key for future deepwater exploration and development is natural gas solutions.

"The biggest impediment for economically developing oil in frontier deepwater settings is associated gas," he said. "Most companies have policies forbidding flaring gas, but most countries do not have well developed gas markets, so any gas typically is reinjected – a costly affair."

Technologies and markets eventually will be developed that will allow companies to actively explore for natural gas in deepwater settings – perhaps globalization of LNG or expanding local gas markets, according to Wilhelm.

"That will mean a second wave of exploration in deepwater regions," he said. "There is plenty of stranded gas in the world today that must be developed first, but at some point in the future tremendous natural gas resources from deepwater settings will become economically profitable and be an important worldwide resource."

### New Opportunities

While the Gulf of Mexico, Brazil and offshore West Africa will continue to be the deepwater exploration focus for the near term, Wilhelm indicated there are many smaller opportunities in other regions that could be attractive.

"Certainly, companies look for the

See **Deep Water**, page 18

## Deepwater Session Set for Cancun

A seven-paper session on "Global Deepwater Review With Examples of Cycle Time Reduction" will be held in the afternoon of Wednesday, Oct. 27, during the AAPG International Conference and Exhibition in Cancun.

The session, chaired by Chandler Wilhelm (see related story on this page) and Adan E. Oviedo-Perez will feature:

❒ Global Overview of Tertiary Deepwater Foldbelts.

❒ Deepwater Development: What's Next?

❒ Subsurface Learnings: Angola Deepwater Developments.

❒ Subsurface Work Processes and Technologies to Shorten Cycle Time on Major Deepwater Developments, Angola Block 14.

❒ Design One and Build Two: Cycle Time Reductions in Angola's Block 14 Tombua-Landana Deepwater Development.

❒ Early Production Systems to Reduce Cycle Time of Offshore Developments.

❒ The Future of Deepwater Oil and Gas (see related story, page 12).

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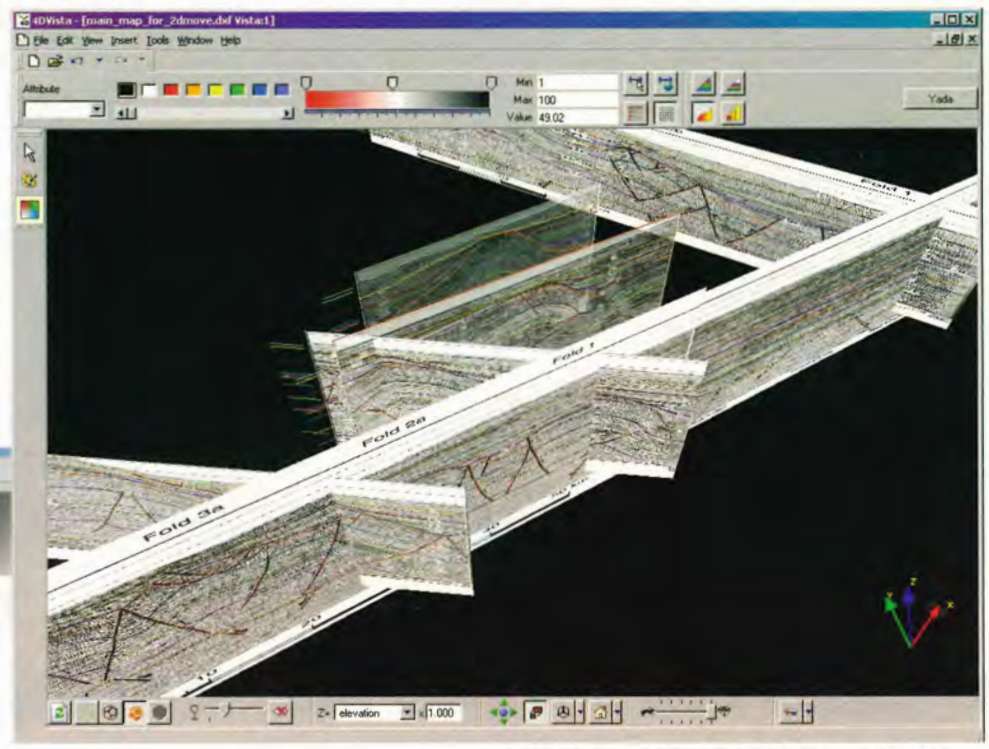


Sections courtesy of Bruce Trudgill, Colorado School of Mines.

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*Future Exploration Trends Strong*

# 'Plenty' of Deep Treasures Remain

By KATHY SHIRLEY
*EXPLORER Correspondent*

Many industry experts are quick to point out that the world holds plenty of remaining deepwater potential.

Included in that group is Edinburgh-based energy consulting firm Wood Mackenzie, which says that while 78 billion barrels of oil equivalent have been produced or already discovered in the world's deepwater regions, a whopping 182 billion barrels of oil equivalent is yet to be found.

"Deepwater exploration has accounted for over 60 percent of success in the last several years and I don't see that changing," said Andrew Latham, Wood Mackenzie vice president of energy consulting. "I would expect to see at least half and perhaps as much as three quarters of all exploration success come from deepwater and as a result deepwater should account for similar fractions of exploration budgets."

Latham will present a paper titled "The Future of Deepwater Oil & Gas" during the global deepwater technical session (see related story, page 10) at the AAPG international meeting in Cancun, Mexico.

In 2002-03 deep water accounted for 65 percent of all oil and gas discovered globally, and the deepwater reserves per well from 1996 to 2003 averaged 50 million barrels of oil equivalent compared to just 15 million barrels of oil equivalent from non-deepwater wells.

"One of the primary ways we assess the balance of risk and reward is through full-cycle returns, which measure the cost of exploration failures and successes, and the three major deepwater provinces typically achieve strong full-cycle returns," Latham said.

"Even using $20 oil prices, some of the best deepwater plays achieve full-cycle returns of 20 percent or so, with the Gulf of Mexico posting some of the highest returns," he noted.

Angola and Nigeria were not far behind in terms of performance, averaging 18 to 19 percent returns. "Going forward, we expect the average size of discoveries in West Africa to decline somewhat, but returns should remain in the 15 to 17 percent range."

Full cycle returns from deepwater Brazil have typically been lower – under 15 percent – due to geology and economics. Latham said the crude quality from Brazil is not as good as the Gulf of Mexico and West Africa, which drives down returns, and the fiscal terms are a little more onerous, making post tax returns for investors less attractive.

"Also, Brazil is very much a case of Petrobras and the rest," he said. "Petrobras has been doing very well in Brazil lately and accounts for the lion's share of success and a large fraction of all the activity. Foreign companies operating in Brazil have had only limited success and most have achieved sub-10 percent returns, which at Wood Mackenzie we consider value destruction.

"If full cycle returns are anything less than 10 percent," he said, "there are probably better things to do with your money."

### Who's Next?

Latham said it is difficult to assess with any degree of certainty where the next deepwater frontier will emerge. He did, however, mention some Western Hemisphere deepwater regions that might garner a few exploration wells in the next few years, including:

✓ The mouth of the Amazon Basin, where BP has acreage.

✓ Suriname, where there has been some interest in a licensing round.

✓ Trinidad, which is beginning to focus on generating some deepwater activity, although they have not been successful to date.

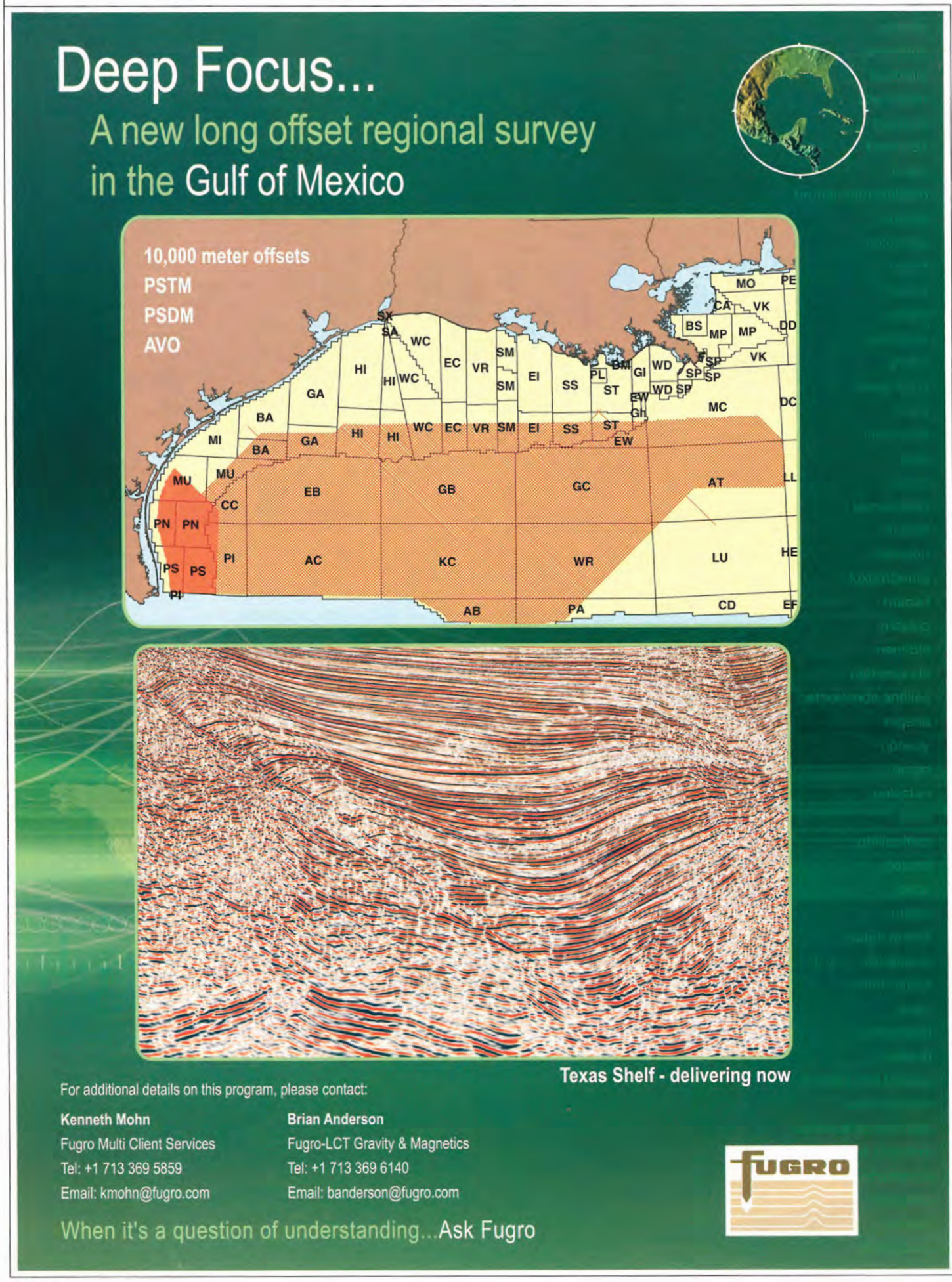
✓ Cuba.

"On the other side of the south Atlantic there are various less well-known Africa countries that might have potential," he said. "Virtually any country along the northwest African coast could be the next Mauritania.

"Companies are very focused on exploring within the main, proven deepwater provinces," he said. "The big question is what will happen when success in these areas starts to decline, but I don't think that is going to be the case in the next several years."

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



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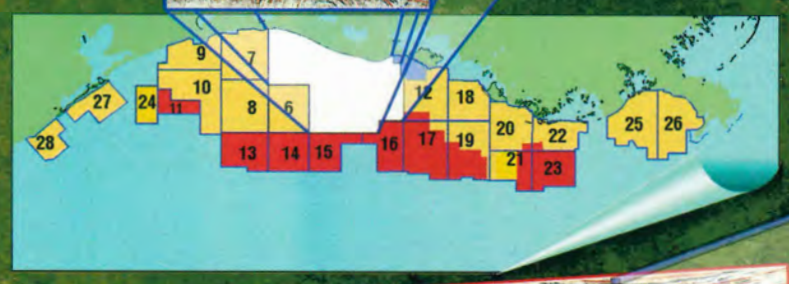


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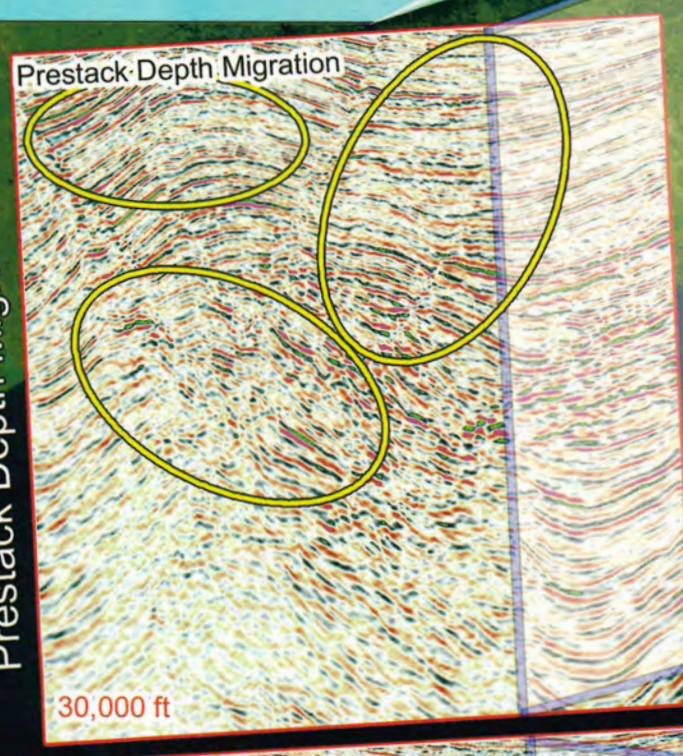


Prestack Depth Migration

Time

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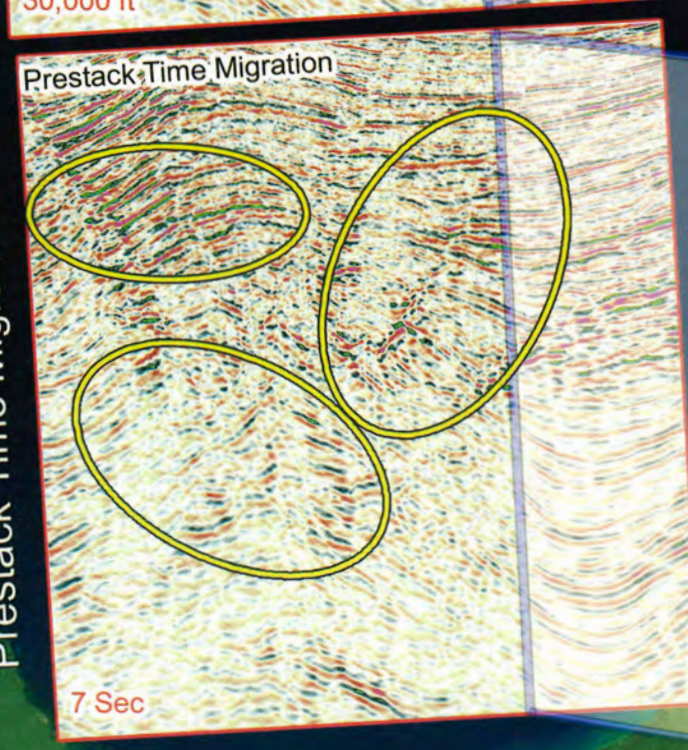


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*'Probably the Best Royalty Regime in the World'*

# North Sea Royalty Idea Paying Off

By LOUISE S. DURHAM
*EXPLORER Correspondent*

Once upon a time the mere mention of an independent staking a claim in an offshore province would have elicited laughter from the E&P community – especially in the environmentally intimidating North Sea.

But that was then, this is now.

It's the usual scenario where the big folks drill the big finds and then move on to begin again elsewhere, leaving the supposedly smaller stuff for others. Depending on who's talking, the North Sea leftovers might include 30 to 50 billion barrels of hydrocarbons waiting to be tapped.

Larger independents such as Apache, Burlington and long-time North Sea player Kerr-McGee are among the names having a current stake in the action.

Given the major discovery at the Brenda Field early this year by Calgary-headquartered Oilexco North Sea Ltd. – which has a 10-person staff – opportunities apparently are rife for even the smallest companies who are chasing new finds using the latest 'n greatest approaches, techno-wise. These include such heavy-duty applications as GX Technology's (GXT) gridded tomography package and the PGS Mega Merge – a regional 3-D data set across producing areas of the North Sea.

In fact, startups are being formed with a sole focus on E&P opportunities in the North Sea.

*Photo courtesy of Oilexco North Sea*

**Who said bigger is always better? Smaller independents, such as Calgary-based Oilexco, are finding success in the North Sea. This semi-submersible rig is one of the appraisal wells for the company's successful Brenda pool operation.**

### Newbie Heavyweights

One of these newbies is publicly-traded Endeavour International, which was created via the merger of a shell corporation formed in 2003. The new Houston-based company might best be called an independent spin-off of an independent given the background of the two founders: AAPG member John Seitz, formerly the head honcho at Anadarko, and William Transier who reigned over the finances at Ocean Energy, nee Devon, as chief financial officer.

The duo quickly assembled a staff, including former management team members from Anadarko and Ocean Energy, and hit the ground running.

"We felt the new PGS Mega Merge would serve us well," Seitz said, "so we negotiated access to that data set with PGS for a piece of our North Sea New Ventures, which was set up prior to Endeavour."

The company was an active participant in the 22nd UK offshore licensing round, and is now awaiting the results, which are due by early August.

"Depending on how many awards we receive, this would give us the nucleus of an exploration portfolio," Seitz said. "We've identified ready-to-drill prospects as well as leads that require added technical work – typically seismic or geologic analysis – that we can mature into drillable prospects.

"We're also looking for acquisitions, both asset and corporate, that would make sense and establish some cash flow," he added.

Although the Norwegian continental shelf is deemed promising, the barriers to entry for the independents are lower in the UK North Sea, according to Irene Haas, senior vice president institutional research at Sanders Morris Harris, who recently completed a research report on the North Sea and the influx of North American producers.

For instance, there's the fallow fields program administered by the UK Department of Trade and Industry (DTI), which requires operators to relinquish acreage where there's been no activity for four years and none planned for the future.

This opens the door to others to acquire licenses where wells have been drilled and orphaned and where discoveries perhaps have been made, making them attractive to a new licensee

See **North Sea**, page 16

*And 'Subtle' Doesn't Mean Small in the North Sea*

# Subtle Traps Become New Prey

When once-rampant drilling activity in a region begins declining and the majors begin losing interest, "it's all drilled up" becomes the common refrain.

