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EXPLORER

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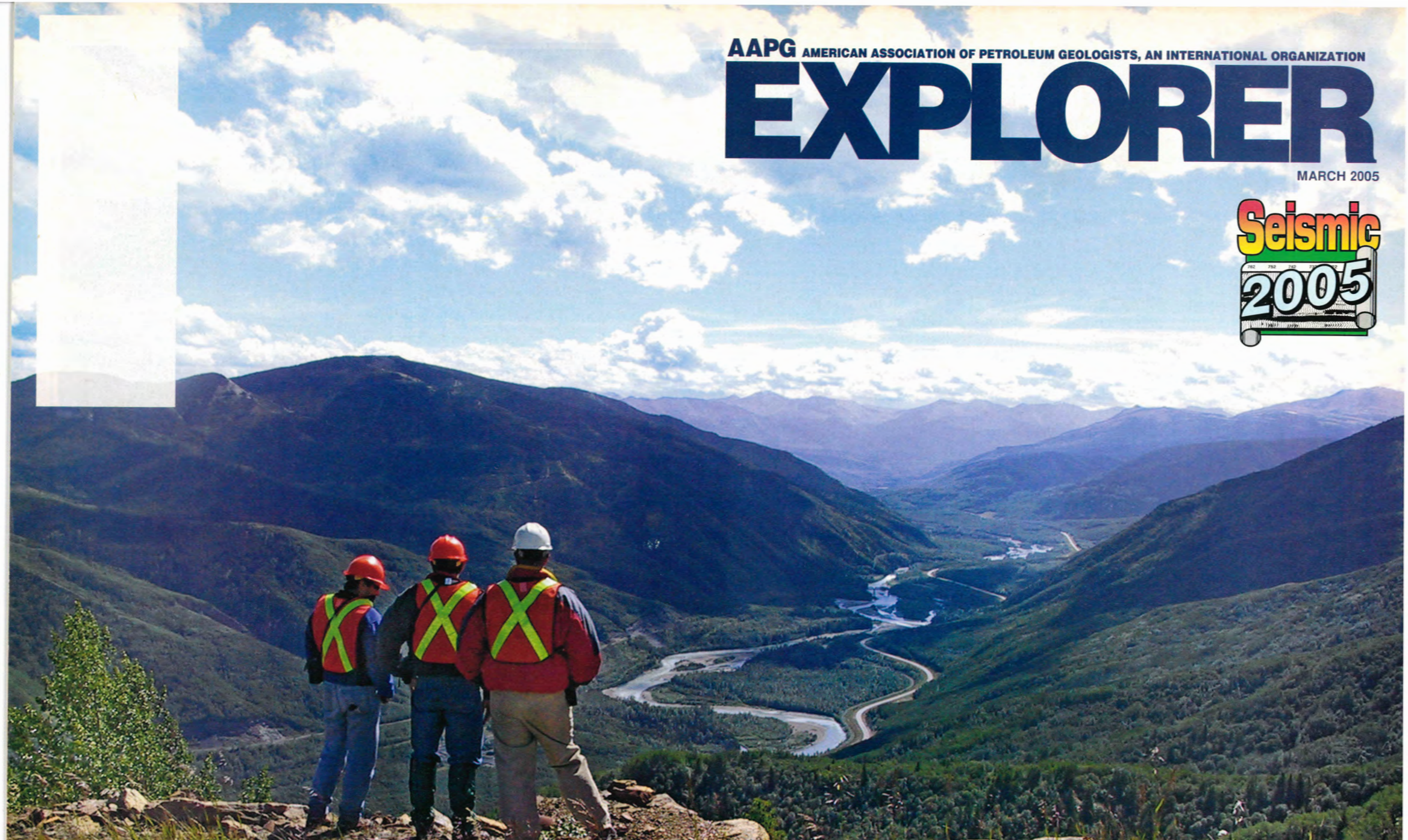
Seismic 2005



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AAPG EXPLORER

On the cover: This seismic crew working in the foothills of the Canadian Rockies in Alberta is enjoying a beautiful view – and for the seismic industry, the outlook for better times and increased activity is looking beautiful, too, thanks to a variety of factors that have triggered optimism in the oilpatch. This month's EXPLORER takes its annual look at the current state of the seismic industry, and for the first time in a long time more people than not are smiling when they talk about trends. There are still causes for concerns, of course (see page 14), but technological advances continue. Photo courtesy of Veritas DGC.

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STAFF

AAPG Headquarters – 1-800-364-2274 (U.S. & Canada only), others 1-918-584-2555

Communications Director
Larry Nation
e-mail: lnation@aapg.org

Managing Editor
Vern Stefanic
e-mail: vstefan@aapg.org

Editorial Assistant
Susie Moore
e-mail: smoore@aapg.org

Correspondents
David Brown
Louise S. Durham
Diane Freeman
Barry Friedman
Ken Milam

Graphics/Production
Rusty Johnson
e-mail: rjohnson@aapg.org

Advertising Coordinator
Brenda Merideth
P.O. Box 979
Tulsa, Okla. 74101
telephone: (918) 560-2647
(U.S. and Canada only:
1-800-288-7636)
(Note: The above number is for advertising purposes only.)
fax: (918) 560-2636
e-mail: bmer@aapg.org

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Photo courtesy of the Calgary Visitor and Convention Bureau

The view is superb at Dinosaur Provincial Park, located near Calgary – just one of the regional attractions awaiting those who attend this year's AAPG Annual Convention, set June 19-22 at Calgary's Stampede Park. Another meeting attraction is an excellent technical program. See related story on page 41.

PRESIDENT'S COLUMN

Digital BULLETIN: The Future is Now

By PATRICK J.F. GRATTON

Gone digital!

Well … mostly, and not for those of you who want a paper BULLETIN.

Under last year's president Steve Sonnenberg's leadership, the Executive Committee supported the conclusions of the BULLETIN Reformat Ad Hoc Committee. The thrust was to change the primary format of the BULLETIN to digital.

At the Jan. 15 Executive Committee meeting associated with a retreat at El Segundo Ranch near Telegraph, Texas, your leadership endorsed specific details for implementing this basic switch. These details are in my note accompanying the dues statement.

This column is devoted to the need for the changes and the reason we will continue to make the paper BULLETIN available for some time.

* * *

Mailing costs of the BULLETIN are a growing expense for the Association. Increases are driven by rises in postage rates, especially outside the United States, plus steady expansion in international membership. (It costs AAPG four-to-seven times as much postage to deliver in some areas internationally than in the United States.) That's the major negative driver.

On the positive side, digital publishing of the BULLETIN will allow:

✓ Increasingly more descriptive, dynamic graphics.

✓ Much easier searching for topical or site-specific articles.

Gratton

✓ Instantaneous delivery.

✓ Greatly reduced storage requirements.

✓ Almost infinite portability.

✓ Downloading capabilities.

✓ No back strain loading and reloading those shelves!

Further, we anticipate technology growth will allow secondary storage (e.g. CD-ROMs) to improve and make for even greater versatility of our BULLETIN.

* * *

Having writ that, the EC is very much aware that many of you will prefer to continue receiving the paper BULLETIN. To do so requires a specific election on your dues statement, *so please don't overlook that!*

I am proud that your elected leaders chose not to go "cold turkey" on this changeover. We really want you to switch but it should be an OPTION.

Our Executive Director Rick Fritz covered some of this in his January 2005 Director's Corner, but it is such an important issue that I thought it worth this column.

Patrick J. F. Gratton

Bylaw Changes Proposed

A special insert containing six proposed amendments to the Association's constitution and bylaws, submitted for consideration by the AAPG House of Delegates, can be found in this issue of the EXPLORER at pages 12-13.

Delegates will hold their annual meeting June 19 at the Calgary Hyatt Regency Imperial Ballroom, just before the official start of the AAPG Annual Convention.

The proposed changes have been submitted by the HoD Constitution and Bylaws Committee, chaired by Paul Britt.

Comments on the proposed changes can be made to HoD Chair Valary L. Schulz, at vschulz@matadorresources.com; to Britt, at pbritt@texplore.com; or to any HoD officer or delegate. ❑

Photos courtesy of Veritas DGC

Stronger oil prices have brought optimism and increased activity levels back to the seismic industry, as seen in these crew shots from Bolivia (left) and Louisiana.

Former Overcapacity Bugaboo is Diminishing

Seismic Industry Mood Buoyed

By LOUISE S. DURHAM
EXPLORER Correspondent

It's a bit early for a full-scale celebration, but there's more than a hint of optimism sweeping through the geophysical industry – a notable contrast to the rampant pessimism that permeated the business over the past few years.

"Business is good, as it should be with oil prices in the upper $40 range and gas around six bucks," said Steve Mitchell, operations vice president at Fairfield Industries. "In fact, we're seeing a lot of good things happen as we've moved into new things – such as reservoir imaging tools – with our new nodal system."

"Things really have improved," noted Chip Gill, president of the International Association of Geophysical Contractors, "but we have to remember how far down things were and how far up there is to go."

Thierry Pilenko, chairman and CEO at Veritas DGC, concurs.

"Overall, the seismic industry is improving," Pilenko said. "But we were coming from a period so bad, we're not yet in an area of profitability that would make us completely happy with the situation.

"The improvement is across the board," Pilenko noted, "and some sectors are doing better than others."

Blue Skies

One of the good news sectors is the marine business, where over-capacity, especially for high quality 3-D vessels, has diminished.

"The past few months, we've been talking with customers trying to secure assets for next summer and the second half of '05," Pilenko said.

"They're aware the over-capacity period is over. As recently as late spring of last year, customers were making decisions about shooting 3-D and calling for tenders only two-three weeks before the project."

Another area experiencing considerable growth is the processing arm of the industry.

"Acquisition activity started to increase in 2004, and across the board we started to see the demand for high quality processing moving up," Pilenko said. "This is especially true for imaging illuminating areas below salt in the Gulf of Mexico, for example, where high quality imaging technologies, such as prestack depth migration (PSDM) and wave equation migration, are in high demand."

Even though Veritas continues to embrace the multi-client business successfully, many companies now opt to keep their distance from this business model, still haunted by mistakes some made in the past such as acquiring data just to keep boats and crews busy. Pilenko noted, however, that in such hot areas as the Gulf where a plethora of properties will soon be offered in upcoming licensing rounds, data libraries capable of illuminating below the salt with proper PSDM will be a good business.

It is noteworthy that as the energy-hungry world pushes the need for new reserves and increased production from existing reservoirs, what once was old is new again.

"We not only see money being spent on exploration projects once again," said Peter Duncan, president of Microseismic Inc. and past president of SEG, "but, interestingly enough, we see this in North America, which went dead for awhile."

Another so-called mature region, the North Sea, also is experiencing a new life, as far as exploration is concerned. As the super majors are exiting, Pilenko noted smaller players are coming in and looking at their multi-client data, which were shot with longer offsets, and making decisions about potential deeper prospects and having good success.

See **Trends**, page 6

Photo courtesy of BGP

This seismic activity is taking place in Mexico, but the crews work for BGP, a subsidiary of the China National Petroleum Corp.

Trends

from page 4

The China Syndrome

The marine business may be getting its groove back, but the land side of the industry is a whole other story.

The barriers to entry on land are low, financially speaking, and there is a lot of equipment and knowledge readily available to set up a land acquisition company, whether domestic or international.

Consequently, the land business has become very fragmented and increasingly competitive.

"We're seeing new entrants and new capacity coming in," Gill said. "It seems to be primarily where national oil companies (NOC) want to grow a homegrown industry, and they're starting geophysical companies to service their needs."

Photo courtesy of BGP

BGP field operations in the Tarim Basin on the Taklamakan Desert of Western China

Perhaps the most striking success in the NOC arena is seasoned veteran BGP Inc., which is the largest land and shallow water seismic contractor in the world. BGP is a wholly-owned subsidiary of China National Petroleum Corp. and operates 94 field crews around the world.

"We're in the land and shallow water business only," said Rick Ward, vice president of business development of BGP International. "We've grown our international business by 50 percent every year for the last four years, and we anticipate adding more crews next year."

BGP has no field operations in the United States and no deepwater marine activity – at least for now.

Ward noted they are expanding their shallow water operations and are looking at the marine market.

"BGP continues to be an aggressive competitor, seeking opportunities anywhere we can find them," he said. "If we find the right situation, we'll get into the marine business."

A Matter of Perspective?

For some time the oil and gas players and others have expressed concern about the demographics of the industry (see related story page 14). This "people-issue" has the potential to become a particularly thorny problem for the geophysical community.

"The geophysical departments of the oil companies have been downsized, thinned out," Gill said. "As they're looking to grow their business on the exploration side, recognizing they can't buy their way to more reserves, they're thin on geophysical expertise. This means they're likely to go to geophysicists at the service companies to fill their ranks."

"The service companies have kept a high level of recruiting and developing geoscientists and reservoir engineers," Pilenko noted. "The biggest challenge over the next few years will be the ability to retain these people."

Another troubling issue yet to be resolved in the industry is the tendency of the oil and gas companies to shift risk onto the contractors, which hinders their ability to realize the benefit of any increase in tender prices. In fact, the geophysical industry is exposed to more risk than any other oilfield service sector, Gill said.

"We as a group have been asked to take on risk we shouldn't have, and we took it because our strength in contract negotiations eroded over time," said Magne Reiersgard, president of PGS Marine Geophysical NSA.

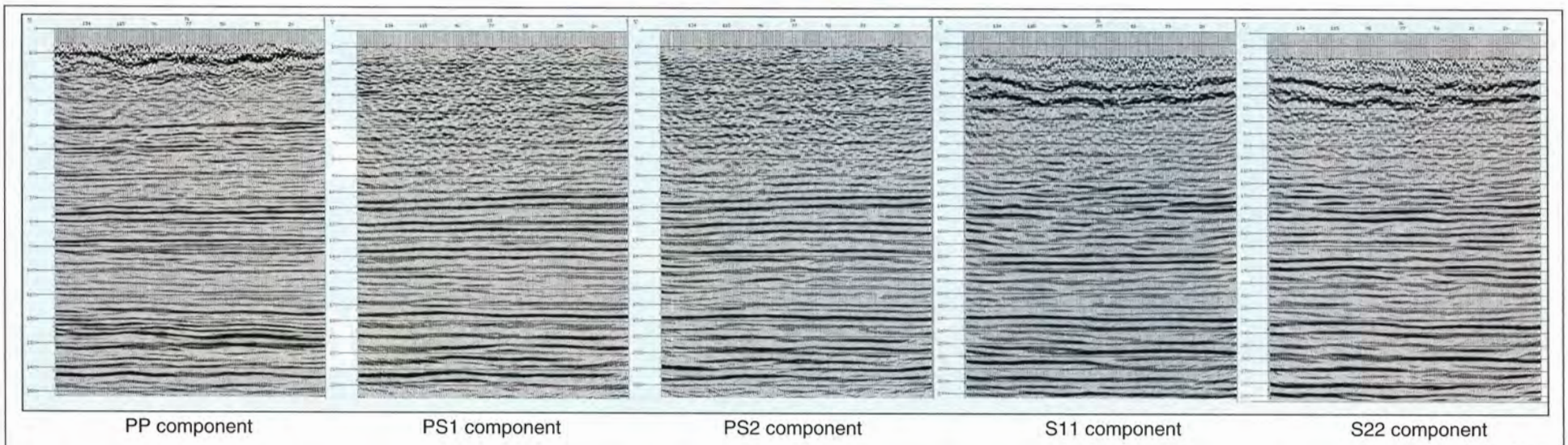
"We hope the market will give the opportunity to get a more balanced risk profile between the oil companies and the contractors," he said. "We're pushing for this, and would like to think others are pursuing the same avenues."

Even though industry participants in general are optimistic about the uptick in activity, the reality of the recent past continues to have an impact.

"I think the market forces are in play for commodity prices to stay reasonably strong for a longer period than what we saw in the late '90s, where gas would zoom up and zoom right back down," Mitchell said.

"But if you've survived the last 20 years in this industry, you know how to look over your shoulder and plan, or at least you should," he noted.

"Even though things should continue to be good, every now and then you need to look behind you and not forget where you came from." ❑



PP component | PS1 component | PS2 component | S11 component | S22 component

Images courtesy of Tom Davis

The three major wavefields are shown: compressional (P-P), converted (P-S) and pure shear waves, which all travel at different velocities – hence, time scales are different. The p-wave is the fastest, and the shear wave travels at roughly half the speed of the p-wave. The shear wave is sensitive to anisotropy in the subsurface and splits into two waves, making shear waves a tool to characterize, measure and monitor anisotropy, which aids in evaluating fracture regimes. In the example above, the reservoir interval being studied (5,000-7,500 feet in depth) is the Mesaverde gas reservoir at Rulison Field, Piceance Basin, Colorado.

