

AAPG AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, AN INTERNATIONAL ORGANIZATION

EXPLORER

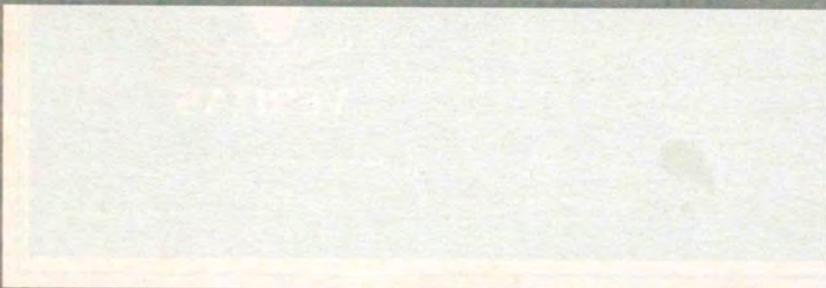
DECEMBER 2004



Getting Closer

Are New Reserves Within Reach?

See pages 8, 12



Environmental integrity.



Meeting the challenge everyday, everywhere.

Throughout the world Veritas operates with a cultural awareness of environmental sensitivity. The use of solid streamer vessels offshore and low impact procedures on land are just two of the many ways we meet the daily challenges of maintaining environmental integrity.

Excellence in Health, Safety, and Environmental practices and performance.

www.veritasdgc.com

geophysical integrity



On the cover: WesternGeco's *Snapper* acquiring 3-D seismic data in the Beaufort Sea. Canada's icy waters, once considered by some too harsh and too risky for exploration, are getting new looks thanks to technological advances and new understandings of the regions' geology. Labrador is included in the group (see story, page 8), as is the Beaufort sea. Story on page 12. Photo courtesy of Devon Canada.

CONTENTS

Recent technological developments plus a new understanding of the region's geology are making the icy and harsh waters offshore **Labrador** attractive. **8**

What's behind the **Beaufort Mackenzie Basin's** current **exploration renaissance**? A strategy focusing on natural gas. **12**

Hydraulic fracture monitoring **using microseismic detection** is a rising new star in the arena of **reservoir characterization**. **16**

Cancun 2004: A scientific meeting set in a beautiful location proves to be "great success" in an unexpected way. **20**

Flirting with disaster? **Mount St. Helens**, despite its capacity for destruction – or maybe, because of it – has become the celebrity attraction of nature's wrath. **22**

AAPG member **Ed Capen** remembers well the birth of the phrase "**winner's curse**" – and he has more to say about the subject of bidding strategy. **24**

With prices at or near historic high, why does the **exploration segment** of the industry remain relatively lethargic? Hint: Let's look toward Wall Street. **26**

REGULAR DEPARTMENTS

| | | | |
|------------------------------|-----------|------------------------------|-----------|
| Geophysical Corner | 28 | Membership and Certification | 40 |
| Looking Back | 30 | Meetings of Note | 40 |
| Education Update | 34 | Foundation Update | 41 |
| In Memory | 34 | Readers' Forum | 42 |
| International Bulletin Board | 35 | Classified Ads | 43 |
| Professional News Briefs | 36 | Director's Corner | 46 |
| www.update | 38 | DEG Column | 46 |

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 | Correspondents Louise S. Durham Susan Eaton Barry Friedman | 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 |
| Managing Editor Vern Stefanic e-mail: vstefan@aapg.org | Graphics/Production Rusty Johnson e-mail: rjohnson@aapg.org | |
| Editorial Assistant Susie Moore e-mail: smoore@aapg.org | | |

Vol. 25, No. 12
The AAPG EXPLORER (ISSN 0195-2986) is published monthly for members. Published at AAPG headquarters, 1444 S. Boulder Ave., P.O. Box 979, Tulsa, Okla. 74101, (918) 584-2555, e-mail address: postmaster@aapg.org
Periodicals postage paid at Tulsa, Okla., and at additional mailing offices. Printed in the U.S.A.
Note to members: \$6 of annual dues pays for one year's subscription to the EXPLORER. Airmail service for members: \$45. Subscription rates for non-members: \$63 for 12 issues; add \$67 for airmail service. Advertising rates: Contact Brenda Merideth, AAPG headquarters. Subscriptions: Contact Veta McCoy, AAPG headquarters. Unsolicited manuscripts, photographs and videos must be accompanied by a stamped, self-addressed envelope to ensure return.
The American Association of Petroleum Geologists (AAPG) does not endorse or recommend any products or services that may be cited, used or discussed in AAPG publications or in presentations at events associated with AAPG.
Copyright 2004 by the American Association of Petroleum Geologists. All rights reserved.
POSTMASTER: Please send address changes to AAPG EXPLORER, P.O. Box 979, Tulsa, Okla. 74101. Canada Publication Number 40046336.
Canadian returns to: Station A, P.O. Box 54, Windsor, Ontario N9A 6J5

Legendary Oilman Michel T. Halbouty Remembered at Services in Houston

AAPG legend Michel T. Halbouty died November 6 after seven decades of influencing the industry and the Association.
Halbouty, a colorful and charismatic geologist who was a leader whether exploring in the fields or leading from his



desk, was 95.
His funeral service at St. Martin's Episcopal Church in Houston attracted many well-wishers, including former U.S. President George H.W. Bush.
Related stories on pages 4 and 6.

PRESIDENT'S COLUMN

Different Strokes For Different Folks

By PATRICK J.F. GRATTON
Cancun! What a terrific international conference!
The AAPG staff did an outstanding job assisting general chair Alfredo Guzmán and his committees for our most recent international meeting, held in late October. Asociación Mexicana de Geólogos Petroleros (AMGP) President Adán Oviedo and his executive committee made all attendees feel very welcome. At least 1,799 registrants participated in a splendid lineup of technical talks, exhibits, short courses, luncheons and social events. (Related stories on pages 20 and 32.)



Gratton

others may be working in the United States but on projects "overseas."
Of course, the reciprocal also applies, especially to international company employees working on Gulf of Mexico and Rocky Mountain basins while living outside the United States.

For me it was an especially valuable time to discuss topics of interest with many international members – and the AMGP annual meeting, a formal event in which new officers are installed and recognition awards presented, gave me at least a couple of examples worth importing to you.

More over, since exploration is a "leading edge" topic, perhaps we should expect fewer papers concerning mature regions.

The Cancun conference also presented an opportunity to review, reflect and present information on AAPG's international heritage and current circumstances.

Even so, most would agree that even with adjustments – i.e., areas of work focus – there seems to be a substantial disparity in favor of papers covering international locales.

As I remarked during the meeting's opening session, the very first issue of the BULLETIN (published in 1917 under our first name of the Southwestern Association of Petroleum Geologists) conveniently – and fittingly – carried two international articles:

✓ Dutch geologist (and an AAPG founder) W.A.J.M. Van Waterschoot Van der Gracht's paper was about salt domes in northwest Europe.

I believe what is important is to consider all the products and services AAPG offers before coming to conclusions about fairness of distribution of such.

✓ K.D. White (another founder) reported on oil developments in Colombia.

For example, the Distinguished Lecture Program in recent years has averaged about 25 percent of its total audience count outside the United States. About 40 percent of all schools visited in the last four years by the Visiting Geologist Program were outside the United States. On the other hand, the Student Expo/Job Fair has been used mostly by U.S.-based students (the new Virtual Student Expo initiative may provide a partial balancing).

Also shown to the audience during my talk was the change in proportions of international and U.S. members (all classes, based upon mailing addresses) since 1918. Today, international members constitute about one-third of the total.

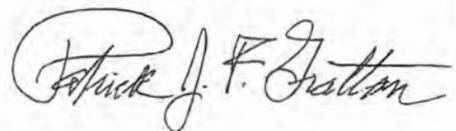
If we look at all the products and services provided by AAPG we'll see a similar wide range of variables. Some favor international members, and others are more focused on members in the United States.

A survey of "site-specific" or regional papers in the BULLETIN indicates about two-thirds of the total concern areas outside the United States.

I hope you will join me in treating the mix as a natural outgrowth of "different strokes for different folks," and that members in general benefit greatly from the wide range of Association activities. This wide and growing choice of services makes the Association stronger. Let me hear from you as to how to make our "mix" even better. (Thanks to President-Elect Pete Rose for helpful suggestions.)

So, is it fair that one-third of the membership gets two-thirds of these papers? In a narrow context it is not fair. But I hope you join me in believing it is NOT UNFAIR.

There are complications to this analysis: For example, some members with U.S. addresses are actually working outside the United States, while



A Giant in Industry, Profession and AAPG

Wildcatter Michel T. Halbouty Dies

By LARRY NATION

AAPG Communications Director

Famed geologist Michel T. Halbouty, the son of Lebanese immigrants who became a legend in his own time, died November 6 with his wife Billye at his side at a Houston hospital after a long battle with pancreatic cancer. He was 95.

From humble beginnings as the son of a grocer in Beaumont, Texas, Halbouty's career spanned seven decades, and he was known worldwide as much for his strong, outspoken advocacy for industry issues as for his success as an oilfinder. His travels made him an internationally known figure who was on a first-name basis with presidents and world leaders, even playing golf regularly with former U.S. President George H.W. Bush, who attended Halbouty's funeral.

His interest in geology began when he was refused an answer by a teacher to the question, "How old is the earth?" She told him to find out for himself. His trips to the library sparked his fascination – and he knew what he wanted to do. He began saving for college – and worked his way through.

The Legend Begins

The making of the legend began in 1931 in the teeth of the Depression, when Halbouty landed a job as a chain-puller on a survey crew for Yount-Lee Oil Co. after graduating with bachelor's and master's degrees in geology and engineering from Texas A&M. Six weeks later, he was credited with the discovery of the prolific High Island Field between Beaumont and Houston. He had challenged his boss to drill the well, staking his job on the discovery.

Two years later Halbouty joined wildcatter Glen McCarthy, who was known for his flamboyant lifestyle and business activities. In the Halbouty biography *Wildcatter*, the relationship was described as "King Kong and Godzilla agreeing to share the same apartment."

Nineteen months later Halbouty launched his own consultancy until being called into the Army following Pearl Harbor. During World War II, he served on the Army-Navy Petroleum Board under the Joint Chiefs of Staff, mustering out in 1945 as a lieutenant colonel to resume his consulting practice and eventually to become an operator.

His first discovery as Michel T. Halbouty Energy Co. was the Ashland Oil Field in Louisiana. His astute use of the science and the ability to make deals lead to fantastic successes. By 1950, Halbouty and partners had drilled 29 wells with only two dry holes.

Halbouty discoveries included big producers in Texas such as:

✓ The South Boiling Field in Wharton County.

✓ The Northeast and Northwest extensions of the South Liberty Field in Liberty County.

✓ The West Saratoga Field in Hardin County.

✓ The Pheasant Field in Matagorda County.

✓ In Montgomery County, a Halbouty discovery revitalized Fostoria Field.

In 1956, Halbouty drilled 14 exploration wells, and 12 found production.

But as every wildcatter knows, dry holes are part of the business, too. He also had been broke – at least twice. But his enthusiasm never waned, and his



Michel T. Halbouty, active through the decades: From left, his photo when receiving the Sidney Powers Medal in 1977; as an AAPG Advisory Council member representing the Circum-Pacific Council for Energy and Mineral Resources in 1982; and speaking at the dedication ceremonies for the Pratt Tower at AAPG headquarters in Tulsa in 1985.

adventurous nature led him to areas far beyond Texas.

In 1957, for example, he was the first independent to explore in Alaska, finding a gas field.

Reaching Out

All the while, Halbouty's AAPG and other professional organizations drew his attention as well.

He was the author of over 400 articles on petroleum geology and engineering and lectured widely on scientific and industry topics. He was the subject of three biographies and was the author, along with James Clark, of *Spindletop*, widely acknowledged as the definitive work on the prolific discovery.

Because of his willingness to thrust himself into the vortex of the public eye and his strong-willed views, Halbouty became one of the world's most widely known geologists. His speeches delivered

in world-spanning lecture tours and articles chided major oil companies, independents, government policies, the public, the media and anything else he saw as obstructionist or harmful to his main goal – exploration for oil and gas.

He was always an evangelist for the science of petroleum geology, and his oratory became celebrated as theater as well as substance. With a tenor speaking voice and a distinctive accent, his revivalist style of fortissimo and crescendo oratory drew standing-room-only crowds at AAPG presentations. A major theme was energy independence. His stands sometimes sparked controversy, but the honors and awards piled up as his legend grew.

He counted his election as president of AAPG in 1966 as one of the honors of which he was most proud, along with being named the Sidney Powers Medalist in 1977. He also received AAPG Honorary Membership in 1969 and the Human

Needs Award, which now carries his name, in 1975. He widely professed that AAPG was one of the major focuses of his life, along with Texas A&M. He was the originator of the AAPG Foundation, and a student Grants-In-Aid fund carries his name.

He was a Distinguished Lecturer and chaired or served on many AAPG committees. He also authored, co-authored or contributed to numerous AAPG publications including the three *Giant Oil and Gas Fields of the Decade* volumes for the 1970s, 80s and 90s.

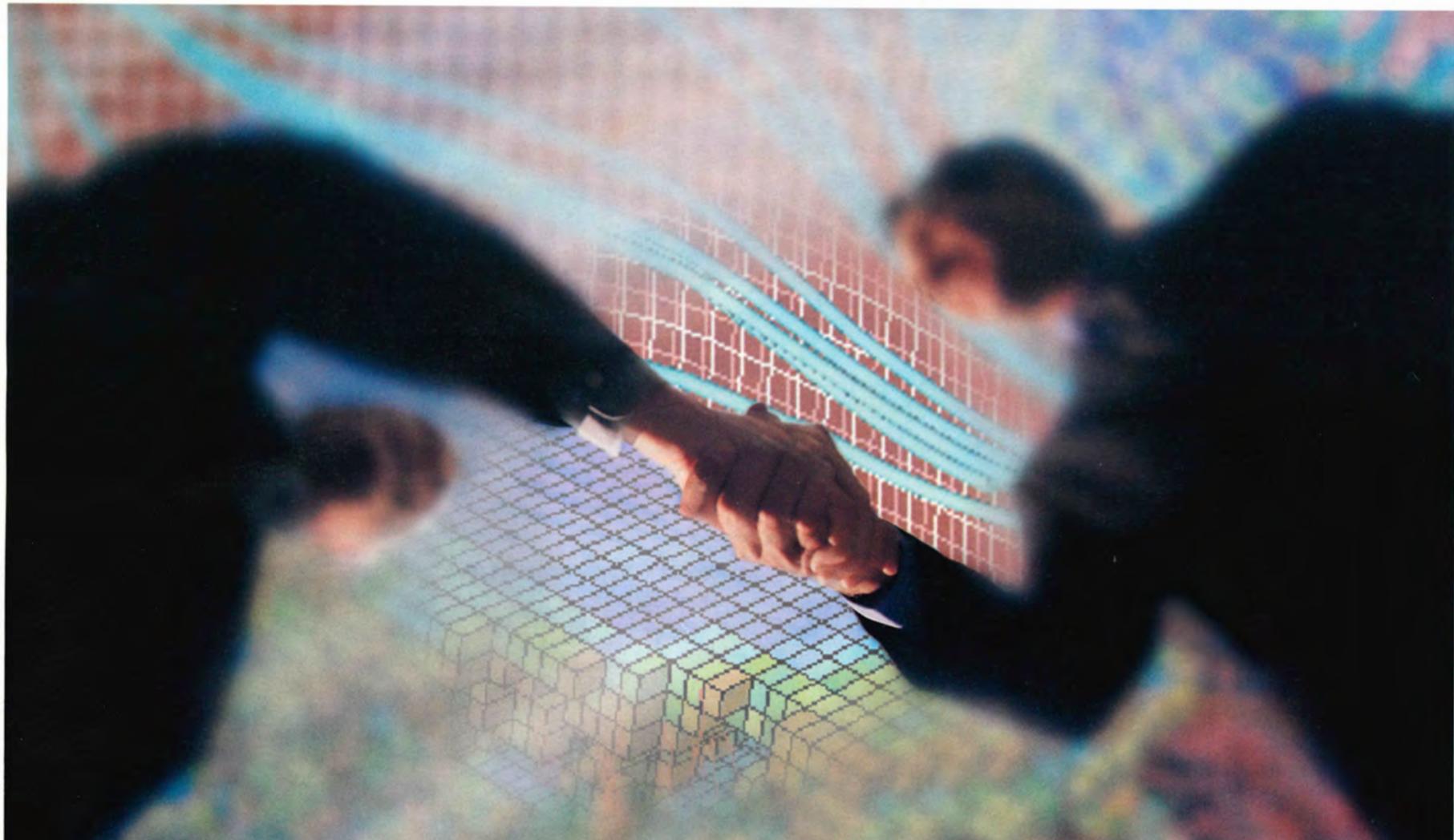
He was one of AAPG's strongest advocates and leaders and did much to shape the organization, including leading the first AAPG International Meeting in Brighton, England, in 1968.

In addition to receiving the three highest awards bestowed by AAPG, he also received the highest honors

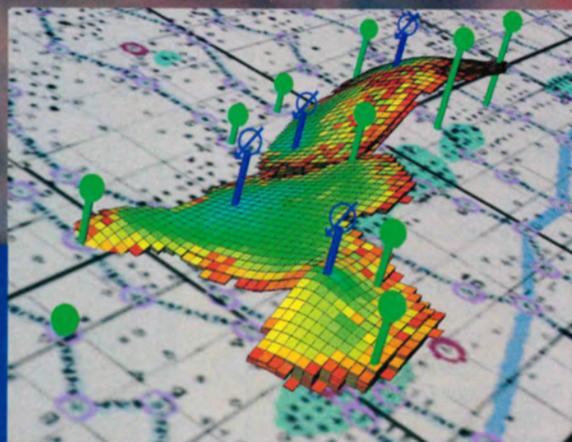
See **Halbouty**, page 7



A young Michel Halbouty, wearing sunglasses and standing third from the left, stands with Glenn H. McCarthy to his left, as both observe the opening of the discovery well in the West Beaumont Field, Texas, in 1936.



**Eliminate the boundaries
between geology, geophysics
and reservoir engineering**



Petrel Reservoir Engineering

Petrel™ workflow tools now enable you to prepare, run, and analyze results from any ECLIPSE® family simulator to better understand the uncertainties and opportunities in your reservoirs.

Reliable and timely reservoir decisions demand a robust and accurate simulator, the ability to investigate the impact of uncertainty, and a consistent, up-to-date reservoir model—reveal the possibilities through the integration of Petrel and ECLIPSE.

Now you can build simulation models directly from geological models; add fluid properties, well completion, production history, and event scheduling. Organize geological realizations, simulation runs, and development scenarios into cases. Select and launch the appropriate ECLIPSE simulator and analyze the results—all with the usability of Petrel.

Petrel and ECLIPSE—Joining forces for improved decision making.

For more information about Petrel Reservoir Engineering, contact your local Schlumberger Information Solutions office or email: sisinfo@slb.com



www.sis.slb.com

Schlumberger

© 2004 Schlumberger Information Solutions. All rights reserved. Petrel is a trademark of Schlumberger. ECLIPSE is a registered trademark of Schlumberger. The i enabled and design is a service mark of Schlumberger. 04-1S-397

*Peers Remember the Legend***Halbouty: A Man of Talent, Vision**

The passing of Mike Halbouty is not the start of a legend. He has been recognized for many years as a *living legend* in the field of petroleum exploration. Mike's been an inspiration to many young – and once young – geologists to work hard, persevere and win in this great scientific game of finding oil and gas.

– Patrick J.F. Gratton
AAPG President

Michel Halbouty was a man blessed with many special talents – a dedicated leader, a dynamic speaker, a respected and ingenious explorationist, a spokesman for the oil industry in general and for petroleum exploration in particular. He was the ultimate optimist – he seldom saw a new prospect that he didn't like!

My initial contact with Mike came over 50 years ago, when I first heard the words, "Larry, I need a good farm-out!" Those words were repeated many times over the years until, after a series of rather dismal dry holes, he advised me that I owed him a farm-out of an inside location!

Mike had a strong impact on my participation in AAPG activities. He asked me to take on a number of jobs in the organization; it was impossible to convince him that "no" was an acceptable answer.

His many years of supporting and enhancing AAPG's role as the world's leading exploration association were legendary. I particularly laud him for his leadership in creating and organizing the AAPG Foundation, one of the Association's strengths.

We all will miss Mike. His energy, his thirst for finding new oil fields and for encouraging other geologists to do the same, and his willingness to speak for the industry were contributions that ensure him a very special place in the annals of exploration geology.

– Larry Funkhouser
past president and
AAPG Foundation Trustee Emeritus

During my years as executive director of AAPG I traveled extensively to meetings in the United States and around the world and found that wherever petroleum geologists gathered, the name of Mike Halbouty almost always came up in discussions. He was, indeed, a legend in his own time, beginning at Spindletop and continuing until his death.

One citationist referred to him as the "quintessential wildcatter." When the funds were available, he drilled a hole in the earth. Many of them were discoveries.

I was with Mobil in Houston in 1972 when the AAPG offered me the executive director's job. Morgan Davis Sr., then in Houston, was a Foundation Trustee and interviewed me for the additional job as director of the AAPG Foundation. Morgan, a former chairman of Humble Oil, suggested "before you go up to Tulsa; you should have a visit with Mike Halbouty."

Mike granted my request when I called, and I went to see him in his old building on the grounds of what was being developed as the Galleria shopping center on Westheimer. I was greeted by Mary Stewart, his administrative assistant and secretary who was still with him at the time of his death. Mary ushered me into the "living legend's" office.

He had been president of AAPG in 1966-67, and let me know that AAPG was

a very important organization to him. He said, "Fred, if the Association ever needs help, just let me know."

In the years to come, he kept his promise. He never lacked for ideas of what would make AAPG a better organization.

– Fred A. Dix
AAPG Executive Director Emeritus

If ever there was a man firm in his convictions, it was Mike Halbouty. He could be for you or against you at different times, and equally strong. There was never equivocation on his part, and if

he had doubts he kept them to himself. His dedication to his profession and business was fierce and his energy was full.

It will be a long while, if ever, that this Association and the profession of petroleum geology again sees the likes of Mike Halbouty. His tracks are deep and lasting.

– William L. Fisher
past president and
AAPG Foundation Trustee

Mike had tough exterior, but was always very warm and thoughtful. He was

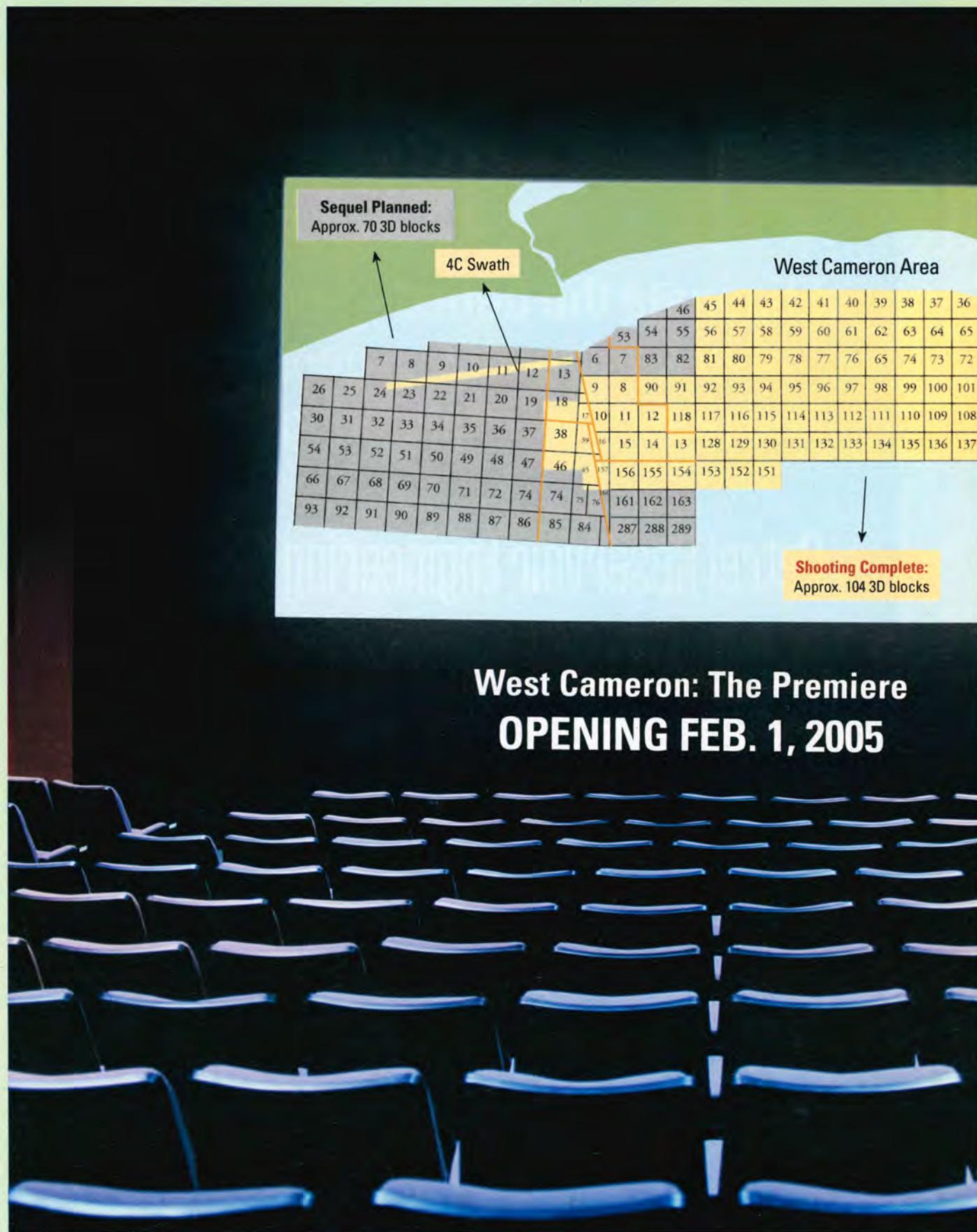
a true friend and a loyal supporter of both the AAPG Association and Foundation.

– Jack Threet
AAPG Foundation Chairman

The words dynamic, innovative, passionate are words that ordinarily belong to the young. Mike Halbouty retained those qualities all his life. I hope I can be like Mike ... when I grow up.

– Marlan Downey
AAPG past president

continued on next page



**West Cameron: The Premiere
OPENING FEB. 1, 2005**



A man for all seasons: Michel T. Halbouty receiving the American Geological Institute's Legendary Geoscientist Award during the All-Convention Luncheon at the 2002 AAPG Annual Convention in Houston (above), and aboard the *S.P. Lee* in 1983.



Halbouty

from page 4

conveyed by the American Institute of Mining, Metallurgical and Petroleum Engineers. He was the only earth scientist to have achieved the distinction of being so honored by these two scientific and professional societies.

Other honors especially meaningful to Halbouty included a Doctorate of Geoscience from the USSR Academy of Science, and being named Scientific Adviser to the Research Institute of Petroleum Exploration and Development of the People's Republic of China and an Honor Professor in Geology at the University of Nanjing.

A longtime supporter of Texas A&M, he endowed the Michel T. Halbouty Chair in Geology, one of the largest individually endowed chairs at the university. He also established the Michel T. Halbouty Visiting Chair for the College of Geosciences, the university's only visiting chair, and the geology building on the campus carries his name.

In addition to his oil activities, Halbouty also had extensive banking interest in Texas as well as real estate holdings in Houston.

He was on a number of civic boards and established treatment care of childhood diseases at Texas Children's Hospital. He also served as chairman of the President's Energy Policy Advisory Task Force and leader of the "Transition Team on Energy" for the Reagan administration. Former U.S. President George H.W. Bush said Halbouty was instrumental in locating his presidential library at Texas A&M.

"I consider my profession and the science it represents as one of the most vital to the welfare of the world's people," Halbouty said in receiving the Horatio Alger award in 1978. "To me, geology is more than a science. It is a vital element – the basic entity which formed my outlook and philosophy of life.

"Geology has no rival in the spectrum of science," he said. "The story of this earth, the evolution and destruction of continents, the recording of all life since the beginning of time has attracted countless men and women to its realm and continuously records the captivating events of the planet upon which we all live ...

"When I leave this earth, I trust my contributions to the science will leave it better than the day I became its student."

As a post script, Mary Stewart, his longtime administrative assistant, said that at the time of his death, Halbouty was still involved in deals – including a development project in West Texas. □

Two Thumbs Up!

Geophysical Pursuit and WesternGeco are pleased to announce the completion of approximately 104 blocks of full-fold, 3D data in the West Cameron area. PSTM processing will be available on February 1, 2005. The next phase of acquisition is planned for the second quarter of 2005.

| Acquisition Comparison | Existing Data | Newly Acquired Data (2004) |
|------------------------|---------------|----------------------------|
| Record Length | 8 sec. | 13 sec. |
| Receiver Interval | 100 m | 50 m |
| Fold | 60 | 120 |
| Receivers | Hydrophone | Dual Sensor |
| Long Offsets | 6000 m | 9000 m |

For the best view of West Cameron, call Geophysical Pursuit.



www.westerngeco.com



3501 Allen Parkway
Houston, TX 77019
713.529.3000

2895 Highway 190, Suite 227
Mandeville, LA 70471
985.727.6720

continued from previous page

Mike Halbouty was one of those petroleum businessmen-geologists with a truly electric personality. Any time I was around him, I always felt that something big was going to happen – that he was about to unleash a revelation.

He accomplished many things in his long life, but to me, he was the consummate explorer, whether for petroleum or pure science. Whenever I was prospecting around the country, I always was amazed that out in the middle of nowhere, I would find a well drilled by Mike Halbouty.

He was a great supporter of AAPG, and a true wildcatter. We will miss him.