A close look at the North Sea, however, suggests the oil finders may be looking for the wrong thing in many instances.

"A key thing in my mind is that 88 percent of the fields discovered are structural traps and only about 5 percent are stratigraphic traps," said Rod Christensen, chief geologist at Canadian-based Oilexco.

"It's no surprise that most companies are looking for structures," he said, "so the majors, when most big bumps are drilled, look for other places with big bumps not drilled, or big anomalies you can see on seismic."

According to Irene Haas, senior vice-president institutional research at Sanders Morris Harris, future discoveries, at least in the UK offshore, are more likely to be the under-explored stratigraphic plays, or combination structural-stratigraphic plays.

She emphasized new fields will be subtle and require better data and more rigorous analysis, which ideally will yield innovative concepts leading to new discoveries.

"When you say there are more stratigraphic traps to be found in the North Sea," Christensen said, "we're not on the downside of the exploration parabola showing just small things to be found."

He pointed to the Buzzard discovery in 2001, which is an accumulation of maybe 400 million barrels of recoverable resources. Then there's Oilexco's recent find at the Brenda field with perhaps 200 million barrels recoverable.

"I think if you go in and do AVO-type seismic work looking for stratigraphic traps rather than just using seismic to look for four-way closure on structures," Christensen said, "you're likely to find a lot more stratigraphic traps. It's like in the Gulf of Mexico where structures were drilled first and then new seismic techniques found a lot of stratigraphic accumulations."

Reinforcing this opinion, the Geological Society of London recently sponsored a conference on what was called "the deliberate search for the stratigraphic trap."

"Everyone's realizing we must start looking for these deliberately," Christensen said, "and not find them like we used to, either by mistake or for the wrong reason, such as accidentally while drilling structures."

### Tools of the Trade

The Brenda hydrocarbon accumulation and trapping mechanism initially was a head-scratcher given the differing oil/water contacts in neighboring wells that were originally thought to be the same accumulation.

To get a handle on things, Oilexco used the London-office arm of Houston-based GX Technology (GXT) – an approach that's in line with its practice of employing locally-sited companies in the North Sea region, where possible. In turn, GXT brought UK-based rock-physics experts IKON Science on board for the project.

A multi-disciplinary effort ensued to identify potential drilling targets, using both 3-D seismic and data from nearby producing and non-producing wells.

"The focus was on pre-processing of the seismic data, model building and pre-stack depth migration," said Ian Jones, geophysical adviser at GXT.

"We didn't know in advance we were dealing with a stratigraphic occurrence," Jones said, "but one of the relevant details in using the technology we used is that it preserves the amplitude information correctly so we're not destroying the stratigraphic information in processing."

Among the tools used was gridded tomography, where velocities were estimated continuously throughout the volume. Gridded tomography technology employs an auto-picker so the process is fully automated and the manpower can be focused on the Quality Control of what was picked.

Because the process is automated, huge volumes of data are run quickly on a supercomputer cluster.

A pre-processing technique known as SRME (surface-related multiple elimination) was used for multiple suppression.

"A distinguishing feature here is you don't need knowledge of the velocity field to use it," Jones said, "whereas other de-multiple techniques require you to have a good guess at the velocity."

Careful pre-processing to remove noise and multiple contamination, followed up by high fidelity 3-D pre-stack depth-migrated imaging resulted in a data volume suitable for accurate AVO and EI analysis, according to Jones.

"We happened to map a big blob of this AVO anomaly that couldn't be attributed to a structural reason to be there," Christensen said. "It had to be stratigraphic, so based on that and core work we thought that's what it was, but we still had to drill the first well to be sure.

"We also reappraised the structural interpretation based on the stratigraphic evidence," he said, "leading to a correct re-classification of the stratigraphic ties. It was intriguing to see the mis-positioning of some of the old wells based on old-tech imaging, and then to see we were spot-on with the new images."

– LOUISE S. DURHAM

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# North Sea

from page 14

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### Smart Moves

Oilexco went after a number of licenses of that ilk in the 20th licensing round in 2002. The company was awarded a license where Conoco had drilled a well in 1990 that tested 2,690 barrels per day.

"This was a delineation well, you might say, from the one drilled by Sun in the next block that tested 3600 barrels a day and a little water," said Rod Christensen, chief geologist at Oilexco. "The oil/water contact was different in the two wells, and we weren't sure if we had a little structural play or something bigger (see related story, page 14).

"We purchased 3-D shot by Conoco in 1993, and GXT reprocessed essentially 300 square kilometers," he added. "They threw everything at it they could do, including state-of-the-art pre-stack depth migration, things that companies normally don't do in this Paleocene trend."

The first well in the newly-dubbed Brenda Field spudded last December, 150 meters from the Conoco well. It encountered 75 feet of section with 42 feet of sand and was heralded as the biggest discovery in the North Sea since the 2001 discovery of Buzzard Field. Three wells and several sidetracks have now been drilled in the field, which proved to be a stratigraphic accumulation.

This was the company's first-ever offshore experience, and Christensen noted they relied on boutique-type groups in the UK to bring the drilling expertise to the table – and he strongly encourages other independents to do likewise.

"You pay," he said, "but it's smarter to use local expertise. We think Brenda may have 200 million barrels of resources recoverable, and we hope to have first production by October 2005, which is an unusual timetable considering Buzzard was found in 2001 and still isn't producing.

"Little companies can't wait for cash flow," Christensen noted. "We need to start getting return on our investment."

Oilexco took advantage of the DTI's Promote Licenses, which Haas noted are particularly interesting to new entrants. They carry a four-year initial term with a two-year decision point in which to drill or drop the license. The awardee is not the highest bidder. Instead, each interested party presents a work program designed to convince the DTI of its merit via innovative ideas and new play concepts, Haas said.

"As part of the licensing round, we had to convince the British government we were a viable candidate to receive a license," Christensen said. "We brought GXT in because we promised the government we would purchase seismic already shot and reprocess it ... we had a list of things we wanted to do with it.

"Because it's more of a work commitment there, if two or three companies want in on a license, the DTI will say you have to share certain percentages, and one will operate," Christensen said. "This can make for strange bedfellows, and sometimes nothing happens as a result.

"We told the DTI we didn't want to be randomly assigned partners," he said, "and we got three different licenses all at 100 percent. I think they understand that if they're going to bring new companies in, they have to have the latitude to find their own partners."

### New Kids on the Block

Because independents who are experienced in Promote License activity already understand the North Sea geology and have the know-how to compete for the licenses and drill, they provide an opportunity for newcomers to gain a foothold quickly.

"We acquire licenses to explore where we have identified exploration and development opportunities," said Miles Newman, exploration director at Aberdeen-based Reach Exploration. "We seek partners to assist in exploring these areas, and my view is we can provide accelerated entry into the North Sea for potential new participants with our drill-ready opportunities."

It appears there may be a growing number of new folks coming onto the scene.

"I think I saw 30 new entrants I had never heard of bid on licenses in the 22nd round," Christensen said. "The main areas they're coming from are Canada, the U.S. and the UK."

"I think as opportunities in the Gulf of Mexico diminish, we'll see a series of North American independents transferring their efforts to the North Sea," Seitz said. "If oil prices role back, we'll see more of the majors divesting assets because they're not paying a lot of attention to them."

Sure, there are obstacles to surmount such as weather conditions that demand special equipment, how to quantify abandonment liabilities, etc. Even so it's getting to be an increasingly better deal as time goes by.

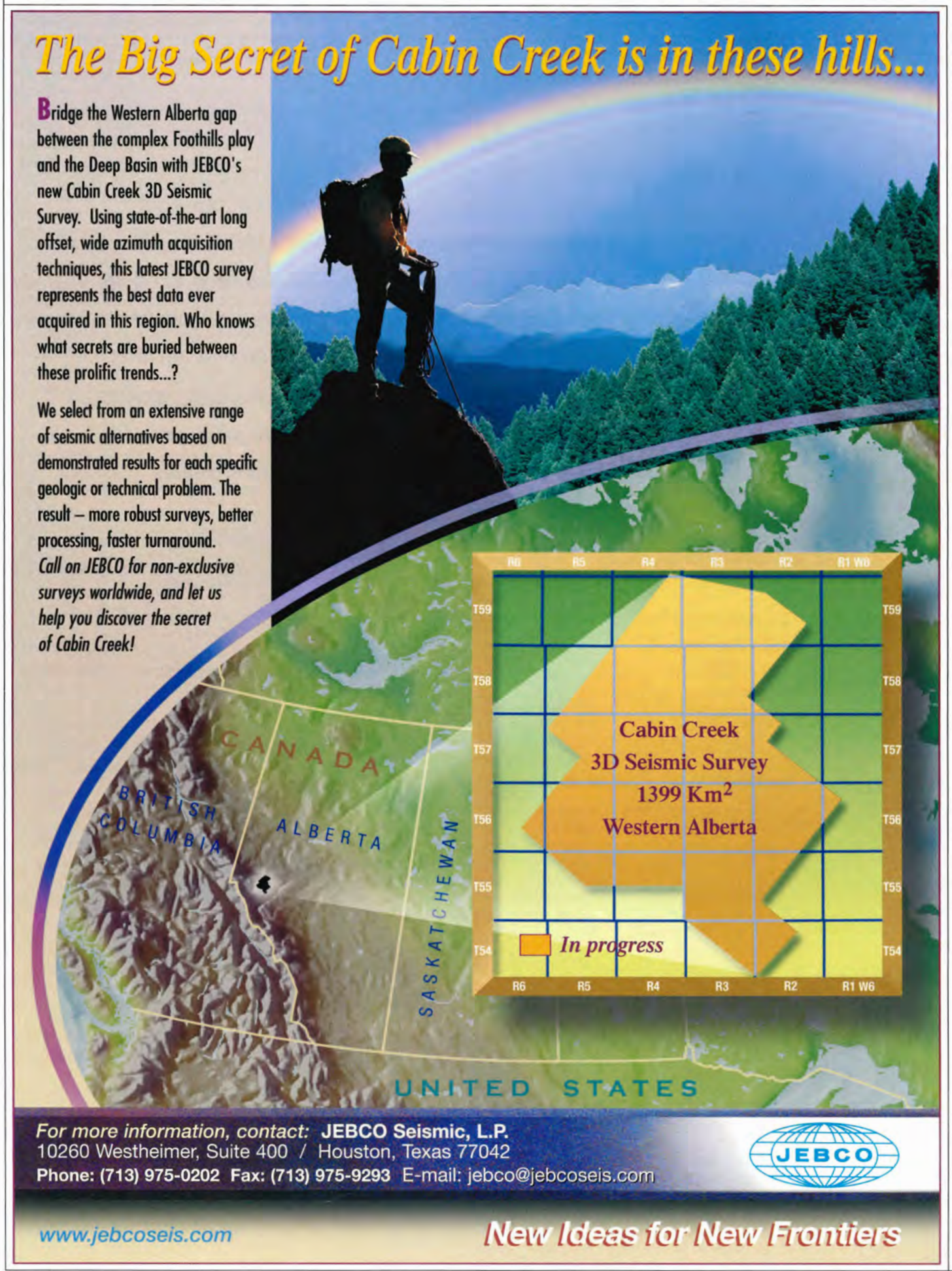
"Under the new royalty scheme, you pay no royalty tax on offshore production," Christensen said, "so the only tax you pay is corporate. The UK government has done a lot to enable new oil search to be a lucrative thing for new companies coming in.

"This is probably the best royalty regime in the world," Christensen said.

Indeed, staunch support by an array of governments for North Sea E&P activity is particularly noteworthy given the continuing fierce opposition overall to drilling in most parts of the United States.

"It's safe in the North Sea in the sense of sanctity of the contract and the ease of doing business," Seitz said. "You have regulatory bodies and governments that want new energy supplies to be developed and discovered because it makes economic sense for them.

"That and having a partner to work with in the sense of regulatory bodies and host governments is a great aid to any company," Seitz said. "It's a partnership." ❑



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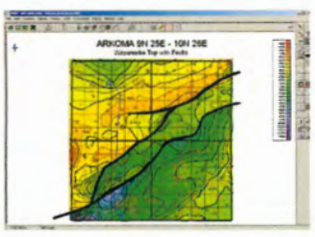

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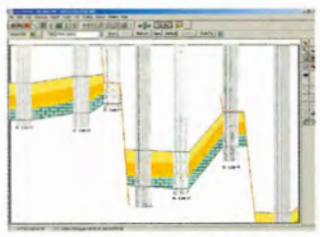

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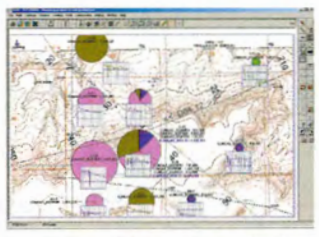

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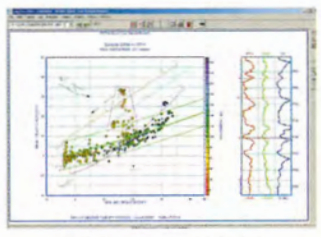

**CROSS PLOTS**
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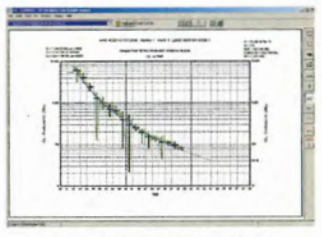
"Z" crossplots
Lithologies to facies
Pickett plots
Regression curves
User defined overlays



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## Deep Water

from page 10

combination of favorable geologic factors supported by attractive economic parameters," he said. "In general, companies have been most successful exploring in Tertiary deltaic systems on mobile substrates that provide a multiplicity of traps, an active and robust petroleum system, reservoirs that can deliver the high rate ... wells need for commerciality, and play longevity to realize sustained returns from the initial investment stream.

"Some new plays also are emerging that target older Mesozoic," he added, "but deepwater basins are not uniformly prospective. Finding sweetspots with the right combination of factors can yield very attractive financial returns. Just being in the neighborhood is not good enough – and is a recipe for value destruction."

*"... Activity will be limited by the availability of spec seismic data, which drives all exploration activity."*

A region must have enough density and reproducibility of drill sites to allow for economic development in deep water, according to Wilhelm.

"It's not the first infrastructure hub that makes the most money. The key is the potential that first hub unlocks – that's why Tertiary deltas tend to be areas where a lot of value is created. After the infrastructure hub is established there are multiple opportunities for satellite fields, infield drilling and field optimization. In some cases the bulk of the value is created through infield drilling, facilities upgrades, and tying back near field opportunities."

Wilhelm said virtually every potential deepwater margin in the world will see some licensing round or some industry interest. However, this activity will be limited by the availability of spec seismic data, which is a key enabler for exploration activity.

Underexplored deepwater provinces include both sides of the North Atlantic, parts of the Caribbean, part of Southeast Asia (Indonesia and China) and even the Mediterranean rim.

"However, there are some places where industry has already bent its pick that likely won't attract additional investment," he added.

### Geology Matters Most

Current oil prices are not all that meaningful for deepwater projects that can take years to bring to fruition, but Wilhelm said strong commodity prices over a prolonged period of time could generate activity in what would otherwise be marginal ventures or in difficult operating conditions.

Recent examples of high signature bonuses in places such as Sao Tome, he said, suggest that this bullish view may be influencing some companies.

From a water depth standpoint, Wilhelm said the ultimate limitation will be geological, not technological.

"I think as you move into ultra deep settings, onto oceanic crust and away from continental margins and their clastic delivery systems, you will eventually run into questions about adequacy of the petroleum system and the whole model of Tertiary deltas on mobile substrates," he said. "There won't be enough structure, there won't be an active petroleum system.

"Reservoirs tend to go out about as far as you can get, so we rarely see plays where reservoir limitations are the constraining factor," he continued. "Modern seismic of modern-day abyssal plains show channels going far past their underlying geologic prospectively.

"So, it is fundamentally about the petroleum system." ❑


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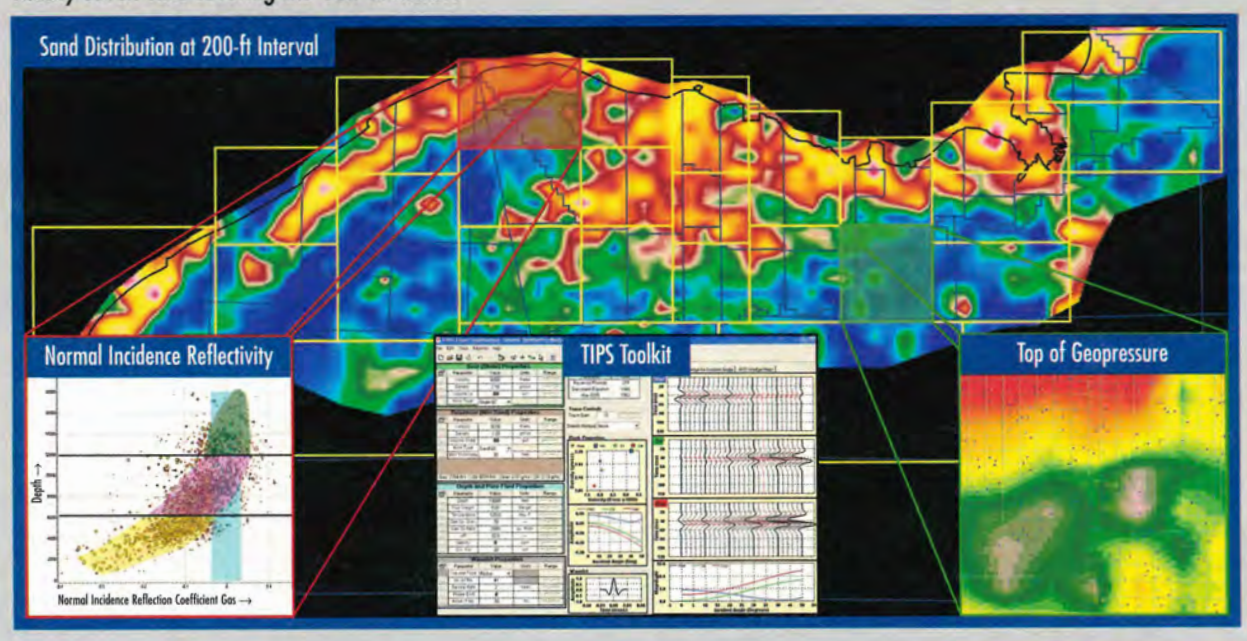


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ACQUISITION PROCESSING INTERPRETATION


## Scorecard

from page 6

"There are other companies who tend to work more quietly about such things, but the movement is substantial," she added.