The Next Tech Step?

Full-Wave Seismic Gets Tryout

By LOUISE S. DURHAM
EXPLORER Correspondent

The E&P industry has wrung enormous value from 3-D seismic, yet the demands made on this technology continue to increase.

For instance, seismic data are needed to support a whole new level of imaging quality necessary to better explore and exploit the many complex, often unconventional reservoirs, e.g., tight sands and fractured shales, commonly targeted by industry today. Conventional 3-D seismic technology, however, falls short of providing the needed information.

It's time to kick it up a notch.

Enter full-wave seismic, which is positioned to become the next new thing in seismic imaging technology, according to a number of industry experts.

Full-wave seismic acquisition and processing provide adequate sampling of the full seismic wavefield, which is essential for producing the best possible subsurface image, according to Joe Jacquot, director of product marketing at Input/Output (I/O).

Full-wave technology records the complete ground motion from both pressure (P) and shear (S) waves in three dimensions using MEMS (micro-electro-mechanical system)-based accelerometers.

In contrast, the standard analog geophone arrays measure only the vertical component of the seismic waves reflected from the subsurface. Eliminating the conventional phone array has the added benefit of lighter, less bulky equipment and greater operational efficiency.

See **Full-Wave**, page 10

Full-Wave

from page 8

Seeking Subsurface Resolution

The technology required for land full-wave imaging consists of high vector fidelity, three-component, single point receivers and high capacity land acquisition systems capable of supporting the high receiver densities and large channel count operations required by wide azimuth and long offset recording, according to Jacquot.

The purpose-built, multi-component VectorSeis and DSU systems of I/O and Sercel, respectively, currently serve the full-wave market.

Digital sensors deployed as point receivers measure any energy impinging on them whether it's seismic or source-generated noise, which can be removed in processing. They can be deployed at any angle because they are insensitive to orientation.

While geophones act as a filter on the highest seismic frequencies, the point receivers record a wider bandwidth of signal, including both higher and lower frequencies. This results in better resolution of subsurface layers, which can be particularly beneficial when planning placement of horizontal wells, according to Jacquot.

"Because these receivers use accelerometers, they measure acceleration rather than velocity, so they can measure lower frequencies down to 1-2 Hz," Jacquot said.

"The point with recording lower frequencies is you can do a better job with seismic inversion, whereas the preservation of higher frequencies lets you see thinner beds in the subsurface.

"Another thing, because you can measure ground roll characteristics, there's the potential to do a better job of modeling near surface velocity variations," Jacquot said. "If you can model velocity and thickness properties of these layers, then you can do a better job of removing their influence during processing and end up with a clearer seismic image."

An added benefit of full-wave technology is the concept of a wide azimuth survey. Point receivers deployed in wide azimuth surveys give a much better idea of anisotropy – or azmuthmal variations in velocity – and that gives a better indication of the fracture regime at the reservoir level.

This is particularly meaningful when working in carbonates or a formation such as the Barnett shale.

Because geoscientists in general are still struggling to get their collective arms around the still-challenging shear wave data, particularly when it comes to processing, these data sometimes might be considered extraneous information gleaned from full-wave seismic. The advantage is they will be in-house when the technology to best process and interpret them matures.

Colorado Case Study

Even though full-wave is essentially in its infancy, a number of field implementations are in place.

In fact, a group of 23 companies representing a variety of oil and gas industry sectors are jointly sponsoring a full-wave 4-D seismic project at Rulison Field in the Piceance Basin, Colorado. The program kicked off in July 2003 under the auspices of the Reservoir Characterization Project (RCP) at the Colorado School of Mines.

The field is operated by Williams Company and produces from Mesaverde tight gas fluvial sandstones of the Cretaceous. The reservoir is made up of multiple stacked channel sand lenses having permeabilities between 5 and 80 microdarcys. Conventional P wave data are not sufficient to locate the channel sands or to resolve the subtle fracture networks that control gas migration.

The time-lapse, or 4-D, multi-component analysis of the field was undertaken to:

✓ Integrate reservoir characterization and improved imaging to increase gas production from tight gas formations with minimal environmental impact.

✓ Understand the fracture networks that determine gas migration and accumulation.

✓ Use time lapse shear waves to monitor the stress changes associated with reservoir depletion of the gas sands.

Thus far, two surveys have been implemented: a base line survey in the fall of 2003 and a monitoring survey last fall, according to Tom Davis, professor of geophysics and director of the RCP. Because wells are being drilled in the field each year, changes in production response should be observable.

The team replants the sensors rather than incur the expense of buying the sensors and then having to drill to place them relatively deep in the subsurface because of the considerable drilling activity in the field. Davis noted they replanted 1,500 stations in only 1 1/2 days.

"We have a lot of data rolling in," Davis said, "and now we're trying to tie it all together. It started out to be mainly multi-component seismology, and now it's a truly integrated research project with geologists, geophysicists and petroleum engineers.

"It's the first survey of this kind related to tight gas and related to depletion only," he added, "and we're looking at primary depletion."

Given the methodology being used, Davis anticipates they may be able to find the better areas to drill first to get the most production up front. Because the reservoir is 2,000 feet thick, there is also an issue of how best to drill the wells, which historically have been vertical.

"If we can identify the sweet spots, maybe fewer wells could be located off these pads if they angle out into the sweet spots," Davis said. "So maybe drilling costs can be reduced through better location."

The project area is sensitive, environmentally speaking. There are multiple landowners to answer to, and the land borders onto federal BLM land. Numerous permits were required for the program to move forward.

Employing a recording system using point receivers requires a smaller footprint and no dynamite, which helped considerably to appease outside parties. ❑

Utah Discovery in Denver Spotlight

Case Histories Mark Rock Confab

By DIANE FREEMAN
EXPLORER Correspondent

Three-D seismic technology continues to evolve and improve – as does one conference whose intent is to document and present those changes and their significance.

Initial presentations on new discoveries and case histories plus a showcase roundup of technology have helped make the annual 3-D Seismic Symposium in Denver a significant stop for those wanting to stay current on seismic advances.

Sponsored by the Rocky Mountain Association of Geologists and the Denver Geophysical Society, this year's symposium – the 11th annual – will be held March 11 at Denver's Marriott City Center.

R. Randy Ray, owner of R-3 Exploration Corp., and Bill Pearson, of Pearson Technologies in Denver, teamed up to start the program in 1995. Ray is past editor of the EXPLORER Geophysical Corner and serves as chairman of the organization's geophysical integration committee.

"There was high interest in the technique of 3-D seismic back then – it was a new technology sweeping across the country and improving technology," Ray said. "Today 3-D is maturing, but we're getting smarter about extracting more information from 3-D data sets."

Ray attributed the conference's endurance to the many talks on applications and case histories.

"It's what people like to see," he said. "It's the longest running 3-D symposium in the country to my knowledge. Other places have them for a year or two and they burn out, but we keep going."

"It's definitely a valuable tool because of the savings people can realize from picking up on other companies' triumphs and tragedies."

Historically, the one-day symposium has drawn attendees not just from Denver, but from over the country, including many from Houston, Casper, Wyo., Oklahoma City and Tulsa.

"It draws a steady audience," Ray said. "It serves mainly the Rocky Mountain area, but there's always interest in what's going on."

It also has succeeded, Ray said, because:

✓ It narrows in on specialized topics.

✓ It brings geologists and geophysicists together, because it merges disciplines.

✓ It's a one-day symposium. "That's one reason it's so popular," Ray said. "Everybody can take off one day from work."

Varied Program

Steve Sahinen, vice president of operations for Seitel Data in Houston, has attended the symposium on and off for about 10 years. He said the Denver conference was a major event from the start because of the case histories presented there.

"It really helps grow the use of 3-D by hearing other people's experiences," Sahinen said. "It helps people better plan and utilize their assets.

"It's definitely a valuable tool because of the savings people can realize from picking up on other companies' triumphs and tragedies," he added.

Over the years, keynote speakers have touched on a variety of topics, Ray said. Mike Bahorich, of Apache Energy Corp. in Houston, discussed inventing of the coherency cube at the second annual symposium; the following year, Michael Zeitlin, of Magic Earth in Houston, demonstrated the latest applications of visualization technology.

In 2003, keynote speaker Scott Tinker, director of the Texas Bureau of Economic Geology, showed LiDAR imagery for studying 3-D outcrops – "One of the first times that it had even been shown," Ray said.

Last year's keynote speaker Henry Posamentier, of Anadarko Canada, discussed seismic geomorphology, which "went on to have a conference scheduled in London," Ray noted.

This year's keynote speaker is AAPG Distinguished Lecturer Alistair Brown – the symposium's original keynote speaker in 1995 – who will discuss "Pitfalls in Modern 3-D Seismic Interpretation" (see related stories, pages 14 and 28).

"Much seismic data today, especially 3-D, is underutilized," Brown said. "A better understanding of geophysical principles is required. Seismic attributes are not independent of each other. The well to seismic tie is

See **Denver**, page 14

Issues Beyond Headcount

Manpower Issues Shade Optimism

By LOUISE S. DURHAM
EXPLORER Correspondent

Exciting, fun, vibrant.

These are a few of the upbeat words currently used to describe today's oil and gas industry, where activity has been bolstered by the now-long period of acceptably high commodity prices.

Given all the downsizing of the past, however, and the relatively small pool of available new professionals, there is much hand-wringing over who will staff the industry to continue moving it forward.

The problem extends beyond head count. In fact, there a number of issues that need to be addressed, according to Dallas geophysicist and author Alistair Brown, current editor of the EXPLORER's popular Geophysical Corner:

✓ There is a shortage of people associated with the cyclical nature of the industry and layoffs.

✓ Many of these people are not as trained in some of the technologies as they should be.

✓ Management in the oil companies is not especially versed in the technology and doesn't know what geoscience is all about – and, consequently, can't give appropriate guidance to working geoscientists.

✓ Everything today has extreme computer orientation – and that's both good and bad.

"A lot of graduates come through the university with tremendous dependence on computers, which are wonderful things," Brown said. "But they tend to cloud the mind, and we've swung from not enough dependence on computers to too much.

"Also, there are a huge number of people confused and bewildered by the all the technologies we have," he added. "It's very difficult to be abreast of all these things.

"More and more geologists are doing seismic interpretation, and they're understandably confused by all the bells and whistles available to them," Brown said.

"Rather than try to understand all these things suddenly, they resort to looking for the silver bullet by pressing some buttons."

At the other extreme, there are some geoscientists around who once interpreted black and white wiggles on seismic with colored pencils. They find converting to a workstation very difficult – and err in the other direction.

Somewhere in the middle is a happy medium, but it will take a concerted effort to get there.

At least part of the answer to the problem is a retraining and re-educating focus within the geoscience community, according to Brown, who, with some of his colleagues, is working on this by teaching courses and helping within the companies.

"Getting the ear of management is one of the most difficult and significant issues," Brown said. "A lot of them are not reading the literature for the most part, and getting through and getting their attention would be a significant leap forward."

In large part the current problems stem from the reality that the business is an inexact science. This can make it particularly difficult for some of the more analytically trained people to understand what it takes to do the best job.

"Ours is a special business with loads of gray areas in the middle," Brown said. "There isn't *the* right answer; there's the closest approximation to the right answer." ❑

Denver

from page 12

complex with phase, polarity and tuning being big issues."

Another major talk at this year's symposium will be on the new Covenant Field, a significant new thrust belt discovery in Utah.

"This has been recognized as the largest oil discovery onshore in over 20 years," Ray said.

Keith R. Johnson and Doug Strickland (see related story, page 16), of Wolverine Gas & Oil Corp., will discuss the discovery in the central Utah and western Wyoming thrust belt, explaining how 3-D seismic was used to drill the Kings Meadow Ranch 17-1 discovery to open a new petroleum province in central Utah.

This talk will mark the first time that a company official has discussed the discovery publicly.

Also scheduled this year:

✓ A talk on using 3-D seismic for coalbed methane plays. "A lot of plays are going on in the Rocky Mountains, and this is the first paper showing this for evaluation," Ray said.

✓ A number of case histories presented.

✓ Robert P. Peebler, president of Input/Output, will discuss the latest in recording technology, and will illustrate the possibilities for finding oil and gas in onshore Rockies seismic programs.

✓ Talks on the acquisition on federal lands.

"We've had a paper every year on the acquisition on federal lands because the rules are changing so fast," Ray said. "We want to see what's being done, and what's being challenged by the Bureau of Land Management and environmental groups. We're working hard to become more sensitive to the environment." ❑

New Era, New Tools, New Approaches

It's Playtime for Prospectors

By DAVID BROWN
EXPLORER Correspondent

Red Sox win World Series!

Shell engineers admit mistake!

Onshore exploration rebounds in the United States!

Never thought you'd live to see the day? Given enough time, strange things will happen.

Capital for new exploration projects is flowing back into the industry, thanks to lofty oil and gas prices.

Playmakers in the Mid-continent can sell deals again, and they're generating prospects in ways different from the last oil boom.

With apologies to the New York Yankees: It's a whole new ball game.

Smiles All Around

Talk to independent playmakers who've been to NAPE and APPEX recently. They're excited about the market for U.S. prospects.

"In the past six months people have started to believe in the higher oil prices," said Ted Beaumont, an independent geologist in Tulsa and former AAPG science director.

"If prices stay where they are, in a year things are going to be crazy," he predicted.

Talk about a change.

Activity dropped off the map during the last price downturn, when oil dipped to $12

See **Playmakers**, page 18

Photo courtesy of Charles Wickstrom

A variety of factors – led by recent strong oil prices – are making independent U.S. prospects like this one much easier to sell.

Playmakers

from page 16

The industry's risk-averse view of domestic exploration has affected its ability to generate new plays.

a barrel, he said. Playmakers couldn't give away a prospect, much less sell one.

"It put such a pall over the industry, no one wanted to do anything. A lot of people got out of the business," Beaumont said.

"It was just a bad time, and we haven't fully recovered from losing a lot of good people," he added.

Beaumont looks for plays primarily in East Texas, the Texas panhandle and Oklahoma, but branches out to other areas of the United States for promising prospects.

Today, he notes, some land that might have leased for $100 an acre a year ago is going for $300 an acre.

"One thing I'm starting to worry about is that things will get *too* crazy," he said, "just like they did in the last boom."

Technological Edge

Most U.S. playmakers no longer feel confined to a narrow geographic region, since knowledge and technology can be applied anywhere.

"Today, I think the specialization is more in specific areas of technology," said AAPG member Charles Wickstrom, managing partner for Spyglass Energy Group in Tulsa.

"I have particular expertise in certain areas of technology, and I apply that across the country," he said.

Wickstrom founded Spyglass with fellow geologist (and AAPG member) Chris Johnson in 2003, and they've enjoyed continued success.

Much of that success comes from applying advances in technology, according to Wickstrom, who entered the industry in 1978.

"At that time, we were doing seismic stratigraphy with 100 percent shothole dynamite," he recalled. "It was successful to an extent, to the usefulness of the tool.

"Then in the early 1980s, we moved into 2-D or CDP, common depth point seismic," he said. "That allowed us to do better resolution on stratigraphy and a little better on structure."

But it was the advent of 3-D seismic acquisition that truly altered the picture for onshore playmakers, Wickstrom said.

"In the late '80s and early '90s, we moved into 3-D," he noted. "That really changed the whole spectrum of exploration onshore."

It also changed the economics of exploration, moving investment risk away from drilling the well and toward shooting the 3-D seismic, Wickstrom said.

Costs associated with horizontal drilling make the exploration/development process ever more capital intensive.

"In the last six or seven years, we've moved into applying horizontal drilling to increase our recovery on a field-wide basis," Wickstrom said.

"All of this calls for an increased demand on capital. We've moved away from the days of drilling one-well prospects," he continued.

"To make the economics work, we have to have significant acreage, enough to drill multiple development wells."

Thinking Big

Doug Strickland is exploration manager in Oklahoma City for Wolverine Gas and Oil, which has headquarters in Grand Rapids, Mich.

Wolverine made headlines recently with its major Covenant Field discovery in Utah.

"We think we've stumbled into another billion-barrel hydrocarbon province," Strickland said.

Very small independents that develop plays aren't thinking small at all when it comes to leasing.

Wolverine targeted 500,000 acres in the Utah play, 350,000 acres for a Kansas coalbed methane project and 120,000 acres in a Rocky Mountain play, he said.

Strickland, an AAPG member, cited advances in technology and technique for changing the ways plays are developed today.

"One of the significant things that has changed is the petroleum system information, and the geochemistry that goes along with it. Today we can run isotopes. We can do fluid-inclusion work," he noted.