– Rick Fritz
AAPG Executive Director

New Seismic Being Studied

Labrador Looks to Retrieve Gas

By SUSAN EATON
EXPLORER Correspondent

Building on a long history of seismic data acquisition in the harsh North Atlantic, a Calgary-based geophysical company is taking the plunge to explore for oil and gas in the icy waters of offshore Labrador.

After a hiatus of more than 20 years, Geophysical Service Inc. (GSI) has returned to Labrador's continental shelf, investing US \$23 million to purchase and equip a seismic vessel, and to acquire more than 10,000 kilometers of 2-D seismic data.

In early October, GSI completed this year's program of approximately 9,000 kilometers of 2-D seismic data off the Labrador coast. Labrador's continental shelf is about 250 kilometers wide and extends 2,000 kilometers from the northern tip of Newfoundland to Baffin Island. The area is characterized by rough seas and sporadic iceberg traffic.

"We're the pointy tip of the exploration stage," said Paul Einarrson, GSI's chief operating officer, chairman and executive vice president. "We're very little, but very important."

"We've been working here (Atlantic Canada) longer than anyone else," he added. "We understand the geology, the players and their level of interest in the oil and gas basins."

During the late 1970s and early 1980s, the oil and gas industry drilled 27 wells off the Labrador coast, resulting in five significant discoveries totaling 4.2 Tcf of natural gas and 123 million barrels of natural gas liquids. Because the industry was looking for oil, the gas discoveries were deemed a technical success but a commercial failure. Accordingly, Labrador's stranded gas reserves have languished for more than 20 years.

But rising natural gas prices – combined with a North American gas market that is becoming increasingly constrained by supply – make Labrador's stranded gas reserves all the more attractive.

According to Einarrson, recent developments in production technologies have finally caught up to the remote areas of offshore Labrador, including:

- ✓ Liquefied natural gas.
- ✓ Compressed natural gas.
- ✓ Floating Production, Storage and Offloading (FPSO) facilities like the one being installed at the White Rose Field, offshore Newfoundland, which offer possible options for the harsh Labrador environment.

"We want to figure out how to get this gas to Boston," Einarrson said.

The Magic Bus

Steven Campbell, president of Trans Ocean Gas, hopes to deliver stranded gas to southern markets from the White Rose oil field by 2011, and from the Labrador Shelf within 10 years' time. Campbell, a native of Newfoundland, intends to supply markets that don't have existing pipelines or liquefied natural gas (LNG) facilities. St. John's-based Trans Ocean Gas has patented the concept of using ships to transport compressed natural gas (CNG) in fiber-reinforced plastic (FRP) pressure vessels. According to Campbell, FRP cylinders are already used as fuel tanks for applications ranging from fighter jets to city buses.

In 1999, Campbell, a petroleum engineer with both onshore and offshore facilities experience, began researching the numerous technologies that might be



Map by Rusty Johnson; graphics, data courtesy of Exploration Geosciences

Rising natural gas prices and the potential demand from North American markets are making Labrador stranded gas reserves much more attractive.

suitable to produce the stranded gas reserves of offshore Newfoundland and Labrador. Campbell's epiphany came shortly thereafter, on a street corner in Calgary: He observed a city bus drive by, equipped with a FRP pressure vessel on the roof, and advertising that it was fueled by CNG.

The rest, as they say, is history. Earlier this year, Trans Ocean was one of nine companies invited by Husky Energy to submit proposals on how to produce White Rose's 2.7 Tcf of associated natural gas.

"We know that we're on the verge of creating a multi-billion dollar a year industry," Campbell said. At a cost of US \$1 billion, Trans Ocean's proposal contemplates the construction of three container ships, each capable of carrying 1 Bcf of natural gas to market. Each ship would be equipped with 690 cassettes (large racks) that, in turn, each house 24 pressure vessels or cylinders – a whopping

16,560 pressure cylinders per ship. Trans Ocean's ships would connect to a FPSO unit, transferring gas into the pressurized cylinders at 3,600 psi (pounds per square inch).

According to the Canada-Newfoundland Offshore Petroleum Board:

- ✓ The Grand Banks contain 5.4 Tcf of stranded gas reserves and 313 million barrels of natural gas liquids (NGLs).
- ✓ The stranded reserves of the Grand Banks and Labrador total 9.6 Tcf and 436 million barrels of NGLs.
- ✓ Oil production on the Grand Banks is approximately 350,000 barrels per day from the Hibernia and Terra Nova fields.
- ✓ By late 2005 or early 2006, the South Korean-built *Sea Rose FPSO* will commence production at White Rose, at an estimated peak production rate of 92,000 barrels per day.

"CNG is all about weight," Campbell said, adding that one cubic meter of natural gas – compressed at 3,600 psi –

weighs about one-third of the equivalent volume of water. Container ships can therefore transport CNG more efficiently and cost-effectively than bunker crude tankers.

Trans Ocean asserts that its FRP pressure vessels are one-sixth of the weight of comparable high-strength steel pressure vessels, are corrosion resistant and unlikely to rupture from a side impact collision.

"Because the FRP vessels are 100 percent corrosion resistant, we can take unprocessed gas right out of the wellhead," Campbell explained. "Corrosion is the Achilles' Heel of the oil and gas industry."

CNG technology is preferable to LNG, he continued, because the liquefaction process gobbles up 25 percent of the natural gas. An additional 5 percent loss occurs when LNG is re-gasified and compressed before going into pipelines.

The Failure Was a Success

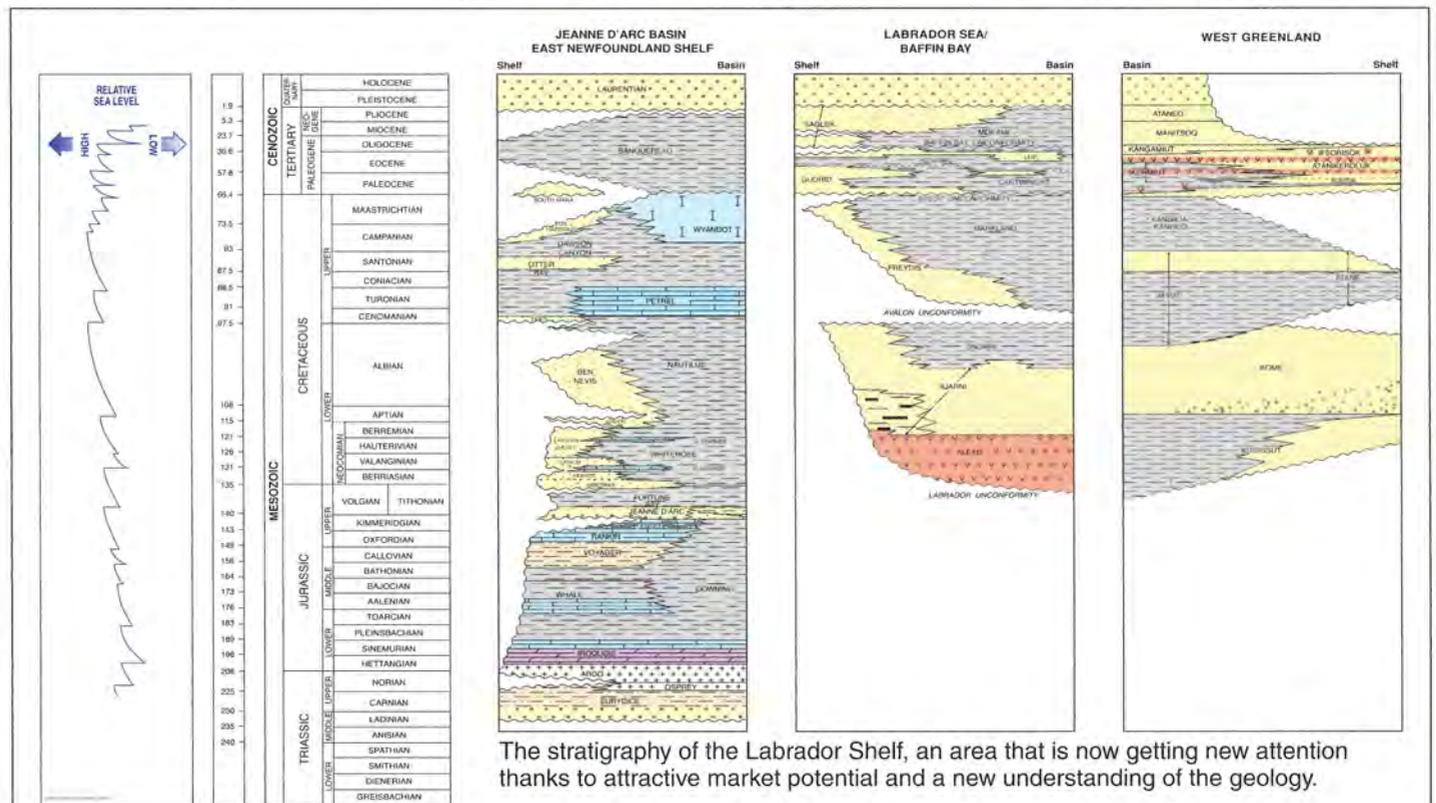
Steven Millan, chief executive officer and chairman of Newfoundland-based Canadian Imperial Venture Corporation (CIVC), sees CNG as a technical option for producing Newfoundland's onshore gas reserves (see the EXPLORER March 2004, Trenton-Black River play).

According to Millan, an AAPG member, the hydrocarbons produced to date in the Trenton-Black River play of western Newfoundland are rich in gas and liquids. In 1995, Hunt Oil and PanCanadian Energy (now EnCana) tested the Cambro-Ordovician age hydrothermal dolomite play with the Port au Port #1 well. On an extended production test, the well flowed a total of 5,012 barrels of oil and 9.2 mcf of natural gas over a nine-day period.

During the next couple of years, CIVC will continue drilling the Trenton-Black River play on the Port au Port Peninsula, situated on Newfoundland's remote west coast. Millan can envision the day when a CNG ship from Labrador – en route to distant markets – stops at his ocean-bounded concession to load natural gas and associated NGLs.

Twenty years ago, during the heyday of the drilling on the Labrador Shelf, Millan

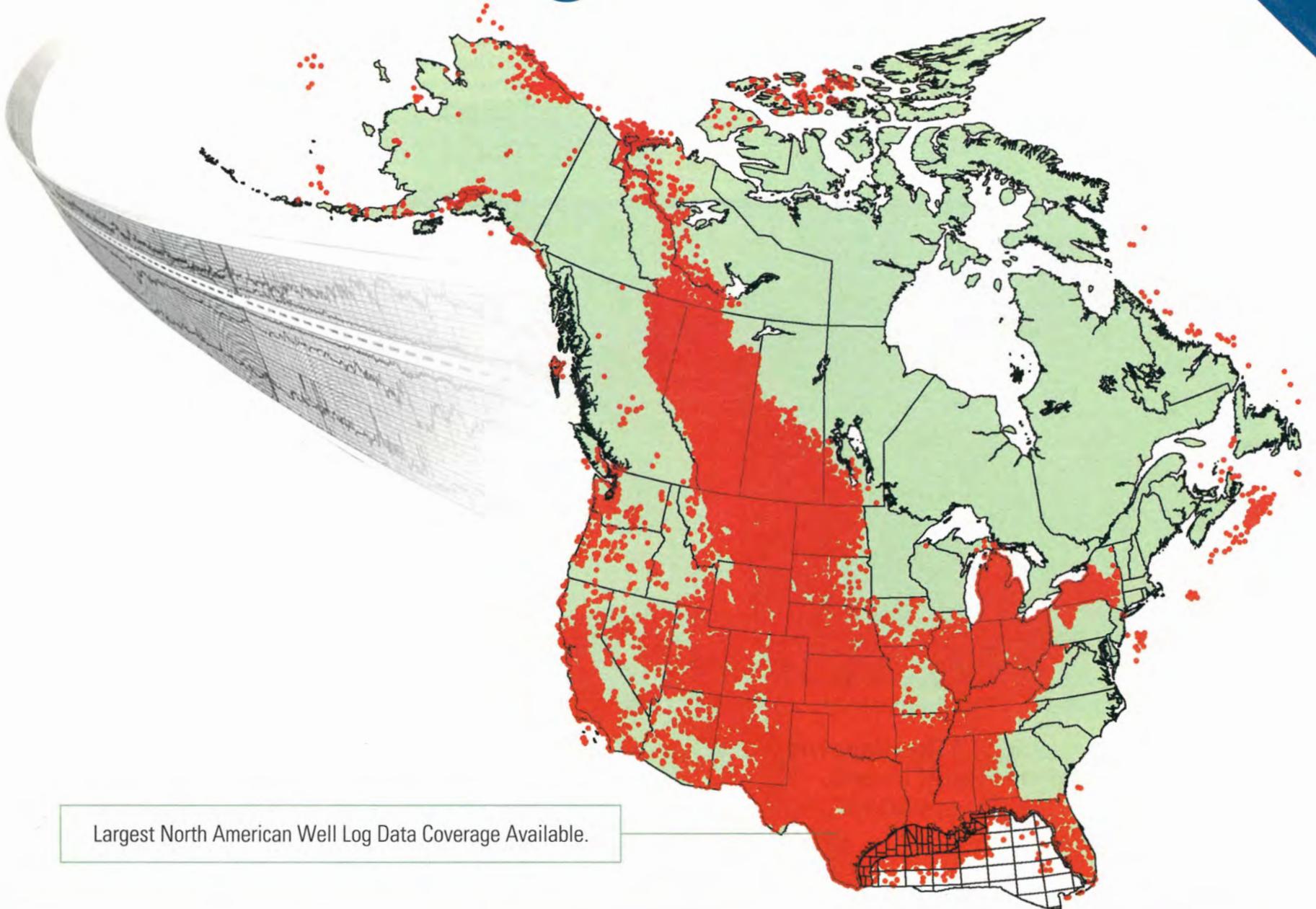
See **Labrador Shelf**, page 10



The stratigraphy of the Labrador Shelf, an area that is now getting new attention thanks to attractive market potential and a new understanding of the geology.

You Focus on the
Prospects, Leave the
Well Log Data to A2D.

Ask about
smartSECTION 5.0



If you need well log data, then you need us.

- LOG-LINE Plus!® Online Well Log Database
- Digital and Hardcopy Well Logs
- Well Log Digitization Services
- Work Station Ready Logs
- Pore Pressure Analysis and Purified Logs
- Flexible ADVANTAGE Data Subscriptions
- smartSECTION® Geologic Software
- Data Management Services

A2D Technologies

888-LOG-LINE

www.a2d.com



Labrador Shelf

from page 8

was Petro-Canada's vice president of frontier and international exploration.

"A gas well was deemed a failure," he said. "Generally speaking, there was disappointment. But, geologically speaking, it was a technical success."

During the early 1980s, he said that all sorts of "far out" ideas were discussed for gas production and transportation in an area prone to iceberg traffic and scours. Some of the more creative ideas included constructing caves below the seabed and depth of ice scour for offshore production, and using dirigibles and submarines to transport the gas to southern markets.

Today, Millan points to the acute energy needs of northern communities in Labrador, the Canadian Arctic and nearby

Greenland, and he questions the current wisdom of where to market Labrador's gas.

"Perhaps the market for some of this gas is north and not south," he said. "Perhaps we need to turn things upside down."

A Lot of Data

According to Einarrson, several large oil and gas companies participated in GSI's Labrador speculative seismic programs in 2003 and 2004. With almost 300,000 kilometers of 2-D and 3-D seismic data in its library, GSI bills itself as the largest owner of "non-exclusive" seismic data in Canada's offshore frontiers (the Beaufort Sea, the Arctic Islands, Hudson Bay, Baffin Bay, Labrador, Newfoundland and Nova Scotia).

Founded in 1930 in the United States, the original GSI was widely credited with the development of digital acquisition

systems and 3-D seismic data acquisition and processing methods, leading to the formation of Texas Instruments in 1950. GSI was subsequently purchased by Halliburton Energy Services. In 1992, Davey Einarrson, a longtime executive of the original GSI, purchased the proprietary rights to GSI's speculative data in the Canadian offshore, launching the new GSI in Calgary.

Between 1971 and 1983, GSI acquired 32,000 linear kilometers of data off the Labrador coast, or about 25 percent of all data acquired by industry. Before embarking on its 2003 and 2004 acquisition programs, GSI reprocessed 20,000 kilometers of its in-house 2-D seismic data, using modern processing techniques.

The improvements in imaging deep geological formations were amazing, said Michael Enachescu, an associate professor of geosciences at the Memorial University

of Newfoundland. Enachescu, also an AAPG member, is the Senior Husky Research Fellow at Memorial University.

Enachescu knows his way around the Grand Banks and the Labrador Shelf – before joining the Memorial University last year he spent 20 years as an exploration geophysicist with Sun Oil (now Suncor Energy) and Husky Energy.

Enachescu praises GSI.

"They are discovery driven, and they have the fire of exploration in their bellies," he said.

Enachescu is confident that the oil and gas industry has only touched the "tip of the iceberg" on the Labrador Shelf. He points to the industry's historical track record of a 20 percent success rate, and he's optimistic that the new 2-D seismic data will position the industry for additional discoveries. In fact, Memorial University was the recent recipient of a multi-million-dollar donation by GSI – the company donated all of its historical data, as well as its recent data acquisitions, for offshore Newfoundland and the Labrador Shelf.

"I have access to more data than most of the oil companies," Enachescu boasted.

What about the fact that there have been no exploration licenses nominated yet on the Labrador Shelf?

"I'm impatient," he said. "I trust the geology – if you step out from the significant discoveries, you'll easily double the reserves."

Finding a New Play

Mark Groves Gidney concurs. He is a director of Exploration Geosciences, a UK-based, independent consultancy firm that earlier this year completed a Labrador Shelf Atlas – that followed on the heels of a series of circum-Arctic G&G studies.

EG's studies all include the integration of well, seismic, gravity and aeromagnetic data; basin modeling; burial modeling; reservoir and source rock distribution; and the generation of play fairways.

"The idea was to come up with new plays, as opposed to the one that had already been drilled," explained Groves Gidney, an AAPG member.

The study identified many stratigraphic leads that remain undrilled today, he said, including Tertiary and Cretaceous age delta and shoreface sands.

"On a continental shelf on a passive margin, you don't find the large structures that you would find in a rift basin," explained Groves Gidney. However, he described "the kitchen areas as huge – the Labrador Shelf has as good potential as the Scotian Shelf."

The 200 wells drilled to date on the Scotian Shelf have resulted in approximately 25 significant discoveries, or a 12.5 percent success rate.

The Labrador Shelf includes the Saglek and Hopedale basins, which are separated by an east-west trending basement high. To date, the significant discoveries are situated in the Hopedale Basin, which contains a thin Mesozoic age sedimentary section.

There are two main trapping mechanisms:

- ✓ Drape of Cretaceous and Lower Tertiary age sands over popped up basement fault blocks.
- ✓ Stratigraphic pinchouts of sands against the flanks of the fault blocks.

In the Hopedale's southernmost part, two wells tested gas from an interpreted erosional remnant of the Cambro-Ordovician carbonate platform (Trenton-Black River equivalent) – the Hopedale E-33 well flowed at 19.5 mmcf/d and the Gudrid H-55 well at 8.1 mmcf/d. □

"The Mapping Guru"

Your First Name

Your Last Name

Once you harness the power and flexibility of the world's best mapping program, there's only one question: How well do you handle fame?

Extraordinary maps now come together incredibly fast. Because Petrosys simply works better. It's compatible with all the most popular software tools, including OpenWorks, GeoFrame, SMT, ArcSDE, Oracle and more. Works with WindowsXP, Linux, Solaris or Irix. And lets



you gather, share and interpret data to create presentation maps that not only look good enough to blow your audience away, but are undeniably thorough and precise. Give Petrosys a trial run on your next project. But don't let the simplicity fool you. It's the best there is.

©Petrosys Pty. Ltd. OpenWorks is a mark of Halliburton, Inc. GeoFrame is a mark of Schlumberger. SMT is a mark of Seismic Micro-Technology, Inc. ArcSDE is a mark of Environmental Systems Research Institute (ESRI). Oracle is a mark of Oracle Corp. WindowsXP is a mark of Microsoft. Linux is a mark of Linus Torvalds. Solaris is a mark of Sun Microsystems. Irix is a mark of Silicon Graphics Ltd.

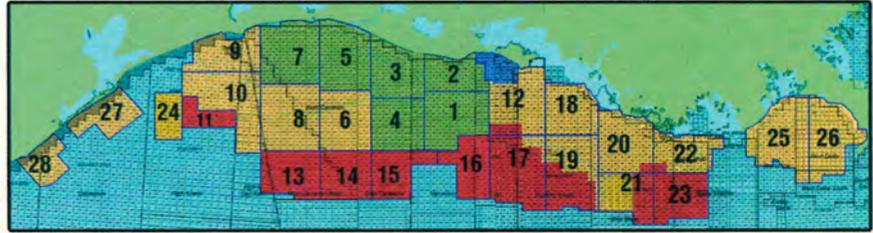
Petrosys > Australia/Asia +61-8-8431-8022 > Americas 1-888-PETROSYS > Europe +44-1-292-282-209 > www.petrosys.com.au

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



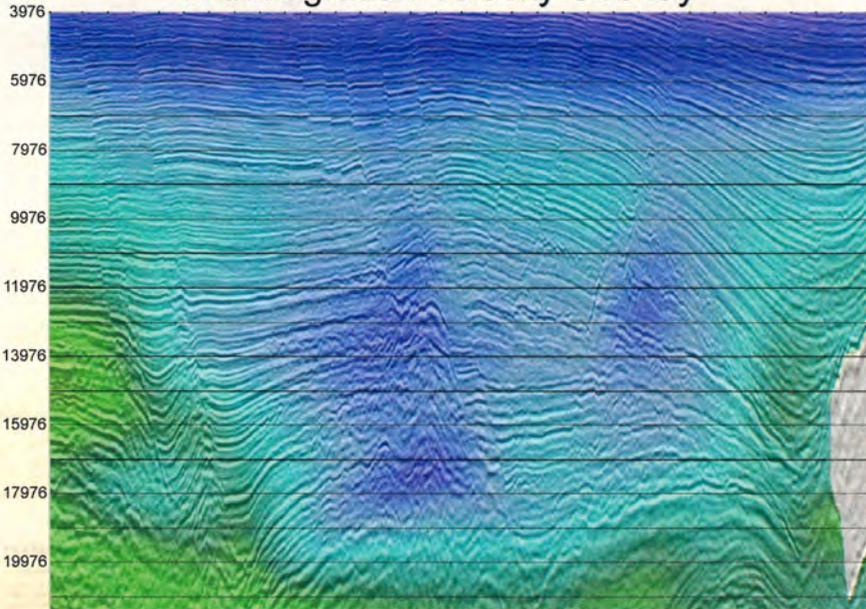
**EAST and WEST CAMERON
NOW
AVAILABLE**

**PRESTACK
DEPTH MIGRATION**



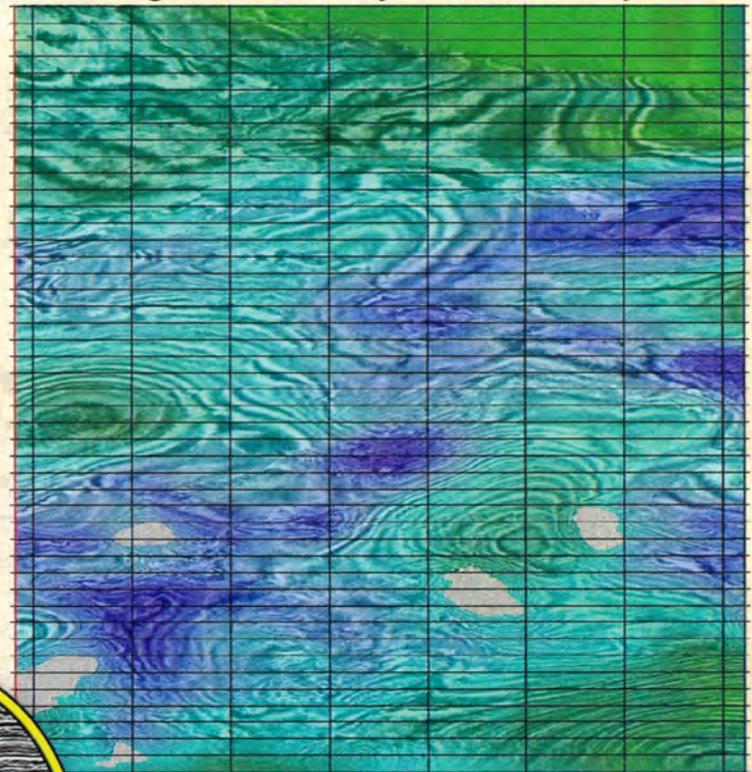
Areas 1-5, 7 complete.

**E. CAMERON Area North-South PSDM
With Migration Velocity Overlay**



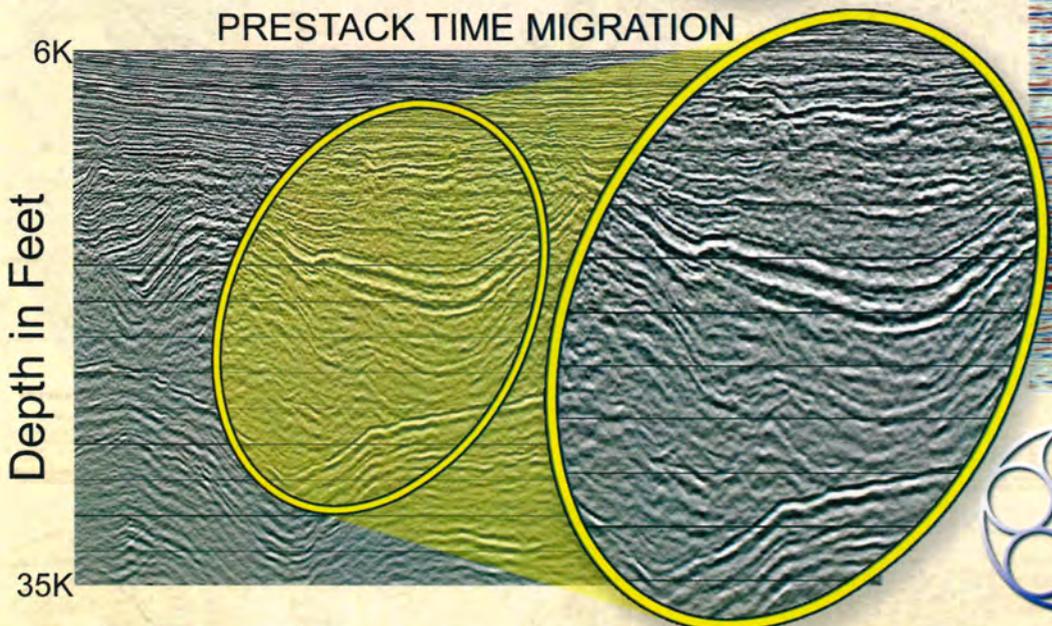
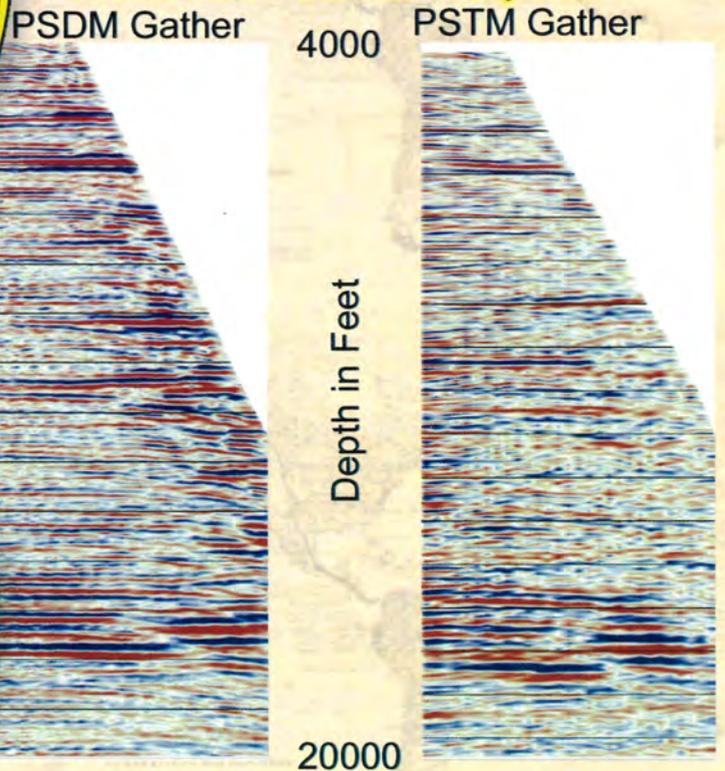
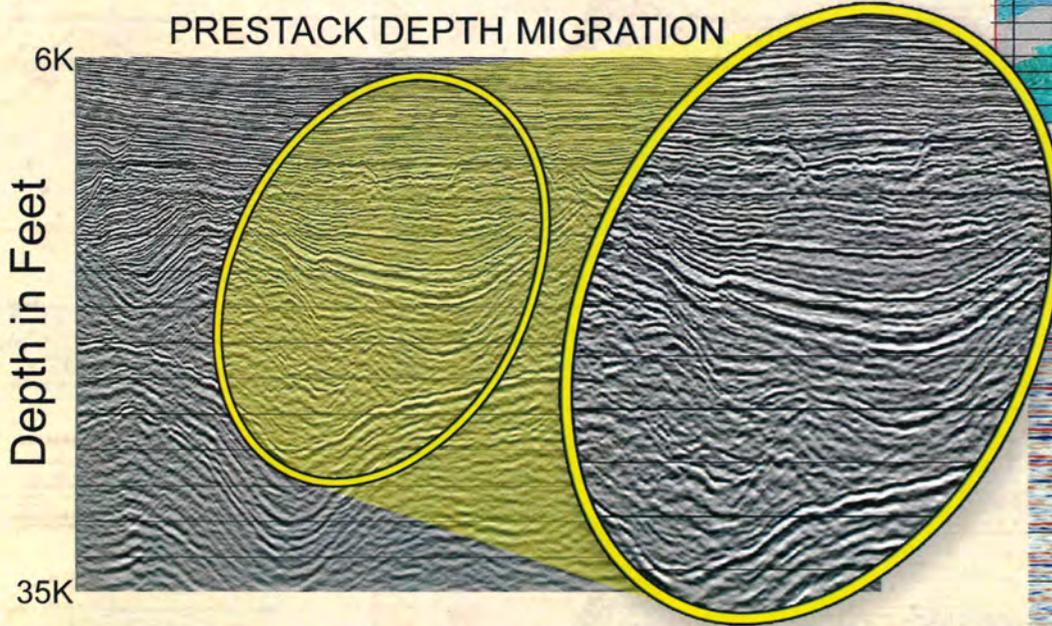
3D Depth Migration Velocity Analysis
Providing Great Detail Models