Then, she said, "there are companies that have not even yet begun to think about biodiversity issues."

An important step comes with bringing biodiversity awareness into the management, planning and decision-making systems within companies, O'Brien said.

"That's almost as big an effort, although not as visible, as anything else we're doing in the field," he noted.

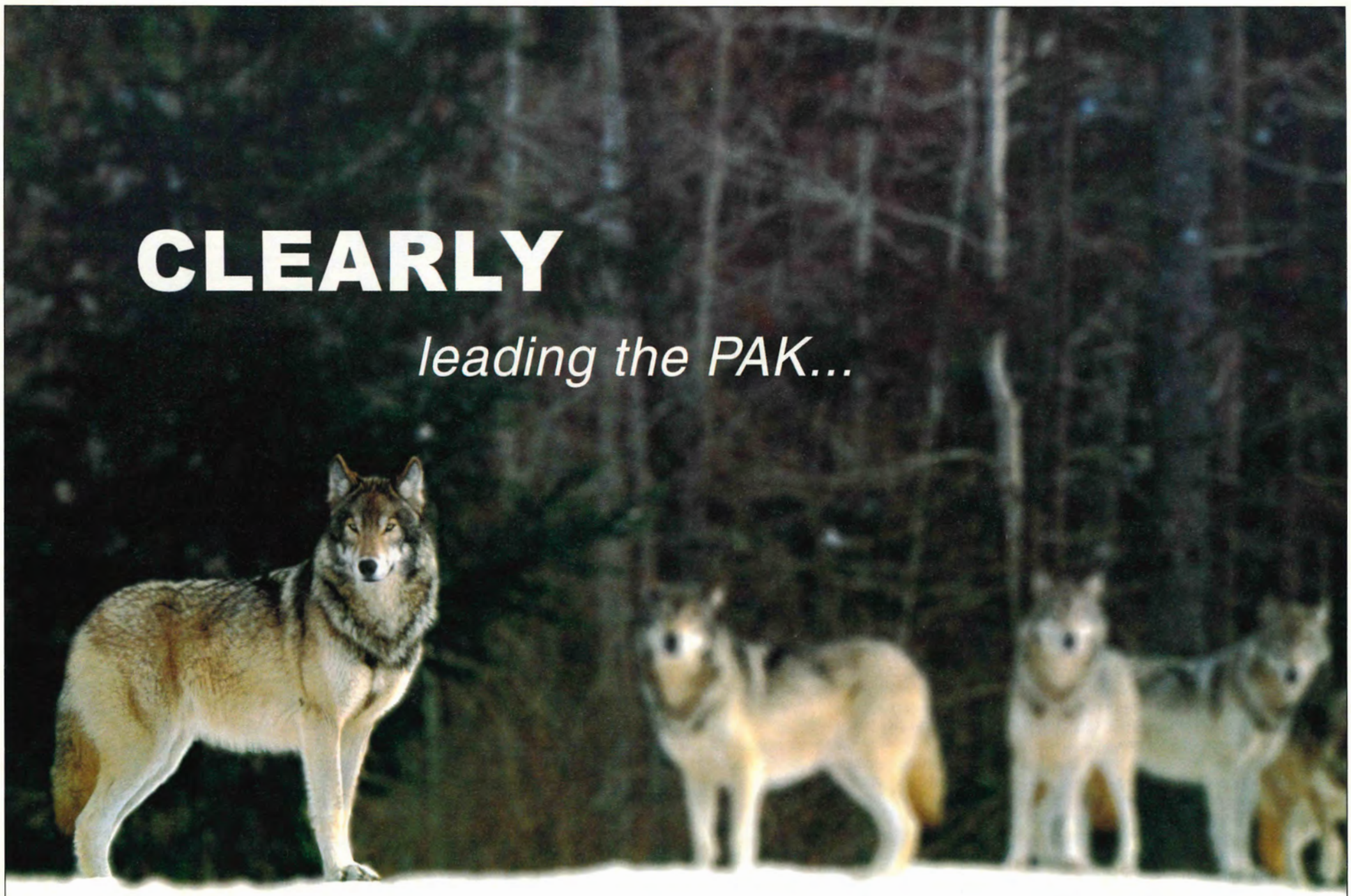
Companies active in biodiversity initiatives have been willing to share results with the rest of the industry, and for good reason, according to Armstrong.

"Even the best can be dragged down by public perception of the worst. The leading companies have an interest in promoting biodiversity awareness among their colleagues," she said.

Carter thinks the industry will take another year to refine and begin adopting a more systematic approach to biodiversity conservation, like the one outlined in the EBI report.

"In the long term," Carter said, "companies are thinking: 'How can we demonstrate that we can be responsible actors, and not be excluded from these sensitive areas?'

"'If we demonstrate that we can extract oil and gas and at the same time minimize our harm to biodiversity – and hopefully provide some positive returns to conservation – then we're more likely to have long-term access to the land.'" ❑

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## Activities Begin Sept. 14

# Forum Adds Value At APPEX Houston

An event that already is a "can't miss" gathering just got better.

The event is AAPG's annual Prospect and Property Expo – known now by the popular acronym "APPEX" – which will be held Sept. 14-16 in Houston at the George R. Brown Convention Center.

This year's fourth annual Houston APPEX will once again offer geoscientists the chance to buy, sell and trade their work in a professional marketplace.

The three-day event, expected to attract over 2,000 participants this year, has lined-up a "power luncheon" speaker to discuss experiences as an independent in the international arena, and also will for the first time feature a new workshop geared for geoscientists who are eyeing international activities, titled "Tools and Techniques for Assessing New-Country Entry."

This "going international workshop," offered by IHS Energy, will be held Thursday, Sept. 16 from 7:30-9 a.m.

The workshop is just one of many new features being added to APPEX this year to give attendees even more opportunities for success.

Among those features is a "Perspectives on the Upstream Business of Oil and Gas" forum, also sponsored by IHS Energy around the theme "The Exploration Dilemma: What is Exploration's Role in Shaping the Energy Future?"

Houston APPEX®
AAPG PROSPECT & PROPERTY EXPO
CO-CONVENERS: SIPES and HGS
SEPTEMBER 14-16, 2004

The forum, set from 8:30 a.m. to 4:30 p.m. on Tuesday, Sept. 14, will address issues such as financial markets, technology, regulations, politics and policies, and is organized into three sessions:

❒ Global exploration opportunities, discovery trends and directions – Experts and executives from various company sectors will discuss industry directions, and will assess risks and rewards to stimulate increased international exploration investments.

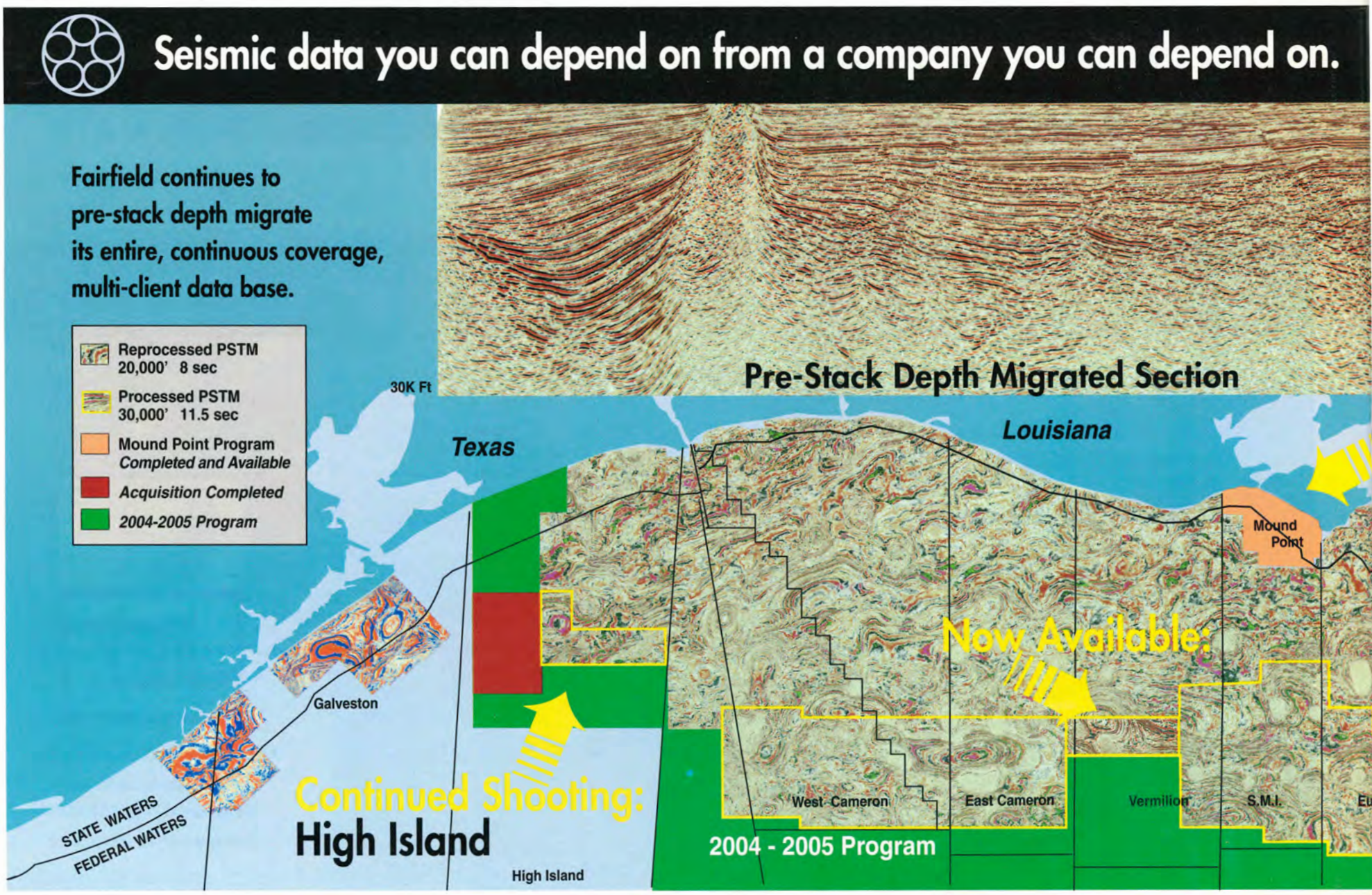
❒ North American exploration outlook – Executive views of challenges, opportunities and policy issues.

❒ Investment opportunities.

continued on next page

*Photos courtesy of Michelle Mayfield-Gentzen*

APPEX, set Sept. 14-16 at the George R. Brown Convention Center in Houston, is big enough to accomodate thousands of people who are looking to buy or sell deals and property – and intimate enough for the personal touch.



## At APPEX, Some Are Both

# Buyers and Sellers Happy

*Aside from the "art of the deal" aspect, APPEX also can be fertile ground for job hunters.*

Smith

By LOUISE S. DURHAM
*EXPLORER Correspondent*

The upcoming APPEX event in Houston is set to draw numerous repeat customers beckoned by the show's theme to "Discover More in 2004."

Cherokee Production is among the repeats that have had a booth each year since the event's debut in 2001.

"We're both a buyer and a seller," said Bill Parmley, geologist and president of Cherokee, which he also operates.

"Since I'm a geologist, the cost to generate prospects versus buying is such that it's better for me to generate," Parmley said. "But I like to see everything that's out there.

"People have bought into my wells from as far away as Vancouver and Wyoming," Parmley said. "APPEX is a tremendous draw."

Like many attendees at the various prospect expos being offered, Parmley praised the convenience of attending APPEX, now held at the George R. Brown Convention Center in Houston.

It's a big deal, but the dealing is done on a personal and friendly basis.

"You can go through the whole show fairly easily and see all the booths, which is not so easy at a bigger show," he said. "Still, it's getting bigger each year, and I'm seeing more and more new people there."

He's not alone. Joining Cherokee and other exhibitors in the repeat category is Sandalwood Oil & Gas, a company that already has drilled 10 wells this year and plans to drill another 15 before year-end, according to company president Dan Smith.

Smith, also a past president of AAPG, attributes much of this activity to prospect expos like APPEX.

"Overall, just about all we've done is sold," Smith said, "mainly because of prospect shows' exposure, and APPEX has been really good to us."

A caveat: While there are instances of deals being finalized on the floor, don't consider your booth investment a failure if you close the show without closing a sale.

"I've never sold on the spot," Smith said. "Generally we make a long list of people who come by and are interested and end up making appointments where they come by and do due diligence – reviewing seismic data with the workstation and such.

"We're then able to sell the prospects in that manner," Smith said, "where the contact was made at the show. And we've also sold some things by 'word of mouth,' where a company decided a prospect didn't fit its needs but led us to another company where it would."

Because of this type of carryover from a prospect expo, hard and fast statistics for what sells directly as a result of each show are elusive.

"It's far more complex than that," Smith said, but "a show like APPEX can be carried to an exponential value.

"For instance, a company may look at a prospect and not buy," he said, "but a familiarity is established. Then we may be able to sell them the next prospect that comes along.

"This is an extension of the value of the show," Smith added, "where contacts are made that have multiple effects."

Aside from the "art of the deal" aspect, APPEX also can be fertile ground for job hunters.

"I know of one guy who went to APPEX last year looking for a job," Smith said. "Because of the contacts made, he got several offers and landed a good job." ❑

continued from previous page

The forum is the lead-up, of course, to the expo itself, which begins with an Icebreaker at 4:30 p.m. on Sept. 14 and offers the opportunity to find and/or sell ideas, prospects and property.

Other APPEX highlights include:

✓ A "power lunch" on Tuesday, Sept. 14, featuring a talk by John Seitz, geologist and president of Houston-based Endeavour International (and former head of Anadarko Energy). (See related story on page 14.)

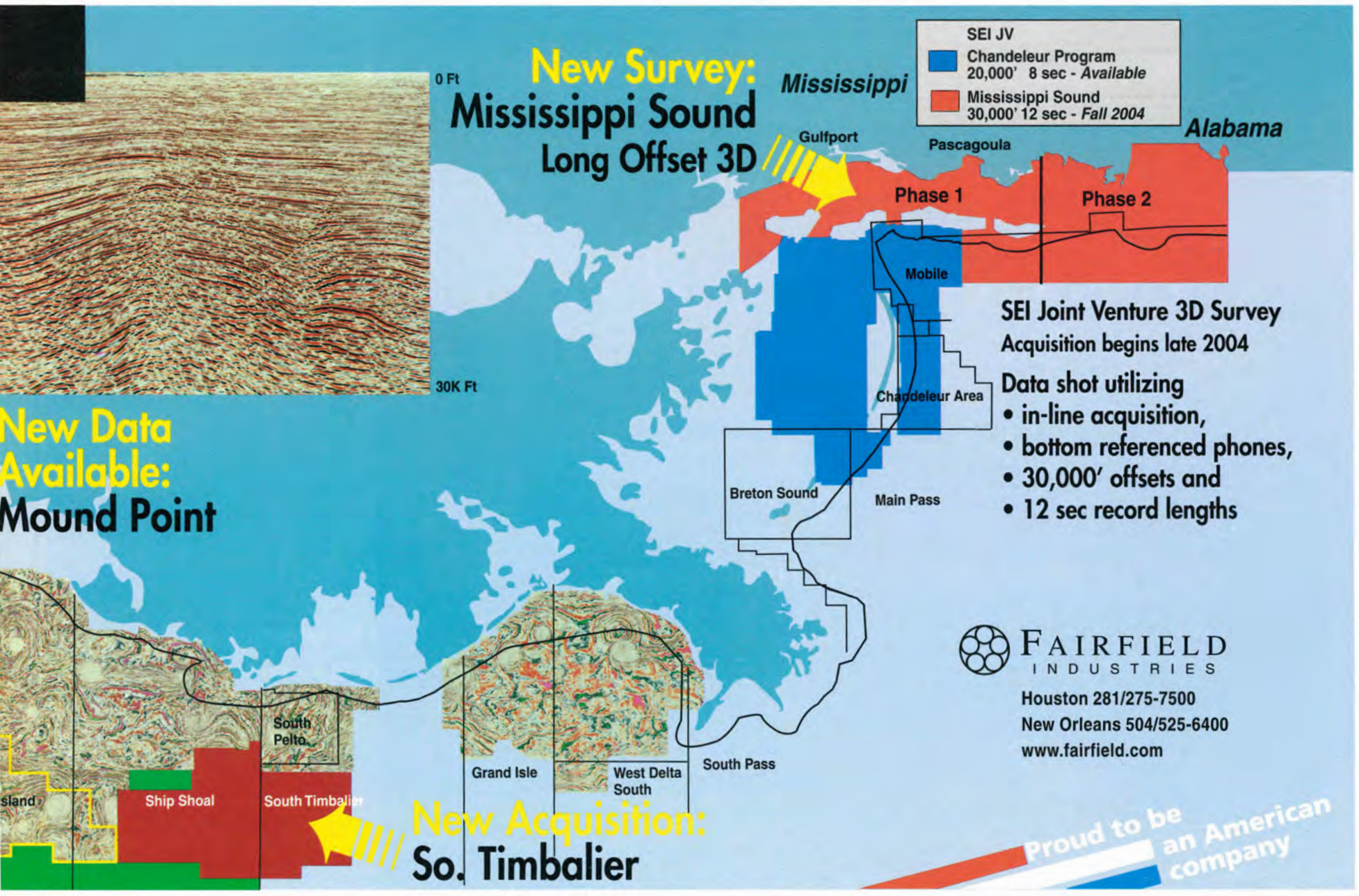
✓ A SIPES/HGS/AAPG short course, "Packaging and Selling Your Prospect: Geoscience, Land and Financial Return – A How-To Guide for Presenting Prospects to Management and Investors," to be held from 1-5 p.m. on Thursday, Sept. 16.

✓ A "mini-breaker" at 4 p.m. on Wednesday, Sept. 15.

✓ Continental breakfast available on both Sept. 15-16.

Blocks of rooms are being held at the Holiday Inn and Hilton Americas, available through Aug. 13.

Best of all, online registration and further updated information – about both attending or securing space on the exhibit floor – can be found at www.aapg.org.



*New Problems, New Solutions*

# CPC Eyes Pacific Rim Energy Needs

By KATHY SHIRLEY
*EXPLORER Correspondent*

A new century has brought new challenges to the Circum Pacific Council for Energy and Mineral Resources, which is taking steps to expand and enhance its role in the region's energy future.