"The second big difference is the improvement in seismic," he said. "The prestack depth and time migration has really helped."

But when Strickland begins to identify a play, he falls back on the tried-and-true approach of researching the published literature.

"I go through a tremendous amount of literature every week," he offered. "There has been a lot of good work done in the past."

Wolverine takes time to examine and re-examine prospects, adding seismic as a next step for analysis.

"We'll spend two or three years on a single area," Strickland said. "After we've developed several good lead areas, we use geophysics.

"We buy trade data to start with, and we'll oftentimes shoot data, 2-D and 3-D," he continued. "In exploration plays, we've mostly been using 2-D."

Despite the scope of some of its projects, Wolverine is happy to put a deal together and operate the exploratory well, according to Strickland.

continued on next page

Southwest Section Meets April 10-13

"Budding New Technologies" is the theme for this year's AAPG Southwest Section annual convention, to be held April 10-13 in Fredericksburg, Texas.

The meeting will feature short courses, field trips, two luncheon talks, an exhibits hall and a variety of social activities. Organizers have tried to tie the region's historic heritage to all meeting activities.

An Icebreaker will be held from 5-7:30 p.m. on Sunday, April 10, in the exhibits hall at the Hangar Hotel and Conference Center. Technical sessions will be held during the morning and afternoon hours on Monday, April 11, but only during the morning on Tuesday and Wednesday, allowing time for participation in field trips and other special activities.

Also set are two luncheons:

✓ The All Convention Luncheon on Monday, April 11, featuring a talk on "Geological Perspectives of Global Climate Change – The Update," by Lee C. Gerhard.

✓ The All Division Luncheon on Tuesday, April 12, featuring a talk on "Influence of Geology and Technology on Frontier History, Texas Hill Country," by AAPG president-elect Peter R. Rose.

Registration details and other information is available online at www.southwestsection.org/swsaapg2005/convention.htm.

continued from previous page

"When we sell deals to majors, they typically like to operate. But there again, we're a little company putting together these very large plays, and they don't seem to have the wherewithal to put them together," he said.

The industry's risk-averse view of domestic exploration has affected its ability to generate new plays, Strickland believes.

"It's an industry where it's been mostly acquisition-divestiture, development drilling, down-spacing," he commented.

Strickland thinks larger companies "simply aren't managed for new plays."

"Some of the bigger companies no longer have the expertise," he said. "They're very focused, mostly on development activity – there just isn't time to examine regional (exploration) plays."

Computing Power

Don't overlook the importance of computing power that allows small companies and independent playmakers to be competitive.

As a productivity tool, the computer rules.

"We've greatly decreased the number of staff required," Wickstrom observed. "When I started, we needed one draftsman for every three geologists or engineers. Today, we have no draftsmen."

Computer-assisted exploration now affects every part of the industry and everyone left in it.

"In 1978, we had – at best – a handheld calculator," Wickstrom added. "Today I have three computers in my office and one at home."

Data transmission, computer access and the Internet also can give investing partners a direct look at drilling progress on a play, he noted.

Spyglass captures real-time drilling data and has it relayed by satellite for remote monitoring, according to Wickstrom.

"Everybody who has an interest in the well can be given a password, and they can get on the Internet and watch the well being drilled," he said. "That's been a big benefit for us."

Independent geologists also benefit from the technology leverage enjoyed by small companies.

"We know several of them, and we recently have taken a geological concept developed by two geologists working together," Wickstrom said.

Playmakers with a good prospect don't even need seismic to sell the deal, although having it doesn't hurt, according to Beaumont.

"We're using attribute analysis. You may be looking at something that's too subtle for the seismic to show," he said.

"My dad's a geologist and I'm a geologist," Beaumont said. "His generation didn't have the well density in Oklahoma that we have now, which gives you a better chance to find stratigraphic traps."

Tipping Point?

Is U.S. onshore exploration really back?

Let's just say, things are better than they were.

"It's still very hard to sell a true wildcat right now," Beaumont said. "It's been that way for 20 years."

Industry investors continue to prefer a play that extends a field, or one that expands a proven concept based on nearby production.

"That's the main thing people have sold for the past 20 years. It's always been easier to sell that, and it still is," he said.

But with today's higher prices, the playmaker with a quality prospect can ask for a much better override and a nicer bonus, according to Beaumont.

"At APPEX, I heard from a lot of people looking for deals that there were not a lot of deals to choose from," he said.

"The other side of it is that more people are looking at prospects and want somebody to do due diligence," which creates even more opportunities for the independent geologist, he added.

Wickstrom sees the exploration environment changing as higher oil and gas prices attract new capital investment.

After years of frustration for independent playmakers, the industry might be near a tipping point.

"What we're seeing right now," he said, "is a shift from the industry looking for capital, to capital coming in and looking for deals." ❑

Adoption Coming Later This Year

Texas Rules to Require CE Credits

By KEN MILAM
EXPLORER Correspondent

Texas soon will require continuing education credits for geoscientists renewing their licenses.

The Texas Board of Professional Geoscientists has drafted a set of continuing education rules with the aim of adopting them later this year, according to board vice chairman Edward G. Miller.

The new rules require 15 hours of continuing education credit per year. Barring major revisions, the rules probably will go into effect Sept. 1, 2006, Miller said.

Although petroleum and other resource geoscientists are exempt from licensing, many choose to obtain a license because the energy industry remains volatile and they may find themselves taking a career path where licensure is required, Miller said.

"I would do it – in fact, I did do it," said Rick Erickson, chairman of the AAPG Division of Public Affairs' State Registration and Licensing Committee. Erickson also serves as liaison between the DPA and the National Association of State Boards of Geology.

Erickson, who also is executive director of the Mississippi State Board of Registered Professional Geologists, said roughly 90 percent of resource geologists in that state register even though they are exempt.

"The oil and gas industry has so many ups and downs that it's more or less an insurance policy," he said.

"I'm sure the same thing can be said of every other state, especially in the petroleum areas," he added.

"There is a broad scope of things people can do to acquire the continuing education credits," Miller said.

Some of the opportunities include:

✓ Completing or auditing college courses.

✓ Attending or presenting technical sessions at trade shows or professional meetings such as those offered by AAPG.

✓ Taking in-house and other training sessions or seminars.

✓ Participating as an official or committee member in a professional society.

✓ Teaching.

✓ Publishing papers, articles, books or software programs.

Military personnel deployed outside the United States more than 120 days are exempt for that year.

Professionals employed outside the United States more than 120 days in a year are exempt, except for five hours of self-directed study.

Miller said up to 30 hours in excess of the requirements may be carried over to the next year.

Geoscientists must keep track of their credits on a form provided by the Texas board and save receipts or other documents to verify attendance. Miller said the board audits a certain percentage of renewals each year, and only those license holders are required to present the documentation. The fee is $150 per year.

Beginning in July, geoscientists will

See **Registration**, page 29

Seminar Planning Under Way

While the final wording of the continuing education requirement for the Texas Board of Professional Geologists is not yet finalized, AAPG already is planning and preparing to help members through its education department offerings.

The current Texas licensing text suggests that 15 Professional Development Hours (PDH) will satisfy the annual requirements, and one of these hours must be on the subject of ethics.

AAPG's approach is based on the interpretation that most – if not all – of AAPG's education offerings can be used toward satisfaction of the state requirements, according to AAPG Geosciences Director Jim Blankenship.

Both AAPG and the Division of Environmental Geosciences will be offering talks or seminars on ethics. AAPG also offers Continuing Education Units (CEUs) on all of its courses, and we maintain a database of cumulative CEUs for all members and participants.

A CEU issued by AAPG is equivalent to 10 PDH, as defined by the Texas board's definition.

AAPG will continue to monitor the status of the Texas ruling and explore ways for our offerings to best serve the needs of our members registered in Texas as well as other states. ❑

Second TOTY from Santa Barbara

Another Cal Teacher Gets Award

By BARRY FRIEDMAN
EXPLORER Correspondent

For the third time in six years, AAPG's Teacher of the Year hails from Southern California, a place more known for its love of Pilates (for us "unhip," that's the latest exercise vogue) than its love of petroleum exploration.

And for the second time, the teacher is from Santa Barbara.

Marilyn Bachman is the 2005 AAPG Teacher of the Year (TOTY), a $5,000 award funded by the AAPG Foundation and presented for "Excellence in the Teaching of Natural Resources in the Earth Sciences."

Bachman, a 35-year teaching veteran, teaches sixth grade science and math at the Montecito Union School in Santa Barbara, where she has taught since 1986.

Last year's TOTY was Mike Fillipow, from Polytechnic High School in Long Beach, Calif., and the 2000 awardee was Peggy Lubchenco, of La Colina Junior High School in Santa Barbara, where the relationship between the petroleum industry and environmentalists usually resembles the one between the Reverend James Dobson and Planned Parenthood.

Bachman, however, says that relationship doesn't have to be dysfunctional.

"Students living in Santa Barbara – and especially minutes from the beach – are definitely environmentally sensitive, but they are not politically biased," Bachman said. "I have lots of students who surf, bike, hike and ski, so caring for the environment is a top interest and priority for them."

Bachman is in *Who's Who in American Teachers*; was named Distinguished Educator in Santa Barbara County in 2000; and received awards with words like "inspirational" and "excellence and mentor" in the title. Saying retirement will be "the saddest day of my life," she can't name another occupation she'd rather be doing.

For Bachman, teaching earth science is like being an actress in a play in which she both writes and directs.

"And then if the audience applauds – in my case, if you see the students excited – what more could you ask for?

"I love it more now than I did 35 years ago."

Bachman, whose husband is a geologist and daughter is an earth science teacher, has traveled extensively throughout the world and says those trips "have made me who I am, the teacher I am – all the geology trips over the years."

Mixing Science and Society

The world is one thing, California is another. Depending on the point-of-view, it is a place either held hostage by Big Oil or cowed by the Sierra Club.

Perhaps in other areas teachers don't have to assuage the fears and preconceptions of sixth graders and their parents, but this is California, a place about which Joan Didion described as: "People have the sense that things had better work out in California, because here, underneath this enormous bleached sky, we run out of continent."

Bachman

Asked if she's an environmentalist out to protect that sky at all costs, Bachman says: "Possibly, but I'm a realist. We all need fuel, and then I see their parents driving their SUV and then complain about drilling for oil. Kids find out most people understand both sides of the issue. Everything we can do to protect the environment, we should."

Bachman concedes her students are probably more sensitive than their peers in other states.

"I do think my students are more keenly aware of the environment than students were 15 years ago," she said. "Drilling for oil in the offshore is a huge concern to them, and oil spills are of critical concern. Many of (them) come to class expressing concern about high gas prices, oil companies making a killing, etc. Some express concern about drilling for oil in environmentally sensitive areas.

"In the resources unit, I deal with the realities of the need and uses of natural resources," she continued. "The best thing I have done is to take students down to the beach in Carpinteria to observe the natural oil seeps. This makes a big impression on them. Students suddenly realize that

continued on next page

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oil seeps out of the ground naturally. This experience, alone, makes them think a bit more carefully.

"Now when they go to the beach and get tar on their feet, they don't immediately think that it is seeping out of the oil platforms offshore!"

As a further example, Bachman explains, "In their research, they discover that companies like Chevron have learned to drill in Indonesia in a way that has the least possible affect on the environment. So, generally, my students show an interest in both sides of the issue and they begin to learn the complex ways in which various factors in our environment interface."

A Special Teacher

It takes a special teacher to teach about resources and the environment to 11- and 12-year olds whose hormones are beginning to meringue, but Bachman says it can be done.

She says it is most important to employ teaching methods that lead to self-discovery.

"In the lab itself, I always structure the lab so they discover the answer."

"The most important thing I do is remind them that oil comes out of rock on its own. It doesn't come from oil rigs."

And it seems to be working.

She then tells a story about one of her students.

"The La Conchita landslide occurred recently and one student came to class saying, 'Well, they should have known that water shapes the earth – everyone could see that La Conchita was at the base of a landslide ... I still feel sorry for the people who died, though!'"

Natural disasters, from floods to earthquakes to fires to tornadoes, are part of the California psyche, so Bachman believes it's important to present the oil and petroleum lessons in a factual, open manner.

"It is essential that students learn where oil and gas deposits are found," she said. "We have a great example in Santa Barbara with the offshore oil wells in the Santa Barbara Channel. When the oil production stopped and the oil companies wanted to remove the platforms at the base, students followed the debate in the community."

In that debate, Bachman said that environmentalists lobbied to have the platforms cut off at a safe distance just below the surface so that the ecosystem of subsurface plants and animals could continue to inhabit the platform ecosystem. The fishermen wanted the oil platforms removed at the base because they were concerned about their fishnets getting caught on the subsurface platform.

"This is an example of how I engage students in discussions about the effect of industry decisions on the ecosystem," she said. "When discussing recent oil exploration in the United States, most students realize the dependency that the U.S. has on foreign oil ... and are very concerned about politics in the Middle East. We research and discuss the need for the U.S. to conserve oil and to become less dependent upon foreign oil.

In winning the TOTY award, AAPG bestows $2,500 to Bachman, as well as $2,500 to her school. Calling herself "completely honored and amazed" when told she won the award, she says she received notification during an early morning phone call that was patched through to her classroom.

"I thought 'Oh, great, this must be a parent,'" she says, laughing.

Some day, a teacher winning an award for the teaching of natural resources in the earth sciences will hold up her certificate and say, "I'm going to Disneyworld," but Bachman wished for something less gaudy:

"I wanted a seismograph."

Eventually, she and the school decided to use the school's portion of the money to fund more hands-on activities for students in lower grades.

As for Bachman, with the seismograph on hold, she wants to take her portion of the money and take another defining trip – this time to the Galapagos Islands.

"Now, if only I can get someone to go with me." ❑

Pac Section to Perform Teacher Award Honors

Marilyn Bachman will receive the 2005 AAPG Teacher of the Year award at the AAPG Pacific Section annual meeting, set April 29-May 1 at the Fairmont Hotel in San Jose, Calif.

The event is a joint meeting with the Cordilleran GSA, built on the theme "Bay, Basins, Basement and Beyond."

Bachman, a 35-year teaching veteran, is being honored for her efforts teaching sixth grade science and math at the Montecito Union School in Santa Barbara, Calif.

The award includes a $5,000 prize from the AAPG Foundation, with $2,500 going to the school's science program and $2,500 going to Bachman.

TOTY presentations are usually made at the AAPG convention, but Bachman will not be be able to attend the Calgary meeting in June because of a previous commitment.

"I am really excited to get this amazing award – the award for a lifetime of work," she said when told of the honor. "I very much appreciate all of you."

Complete information on the Pacific Section meeting can be found online at http://psaapg.org/convent.html. ❑

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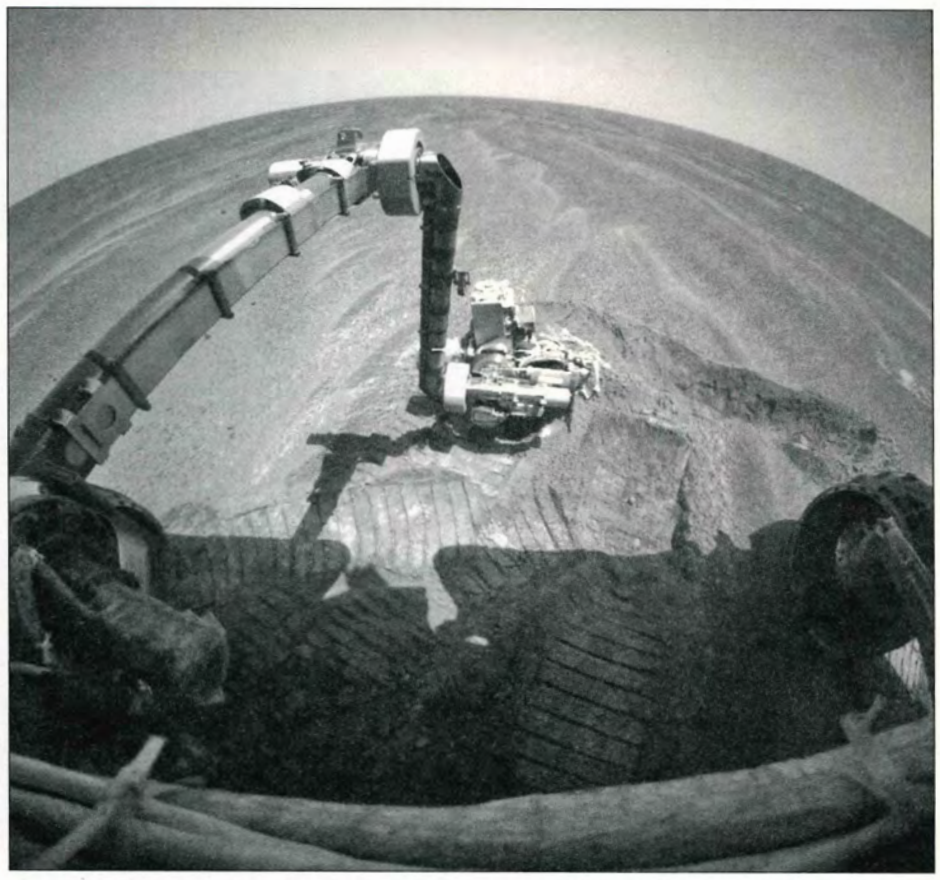

Photo courtesy of Jet Propulsion Laboratory

The dependable rover Opportunity is collecting a wealth of data about the geology of Mars as it explores the planet, taking photos and gathering specimens – and a planetary geologist is doing the steering.