PSDM depth slice @ 11000' with
migration velocity model overlay

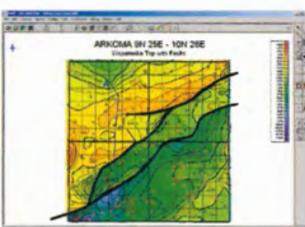
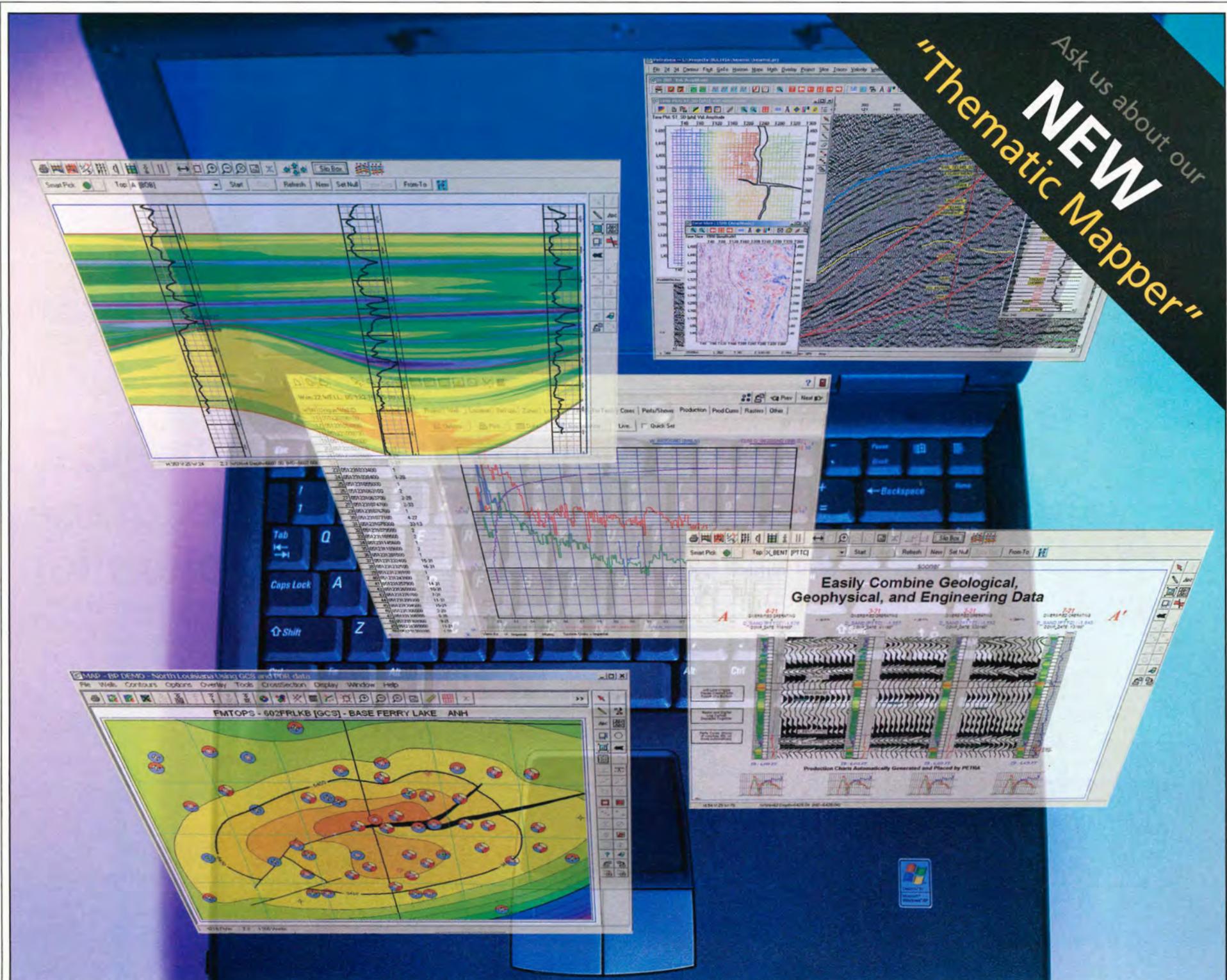


Approximately 135 blocks of data

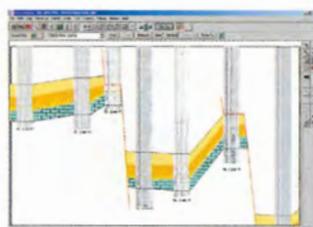
Velocity & Ray Path Solution
Shows New Potential Prospects



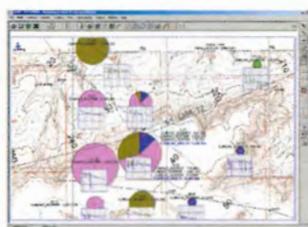
Houston Denver www.fairfield.com (800) 231-9809 (281) 275-7500 dataprocessing@fairfield.com



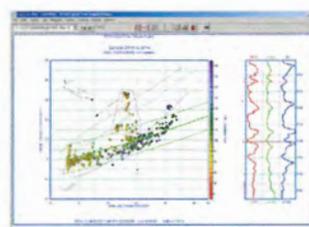
CONTOURING
Faulted contours
Isopachs
Volumetrics
Grid operations
New flexing options



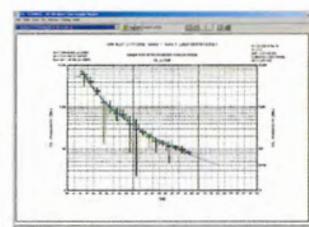
CROSS SECTIONS
Digital and/or Raster
Geocolumn shading
Multiple rasters/well
Stratigraphic/Structural
Shade between crossover
Dipmeter data



MAPPING OPTIONS
Bubble maps
Production charts
Log curves
Posted data
Highlighted Symbols



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



DECLINE CURVES
Compute EUR, RR, etc.
Hyperbolic or exp.
Rate/Time or Cum P/Z
User defined Econ. Limit
User defined Extrap. Time

PETRA® delivers the industry's only easy-to-use and affordable integrated solution for today's workflows. It provides multi-user access to large projects through geological, petrophysical and engineering analysis tools. The PetraSeis™ option extends PETRA® into 2D/3D seismic interpretation with practical tools such as RasterSeis™. [Download a trial version at www.geoplus.com](http://www.geoplus.com), or call us at 888-738-7265 (in Houston, call 713-862-9449) for more product information.



THERE IS A DIFFERENCE

PETRA®



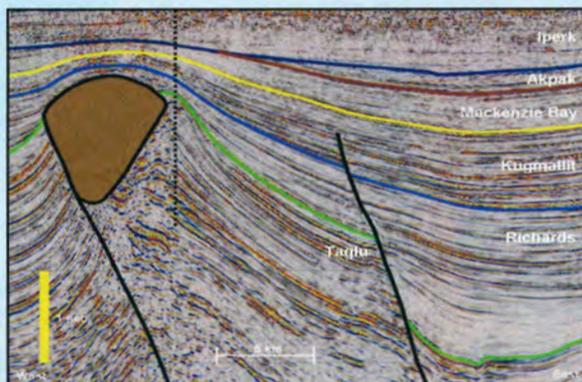
Mackenzie Delta

from page 12

during the winter of 2005-06. While the offshore well is still two years distant, timelines in the North are protracted due to logistics and regulatory approvals (including environmental and aboriginal).

Devon exploration geologist Chris Bergquist describes a huge stratigraphic structure that his company has identified with its newly-acquired, 1,800 square kilometer 3-D marine seismic program – the structure boasts impressive AVO anomalies in Tertiary age sediments that ring a shale diapir structure.

This diapir flank play is located updip from a structure that Bergquist describes as “a pimple on the side of a huge feature.”



The “pimple” was tested by the Minuk I-53 well, which flowed a combined 27.4 MMcf/d from two zones in the Oligocene age Kugmallit Formation and 26 MMcf/d from a conglomeratic zone in the Eocene age Taglu Formation. Bergquist’s previous interpretation of this structure – based on

A huge stratigraphic structure identified by 3-D seismic showed AVO anomalies in Tertiary age sediments ringing a shale diapir structure, located updip from a structure that was called “a pimple on the side of a huge feature” – an important step toward determining drilling locations.

a 2-D seismic grid – was that of a tightly folded anticline.

According to Peter Graham (also with Devon) and Bergquist, historical success rates of Cretaceous plays onshore are about 5 percent. Onshore and offshore, Tertiary age plays have averaged a

whopping 50 percent in historical success rates.

Devon’s onshore wells in the Mackenzie Delta average about \$C 20 to 25 million to drill. The company’s proposed offshore well, however, could cost as much as \$C 65 million.

“Without a pipeline, it’s difficult to justify putting a lot of money into something that’s going to sit there for 30 years, as some discoveries have,” Bergquist said. “But we believe that we see the light at the end of the tunnel.”

Several hurdles must be cleared, however, before Canada’s Arctic gas reaches southern markets. These include:

- ✓ Regulatory approvals.
- ✓ Securing shipping commitments from producers.
- ✓ Resolution of a lawsuit filed by the Deh Cho First Nation, an aboriginal group residing in the southern Northwest Territories. □

Arctic Venture...

We're up for the challenge...are you?

- Extensive marine experience in the Arctic
- Solid streamer and dual source technologies
- Shallow-water towing capabilities
- Canadian-built ice-class hull

BEAUFORT SEA

ALASKA

Calgary +1 403 509 4666 Houston +1 713 689 1000

www.westerngeco.com A Schlumberger / Baker Hughes company

Seismic for the life of your field

Exploration Appraisal Development Production IDR Rejuvenation



Initiatives Encourage Exploration

Canadian government initiatives have proved pivotal in kick-starting renewed oil and gas exploration in the country’s northern areas – specifically the Mackenzie Delta and the adjacent Beaufort Sea.

The evolution of exploration thinking has been led by research scientists at the Geological Survey of Canada (GSC).

The GSC, a division of Natural Resources Canada, has taken a lead role in the federal government’s Northern Resource Development Program. To support the consortium of up to nine oil and gas companies, the GSC has assembled a team of 20 people, including 13 research scientists, for a five-year study of the hydrocarbon resources of the BMB.

The GSC has leveraged on its in-house wealth of experience – the Calgary-based scientists have, on average, 15 to 20 years of experience in the north. The GSC team also includes seasoned veterans with more than 30 years of northern experience.

The consortium has access to cores and drilling samples for northern wells that are housed at the GSC facility in Calgary. In addition, the facility boasts the only organic geochemistry and petrology lab in Canada.

Issler’s group is using the base of the permafrost as a zero datum for its thermal modeling. However, the permafrost varies by up to 800 meters across the BMB.

Resistivity logs can be used to determine permafrost thickness. The GSC is trying to predict the top of the overpressure zone in the basin. According to Issler, the top of the overpressure varies by up to three kilometers over the basin, causing potential drilling problems and reservoir quality issues.

He has documented cases of secondary overpressure where fluids have been discharged from deeper sediments and have moved upwards, charging overlying sediments.

Larry Lane, a structural geologist with the GSC, is creating a digital, GIS-based database for the BMB that incorporates his field work and seismic data interpretations dating back to the early 1980s. He’s archiving his mosquito-encrusted field notes gathered 20 years ago, and he’s indexing fossil localities described by GSC emeritus geologists that date back to the 1950s.

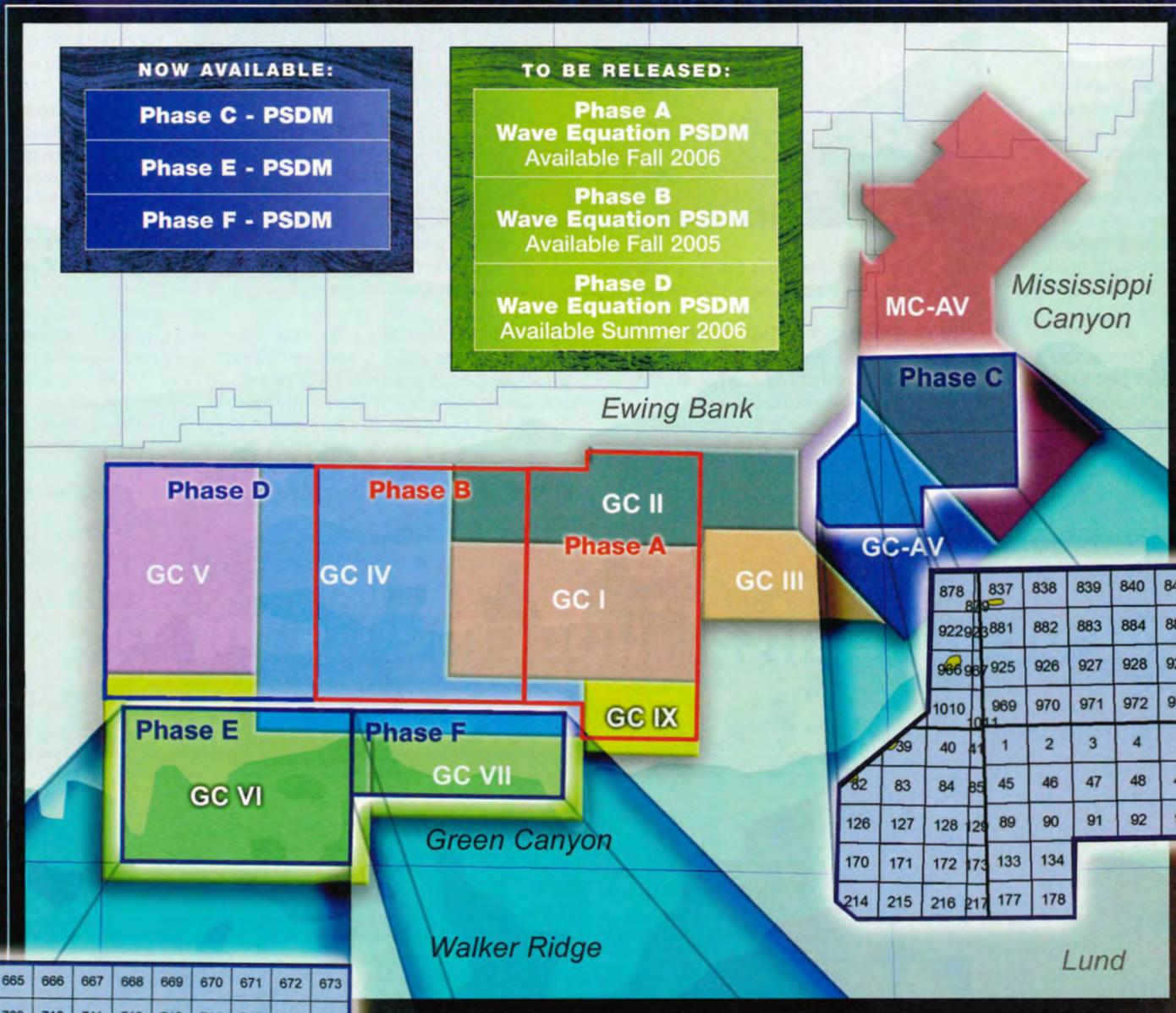
Lane described how his horizons have been broadened by working with industry.

“Because they’re new to the basin, they ask very fundamental questions,” Lane said, “and that forces you to continually reassess your basic assumptions.”

– SUSAN EATON

Fresh from the Gulf

GULF OF MEXICO

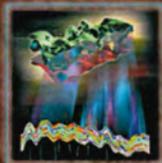


| | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 662 | 663 | 664 | 665 | 666 | 667 | 668 | 669 | 670 | 671 | 672 | 673 |
| 706 | 707 | 708 | 709 | 710 | 711 | 712 | 713 | 714 | 715 | 716 | 717 |
| 750 | 751 | 752 | 753 | 754 | 755 | 756 | 757 | 758 | 759 | 760 | 761 |
| 794 | 795 | 796 | 797 | 798 | 799 | 800 | 801 | 802 | 803 | 804 | 805 |
| 838 | 839 | 840 | 841 | 842 | 843 | 844 | 845 | 846 | 847 | 848 | 849 |
| 882 | 883 | 884 | 885 | 886 | 887 | 888 | 889 | 890 | 891 | 892 | 893 |
| 926 | 927 | 928 | 929 | 930 | 931 | 932 | 933 | 934 | 935 | 936 | 937 |
| 970 | 971 | 972 | 973 | 974 | 975 | 976 | 977 | 978 | 979 | 980 | 981 |

| | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 674 | 675 | 676 | 677 | 678 | 679 | 680 | 681 | 682 | 683 | 684 |
| 718 | 719 | 720 | 721 | 722 | 723 | 724 | 725 | 726 | 727 | 728 |
| 762 | 763 | 764 | 765 | 766 | 767 | 768 | 769 | 770 | 771 | 772 |
| 806 | 807 | 808 | 809 | 810 | 811 | 812 | 813 | 814 | 815 | 816 |

CONTACT INFORMATION

Charles Bowen (281) 646-2559 EMAIL: cbowen@cgg.com
Richard Fossier (985) 624-3027 EMAIL: rfossier@cgg.com
April Robertson (281) 646-2561 EMAIL: arobertson@cgg.com



www.cgg.com



Fracture 'Groans' Quietly Noisy

Microseismic Detection Emerging

By LOUISE S. DURHAM
EXPLORER Correspondent

It's likely not something you would want to bring up for cocktail party patter, yet it has more far-reaching impact than you might think.

We're talking about all those creaks and groans going on inside the earth, making the downhole world a fairly noisy place.

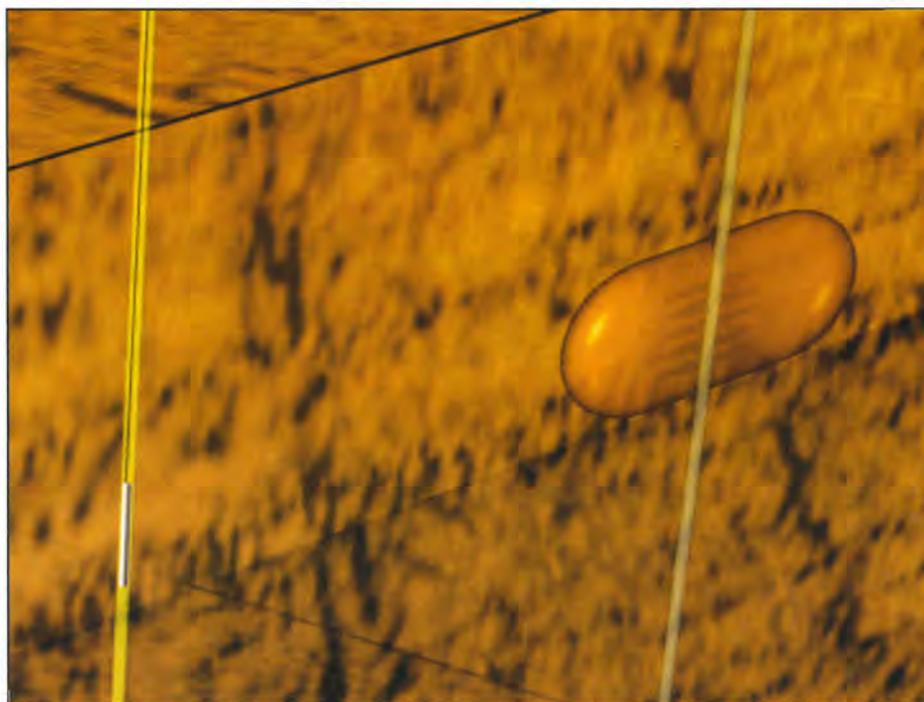
These many noises actually are used as seismic sources in the realm of passive, or sourceless, seismic technology. As such, they have been harnessed for a number of applications, including mine fracture monitoring, geothermal reservoir performance and more.

Passive seismic events also have been used for some time as a sort of fringe application in the E&P industry – with little fanfare for the most part.

One such project, for example, involved an exploratory program in Greece where surface rocks and topography hindered adequate seismic imaging. Instead, buried seismometers were used to monitor small-earthquake activity for almost a year, and a well was drilled based in part on the results obtained.

Although the well was abandoned a few feet above the reservoir because of high pressure, project participants noted the passive data were quite compatible with the well data.

Microseismic events triggered by earthquakes currently are being tested



Photos, graphics courtesy of Schlumberger

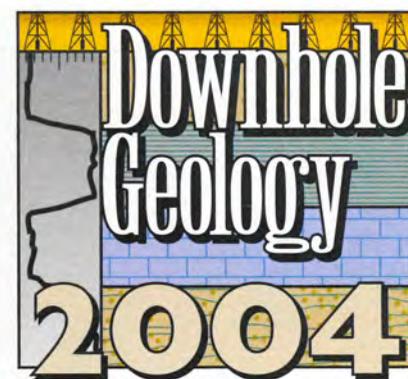
What's shaking: Hydraulic fracture monitoring using microseismic detection, providing data like this, is becoming a tool of choice in the arena of reservoir characterization.

in other E&P projects. But not all applications are earthquake-dependent.

"I neither predict nor study naturally-occurring earthquakes, but I utilize microseismic detection in passive reservoir monitoring and hydraulic fracture monitoring, where it's useful for fracture treatment diagnostics and

optimization," said Mark Puckett, business development manager and principle geophysicist, data and consulting services at Schlumberger.

"In fact, hydraulic fracture monitoring using microseismic detection has shown itself to be a rising new star in the arena of reservoir characterization."



Ahead of the Game

One reason a company elects to record fracture treatment microseismicity is to determine where, in fact, the frac goes.

"The microseismic events occur as the rock breaks," Puckett said, "so we're getting measurements in time of the rock breaking down. This gives a pretty good idea of what the geometry is."

"You can tell geometrically where events are occurring," he noted, "and when you bring it all together, it gives a good picture of reservoir symmetry, coplanarity and medium homogeneity. This enables a more accurate assessment of the treatment methodology being used."

"This knowledge helps optimize treatments for economy and performance," he added, "resulting in a

See **Fractures**, page 18

Are your geochemical judgements too immature?

Import & Merge

Database

Graph

Map

Help

Ratios

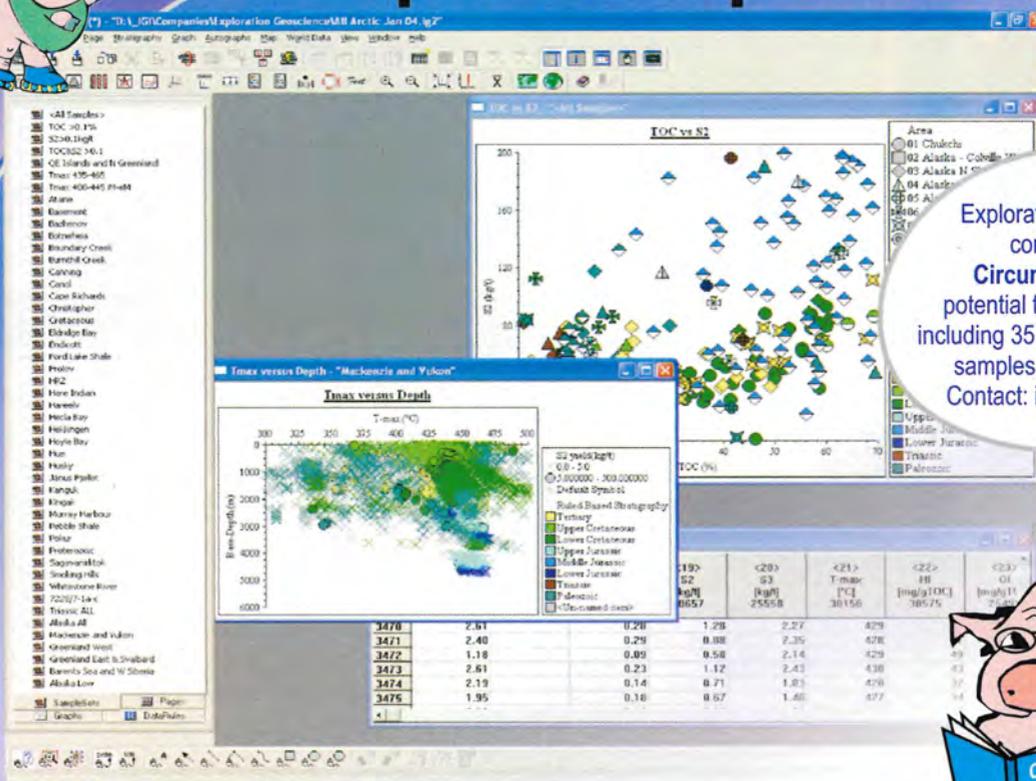
Statistics

See IGI's p:IGI-2

IGI's p:IGI-2 software, already used by companies worldwide, encourages you to database, quality assure and consistently interpret your bulk molecular and isotopic geochemical data, with a huge capacity for innovation.



p:IGI-2 interpretation software



Also:
Exploration Geosciences' comprehensive Circum-Arctic Report potential field to prospectivity including 35,000 Arctic source rock samples in p:IGI-2 format. Contact: info@expgeo.co.uk



Contact Chris Cornford at:

Integrated Geochemical Interpretation Limited
Hallsannery, Bideford, Devon, EX39 5HE. UK
Tel: +44 (0) 1237 471749. Fax: +44 (0) 1237 421700
Email: info@igilt.com. Website: www.igilt.com

Leading the PAK in AVO Interpretation Software



AVOPAK

2d/3dPAK

EarthPAK

VuPAK

SynPAK

TracePAK

ModPAK

Rock Solid Attributes

(RC)² Modeling

SURE Simulation

AVOPAK

- Interpret horizons on gathers and view amplitude response in crossplots
- Integrate the display and interpretation of AVO gathers into a conventional stacked data workflow
- Crossplot AVO attributes for dynamic display on seismic sections and maps
- Integrate horizon interpretation on stacked data and on AVO gathers
- Correlate logs, synthetics, and stacked data with AVO gathers
- Extract and display commonly used AVO attributes
- Load gathers into current project through an enhanced DataModel
- Visit our website for more information about AVOPAK
- Now available!

**CALL FOR AN
EVALUATION OF
AVOPAK!**



Seismic Micro-Technology, Inc.
www.seismicmicro.com
Houston +1 713 464 6188
Europe +44 20 8240 6524

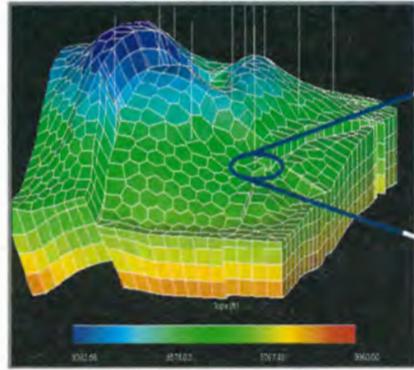
Fractures

from page 16

more profitable operation for the operator."

To observe and measure microseismic events during a hydraulic fracture application requires an observation well, which is instrumented with either a permanent or retrievable array of triaxial geophones no less than 400 feet long. Orientation of the phones is determined by recording the perforation of the treatment well, or by discharging an impulsive source in the treatment well prior to the hydraulic fracture operation.

Surface equipment is set up for continuous monitoring and recording, even though systems only record the



Single-well flow model of a fracture treatment using the reservoir-modeling program, which proponents say can lead to cost savings and production gains.

buffered data when an event is detected. The data are processed on site and results transmitted to the system associated with the fracturing operation. The data are then sent to a processing center for additional processing and event interpretation.

For an example, Puckett cited a project in a sandstone reservoir in West Texas where the fracture program model called for 400,000 gallons of slurry, meaning the fracs would be pricey.

During the effort, the operator learned about the microseismic technique as a fracturing diagnostics tool and recorded the microseismicity on the next well.

"The microseismic data showed maximum fracture half-length (only one side of the well is modeled in frac design) was achieved with only 270,000 gallons of slurry, reducing treatment costs by 35 percent," Puckett said. "The data also showed the achieved half-length to be 20 percent longer than predicted by the model."

"To reduce treatment cost, it's common practice to reduce the amount of proppant in the slurry and still maintain wing-length (actual length of the frac on a given side of the wellbore)," Puckett noted, "but this can negatively impact production performance. The microseismic data let the operator reduce costs without sacrificing proppant or wing-length."

Reservoir Management

Where hydraulic fracturing is required to achieve well flow, hydraulic fracture monitoring using microseismic detection can be a highly effective tool in reservoir management, answering an array of concerns, including:

- ✓ How efficiently a reservoir is being drained.
- ✓ The volume of hydrocarbons left behind.
- ✓ If field rules should be changed to reduce well spacing.

Wells subjected to frac treatment typically have low matrix permeability, limiting their drainage area. Also, they suffer from an asymmetric drainage pattern because hydraulic fracturing has a preferred azimuth. The geometry of the treated zone is sensitive to rock heterogeneities, including reservoir stress changes as a result of structure, stratigraphy and fluid replacement.