Recognizing the need for a comprehensive energy plan for the Circum Pacific region, the council recently embarked on an ambitious project to compile data on all facets of the energy issue for its part of the world.

The initiative, called "Powering the Rim: The Future of Energy Security in the Circum Pacific Region," is designed to help understand the energy flow within the Pacific region and make scenario-studies for future energy demands out to the year 2025.

The AAPG-affiliated council seeks to understand potential impacts that various energy sources will have on national and international security, the environment and industrial development. It is, according to Council officials, a topic that demands attention.

"In the late 1990s there was a huge economic downturn in Asia that reduced demand for energy, but we knew that wouldn't last," said David Howell, council president and a research geologist with the U.S. Geological Survey in Menlo Park, Calif.

"Sure enough, here we are today with Asia rebounding, China booming and energy demand soaring," he said.

"The Circum Pacific Council (CPC) always has been an excellent avenue for the exchange of information and knowledge among scientists – but we have felt for some time that the ultimate customer for the CPC should not be just other scientists, but the world community at large," added Nahum Schneidermann, CPC executive committee chairman and manager-international technical relations with ChevronTexaco Overseas Petroleum, San Ramon, Calif.

"Powering the Rim is an effort to use our scientific background, knowledge and contacts to develop programs that will allow us to share with and educate the public and governments so they can employ science as part of policy and decision making."

The initiative will be completed in stages, all based on partnerships and integration of various databases, with cooperation between government and public-based energy councils in the United States and Pacific Rim countries. The CPC already has established cooperation with the coordinating committee for Geoscience Programmes in East and Southeast Asia, the U.S. Geological Survey, Stanford University, Asia Pacific Energy Research Centre, East West Center and a host of industrial, public and private energy institutes.

The project's first initiative, an undergraduate energy seminar called "The Pacific Rim: Understanding Energy Flow and Policy Issues," was offered last year at Stanford. The Circum-Pacific Council released a DVD series earlier this year that includes all 11 of the presentations made during the seminar.

(The two-disk set, titled "Perspectives for Energy," gives an overview of the energy challenges facing the Pacific region. It is available through the AAPG Bookstore – $50, catalog #716-03.)

The second initiative is the Pacific Rim Energy Database, which is currently being compiled. The CPC-led project proposes to develop, compile and present the fundamental energy resource data necessary to make sound, strategic energy policy decisions for the Pacific Rim. The data will include:

✓ Estimates of reserves and resources of fossil fuels.

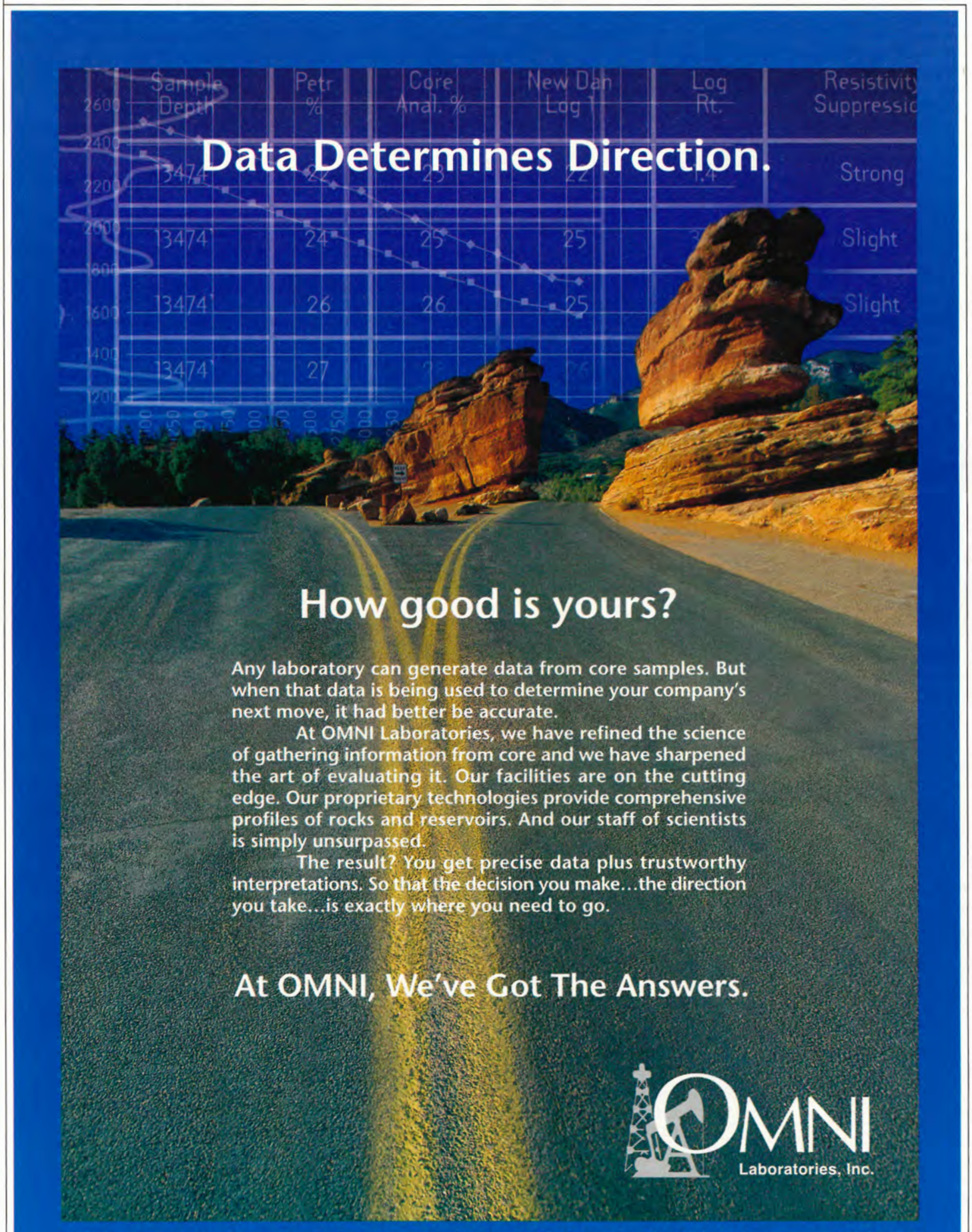
✓ Sources of renewable energy production and potential.

✓ Strategic minerals such as uranium.

The initiative will not stop simply with energy resource data.

"I am a geologist, so I always felt that resource issues were the most important,"Howell said, "but this process has helped me realize that resources alone are not the main driver.

"What we are trying to do is get our arms around energy from all perspectives," he continued, "the role of economics, environmental considerations, the consequence of new technologies, the vulnerability of transportation corridors for the Circum Pacific region, to name a few." ❑




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

www.aapg.org

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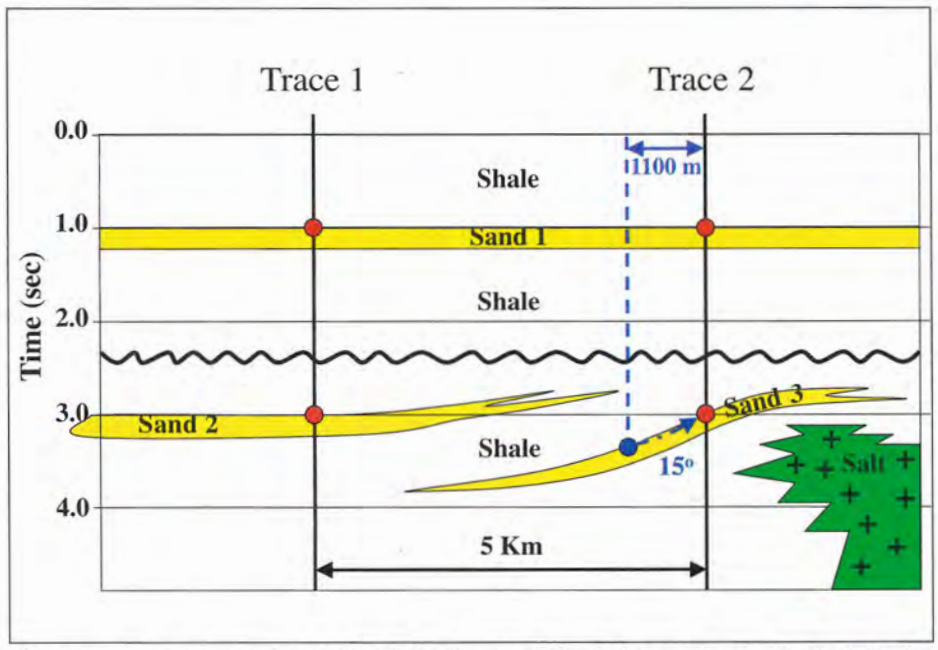



Figure 1 – Illustrative earth model. Reflection coefficients for sands are identical. Red dots are where the amplitudes have been calculated in figure 2. Blue dot is position of amplitude for dipping Sand 3 before seismic migration moved amplitude 1100 m laterally and 275 m (200 ms) vertically updip (Vavg=2860 m/s).

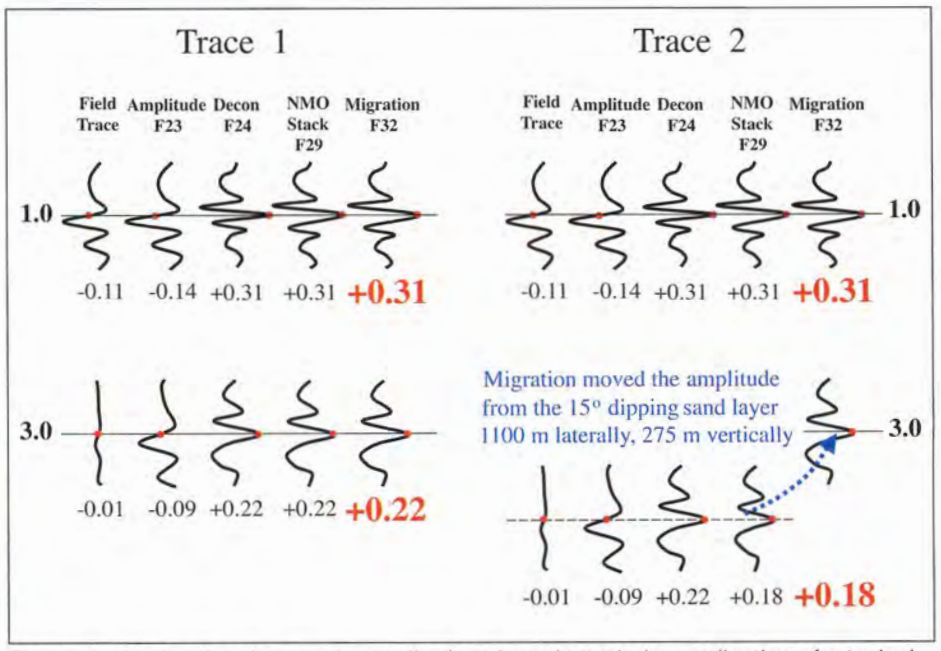



Figure 2 – Notice the changes in amplitude values through the application of a typical seismic processing sequence. This illustrates the changes for the zero-offset trace at the top sand reflectors shown in figure 1. Observe the amplitude decreases with depth, and the major amplitude changes due to the amplitude correction, and deconvolution. Amplitudes from the dipping sand also change with NMO and Stack, and move with migration to proper location.

## GEOPHYSICAL CORNER

# More Amplitude Understanding

*(The Geophysical Corner is a regular column in the EXPLORER, edited by Dallas consulting reservoir geophysicist Alistair R. Brown. This month's column is the second of a two-part series.)*

By STEVE HENRY

Last month's article on "Understanding Seismic Amplitudes" listed 21 factors that could affect seismic amplitudes through seismic acquisition and the earth. This article presents 14 additional factors that arise in seismic processing and interpretation.

Again, only the major factors will be discussed; unfortunately, any of the factors could be important in interpreting amplitude changes as changes in geology.

It is good practice for interpreters to inform seismic processors (good processors appreciate this) how they will use the data in interpretation (i.e. structural, stratigraphic, AVA, etc.). Processors will appreciate your insights, because they will be using tens of processing programs containing hundreds of parameters. Many of the programs and parameters alter seismic amplitudes.

The table to the right summarizes the most important of these amplitude-altering processing steps. You can use this table in amplitude discussions with your processor.

* * *

This article, to assist understanding of workstation amplitudes, reviews the processing of a pair of seismic traces. Both the wavelet shape and amplitude from the top of high impedance sands are followed from the raw field traces to their final processed form.

To begin this journey, consider a simplified earth in which thick (200m) sands reside in a shale-dominated section (figure 1). Two of the sand units are flat (sands 1 and 2) and the third is dipping at 15 degrees (sand 3).

The normal incidence reflection coefficients for the top of all of the sand units are identical. Ideally, workstation amplitude for these sands would also be identical.

Figure 2 shows the wavelets from the top of these thick sands as seen through successive stages of seismic processing. Reading from left to right, first observe the zero-offset, raw field trace before processing. Then notice the changes in the seismic amplitudes due to an idealized processing sequence of:

✓ Curved-ray, spherical-divergence correction.

✓ Minimum-phase deconvolution.

✓ Normal moveout (NMO) correction and stack.

✓ Migration.

After-migration amplitude values (shown in red) should ideally be identical for all the top sand reflectors. The only amplitudes that are identical are the two from the flat sand 1. The deeper flat sand visible on Trace 1 should have the same amplitude value as the shallower reflector; unfortunately, spherical-divergence correction programs (F23) typically under-correct deep amplitudes.

This correction only accounted for one of the many amplitude-altering factors encountered by the wavelet during its round-trip between the surface and the top of sand 2. The observed amplitude at sand 2 also is a function of the phase and frequency content of the wavelet (F24), which is different from sand 1 due to attenuation and maybe assumptions in deconvolution.

On the migrated version of Trace 2 we view the dipping-reflector from sand 3 at the same time as sand 2 on Trace 1. The dipping sand has lower amplitude than the flat sand, due to NMO (F26) combined with stack (F29).

In our simple model, we assume that a flat-reflector value was used for the NMO correction. Thus, NMO is correct only for flat reflectors so that the stack process attenuates the amplitude of dipping reflectors, due to uncorrected dip contamination of the NMO velocities. In addition, dipping reflectors are displaced from their apparent location on the

continued on next page

| Factors<br>Seismic Processing | Comments: | Magnitude |
|---|---|---|
| F22) Mute | Within Mute (0-2 sec) number of traces / offsets decrease but compensated | Minor |
| F23) Amplitude | No "True Amplitudes," Windowed approaches only good for structure | Major |
| F24) Deconvolution | Minimum Phase assumption incorrect, Designature approaches best | Major |
| F25) Noise Reduction | Filtering (time varying and spatial dip), multiple attenuation, and many more | Min-Mod |
| F26) Velocity Analysis | NMO velocity is the primary control on amplitude alignment for stacking | Minor |
| F27) Normal Moveout | NMO is a time dependent but smooth upward stretching of amplitudes | Minor |
| F28) Statics / Datum | Corrections are bulk (up or down) time shifts with no amplitude change | Minor |
| F29) STACK | Summing of traces in CDP or Bin, Amplitudes highly dependent on F26 | MAJOR |
| F30) Deconvolution | Post-stack decon is usually gapped to increase high frequencies, resolution | Moderate |
| F31a) Noise Reduction | 1D Filtering removes "noise," but is generally smoothly varying | Moderate |
| F31b) Noise Reduction | 2D Filtering removes "dips," but can be laterally abrupt | Moderate |
| F31c) Noise Reduction | F-X Deconvolution removes "unwanted amplitudes" | Min-Mod |
| F32a) Migration | 2D Migration moves dipping reflectors (amplitudes) to "proper" inline position | Min-Major |
| F32b) Migration | 3D Migration moves dipping reflectors (amplitudes) to 3D volume positions | Min-Major |
| F33) Phase Correction | 2D and 3D often require conversion to zero phase | Min-Major |
| **Seismic Interpretation** | | |
| F34) Data Loading | Clip level determines max amplitude, squares off peaks and troughs | Min-Major |
| F35) User Settings | Workstation filters, gains, trace processing, phase adjustments, etc. | Major |
| F36) KNOWLEDGE | Color bars, attributes, voxels displays all help to find amplitude anomalies, but Users must understand amplitudes to successfully predict geology. | MAJOR |

**Table 1**

See July EXPLORER for F1-F21

continued from previous page

stacked section. Thus, they must be migrated (F32) to their proper subsurface positions.

As shown in figure 1, the amplitude that will be displayed on the workstation for Trace 2 at 3.0 sec. was actually from a point 1100 m laterally and 275 m vertically down dip.

* * *

The journey of these amplitudes is not yet completed, as we must load the data onto the workstation for our interpretation.

In the loading process, a percentage of the largest peaks and troughs may be clipped (squared off) to improve the visual dynamic range (F34). Only the largest amplitudes are affected, but these are often of the greatest interest as possible direct hydrocarbon indicators.

With the seismic data now loaded, interpreters have many opportunities to further alter amplitudes (F35). For example, 2-D line balancing programs change gains, timing, frequency and phase. In addition, user-applied settings for filtering, phase rotation and even the selection of color bars change how amplitudes are perceived.

Amplitudes are the basic input to seismic attribute analysis calculations.

* * *

Taken as a whole, these two articles contain descriptions of the factors that affect seismic amplitudes through seismic acquisition, the earth, seismic processing and seismic interpretation. Seismic interpretation contains most of the major amplitude factors (table 1), and the interpreter controls these based on knowledge (F36). By not understanding the factors that affect amplitudes, drilling decisions can be in error.

On the other hand, relative amplitudes provided to interpreters are, with care, being successfully used for reducing risk and discovering hydrocarbons. You can improve your amplitude-based interpretations by considering the factors described. Your interpretation is on the firmest foundation by comparing amplitudes that are at approximately the same two-way time and have similar overlying geologic sections.

Relating amplitudes to geology on vertically separated reflectors, or in areas of laterally changing geology, is risky – and a reason for many unsuccessful wells.

*(Editor's note: Steve Henry is an AAPG member with GeoLearn, in Houston. His e-mail is geolearn@aol.com.)*

LOOKINGBACK

# 'A Pile' – Not Layers – of Leaves

By MARLAN DOWNEY

Perhaps a review – and awareness – of the past may make us better geologists in the future.

* * *

"Sedimentation Framework of the Modern Mississippi Delta," by Fisk, McFarlan and Kolb, *Journal of Sedimentary Petrology*, June 1954.