Geologists Live Vicariously

Two Rovers Take Mars Field Trip

By KEN MILAM
EXPLORER Correspondent

Two remarkable vehicles are tooling around, remapping the history of Mars, and a geologist is in the driver's seat.

Bob Anderson of the Jet Propulsion Laboratory in Pasadena, Calif., is a planetary geologist helping steer the Mars Exploration Rovers (MER) – two robot explorers designed to examine interesting geologic targets on the red planet.

Anderson's role on the MER science team is to work with both the geologic and operational aspects of the rovers, dubbed Opportunity and Spirit, deciding where they go, what targets they choose and how to analyze those targets.

Each machine is equipped with a wide array of instruments and cameras to collect data and beam it back to earth. The gear includes spectrometers, drills, rock hammers, lens and microscopes.

"The only thing we can't do is subsurface exploration," Anderson said. "For the top 10 centimeters or so we're doing pretty good."

Working with remote imagery has its challenges.

"When you can't go and grab a rock in

See **Mars**, page 29

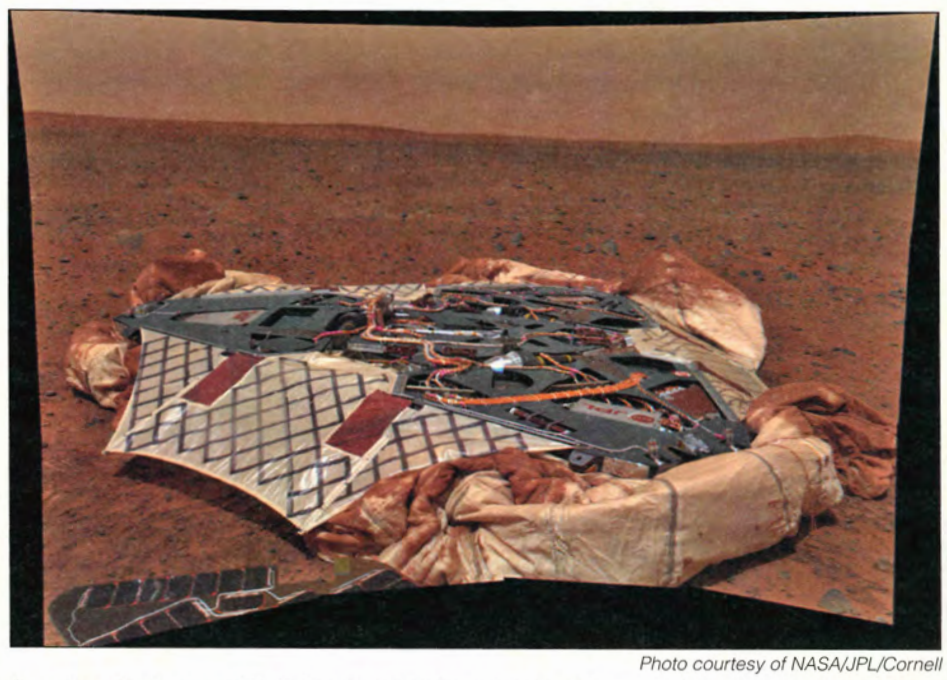

Photo courtesy of NASA/JPL/Cornell

A composite image of Spirit's empty lander, which safely carried the exploration rover over hundreds of millions of interplanetary space, then protected its cargo as it bounded to a landing on the hard Martian surface.

The Human Touch

Schmitt's Dream Still Lofty

By KEN MILAM
EXPLORER Correspondent

The only geologist ever to ply his science in person on an extraterrestrial body views the current exploration of Mars from a special perspective.

"What these young men and women have achieved is quite remarkable. Those Mars Exploration Rovers are no substitute for a human being on the spot," said Harrison Schmitt, head of AAPG's Astrogeology Committee.

Schmitt was the last man to step onto the moon, traveling aboard Apollo 17 in 1972.

The performance of the rovers beyond their expected life and the dedication of the engineers and scientists behind the mission "are just what we saw all through Apollo," he said.

Humans come equipped with "a fully reprogrammable computer" completely integrated with complex visualization and manipulative tools – their brain, eyes and hands," Schmitt said.

"I think we have to look way into the future to see robots duplicate this," he added.

Schmitt hopes the current series of remote exploration missions will help spur interest in putting humans back on the moon and into space.

The Mars rovers may take days to reach an outcrop that scientists want to study, and the data they gather from spectrometry and visual analysis may leave questions unanswered.

"Those questions could have been answered quickly by an exploration geologist – and new questions asked," he said.

"For efficiency and completeness, you need humans," he added. "There is an extra price to pay to get them there, but they give you more in value.

"It's hard to imagine an exploration program here (on earth) solely with robotics," he continued. "It's not cost-effective, not complete. Remote sensing is important, but robotics is not in a position to do it all."

Schmitt says he and others wants to see humans return to the moon and deep space.

"We think the private sector should lead the way," he said. "It's not yet clear what kind of corporation can attract and sustain investor interest.

"I think it should be paid for with investor capital rather than taxes," he said.

But once that matter is resolved ...

"With a believable and sustainable commitment, we could be back on the moon in 10 years and on Mars in 15 to 20 years," Schmitt said.

Schmitt thinks the commercial potential of space eventually will become apparent.

The moon is a potential energy resource target. The only viable resource identified there so far is Lunar Helium 3, he said. The substance was found in moon samples in 1969 and '70, but not identified as a potential energy source for fusion technology until about 1985, Schmitt said.

He believes Mars might yield similar potential – and beyond the economic potential, he said, the value to science remains a powerful lure.

"The moon has given us clues to the origin of the moon, earth and solar system," he said, "that I suspect we would not have gotten any other way." ❑

Schmitt

Sections Set March Deadlines

Late March brings abstracts deadlines for two AAPG annual Section meetings.

The abstracts deadline for the Rocky Mountain Section meeting is March 28, and the Mid-Continent deadline is March 31.

The Rocky Mountain meeting will be held Sept. 24-26 in Jackson, Wyo., at the Snow King Resort. The meeting immediately follows the annual Wyoming Natural Gas Fair, schedule at the same site.

The RMS theme is "Rocky Mountain Rendezvous – Rising to the Challenge."

The Mid-Continent meeting will be held Sept. 10-13 in Oklahoma City. The theme is "Target the Hidden Potential in the Wild West."

Information on both meetings is online at www.aapg.org. ❑

GEOPHYSICAL CORNER

Pitfalls in 3-D Seismic Interpretation

(The Geophysical Corner is a regular column in the EXPLORER, edited – and this month, written – by Dallas consulting reservoir geophysicist Alistair R. Brown. This month's column is titled "Pitfalls in 3-D Seismic Interpretation.")

By ALISTAIR R. BROWN

As a consultant I am often in a position to review seismic interpretations by others. It allows me time to reflect on how geoscientists can improve interpretations and avoid pitfalls.

I was invited to listen to a presentation on seismic attributes and my opinion was sought. We were shown a map of Attribute no. 1, then we were shown a map of Attribute no. 2, then we were shown a map of Attribute no. 3.

At this point I interjected: "What is the objective of this study, and how do these maps relate to that objective?"

"I am gathering *all* the evidence for the study of this reservoir," was the response.

We were then shown Attribute no. 4, Attribute no. 5, Attribute no. 6.

I could not contain myself any longer: "Could you please explain how you selected these particular attributes?"

"Oh, they are all *very* important attributes."

We were shown Attribute no. 7, Attribute no. 8, Attribute no. 9 ...

He was selecting these attributes *because they existed on his workstation.* Sadly, too many workstation users today are button pushers seeking the *silver bullet* rather than analytical thinkers using the workstation as a tool.

Workstations are magnificent tools, but the answers are still to be found in "the minds of men."

How many of us realize that the precision of machine autotrackers is typically around one-quarter of a millisecond? In good data this precision represents geology and must be exploited. Thus autotrackers are indispensable tools of modern interpretation. Derivatives of autotracked time maps, such as residual, dip and azimuth can yield vital structural detail not visible in any other way.

Horizon amplitude versus windowed amplitude is another common pitfall. Windowed amplitude is more modern, but this doesn't mean that we use it to the exclusion of horizon amplitude that has been available for 20 years.

RMS (root mean square) amplitude seems to be the most popular type of windowed amplitude. This has splendid application for various reconnaissance endeavors. Figure 1 shows RMS amplitude over a 500 ms window revealing many small bright spots in the Frio Formation of south Texas. The squaring of the amplitude values within the window gives the high amplitudes maximum opportunity to stand out above the background contamination.

Horizon amplitude (figure 2), extracted along the high precision autotrack, is much better for studying a single reservoir. Horizon amplitude suffers no contamination but requires that the horizon has been correctly identified and tracked. Horizon slices thus remain the best amplitude displays for selecting the optimum drilling location or measuring the area of a reservoir.

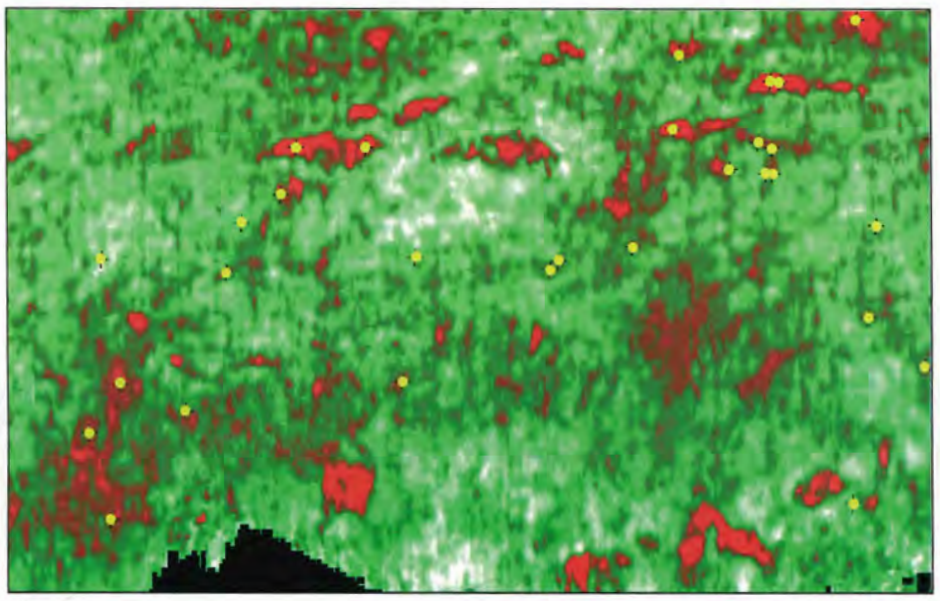

Figure 1

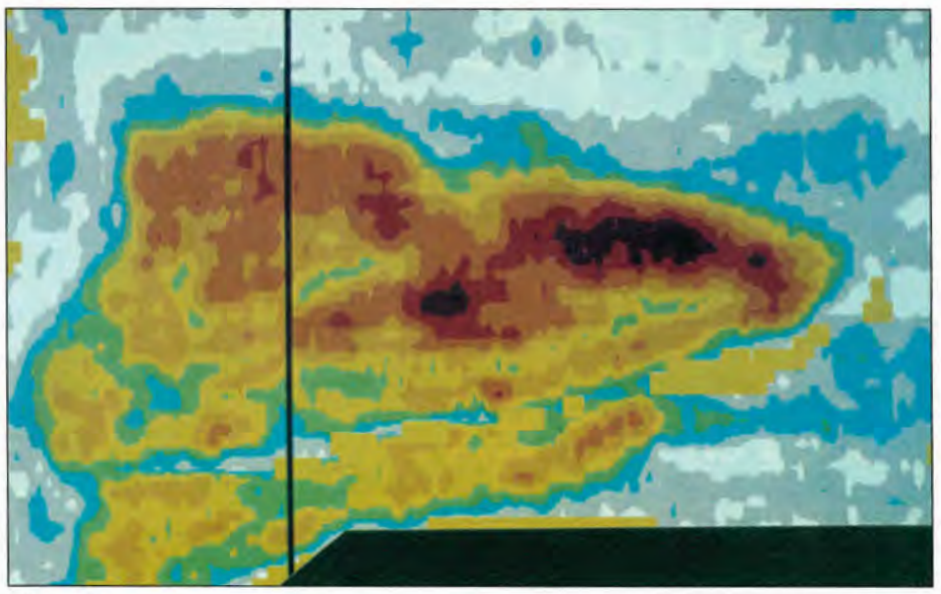

Figure 2

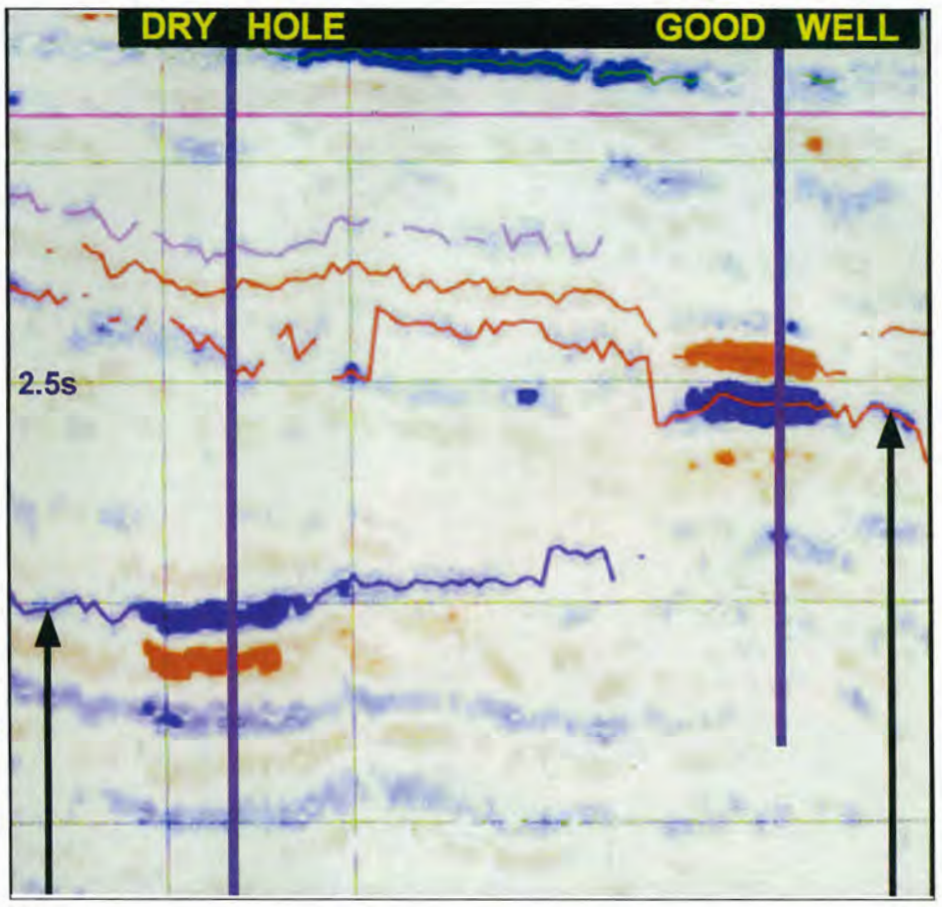

Figure 3

Data phase and polarity critically determine seismic character – and character is more important than amplitude in identifying hydrocarbons. Character is key in making an effective well tie and thus correctly identifying seismic horizons.

So why do interpreters not think more deeply about phase and polarity?

I believe that every seismic interpreter, with an objective beyond structure, has the responsibility to determine or verify the phase and polarity of his or her data. Many dry holes have been drilled by those who failed to do so!

Figure 3 shows a good well and a dry hole both penetrating high amplitudes. This data is American polarity, so red-over-blue (trough-over-peak) is the character of low impedance prospective sand. We should have been able to recognize that the blue-over-red amplitude was a poor prospect.