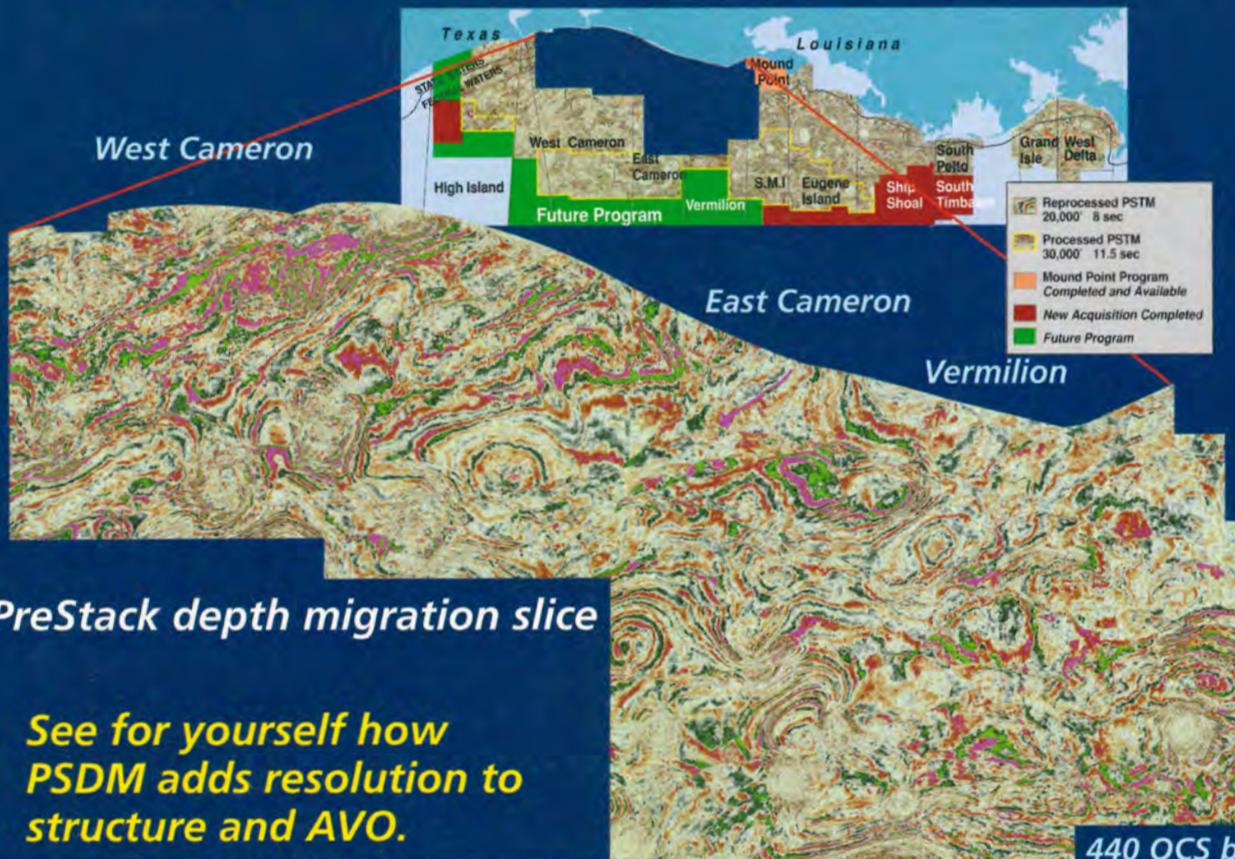
"We had a case where a central Texas operator was drilling a naturally fractured reservoir using hydraulic fracturing with a modeled half-length of 300 meters," Puckett said. "Initial production rates were good, but he noticed about a third of the wells watered out sooner than expected. To understand the impact of the natural fractures, the operator used microseismic measurements to map the standard hydraulic treatment on a well."

Instead of a symmetrical linear frac of 600 meters, the treatment interacted with the natural fractures to produce three linear elements: one along the expected azimuth and the other two parallel to the central element, offset by 300 to 400 feet on either side of the well. Total wing length was approximately 600 meters as predicted, but its geometry was completely unexpected, according to Puckett.

"Using this pattern as a template for updating the well pattern, it was discovered that watered-out wells were victims of new frac treatments 'walking' on existing treated areas," he noted.

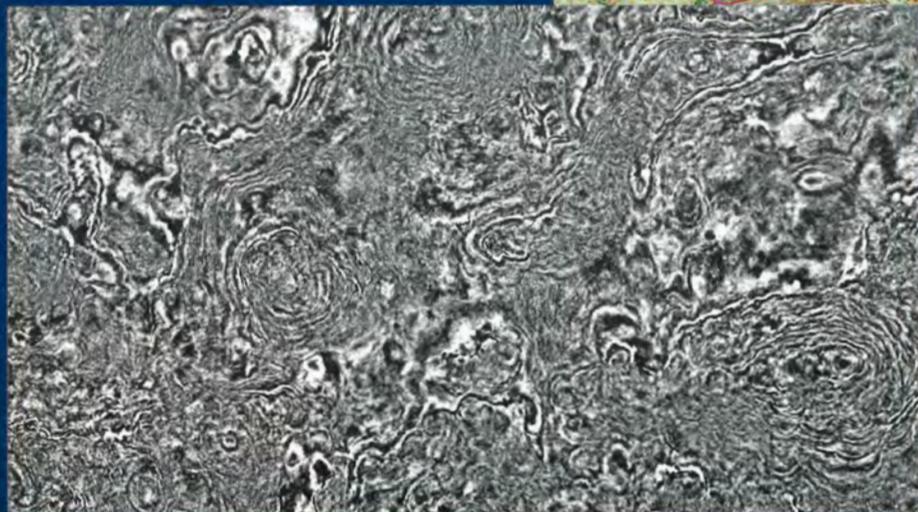
"Wells drilled on the new pattern have not watered out, resulting in significant production revenues." □

**Still think depth is only for salt?
Then, you haven't seen
Fairfield's PSDM data yet.**



PreStack depth migration slice

**See for yourself how
PSDM adds resolution to
structure and AVO.**



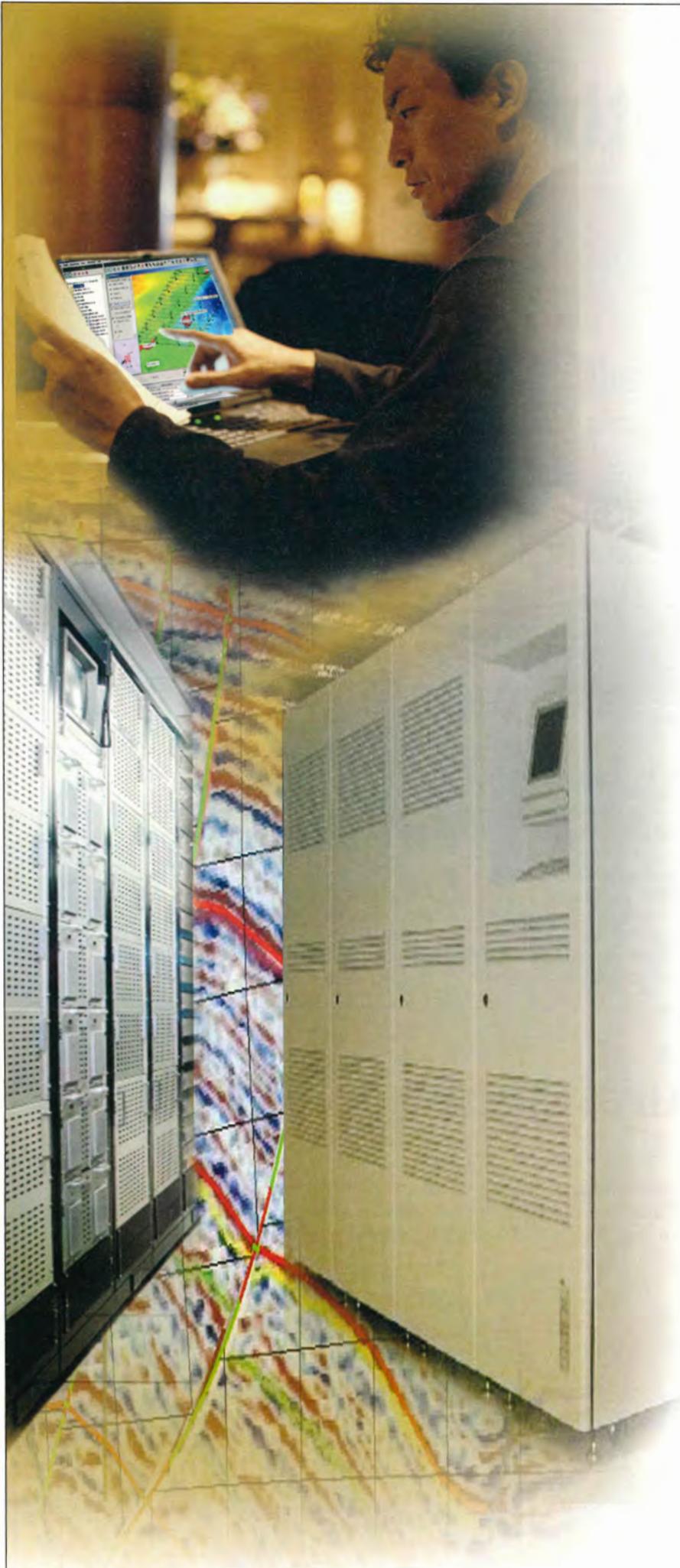
Depth slice closeup 25,000'

440 OCS blocks available now

**Give us a call
Houston
281/275-7500
New Orleans
504/525-6400**

FAIRFIELD
INDUSTRIES
www.fairfield.com

Proud to be
an American
company



Easy and Secure Information Access?

TOGETHER WE CAN.

Working with Landmark, you have access to the broadest and most reliable choice for E&P **information management**. From prospect generation to production operations, Landmark provides open technology and flexible services to support your information management needs. Together, we can implement secure, customized solutions for easy and rapid access to your information assets, across your entire enterprise.

Take the first step toward better information management. Contact us at innovations@lgc.com.

PROSPECT GENERATION

FIELD DEVELOPMENT

DRILLING & COMPLETIONS

PRODUCTION OPERATIONS

Landmark 
A Halliburton Company

www.lgc.com

**INNOVATING TO OPTIMIZE
YOUR PERFORMANCE.**

About 1,800 Attend

Cancun Was a Meeting of 'Firsts'

By VERN STEFANIC
EXPLORER Managing Editor

A scientific meeting set in a beautiful and culturally rich location established a number of "firsts" for AAPG and proved to be a "great success" in an unexpected way – the strength of its technical program.

A larger-than-expected number of nearly 1,800 people – including more than 800 onsite registrants – attended the recent AAPG International Conference and Exhibition in Cancun, Mexico, hosted by the Asociación Mexicana de Geólogos Petroleros (AMGP). The attendance was the third-highest of the 14 AAPG international conferences, behind Rio in 1998 and Bali in 2000. Officials were all smiles when it came to describing the event.

"The Cancun conference was a great success," said Nahum Schneidermann, the meeting's technical co-chair with Javier J. Meneses. "It truly exceeded by a lot my expectations of the number of participants."

His thoughts were echoed by conference chairman Alfredo Guzmán, who also noted the location's appeal in terms of Mexico's current move toward opening areas to outside exploration.

"Luis Ramirez Corzo, the meeting's honorary chair and CEO of Pemex E&P, was not able to make the conference in part because he was in the process of being named general director (chairman) of all of Petroleos Mexicanos, the parent company of Pemex," Guzmán observed. "This sends the signal to the international community that Mexico is going to try to



Opening session addresses by Alfredo Guzmán, upper center, and Pat Gratton, upper right, kicked off three days of activities in Cancun.

continue with its opening process."

It all added up to consistently large crowds at the Cancun Convention Center throughout the entire conference, which in turn added to the event's excitement factor.

"I was concerned briefly by the possible reduction of people in the sessions due to the beautiful beaches," Schneidermann said, "but due to the very strong and timely technical program and

exhibits we had standing room only in many sessions.

"The technical program was focused, yet it did provide specialists with specific sessions of interest," he added. "The focus on the various aspects of deepwater exploration, development and production was very timely, and of major interest to the industry.

"In addition, the hope for some kind of possible opening of new opportunities in

Mexico enhanced the active participation of majors, as seen in the Management Forum participation (see related story, page 32)."

Not only was the large exhibits hall area completely sold out, the exhibits spilled over into a second area adjacent to the poster sessions, making for extremely heavy traffic and participation for all elements of the meeting.

"The compact structure (of the Cancun Convention Center) allowed rapid movement of participants between various activities," Schneidermann said. "I felt that the participants were energized, interested and actively participating."

The conference started with an opening session that featured remarks from several dignitaries, awards for 14 awardees of the AMGP (the meeting's host society) and a brief presentation by AAPG President Patrick J.F. Gratton on the importance of the international world in AAPG activities.

The meeting also marked:

✓ The first time an AAPG conference was held in Mexico.

✓ The first time there was a special exhibitor-sponsored luncheon served in the exhibits hall (a big success).

✓ The first time specific "wireless hotspots" were established, allowing all participants free access to the Internet.

✓ The first time the International Pavilion Theatre was held at an international conference.

✓ The first time there were two ticketed luncheon events geared around special speakers at one meeting – including one See **Cancun**, page 33

Midland Valley

The structural geology experts

At Midland Valley we pride ourselves on having some of the best minds in structural geology in the industry today. Our team, with a combined experience of over 220 man years are the consultants to turn to if you have geological structure questions in any region of the world.

We can help you with...

Structural Modeling:

- Test geological concepts
- Produce structurally valid models
- Establish regional structural framework
- Reveal paleo-structure & geological evolution
- Faults and fractures

Basin Modeling:

- 3D structural model to feed basin modeling
- Burial history
- Palinspastic reconstruction
- Pinpoint salt weld timing
- Charge timing
- Fault movement

Reservoir distribution models:

- Define reservoir presence/quality uncertainty
- Prospect ranking
- Fault seal risk
- Trap geometry definition & timing

Peer Review and Quality Control

- Concept generation
- Context and Opportunity



- - Current hot spots
- ▲ - Where we have done projects
- - Where you will find people using our software
- x - Our consultants' professional experience

For more details on our consulting and services, contact help@mve.com

The structural geology experts
www.mve.com



FRONTIER BASINS of the North Atlantic

East Coast U.S.A. - An Opening Margin?

A report entitled:
**Frontier Basins of the North Atlantic
including 15 000 km
of reprocessed seismic data**

**A REGIONAL PETROLEUM PROSPECTIVITY STUDY
OF THE CAROLINA TROUGH, BALTIMORE CANYON,
GEORGES BANK AND SCOTIAN SHELF.**

KEY OBJECTIVES

- Provides a consistent regional stratigraphic framework
- Establishes a new regional lithostratigraphic and biostratigraphic framework based on Scotian Shelf nomenclature
- Well to seismic correlation using new sequence-stratigraphic framework
- Basin modelling and source rock maturity prediction
- Mapping of reservoir and source rock horizons
- Drainage network analysis, sediment supply and reservoir prediction
- Identification of trap structures, timing and charging
- Play fairway analysis
- Evaluation of drilling failure and success

DATABASE

- A data rich study drawing on over 30 wells, recently reprocessed seismic data and aeromagnetic and gravity data, drawing on analogues from N.W. Africa for petroleum systems analysis
- Hard copy, Adobe Acrobat and map available in GIS Archive maps

For further information please contact:

Fugro Robertson Limited
Llandudno
North Wales LL30 1SA
United Kingdom

Telephone: +44 (0)1492 581811
Facsimile: +44 (0)1492 580084
E-mail: info@fugro-robertson.com
Website: www.fugro-robertson.com

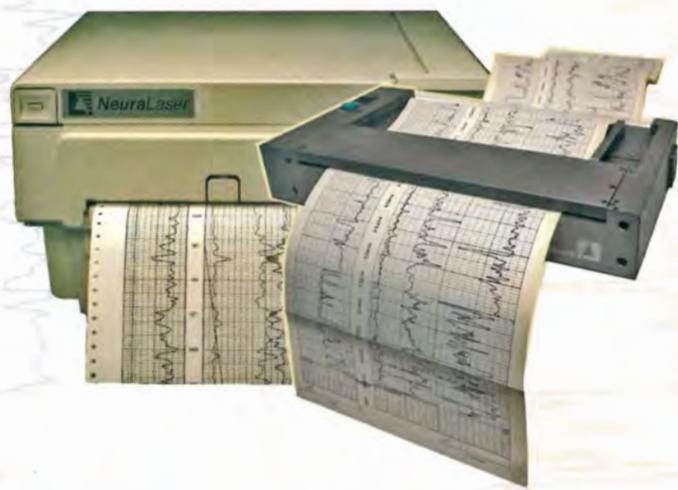


PRM 785.01

How long does it
take to get
YOUR logs?



Don't wait for your data
High speed log printing puts
critical data in your hands



NeuraLaser Log Printer

- 4"/second printing
- B&W permanent laser prints
- Full or half scale logs - raster or LAS
- Includes NeuraView & proprietary drivers
- Select printing area or entire log
- USB or ethernet for your PC or network
- Lowest operating costs available
- Add NeuraScanner for modern log copying

For a quote and other information
call 1-281-240-2525
or visit www.neuralog.com



Neuralog, Inc.

NeuraLaser NeuraScanner

NeuraLog+ NeuraMap NeuraSection+ NeuraPRO



Photo courtesy of U.S. Geological Survey

Scientists, laymen and tourists have a lot in common – compelling curiosity – when volcanoes threaten. Mount St. Helens, as seen on Oct. 3.

Volcanoes: Star Of the Earth Show

*Crowds Gather at Mount St. Helens;
Waiting For a Wreck to Occur?*

By BARRY FRIEDMAN
EXPLORER Correspondent

Some had camped out, sitting in lawn chairs, drinking coffee, talking to friends; some with binoculars around their necks grilled hamburgers and franks, while others sold t-shirts and took pictures of friends and families.

If you didn't know better, you would have thought it was a tailgate party – but these people weren't in the parking lot at Kyle Field or Boone Pickens Stadium. They were preparing for the geological equivalent of another *Star Wars* sequel: the eruption of Mount St. Helens.

But the movie's release has been delayed.

One of nature's great ironies is that volcanoes – unlike its black sheep brethren, the tornado and hurricane – attract rather than repel people to its pending wrath. In fact, while people desperately try to flee a tropical storm, they'll make hotel reservations near an erupting volcano.

Further, after the show is over, nobody comes to see the ravages of Hurricane Ivan or Jeanne; by contrast, 1.5 million tourists have visited Mount St. Helens since May 18, 1980. As one resident who had lived through that blast and was waiting for this one said, "(Last time) the mountain came to us. This time, we came to the mountain."

The thought was that by the time this article came out, Mount St. Helens would have already erupted and etched a new memory into the surrounding landscape. There was the fear of people being trapped, planes being grounded due to ash and another made-for-television movie being filmed with another mythical figure with a name like Harry Truman.

None of that has happened; in fact, the most notable effect so far of last month's activity is that October 27's lunar eclipse appeared brighter and more copper because of all the steam the mountain let off.

Lava Growth Continues

Presently, according to the U.S. Geological Survey, growth of new lava

inside the crater of Mount St. Helens continues, and as long as it does, major changes in activity, including eruptions, can occur with little warning.

While seismic levels remain at a low level compared to the levels of late September-early October, the activity at deadline was still producing a slow rise of magma. However, the relatively low rates suggest that the lava reaching the surface is gas poor, thereby reducing the probability of highly explosive eruptions in the near term.

Until waves of molten lava start racing down the mountain, geologists will have a chance to smoke 'em if they got 'em, review their notes and put the past few months in perspective.

According to the USGS, when Mount St. Helens erupted in May 1980:

- ✓ It lost 1,300 feet in elevation within 20 seconds, destroying the Toutle River valley (burying the North Fork in debris as much as 600 feet).

- ✓ Twenty-four megatons of thermal energy were released and four billion board-feet of timber were blown down (or enough for 300,000 homes).

- ✓ The landslide created was the largest on earth in history, triggering powerful explosions of 300 miles per hour.

- ✓ Over the course of the day, prevailing winds blew 520 million tons of ash eastward across the United States and caused complete darkness in Spokane, Wash., 250 miles from the volcano.

Of the four lakes in the blast zone (Spirit, St. Helens, Fawn and Venus), Spirit was the most affected. While other lakes received varying amount of pyroclastic material, Spirit's surface area increased from 1,300 acres to a little over 2,200 acres. Considering as well the iron, calcium, sodium, potassium and magnesium increase and the alkalinity of the water, the USGS concluded that Spirit Lake "was affected to the extent that it must now be considered a completely different lake. It has increased in area, decreased in depth and risen 240 feet in altitude as a result of the eruption. The

See **Volcano**, page 42



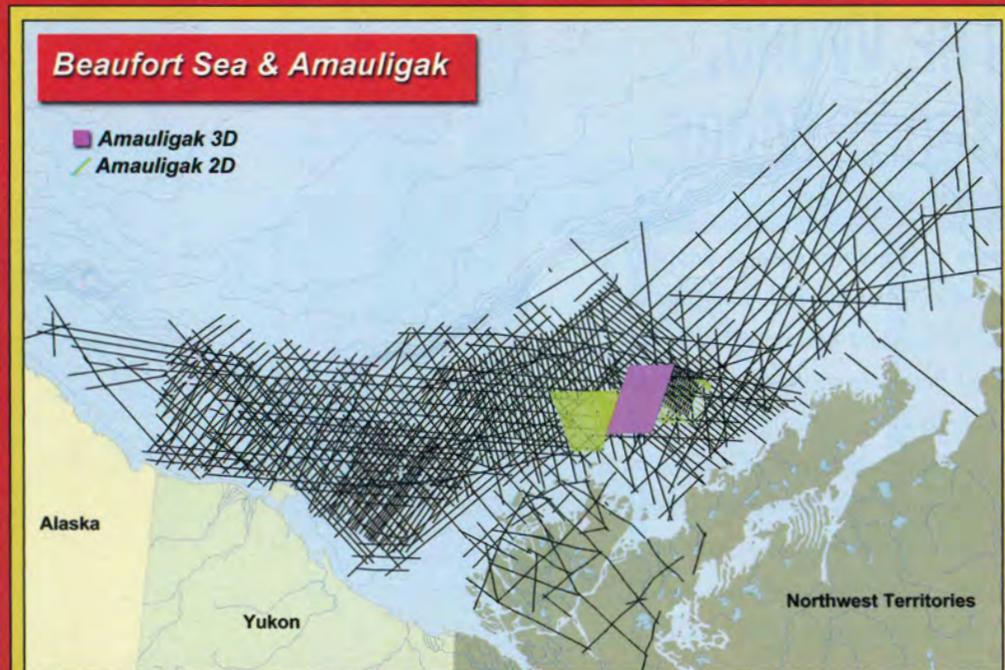
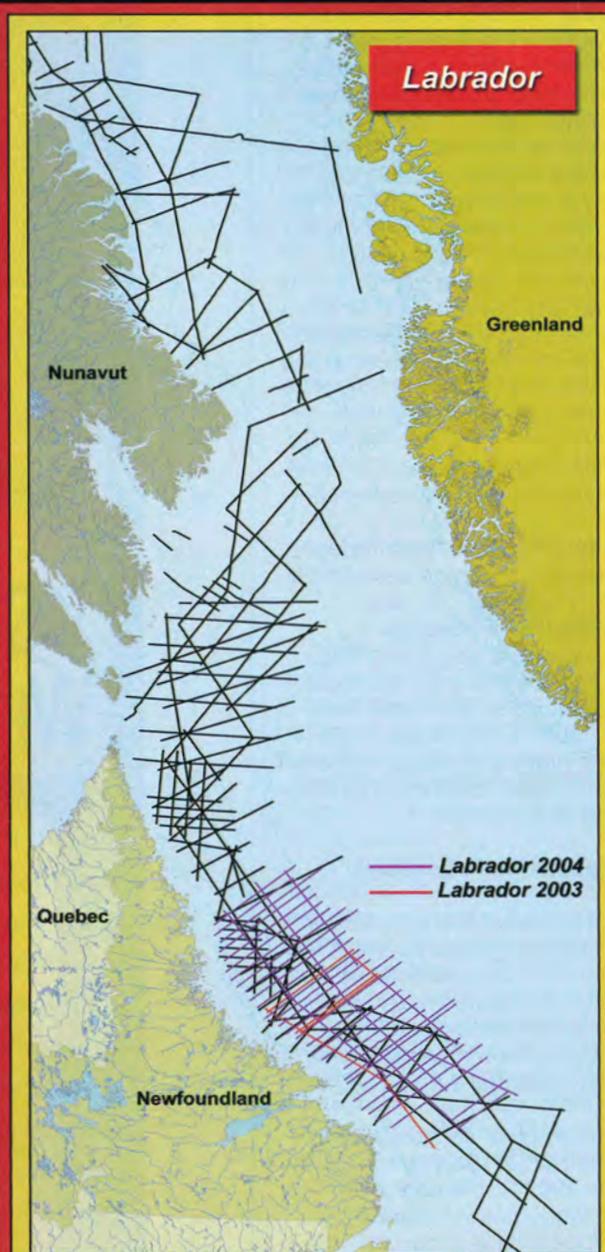
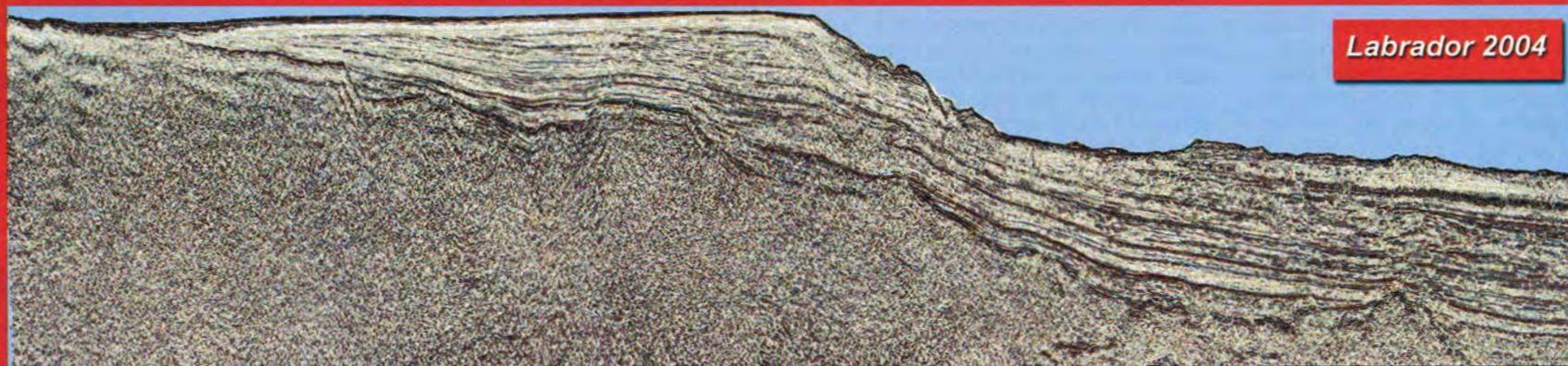
Geophysical Service Incorporated

Speculative Database Land & Marine

Seismic Recording and Source Equipment Leasing

Marine 2D and 3D Data Acquisition

Marine and Land Data Processing



Geophysical Service Incorporated develops speculative data projects and currently owns and markets speculative data onshore and offshore Canada. Current data inventory exceeds 300,000 km, including several international locations (Mediterranean, Argentina & Falklands). GSI conducts marine speculative programs working with exploration companies to stretch their budgets and lower costs.



CALGARY, AB T2P 0L6 400, 400 - 5 Avenue SW Phone: (403) 215-2720 Fax: (403) 215-2724
HOUSTON, TX 77042 10850 Richmond, Ste. 165 Phone: (713) 782-3035 Fax: (713) 782-0257

WWW.GEOPHYSICALSERVICE.COM

*The Tale of the 'Winner's Curse'***Bidding Science Saved \$\$**

Ed Capen, AAPG member and co-author of the paper that coined the term "winner's curse," remembers well the birth of Atlantic Refining Co.'s interest in bidding science.

It was in the early 1960s. In the Philadelphia and Dallas offices of Atlantic Refining there was dread spreading. They had got just what they wanted – they thought.

Atlantic, which had been active in the Gulf of Mexico since the mid-1950s, bought virtually everything it had bid on at a Gulf lease sale. But their bidding "success" put the company in a budgetary bind for a couple of years. They had overbid.

"Management did not want to repeat that experience," Capen recalled, "and asked R&D to see if there were some operations research-type solution available."

The task fell to R&D's Bill Campbell, who was applying management science methodology to exploration decisions. Lawrence Friedman had recently got the first doctorate in Operations Research using bidding as his topic. Campbell used this work as his starting place.

Another Gulf lease sale came along soon – giving R&D a chance to apply Friedman's theories.

Friedman's work turned out to be in error, but it did suggest bidding less than one's value estimate.

"In our case the rest of the company was also working on the problem in ignorance of other similar efforts," Capen said. "Everyone knew that we had to reduce our bids. The geologists lowered their estimates of success ratio. Geophysicists decreased the size of the targets. I don't remember, but the bookkeepers may have raised the discount rate. And, of course, Campbell had already hedged by 30 percent or so.

"By the time everyone was through subtracting value, our bids were so low we didn't buy anything," he said.

After correcting the error in Friedman's work, Campbell and Bob Clapp, an MIT Sloan School graduate who joined Campbell about that time, designed a 20,000-trial Monte Carlo model of the bidding process. It worked. R&D began to "sell" its bidding strategy to operating management.

Reasonable Projections

Capen had joined Atlantic's R&D in 1957 as a research geophysicist. A few years after his arrival at Atlantic he sensed that the repeated trials and high uncertainty so characteristic of petroleum exploration made statistics an under-appreciated but very powerful tool.

Capen returned to school (Southern Methodist University) part time to study statistics. In 1965 Capen took over Campbell's work, and with Clapp continued the bidding effort.