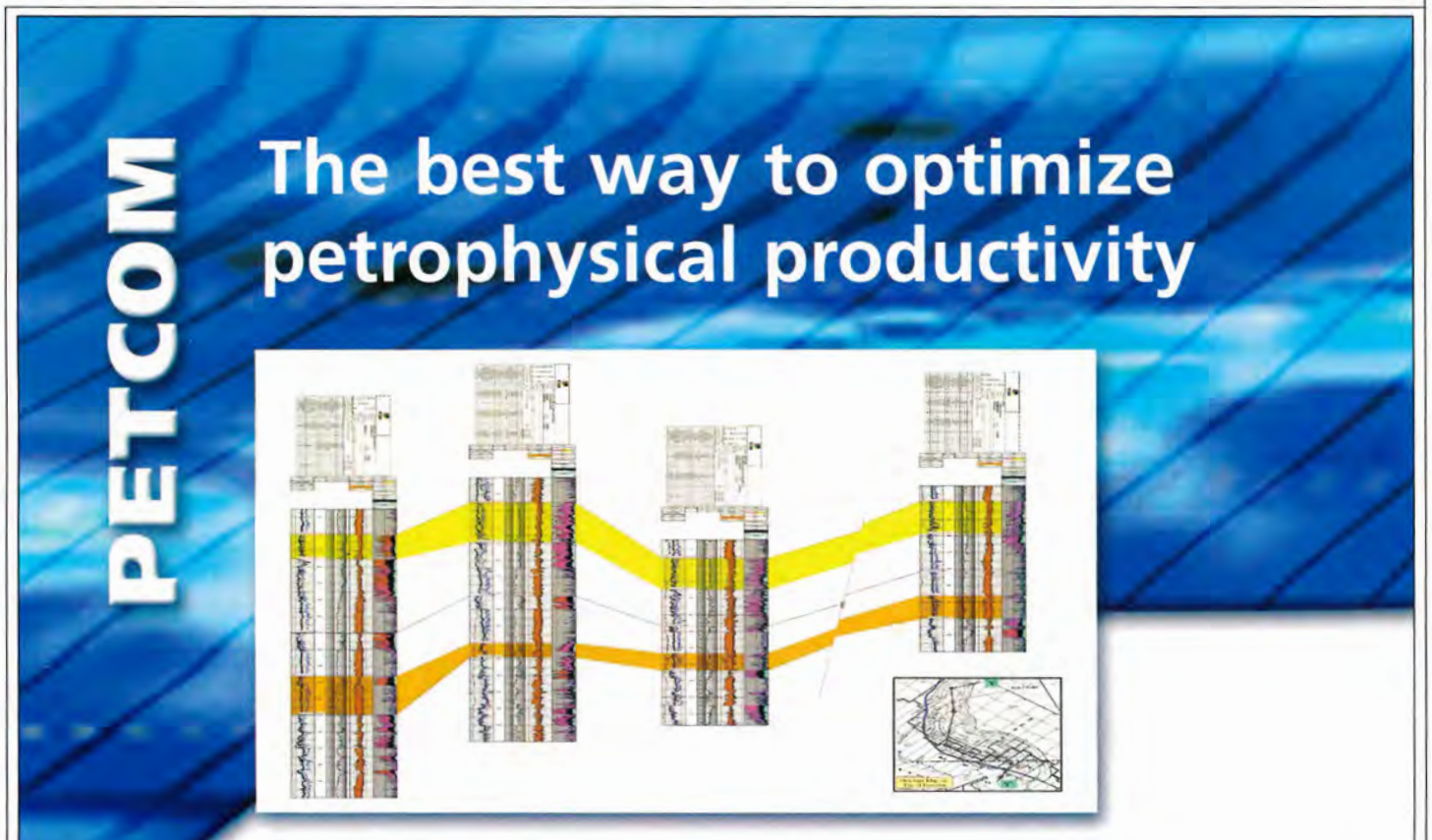
The prior concept of a systematic arrangement of top set, foreset and bottom set beds is shown to be invalid for large scale features such as the Mississippi Delta.

"… Sediments of the river mouth region are arranged in leaf-like form, with the deposits of the natural levees and associated channels forming the veins and veinlets, and those of the marshes representing the inter-vein portions of the leaf. Subsidence and shifting of the river channels, combined with long-continued deposition, have created a 'pile of leaves' structure beneath the extensive deltaic plain of the Mississippi."

This was an important and early paper that demonstrated the complex and variable sediment patterns in a "bird foot" delta – a delta where sediment inflow is overpowering wave action on a shallow shelf.

* * *

Rufus LeBlanc, Sidney Powers medalist, spent 40 more years at Shell's Bellaire Research, powerfully expanding and amplifying this pioneering work by Fisk, et al. ❑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## Committed to development and support

Following completion of the Petcom purchase, Fugro-Jason has been aggressively addressing both short- and long-term plans for the future development and support of **PowerLog**.

The **PowerLog** development work will be driven by the following priorities:

- Positioning the software as a tool for both **generalist** and **specialist** petrophysicists and geologists
- Continuing and **expanding support** for **PowerLog**'s current user community
- Advancing direct data links to third-party software such as Openworks, Geoframe and Petra
- Making **PowerLog** available on both Windows® and Linux/Unix platforms
- Including Fugro-Jason's **Rock Physics** functionality (**Largo**) necessary for advanced reservoir characterization.

Mike Barnett and Doug Schmidt (Petcom's founders and principals) will continue to manage the Dallas-based development team. They will be supported in general by Fugro-Jason's Rotterdam research and development group and specifically by the Rock Physics team.

In addition to expanding software functionality, **PowerLog** users will benefit from the Fugro-Jason support network of petrophysicists based in the Fugro-Jason offices around the world. Fugro-Jason has been using **PowerLog** and **Largo** in its consultancy services business since 2001.

Find out more at www.fugro-jason.com

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## Resource Assertion at Issue

# AAPG Challenges Society Report

By LARRY NATION
*AAPG Communications Director*

A Position Paper that takes to task a Wilderness Society report on recoverable resources in the Western United States has been approved by the AAPG Executive Committee.

Naresh Kumar, chair of the Committee on Resource Evaluation, said then-AAPG president-elect Steve Sonnenberg asked the committee at the 2002 mid-year meeting in Denver to investigate a possible response to the report, which asserted that the resources "under the roadless areas and monuments is extremely small relative to U.S. demand."

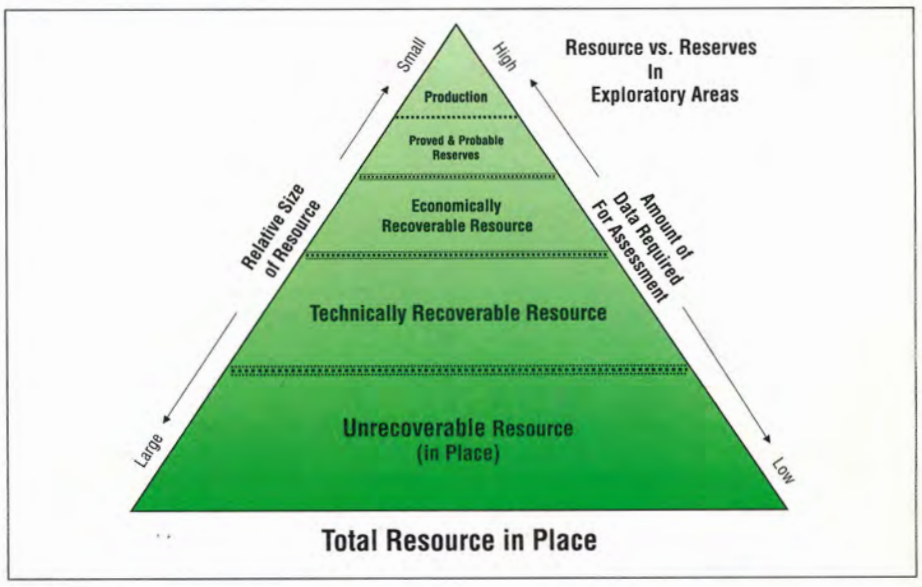
The paper, under the primary authorship of Lance Cook, of the University of Wyoming (now with XTO Energy of Fort Worth), underwent multiple revisions and was approved by the full committee at the recent annual meeting in Dallas.

The Position Paper states that AAPG finds that the scientific, economic and business assumptions on which the Wilderness Society's report on "Energy and Western Wildlands" is based, are unjustified.

Because prices for oil and gas continually fluctuate, technologically recoverable resources may be economic or uneconomic as market forces dictate, the paper states. However, as technology reduces the cost of extracting previously non-economic resources, the overall trend during the next few decades is likely to be the reclassification of technically recoverable, uneconomic resources of today into the economic resources of the future.

The decisions on the development of resources from our public lands are decisions about the long-term stewardship of these regions, the paper continues. These decisions should not be made primarily on the basis of what factors exist during any given month or year. They should be managed for a time frame of decades on the basis of scientific considerations.

To do otherwise will likely act to foreclose future options that the nation would otherwise have for developing energy supply in an environmentally sound manner at reasonable prices.




The paper examines in detail the nature of these assumptions and illustrates that use of the Wilderness Society's method and its conclusions would not be in the nation's best interests.

For full text of the paper see www.aapg.org. ❑

## 2005-06 AAPG Officer Candidates

Nominating Committee chairman Marlan W. Downey has announced the following slate of candidates, who will stand for AAPG election for 2005-06.

The president-elect winner will serve as AAPG president in 2006-07. The vice president will serve for the 2005-06 term, and the secretary will serve for 2005-07.

Biographical information and statements from all candidates will appear in the January EXPLORER. Balloting will begin in Spring '05. The candidates are:

**President-Elect**

❒ Thomas Ahlbrandt, U.S. Geological Survey, Denver.

❒ Lee Billingsley, Abraxas Petroleum, San Antonio.

**Vice President**

❒ Douglas G. Patchen, West Virginia Geological Survey, Morgantown, W.Va.

❒ Steven L. Veal, DCX Resources, Denver.

**Secretary**

❒ John R. Hogg, EnCana Corp., Calgary, Canada.

❒ J. Michael Party, Wagner & Brown Ltd., Midland, Texas.


## Namibia's Fourth Licensing Round

**The Ministry of Mines and Energy is pleased to announce that Namibia's Fourth Petroleum Licensing Round will be held from the 1st September to 30th November 2004. The round will cover selected blocks in the Orange and Walvis Basins.**

> Over 4,300km of seismic data acquired in the Orange and Walvis Basins in 2003 by Veritas DGC is now available.

> The existing Kudu and Ibhubesi fields in the Orange Basin and the huge Ondjou prospect in the Walvis Basin make this an area of exciting prospectivity.

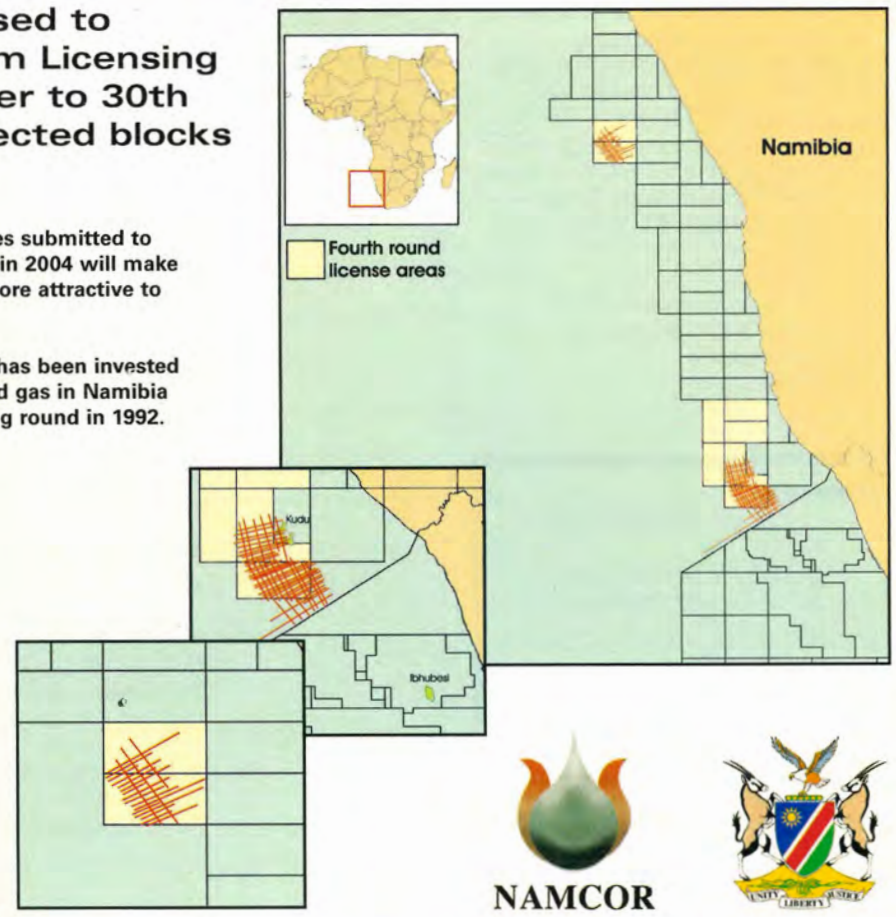
> Petroleum law changes submitted to Namibia's parliament in 2004 will make marginal prospects more attractive to foreign investors.

> Over US$500 million has been invested in exploring for oil and gas in Namibia since the first licensing round in 1992.

**Promotion seminars will be held in London (9th September) and Houston (13th September) for the licensing round.**

For further information please contact:

**Mr Immanuel Mulunga,**
Petroleum Commisioner, Ministry of Mines and Energy, +264 61-2848111
or
**Mr Joe Vatanavi Mazeingo,**
Managing Director, NAMCOR, +264 61-2045000

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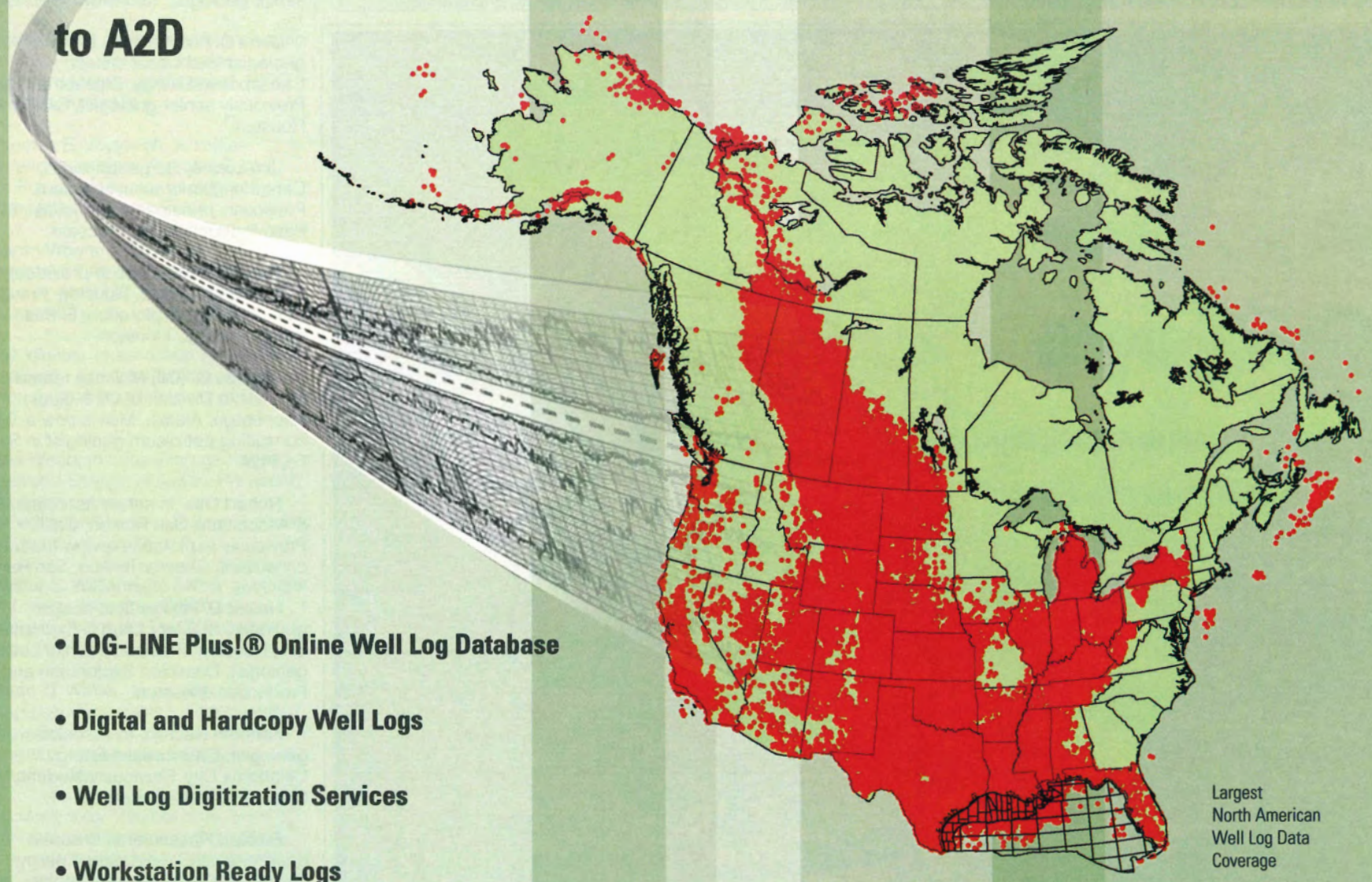

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# PROFESSIONAL NEWS BRIEFS

**Gary B. Babcock**, to geology manager, Laramie Energy, Denver. Previously petroleum consultant, Denver.

**Howard Barousse**, to senior geologist, Centurion Exploration, Houston. Previously geological consultant, Samson Resources, Houston.

**P. Jeffrey (Jeff) Brown**, to partner-exploration and production practice, Decision Strategies, Houston. Previously consultant, Exploration Analysis, Grapevine, Texas.

**Michael Clegg**, to senior geologist, Baytex Energy, Calgary, Canada. Previously senior geologist, Anadarko Canada, Calgary.

**Lance Cook**, to manager of geology-Rocky Mountains, XTO Energy, Fort Worth. Previously Wyoming state geologist, Wyoming State Geological Survey, Laramie, Wyo.

**Mohamad "Mo" R. Etemadi**, to senior geophysicist-Caribbean region, REPSOL/YPF, The Woodlands, Texas. Previously consulting geophysicist, INEXS, Houston.