Seismic data can contain defects caused by the acquisition and processing, and interpreters must attempt to understand these. Amplitude is full of geologic information, so amplitude must be preserved as thoroughly as possible in data processing.

The presence of surface obstacles or the lack of access (no permit) causes reduced and variable seismic coverage. This tends to be the principal acquisition–induced problem facing interpreters of land surveys. Amplitude changes and pseudo-faults can both result from this type of defect.

Recommendations to help today's interpreter get more geology out of 3-D seismic data in a reasonable period of time are outlined below. These will also help avoid common interpretation pitfalls. Seismic interpretation today involves a delicate balance between geophysics, geology and computer science. As interpreters we must be continuously learning to improve our understanding of geophysics and our skills in using the workstation.

✓ Expect detailed subsurface information.

✓ Don't rely on the workstation to find the answer.

✓ Use all the data.

✓ Understand the data and appreciate its defects.

✓ Use time (or depth) slices/horizontal sections.

✓ Visualize subsurface structure.

✓ Use machine autotracking and snapping.

✓ Select the color scheme with care.

✓ Question data phase and polarity.

✓ Tie seismic data to well data on character.

✓ Try to believe seismic amplitude.

✓ Understand the seismic attributes you use.

✓ Prefer horizon attributes to windowed attributes.

✓ Use techniques that maximize signal-to-noise ratio.

(Editor's note – Alistair Brown will present this paper as a keynote address at the RMAG/DGS 11th annual 3-D Seismic Symposium on March 11 in Denver. See related story on page 12.)

❑

Mars

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your hand, it's almost like subsurface geology," he said.

"You have to respect the imagery and learn to understand the perspective," he continued. "When you look at some of the old Pathfinder photos from 1997, some rocks look very, very large. They're really not, because the rover was only the size of a microwave."

Anderson put together a desert field test using the "Fido" rover on earth to help scientists learn the machine's abilities and limits and how to interpret the imagery before the Mars rovers were launched.

The mission passed the "success" threshold long ago, Anderson said, adding that both rovers have exceeded their "warranties" in spectacular fashion.

The robots were designed with a goal of traveling at least 600 meters and relaying data for 90 "sols," or Martian day.

They have traveled about four kilometers and passed the one-year anniversary of the landings in January, still rolling and collecting data.

One major goal – finding evidence of water in Mars' past – was accomplished quickly.

"Spirit went looking for signs of water, and Opportunity was looking for hematite," Anderson said. "We found both at the Opportunity site. Spirit was all igneous, basalt and dust. But now in a hill it's found evidence of water, although it's not totally understood yet.

"We were looking for outcrops and layering," he said. "The odds of landing right next to an outcrop are slim, but we did it with Opportunity.

"A year ago we would have said the mission was a success," he commented. "Now we drive by an outcrop and go, 'Yeah, that's just an outcrop.'"

Rewriting History

Much of the information coming back has been confirmative rather than surprising, but it will "probably rewrite the history books with respect to Mars," Anderson said.

No indications of life have been found.

Aeolian materials, basaltic rock, impact-dominated areas with shock type features were predictable, he said – but still unexplained is what formed small spheres of hematite.

"MER has dominated my life for the last three years," he said, adding that he hopes to stay with the mission as long as he can.

Now that the scientists have taken the rovers' reins, Anderson concedes that "for the engineers, it's boring.

"We're sort of like the extra person during the development," he said. "If you want an instrument on board, there must be a trade off due to the size and power supply. The engineers give us what we can use … that's the challenge.

"You have to walk in both worlds so engineering, operations or science doesn't scare you," he said.

Anderson is part of a team of about 100 scientists around the world analyzing MER data. The team, assembled by Steve Squyres of Cornell University, includes atmospheric scientists, engineers, igneous petrologists, geomorphologists, stratigraphy experts and astrobiologists, to name a few.

"We're bringing in more terrestrial geologists to look at the images," he said. "Once you've identified something, you can go out and field research it with the rover.

"Opportunity spotted some beautiful layers of sedimentary rocks," he added. "The only way to do that (research) is to get up close.

"We have demonstrated that you can do field geology with a rover." ❑

Corrections

In the global discoveries list in the January 2005 EXPLORER, the Avouma 1 discovery that tested at 6,600 barrels of oil a day was incorrectly listed as being in Equatorial Guinea waters. It is actually offshore Gabon.

Also in the January issue, the courtesy line for a graphic on the global warming commentary incorrectly identified Monte Hieb as being with the West Virginia Geological Survey. Hieb is chief engineer for the West Virginia Office of Miner's Health, Safety and Training.

We regret the errors. ❑

Registration

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be able to renew their licenses online at www.texasonline.com using a credit card or electronic check and print a receipt for their own records.

More than 6,000 earth scientists are licensed in Texas, which began requiring licensure in 2003. The TBPG licenses professionals in three disciplines – geology, geophysics and soil science.

States that require continuing education for license renewals include Alabama, Kansas, Delaware, Minnesota, New Hampshire and South Carolina, Erickson said, adding that Mississippi has a voluntary program.

States considering licensing include Oklahoma, Hawaii, Michigan and New York, Erickson said.

AAPG encourages states going through the process to exempt petroleum and other resource geologists from licensing or registration because their work usually does not directly impact public health, safety or welfare, he said.

The proposed continuing education rules may be viewed online at www.tbpg.state.tx.us, Miller said. ❑

Not as Gapped as You Might Think

Geo Generations: So Near, So Far

By DAVID BROWN
EXPLORER Correspondent

Call them the Millennials, Generation Y, the Online Generation.

Call them the Young and the Restless.

But don't call them slackers.

Today's young petroleum geoscientists are after meaningful jobs in the industry.

In a few years, they might be after yours.

"I've seen an increase in professionalism" among geology students, said Timothy Bralower, professor and head of the Department of Geosciences at Pennsylvania State University.

Penn State has turned out bucketsful of petroleum geologists over the years. Petroleum engineers, too, for that matter.

"Undergraduates and graduate students are now extremely concerned about looking good when they come out of school. They know the employers are going to look beyond their grades," Bralower said.

That prompts students to get hands-on company experience through internships, to take on special research projects and to involve themselves in other industry-related activities, he said.

Natalie Uschner, Support Geoscientist II with Schlumberger Information Solutions in Houston, points out a difference of her own: The younger generation is more mobile than their predecessors.

"You can obviously see distinct differences between the older guys and this younger group of geoscientists," she said.

Photo courtesy of Natalie Uschner

Education beyond the classroom: Fred Palumbo (left) leads a tour of the Core Laboratories for Houston NeoGeos Kristi Stepien-Wees (center) and Heidi Justman.

Dedicated and Devoted?

Uschner chairs the Houston Geological Society NeoGeos, a group of young professionals that generally have five years' experience or less in geoscience jobs.

The NeoGeos group began five years ago "as a networking tool for young geologists and geophysicists," she said.

Uschner described six main attributes of her age-group peers in the industry:

✓ They have a passion for doing what they love.

✓ They are "typically very dedicated because of their interest in the field."

✓ They like to share camaraderie with others in the industry.

✓ They enjoy discovering new things – being a detective.

✓ They are risk-takers willing to do what it takes to succeed.

✓ They like to take on new responsibility.

"People I know are really dedicated to their job. I know quite a few people who go in early and stay late," she said.

"It's more of a work-hard, play-hard attitude when you're younger," Uschner noted.

But young geologists don't show the same affinity for the idea of remaining at a particular company.

In general, they aren't looking for a lifelong career at a company, especially if the atmosphere or chemistry is wrong.

"Nowadays, if they don't like it, they'll move," Uschner said. "They may not think there are that many advantages to staying.

"A lot of people go into big companies to get the training, then they go to work for a smaller company," she added.

VERY Ancient History

Here's a question for any young geoscientist just entering the petroleum industry:

Why?

After years of layoffs, turn-downs, mergers and meltdowns, who wants to take the chance?

As it turns out, that's all ancient history.

It's no use talking about what happened in 1986, because some of these new-hires weren't just babies then.

"Students here are not aware of how things were in the 1980s," Bralower said. "I knew that the industry was very cyclical, but I only found out about the 1980s and the background of the industry when I

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came down here (to Houston)."

Uschner agreed.

What new geoscientists know well is the hardship caused by the dot.com meltdown and the economic slump that began in 2000.

"Everybody knows somebody who's unemployed," Bralower noted. "This generation is more concerned (about securing employment) than earlier, when people thought everything was going to work out."

Two other factors might help explain why new graduates don't show much concern for the industry's up-and-down history.

First, most companies now are more likely to add employees slowly and reduce their work force slowly.

"Oil companies are extremely aware of the bad PR they got in the 1980s," Bralower said.

Second, if the petroleum industry has layoffs sometimes, what industry doesn't?

"Geoscientists are concerned about layoffs," Uschner said, "but I don't think that they're that more concerned than people in other industries, because all industries are experiencing layoffs."

Coming Up to Bat

The petroleum industry has good reason to study this new generation of geoscientists, a group just now entering the workplace.

A typical demographic approach identifies the following divisions:

❒ Traditionalists/Veterans, born 1925-45
❒ Baby Boomers, born 1946-64
❒ Generation X, born 1965-80
❒ Millennials, born 1980-2002

Also called Generation Y or Nexters, the new generation will provide the industry's entry-level employees and mid-career professionals for the next two decades.

Its most striking characteristic could well be expertise in technology.

Traditionalists are labeled "unsure of and resistant to" high tech, Baby Boomers "willing to learn" and Generation X "adept with technology."

Millennials are called "technologically superior."

This is the first generation that does not know what it's like to be without a computer.

Younger Millennials can't remember a time before the Internet.

"They are much more computer literate, much more used to getting information from a computer," Bralower said.

"These students are not as used to going to the library," he added. "Now, almost any journal is online."

In other ways, the new generation resembles Traditionalists.

✓ While Traditionalists have valued a stable environment, Millennials look for structure.

✓ While Traditionalists are respectful of authority, Millennials are respectful of tradition – and of Traditionalists.

✓ While Traditionalists make work and career a priority, Millennials look toward work and earning power.

But Millennials also shy away from conformity, and embrace their own diversity.

Diverse and Dual?

Chakib Sbiti, executive vice-president of Schlumberger Oilfield Services, set out five essential steps for the industry in a speech earlier this year.

Sbiti said the following must happen to develop a human resource for the future:

✓ Increase the industry's collective expertise in oil and gas production.

✓ Utilize the human resources of all nations.

✓ Improve the role and participation of women in the industry.

✓ Reverse the poor image of the oil industry among young people in Western nations.

✓ Respect the role of professional societies that "provide a rallying point for the collective professionalism of our wonderful business."

So far, building an adequate human resource base seems an especially difficult problem for the U.S. industry.

"It was reported recently that while 43,000 law students graduated last year in the United States, only 430 geologists and 279 petroleum engineers graduated," Sbiti noted. "This is of concern considering the world's insatiable appetite for hydrocarbon."

Sbiti cited both national diversity and gender diversity as key concerns in developing the industry's future work force.

Women make up a growing segment of geology and engineering students in some countries, but "female enrollment in engineering schools in the West is stuck around 20 percent," he said.

The industry's biggest challenge may come in helping these new, young employees find reward and fulfillment in their jobs.

Supporting the career goals of today's young professionals also will challenge the industry, according to Sbiti.

Traditionalists hoped to leave a legacy. Baby Boomers tried to build a successful career, while Generation X looked for portable careers.

By contrast, Millennials want to build parallel careers with their spouses.

"Dual careers will become the norm – currently almost 50 percent of our top management is in a dual-career situation," Sbiti noted.

"Dual careers require special planning, sensitivity to the couple's intentions," he said. "And we must remember that it's no longer necessarily the man these days who holds the primary career."

See **Generations**, page 33

Gains for Attendance, Companies – and WTI

NAPE Rocks With Over 10,500

By LOUISE S. DURHAM
EXPLORER Correspondent

It's likely no one would argue that this year's North American Prospect Expo (NAPE) ranked right near the top on the wow-factor scale.

To the point, NAPE rocks.

More than 10,500 viewers congregated at the George R. Brown Convention Center in Houston in January to tour the 1,038 exhibitor booths representing an array of 665 entities, including academia, government ministries, service companies, financial organizations, professional societies, individual buyers, prospect generators and E&P companies.

The many exhibitors hailed from across North America and a variety of international locales, and they arrived toting a smorgasbord of prospects and other deals to display. These included domestic opportunities – both conventional and unconventional – that ran the gamut from the bayou country of South Louisiana to the Powder River and Wind River basins properties exhibited by the Crow Nation.

International prospects were in such far-flung sites as Malaysia and Peru. Exhibits were up 18 percent from 878 in 2004.

It's a nod to the sign of the times that a team of Alaskan officials representing various groups was on hand to promote exploration in the Bristol Bay/Alaska Peninsula area. Ten years ago, the salmon industry was prospering, oil prices were low and the area residents said "no way" when the oil companies came calling with drilling plans in hand. There's been a notable attitude shift now that salmon prices have tanked and oil is hovering around $50/barrel.

Photo courtesy of the AAPL

The aisles were crowded and the booths were busy at the recent North American Prospect Expo in Houston, which attracted more than 10,500 people looking to deal.

NAPE was not just a mighty big show but a high-voltage crowd pleaser as well.

"It was electrifying for everyone, both buyers and sellers," said Dan Smith, executive vice-president of exploration at Sandalwood Oil & Gas and former AAPG president. "It was just hugely successful."

Thierry Pilenko, chairman and CEO at Veritas, concurred.

"NAPE was great," Pilenko said. "It's *the* event where you see a lot of decision makers, people looking for opportunities and willing to make deals. It was extremely vibrant and full of ideas, and everybody was very positive."

The upbeat atmosphere at the gathering was particularly striking given the recent months of speculation about the industry's relative lack of activity, particularly in the exploration arena.

Buyers and sellers at NAPE represented the broad spectrum of E&P companies, ranging from super-big ExxonMobil to the one-person shops.

In fact, a scan of exhibitors at prospect expos over the past year-plus indicates a trend toward the establishment of new, small companies set up by both old and new names, now that the days of low-priced oil and gas appear to be history.

Step on the Gas

An apparent trend within this trend is the emergence of groups of seasoned independent prospect generators and buyers banding together in relatively unstructured arrangements rather than formal organizations to generate and pursue deals together while continuing to do their "own thing" as well.

In keeping with what one would expect of this kind of entrepreneurial spirit, attention-getting company names appear to be gaining in favor.

For instance, "5 Guys Looking For a Deal" drew a steady stream of viewers at NAPE, where four of the "5 Guys" were there as buyers and the other partner was also selling prospects.

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Another similar-type consortium, comprising individuals who banded together while maintaining their existing independent companies, had high visibility at a NAPE booth. Aptly dubbed "The Unconventionals," these folks eschew conventional-type hydrocarbon plays in favor of the more esoteric.

The band of five geologists, two geophysicists and a reservoir engineer all worked together at Oryx prior to the Kerr-McGee buyout. For the past four years or so, their joint effort has focused primarily on generating shale gas deals throughout North America, according to geologist and AAPG member Frank Maio.

Members of this exploration-minded group have varied expertise working shale gas and coalbed methane. In fact, Maio said they think shale gas today is where coalbed methane was 15 years ago.

A stakehold in the now-popular Barnett Shale play arms The Unconventionals with added knowledge to help track down what they assert to be a tremendous amount of unexplored shale gas potential.

Particularly noteworthy for the many fledgling small, independent companies coming into the industry is the low barrier to entry in this type play.

"When you look at the supply/demand curve in the U.S., a huge part of the percentage of growing demand for gas will come from unconventional gas," said geologist and AAPG member Jeff Roberts. "We feel that of the traditional unconventional plays, e.g., tight sands, coalbed methane and shale, that shale gas is easiest in terms of entry and has the biggest upside. It's really an old play that got kind of forgotten when coalbed methane got so hot and everything went in that direction.

"One of the myths of shale gas is it's a high gas price play," Roberts noted. "This is offset by the very low risk of finding hydrocarbons."

An added allure of shale gas deposits is they're generally not overpressured or very deep. In these instances, drilling and completion can be relatively inexpensive, according to Maio.

"Even if you might not have the same flow rate potential as the Barnett," Maio said, "the economic potential is great because you have a low cost well."

Because shale gas is mainly a completion risk and not a finding risk, banks love it, Roberts noted.

"It's highly fundable because of low risk," he said. "Once you've established a statistical base, they're very easy to get funded." ❑

Generations

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Talkin' 'Bout My

The new generation of geoscientists displays innate optimism, scientific curiosity and a sense of adventure.

It continues a trend toward advanced degrees for young employees.

"Almost any employer is looking for a master's degree. That's entry-level, at this point," Bralower commented.