To basically describe Arco's bid strategy, a value is placed on a lease based on the promise of the geology. Companies should then bid about 30 percent of their value estimate (depending on competition and uncertainty). Bids are then handed to the government on sale day. On a given tract, some company value estimates will be too high and others too low. The winner will tend to be the one who estimated too high. Bidding only 30 percent of value protects a company that

Virtually every company placing the bids was aware of the pitfalls – the industry's OCS rate of return was miserable.

wins because of an inflated value estimate.

Many managers do not like this strategy because the reduced bids also lower the chance of winning.

Emotionalism usually carries the day. Managers would rather buy leases than maximize profit. Often it will be five to 10

years before the results are known so that the guilty, having been promoted and/or transferred, are never punished, Capen said.

In 1967 Capen was transferred to

continued on next page



Capen

PGS GOLD PROGRAM: THE QUEST IS ON

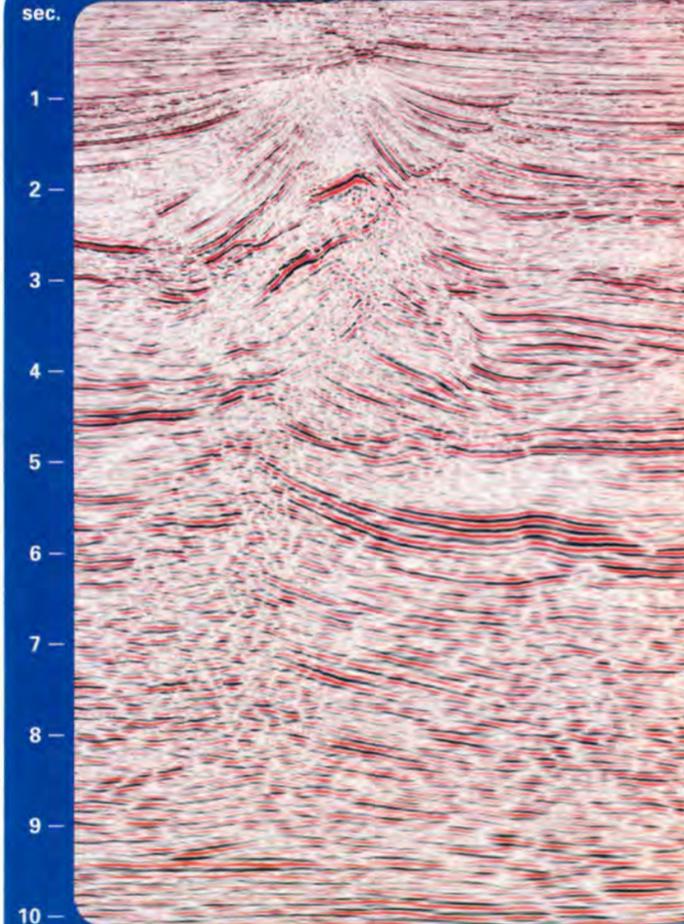


SAY THE WORD, WE'LL SHOOT MORE.

The PGS Gold Program is acquiring data at unprecedented densities and times. As you can see, initial survey results show great promise. And certainly justify the acquisition of additional long offset/long record length HD3D data. This higher quality data uses the most sophisticated processing technology available to give you every possible advantage and more definitive answers. If you are considering deep and ultra-deep prospecting on the shelf, you should join us in this exciting new venture. For more information, log on to www.pgs.com/link/gold, or contact your sales representative.

PGS GEOPHYSICAL

10550 RICHMOND AVENUE • HOUSTON, TX 77042 • TEL: 713-781-4000 • FAX: 713-266-0455



PGS Gold HD3D Parameters

- ▶ HD3D 6.25m x 25m bins
- ▶ 9000+m maximum offsets
- ▶ 14 second records
- ▶ 72 fold
- ▶ True Amplitude 3D PreSTM
- ▶ Coming soon: 3D PreSDM

AAPG-SPE Sets Conference On 'Risk and Uncertainty'

A joint AAPG-SPE meeting on "Delivering E&P Performance in the Face of Risk and Uncertainty: Best Practices and Barriers to Progress," is scheduled Feb. 20-24 in Galveston, Texas.

The meeting is designed to bring together oil and gas exploration and production professionals to discuss how organizational structures, decision processes, estimating procedures, project risk analysis, portfolio management, incentive schemes and ethics can interrelate to

enhance or impede efficient E&P performance and financial results.

The conference, to be held at the San Luis Resort and Conference Center, will provide a relaxed atmosphere to encourage open discussion and interaction among participants.

Steering Committee co-chairs are John Howell and Peter R. Rose, AAPG president-elect.

For further information see the AAPG or SPE Web sites. □

continued from previous page

operations staff with the principal task of implementing the new bidding strategy for all Outer Continental Shelf lease sales. Clapp rejoined Capen a year or so later.

The overbid difficulty was not confined to Atlantic. Virtually every company placing the bids was aware of the pitfalls – the industry's OCS rate of return was miserable.

Atlantic was careful in releasing information about its system. Over time, however, Capen was allowed to give oral presentations and finally a published paper. The lawyers and some in management were reluctant to share the company's strategy. R&D players saw the obvious advantages of telling the whole world. The R&D VP

recognized the ploy as "legalized collusion."

"If everyone lowered their bids to protect from the curse, the entire industry would be better off," he said. "The sellers would suffer a reduction in bonuses. The sellers, however, were doing far better than they should have."

Capen recalled that when he made an oral presentation to an overflow audience at the 1970 SPE annual meeting, "I invited the audience to guess my weight, and then by polling the 600 people I was able to show clearly that some overestimated and more underestimated. The demonstration worked perfectly.

"We used the bidding strategy from 1967 (Atlantic merged with Richfield in 1966) until the merger with BP 30-plus years later precisely to generate bids," he said. "The work is quantitative, not qualitative. Arco management was pretty faithful in using the recommendations made by either Bob Clapp or myself.

"However, it is Campbell who deserves much of the credit because of his original assessment that the big leverage in economic decisions would be in exploration," Capen said. "He was poised to take advantage of that fact when the bidding opportunity came along. I recall just one sale where using our bidding strategy saved the company about \$300 million.

"The only change we made over the next 35 years was a move to numerical integration rather than Monte Carlo," he continued. "I had reduced the problem to an expected value integral for the publication in 1971, but we did not have the computer power for numerical integration. Monte Carlo was easier, and with enough trials (it) worked very well.

"We had decided that the lognormal distribution was the proper one to use in the analyses," Capen said. "We observed it in the bidding, and we knew the Central Limit Theorem would lead to lognormal. We were very comfortable with these assumptions. The proof was that we were able to make reasonable projections of how many leases we would buy and how much we would spend."

To Coin a Phrase

It was in 1971 that Capen, Clapp and Campbell (all began as physicists) authored the paper "Competitive Bidding in High Risk Situations" in the *Journal of Petroleum Technology*. It was that article that the term "winner's curse" first appeared.

The practical approach has been applied to situations beyond the oil industry – including mergers and bidding for baseball players in the free agent market (see *The Winner's Curse* by Richard Thaler, Free Press, 1991).

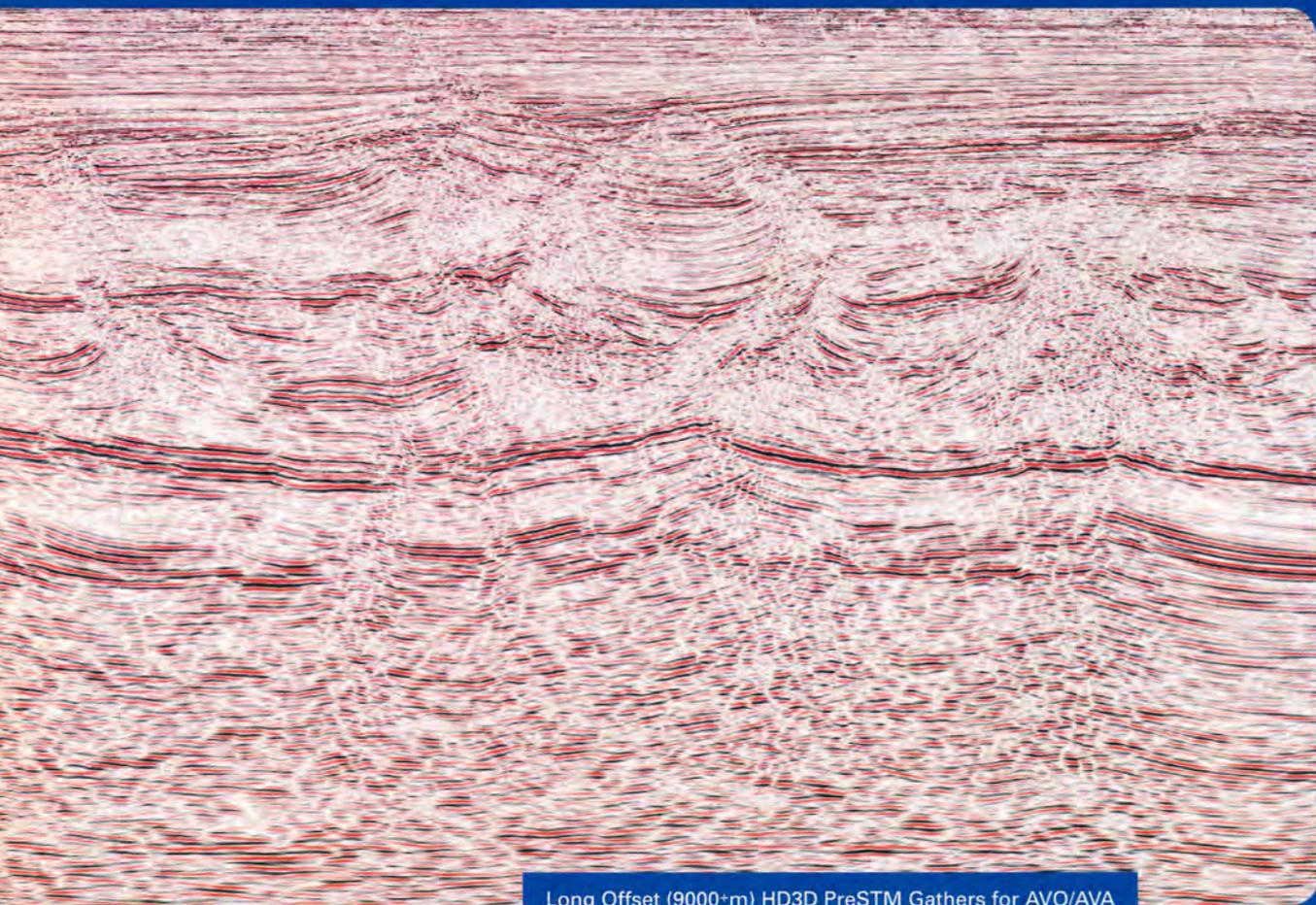
Capen's work has been published widely in SPE literature. AAPG published *The Business of Petroleum Exploration Treatise* publication (1992), where he presented all the statistical formulae involved with estimating prospect reserves.

Also he was part of the team instructing AAPG's "Managing and Assessing Petroleum Risk" education course for 14 years.

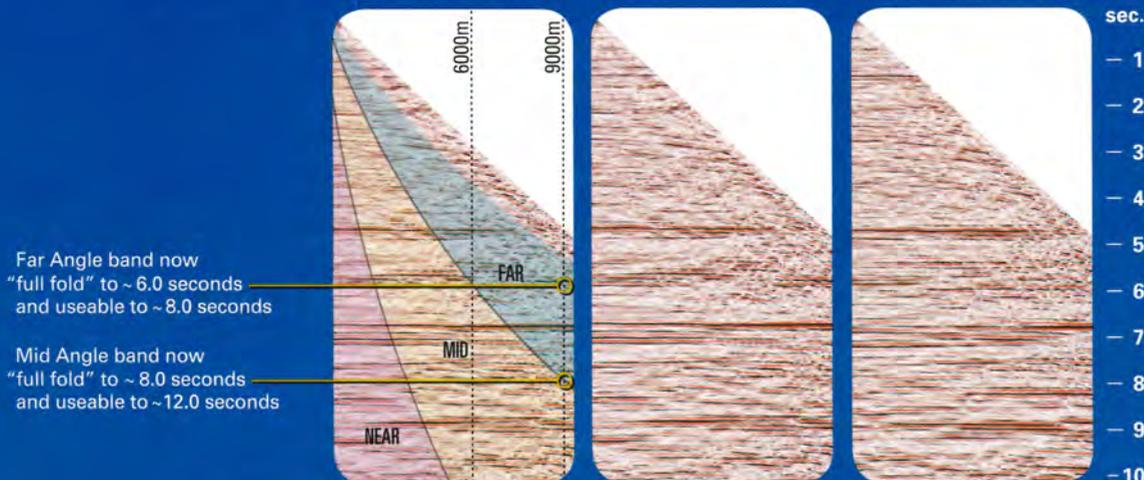
Since retiring in 1992 from his position as Distinguished Management Adviser at Atlantic Richfield, he has been an active consultant.

In 2001, AIME-SPE recognized him with its highest award, Honorary Member – "For Profound and Lasting Contributions in Advancing the Industry's Understanding of Risk Assessment." He is now mostly retired and divides his time between homes in Georgetown, Texas and Durango, Colo. □

High Density 3D (HD3D™) Prestack Time Migration



Long Offset (9000+m) HD3D PreSTM Gathers for AVO/AVA



*Tips on Financing Exploration***The Market Is Hungry For Success**

By LOUISE S. DURHAM
EXPLORER Correspondent

Major exploration efforts are essential to identify badly needed new reserves. Yet the exploration segment of the industry remains somewhat lethargic – for a number of reasons.

The average mid-cap E&P company reported an average success rate of 82 percent for the last three years, according to industry veteran Stuart Burbach, who presented some of his views on exploration during the Perspective 2004 forum at the recent AAPG Property and Prospect Expo (APPEX) in Houston.

This success, however, is attributed in large part to such relatively low-challenge-type projects as infill drilling, shallower completions, step-outs and the like – in other words, non-exploration.

It's a bottom-line thing, according to Burbach, who cautioned the audience not to fall into the "90-day report card" trap, referring to Wall Street's unrealistic demand for specific growth numbers from the E&P companies every three-months.

Other, yet related, issues he cited for stalling exploration efforts include:

- ✓ Fear of loss of investor confidence.

- ✓ Fear of downgrading by analysts.
- ✓ Industry-wide beliefs that acquisitions are better (safer?) targets.
- ✓ Capitalized effects of front-end cost G&G items to company's bottom line.

A Hungry Market

"Right now, it seems the industry has forgotten about making discoveries and is focusing its efforts on anything but exploration," said John Seitz, co-chief executive officer and director of Endeavour International Corp., during his keynote luncheon talk at APPEX.

"The result seems to be a lack of high

quality exploration opportunities, which is what I'm hearing from a lot of people," he said.

Steps that companies might take to remake their exploration efforts include:

- ✓ Rebuild the tried and true methods of their internal capabilities.

- ✓ Build virtual organizations and access a worldwide network of experts (companies often engage experts just retired or laid-off).

- ✓ Outsource all or some exploration, supplementing the portfolio with a variety of prospects from a variety of sources. The market cares about the portfolio and the predictability of investments, not necessarily where they originated.

"Not only is there a market for exploration prospects, there's an even stronger market for discovered fields," Seitz said. "In a newly developed field, you can play along the value chain depending on expertise, data and capital.

"The market is hungry for higher returns to be delivered by exploration success," Seitz said. "Private equity providers and drilling funds are looking at skilled managers to select drilling opportunities, and looking for skilled teams for ready-to-drill prospects. Investors in these are looking for opportunities that provide a greater ROR.

"But you must be realistic with your program," Seitz noted. "If you're realistic, then portfolios will include your projects."

Making It Happen

Seed money and access to data can be formidable obstacles to generating drillable prospects, particularly for small independents/prospect generating teams. Seitz presented a how-to scenario to make things happen:

- ✓ Put together like-minded professionals with the right combination of skills.

- ✓ Invest in computers.
- ✓ Invest in office space, or work from home as a virtual team, communicating and sharing data over a broadband connection.

- ✓ Offer an exclusive arrangement to investors for startup capital.

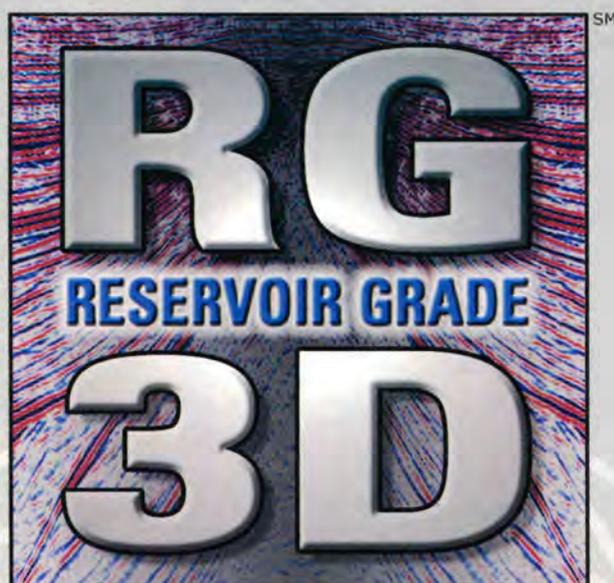
- ✓ Cut a deal with seismic company for data and services.

While the prospect is key to exploratory drilling, even the best prospect is not enough, Seitz cautioned. Non-G&G uncertainties can be formidable and have a dramatic impact on any project. Political risk, commodity prices and project timing all impact project profitability.

Burbach presented a general outline of steps the industry as a whole can take to reverse the trend to drill the easy, known accumulations and go after the more challenging stuff that has the potential to beef-up reserves meaningfully:

- ✓ Set aside a percentage of the budget for exploration, and do not waiver (champion the cause).
- ✓ Be prepared to really take risks (analysts must understand).
- ✓ Keep the staff on the project to completion (give people time).
- ✓ Believe in the process (if it's a play or a concept, stay with it).
- ✓ Legislate for an energy policy that treats front-end cost realistically.
- ✓ Enjoy this wonderful business; no other job is as rewarding or thrilling. □

Introducing Global Geophysical Reservoir Grade Seismic SolutionsSM



AVO and AVA processing, fracture detection, lithology-discrimination techniques, and other advanced processing and interpretation methods all require Reservoir Grade seismic data for optimal results. Our Reservoir Grade 3D p-wave products feature:

- Full aperture recording (full offsets, wide azimuths), ideal for pre-stack analysis
- High trace density, providing improved signal-to-noise ratio
- Smaller natural bin sizes for increased resolution
- Optimum signal bandwidth

Global Geophysical provides Reservoir Grade seismic products for prices that are very competitive with conventional acquisition parameters. Our management, survey designers and field personnel all have proven track records for highly productive seismic operations. Our experienced staff, state-of-the-art equipment and low overhead allow us to provide high quality 3-D seismic data at cost-effective rates.

Global Geophysical's first two field crews will be deployed during Q1 of 2005. Put Global Geophysical on your bid list for your next land or transition-zone seismic project or call us for more information!



RG2D, RG3D and Reservoir Grade are service marks of Global Geophysical Services

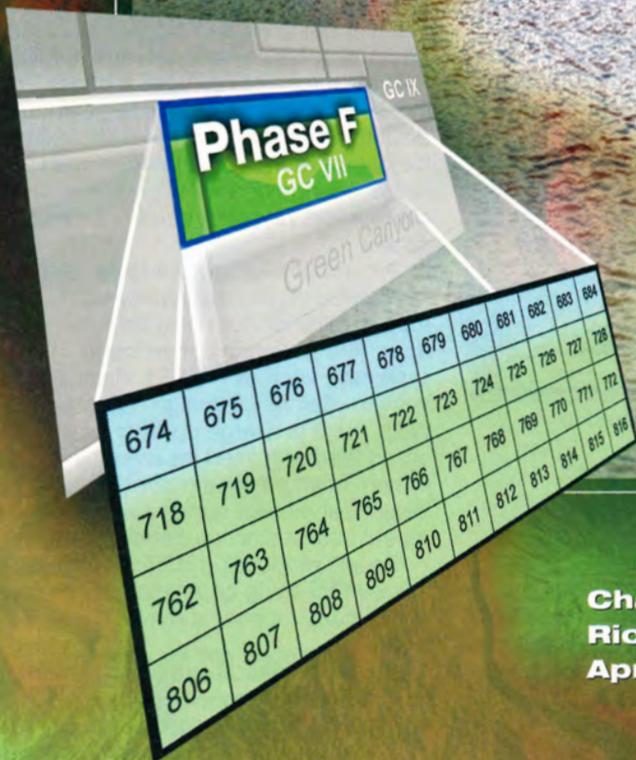
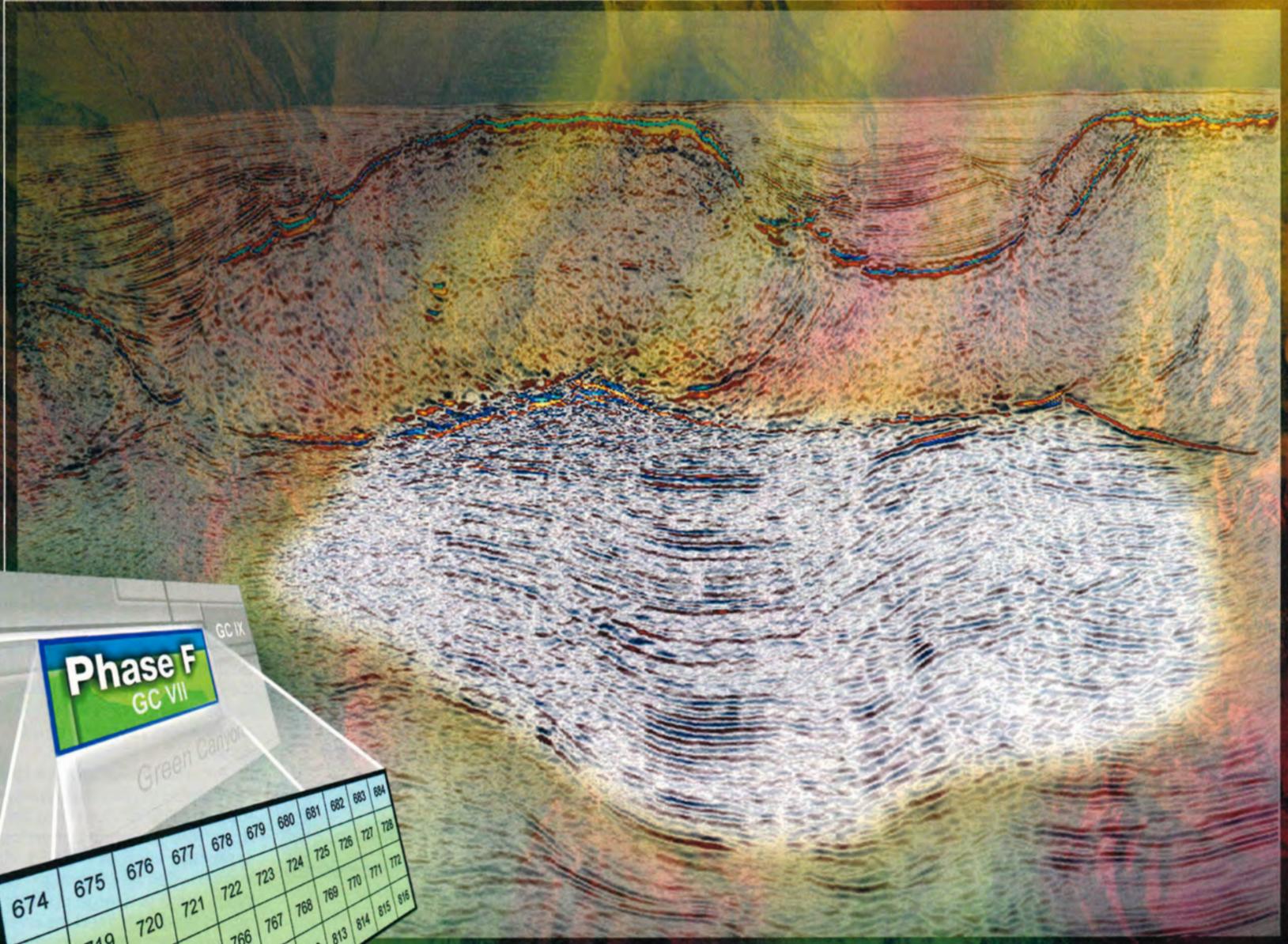
3535 Briar Park
Suite 200
Houston, Texas 77042
Tel: 713-972-9200
Fax: 713-972-1008
www.globalgeophysical.com



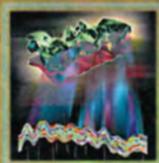
Your **Island** in the **SUN!**

GREEN CANYON
Gulf of Mexico

PHASE F — 44 BLOCKS



Charles Bowen (281) 646-2559 EMAIL: cbowen@cgg.com
Richard Fossier (985) 624-3027 EMAIL: rfossier@cgg.com
April Robertson (281) 646-2561 EMAIL: arobertson@cgg.com



www.cgg.com



GEOPHYSICAL CORNER

4-D Gives Reservoir Surveillance

(The Geophysical Corner is a regular column in the EXPLORER, edited by Dallas consulting reservoir geophysicist Alistair R. Brown. This month's column deals with "Time-Lapse 4-D Technology.")

By DAVID H. JOHNSTON

Reservoir surveillance during production is a key to meeting goals of reduced operating costs and maximized recovery. Differences between actual and predicted performance are typically used to update the reservoir's geological model and to revise the depletion strategy.

The changes in reservoir fluid saturation, pressure and temperature that occur during production also induce changes in the reservoir acoustic properties of rocks that under favorable conditions may be detected by seismic methods.

The key to seismic reservoir surveillance is the concept of differential imaging using time-lapse, or 4-D measurements.

Time-lapse seismic methods are usually based on differences in seismic images that minimize lithologic variations and emphasize production effects. The concept is illustrated in figure 1, where a base 3-D survey acquired before production is compared with a monitor 3-D survey acquired at a later time, dependent on the recovery process to be monitored.

The difference between the seismic surveys can then be interpreted in terms of the production-related changes in reservoir properties.

Time-lapse seismic data have been shown to increase reserves and recovery by:

- ✓ Locating bypassed and undrained reserves.
 - ✓ Optimizing infill well locations and flood patterns.
 - ✓ Improving reservoir characterization – identifying reservoir compartmentalization and permeability pathways.
- Four-D also can decrease operating costs by:
- ✓ Reducing initial development well counts.
 - ✓ Optimizing phased developments using early field-wide surveillance data.
 - ✓ Reducing reservoir model uncertainty.
 - ✓ Reducing dry holes and targeting optimal completions.

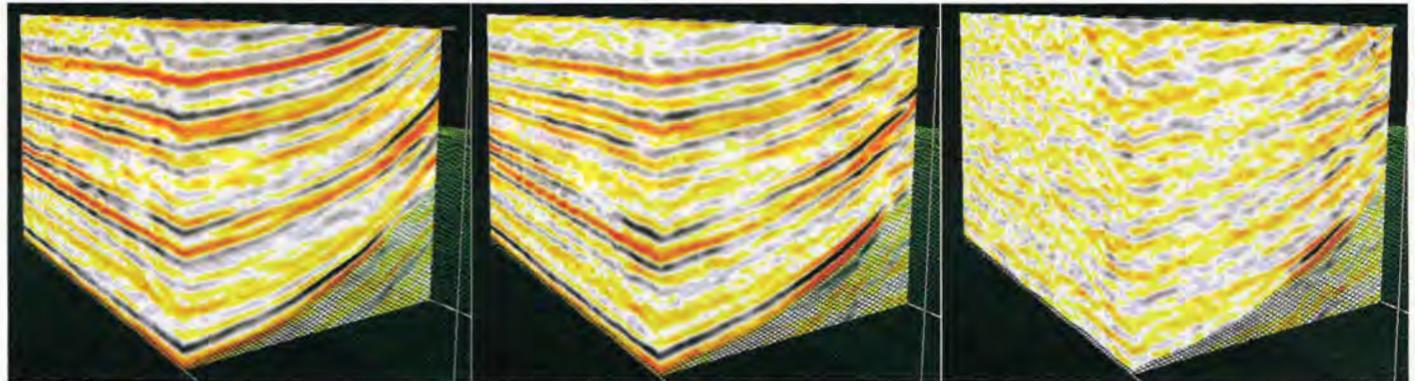
As a result of these benefits, many oil companies are aggressively pursuing the application of time-lapse seismic data.

The Physical Basis

Seismic velocity and density changes in a producing reservoir depend on rock type, fluid properties, and the depletion mechanism. Time-lapse seismic responses may be caused by:

□ **Changes in reservoir saturation.** Displacement of oil by gas cap expansion, gas injection or gas exsolution resulting from pressure decline below bubble point; these decrease velocity and density. Water sweep of oil increases velocity and density.

□ **Pore fluid pressure changes during fluid injection or depletion.** Injection will increase fluid pressure, decreasing the effective stress acting on the rock frame



Base Survey
Initial Reservoir Conditions

Monitor Survey
Reservoir Under Production

Difference
Image Reservoir Changes

Figure 1 – Illustration of time-lapse seismic.