**David Thomas Frazier**, to senior geologist, Arkansas Department of Environmental Quality, Little Rock, Ark. Previously consulting geologist, Monroe, La.

**Matthew Grove**, to associate geologist, Brown and Caldwell, Methuen, Mass. Previously exploration geologist, Anadarko Petroleum, The Woodlands, Texas.

**Mark E. Hargis**, to vice president-geoscience, Legend Natural Gas, Houston. Previously manager-geoscience, Legend Natural Gas, Houston.

**William J. (Bill) Haskett**, to vice president-exploration and production practice, Decision Strategies, Houston. Previously senior partner, Decision Strategies, Houston.

**Brian Hoffman**, to exploration geologist, Continental Resources, Enid, Okla. Previously geologist, Continental Resources, Enid.

**Keith H. James** has been awarded Honorary Fellow Institute of Geography and Earth Sciences, University of Wales, Aberystwyth, Wales. He is a consulting geologist-Caribbean area, residing in Covarrubias, Spain.

**Brent D. Johnson**, to senior geologist, Encore Acquisition Co., Fort Worth. Previously consulting geologist, Cortez Oil & Gas, Plano, Texas.

**Barbara Cowles Kearney**, to geologist, Fortson Oil, Dallas. Previously senior geologist, Tom Brown Inc., Dallas.

**John C. Kucewicz Jr.**, to senior geologist-Gulf Coast district, Chesapeake Energy, Oklahoma City. Previously senior geologist, Swift Energy, Houston.

**Jim Lockley**, to geophysicist, Centurion Exploration, Houston. Previously principal geophysicist, El Paso Production Co., Houston.

**Kevin J. McMichael**, to president, Claymore Oil & Gas, Houston. Previously vice president exploration, El Paso Production Co., Houston.

**Charles G. (Gil) Mull** has retired from the Alaska Division of Oil & Gas, Anchorage, Alaska. Mull is now a consulting petroleum geologist in Santa Fe, N.M.

**Robert Otis**, to senior associate, Rose & Associates, San Ramon, Calif. Previously exploration review team consultant, ChevronTexaco, San Ramon.

**Nestor D. Phillips II**, to senior geologist, St. Mary Land & Exploration Co., Houston. Previously senior staff geologist, Dominion Exploration and Production, Houston.

**Kenneth Rechlin**, to associate geologist, Chesapeake Energy, Oklahoma City. Previously student, Oklahoma State University.

**Richard Rosencrans**, to senior geophysicist, Chesapeake Energy, Oklahoma City. Previously senior geophysicist, Marathon Oil, Oklahoma City.

**William Aaron Siemers**, to associate

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geologist, Chesapeake Energy, Oklahoma City. Previously student, Oklahoma State University.

**Robert J. Sperandio**, to senior geologist, Chesapeake Energy, Oklahoma City. Previously explorationist, Edge Petroleum, Houston.

**Janny A. Spilsbury-Schakel**, to principal development geologist, Woodside Energy, Perth, Australia. Previously senior staff development geologist, Santos, Brisbane, Australia.

**Jimmy Thomas**, to president and chief operating officer, Royalco Oil & Gas, Weatherford, Texas. Previously consultant, Castaneda Consulting, Weatherford, Texas.

**Conrad Todd**, to exploration manager, Cooper Energy, Perth, Australia. Previously principal geoscientist, RISC, West Perth, Australia.

**Thomas E. Voytovich**, to region exploration manager, Apache Corp., Tulsa. Previously senior geological adviser, Apache Corp., Tulsa.

**Aaron Vrbenec**, to geologist, Chesapeake Energy, Oklahoma City. Previously geologist, Berexco Inc., Oklahoma City.

**Jud Walker**, to associate geologist, Chesapeake Energy, Oklahoma City. Previously student, University of Texas at Austin.

**Ken Webb**, to consulting geologist, Ridgewood Energy, Houston. Previously geoscience manager, OGJExchange/Madison Energy Advisers, Houston.

**Wilbur S. Williams**, to senior geologist, Swift Energy, Houston. Previously consultant geologist, The Woodlands, Texas.

**Brian Q. Winter**, to geological manager-Arkoma district, Chesapeake Energy, Oklahoma City. Previously senior geologist, Chesapeake Energy, Oklahoma City.

*(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.)*

Past AAPG president and Sidney Powers award winner Michel T. Halbouty, right, and wife Billye were feted at Halbouty's 95th birthday June 6 in Houston, with over 100 invited guests in attendance. Halbouty's philanthropy and influence in various areas of his life were celebrated, with AAPG member Charles Sternbach speaking on behalf of the exploration community.

*Photo by Charles Sternbach*

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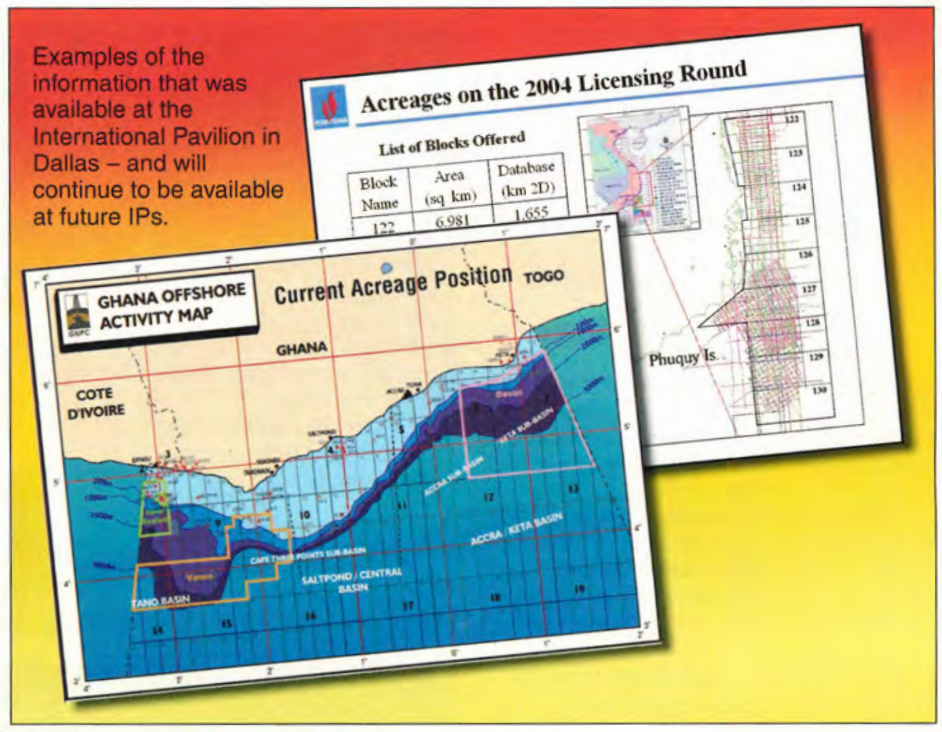


Examples of the information that was available at the International Pavilion in Dallas – and will continue to be available at future IPs.

# INTERNATIONAL BULLETIN BOARD

*(Editor's note: This column is for international items of note to the AAPG.*

*News items, press releases and other information should be submitted to the EXPLORER/International Bulletin Board, P.O. Box 979, Tulsa, Okla. 74101; telephone – 918-560-2616; fax – 918-560-2684; or e-mail – dfree@aapg.org.*

*This report on the AAPG International Pavilion was prepared by Jonathan Green, the IP Committee's country coordinator.)*

A visit to the Dallas Convention Center during the AAPG Annual Meeting last April was all that would have been needed for you to travel to the four corners of the world.

A few steps in one direction would have taken you from Brazil to Indonesia, passing by Greenland and Mongolia. Next you could have taken a stroll through East Africa from Eritrea to South Africa via Kenya, Uganda, Tanzania and Mozambique.

For the tenth year running – since its inception in Denver in 1994 – the International Pavilion has taken pride of place in the exhibits hall as one of the key attractions of the AAPG Annual Meeting.

A highlight to this year's event was the presence of delegations from Afghanistan and Vietnam, both exhibiting for the first time ever in the United States.

* * *

The mission of the IP is to provide a venue where some 40 nations can exhibit their investment opportunities to investors from the world's international oil companies.

One of the underlying secrets for its success has been not only the exhibit's commercial aspects, but also its educational value.

For geologists, it provides an opportunity to discover far-flung petroleum systems, perhaps identifying plays analogous to those in their own back yard, and to discuss exploration strategy.

For exhibitors, it provides an opportunity to share and learn from their peers.

The competition for investment in international E&P has made countries acutely aware of their own relative competitive advantage. The IP offers an unparalleled opportunity for these countries to compare with their competitors the terms of their legislation and regulations, the operating difficulties specific to each country, their respective strategies for attracting investment and their relative success.

The mutual exchange of ideas is further enhanced by dedicated "Global Forums." Open to IP exhibitors and IP sponsoring companies, the pre-meeting forum is designed to enable the representatives of the countries that exhibit at the IP to debate with their counterparts in the international oil companies the principle issues of concern and to benefit from their mutual experience and understanding.

In recent years, the opportunity to promote investment in each country has been significantly enhanced by the

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*Conference Begins Oct. 24*

# Start Planning Now For Fall in Cancun

It's not too early to get ready to attend the year's premier international conference.

This year's AAPG International Conference and Exhibition, sponsored jointly with the Mexican Association of Petroleum Geologists, will be held Oct. 24-27 in Cancun, Mexico.

The preregistration deadline is Sept. 23.

The site for all activities is the Cancun Convention Center, featuring a nearly 30,000-square-foot ballroom that will house the large exhibits area.

The meeting's theme is "Petroleum Industry in the 21st Century: Technology, Business and Frontiers," which will be explored through field trips, short courses, special talks and a technical program that features more than 340 presentations.

The technical program – details of which are now available in print and online – is divided into six themes:

❒ Deep-Water Exploration, Development and Production – Six sessions dealing with the latest developments from the areas of Gulf of Mexico, Angola, Brazil and other regions.

❒ Geology and Seismic Interpretation – Six sessions devoted to imaging, interpreting, modeling and understanding subsurface geology from seismic data.

❒ Mexican Basins and Beyond – Three sessions focusing on the host country's basins, plus looks at the remaining potential of the Americas.

❒ Management and Strategy – Six special sessions.

❒ Beyond Conventional Petroleum – Three special sessions on impact structures, environmental and gas monetization topics.

❒ Exploration and Production Concepts and Technologies – Nine sessions, including two provided by the SPE, on production and remote control, drilling practices, IT, carbonates, fractures, heavy oil and mature basins and fields.

Registration and updated meeting information are available online at www.aapg.org. ❑

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introduction of the IP Theatre – a dedicated area within the IP area where each country is given a 30-minute slot to present its opportunities and the conditions of investment.

This and previous years' presentations from both the IP Global Forum and the IP Theatre are available for viewing at the IP's dedicated Web site, "International Pavilion Online." Access is provided via the AAPG home page (www.aapg.org) under "Where do you want to go in AAPG's site?"

In recognition of the success of the IP, AAPG will be holding an IP event at the AAPG International Conference in Cancun, Mexico, Oct. 24-27, and at the APPEX London, March 1-3. The next full exhibition of the IP will be held at next year's AAPG Annual Meeting in Calgary, June 19-22. For more information about the IP and its activities contact:

❒ Gina Godfrey, IP chair; telephone – 1 (303) 308-9100; e-mail – gina.godfrey@petroweb.com.

❒ Jonathan Green, IP country coordinator; telephone – 41 22 721 1717; e-mail – jonathan.green@ihsenergy.com.

❒ Evelyn Medvin, IP sponsorship coordinator; telephone – 1 (713) 328-2212; e-mail – evelyn.medvin@corelab.com. ❑


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**Perspectives Lunch**
Date: Tuesday, September 14, 2004
Time: 11:45–1:00 p.m.
Fee: Included in Combo Pass or $35

**Featured Speaker:** John Seitz, Co-CEO and Founder, Endeavour International Corp.

**APPEX Houston Forum 2004 "Perspectives on the Upstream Business of Oil and Gas"**
(please check the APPEX Web site for schedule and updates)

**Theme: "The Exploration Dilemma: What is Exploration's Role in Shaping the Energy Future?"**

**AM: Global exploration issues and outlook**
Objective: Explore points of view (POV) from various industry sectors.

Introduction: **Pat Gratton, AAPG President 2004-2005**
Global exploration trends, issues, and outlook: **Pete Stark, VP Industry Relations, IHS Energy**
Major oil company POV: **Philip Behrman, Sr. VP Worldwide Exploration, Marathon**
International NOC POV
Small Independent POV: **Brian Maxsted, Founding Partner and EVP, Kosmos Energy LLC**
Exploration economics: **Leta Smith, Ph.D., Sr. Consultant, IHS Energy**
Independent POV: **Larry Sheppard, VP New Ventures, Vintage Petroleum**
Independent POV: **Bill Schneider, Sr. VP, Newfield International Holdings**
Panel discussion / Q&A session

**Perspectives Lunch**
Keynote Speaker: **John Seitz, Co-CEO and Founder, Endeavour International Corp.**

**PM: North American exploration issues and outlook**
Objective: Explore points of view (POV) from various industry sectors.

North American exploration trends, issues, and outlook: **Carl Garrison, Practice Director – Strategic Consulting, IHS Energy**
Independent – Gulf Coast / GOM POV
Small Independent POV: **Rod Erskine, President and Founder, Erskine Exploration**
Independent – Rocky Mountain Region POV: **F.X. O'Keefe, Exploration Manager, Western Gas Resources**
Panel discussion / Q&A session

**Exploration Investment Opportunities Forum**
Objective: Ten 10-minute slots reserved for selected APPEX Expo participants to present significant international and North American exploration prospects / investment opportunities that will be featured during the Expo.

For information, contact:
Michelle Mayfield Gentzen, American Association of Petroleum Geologists
Fax: 918 560 2684 • E-mail: mmayfiel@aapg.org
Web site: http://appex.aapg.org

# FOUNDATION UPDATE

## 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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continued on next page

WWW.UPDATE

# More Online Options Coming for Members

By JANET BRISTER
*AAPG Web Editor*

Thanks in advance for your patience.

Yes, patience is the "word of the month" for AAPG members who are contacting headquarters. Webster defines it as "the act or power of calmly or contentedly waiting for something due or hoped for."

We are in the throes of moving membership data into a new database system – a long-awaited project that has finally arrived. And, as with any worthwhile change, there are transitional challenges we are encountering. This includes everything from training users, to finding those little electronic or digital "gotchas" that no manual or techie could have possibly anticipated, but somehow we made it happen!

So, AAPG membership, thank you in advance for being patient when you contact headquarters and the response you receive is, "I'll start working on that now," instead of the usual, cheerful, "you'll have that today!"

### Worth the Wait

Because of your patience you'll soon see some improvements on the Internet side of this new database system. It has features that provide real-time feedback to purchases and changes you may need to provide to AAPG.

Here's an example: Currently, your member profile can be reviewed and, if you need to update information, you send in changes to AAPG via an e-mail form. That will change. Soon you'll be able to edit your own information – and it will be immediately incorporated in the headquarters' data.

Yep. If you decide you no longer like that yahoo! personal e-mail address you are using you can change to a different free service, go to the AAPG Web site and update your personal e-mail address. Then the next time we communicate with you via e-mail it will go to the newest personal address you have provided!

Another benefit: Currently AAPG offers online meeting registration – but with the change, this registration capacity will be expanded to all educational events.

As the next membership drive approaches you'll be surprised to know that you may point potential members to the AAPG Web site to submit their application. No longer will a paper form be required. Just remember www.aapg.org!

Because of the sponsor look-up feature of this process, it may even shorten the time it takes to attain Active member status.

In the meantime, from all of the staff that serves you, we offer this in advance: "Thank you for your patience. It's been a pleasure serving you."

Good browsing! ❑

continued from previous page

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## Friends Go Public With Science

# Filmmakers Celebrate Geology

By LARRY NATION
*AAPG Communications Director*

Two friends who have known each other since the first grade in Crandall, Texas, have become partners in a quest to bring geology to the public via television.

Devin Dennie, a doctoral geology student at the University of Oklahoma, and Todd Kent, a filmmaker with Savvy Center Digital Media in Dallas, have teamed up to produce GeoAmerica, a quickly paced travel show that focuses on the "earth science heritage," and uses history, folklore and casual personality to educate the public about their geological environment along the way.

Dennie is the "broadcast geologist host" for the programs.

Kent said GeoAmerica is meant to entertain while maintaining a high level of value and quality.

"The show integrates education with popular tourist locations and common every day concepts," Kent said. "Each episode revolved around a single scientific point in earth science heritage pertinent to that location."

Earth science heritage?

"It is the part of our lives and histories that are intimately related to our continent and its resources," he continued, "whether it's the rock in our patio floor, the steep mountain bike trail you ride on, your granite countertops, the salt on your food or the gas in your car. Geology is in everything – everywhere.

"A major goal is to open the eyes of our viewers to these relationships," he said. "We hope to generate interest in geosciences within our youth, change understandings on climate and environmentalism and generate a better appreciation of the role of natural resources in everyday life."

*Photo courtesy of GeoAmerica*

Todd Kent videos Devin Dennie with the Wichita Mountains as a backdrop for an upcoming episode of GeoAmerica

The idea for GeoAmerica grew out of a college project when Kent was studying at the University of North Texas, where he was to create and produce a television program as a project. He collaborated with his childhood friend, who was then completing his master's at Texas Christian University, to produce "North Texas Explorer," a science-based travel magazine for North Central Texas.

"We initiated 'North Texas Explorer' on a shoestring budget using school equipment and shot mainly after school and on weekends," Kent said. With limited funds, they began distributing the show to other cable channels. It quickly grew to as many as 10 stations in Texas and New Mexico and developed a large online following due to the streaming videos of the show on their Web site, OutdoorFlix.com and www.geoamerica.tv.

"With NTE, we proved it is possible to take a relatively uniform geologic area and make a recurrent, interesting show that utilizes earth science content in a travel show format. GeoAmerica is a natural progression of what we began with North Texas Explorer," Dennie said.

The two gathered more footage at the AAPG Annual Meeting in Dallas, interviewing geologists and going on a pre-convention field trip.

Dennie founded and is president of Explorer Multimedia, a 501(c)(3) non-profit organization to gather funds for GeoAmerica, with plans to produce visual products for classroom and exhibits use.

Their vision has gotten some traction recently, with the University of Oklahoma agreeing to provide some support.