Students and young professionals also tend to be generalists with broad knowledge.

"The message that comes across loud and clear from petroleum companies is 'Stay broad' and 'Learn how to think,'" Bralower said.

"They aren't looking for an expert in Mesozoic paleofossils. They want someone they can train in-house," he added.

Managers, especially Traditionalists, may be confused or put off by the Millennials' approach to career development.

Blurred lines between home and office space, and family and work life, are changing the traditional concepts of careerism.

From another view, earlier generations of employees probably aren't as technology-deficient, fully matured and inflexible as Millennials may think.

In fact, many geologists remain physically active and mentally alert well into their mid-30s. (Just kidding.)

Overall, the view of young professionals as a 9-to-5, home-based, private-life generation just won't hold.

If anything, this new generation of geoscientists has bought into the romantic ideals of the petroleum industry and the thrills of discovery even more than did their elders.

"It's a fast-paced industry that's very exciting and intriguing," Uschner explained. "I like the fact that this industry is very international, that there are a lot of places you can go."

The industry's biggest challenge may come in helping these new, young employees find reward and fulfillment in their jobs.

If future exploration takes place on spreadsheets instead of drilling sites, oil companies could end up with offices full of the Disappointed Generation. ❑

PROFESSIONAL NEWS BRIEFS

Bruce A. Blake, to geophysicist, Repsol YPF, Madrid, Spain. Previously geophysicist, Repsol YPF (seconded to Nexen), Calgary, Canada.

Craig B. Davis, to senior staff geologist, Murphy Oil Exploration and Production-International, Houston. Previously principal geologist, El Paso Production, Houston.

Michael P. Dolan, to senior staff geologist, Ellora Energy, Boulder, Colo. Previously senior petroleum geologist, ExxonMobil Exploration, Houston.

Richard D. Green, to geological manager-Anadarko district, Chesapeake Energy, Oklahoma City. Previously senior geologist, Chesapeake Energy, Oklahoma City.

Steve Hertig, to exploration manager, EOGR Trinidad, Port of Spain, Trinidad. Previously geological specialist, EOG Resources International, Houston.

Karen S. Hoffman, to business development consultant-reservoir interpretation and modeling, Roxar, Houston. Previously technical specialist, Dynamic Graphics, Houston.

Brian Horton has been awarded the 2004 Young Scientist Award (Donath Medal) from the Geological Society of America. Horton is an assistant professor with the University of California, Los Angeles.

Gerhart Hunter, to managing director/exploration geologist, TROG Exploration & Production, Waller, Texas. Previously exploration geologist, Republic Exploration, Magnolia, Texas.

Doug W. Johnson, to geological manager-Delaware Basin, Chesapeake Energy, Oklahoma City. Previously senior geologist, Chesapeake Energy, Oklahoma City.

John Kapchinske, to geological manager-Mid-continent division, Chesapeake Energy, Oklahoma City. Previously geological manager-Anadarko district, Chesapeake Energy, Oklahoma City.

Mohit Khanna, to adviser-reservoir geological modelling and uncertainty analysis, Statoil ASA, Stavanger, Norway. Previously staff geologist, IDP-Asset Support team, Statoil ASA, Stavanger.

David Kosmitis, to managing director/exploration geophysicist, TROG Exploration & Production, Waller, Texas. Previously exploration geologist, Republic Exploration, Magnolia, Texas.

Olatunbosun Olagundoye, to geophysicist-onshore assets, Total (Elf) Petroleum Nigeria, Port-Harcourt, Nigeria. Previously lecturer, Department of Geology, University of Calabar, Calabar, Nigeria.

Karyn Olschesky, to associate geologist, Chesapeake Energy, Oklahoma City. Previously engineering geologist, Engineering Consulting Services, Raleigh, N.C.

Gary W. Paukert, to senior geophysicist, Talisman Energy UK, Aberdeen, Scotland. Previously senior geophysicist, Talisman Energy, Calgary, Canada.

James R. Phillips, to exploration and new ventures manager, Lundin Petroleum, Geneva, Switzerland. Previously new ventures manager-Latin America, Occidental Oil and Gas, Houston.

Skip Rhodes, to independent consultant, Houston. Previously consultant geologist, El Paso Production, Houston.

Larry Risley, to vice president-exploration and production, Pure Energy Group, San Antonio. Previously vice president-exploration and production, North Coast Energy, Twinsburg, Ohio.

Arthur C. Saltmarsh, to owner/chief geologist, Saltmarsh Consulting Service, Eagle River, Alaska. Previously geologist, Forest Oil, Anchorage, Alaska.

John L. Sharp, to senior geologist, Chesapeake Energy, Oklahoma City. Previously exploration geologist, Suemaur Exploration and Production, Corpus Christi, Texas.

Denise M. Stone, to senior geologist-North Sea, Endeavour International, Houston. Previously consulting geologist-Trinidad exploration team, BHP Billiton, Houston.

Luis Vergara, to senior geologist-exploration (Europe, CIS, Poland), RWE Dea AG, Hamburg, Germany. Previously senior geologist, RWE Dea Norge, Oslo, Norway.

John A. Walker, to senior geologist, Sanchez Oil and Gas, Houston. Previously senior staff geologist, Dominion E&P, Houston.

Rob Walters, to geophysicist, Ryder Scott Petroleum Consultants, Houston. Previously geophysicist, ExxonMobil, Houston.

Lee Wescott, to geologist, Chesapeake Energy, Oklahoma City. Previously geologist, Ascent Energy, McKinney, Texas.

Laura L. Wray, to consulting petroleum geologist, Rocky Mountain exploration group, Williams Production, Denver. Previously consulting petroleum and coalbed methane geologist, Lighthouse Consulting, Denver.

(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.) ❑

No Risk, All Reward

New Recruiting Program Coming

It's pretty simple: The goal is to recruit new members – and recognize and reward the recruiters.

So get ready, recruiters. A new program is coming your way.

Dan Smith, chairman of AAPG's Membership Enhancement and Development Committee, said the goal of the new program, "Recruitment, Recognition and Reward," is "to build and strengthen AAPG by increasing the Active membership, and to recognize and reward the members who work toward this achievement."

The program will begin on April 1, and participation is easy: Just sign your name in the recruiter's block on an Active application form and give it to a colleague who is not an Active AAPG member.

The reward side of the program is new and is not a contest – it's an on-going program allowing the recruiter to accumulate points for as long as they wish.

It is different from past recruiting efforts because credit will be given only for new, reinstate or transfer to Active member applicants. Each new or reinstate to Active member applicant will earn the recruiter one point, and an applicant for transfer to Active member earns the recruiter one-half point.

Reward points can be cashed in after accumulating a minimum of five points, which equates to a $35-$40 reward – or the recruiter may choose to continue building his account for a bigger/better reward.

For example, 25 points equates to a reward value of $185-$190. Recruiters' progress can be tracked on the AAPG Web site. Once a reward is claimed, those points are deducted and the recruiter can begin to build up points again.

The rewards are beautiful, one-of-a-kind mineral and fossil specimens, including:

- ✓ Fossil fish displayed on a brass stand.
- ✓ Polished ammonites.
- ✓ Petrified book ends.
- ✓ Onyx bowls.
- ✓ Amethyst geodes.
- ✓ Megalodon shark tooth.

As an alternative, the recruiter may request an AAPG Bookstore voucher of equal value.

Recognition of members who participate in recruiting new, reinstate or transfer Active members will be enhanced by service awards at various levels. These begin with modest tokens of appreciation, such as a desk flag or lapel tack, and increase appropriately as the number of new sign-ups increases.

A "Recognition" page on the AAPG Web site will acknowledge the recruiters and the work they have done. AAPG also will promote recognition at the local level through the recruiter society, section or region.

The two programs work together in that a recruiter is given credit in both the Reward and the Recognition Web pages for their efforts. However, they are not alike in that the recognition total will always increase as new Active members are recruited, while the reward point total will be lowered whenever rewards are redeemed.

So line up your prospects, folks. There are rewards to be reaped.

Membership forms can be downloaded from www.aapg.org, or by contacting the Member Services department at 1-800-364-2274. ❑

FOUNDATION UPDATE

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In memory of Bill Davidson and Bob Kropschot

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Thomas James Tourek ❑

Photos courtesy of John Kaldi

Student leaders from all 11 AAPG Student Chapters in Indonesia gathered in Depok, West Java, last August for a three-day Leadership Conference.

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 was prepared by John Kaldi, professor and head of the Australian School of Petroleum at the University of Adelaide, South Australia, and president of the AAPG Asia-Pacific Region.)

By JOHN KALDI

With this column I hope to cover the events of note in the Asia-Pacific Region – and that's no mean feat.

The Asia-Pacific Region spans the largest area of any of our AAPG regions, extending over three continents, stretching through two hemispheres, 14 countries and the largest population by far of any area in our global village.

Perhaps the greatest challenge is to consider this huge region, with its myriad of cultures, diversity of languages and religions and range of attitudes, perceptions and opinions as simply one entity.

Australia

Perth, Western Australia, has been selected as the site of the 2006 AAPG International Conference and Exhibition. The meeting, with the theme of "Reunite Gondwana – Realize the Potential," will be hosted by the Petroleum Exploration Society of Australia (PESA) and is scheduled for Oct. 22-25, 2006.

An exciting technical program, highlighted by a wide array of exotic field trips, will ensure that visitors "down under" will have a memorable geo-experience! Principal committee chairs are Agu Kantsler (Woodside Petroleum) general chair; Peter and Robyn Purcell (P&R Geological Consultants) general vice chairs; John Kaldi (Australian School of Petroleum) and Ian Russell (ExxonMobil) technical program chairs.

Indonesia

Student leaders from all 11 AAPG Student Chapters in Indonesia (above) gathered in Depok, West Java, last August for three days of workshops, technical presentations and short courses. This Leadership Conference was organized as a special event to coordinate Student Chapter activities and learn more effective ways to conduct events, manage costs and work with the AAPG and the local oversight committee.

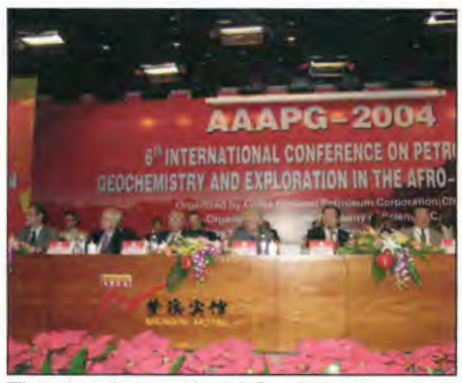
The conference was sponsored by the Southeast Asia Petroleum Exploration Society (SEAPEX), a professional organization with headquarters in Singapore and more than 500 members worldwide. Many of these members live and work in southeast Asia, and SEAPEX is the local AAPG affiliate for this area.

In December, the Indonesian Petroleum Association hosted a deepwater conference in Jakarta, co-sponsored by AAPG, which brought together experts from around the region and the world for three days of short courses and technical papers focused on deepwater and frontier exploration in Asia and Australasia.

The conference, chaired by Ron Noble of Unocal, attracted about 250 people.

India

The second APG-India conference and exhibition was held last September at Khajuraho, M.P., India, with the theme "Promoting Excellence for Exploration of Oil and Gas." The meeting was opened by AAPG Vice President Neil F. Hurley, with guests of honor professor D.H. Welte, YB Sinha, Patron AP. The conference had seven technical sessions, three short courses and showcased the first APG Special Publication on "An Overview of Litho-Bio-Chrono-Sequence Stratigraphy and Sea Level Changes of Indian Sedimentary Basins," edited by D.S.N. Raju, James Peters, Ravi Shankar and Gopender Kumar.



The sixth International Conference on Petroleum Geochemistry and Exploration.

China

The sixth International Conference on Petroleum Geochemistry and Exploration in the Afro-Asian Region, co-organized by China National Petroleum Corp. and Chinese Academy of Sciences, was held in Beijing last October. The conference attracted 233 geochemists from 23 countries that included China, India, Indonesia, Japan, South Korea, Nigeria, Sudan, Tanzania, Thailand, Vietnam, United Kingdom, United States, Germany, France, Canada, Denmark, Norway etc, which participated in the conference.

A plenary session and four technical

continued on next page

Tsunami Relief Efforts Provide Evidence of Global Altruism

Tsunami – a word until recently understood by few but members of our profession, now epitomizes, in the lingua franca of an entire planet, the heartbreak, sorrow and devastation of an entire region. The wave whose death toll crested at more than 150,000, cut its swath of destruction not only across the resort beaches and the countless fishing villages and coastal towns, but also through the hearts and souls of most of the world!

As explorationists most of us are naturally predisposed to finding something – anything – positive in even the worst scenarios. If there is any good in this horrific tragedy it is the realization that pain and grief are shared; that a commonality of purpose with the only desire being to help exists; the recognition that the "global village" is a reality; and that we villagers can put aside our day-to-day activities to reflect and mourn.

I am so proud to be part of an industry whose corporate donations are pouring in; to be a member of the AAPG, whose collection drives continue to bring welcome relief; to be Australian, where private contributions raised over $200 million.

– JOHN KALDI

LOOKINGBACK

Speculations Trumped Maps

By MARLAN DOWNEY

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

* * *

One of the pleasures of a document-browser is the recognition of early work by old friends. I returned from a delightful lunch with James A. Brooks, emeritus professor at SMU, and my first library visit of 2005 discovered an AAPG review by friend Jim of a 1954 book, *Oil in the Soviet Union.*

What a retro-glimpse at the sensitivities of the times. No field locations could be shown in the book! A book about oil with no oil field maps!

Technical discussions took a back seat to speculations about whether the Soviet Union's oil reserves were adequate to prevent the Russian Bear from stalking into the Middle East.

How did that come out, anyway?

They say memory is the second thing to go … I've forgotten what the first is. ❑

continued from previous page

sessions were held, focusing on:

✓ Petroleum geochemistry and exploration in the Afro-Asian frontier basins.

✓ Source rock evaluation, migration and reservoir geochemistry.

✓ Molecular and isotopic geochemistry.

✓ Basin modeling, novel geochemical approaches and petroleum strategies.

Altogether, 111 technical papers and 50 posters were presented. The conference provided a great opportunity for technical exchanges among world petroleum geochemists and was highly valued by the participants.

New Zealand

This island nation's exploration scene is responding to a wake-up call since the giant offshore Maui gas field entered its decline stage in 2003. Since its initial development 25 years ago, Maui has comfortably sustained the energy market of a country the same approximate size and population as the state of Colorado – or, put an Asia-Pacific way, the land area of Japan and population of Singapore.

Now, as a substantial methanol industry is down to 20 percent of its size of just years ago, and new power stations can't be financed for shortage of fuel, government and industry are cranking exploration up to levels not seen since the late 1980s.

The discovery of condensate-rich 700 bcf Pohokura Field in 2000 and a cluster of oil fields west of Maui over the past two years have testified to the remaining potential of the offshore Taranaki Basin, where Pogo Producing Co. is currently acquiring the largest ever 3-D seismic survey over three blocks awarded to them at the beginning of 2004.

Onshore in the same basin, Swift Energy have established a string of oil and gas discoveries and brought them into production, since 1999.

Meanwhile, government is moving to reduce costs and risks of exploration in New Zealand's extensive offshore frontier basins, committing NZ$15 million (about US$10 million) to new seismic and other work that will be made freely available to industry. Acquisition off the eastern North Island commenced in late January.

Bangladesh

AAPG member A.H.M. Shamsuddin has been elected vice president of the Bangladesh Geological Society, the country's only geoscientific society.

Shamsuddin writes that the country's energy sector, which had been expanding at a 10 percent growth rate over the last four years, has been suffering more recently from a shortage of gas. The recent development of Unocal's Bibiyana and Moulavibazar gas fields has had huge impacts on this situation. ❑

SPOTLIGHTonEDUCATION

Spring and summer are just around the corner (at least, we hope so!) so it's time to think about getting out of your stuffy office and getting some fresh air by taking an AAPG field seminar!

And this spring we have two brand new field seminars, both in an international setting:

✓ **Equatorial Carbonate Systems – Modern and Miocene Analogs for Carbonate Plays in Southeast Asia**, to be held May 22-28, in and around Jakarta, Indonesia.

✓ **Complex Carbonate Reservoirs: The Relationship Between Facies and Fracturing**, set for May 22-27, beginning in Naples and ending in Pescara, Italy.

Several perennial favorites are back as well, so if you've always wanted to experience Miles Hayes' **Modern Clastic Depositional Environments** trip in South Carolina, or get a history lesson during the **Lewis & Clark Geotour** (March 2004 EXPLORER), now's your chance! Other field seminars are set in California, Utah, Florida, Colorado, Arizona, Montana, Wyoming and even Borneo, so there is something (and someplace!) for everyone.