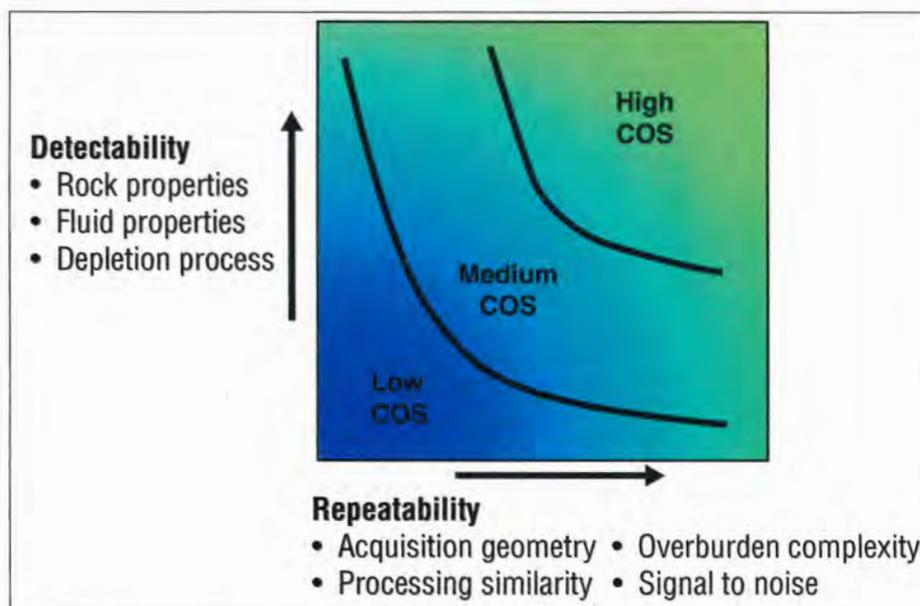


Figure 2 – Dependence of 4-D chance of success (COS) on detectability and repeatability.

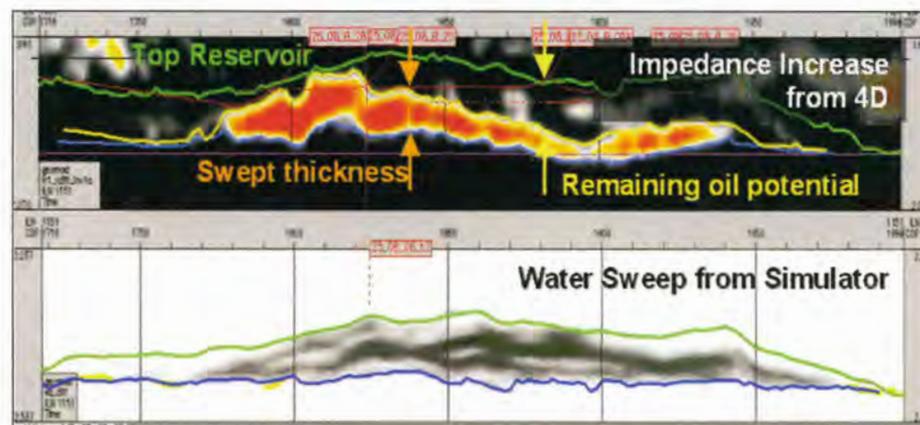


Figure 3 – Time-lapse seismic data from the Jotun Field, Norway, compared to reservoir flow simulation predictions.

and lowering seismic velocities. Compaction during depletion reduces porosity and increases velocity and density.

□ **Temperature changes.** An increase in temperature increases fluid compressibility, and as a result decreases reservoir seismic velocities and density.

Reservoir factors that affect the seismic detectability of production changes can be evaluated in order to determine which geological settings and production processes are most suited for reservoir monitoring. Each field is unique, and modeling of the seismic response to production, based on reservoir flow simulation, is used to evaluate the interpretability of seismic

differences and to determine how early in field life a time-lapse survey can be used to monitor reservoir changes.

The optimal times for repeat seismic surveys depend on detectability and the field's development and depletion plan. Planning for repeat surveys in the context of field surveillance will maximize the value of the data.

Seismic Repeatability

The difference between two seismic surveys is not only sensitive to changes in reservoir rock properties, but also to differences in acquisition and processing.

As suggested in figure 2, the chance of success for a 4-D project depends on

both detectability and seismic repeatability. Some of the factors that affect repeatability include:

- ✓ Acquisition geometry differences such as sail line orientation and heading, source-receiver spacing, streamer feather, and coverage due to obstructions.
- ✓ Near surface conditions resulting in statics and receiver coupling variations.
- ✓ Sea level, sea state and swell noise, water temperature and salinity.
- ✓ Residual multiple energy.
- ✓ Ambient and shot-generated noise.
- ✓ Geological factors such as shallow gas and steep geological dip.

4-D Seismic Acquisition, Processing

The objective of 4-D seismic acquisition and processing is to minimize differences in the seismic data that are unrelated to production – and to preserve and resolve those differences in the reservoir that are due to production.

Four-D repeat survey acquisition attempts to match both the source and receiver positions and signatures of the baseline survey. Positional repeatability ensures the same raypaths for base and monitor surveys. Tolerance to geometry deviations depends on the complexity of the overburden; where there is rapid lateral change or anisotropy in the overburden, raypaths need to be more similar.

A number of strategies have been developed to maximize acquisition repeatability for both land and marine data. And permanent monitoring systems – such as the BP's installation at Valhall – can result in high repeatability. While there is a large up-front cost associated with fixed receivers, these systems can permit the acquisition of lower-cost monitor surveys with short repeat intervals or "on demand."

Four-D processing is best described as co-processing or parallel processing of base and monitor surveys. This implies:

- ✓ Controlled amplitude and phase.
- ✓ Early equalization of geometry to facilitate QC comparisons.
- ✓ Application of the same algorithms and parameters where appropriate.

A key to successful time-lapse processing is continual comparison of the base and monitor surveys to ensure repeatability is not being compromised. Often, "fast track" data (e.g. decimated, post-stack migrated and/or using

See **Time-Lapse 4-D**, page 30



Rugged Trail or Structural Trend?

Visit us at NAPE
Booth 1327
January 26 - 27
Houston, Texas

We see both.

At TGS, we are reminded of the subsurface everywhere we look. Our world-wide database of geologic and geophysical data provides a wealth of Earth Knowledge to Oil and Gas exploration companies. But TGS is also a collection of the industry's best people, processes and technologies, all focused on guiding the search for hydrocarbons. Be it on the exploration frontier or a developed play, we offer direction, expertise and a track record of success.

Earth Knowledge.



Have you seen us lately?
www.tgsnopec.com

LOOKING BACK

Some Simple Career Advice

By MARLAN DOWNEY

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

* * *

It is a clear sign of my advancing age: Young people are asking me for career advice. It is possible to deluge young people with well-meaning advice.

Let me keep it simple:

Kids, do the important thing – FIND SOMETHING TO DO THAT YOU

ABSOLUTELY LOVE.

Every career problem fades away when your work is your passion; after all, passion is a more powerful engine than a paycheck.

The route to career success is found by working at something that challenges and excites you.

In 1854, exactly 150 years ago, the American Henry David Thoreau observed, "The mass of men lead lives of quiet desperation."

Don't let that phrase be the summary of your life. □

Time-Lapse 4-D

from page 28

parameters based on earlier processing) are used to evaluate the processing flow and refine interpretation concepts.

And the objective to maximize repeatability may be at the expense of other processing objectives, such as high-resolution imaging. As a result, it is not uncommon that separate flows are used for time-lapse data.

4-D Interpretation

The interpretation of time-lapse seismic differences in terms of reservoir changes requires integration of the data with detailed reservoir characterization, fluid flow simulation, petrophysics and

conventional reservoir surveillance data.

Many companies use a model-based 4-D interpretation workflow, where seismic differences are compared to predicted differences based on seismic modeling of history-matched reservoir flow simulations. The interpretation process is one of comparing, contrasting, reconciling and validating these two images of the production process.

This approach is used because 4-D seismic interpretations are non-unique.

□ A lack of change between the baseline and monitor seismic surveys can be interpreted as unswept reservoir or as an area of no reservoir.

□ Four-D measurements taken once every few years can be aliased in time. Rapid changes in saturations and pressures found in some recovery processes can require more rapid seismic repeat intervals.

An example of 4-D interpretation is from the North Sea Jotun Field, where oil is being depleted through a strong natural water drive. Water sweep in the reservoir results in a 10-12 percent increase in the seismic impedance.

Figure 3 (page 28) compares the results of inverting the seismic difference acquired after three years of production to obtain impedance change with the oil saturation change predicted by the reservoir flow simulation. At this location, the simulator suggests that the reservoir is fully swept – but the seismic data show that only one reservoir zone has been swept and that internal shales act as barriers or baffles to flow. This results in a flank rather than bottom water drive.

Infill or sidetrack opportunities are found where there is no change in the seismic data, and where reservoir characterization suggests there is high net-to-gross sand. As a result of the 4-D survey at Jotun, three successful infill wells were drilled and a potential dry hole was avoided.

Other published 4-D case studies show that seismic data can image production changes in a variety of geological settings and production scenarios, including water and gas sweep, pressure changes and compaction, and enhanced recovery. And 4-D interpretation is evolving toward a more quantitative analysis of the data. By incorporating time-lapse shear wave information, either from AVO analysis, elastic inversion or PS data, it is possible to estimate saturation and pressure changes in the reservoir. These estimates can be a strong history match constraint on reservoir simulations.

More predictive simulations will result in more efficient reservoir management.

(Editor's note: David Johnston, an AAPG member, is with ExxonMobil Exploration, Houston.) □

MORE power

... options

... support

... innovation

PETCOM **Power Log**

PowerLog is the industry standard for Windows-based petrophysical analysis. Combining solid performance and results with world-class support, PowerLog is the most economical and user-friendly package dedicated to log data interpretation and presentation.

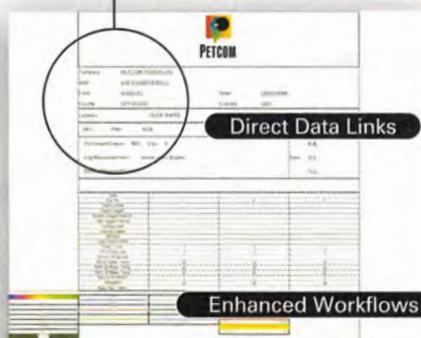
Fugro-Jason's ongoing commitment to the Petcom software suite means enhanced support today and future innovations for evolving user needs:

- New graphics now available in PowerLogSE that represent the first step in the next generation of PowerLog
- Direct data links to third-party databases such as Petra®, OpenWorks®, and GeoFrame®
- Enhanced workflows, including rock physics and fluid substitution modeling
- Microsoft® Windows® and Linux® compatibility

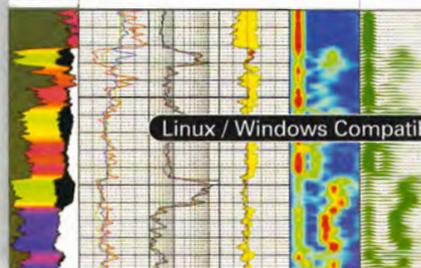
Turn up the power! Contact your Petcom representative to learn more about the latest PowerLog technology and productivity enhancements. Call 713 369 6900 or go to:

www.petcominc.com

New Graphics



Direct Data Links



Enhanced Workflows

Linux / Windows Compatibility

FUGRO-JASON
A FUGRO GEOSCIENCE COMPANY

Robertson
LCT Gravity & Magnetics

FUGRO

FUGRO ROBERTSON INC.
LCT Gravity & Magnetics Division

- Gravity & Magnetics
- Acquisition & Processing
- Multi-Client Data
- Fully Integrated Interpretations
- Database Management



www.fugro-lct.com



AAPG INTERNATIONAL CONFERENCE & EXHIBITION
OCTOBER 24-27, 2004 • CANCUN, MEXICO

PETROLEUM INDUSTRY IN THE 21ST CENTURY:
TECHNOLOGY, BUSINESS & FRONTIERS

HOST: ASOCIACIÓN MEXICANA DE GEÓLOGOS PETROLEROS

*The 2004 AAPG International Conference and Exhibition
in Cancun was a tremendous success!*

AAPG gratefully acknowledges:

- ☉ **Asociación Mexicana de Geólogos Petroleros (AMGP)**
- ☉ **Organizing Committee** ☉ **Volunteers** ☉ **Attendees**
- ☉ **Exhibitors** ☉ **Sponsors and Contributors**

PEMEX

Titanium (\$20,000+)

**Petrobras
ExxonMobil**

Compañía Mexicana de Geofísica, S.A. de C.V.

Platinum (\$10,000-\$19,999)

**Exhibitors • Halliburton de Mexico • petroWEB
Veritas Servicios Geofísicos S. de R.L. de C.V. • ChevronTexaco
Jaguar Exploration Inc. • Schlumberger Oilfield Services
Shell Exploration and Production Company, Inc.**

Gold (\$5,000-\$9,999)

**Compañía Mexicana de Exploraciones, S.A. de C.V. • Core Lab
Repsol Exploracion Mexica S.A. de C.V. • NuTech Energy**

Silver (\$3,500-\$5,999)

BGP • IHS Energy • TGS-NOPEC/A2D Technologies

Bronze (\$1,500-\$3,499)

Teknica Mexicana, S.A. de C.V. • Net Brains de Mexico

Cancun Management Session

IOCs, NOCs Facing New Realities

By LARRY NATION
AAPG Communications Director
Statoil Venezuela President Tor Espedal sees the international oil companies facing a dilemma and asks, "Will the national oil companies help the IOCs?"

Basically, he answers his question "maybe." But if both parties are smart, both sides can benefit.

Espedal's presentation at October's AAPG International Conference and Exhibition in Cancun was part of a full day of presentations by executives of major companies who discussed technology and strategies for maximizing efficiency.

Companies represented in addition to Statoil included Pemex, Aramco, BP Exploration, ChevronTexaco, ExxonMobil, Kuwait Petroleum, Schlumberger, Shell International and Total.

Espedal sees a much stronger commercial and non-commercial partnership between the NOCs and IOCs.

"Globalization of the political agenda within the oil producing countries will create increasing demands for international cooperation on trans-national issues," he said, "such as training, models for social development, models for industry development and commercial models."



But first, the dilemma.

Espedal said at the heart of the dilemma is the great pressure the IOCs face by the market to replace reserves –

and their efficiency at realizing sustainable maximum benefits for the resource owners in their alliances with the NOCs and their governments – because the NOCs are where the projected world reserves await.

"If they (IOCs) don't replace the reserves, their value declines. With time, they will cease to exist," Espedal said, adding statistics that showed that production and reserve growth of the super majors has occurred through merger and acquisition activities. "For two decades, exploration additions have not replaced production."

Meanwhile, the IOCs have changed their structure of E&P spending dramatically.

"With perhaps one exception (ChevronTexaco), Statoil's larger peers have adjusted their exploration spending from 25-30 percent to 10-15 percent of their E&P spending," he said. "This year, worldwide exploration and production spending will grow only 9 percent, up from the 4 percent first planned."

"That's a weak response to oil prices that are up 30 percent," he added.

Aversion to Risk?

Bolstering Espedal's point, four days after his presentation the *Wall Street Journal* reported that the seven largest Western oil companies are expected to generate \$71.3 billion in free cash this year – and that is after funding \$78.1 billion on new projects. The *Journal* reported that dividends, share repurchases and building cash reserves appear to be the priority.

"Why are the IOCs not exploring more?" Espedal asked during his presentation. "Could there be one main factor – an extreme aversion to risk? The same risk aversion that drove oil companies into mega-mergers aimed at cutting costs?"

Espedal said very high production growth rates in the range of 2-6 percent and high near-term "normalized" return on average capital employed "was not sustainable, because in the long term you cannot maximize these two metrics and at the same time keep the reserve/production ratio healthy."

But the NOCs, where the IOCs look to access their future reserves, are facing pressures of their own, both in supply/demand and political/societal pressures.

Espedal sees world oil demand increasing from about 75 million BOD to 100 million BOD in 2015 – almost as large as OPEC's current production. That includes "dramatic demand increases" in China and India, with 10 percent of Persian Gulf oil directed to the Western markets and close to 70 percent to Asia.

"The Atlantic Basin energy system will emerge, and Latin America, especially Venezuela, Mexico and Brazil, will become an increasingly important oil producer by 2015," he said. Also he sees Russia increasing its role in global energy markets.

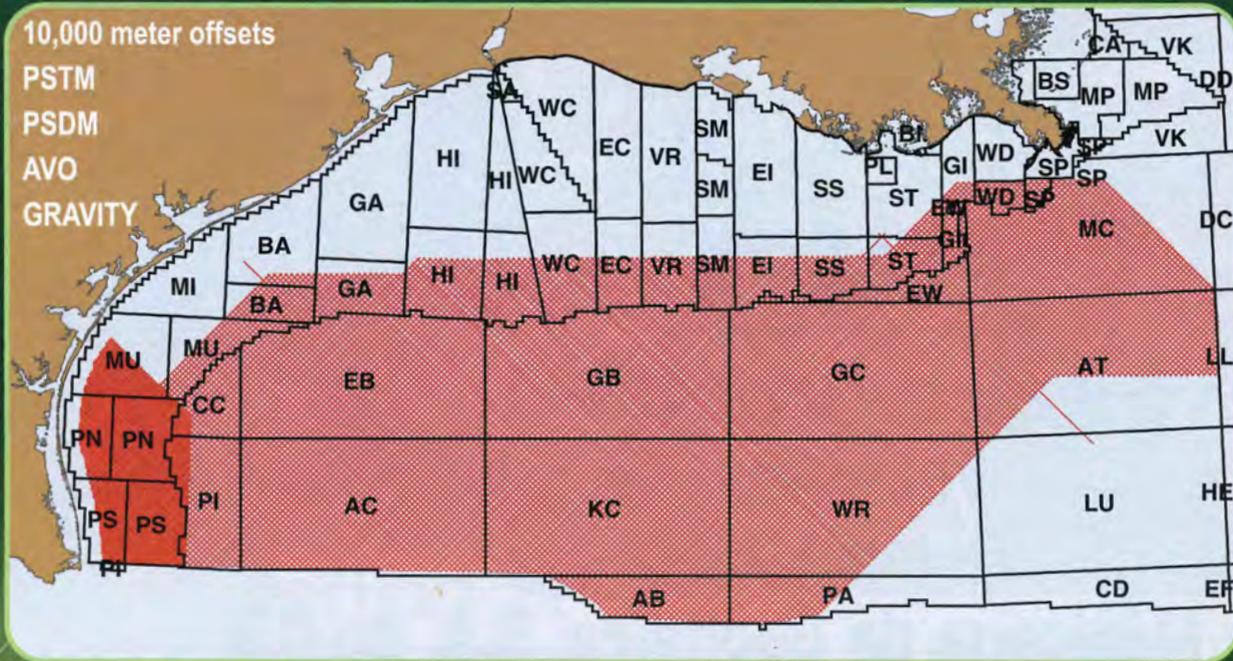
Meanwhile, he said, other factors loom:

- ✓ World population is growing, he said, noting that 40 percent of the world's population is concentrated in oil rich countries.
- ✓ Three percent of the world's population will control 75 percent of the remaining reserves.
- ✓ The explosive growth of cities will

continued on next page

Deep Focus...

A new long offset regional survey in the Gulf of Mexico



Alaminos Canyon Depth

For additional details on this program, please contact:

Kenneth Mohn
Fugro Multi Client Services
Tel: +1 713 369 5859
Email: kmohn@fugro.com

Mike Whitehead
Fugro Multi Client Services
Tel: +1 713 369 5862
Email: mwhitehead@fugro.com



When it's a question of understanding... Ask Fugro

continued from previous page

test the capacity of their governments to provide jobs and social support to sustain livable and stable environments.

✓ The emerging urban middle class is creating rising expectations and aspirations, and "demands on improved living stands equal to the living standards in the major oil importing countries and the best of the exporting countries."

Collision Course

A key driver for the "oil rich" countries over the next 15 years, Espedal said, will be increased pressure in generating jobs for the young masses.

"More than half of their population is now under 20 years of age and will continue to have large, young populations with the labor force growing at an average of 3.2 percent per year," he said. "The problem of employment, personal development is compounded by weak educational systems that (are) producing a generation lacking the technical and problem-solving skills required for economic growth."

Thus, the collision of the dilemmas: The IOCs are driven by the demands of the capital markets and the investment community, and the NOCs are primarily driven by socio-economic and political demands.

Espedal said it is imperative for NOCs to re-evaluate their positions and their relations with the IOCs.

Given the prices and the mega trends, the oil producing countries will turn to a rent-driven policy at the cost of a new development-driven policy, according to Espedal. The NOCs can expect to control the rent and a larger share of the pie for their people *IF* they do it in a gradual and managed fashion. The NOCs that are able to implement this with the IOCs will win in

the long run.

Meanwhile, IOCs can expect less financially attractive and potentially lower profitability below today's acceptable thresholds, he added. Dynamics around the oil and gas business have created the space and need for coherent "Corporate Social Responsibility Policies" as part of their core business, which will promote economic and human development, and environmental protection.

Due to the lack of public policies, this is fertile ground for the IOCs, he said.

Espedal also sees a financial market drive that forces the IOCs to seek new "monster mergers," because it is "easier," "quicker," "familiar" and "under control" much more than the other routes open to the IOCs – especially if the oil prices dip below \$18 for more than 4-6 months.

"These trends will be stronger and more visible sometime in the 2005-2007 timeframe," he said. □

Technical Award Winners Announced for Cancun

Technical awards for best paper and poster presentations at the International Conference and Exhibition in Cancun have been announced.

The winners will receive their awards June 19 during the opening session at the AAPG Annual Convention in Calgary, Canada.

They are:

Gabriel Dengo Memorial Award
(best international paper)

□ Jose A. Luquez, with Pluspetrol

S.A., Buenos Aires, Argentina, for "Camisea Gas Fields, Peru: Uncertainties and Technologies Applied."

His co-author was Alfredo Disalvo, also with Pluspetrol in Buenos Aires.

Ziad Beydoun Memorial Award
(best international poster)

□ Harry Roberts, Coastal Studies Institute and Department of Oceanography, Louisiana State University, Baton Rouge, La., for "Deltaic Deposits and Linked Downslope Petroleum Systems." □

Cancun

from page 20

that featured a cultural topic. Pilar Luna Erreguerena, head of the Underwater Archaeology Area at the National Institute of Anthropology and History of Mexico spoke (and showed a brief film) about her work dealing with Mexico's underwater treasures. Her talk "was very well integrated into the conference," Schneidermann said.

✓ The first time the AAPG Executive Committee officially met during an international conference.

✓ The first time there was an official House of Delegates breakfast at an international conference.

✓ The first time, obviously, for AAPG and the AMGP to work together on an international conference – but the first time was significant.

"AMGP actually cancelled its own conference in 2003 to put all of their efforts toward this one," noted Dana Patterson Free, AAPG's international conference manager. "Their collaboration was crucial to the success of this meeting, and they worked extraordinarily hard to make this a real team approach."

AMGP held its own ceremony during the meeting to announce its association's election results, install new officers and recognize both AMGP and AAPG personnel who helped in planning and preparing for the conference.

Patterson Free also praised the "huge support, both financially and in other ways" of Pemex throughout the entire meeting as one more element that ensured success.

The 2005 international conference will be held Sept. 11-14 in Paris, France. A call for abstracts was included in the September EXPLORER and is available online at www.aapg.org. □



Customers Expect Results

And that's particularly true when discussing oil and gas exploration and production, where sizable investments depend on the successful exploitation of wells.

Only one company combines the depth of technology innovation, professional expertise, global presence, 100% in-house geoscience knowledge and computing power to offer the most advanced geophysical services, all under one roof.

Paradigm.

With imaging solutions for large-scale 2D, 3D and 4D projects, and the most experienced geoscience professionals in the business, Paradigm is proud to provide customers around the world with on-time delivery, cost-efficient workflows and highest-quality results.

Please visit us at SEG
Booth #741, Hall C
October 10-15, 2004
Denver, CO



Solutions that aim high. Services that run deep.

www.paradigmgeo.com

Want to know more about Paradigm integrated services? Contact services@paradigmgeo.com

| | | | | | | | |
|-------------------------------|----------------------------------|-----------------------------------|--|--|--------------------------------------|---|----------------------------------|
| USA +1 713 393 4800 | Canada +1 403 750 3535 | Mexico +52 993 3520 734 | South America +55 21 3084 3898 | Europe/Africa/Middle East +44 1483 758 000 | CIS/Russia +7 095 933 4440 | Asia Pacific +91 22 5691 9300 | China +86 10 6465 4870 |
|-------------------------------|----------------------------------|-----------------------------------|--|--|--------------------------------------|---|----------------------------------|

Data Processing and Imaging

Visualization, Interpretation and Earth Modeling

Reservoir Characterization and Petrophysics

Well Planning and Drilling

Petroleum Engineering

Second Annual
**AAPG Winter
Education
Conference**

**February 14-18, 2005
Houston, Texas**

Courses include:

- ◆ Reservoir Engineering for Geologists
 - ◆ Geochemical Exploration
 - ◆ Tight Gas Sands
- ◆ Risk Analysis for Development Applications
 - ◆ Giant Oil and Gas Fields
 - ◆ Well Log Analysis
- ◆ Assessment, Classification and Reporting of Reserves
 - ◆ Practical Salt Tectonics
- ◆ Essentials of Subsurface Mapping
- ◆ Permeability in Carbonate Rocks



Hosted by the Hilton Houston Southwest Hotel
6780 Southwest Freeway
713-977-7911 • Fax: 713-977-6310

Tuition for the week is only \$1095 for AAPG members
or \$250/day for individual courses

Registration and Information:
Toll-free 888-338-3387 (U.S. and Canada) or 918-560-2621
Fax: 918-560-2678 • E-mail: educate@aapg.org
<http://www.aapg.org/education>

SPOTLIGHT ON EDUCATION

**Winter Conference
Returns to Houston**

By DEBBI BOONSTRA
AAPG Education Coordinator
AAPG's second annual Winter Education Conference, which includes 11 different courses over five days, will be held Feb. 14-18 in Houston.

The conference's concept is a retooling of a program AAPG first held in the early 1980s – one-stop, a la carte shopping for a variety of education opportunities, all in one place at one time.

At this conference there will be four concurrent sessions going on each day – and the start/stop times for the courses are staggered throughout the week so attendees can attend from two to four courses, depending on their interest and training needs. The courses range from one to three days in length.

"It is like an all-you-can-eat buffet," said Jim Blankenship, AAPG's new geosciences director. "Pay one price, and you have 11 different choices on the menu!"

The debut offering last January drew more than 60 participants, and attendees reported they appreciated being able to take several courses and yet be away from the office for only a week. Others liked that the badges are transferable – for one full-week paid registration, one person can attend a course early in the week, then pass the badge to a co-worker to attend a course later in the week. Several companies took advantage of this benefit by buying a block of five to 10 registrations, then letting their employees decide who would use them on which days.

While the full-week registration fee of \$1,095 for AAPG members (\$1,195 for non-members) is a bargain, courses also are priced individually for those that prefer the "a la carte" option.

Among this year's new topics are:
✓ Practical Salt Tectonics (Mark Rowan).

✓ Assessment, Classification and Reporting of Reserves (Rawdon Seager, Menno Dinkelmann).

✓ Giant Oil and Gas Fields: Global Inventories, Tectonic Settings, Stratigraphic Framework and Predictive Parameters (Paul Mann, Mike Horn).

✓ Characterization of Tight Gas Reservoirs (Alan Byrnes).

✓ Well Log Analysis (Dan Krygowski).

✓ Log Analysis of Shaly Sands (George Asquith).
✓ Geochemical Exploration For Oil And Gas – Strategies For Success (Deet Schumacher).

✓ Reservoir Engineering/ Characterization for Geologists (Rich Green, Bill Kazmann).

Encore topics from last year are:

✓ Risk Analysis for Development Applications (Jim Gouveia, Mark McLane and Ray Young).

✓ Essentials of Subsurface Mapping (Dick Banks).

✓ Understanding and Predicting Permeability Distribution In Carbonates: The Rock Fabric Approach (Jerry Lucia).

In addition to the courses, a small AAPG Bookstore will be set up to give attendees the opportunity to purchase AAPG books and maps. A welcoming icebreaker is included on the first evening to encourage networking among the attendees from all the courses.

For more information contact the AAPG education department at 1-888-338-3387 (USA only); or at educate@aapg.org.

Complete course descriptions are available online at www.aapg.org/education. □

IN MEMORY

Beams, Robert Jess, 85
Dallas, Oct. 15, 2004

Brown, Burton, 76
Richmond, Va., June 28, 2004

Halbouty, Michel T., 95
Houston, Nov. 6, 2004
(See story, page 4)

Hale, Lyle A. (EM '49)
Bountiful, Utah

Kim, Joon Yol, 57
San Ramon, Calif., Aug. 15, 2004

Kunz, Howard Edward, 67
Bellaire, Texas, March 12, 2004

Mooney, Thomas Davis, 67
Houston, Feb. 23, 2004

Ralston, Roy B., 87
Bartlesville, Okla., Sept. 30, 2004

Smalley, Randal Keith (AC '80)
Tyler, Texas

Wigley, Perry B. (AC '83)
Lincoln, Neb.

(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.)

Currie Concludes DL Tour

AAPG Distinguished Lecturer Philip J. Currie concludes his U.S. speaking tour in early December with four sessions.

Currie, who started his tour in late November, is curator of dinosaurs at the Royal Tyrrell Museum of Paleontology at Drumheller, Canada. His talk will be "Feathered Dinosaurs and the Origin of Birds."

His itinerary includes:

✓ Dec. 6 – North Dakota Geological Society, Bismarck, N.D.

✓ Dec. 7 – South Dakota School of Mines and Technology, Rapid City, S.D.

✓ Dec. 8 – Dallas Geological Society-International Group, Dallas.

✓ Graham Geological Society, Graham, Texas.

For more information contact the AAPG Web site at www.aapg.org. □



Delegates gather at the AAPG European Region meeting in Prague, Czech Republic.

INTERNATIONAL BULLETIN BOARD

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

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

This report on the upcoming 2005 AAPG annual and international meetings was prepared by Brenda Cunningham, AAPG's director of global development.)

It's never too soon to start preparing to attend an AAPG annual or international convention, and the meetings offered in 2005 are guaranteed to attract an enormous amount of attention.

Both events promise to be great meetings in great locales – Calgary, Canada, for the Annual Convention and Paris, France, for the International Conference and Exhibition.