Plans are also in the works for similar GeoAmerica shows on archeology, geography and other sciences. The goal is to meet two-year funding goals for the first full season of GeoAmerica. ❑


# 54th Annual GCAGS Convention

**October 10-12, San Antonio, Texas**

**The South Texas Geological Society (STGS) will host this year's convention in conjunction with GCSSEPM at the newly remodeled and expanded Convention Center in downtown San Antonio, Texas. The headquarters hotel is the adjacent Marriott Riverwalk Hotel.**

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- **Mexican basins and trends**

*Visit www.stgs.org for registration and hotel information*
*or call GCAGS 2004 Headquarters at 210-822-9092*

# 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.)

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**Deibert, Jack Edward**, Austin Peay State University, Clarksville (R.J. Steel, J.R. Steidtmann, R.S. Martinsen)

**Texas**
**Austin, Jeffrey Keith**, Chevron USA, Houston (M.K. McInerney, R.A. Kaufmann, T.J. Neely); **Chaffin, Christopher George**, Hilcorp Energy, Houston (J.E. Nunneley, T.L. Davidson, J.L. Eells); **Etti-Williams, Jimmy L.**, Black Crystal Energy, Dallas (C.J. Mankin, V.F. Agbe-Davies, K. Ladapo); **Guffey, John**, Heyco Maroc, Dallas (L.M. Cathles, W.R. Guffey, W.H. Beauchamp); **Hopson, Kevin Seely**, Daniel B. Stephens & Associates, Lubbock (M.A. Jacobs, C.W. Reynolds, W.R. Gibson); **Hughes, James Douglas**, independent, Austin (G.D. Stanton, D.E. Cassell, B. Kalil); **Johnson, Imelda Gorman**, ExxonMobil, Houston (J.R. Markello, J.F. Sarg, G.B. Asquith); **Kessler, Jennifer LP**, ConocoPhillips, Houston (R. Wayland, J.W. Serbeck, W.W. Clopine); **Kim, Eugene Miryong**, Bureau of Economic Geology, Austin (S.C. Ruppel, R.G. Loucks, R.H. Trevino); **Moore, Vernon Michael**, El Paso Production, Houston (T.L. Davidson, J.E. Nunneley, C.R. Hird); **Nicoud, Brian Dennis**, Core Laboratories, Houston (K.W. Mohn, J.M. Spaw, J.S. Kier); **Ojo, Akinsanmi Olufemi**, ExxonMobil, Houston (W.B. Odufisan, T.O. Ewherido, O.A. Olawoki); **Olson, Hilary Clement**, University of Texas, Austin (P.P. McLaughlin Jr., W.E. Galloway, G. Shanmugam); **Read, Robert L.**, independent, Midland (A. Cardamone, J.D. Gillespie, S.M. Ingram); **Smagghe, Guillaume C.**, BP America, Houston (D.F. Greeley, P.D. Heppard, L.A. Martin)

**Utah**
**Fausto Mosca**, Petroleum Systems International, Salt Lake City (D.A. Wavrek, D.W. Waples, D.M. Jarvie)

**Virginia**
**Imhof, Matthias Georg**, Virginia Tech, Blacksburg (W.D. Pennington, J.W. Castle, J.F. Read)

**Argentina**
**Borbolla, Maria Claudia**, ChevronTexaco, Buenos Aires (M.E. Lara, L. Legarreta, I.A. Orchuela); **Witte, Jan**, Wintershall Energia S.A., Buenos Aires (P.R. Ganduglia, G.O. Peroni, H.R. Karg)

**Brazil**
**Neumann, Virginio Henrique**, Federal University, Pernambuco, Recife, Pernambuco (R. Rodrigues, M.D.G.F.D. Costa, M.R. Mello)

**Canada**
**Griffiths, Elizabeth Jean**, Griffex Oil & Gas, Calagary (A.A. Hartling, K.R. Barrett, J.A. Weissenberger)

**Germany**
**Hollmann, Greg**, Gaz de France, Lingen (E. Kiefer, J. Schmitz, W.R. Von Haugwitz)

**India**
**Singh, Vijay Kumar**, Oil & Natural Gas Corp., Mumbai (P. Seal, M.K. Chakrabarti, R.M. Kotecha); **Vallikkat, Thachaparambil**, Schlumberger, Mumbai (T.A. Ryer, H. Gamero de Villarroel, E. Bornemann)

**Netherlands**
**Knight, Richard Robert W.**, Shell International, Assen (G.R. Louwaars, J.M.J. Terken, C.A. Visser)

**Nigeria**
**Ohanele, Christopher C.**, Shell Petroleum, Lagos (A. Adesida, K.O. Ladipo, N. Omorodion); **Ulu, Ogbonnaya Kalu**, ChevronTexaco Nigeria, Lagos (A.O. Akinpelu, B.S. Akinyemi, L. Linden); **Whisky, Komboye Rita**, Shell Petroleum Development, Port Harcourt (P.C. Egele, F.R. Ebiwonjumi, O.O. Olatoye)

**Pakistan**
**Farrukh**, Mari Gas, Islamabad (S.U. Siddiqui, M.R. Khan, N. Ahmad); **Rahman, Ishrat**, Mari Gas, Islamabad (S.U. Siddiqui, M.R. Khan, N. Ahmad)

**Saudi Arabia**
**Al Ghamdi, Saleh M.**, Saudi Aramco, Dhahran (A.Q. Hameda, I.A. Al-Ghamdi, M.O. Alamoudi) ❑

## Certification

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

**Petroleum Geologist**

**Texas**
**Kisucky, Michael John**, ChevronTexaco, Bellaire (T. Whitacre, R.C. Young, E. de la Pena); **Mallick, Jeannie Ann**, Excalibur Consulting, Houston (Society of Independent Professional Earth Scientists)

## *CALL FOR PAPERS*

### *BUDDING NEW TECHNOLOGIES*

### *Southwest Section AAPG 2005 Convention*

### *April 10-13, 2005*

### *Fredericksburg, Texas*

The Southwest Section is seeking paper and poster presentations for the 2005 Southwest Section Convention to be held April 10-13, 2005 in Fredericksburg, Texas. There will be Technical Sessions on Monday, April 11th in the morning and afternoon, and only morning sessions on Tuesday, April 12th and Wednesday, April 13th. We are soliciting papers covering topics from field studies to emerging technologies.

With historical Fredericksburg as the backdrop for the convention, we anticipate a rather sizeable turn out. This would be a great opportunity for you, as an author, to present your work before a large and appreciative audience.

The planned attractions for the convention include a German Festival with an Oompah Band, a Wine and Wildflower Tour, shopping for the spouses and, of course, the ice breaker which will be held at a local brewery. Mark your calendars and watch for coming announcements. If you have any questions about the convention, contact Mike Party (Convention Chairman) at (432) 686-5971 or by email at mparty@wbltd.com. We hope to see you in Fredericksburg!

Deadline for submittal of papers is December 15th 2004.
If you would like to present a paper or poster, please contact:

David J. Sivils, Tom Brown, Inc., djsivils@tombrown.com
(432) 688-6942 (Office) or (432) 682-5034 (Fax)

# New AAPG Field Courses for Fall

***Sedimentology and Sequence Stratigraphic Response of Paralic Deposits to Changes in Accommodation: Predicting Reservoir Architecture, Book Cliffs, Utah***
**September 18-24, 2004**
**Leaders: Keith W. Shanley, J. Michael Boyles**

**ENCORE OFFERING *Depositional Sequence Stratigraphy of Fluvial-Deltaic Deposits: Implications for Reservoir Delineation, Description, and Characterization***
**September 12-18, 2004**
**Leader: James R. Garrison, Jr.**

**Get more information or register at:**
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**or call 888-338-3387**

# READERS' FORUM

### The Haunting

The price of gasoline continues to rise; the price of natural gas and oil will continue at their present high levels – or even higher. Imports are continuing to increase and our domestic production of oil continues to decline. Worldwide exploration has lagged during the past 10 years – especially in the United States.

Without a comprehensive domestic energy policy to provide for the long-term energy needs of the country, our energy problems will continue to haunt us.

There is an inextricable link that exists between the fortunes of the petroleum industry and the nation's well-being. Today, the fortunes of both are troubled – very troubled!

At one time in the United States there were more than a score of large companies and thousands of independents hunting for oil and gas together and contributing to the welfare, not only of this country, but of many more scattered over the globe. We were producing close to 10 million barrels a day and growing.

Today, we have six large, merged companies in the world – three of those in the United States – and in this country there are just a few independent wildcatters. Domestically, we are producing over five million barrels a day and declining.

Exploration drilling activity in the United States is at the lowest level it has ever been. Also, there is a continuing slow-down of drilling in foreign areas. The world petroleum industry has not kept up with consumption. For every four barrels of oil the world consumed in the last decade, only one new barrel of oil was found.

The United States will never be able to domestically produce enough oil to completely satisfy its needs, but we should explore more to produce an amount sufficient to be readily available for the long term if imports are drastically reduced. Now.

The large mega-merged giants are hoping to prove that "bigger is better" – so far they have failed to show the strength expected of them.

Michel T. Halbouty
Houston

*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.*

### An Attractive Choice?

Many of your readers have expressed reasons as to why the enrollment in geology is down. I do not believe the reasons suggested are the major ones. The answer to "why," in my opinion, encompasses more than just salaries, benefits, companies, management and professors.

A reason often given is that the industry is too cyclical; this may be the case, but so are many other industries. Changes do impact employment and affect recruiting – but that probably is only a small part as to "why."

We continue to see mergers, but that, too, is no different than what is occurring in other industries ...

Actually, when merging occurs some employees may lose their jobs but other opportunities become available with smaller companies, independents and consulting firms. I would venture to say that mergers do not impact total employment significantly – although when the employment of our younger professionals is reduced at the major company level, that does impact the training of younger explorationists and therefore this may also be a small contributor as to "why."

Although I'm sure there are exceptions, I believe that most major companies continue to train and encourage further education, usually at the company's expense. I believe that most companies appreciate the employee's devotion, dedication and services, encourage prospect or project generation, reward employee's creativity and expect productivity from the creative oil finder while living up to their commitments and are competitive with regard to benefits.

So why is enrollment down?

Continued reorganization and restructuring based on recommendations made by young, inexperienced MBAs who have little or no knowledge of the oil and gas industry never has made any sense to me. I believe the application of some of their recommendations – along with creative accounting techniques – enhanced the bottom line in the short term but may be one of the major problems within the industry. Short-term profits seem to be their major goal with little or no concern for the long-term future and growth of the company.

Based on many companies' actions it seems that few realize that their most important assets are their employees; it probably does contribute significantly as to "why."

I believe the attractiveness of the many other available challenging careers is one of the main reasons as to "why" – many are relatively new and exciting, have great challenges, provide greater opportunities, provide rapid growth potential and have attractive salaries. Seeing what has happened to the geological profession – and what they have to look forward to – tends to steer potential students away from what they see as a less exciting future.

In the good old days the geologist had opportunities to perform tasks that perhaps many do not get to do today – responsibilities and duties that used to make the geological profession more attractive, including:

✓ There were more frontier areas available for exploring; geologists were able to be more creative.

✓ Jobs were more diversified and prospect generation was more encompassing (fewer specialists).

✓ The opportunity to do surface work, mapping and being in the great outdoors occurred on a regular basis.

✓ There was more one-on-one opportunities within and outside the company.

✓ There certainly were more numerous and smaller offices, and they were located in or near the area being worked. That seemed to provide a more family type environment – and, of course, commute time was at a minimum.

✓ There was less outsourcing; in many cases the prospect developer also did the well site work, which included collecting and evaluating samples.

continued on next page

**Answers**
*...not attributes*

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*Commentary*

# Looking Long-Term On Water Issues

By PAUL A. CATACOSINOS

Consider this scenario: It is the mid-21st century. All continental U.S. cities, towns and hamlets are now connected to one another by a continent-wide system of water pipelines.

Water is clean, abundant and available to all at a reasonable cost. In regions where flooding may occur, the water is directed to huge underground cisterns, to groundwater reservoirs or to a channel or canal system that can safely return water to the oceans.

In all major agricultural areas all sources of water – whether surface or sub-surface – are filled to highest usage capacities. In the arid southwestern deserts, all subsurface aquifers are constantly maintained at required levels, as are all streams, lakes and rivers necessary for agricultural and recreational purposes. In the deserts, oases have been created and in marshlands water is always available for wildlife.

In addition, the legal framework to support this system has been established by the federal government ... Established usage rules have now been legally tailored to accommodate local, state and regional requirements.

Desalination plants located along the Atlantic, Pacific and the Gulf of Mexico coastlines provide the system's water. The water is then pumped via pipelines to "water farms" located in strategic areas. These are large, regional pipeline computer centers that in turn service smaller facilities that are tailored to respond to the particular needs of their area, i.e., flooding conditions, drought areas, aquifer replenishment and so on.

All water farms provide backup to each other, as necessary. The pipelines themselves follow existing gas pipeline routes where practical but have also been considerably extended throughout the country. In addition, cavernous cisterns, diversion channels, storage lake systems and water treatment plants have been constructed to handle storm waters.

* * *

Had this system or something like it been started back in the mid-1950s along with our interstate road system, it would now be in place, or nearly so, and there would be no problem with the present drought in the southwestern states.

The aquifers would now be fully maintained at safe levels as a matter of practice.

There would be abundant water available to agricultural regions, and in regions subject to storms, water diversification processes would routinely reduce flood damage.

The project might even provide an incentive for gas and electric utilities to overhaul their transmissions systems and ensure that they can provide gas and electricity anywhere needed in times of heavy usage or emergency conditions.

Federal and state governments must act more quickly to solve this crisis now.

My main concern is that we may lose some or even much of our underground aquifer system. Aquifer draw-down may be accompanied by drying and mineral filling of the reservoir pores and cracks. Subsequent compaction may increase the damage to the reservoir, perhaps permanently.

I believe that it would be ironic, indeed tragic, if the largest and greatest scientific establishment the world has seen to date, of which we are a part, did not prevent the squandering and loss of our most precious natural resource, water.

*(Editor's note: Catacosinos is an AAPG member residing in Albuquerque, N.M.)*

## INMEMORY

**Cavallas, Joe Farish**, 70
Natchez, Miss., May 25, 2004
**Dameron, Wyllie F.**, 83
Midland, Texas, May 25, 2004
**Edmunds, David R.** (AS '83)
Llanelli, Wales
**FitzGerald, Norman D.** (AC '44)
Abilene, Texas
**McCasland, Barney C.**, 86
Midland, Texas, June 12, 2004
**McKenna, Philip J.**, 74
Centennial, Colo., Jan. 28, 2004
**McNamee, John J.**, 83
Richland, Wash., May 29, 2004
**Morris, David A.**, 67
Oklahoma City, April 14, 2004
**Palen, Frank Stone** (AC '56)
Port Washington, Wisc.
**Stanley, Thomas B.J. Jr.**, 91
Kerrville, Texas, Dec. 25, 2003

*(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.)*

continued from previous page

If we were to make geology as interesting and exciting as it once was we would attract more students to the profession.

Paul S. Horvath
Ponte Vedra Beach, Fla.

**E.T. Dumble**

I read with interest Don Zieglar's article on E.T. Dumble (July EXPLORER), and I thought perhaps your readers would like to know where they could see more of Dumble's work.

The Web site address for the entire set of publications of the Third Geological Survey of Texas, known as the "Dumble Survey" is http://www.lib.utexas.edu/dlp/project.html?project_id=dumble. The Walter Geology Library at the University of Texas at Austin Libraries is developing these online documents to preserve and enlarge the readership of these classic works.

Dennis Trombatore
Walter Geology Library
Austin, Texas

# SEG DENVER 2004

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Robert Brunck

Peter Carragher

João C. A. Figueira

Robert A. Gistri

## TLE Forum V: Globalization of the Energy Business

Monday, October 11, 2004, 9 a.m.
Colorado Convention Center, Denver, Colorado

**This year's distinguished panel includes:**

- **Robert Brunck**, chairman and CEO of Compagnie Générale de Géophysique (CGG)
- **Peter Carragher**, head of Discipline, Worldwide Exploration, of BP's Exploration and Production Technology
- **João C. A. Figueira**, executive manager of Petrobras' International E&P
- **Robert (Bob) A. Gistri**, manager, New Business Identification - Business Development of ExxonMobil Exploration Company
- **Robert (Bob) Peebler**, president and CEO of I/O
- **Matthew R. Simmons**, chairman and CEO of Simmons & Company International
- **Michael (Mick) Lambert**, president and CEO of GX Technology (GXT) Corporation

Robert Peebler

Matthew R. Simmons

Michael Lambert

DENVER MUSEUM OF NATURE & SCIENCE

**2004: A Museum Odyssey - Wednesday Night**
The event will take place at the Museum of Nature and Science. Diverse musical groups and multiple food and beverage stations will be arranged throughout the museum. the exciting exhibits range from dinosaurs to space! **Each fully registered delegate will receive a voucher to the event.**

**Applied Science Education Program**
Keynote address by **Dr. Robert T. Bakker**, "Dinosaur Renaissance Man"

Bakker is one of a few scientists who is most responsible for the new ideas that show dinosaurs as warm-blooded creatures of superior construction. **See him on Wednesday, October 13, 2004, at the Colorado Convention Center**

Dr. Robert T. Bakker

SEG **Advance Registration** Opens June 14, 2004 • **Housing Reservation** Opens June 14, 2004

For more information or to receive a **2004 SEG Denver Annual Meeting Announcement** contact:
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**www.seg.org** SOCIETY OF EXPLORATION GEOPHYSICISTS


# RMS Annual Meeting Offers Science, Business Themes

Science and business are the themes for the Rocky Mountain Natural Gas 2004 energy summit – this year's annual Rocky Mountain Section meeting – which will be held Aug. 9-11 at Denver's Colorado Convention Center.

The meeting is a joint session for RMS and the Rocky Mountain Natural Gas Strategy Conference and Investment Forum, sponsored by the Colorado Oil & Gas Association.

The meeting, a "first time ever" blending of RMS and COGA – RMS attendees can add $50 to their registration fee to attend concurrent COGA sessions – will include eight technical sessions, posters, two luncheons and icebreakers, short courses and dual exhibits featuring more than 150 exhibitors.

Other highlights will include:

✓ A Monday luncheon featuring keynote speaker Scott W. Tinker, director of the Bureau of Economic Geology in Austin, Texas, speaking on "Unconventional Gas and Global Energy: Is It Mountain Standard Time?"