For full course descriptions, dates, instructor information and tuition details, logon to the AAPG Web site at www.aapg.org/education/fieldseminars/index.cfm.

Hope to see you in the field! ❑

WWW.UPDATE

Login When Seeking Membership Benefits

By JANET BRISTER
AAPG Web Site Editor

To login or not to login …

That is the confusion – at least, for some members who want to use the AAPG Web sites for maximum benefit.

Actually, I think I've come up with a simple mantra to help AAPG members remember Web site areas that require login and areas that don't.

It's simple: "Membership has its privileges!"

AAPG began so scientists could collaborate and discuss geology and where petroleum might exist within the earth.

Having access to that kind of information is a privilege and benefit of membership in AAPG. Therefore, a login to the scientific data is required.

In fact, anything that enables an AAPG member to take advantage of the benefits of their membership is going to require a login. The username of that login is your AAPG member number, and the password determined by each member.

For those who haven't designated their password, there is a default password. That information will be e-mailed to you through a link located on the members only login page.

Be sure when you return to login that cookies are enabled for the www.aapg.org Web site. Otherwise you will experience difficulty.

Behind the Link

One of the biggest sources of information members find behind the "Members Only" link is the BULLETIN archives. These are searchable and cover all publications since the beginning of AAPG's existence.

For members who have opted for reading the AAPG BULLETIN electronically, access is gained through the Members Only login.

Login to the Members Only area when you want to make any financial transaction with AAPG: register for a meeting, buy a publication, pay your dues. By first taking the time to login all special pricing for AAPG members is made available.

Must I Always Login?

No. If you are simply seeking information about news in the industry or about AAPG specific events there is no need to login.

Membership privileges are not required to learn about AAPG. We want the world to know what a great organization AAPG is and about all the pertinent events, information and opportunities we provide.

Public information of this nature will not be concealed behind a link. It's news. AAPG wants such news read by all. Thus, the EXPLORER, meeting details, educational opportunites, etc. are available at all times – with or without a login.

To Accept Cookies?

That's the final question.

Many security articles will advise browsers of the Internet to not accept cookies – but because cookies pass critical information to computers serving up information to your home workstation, you can't ignore them.

Browser clients recognize that not every Web surfer will desire to accept cookies, so in their preferences users may specify how they want cookies managed.

To easily use the AAPG Web site you will need to accept cookies for aapg.org. If you do not, our servers will be unable to pass on to receiving machines (particularly the science archives) that you are cleared for access.

Membership has its privileges, so don't let your Web experience crumble into frustration by ignoring your computer's cookies!

Good browsing! ❑

Virtual Student Expo a Jobs Marketplace

By MIKE MLYNEK
AAPG Student Services Coordinator

Attention AAPG Student members (especially those student members who are looking for a job):

Have you placed your resume, PowerPoint presentation or video on the Virtual Student Expo site?

If not, why not? Now's the time.

The Virtual Student Expo is the newest addition to the AAPG Student member benefit package, providing you with a site to showcase yourself to companies in the energy industry.

Student members of the AAPG, the Geological Society of America, the Society of Exploration Geophysicists or the Society of Petroleum Engineers can post resumes, slide presentations and examples of their work – including academic assignments, technical papers and portfolios from internships, or even a short video of themselves explaining why a prospective employer might want to hire them.

This service is free to Student members of any of the professional associations. Potential employers pay a small fee to review the student postings and/or post their job openings.

Employers reap benefits from the VSE by pre-screening potential candidates in a cost-effective manner prior to selecting them for an interview. The process is intended to result in more productive interviews between students and employers when the employer visits the campus during recruiting season – or at another AAPG Student Expo event.

Currently over 460 resumes have been posted to the VSE, and a number of employers already are taking advantage of this unique resource.

Perhaps you just need to know where to visit to begin using this service. For employers please visit: http://vse.virtualstudentexpo.org/post.cfm

At this Web site you can set up your company account and view the different packages offered, post an ad or peruse the resumes and other information that students have supplied.

AAPG Student members using the site first must login to the "Members Only" area of the AAPG Web site:

Next, look for the Virtual Student Expo logo, click on it and you can begin setting up your VSE account and posting your information.

For more information, or if you have a problem with logging in, contact Mike Mlynek at AAPG by e-mail: students@aapg.org

Happy job searching! ❑

IN MEMORY

Thomas D. Barber, a former AAPG vice president and an honorary member in Georgetown, Texas, died Jan. 15. He was 85.

Barber served as the Association's vice president in 1978-79. He also served on several AAPG committees during his career, was an associate editor in 1973-78, received the AAPG Distinguished Service Award in 1985 and was made an honorary member in 1997.

Hans Ashauer (EM '37)
Irvine, Calif.
Walter Douglas Baird (EM '58)
Fort Worth
Thomas David Barber, 85
Georgetown, Texas
Jan. 15, 2005
Howard Elbert Hansen, 80
Dallas, Jan. 2, 2005
Robert H. Kelso (AS '83)
Saint Michaels, Md.
Peter Norton (AC '59)
Houston
William Benjamin Oliver, 85
Shreveport, La.
Sept. 20, 2004
Gordon Dean Upchurch, 69
Shreveport, La.
Feb. 13, 2003
George Quigley Williams, 84
Lewes, Del., Aug. 11, 2004

(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.) ❑

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.)

For Active Membership

Colorado
Becker, Clyde M. Jr., Becker Oil Corp., Conifer (C.M. Becker, J.P. Rogers, P.R. Clute); **Brown, Karen Marie**, Energy Strategies & Solutions, Arvada (reinstate); **Claypool, Alexander Lee**, Fidelity Exploration & Production, Denver (J.M. Meyer, B.E. Gimza, J.E. Frazier); **Hinaman, Gary Lee**, Argali Exploration, Rangely (K.C. Hinaman, S.M. Landon, R.T. Mackey)

Ohio
McDonald, James, Ohio Division of Geological Survey, Columbus (L.H. Wickstrom, R.A. Riley, W.M. Rike)

Oklahoma
Mollison, Richard Allen, Samson, Tulsa (reinstate)

Texas
Al-Khersan, Hashim Fadhil, Pioneer Natural Resources, Irving (J.M. Coss, E. Caamano, D.E. Nelson); **Bannister, Kirsten Michelle**, ExxonMobil Production, Houston (B.D. Keith, J.F. Sarg, J.W. Flannery); **Fowler, James Kevin**, Colorado Oil Co., Houston (reinstate); **Hills, John D.**, RL Ray Ltd, Tyler (R. Griffen, L.D. Brisendine, T.M. Perry Jr.); **Hubner, Linda A.**, Shell E&P, Houston (L.A. Pearce, L. Zarrow, C.J. Minero); **Wallgren, Jason Ryan**, Ventana Exploration, Dallas (T.F. Matthews, S.C. Atchley, S.J. Talbert)

Australia
Purcell, Robyn Ruth, P&R Geological Consultants, Scarborough (P.G. Purcell, J. Scott, J.D. Gorter); **Sayers, Ian L.**, Roc Oil Co., Sydney (A.J. Mebberson, D.L. Schmidt, G.M. Bradley)

Azerbaijan
Aliyev, Farhad, BP, Baku (S.A. Movsumova, H.G. McDowell, I.S.O. Guliev)

Ecuador
Toro Alava, Jorge Eduardo, Petroproduccion, Quito (H.J. White, J.R. Barragan, R.H. Vera)

England
Fowler, Reginald William, Oroco Ltd, Braunton (reinstate)

France
Chevallier, Bertrand Henri, Total, Paris La

continued on next page

Certification

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

Petroleum Geologist

Texas
Norman, Gregg Arlan, Gunn Oil Co., Wichita Falls (R.D. Gunn, W.C. Stephens Jr., C.W. Reynolds)

Scotland
Kenneth M. Simpson, Talisman Energy, Calgary, Canada (G. Weiss, M. Morrison, J. 't-Hart)

Technical Program Set for Calgary

By ASHTON EMBRY
Technical Program Coordinator

From a technical perspective, the 2005 AAPG Annual Convention promises to be the biggest and best geological meeting ever held in Calgary.

Set for the meeting, which will be held June 19-22, are nearly 1,000 presentations based on the theme "Global Roundup: Exploring Energy Systems."

The program includes:

✓ A look at the Western Canadian Sedimentary Basin and Canadian Frontier Basins.

✓ "Recent Major Discoveries."

✓ The latest concepts in sedimentology and stratigraphy. An entire day of talks on "Seismic Geomorphology" will showcase the sedimentological details that now can be imaged by 3-D seismic.

✓ A symposium on "Controls on Carbonate Platforms and Reefs."

✓ Clastic sedimentation, from non-marine to deep water and everything in between – including a look at Mars.

✓ Sessions on petroleum systems.

✓ Sessions on tectonics, including a full-day of talks on "The Interplay of Basin Tectonics and Sedimentation."

✓ Unconventional hydrocarbon sources – oil sands, coalbed methane, tight gas and gas hydrates.

✓ Environmental issues such as CO_2 sequestration, water resources and alternative energy sources.

✓ The business side of the industry – including talks on reserve reporting.

Complementing these are 21 field trips to a wide variety of terrific geological exposures, and 14 short courses, including never-before-presented courses on carbonate sequence stratigraphy, coalbed methane and hydrocarbon biodegradation.

For complete information or to pre-register, go online to www.aapg.org. ❑

continued from previous page

Defense (C. Cazzola, L.T. De Walque, A.M. Dall)

Germany
Meurer, Heinrich Wilhelm, GeoTec GmbH, Bruehl (reinstate)

India
Rath, Jaysurya, Cairn Energy (India), Chennai (S. Sarkar, P.K. Webb, R.P. Fouldes); **Senapati, Nirmal Kumar**, Cairn Energy (India), Chennai (D.A. Pratt, D.E. Pitzl, S. Sarkar); **Singh, Amit Pal**, Cairn Energy (India), Chennai (N.L. Banks, D.P. Kelly, S. Sarkar)

Nigeria
Okoli, Obinna C., Total SA, Port Harcourt (reinstate); **Oyawale, Adedapo Adekunle**, Obafemia Awolowo University, Ile-Ife (J.I. Nwachukwu, T.R. Ajayi, A. Adesida)

Peru
Espinoza, Javier R., Baker-Inteq Trinidad & Tobago, Lima (reinstate)

Philippines
Carlos, Daniel Stephen P., Forum Exploration, Paranaque City (J.R.L. Apostol, A.A. Morado Jr., R.A. Reyes Jr.)

Saudi Arabia
Hawari, Hassan Fouad, Al-Khafji Joint Operations, Al-Khafji (A. Taal, R. Uchimura, K. Miyazawa) ❑

Straight Forward Procedures

'Structure Contour' Map Born in India

(Editor's note: This commentary is part of ongoing reports by the EXPLORER to highlight geologists who have made important contributions to the science and the profession.)

By DONALD L. ZIEGLAR

Edgar Owen noted that in AAPG's Memoir 6, "The Trek of the Oil Finders," the first "structure contour" map ever published was part of a report by Benjamin S. Lyman in 1870, evaluating the oil potential of some lands in the Punjab of India.

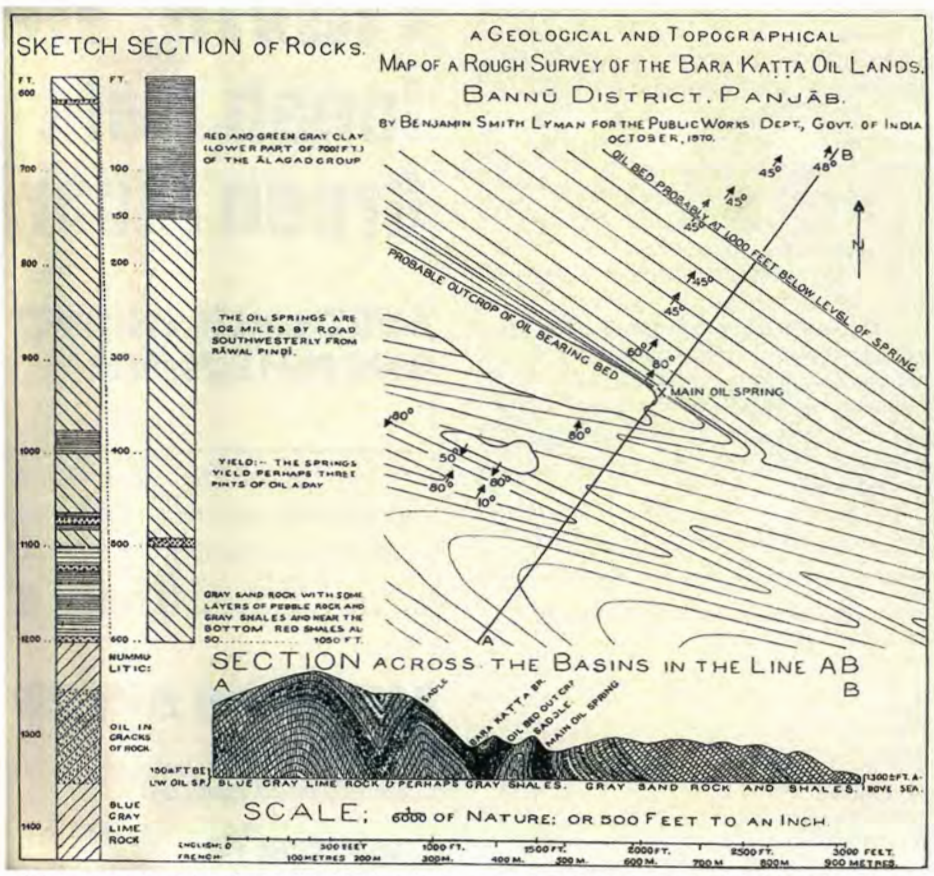
But what were the geological experiences Lyman had to enable him to come up with the innovative idea of using contours to depict the geometric shape of specific rock units in the subsurface – i.e. "structure contours"? And why did his first publication involve such a remote geographic area?

Here's the story.

* * *

Lyman graduated from college in 1856 and, except for the period 1859-62 when studying geology in France and Germany, worked as an assistant to J. Peter Lesley, a well-known geologist with work experiences dating back to 1838 and the first Pennsylvania Geological Survey.

During that survey the relationship between surface topography and the character of the underlying rock units became clearly recognized, and Lesley began using such topographic relationship in his geologic evaluations. He first used hachures and shading to indicate the steepness of topography, but in 1853-54 he began using contours.



A "structural contour" map by Benjamin Lyman was reproduced in AAPG's Memoir 6 – *Trek of the Oil Finders.*

Lyman, through his geological work on Lesley's consulting projects related to coal, iron ores and petroleum in the United States and in southeastern Canada, had to be thoroughly familiar with the usage of contours in topographic mapping and the relationship of topography to the character of the underlying rock units.

Lyman recalled in an 1871 AIME article that in 1865-66, while working on a mining property in Virginia, he had the idea that "as contour lines give the best means of showing on paper the shape of the surface of the ground, so they give likewise the best means of showing on paper the shape of the surface of a bed of rock."

Lyman recalled showing a photograph of such a map at an AAAS meeting in 1867, and that he had discussed the innovative usage of "rock surface" or "underground" contours with Lesley in 1868.

Lyman's mapping procedures were straight forward: determine elevations on the key bed, estimate underground elevations from the measured thickness of overlying units, determine dips and strikes and contour the area with the spacing of contours honoring dip magnitudes and the direction of contours reflecting the strike of the formations.

He noted that with such a finished contour map a structural profile could be drawn in any direction across the map, and that a complete, true scale geologic profile could be prepared by adding the known stratigraphy to that profile.

In 1869 Lyman – probably with Lesley's endorsement – was hired by the

See **Lyman**, page 44

READERS' FORUM

The End of Enlightenment?

News reports indicated that evolution is not being discussed by biology teachers, even in states where it is a formal part of the curriculum. Teachers and school principals are simply trying to avoid getting into trouble with conservative parents.

Here is an issue for the American petroleum community to take as their own. Evolution is a fact.

You all know it.

The discovery of evolution is one of the triumphs of the Enlightenment, along with the beginnings of physics and chemistry, Adam Smith's elucidation of free market economies, and concepts about human rights. It was the end of religious dogmatism that let all this happen, and the mainstream Christian denominations long ago accommodated themselves to all of these ideas. Do you folks have to go through the Scopes trial all over again?

Why should petroleum geologists care? It should be a question of American pride and nationalism. Americans have won more Nobel Prizes in science than the citizens of any other country. Why? Because of the spirit of imagination and of free inquiry for which Americans are famous. The world needs more of this.