AAPG already is in full swing in its preparation for the meetings, including this information that may help you as you make your plans for 2005.

New Registration Pricing Structure Set for Calgary

A new plan is being introduced by AAPG that can help members save money as they plan for the AAPG Annual Convention.

Register early and save for the 2005 AAPG Annual Convention in Calgary, Canada June 19-22.

For the first time, AAPG is offering three-tiered pricing for the meeting. AAPG members registering early will save US \$45 off the price of regular advance registration.

This early subscription price also represents a US \$115 savings over registering onsite.

Watch your mailbox and the AAPG Web site beginning in February for more information.

You'll Love Paris in the Fall ...

AAPG has reserved several blocks of rooms in close proximity to the CNIT, the

facility where the 2005 AAPG International Conference and Exhibition will be held Sept. 11-14. These hotels offer the convenience of easy access to the conference, and are in close proximity to the Paris Metro for after-hours excursions into the city.

Should you desire to stay at a hotel nearer to Paris' world-renowned attractions, you are welcome to make independent arrangements, or you can get the assistance of AAPG's designated management company, Lafayette Travel.

When deciding where to stay, please consider the travel time and expense that will be incurred each day from your hotel to and from the conference.

Paris is a popular destination during September, and several major conferences in addition to AAPG's are scheduled there – so please make your reservations early!

Detailed information will be available on AAPG's Web site at www.aapg.org in March 2005.

Success in Prague

Finally, approximately 400 persons attended the first-ever European Region Conference (with GSA) independently organized by the AAPG European Region, held in October in Prague.

The Czech Geological Survey was the



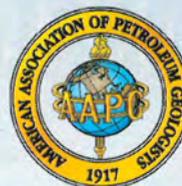
Robbie Gries on Czech television.

official host society, with the Geological Society of America contributing meeting content and event participation.

Due to popular demand, an exhibition was added to the conference schedule with AAPG participating in the exhibits by having a stand there. Past AAPG President Robbie Gries attended as the official representative of the AAPG Executive Committee and also delivered the Festive Luncheon address.

The European Region Council, headed by President Sigrunn Johnsen, held important meetings and networked with many members of the Region while in Prague.

Special thanks are due Juraj Francu, general chair, and Vlastimila Dvorakova, general vice chair, for a job well done. □



AAPG International Conference and Exhibition September 11-14, 2005

General Chair: Jean-Marie Masset, Total
Vice Chair: Gérard Friès, IFP

**ABSTRACTS DEADLINE
IS JANUARY 12!**

**Exhibit space is available.
First-come, first-served!**

**Reserve hotel
rooms EARLY!**

- ❖ **Submit an abstract for the first-class technical program**
- ❖ **Exhibit to showcase your company**
- ❖ **Volunteer as a committee member or to work on site**
- ❖ **Sponsor to contribute to the quality of the conference**
- ❖ **Attend for exposure to the latest technologies and innovation**



AAPG Convention Department
PO Box 979 • Tulsa, OK 74101-0979 • USA
Phone: 1 918 560 2617 • Fax: 1 918 560 2684
E-mail: convene2@aapg.org
www.aapg.org/paris/



PROFESSIONAL NEWS BRIEFS

Laurel L. Alexander, to senior development geologist, Pennsylvania General Energy, Warren, Pa. Previously senior geologist, ConocoPhillips, Houston.

Patrick M. Bouisset, to Africa exploration coordination and portfolio manager, Total, Paris, France. Previously geoscience manager, Total E&P Borneo B.V., Bandar Seri Begawan, Brunei.

Brian S. Brister, to geologist, Gunn Oil Co., Wichita Falls, Texas. Previously petroleum geologist, New Mexico Bureau of Geology and Mineral Resources, Socorro, N.M.

Stephen J. Calvert, to petroleum geologist, Fugro Robertson, Llandudno, North Wales, United Kingdom. Previously structural geologist, Midland Valley Exploration, Scotland.

Ricky Cox, to senior staff geologist, Latigo Petroleum, Midland, Texas. Previously area geologist, Great Western Drilling, Midland, Texas.

Paul C. Cunningham, to senior geologist, Newfield Petroleum U.K., London, England. Previously with Newfield Exploration, Houston.

Russ Cunningham, to northern exploration manager, Kodiak Oil and

Gas, Denver. Previously exploration geologist, Cabot Oil and Gas, Denver.

Donald W. Dorn-López, to lead geophysicist, Maersk Olie og Gas, Copenhagen, Denmark. Previously senior geophysicist, Maersk Olie og Gas, Copenhagen.

Olivier Dubrule, to manager-Geoscience Research Centre, Total Exploration and Production, Aberdeen, Scotland. Previously manager-geoscience training and technical image, Total, Pau, France.

Steve Flaten, to geophysicist, Minerals Management Service, New

Orleans. Previously consulting geophysicist, Petrogulf Corp., Houston.

Nick Harris, to research associate professor, department of geology and geological engineering, Colorado School of Mines, Golden, Colo. Previously senior scientist, department of geosciences, Pennsylvania State University, University Park, Pa.

Steven J. Hendrick, to senior vice president-exploration and land, Sanchez Oil and Gas Corp., Houston. Previously general manager-exploration, Dominion Exploration and Production, Houston.

Michael Kisucky, to geoscientist-Orphan Basin project, ChevronTexaco North America Upstream, Houston. Previously development geoscientist, ChevronTexaco Southern Africa Business Unit, Bellaire, Texas.

Dave Majewski, to southern exploration manager, Kodiak Oil and Gas, Denver. Previously exploration geologist, Cabot Oil and Gas, Denver.

Matthew R. Martin, to senior staff geophysicist-Gulf of Mexico, Sterling Energy, Houston. Previously senior development geophysicist-deepwater development, Anadarko Petroleum, The Woodlands, Texas.

Wilbert L. Mathews has retired as associate geologist, ExxonMobil Exploration. He has formed Mateus Petroleum Consultants and will reside in the Republic of South Africa.

Louis J. Mazzullo has been chosen to receive the Monroe G. Cheney Science Award at the 2005 AAPG Southwest Section meeting. Mazzullo is a petroleum geological consultant in Albuquerque, N.M.

Doug McGuire, to geologist-technical sales, Paradigm Geophysical, Houston. Previously G&G principal consultant,

continued on next page



Where the Worlds of Gas & Oil Come Together

Under the patronage of H.E. Abdullah bin Hamad Al-Attiyah,
Second Deputy Premier, Minister of Energy and Industry, Qatar.

21-23 November 2005 • Doha, Qatar
Sheraton Doha Conference Centre
Qatar International Exhibition Centre

**Call for Papers –
Abstracts Due 1 December 2004**

**Exhibit Space and
Sponsorship Opportunities –
Available Now!**

For additional information, visit www.iptcnet.org.

IPTC, P.O. Box 502217, Dubai, UAE
Tel: +971.4.390.3540 Fax: +971.4.366.4648
E-mail iptc@iptcnet.org



Host Organisation:



EAGE

EUROPEAN
ASSOCIATION OF
GEOLOGISTS &
ENGINEERS



Session Thoughts Due for Houston

Do you have a good idea for a technical session at the AAPG Annual Convention?

The 2006 Technical Program Committee for the annual meeting in Houston wants your ideas – and the time to get it to them is now. Committee members are seeking session suggestions for the theme "Perfecting the Search."

The suggestions deadline is Dec. 15.

Session topics and chairs for both oral and poster sessions sponsored by AAPG, SEPM, EMD, DEG and DPA are needed.

The committee is "planning a world class program with an overall global emphasis," and they are particularly interested in sessions that involve discoveries, dry hole analysis, management vision and strategic business strategies, lessons learned, prospect and play analysis, integrated case studies, etc.

Suggestions should go to Bob Merrill, technical program coordinator, at rmerrill@samson.com.

continued from previous page

Landmark Graphics, Houston.

Mike McGuire, to senior vice president-Rocky Mountain division, Davis Petroleum, Denver. Previously executive vice president, Prima Energy, Denver.

Henry (Hank) Nowak, to senior geologist-Rocky Mountain division, Yates Petroleum, Denver. Previously geologist, Yates Petroleum, Artesia, N.M.

Dag Nummedal, to director-Colorado Energy Research Institute, Colorado School of Mines, Golden, Colo. Previously director-Institute for Energy Research, University of Wyoming, Laramie, Wyo.

Pat Pontoriero, to vice president, MACTEC Engineering and Consulting, Pittsburgh. Previously senior principal geologist, MACTEC Engineering and Consulting, Pittsburgh.

Sara Potter, to exploration geologist, American Shoreline Inc., Corpus Christi, Texas. Previously geotech, Suemaur Exploration and Production, Corpus Christi, Texas.

Dave Purcell, to senior geophysicist, St. Mary Land and Exploration, Houston.

Previously senior explorationist, Westport Resources, Houston.

Trent Rehill, to senior explorationist, Murphy Sarawak Oil, Kuala Lumpur, Malaysia. Previously senior geologist, ChevronTexaco Overseas Petroleum, Kuwait.

Jeff Ronck, to advanced geologist, Marathon, Houston. Previously senior geologist, El Paso Production, Houston.

Phil Salvador, to staff geologist, ConocoPhillips, Jakarta, Indonesia. Previously staff geologist, Dubai Petroleum Co., Dubai, United Arab Emirates.

Steve Sonnenberg, to exploitation manager-Rockies, Kerr McGee Rocky Mountain Corp., Denver. Previously exploitation manager-northern division, Westport Oil and Gas, Denver. Sonnenberg is past president of AAPG.

Dave Thomas, to president, Trey Resources Inc., Midland, Texas. Previously exploration manager-southern region, Tom Brown Inc., Midland.

Charles L. Ways, to senior geologist, XTO Energy, Fort Worth. Previously staff geologist, ConocoPhillips, Indonesia.

Steve Weatherl, to vice president and general manager, EOG Resources, Midland, Texas. Previously exploration manager, EOG Resources, Midland, Texas.

David White, to geologist, Sharp Image Energy, Midland, Texas. Previously consultant, Midland, Texas.

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

Daniel C. Huston
Holly Hunter Huston



HUNTER 3-D

3-D Seismic Interpretation, 3-D Gravity/Magnetics
Geostatistics, AVO Analysis, Inversion.

6001 Savoy, Suite 362 • Houston, TX 77036

(713) 981-4650

e-mail: hunter3d@wt.net

Website: www.hunter3dinc.com

GULF COAST ASSOCIATION OF GEOLOGICAL SOCIETIES GULF COAST SECTION OF SEPM

CALL FOR PAPERS

55th ANNUAL CONVENTION

NEW ORLEANS, LA

HOSTED BY THE NEW ORLEANS GEOLOGICAL SOCIETY

September 25–27, 2005



Are you coming to
New Orleans?

New Orleans! World-renowned for its cuisine, recipes and chefs, New Orleans lies in the heart of the most financially rewarding and geologically diverse basins in the continental United States. We are pleased to present our convention theme, "**Geological Gumbo - A Gulf Coast Recipe for Success**" and invite you to submit an abstract, your own "Gulf Coast recipe for success". The Gulf Coast continues to be a major hub of drilling activity and just like all good New Orleans gumbo recipes; methods and technology for finding oil & gas vary widely. Your paper, oral discussion, or poster presentation will add new flavors to the recipe and we offer only the best ingredients to work with: deep-water frontiers, deep gas, sub-salt, inland waters, new onshore trends, old trends to exploit, from Pleistocene to Paleozoic. We've got it all! **Are you coming to New Orleans?**

THEMES FOR SUBMISSION

Presentations on all aspects of Gulf Coast geology are welcome.
We especially invite **recipe for success** presentations with the following themes:

Deep Water Recipes

Sub-Salt Recipes

Deep Shelf Recipes

Recent Discoveries and New Developments in Texas, SoLA, and MAFLA

New Exploration Trends and Discoveries - Offshore GOM and Mexico

Salt Tectonics and Growth Faulting

Shelf Re-Development Successes

Holocene – Recent Gulf Coast Geology

Environmental and Coastal Studies

HOW AND WHEN TO SUBMIT

Abstracts of all proposed presentations must be submitted in standard format (250 words or less, no figures) by **January 17, 2005**.

There are two ways to submit abstracts:

- 1) Connect to the GCAGS 2005 website, <http://www.gcags2005.com> and follow the instructions. You can cut and paste a prepared text.
- 2) Mail a diskette or CD with the abstract in a .doc or .rtf format, and a short note indicating your address, phone number and email address. Also, indicate your preferred theme and preferred mode of presentation to:

Technical Programs – GCAGS 2005, 810 Union Street, Suite 300, New Orleans, Louisiana 70112

Oral, poster, visualization, or core presentations will be accepted. Authors will be notified of acceptance on February 20, 2005. All presenters must submit a paper of < 11 pages or an extended abstract with key figures of ~2-4 pages by April 10, 2005. These will be published in the *Transactions*. Instructions and a template will be posted on the GCAGS2005 website.

ABSTRACT DEADLINE: JANUARY 17, 2005! Questions should be directed to Mike Ledet at abstracts@gcags2005.com.



AIRMAG SURVEYS, INC.
AIRBORNE GEOPHYSICAL SERVICES

HIGH RESOLUTION AEROMAGNETIC
DATA ACQUISITION

- DGPS Navigation & Positioning
- Cesium Vapor Magnetometer
- Micro-Magnetic Repeatability
- Non-Exclusive Data Available
- Aerial Photography & Remote Sensing
- Serving The Exploration Community Since 1963

NORTHEAST PHILADELPHIA AIRPORT
P.O. BOX 21059
PHILADELPHIA, PA 19114

PHONE: (215) 673-2012 FAX: (215) 464-2889
E-MAIL: info@airmag.com
WEB: www.airmag.com

WWW.UPDATE

AAPG's Web Site Is Staying Busy

By JANET BRISTER
AAPG Web Site Editor

A little more than a year ago we began collecting usage statistics for our Web site with a new tool. The results are pretty interesting:

✓ Since October 2003 the AAPG Web site was visited over one million times (1,036,979 to be exact). That averages out to 2,878 "visits" per day.

✓ Since the first of November 2003 almost 55 million "hits" were made on the AAPG Web site. That's about 53 hits per visit.

That's a lot of surfing.

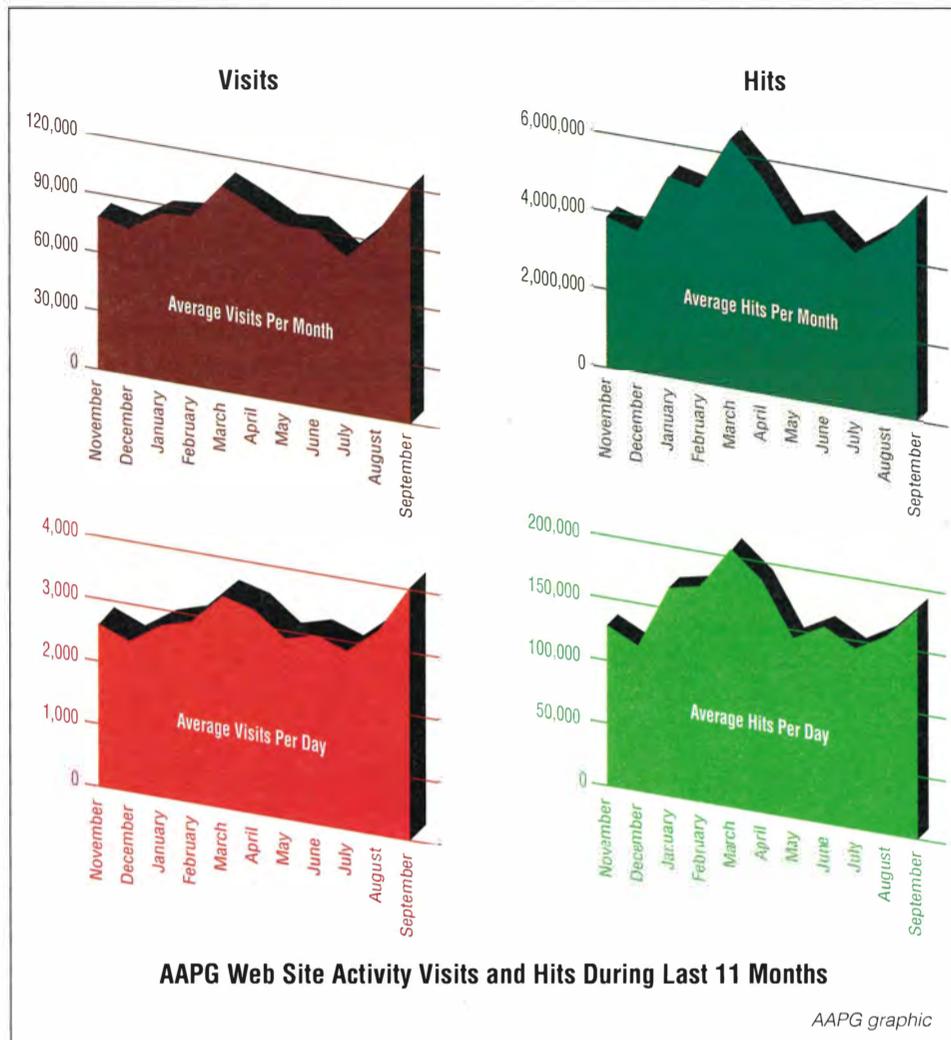
To put this in perspective, a "visit" is when a person begins using our site at www.aapg.org; a "hit" is when they change to another page within the site.

With the aapg.org Web site averaging over 2,800 visits a day, it comes to over 91,000 a month.

Besides the home page, the pages that regularly fall within the top five or ten hits consistently include the e-mail to another member form; members only data (including the member lookup directory); the EXPLORER; meetings; the BULLETIN; and education.

At the end of January we incorporated the Google® search engine to our home page for both internal and external searches. Usage visits jumped by 10,000 that month and have remained in that range since. Clearly, the search engine has been a great tool for our users.

* * *



It's fun to look at certain months – particularly those preceding abstract submittal or registration deadlines – for the more highly attended meetings.

This past March is a great example of peak usage, since that was the month that included the registration deadline for the Dallas Annual Convention.

In fact, as you watch the visits leading into March they escalate to close to 4,400 daily for about two weeks, and then on March 6 they fall back to the usual 2,500-2,700 each day.

During March there were over 104,981 visits to the AAPG Web site. It happened again in September, with 120,928 visits – most likely in anticipation of the Cancun international meeting and other fall sectional gatherings.

There's also a definite pattern as to when people are accessing AAPG pages. Monday through Friday almost looks like a set of stairs descending to a leap off a short cliff for the weekend when usage drops by close to 50 percent.

Looking back is always interesting, but I'm most interested in what next year's December stats will reveal.

We made some changes within 2004 in the configuration of our Web site. These changes consolidate entry into Web pages served up from aapg.org.

It was during 2004 that all of the divisions began using the aapg.org server to host their Web pages.

Then in August we added the online

continued on next page

Answers ...not attributes

Weinman GeoScience
Integrated GeoPhysical Analysis
20 Years Experience

Seismic Data Processing & Imaging

Full 2D & 3D Services, Proprietary Noise Attenuation
High Resolution Velocity Analysis, Higher Order NMO
PSTM, PSDM, Tomography, Illumination

Seismic Attribute Analysis

GeoStatistical Inversion, Lambda Mu Rho, AVO Cross Plot Detection
Neural Network SeisFacies Classification

Seismic Derived Rock Properties (SDRP)

Lithology, Porosity, Fluid Type, Pore Pressure, Environment of Deposition

Prospect Generation, Ranking & GeoModel Building

Visualized Interpretation of Structure, Stratigraphy and SDRP
GeoStatistical Mapping & Depth Conversion

For an in-house presentation demonstrating how our team of exploration professionals can add value and reduce risk for your portfolio, call us.



Weinman GeoScience
Galen Treadgold
972-818-2550
WeinmanGeoScience.com

WellSight Systems

Practical Data Solutions for Geologists

Composite Logs

Mud Logs

Horizontal Logs

Strip Logs

Log Analysis

Easy To Learn and To Use
Fast Intuitive Interface
Reliable Field tested
Flexible Header, Layout
Professional Quality
Free Log Viewer / Printer
Affordable
Windows 95/98/ME,
NT4/2000/XP

www.WellSight.com

WellSight Systems Inc.

Phone: 403-237-9189 Toll Free: 1-800-447-1534

Email: info@wellsight.com Web: www.wellsight.com

Networking Helps Make Fall Student Expo a Hit

More than 170 students and a historic number of representatives from 20 companies made the recent AAPG/SEG Student Expo an across-the-board success.

The meeting attracted the highest number of industry representatives ever to the annual fall event, which was held in mid-October at the Westin Galleria in Houston.

The expo offered corporate recruiters the chance to interact with a talented and diverse pool of geoscience students from around the world. Activities included student poster presentations, informal interviews, network opportunities and field trips to active Anadarko drilling rigs north of Houston; an east Texas coastal trip to examine modern and late Quaternary environments; and the Texas Energy Museum and the Spindletop/Gladys City Boomtown Museum.

Poster presentations were for the 100-plus company recruiters there, and companies conducted well over 300 interviews.

Christopher Mattheus from the University of Alabama won the top poster prize, which was a \$500 gift certificate for either AAPG or SEG educational items such as books, short courses or meeting registration fees.

Four honorable mention awards of \$200 per student went to:

- ☐ Yogesh Agnihotri, the University of Texas at Dallas.
- ☐ Weihong Fei, the University of Texas at Dallas.
- ☐ Jon Koenig, Baylor University.
- ☐ Sylvia Nordfjord, the University of Texas at Austin.

Sponsors of the Student Expo were:
 ✓ **Platinum Level** – Anadarko, bp, ChevronTexaco, Devon, ExxonMobil, Kerr McGee, Occidental, Pioneer Natural Resources, Shell, Total, Unocal and Veritas.

✓ **Sponsor Level** – ConocoPhillips, EnCana Oil & Gas, Gunn Oil Co., Marathon, Minerals Management Service, Samson Resources, Schlumberger and Selman & Associates

For more information visit the AAPG/SEG Student Expo Web site at www.studentexpo.info, or contact Mike Mlynek at AAPG at students@aapg.org.
 ☐



Networking was an important part – as it always is – of the annual fall AAPG/SEG Student Expo in Houston.

CALL FOR PAPERS

Abstracts accepted November 30 – January 5th, 2005

www.seg.org/Cairo2005/abstracts

YOU ARE INVITED TO CAIRO, EGYPT

FOR THE
SECOND INTERNATIONAL
PETROLEUM CONFERENCE
& EXHIBITION

MAY 16-19, 2005



IMAGING THE FUTURE

For more information:
cairo2005@seg.org

Organized and hosted by:



continued from previous page

bookstore into our configuration – so by this consolidation alone the numbers will be up for 2005.

And we have some more features we plan to incorporate, including new software tools that will allow us to establish virtual communities to aid in communication between members.

This apparently will be a popular add, because AAPG members seem to want to talk to each other; the second most accessed page each month is the “e-mail a member” form – and there are all those hits to locate another member through the online directory.

Thanks for a great year.
Good browsing! ☐

Libya

Oil Types-Distribution
Oil Quality - API controls
Source Rock Kinetics
Oil Asphaltene Kinetics

www.humble-inc.com/libya.html

Humble Geochemical
www.humble-inc.com



global exploration starts here

DATA AND SERVICES

- GLOBAL GRAVITY AND MAGNETIC DATA
- ENHANCED SATELLITE GRAVITY
- INTEGRATED EXPLORATION STUDIES
- DATA MANAGEMENT

BENEFITS

- ENHANCED BASIN EVALUATION
- EXPLORATION RISK REDUCTION



GETECH Leeds +44 113 343 5240 GETECH Inc Houston +1 281 240 0004 info@getech.com www.getech.com

EMD Publications Available from AAPG

NEW! • Sequence Stratigraphy, Paleoclimate, and Tectonics of Coal-Bearing Strata (AAPG Studies 51)

Jack C. Pashin and Robert A. Gastaldo
This volume contains 10 chapters on coal-bearing strata of Carboniferous through Tertiary age and is based on a special session that was held at an AAPG Annual Meeting in New Orleans. Contributors have employed a multitude of approaches ranging from basin analysis to plant taphonomy to support a variety of views on sequence stratigraphy, paleoclimate, and tectonics of coal-bearing strata.



• Unconventional Energy Resources of North America (Poster) John R. Dyni

This is an excellent summary of information about coal, coalbed methane, natural gas hydrates, oil (tar) sands, oil shale, geothermal energy, and uranium. Anticipated readership: geologists, university geoscience departments, federal and state administrators, high school students, and the informed public.

university geoscience departments, federal and state administrators, high school students, and the informed public.

• Geology in Coal Resource Utilization

Douglas C. Peters
A compilation designed to show how geology and geologic concepts can be applied to coal resource exploration, extraction, and utilization. The papers are directed at managers to demonstrate the applications – and limitations – of geology in the coal industry.

• Atlas of Coal Geology (AAPG Studies 45)

Alexander R. Papp, James C. Hower and Douglas C. Peters
This two-volume publication on CD-Rom is designed as a reference and learning resource for both the novice and the expert in academia or the energy industry. Fully searchable by key words.

Visit the AAPG Online Bookstore:
<http://bookstore.aapg.org>

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

Berge, John S., Energy Advisors, Arvada (reinstatement); Warn, John Michael, Gasynergy, Morrison (reinstatement)

Illinois

Törnqvist, Torbjörn Einar, University of Illinois at Chicago, Chicago (J. Bhattacharya, R.J. Steel, M.D. Blum)

Louisiana

Lawton, William Arthur, Schlumberger, Lafayette (R.K. Cornell, D. Halverson, J.R. Dribus)

New Mexico

Thomas, Glenn M., independent, Cloudcroft (reinstatement)

Texas

Aasmyr, Harry T., ExxonMobil Exploration, Houston (M.R. Johnson, W.A. Gregory, T.M. Whitsett); Anderson, Brian Stewart, Fugro - LCT, Houston (K.W. Mohn, K.C. Bennett, P.K. Mescher); Jones, Gareth David, ExxonMobil, Houston (B.R. Tormey, F.J. Lucia, C. Kerans); Simpson, Joanna Whaley, consultant, Amarillo (D.J. Pertl, J.V. Miesse, J.D. Fisk)

Australia

Frith, Noel Henry John, ANFO Group, Lindfield (reinstatement)

Egypt

Abu Elyazid, Khaled Ali, Qarun Petroleum, Cairo (M.J. Oldani, M.A. Aziz, P.M. Munday);

Badran, Ahmed Mokhtar, Schlumberger, Cairo (A.N. El-Barkooky, A.R. Moustafa, A. Zakaria)

Kuwait

Hugentobler, Mike Ned, Halliburton ESG, Kuwait City (reinstatement)

Lebanon

Nader, Fadi Henri, University of Beirut, Beirut (J.W. Tucker, A. Taal, D.C. Blanchard)

Libya

McCullough, Ross Gwynne, Zueitina Oil, Tripoli (reinstatement)

Mexico

Carrillo-Chavez, Alejandro, Centro De Geociencias UNAM, Juriquilla (A.E. Guzman, R.S. Martinsen, A. Escalera)

Netherlands

Mercadier, Christophe Guy, Shell International E&P, Rijswijk (reinstatement)

Pakistan

Ahmad, Manzoor, Oil & Gas Development Co., Islamabad (T.M. Jaswal, A.S.H. Zaman, J.G. McCann)

Certification

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

Petroleum Geologist

California

Pierson, Raymond Marvin, Aera Energy Services, Bakersfield (J.E. Lucken, D.T. Deininger, K.L. Pitts)

Texas

Daniel, Scott M., Seven D Oil & Gas, Houston (Society of Independent Professional Earth Scientists); Tochterman, Jerry Edward, independent, Andrews (reinstatement)

MEETINGS OF NOTE

Editor's note: Meetings listed here are sponsored by AAPG or an affiliated group. An asterisk denotes a new or changed listing.

2004 International Meetings

Dec. 7-10, Offshore Southeast Asia, Suntec City, Singapore.

2005 U.S. Meetings

(The annual meeting for the AAPG Southwest Section will be announced.)

* April 10-13, Southwest Section, AAPG, Fredericksburg, Texas.

* April 22-29, AAPG Hedberg Conference, "Understanding, Exploring and Developing Tight Gas Sands," Vail, Colo.

April 29-May 1, AAPG Pacific Section, San Jose, Calif.

May 2-5, Offshore Technology Conference, Houston.

June 19-22, AAPG Annual Convention, Calgary, Canada.

June 26-29, Society of Professional Well Log Analysts, annual symposium, New Orleans.

Sept. 11-14, Mid-Continent Section, AAPG, Oklahoma City.

Sept. 18-20, Eastern Section, AAPG, Morgantown, W.Va.

* Sept. 24-26, Rocky Mountain Section, AAPG, Snow King Resort, Jackson, Wyo.

* Sept. 25-27, Gulf Coast Association of Geological Societies, AAPG, New Orleans.

Oct. 9-12, Society of Petroleum Engineers, Dallas.

Oct. 12-15, AAPG Foundation Trustee Associates, Branson, Mo.

Oct. 16-19, Geological Society of America, Salt Lake City.

Nov. 6-11, Society of Exploration Geophysicists, Houston.

2005 International Meetings

March 1-3, APPEX London (AAPG Prospect and Property Exposition), AAPG, London.

May 14-18, Geological Association of Canada/Mineralogical Association of Canada, Halifax, Canada. □



THE
GEOLOGICAL
SOCIETY
OF AMERICA

**BAY, BASINS,
BASEMENT,
and BEYOND**

**Pacific Section AAPG/SEPM
Cordilleran Section GSA
joint annual meeting**

at the spectacular
**Fairmont Hotel
in San Jose, California**

April 27- May 3, 2005

Call for papers

abstract deadline February 1, 2005

- Symposia • Theme Sessions • Field Trips
- Workshops • Short Courses • Special Events

Don't miss this exciting mix of industry and academia.