✓ A Tuesday luncheon featuring Bobby S. Shackouls, CEO of Burlington Resources and chairman of the National Petroleum Council, speaking on U.S. and Rockies natural gas resources.

✓ A Tuesday morning "mega session" on "Natural Gas in the Future of World Energy" and "The Role of the Rockies in the Future of North American Natural Gas."

✓ A Wednesday afternoon "Pipeline Session."

Technical themes will include:

✓ New and Old Plays in the Rockies.
✓ Unconventional Gas.
✓ Applied Reservoir Models.
✓ Coalbed Methane.
✓ Shallow Gas.
✓ Search for Giant Oil Fields.
✓ New Seismic Techniques-Basin and Petroleum Systems.
✓ Smart Development.

Additional information is available online at www.rmag.org and www.coga.org.

# Planning Begins For AAPG's Fall Student Expo in Houston

This fall's AAPG/SEG Student Expo will be held Oct. 17-18 at Houston's Westin Galleria Hotel – an event designed to give geoscience students a chance to showcase their talents and network with industry representatives.

This year's expo, the seventh annual fall event, features activities ranging from poster presentations to interview sessions and optional Sunday field trips.

Activities begin in earnest with the Sunday Icebreaker, followed by a full day of student poster presentations and industry booth exhibits, where students can ask questions and solicit interviews.

An informal reception and awards presentation early Monday evening closes the event.

The expo is completely funded by the sponsoring companies' sponsorship fees. Last year's event attracted more than 215 registered students from 68 universities.

Additional details are available at http://www.studentexpo.info.


USGS science for a changing world

## Position Available

### U.S. Geological Survey (USGS)

### Research Structural Geologist

USGS, Central Region Energy Team, is soliciting interest from qualified individuals for the position of Research Structural Geologist in Lakewood, Colorado. The position will involve state-of-the-art research in structural geology as part of a multidisciplinary team that investigates geologic controls on petroleum occurrence and assesses petroleum resources. The research assignments will address fundamental questions related to the structural geology of hydrocarbon accumulations, at regional to prospect scales, in support of USGS assessments of oil and gas resources in the United States. Research efforts will involve seismic interpretation, structural modeling, and field-based structural analysis.

**How Do I Apply For This Position?**

Applications (resume and application questions) for this vacancy must be received on-line via the USGS Online Automated Recruitment System (OARS) BEFORE midnight Eastern Time (Washington, D.C. time) on the closing date of this announcement. If you fail to submit a complete online resume, you will not be considered for this position. Requests for extensions will not be granted. Most libraries, employment offices, and all USGS personnel offices can provide access to the Internet. If applying online poses a hardship for you, you must speak to someone in the Servicing Personnel Office listed on this announcement PRIOR TO THE CLOSING DATE for assistance. Contact Tina Garcia at 303-236-9569 or tpgarcia@usgs.gov.

The OARS system can be accessed at http://www.usgs.gov/ohr/oars/. The announcement number is: CR-2004-0236. The salary range is $61,712-$95,402 depending upon qualifications. The closing date is August 31, 2004.

U.S. citizenship is required. USGS is an Equal Opportunity/Affirmative Action Employer.


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## CLASSIFIED ADS

You can reach about 30,000 petroleum geologists at the lowest per-reader cost in the world with a classified ad in the EXPLORER.

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Just write out your ad and send it to us. We will call you with the word count and cost. You can then arrange prepayment. Ads received by the first of the month will appear in the subsequent edition.

For further information or assistance, call Brenda Merideth at (918) 560-2647 or (800) 288-7636 (Canada and USA).

DIRECTOR'S CORNER

# Volunteers Receive for Giving

By RICK FRITZ

I hired a landscaper to do some work on my yard, whose main job was to cut down two small trees in the front yard.

Concerned about how the job was progressing, I called him at the end of the day from work (it seems that all contractors now have cell phones for easy access). When I asked about the trees, he said "Sure, I cut down all four of 'em!"

And I'm thinking, there are only four trees in my front yard – two that were small, two that were very large – but when pressed on the matter he insisted that he had cut down four trees!

After a few choice words, I rushed home to gratefully find my two large trees still standing and the two small trees gone. When I asked him about the four trees, he smiled like he was talking to a child and said, "Look h'yar, you can see that the maple had one trunk, and the redbud had three trunks. That's four!"

Now I understood. I also understood how I would be charged for the job.

* * *

Communication, of course, is everything. Even though this workman had a cell phone, he and I were still not communicating. I find this is often true with Association work.

*This year we will be making a special effort to communicate opportunites ...*

This year we will be making a special effort to communicate opportunities for members and goals for the Association.

* * *

One basic opportunity for members is volunteerism. There are numerous committees that cater to a variety of interests in the geosciences. Many of these committees are looking for new members. It is good for the Association to find new members with new ideas.

The Membership Committee, for example, is expanding this year. This committee will be looking for additional help to drive the Membership Enhancement and Development Program, to be led again this year by past president Dan Smith. The Membership Committee, chaired by Jeff Lund, also will be charged with evaluating the interests of certain member subsets. For example, we will be looking at the needs of our retired members to see how AAPG can better serve our senior members.

If you are interested in volunteering for any of AAPG's committees, please log on to www.aapg.org and click on the "Committee" box on the left side. If there is a committee you would like to join, please contact the committee chair.

If you have questions and cannot reach the committee chair, please contact me at rfritz@aapg.org, or call 1-888-945-2274.

We always need volunteers for AAPG's meetings. The fourth annual fall APPEX Prospect and Property Exposition will be held Sept. 14-16 in Houston (see related stories starting on page 20). This show features prospects and properties from around the world and is a great networking opportunity. We are expecting over 2,000 participants, and many volunteers are needed to run the show. You do not necessarily need to be located in Houston, so if you are interested, please contact mmayfiel@aapg.org or call Michelle Mayfield Gentzen at 1-888-945-2274, ext. 618.

* * *

AAPG also continually looks for good submittals for the BULLETIN and special publications. This is a great opportunity to share knowledge with your peers, which is one of the basic missions of AAPG. All members are encouraged to consider sharing his or her work and discoveries in print. It is one of the greatest gifts you can give to your profession.

If you are interested in providing a submittal – or just have a good idea – please contact Geoscience Director Jack Thomas at jthomas@aapg.org, or call 1-888-945-2274, ext. 649.

Jack also is the person to contact if you are interested in developing a short course or field trip for AAPG.

* * *

Please note that these opportunities to volunteer are not just for the benefit of AAPG. Once I started volunteering, I received much more in return for my professional development.

Making new contacts are key to successful careers – and working as a volunteer over time can help build a great network.

*Membership Has Its Privileges*

# EMD Positioned for the Future

By BRIAN J. CARDOTT
*EMD President*

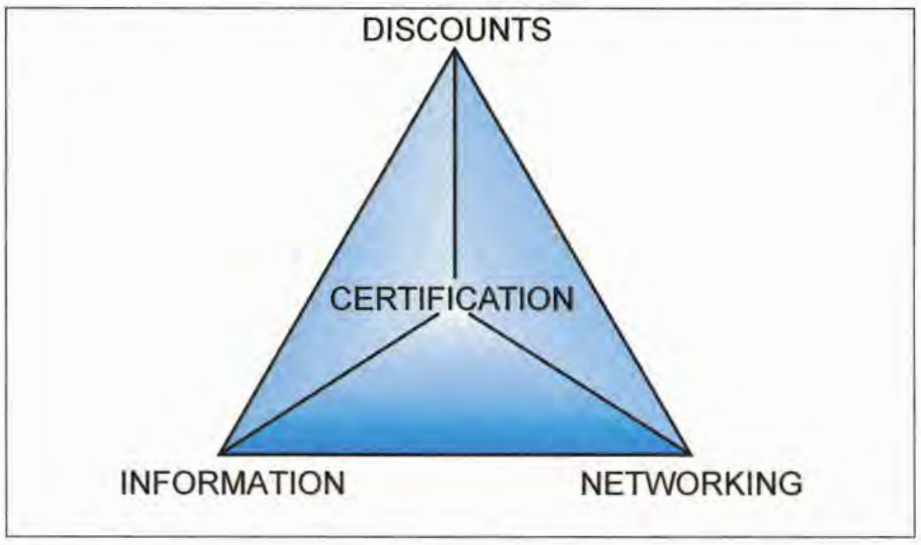
The vision of AAPG's Energy Minerals Division (EMD) is to be the primary professional community for geoscientists working with natural energy resources other than conventional oil and gas, and for professional development, information and networking in the following technical fields:

- ✓ Coal.
- ✓ Coalbed methane.
- ✓ Energy economics and technology.
- ✓ Gas hydrates.
- ✓ Gas shales.
- ✓ Geospatial information.
- ✓ Geothermal.
- ✓ Nuclear minerals (uranium).
- ✓ Oil shale.
- ✓ Tar (oil) sands.

This list has grown with the development of unconventional energy resources. A new technical field for gas shales was added to the EMD program in 2003.

As an organization we strive to be the first place to go when either expanding within a field or moving into a new field. No one is knowledgeable in all of the broad technical fields within EMD, but most EMD members are specialists in at least one field, and the EMD has a knowledge and experience base in each of these fields.

EMD provides benefits to all AAPG members through publications (e.g., *Sequence Stratigraphy, Paleoclimate and Tectonics of Coal-Bearing Strata; Atlas of Coal Geology; Geology and Coal Resource Utilization;* and the *Unconventional Energy Resources of North America* poster) and sponsorship at professional meetings (e.g., oral and poster sessions, short courses, field trips and luncheons). Basic information on each of the technical fields is provided in the public area of the EMD Web site (http://emd.aapg.org/).

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The most value is afforded to EMD members. The members-only area of the EMD Web site currently has information on our annual report, business plan, bylaws, certified coal geologists, committees, Explorer articles, honors and awards (historical list), leadership meeting reports, membership directory (searchable by member name, technical area, AAPG Section, city, state, country and company), newsletters, past executive committees, procedures manual, publications and sections.

The EMD offers:

❒ **Certification** – In conjunction with the Division of Professional Affairs, EMD offers peer-reviewed, professional certification for coal geologists (application forms are available on the Web site). Certification recognizes qualified professionals who subscribe to a strict code of ethics and possess relevant education and experience.

❒ **Discounts** – EMD members receive discounts on EMD-sponsored short courses and field trips at AAPG annual and sectional meetings.

❒ **Information** – The Web site's members-only area has detailed information on both regional and technical levels. The area includes information on meetings, activities and technical areas at the AAPG Section or region level, and technical articles, reference lists, Web links and committee reports at a technical level.

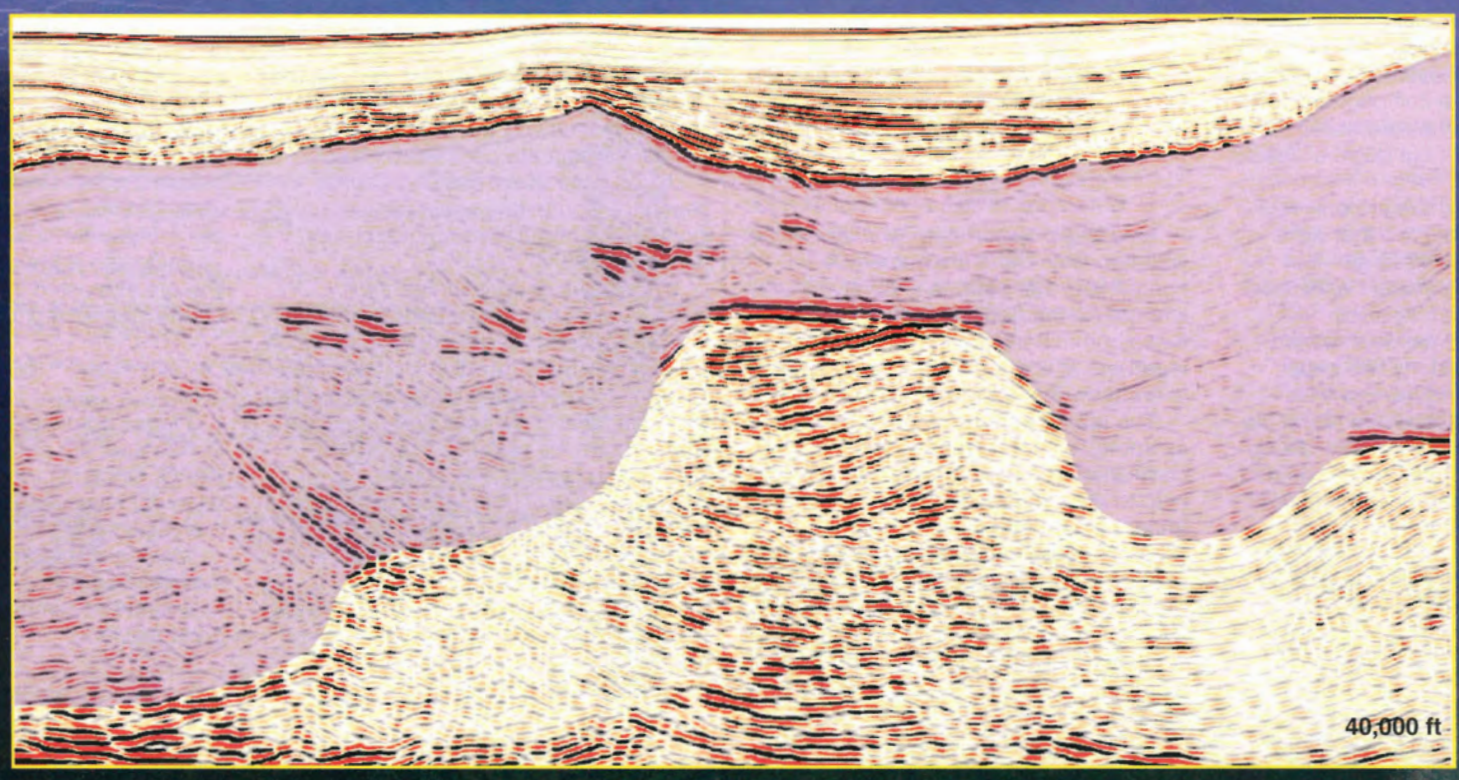
❒ **Networking** – EMD provides a forum for interaction with professionals in a wide range of technical fields to gain knowledge of scientific and technological developments worldwide.

Networking can be accomplished through involvement on committees, attendance at professional meetings and luncheons, and searching the EMD membership directory online for members with similar interests and geographic areas.

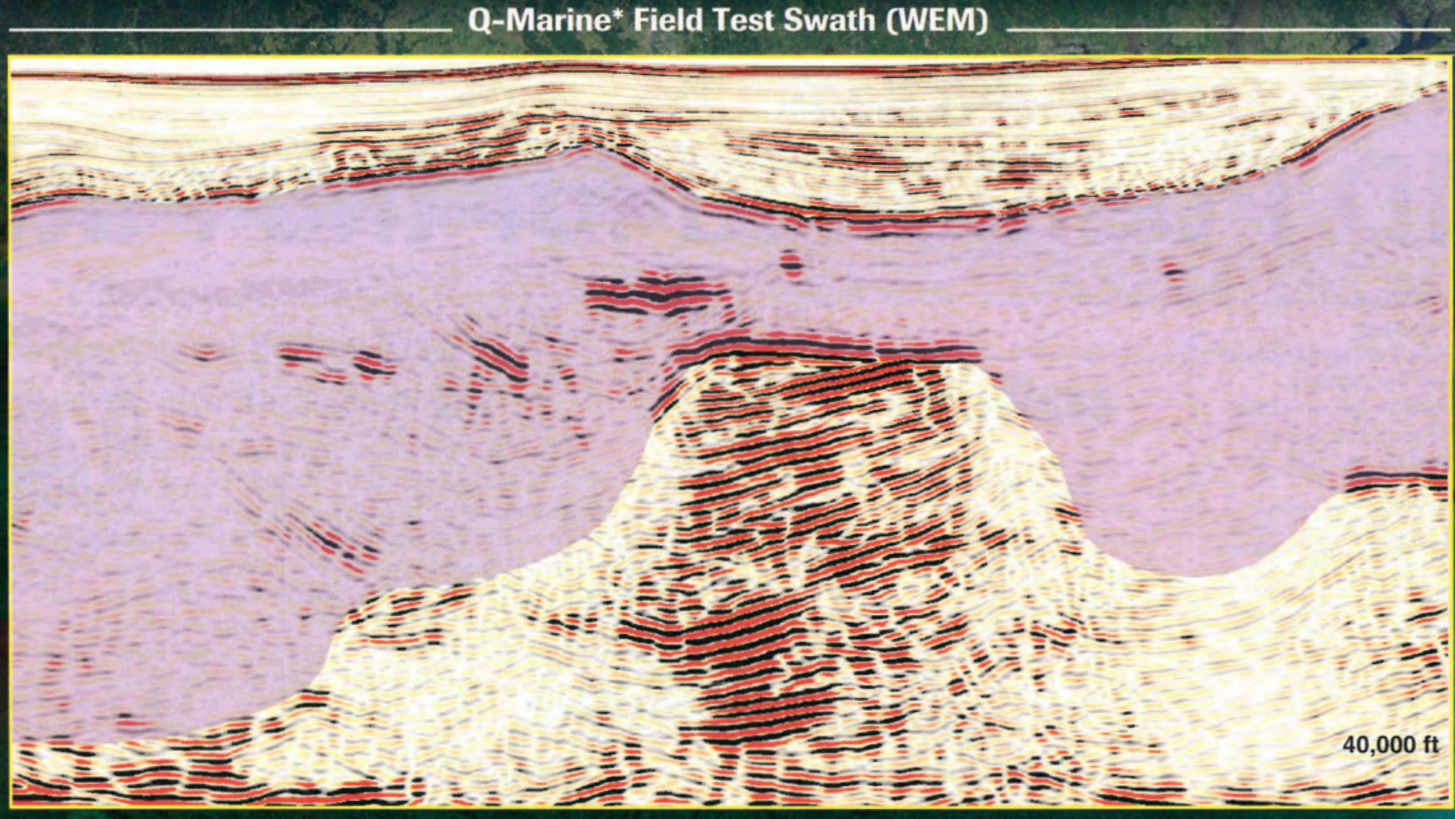
If you have not looked at the Energy Minerals Division recently, it is time to take a look – we have much to offer. The EMD is the place for your professional development within unconventional energy fields on which future generations will increasingly rely. ❑

# Raising the bar for subsalt imaging

Conventional Swath (WEM)




Q-Marine* Field Test Swath (WEM)




Gulf of Mexico

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