But it will get rapidly less, if the conservative trends sweeping the United States increase their grip on teaching and research in your country. This matters, because it is free inquiry, especially the freedom to roam across the fascinating spaces of inventive science, that have built the prosperous communities of the developed world.

America will contribute less to this, and benefit less from it, as the years go by, if these trends continue. The great prizes, the research monies, and the most inventive corporations, the most talented academics will gradually move out – to Canada, to Europe, to anywhere where they are free from the stifling oversight of the religious evangelist.

Why is it that some of the most conservative states also are the most petroleum rich? Texas and Oklahoma come to mind. How is it that these states, which have benefited the most from the full expression of the earth-science enterprise, are the most backward when it comes to integrating the knowledge that arises from the earth sciences into their daily lives?

I await some answers with interest.

Andrew D. Miall
Toronto, Canada

(Editor's Note: Miall is the 2004 recipient of the Grover E. Murray Distinguished Educator Award.)

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.

U.S. Restricting Itself

Through a series of land use restrictions in the United States over the last 30 years or so the energy available to the American public from their own land and ocean sources have been severely restricted.

For instance, we have been importing over half of our crude oil for some years now and yet still have heavy restrictions on drilling in areas where most of our own potential reserves lie. These restrictions are mostly a lack of access to public lands onshore and offshore. The alternative has been to allow unrestricted exploration and development of oil and gas resources in foreign countries onshore and offshore by our oil companies.

Since most foreign countries have fewer drilling restrictions than the United States we are causing the rest of the world to become more polluted while trying to keep our country pristine.

Why not allow more clean development of energy here in the United States and save some of the resources for future needs for other countries?

Another aspect to our restrictions is that the United States has lost huge numbers of jobs, income and taxes to foreign countries by not allowing our own resources to be fully developed.

According to the U.S. Energy Information Agency and the Minerals Management Service, the United States

See **Forum**, next page

Lyman
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British government to make a technical evaluation of the oil potential of some lands with oil seeps in the Punjab of India. He spent the following year on that overseas assignment, which resulted in publication by the Indian Public Works Department of a set of 11 "structure-contour" maps in his "Report on the Punjab Oil Lands, Lahore, 1870."

Lyman returned to the United States in mid-1871, but his stay was brief; he was hired in late 1872 by the Japanese government, and until mid-1881 worked on a variety of geological assignments in Japan.

* * *

In the United States, the second Pennsylvania Geological Survey (J. Peter Lesley, state geologist) started using "structure contour" maps with its first reports in 1874. Other state surveys began doing the same. But the first published by the USGS was in its 1886-87 annual report – a "structure contour" map of the Cincinnati Arch, prepared jointly with the Ohio Geological Survey.

A few years later (1893), the first "structure contour" map prepared by a USGS geologist was published in *Bulletin 111* in M.R. Campbell's report on the Big Stone Gap Coal Field in Kentucky.

Refinements to Lyman's procedures were introduced in 1902 by W.T. Griswold in USGS *Bulletin 198*. He recognized that when preparing maps on a shallow and on a deeper key bed that when the beds weren't parallel a "convergence map" of the interval between the two key beds could be added to the contours of the shallower bed to make a more accurate structural contour map of the deeper bed.

The "convergence map" concept was subsequently refined with the terms "isochore or vertical interval" and "isopach or stratigraphic interval" being utilized for specific mapping purposes.

That's how the usage of "structure contours" to show the geometric shape of both surface and subsurface rock units evolved over time following their innovative first usage by Lyman in 1870. And that's the reason the mapping concept of "structure contours" was available and ready to be applied by petroleum geologists, as the industry developed following the important oil discoveries at Kern River and Spindletop. ❑

Forum
from previous page

consumes about 20 million bod (one nice oilfield) and about 24 million mcfd (one good gas field). We produce about 9.3 million barrels of oil per day (including refinery gains and alcohols), or less than one half of our daily consumption. We produce about 20 million mdfgd – or about 95 percent of our usage. But that is slipping fast, and major companies are now planning huge receiving ports of compressed natural gas from Indonesia and the Middle East.

The Gulf of Mexico is the only bright spot in open exploration for hydrocarbons in the United States. There are thousands of offshore producing platforms in the Gulf offshore from Texas and Louisiana – and the beaches are still white! They furnish some 50 percent of the East Coast's crude oil and more of products. Yet U.S. east and west coast states will not allow offshore exploration or drilling anymore – even for known deposits!

Further, there is a huge unquantified cost to our poor land use policies. I have estimated from my 45-year oil experience that there is about one direct job for every 50 barrels of oil produced in the United States. Using one job for every 50 barrels of oil produced, and estimating that we could produce another five million barrels of oil per day by opening more lands for development, would mean that some one million people would have long range, good paying jobs. And I challenge you to think of the taxes paid on a barrel of U.S. produced oil (at least 10 percent), which on a $30 barrel of oil would be about $15 million per day for county, state and federal taxes.

I believe that by being less restrictive on our own energy resource development we could have more energy security and more jobs and income. The facts of the available oil and gas on undeveloped lands are well known by industry and government sources. It is up to the well informed public to demand more development of their resources.

Philip L. Ryall
Bakersfield, Calif.

Help Needed

Much as I hate to, I think it is time for geologists, geophysicists and petroleum engineers to think about forming a professional union, particularly when they are close to retirement.

I worked as a geologist for a major oil company until I retired. Everything was great. I had a serious medical operation after I retired and no problems with my medical policy.

Then the company was bought by another major. Boy, are things different now.

Last October I had a shoulder operation. Medicare paid its share promptly, but the new insurance company medical plan, which I pay for every month, has not paid a cent – and the way the new plan is set up doesn't indicate that they are going to.

Where do I go to get help or relief? A union would help, but a local lawyer in a small town wouldn't stand a chance against the powers of a major oil company legal staff.

Before you retire plan very carefully and think about all your future needs. And don't believe a word the personnel people in a major oil company tell you about all the benefits you are going to get when you retire, and how they are going to help you after all your years with the company.

Anyone who wants to know which company and which company medical insurance plan I am talking about can contact me to find out.

Fred Haeberle
Delaware, Ohio

CLASSIFIEDADS

POSITION AVAILABLE

Texas A&M University
Tenure Track Faculty Position
Petroleum Geoscientist

The Department of Geology and Geophysics at Texas A&M University invites applications for a tenure-track position at the Assistant Professor level in Petroleum Geosciences, although starting appointments at higher ranks will be considered for suitably qualified individuals. Texas A&M University will hire twenty new faculty within the College of Geosciences over the next four years and this tenure-track position will be an essential part of this planned growth.

We seek an individual who can develop a forward-looking, externally funded research program that integrates geological, geophysical, or petrophysical data in the investigation of subsurface geological systems. The applicant should be able to demonstrate an understanding of modern tools used in petroleum-related research (e.g., seismic and well log interpretation software, innovative approaches to rock-property modeling, 3-D visualization techniques, quantitative basin modeling, hydrogeology of petroleum systems, integration of petrophysical data with seismic response, etc.), although we will consider all outstanding candidates with relevant research or educational experience. The successful candidate is also expected to advise graduate students and teach undergraduate and graduate courses in Petroleum Geology.

Faculty in our department have opportunities to collaborate with colleagues in Petroleum Engineering, Chemical Engineering, Oceanography, the Integrated Ocean Drilling Program, and the Geochemical and Environmental Research Group. Departmental facilities and programs can be reviewed at our web site (http://geoweb.tamu.edu).

Applicants should submit a curriculum vita, recent reprints, a statement of research and teaching interests, and the names, postal and e-mail addresses, and fax numbers of three references to: Chair of Petroleum Geoscientist Search Committee, Department of Geology and Geophysics, Texas A&M University, College Station, TX 77843-3115. We will interview candidates until a qualified applicant is found. A Ph.D. is required at the time employment begins.

Texas A&M University, a land-, sea-, and space-grant university, is located in College Station, Texas, a dynamic and international community of 140,000 people. Texas A&M University is an affirmative action/equal opportunity employer committed to excellence through the recruitment and retention of a diverse faculty and student body and compliance with the Americans with Disabilities Act. We encourage applications from minorities, women, veterans, and persons with disabilities.

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SEDIMENTARY GEOLOGY
Two Faculty Positions at the Jackson School of Geosciences, University of Texas at Austin

The Department of Geological Sciences at The University of Texas at Austin seeks two Sedimentary Geologists. The positions are open at all levels, including Chair level. Applicants with a wide range of specialties within clastic Sedimentary Geology will be considered. There has long been strong Sedimentary Geology at UT Austin, but we wish to further develop our vision as the Jackson School is chartered. The new positions will strengthen our range of approaches in Sedimentary Geology (field, subsurface and experimental observation; laboratory analysis and modeling), and will help use the sedimentary record at all time scales in new Earth-Science initiatives. Opportunities exist for interaction with faculty and students in the Department's programs in sedimentary geology, petroleum geology, mineral resources geology, paleontology, geochemistry, hydrogeology, exploration geophysics and tectonics, and with research staff of the Bureau of Economic Geology and Institute for Geophysics which, together with the Department, comprise the John A. and Katherine G. Jackson School of Geosciences (visit our web site at www.geo.utexas.edu). The successful candidate will be expected to establish a vigorous research program and teach at both the undergraduate and graduate levels. A Ph.D. is required. Please send statements of research and teaching interests, resume, reprints, names and addresses of at least four references, plus any supplemental information to: Chair, Sedimentary Geology Search Committee, Department of Geological Sciences C1100, The University of Texas at Austin, Austin, TX 78712-1101. Review of applications will begin March 11, 2005, and the positions will remain open until filled. The University of Texas at Austin is an equal opportunity/affirmative action employer.

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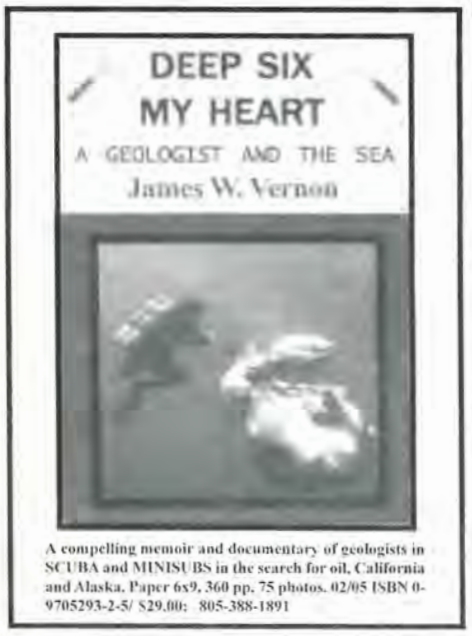

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DIRECTOR'S CORNER

AAPG Responds to Tsunami Disaster

By RICK FRITZ

As I watched the disaster from the earthquake and tsunami unfolding within the area around the northwestern end of Sumatra, it brought into focus the common humanity we feel when geologic events overpower man and his developments.

Albert Schweitzer once said, "We wander through this life together in a semi-darkness in which none of us can distinguish exactly the features of his neighbor. Only from time to time, through some experience that we have of our companion, or through some remark that he passes, he stands for a moment close to us, as though illuminated by a flash of lightning. Then we see him as he really is."

The tsunami disaster was that type of "moment" when we all saw our neighbors clearly, and grieved for mankind and were awed by the earth's power.

AAPG's leadership felt that, especially as a geoscience society, we should develop a planned response to the recent tsunami disaster. We decided that it was important to consider both humanitarian help and scientific issues. The plan is designed to provide information and raise awareness of opportunities to help and educate.

The plan is in six parts:

❒ The first part of the plan was to announce the AAPG Executive Committee response on the Web site and provide links to reputable organization for cash donations.

❒ The EXPLORER is the focus of the plan's second part. AAPG's communications staff is developing stories on the tsunami disaster to discuss science and human needs (see February EXPLORER). We hope we can raise awareness by the membership of any activities that will help educate the public on geohazards.

We also will solicit information about the effects on production facilities in the region.

❒ The third part is designed to solicit papers in the BULLETIN about the effects of tsunamis on ancient and modern coastal environments. I know as geologists, many of us were interested in the aerial photographs that showed the changes to coastal bars and distributaries. Although less dramatic, we also will solicit papers for the BULLETIN that evaluate and discuss the effects, if any, of earthquakes on petroleum geology in Malaysia, Indonesia and India.

In addition to BULLETIN articles, Datapages is producing a set of geohazard maps that will be available on CD-ROM.

❒ Fourth, the headquarters staff asked the leadership of the Asia-Pacific Region about ways AAPG can help, such as offering to help affiliated/associated societies in the Asia-Pacific Region in providing tsunami education and replacement of science books.

We already have contacted local experts for advice on how AAPG can help develop and promote tsunami education.

For example, last year AAPG gave the Halbouty Human Needs award to Hugh Davies for his work on tsunami education in Papa New Guinea. We are currently in contact with Davies to discuss ways that AAPG can help promote similar programs.

❒ Fifth, the EC approved an employee matching fund program to contribute to tsunami emergency funds. Also, we will approach AAPG's Foundation to jointly help with contributions.

❒ Finally, AAPG has notified sister societies of its actions and asked them to join in developing a united response to tsunami disaster.

The tsunami disaster was that type of "moment" when we all saw our neighbors clearly, and grieved for mankind and were awed by the earth's power.

One frustrating thing about geology is knowing that something will eventually take place without the ability to accurately predict a time and place within a short time scale. We may not be able to predict the hour, but certainly we can respond within a short time.

AAPG gives its sincere condolences to those directly and/or indirectly hurt by the tsunami tragedy. We are looking for ways to help. If you have any questions about the program, or other ideas about ways we can respond as a society, please send an e-mail to rfritz@aapg.org.

'Hydrocarbons, Environment and Society'

DEG Sets Calgary Meeting Program

By KENNETH D. VOGEL
DEG President

As global energy resources become more scarce and worldwide energy demand increases, the future success of our petroleum and energy minerals industry never has been so critical. The outstanding technical program to be offered in June at the upcoming AAPG Annual Convention in Calgary covers a wide spectrum of topics, providing our member geoscientists with the very latest information and methodologies to aid in their successful search for hydrocarbons and energy minerals.

Today, more than ever, any successful exploration or production project must consider and satisfy a broad array of environmental and other cultural factors to ensure compliance with environmentally protective regulations, and to fulfill the expectations of an increasingly watchful and concerned society.

To address these critical member and industry needs, the Division of Environmental Geosciences (DEG) is offering "Hydrocarbons, Environment and Society" as one of the major technical emphases at Calgary. This outstanding program presents a diversity of focused offerings of value – not only to environmental professionals, but also to managers and geoscientists involved with planning and implementing any successful petroleum and energy minerals exploration and production project.

This emphasis features:

...any successful exploration or production project must consider and satisfy a broad array of environmental and other cultural factors to ensure compliance with environmentally protective regulations...

❒ Pre-convention short course – "Exploration and Production Issues in the Rainforest."

❒ Pre-convention field trips – Two are planned:

✓ "Renewable Energy: Tour of an Innovative Landfill Gas Operation in Calgary and a State-of-the-Art Wind Farm in the Southern Alberta Foothills."

✓ "Sour Gas Production and Acid Gas Injection in the Rocky Mountain Foothills and Alberta Plains – Source to Sink."

❒ DEG/EMD luncheon – "Marginal Carbons Key to Prosperity," featuring Jim Dinning, chairman of the Canadian Clean Power Coalition.

Dinning also serves as executive vice president of Calgary-based TransAlta Corporation, where his focus lies in clean coal technology, particularly as it applies to providing energy and feedstock to Alberta's expanding oil sands and petrochemical industries.

❒ Technical Programs – "Hydrocarbons, Environment and Society," featuring specific sessions on:

✓ Carbon Management and Acid Gas Injection.

✓ Renewable Energy.

✓ Best Practices in Environmentally Sensitive Areas.

✓ Environmental Issues Associated with Unconventional Resources.

✓ Water and the Petroleum Industry.

I invite all of you to attend the outstanding program being offered in Calgary. There is something for everyone at the "Global Roundup – Exploring Energy Systems," including the excellent DEG technical sessions, field trips, luncheon and short course. I urge you all to take advantage of this excellent opportunity to stay current with the latest in environmental applications and issues pertinent to the petroleum and energy minerals industry – and to connect with your colleagues and industry peers.

The livelihood of every single member of AAPG is affected either directly or indirectly by environmental issues related to the industry in which we work. Therefore, it is in every AAPG member's best interest to actively support DEG's mission by becoming an active DEG member and by attending this outstanding conference in June.

From independents to majors, from students to professors, from consultants to regulators; we all win by showcasing, communicating and sharing our collective knowledge and environmental success stories by actively participating in the DEG.

DEG is for everyone in AAPG!

I look forward to seeing YOU in Calgary! ❑