For more information and
online abstract submission visit

<<http://www.geosociety.org/sectdiv/cord/05cdmtg.htm>>



FOUNDATION UPDATE

Memorial contributions for Michel T. Halbouty may be made to the AAPG Foundation Michel T. Halbouty Grant. Recipients of this grant are graduate students pursuing geoscience careers at Texas A&M University.

The Halbouty Grant was one of the first named grants established by the AAPG Foundation, which was initiated by Halbouty in 1966.

Foundation (General)

Keith Robert Adamson
Mia Alexander
In memory of William R. Davidson
Mia Alexander
In memory of John Mann
Jason Cansler
Alfred Townes Carleton Jr.
In memory of George R. Gibson
Jonathan Roscoe Childs
Edward Alan Clerke
Douglas James Colkin
Pierluigi Corradini
Koby Shaun Cox
Frederika Demangeat
R. Nowell Donovan
Patrick Lee Drumm
Jim Elkin
In memory of Al Hedden and Doug Garrott
Arnout J.W. Everts
James Lee Faroppa
Jean-Hugh Marie Fillacier
Karen E. Franklin
George Michael Grammer
Robert D. Gunn
In memory of George Gibson
David Graham Hardy
In memory of Zuhair F. Al-Shaieb and Robert P. Kunkel
James Oren Hendricks
Andrew Hurst
Wilson Unekwujo Imaji
Eric Henry Johnson
Miguel Lopez-Blanco
Jack David Lynn
Melanie Lynn McQuinn
Douglas Scott Moore
Partners Inc.
In honor of Bob Esser
Geoffrey R. Pike
Jan C. Pluis
Mark Andrew Reynolds
Sabine Roessle
Larry Frank Smyers
Vaughan Martin Stagpoole
Tateishi Takeo
Darren Noel Walker

Public Service Endowment Fund

Hugh M. Looney Excellence Fund
William E. Gipson
In memory of George Gibson
Tillie Looney

K-12 Education Fund

Ibrahim M. Assa'adan
Herbert G. Davis
In memory of Lewis G. Fearing
Robert Gordon Davis
John McCamey Sweet
In memory of Frederick K. Scheerer
Sherrie Anne Pena
Lee R. Russell
Joan Lee Schindler
Joseph Bruce Schindler

Awards Fund

John Baldwin Nelson

Digital Products Endowment Fund

Herbert G. Davis
In memory of Paul N. McDaniel
Curtis Allen Carter
Marshall C. Crouch III
John Hall Howard

Grants-In-Aid Fund

Ibrahim M. Assa'adan
Herbert G. Davis
In memory of Zuhair Al-Shaieb
Nedra Keller Hansen
In memory of Kenneth Keller
Alexander A. Kitchka

Ike Crumbly
Minorities In Energy Grant
Jean C. Hsieh
Donald A. O'Nesky Named Grant
Paul H. Dudley Jr.

Distinguished Lecture Fund

Ibrahim M. Assa'adan
Pierluigi Corradini
Herbert G. Davis
In memory of George R. Gibson
Bruno Saftic
Howard William Schwartz

Visiting Geologist Fund

Charlyne, Deborah and Rebecca Dodge
In memory of Charles F. Dodge □

Officer Candidates Announced

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

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

Biographical information and statements from all candidates can be found on the AAPG Web page (www.aapg.org), and also will appear in the January EXPLORER.

The candidates are:

President-Elect

□ Thomas Ahlbrandt, U.S.

Geological Survey, Denver.

□ Lee Billingsley, Abraxas Petroleum, San Antonio.

Vice President

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

□ Steven L. Veal, DCX Resources, Denver.

Secretary

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

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



BECAUSE, WHEN SHE GOES AWAY TO COLLEGE, YOU'RE GOING TO BE THERE FOR HER.

THE GEOCARE BENEFITS TERM LIFE INSURANCE PLAN. PROTECTING YOUR FAMILY'S FUTURE... AND YOUR PEACE OF MIND. You have dreams for your family's future. Make *sure* you have the financial resources to make those dreams a reality, even if you're not there—help protect your family's financial security with the GeoCare Benefits Term Life Plan. Apply for up to \$750,000 in coverage, at a very affordable group rate.

BE THERE FOR YOUR FAMILY, EVERY STEP OF THE WAY, WITH GEOCARE BENEFITS TERM LIFE PLAN COVERAGE. CALL 1-800-337-3140 OR VISIT US ONLINE AT WWW.GEOCAREBENEFITS.COM FOR MORE INFORMATION, INCLUDING ELIGIBILITY AND RENEWAL PROVISIONS, EXCLUSIONS, LIMITATIONS AND RATES.

GeoCare Benefits Term Life Insurance Plans, P.O. Box 9006, Phoenix, AZ 85068, Email: geocarebenefits@agia.com. The Term Life Plan is underwritten by New York Life Insurance Co. (51 Madison Ave., New York, NY 10010). All coverage is subject to approval by New York Life.



JOHN M. STAFFORD & ASSOCIATES, LLC
ATTORNEYS AT LAW



Confidentiality Agreements • Letters of Intent
Reservation of Overriding Royalty Interests
Purchase and Sale Agreements
Assignments • Litigation Management
Negotiations • Technical/Legal Liaison



PROVIDING COST EFFECTIVE LEGAL SERVICES TO COMPANIES AND INDEPENDENT GEOLOGISTS
AAPG Member since 1979
9876 S. Clairton Way, Highlands Ranch, Colorado 80126
(303) 471-4109 Office • (240) 250-5922 Fax

CLASSIFIED ADS IN THE EXPLORER

You can reach about 30,000 petroleum geologists at the lowest per-reader cost in the world with a classified ad in the EXPLORER.
Ads are at the rate of \$2.10 per word, minimum charge of \$42. And, for an additional \$50, your ad can appear on the **classified section on the AAPG Web site**. Your ad can reach more people than ever before.
Just write out your ad and send it to us. We will call you with the word count and cost. You can then arrange prepayment. Ads received by the first of the month will appear in the subsequent edition.
For further information or assistance, call Brenda Merideth at (918) 560-2647 or (800) 288-7636 (Canada and USA).

READERS' FORUM

Bid This

Regarding your article "Bid Winners Can Face Curse" (November EXPLORER):

My goodness, an article telling me that many winning auction bids are too high? And that you should not bid too high or too low in an auction situation? What is next, an article telling me not to drill dry holes because they are bad for the bottom line?

Cutting edge journalism here.

Curt Morrill
El Dorado, Ark.

A Day Late?

From 1996-2003 I tried to get the message out that the price of gasoline and oil is not necessarily the oil industry

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.

trying to make high profits at the public's expense – that there are many factors involved in producing a gallon of gasoline. I have talked to Rotary clubs, Kiwanis clubs, church groups and any other groups that will listen.

My first problem came from a church group, where I was called a liar for saying that there were state and federal taxes on gasoline. Last year a woman from New York City told me there were not state taxes in New York on gasoline.

How ignorant can the public be?

I finally gave up last year because of the lack of support from the industry and the cost of getting slides updated every year.

I get an impression from recent articles in the last two months of the EXPLORER that the AAPG is finally trying to get the message out that the price of gasoline is not necessarily the industry's fault. Congratulations – but it is probably too late.

Too bad there wasn't more support and effort early.

Fred Haeberle
Delaware, Ohio

Volcano

from page 22

surface of the lake is covered with logs, and the outlet to the North Fork Toutle River has been blocked."

That Was Then, This is ...

Scientists, who euphemistically refer to what went on at the mountain last month as "throat clearing," say that even in the event of a larger eruption there is hardly any chance of a repeat of the mountain's lethal 1980 explosion or of Hawaiian-style lava flows. The mountain is in the middle of a large national forest and the nearest community is 30 miles away, so any activity will occur over rural areas.

(Of course, Mount St. Helens was in a rural area in 1980, as well).

For the time being, experts believe that populated areas will get little ash if the current light west-northwest wind holds.

The biggest fear is that an eruption could melt the volcano's 600-foot-deep glacier and trigger debris flows to the barren pumice plain at the foot of the mountains. Long-term effects of a significant eruption include increased hazards of catastrophic flooding due to the rearrangement of local terrain by volcanic debris that will block parts of the area's natural drainage system.

For now, though, there is no panic and the chief concern is that a significant ash plume laden with pulverized rock and silica could damage aircraft engines and the surfaces of cars and homes.

Predicting the force, devastation, or even temperament of a volcano is not something intelligent scientists discuss for very long, though. Even though Mount St. Helens appears for the moment to be napping, as Peter Frenzen with the U.S. Forest Service recently said (and we may already know this by now), "the volcano reserves the right to change its mind." □

GEO software delivers ALL your well information, uniquely wrapped in just ONE compact file ...



- drastically reducing communication costs
- eliminating e-mail overload
- cutting down post-TD operations costs
- letting you publish logs to your network, intranet, web or CD-ROM,
- and access well logs & information from any connected location ... including home !

active links
to external
docs & files !

..... automatic or streamed-in updates !

..... multiple, selectable log layouts !

..... dynamic, exportable data !

..... embedded spreadsheets, tables, doc files !

GEO

SDC Geologix

www.geologix.com

Houston Norwich Jakarta
+1 713 917 6755 +44 1603 706900 +62 21 575 0896

CAPTURE COMMUNICATE COLLABORATE COMPLETE

CLASSIFIED ADS

POSITION AVAILABLE

**TWO ASSISTANT PROFESSOR POSITIONS
BOONE PICKENS SCHOOL OF GEOLOGY
OKLAHOMA STATE UNIVERSITY**

The Boone Pickens School of Geology at Oklahoma State University (OSU) seeks applications for two tenure-track faculty positions. The appointments will be at the assistant professor level and are effective August 16, 2005. Applicants are required to have a Ph.D. degree in geological sciences at the time of appointment.

The applicants must show promise of an outstanding research program and be committed to excellence in teaching. Applicants should have demonstrated research capabilities in one of the following disciplines: 1) Petrophysics/Well log Analysis; 2) Contaminant Hydrogeology/Aqueous Geochemistry; 3) Basin Analysis/Sedimentology/Stratigraphy/Clastic and/or Nonclastic Petrology and Petrography; 4) Numerical Modeling of Geological Processes.

Preference will be given to those candidates who have previous undergraduate and/or graduate teaching experience, and have published refereed articles in his or her discipline. The successful candidates will be expected to develop a fundable research program that is discipline specific and/or interdisciplinary, and that involves coordination with other researchers within the School of Geology, other departments at Oklahoma State University, and/or other universities.

The regular teaching load at the School of Geology is two courses per semester. The successful candidates will be expected to supervise M.S. graduate students and develop courses in his or her specialty. In addition they will participate in teaching introductory geology courses.

Candidates should submit a letter of application, including a discussion of research interests and approach to teaching, along with a curriculum vitae; academic transcripts; and the names, addresses, e-mail addresses, and phone numbers of five references to: Assistant Professor Positions Search, School of Geology, 105 Noble Research Center, Oklahoma State University, Stillwater, Oklahoma 74078-3031. Phone: (405)-744-6358. Fax: (405) 744-7841. Screening of candidates will begin on January 17, 2005 and will continue until the positions are filled.

Oklahoma State University is an Affirmative Action/Equal Opportunity Employer. The positions are subject to availability of funding.

More information on OSU and the Boone Pickens School of Geology can be found on the web <http://www.pio.okstate.edu> and <http://www.okstate.edu/geology> respectively.

**PETROLEUM GEOSCIENCES
PETROLEUM INSTITUTE,
ABU DHABI, UAE**

The Petroleum Geosciences Program of The Petroleum Institute, Abu Dhabi, is seeking outstanding candidates for several possible positions:

Petrophysics-well-logging. Ph.D. or M.Sc. in a relevant geoscience is required. Candidates must have expertise in petrophysical laboratory measurements and be skilled at integrating modern log, core, seismic, and fluid and pressure data to interpret the subsurface and to predict reservoir performance. Experience with carbonates is advantageous.

Reflection seismology. Ph.D. in relevant area of geoscience required. Candidate must have expertise in seismic processing, with skills in advanced processing, seismic inversion, seismic imaging, and multi-attribute and multi-component analyses, or have expertise in seismic interpretation and experience interpreting seismic attributes. Experience with carbonates is advantageous.

Geochemistry. Ph.D. in relevant area of geoscience required. Candidates must have expertise in inorganic geochemistry of carbonate petroleum systems and fluids and in environmental geochemistry.

Petroleum Geoscience. Ph.D. or M.Sc. in relevant area of geoscience required. Candidates must have expertise in petroleum exploration, development, and reservoir management, modern geoscience technology and software, and be familiar with modern industry trends.

Faculty in Petroleum Geosciences will teach undergraduate and graduate courses, develop an active research program that impacts the UAE petroleum industry, and engage in institutional service work. Opportunities exist to work with PI industry stakeholders in research. Teaching experience and petroleum industry experience are desirable for all positions. Appointments will be at a rank commensurate with experience.

The Petroleum Institute is a small, highly focused, teaching and research institute that offers educational programs that will lead to B.Sc., M.Sc., and Ph.D. degrees in engineering and petroleum geosciences. Faculty will have the resources to equip laboratories with up-to-date analytical equipment and computer software and hardware to support teaching and research.

The compensation package for staff includes housing, utilities, home furnishings loan, automobile purchase loan, and annual leave travel.

This is an unusual opportunity for self-motivated geoscientists to help build a world-class teaching and research institution. Additional information is at www.pi.ac.ae/. Interested candidates should send an application and their résumé to rwinn@pi.ac.ae and to mkassim@pi.ac.ae. Please submit a hardcopy application only if unable to submit electronically to:

Faculty Recruitment Coordinator-
Petroleum Geosciences Program
Petroleum Institute
P.O. Box 2533
Abu Dhabi, United Arab Emirates

Candidates are encouraged to submit an application as soon as possible and no later than 31 January 2004, although applications will be considered until vacant positions are filled.

**ALBERTA GEOLOGICAL SURVEY
Edmonton, Alberta, Canada**

POSITION: SENIOR STRATIGRAPHIC GEOLOGIST

PURPOSE: Provide leadership and expertise in all aspects of bedrock stratigraphy within the Northern Mapping Section of the Alberta Geological Survey.

Responsibilities include:

- Application of advanced geological principals and independent judgement to the interpretation of the stratigraphic framework of Alberta.
- Development of innovative methodologies and standards for the interpretation of geological data and dissemination of geological products that will maintain and enhance the credibility of the Alberta Energy and Utilities Board.
- Providing informed opinions, based upon broad knowledge and experience, regarding mineral deposit potential (including shale-hosted

mineralization) and petroleum potential (including unconventional resources) within areas of investigation.

Qualifications include:

- Advanced university degree in Geology or related discipline (Ph.D. preferred) with a minimum of 10 years of related progressive experience.
- Up-to-date, expert professional knowledge of clastic sedimentology, lithostratigraphy, sequence stratigraphy and biostratigraphy.

Deadline:

Friday, January 7, 2005.

For a complete position description and information on how to apply, please visit www.eub.gov.ab.ca.

**SEDIMENTARY GEOLOGY
UNIVERSITY OF WYOMING**

The Department of Geology and Geophysics (<http://home.gg.uwyo.edu>) invites applications for a tenure-track, assistant professor position in sedimentology/stratigraphy. Higher rank (associate professor) is possible with appropriate qualifications. Ph. D. is required at time of appointment, August 2005.

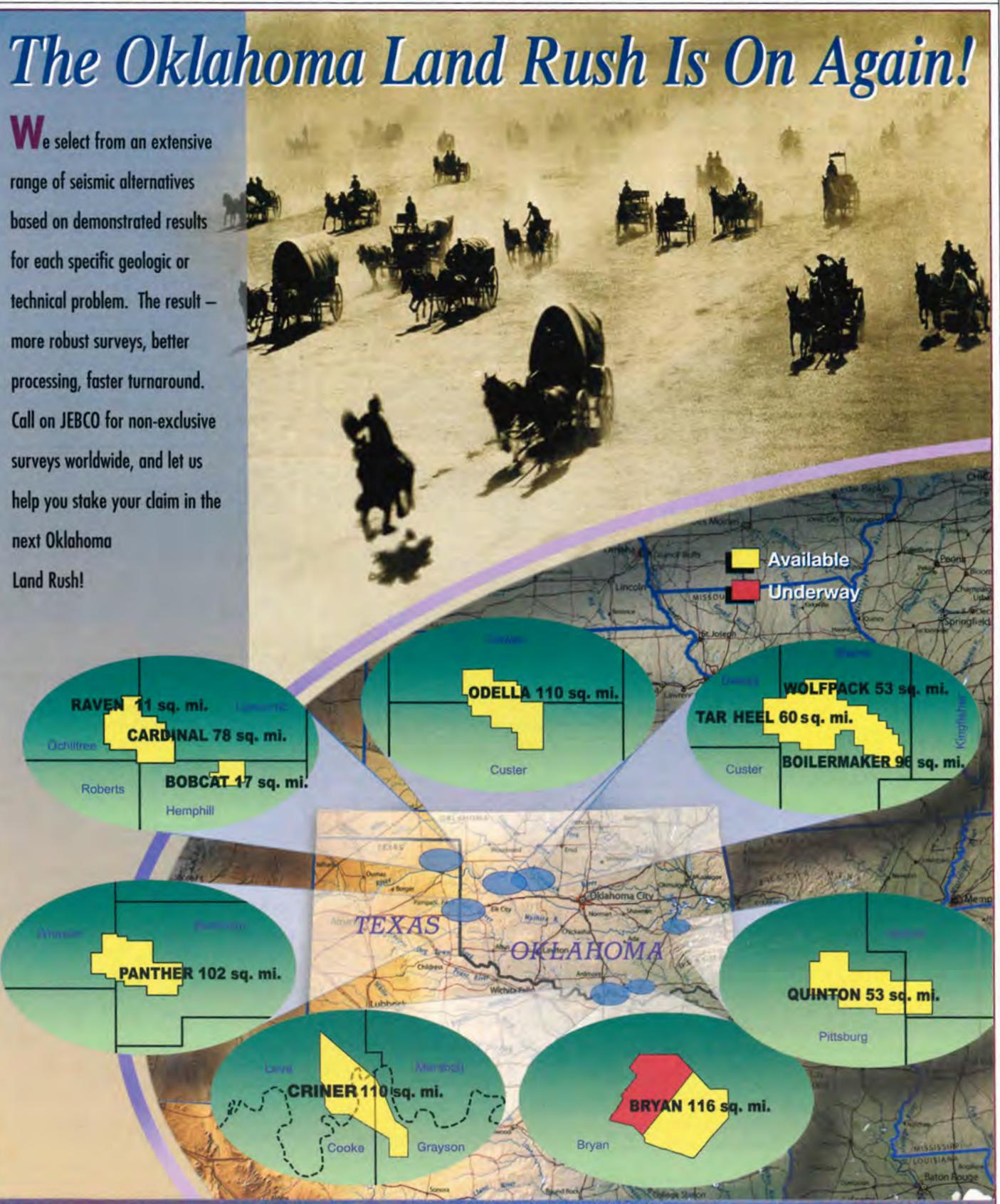
We seek an individual who shows the potential to develop an internationally recognized, externally funded research program, will be involved in the undergraduate and graduate teaching mission of the department, and will build on departmental strengths in sedimentation, energy research, seismology and structural geology. Specialty is open, but may include such diverse fields as quantitative basin analysis, seismic stratigraphy, carbonate sedimentation, paleoclimate reconstruction, physical sedimentology and sediment transport. The Department is home to the Institute for Energy Research (<http://www.ieronline.org/>) and the University has a strong and long-standing commitment to energy-related research in the geosciences.

Applications should include a statement of research and teaching interests and accomplishments, curriculum vitae, and the names and contact information of three references. Review of completed applications will begin December 15, 2004. Send an electronic copy of your application to Ms. Carol Pribyl at cpribyl@uwyo.edu; if you have additional application materials to send, please direct them to Sedimentary Search Committee, Dept. of Geology & Geophysics,

See Classified Ads, next page

The Oklahoma Land Rush Is On Again!

We select from an extensive range of seismic alternatives based on demonstrated results for each specific geologic or technical problem. The result – more robust surveys, better processing, faster turnaround. Call on JEBCO for non-exclusive surveys worldwide, and let us help you stake your claim in the next Oklahoma Land Rush!



For more information, contact: **JEBCO Seismic, L.P.**
10260 Westheimer, Suite 400 / Houston, Texas 77042
Phone: (713) 975-0202 Fax: (713) 975-9293 E-mail: jebco@jebcoseis.com



www.jebcoseis.com

New Ideas for New Frontiers

Classified Ads

from previous page

University of Wyoming, 1000 E. University Ave., Dept. 3006, Laramie, WY 82071.

The University of Wyoming is an equal opportunity/affirmative action employer.

**THE PETROLEUM INSTITUTE
Abu Dhabi, United Arab Emirates****Chemistry Faculty**

The Petroleum Institute in Abu Dhabi is seeking applications for chemistry faculty to teach General Chemistry I and II (Freshman level), and Physical Chemistry (Junior level). Applicants should possess an earned PhD in Chemistry, Chemical Engineering, or a closely related field. Appointments at all levels will be considered by applicants must have demonstrated experience and achievement in teaching. Appointments are anticipated for early 2005, and should continue for at least three years.

The Petroleum Institute, which is affiliated with the Colorado School of Mines, opened in September of 2001 in newly-constructed office, laboratory, and classroom facilities. Chemistry courses at the Petroleum Institute include a significant laboratory component and require an average of 12 contact hours per week (actual class and laboratory time). Additional responsibilities of the chemistry faculty include mentoring and advising of students. The chemistry faculty also works closely with faculty from the Engineering programs and the Foundation program to develop and refine the chemistry curriculum. Further information about the Petroleum Institute can be obtained on the PI website at www.pi.ac.ae.

The total compensation package includes a 12-month base salary and a benefits allowance that covers housing, utilities, initial furnishings, transportation (automobile purchase loan), health insurance and annual leave travel. Applicants must be in excellent health and will be required to pass a pre-employment medical examination.

Interested candidates should submit a letter of application and a detailed resume electronically to Mohamed Kassim (mkassim@pi.ae). Please only submit a hardcopy application if you can not do so electronically to:

**Mohamed Kassim,
Executive Director's Office
The Petroleum Institute
P.O. Box 2533
Abu Dhabi,
United Arab Emirates**

Candidates are encouraged to submit applications

as soon as possible but no later than **December 31, 2004**. Review of applications will begin on November 1, 2004 and continue until the available positions have been filled.

**University of Houston
Department of Geosciences**

Sequence Stratigraphy. The Department of Geosciences is seeking a senior-level geoscientist with a strong international reputation and research background to fill the newly established position in Sequence Stratigraphy at the full professor level. The successful candidate will be expected to develop and maintain a vigorous and actively funded research program, and to teach, advise, and mentor graduate and undergraduate students. Applicants should have extensive practical experience in the application of modern sequence stratigraphic methods using outcrop, core-well log, and/or geophysical data and will be expected to interact with the greater Houston community of geologists and geophysicists. We seek applicants with a broad background in the geological sciences, a distinguished international reputation for innovative research and a strong record of peer-reviewed publication.

The Professor of Sequence Stratigraphy will join an active and expanding faculty in geology, geophysics, and atmospheric science presently consisting of 25 tenure track and 10 research faculty members. The candidate would complement our existing strengths in sedimentary geology (including carbonate and siliciclastic depositional systems, basin analysis, paleontology, chronostratigraphy, thermochronology, organic and inorganic geochemistry) and applied seismology (including seismic interpretation, physical and numerical modeling, petrophysics, tomography, imaging, and attribute analysis). The successful candidate will have access to a wide range of teaching and research facilities in the Department of Geosciences including a modern low-temperature thermochronology lab as well as facilities in the industry-supported Allied Geophysical, Rock Physics, Reservoir Quantification, and Inorganic and Organic and Inorganic Geochemistry Labs. The Department maintains a full suite of commercial seismic interpretation, processing and visualization software running on state-of-the-art workstation and high-performance computing facilities. We strongly encourage prospective candidates to review the department's web site at <http://www.geosc.uh.edu>.

Candidates for this position should send: 1) a letter of application including statements of teaching and research interests, 2) a curriculum vitae, 3) four letters of references (letters must be received before the applications will be considered), and 4) graduate school transcripts to the Faculty Search Committee, Department of Geosciences, Science and Research 1 Bldg., Rm 312, University of Houston, 4800 Calhoun Rd., Houston, TX 77204-5007. Candidate evaluations will begin on February 1, 2005 and continue until the

position is filled. Appointments are expected by the Fall semester, 2005. A Ph.D. in geosciences is required.

The University of Houston is an Equal Opportunity/Affirmative Action employer. Minorities, women, veterans, and persons with disabilities are encouraged to apply.

**Research Faculty Position in Reflection
Seismology, University of Memphis**

The Center for Earthquake Research and Information (CERI) at the University of Memphis invites applications for a Research Faculty position. The position is a 12-month non-tenure track appointment with faculty rank and salary at the Research Assistant Professor or Research Associate Professor level depending on the qualifications of the successful candidate. We anticipate the appointment beginning July 1, 2005.

We are seeking applicants with a demonstrated record of research productivity in the field of reflection seismology. The successful candidate will be expected to develop a vigorous, externally funded research program, supervise research by graduate students, and help develop industry/academic liaisons for CERI. We are particularly interested in applicants with demonstrated research interests in the acquisition of seismic reflection data and its interpretation in terms of the geology, structure, composition, evolution and tectonics of the crust. Interpretation can also have applications to resource exploration, natural hazard assessment, or environmental studies. Knowledge of and experience in field acquisition and processing techniques is critical. A doctorate in seismology, geophysics, or a closely related field is required at the time of appointment. Research professors are affiliated with the Department of Earth Sciences at the University of Memphis through the academic program. CERI (<http://www.ceri.memphis.edu>) has a large seismic network facility with technical staff, exploration geophysical equipment, state-of-the-art computer facilities, and state-of-the-art broadband and strong ground motion field recording capability.

Applicants should submit a full curriculum vitae, a letter expressing their research interests and qualifications, and the names and addresses (with phone numbers and email) of at least three references to: Chair, Research Faculty Search Committee, CERI, The University of Memphis, 3876 Central Ave., Suite 1, Memphis, TN 38152.

To receive full consideration, applications should be received by February 1, 2005 but applications may continue to be accepted until the appointment is made. The University of Memphis, a Tennessee Board of Regents institution, is an Equal Opportunity/Affirmative Action University. It is committed to education of a non-racially identifiable student body.

BUSINESS OPPORTUNITY

DRILLING-PROSPECTS.COM
See us online at
www.drilling-prospects.com

Louis J. Mazzullo, Petroleum Geological Consultant,
Western U.S. basins. Visit www.lmazzullo.com or call
(505) 890-0080

FOR SALE

MICA - Petroleum engineering software for Windows providing interactive decline curves and economic analysis, ease of use, flexible reporting and graphing and production history data from ten states. Live 30 day demo and more information available at www.mcsi.com. Cost US\$1050 per user. Phone: 1-800-869-7616 or 1-719-520-1790.

ESTABLISHED BUSINESS FOR SALE

International Sample Library @ Midland - formerly Midland Sample Library. Established in 1947. Have 164,000 wells with 1,183,000,000 well samples and cores stored in 17 buildings from 26 states, Mexico, Canada and offshore Australia. We also have a geological supply inventory. Phone: (817) 461-0408 Fax: (817) 453-1390

Mudlogging units with easy to learn software. Very reliable, full featured, portable units. Contact Automated Mudlogging Systems, (303) 794-7470. www.mudlogger.com

BOOKS. Rare and out-of-print books and periodicals on geology and related sciences. Large stock on all phases of the oil industry, domestic and foreign covering geology, history, engineering, logging, geophysics, etc. Catalogs available. The Hannum Company, Box 1505-B, Ardmore, OK 73402. info@hannum.cc

MISCELLANEOUS

Wanted: First seven years AAPG Bulletin to complete set. Will buy more. Also will buy libraries. Foster 432-682-9244 mgm144@minerals.net

Research Geologists Aberdeen

TOTAL E&P UK PLC is proud of its international reputation for excellence in the field of geosciences. Active in the areas of petroleum exploration, development and production and with a strong heritage in Research and Development, TOTAL is committed to innovation and to pushing back technical boundaries. Through our geoscience research activities we aim to keep the company ahead of the competition in developing emerging technologies. Geosciences play a central role in delivering our ambitious business strategy and the resulting sustainable growth. Our Geoscience Research Centre (GRC), based in Aberdeen, the hub of Europe's oil and gas industry, has identified vacancies for two Research Geologists.

Working with professionals in Geology, Reservoir and Geophysics and collaborating closely with other TOTAL Group research centres, academia, professional institutions and with our partners to develop and advance new technologies, these roles offer an excellent opportunity for developing professionals to build on their knowledge and capabilities.

To succeed in these posts applicants should demonstrate academic excellence and professional success. Typically your profile will include:

- First degree in earth sciences at 1st or 2.1 Hons level with related MSc and preferably a PhD.
- Ideally 1-2 years relevant experience in reservoir geology
- Highly developed skills in reservoir characterisation and computer based earth modelling
- Excellent report writing and presentation skills
- Self reliant and able to engage effectively with others
- Capable of building and utilising a network of contacts
- Able to work to tight deadlines without compromising the quality of work produced
- Energy, enthusiasm and desire to learn and progress
- Ability to work in multi-disciplinary teams
- Innovative thinker with the ability to identify opportunities and see the business potential

TOTAL can offer the successful applicants an unrivalled environment in which to further develop technical and professional skills, underpinned by a genuine commitment to training and development. Working in multi-cultural teams with leading professionals in their fields, the successful applicants will be given the opportunity to learn French and will be considered for international assignments.

Interested applicants should apply, enclosing a detailed CV to TOTAL's recruitment advisors

TOTAL E&P UK PLC, a leading oil and gas operator on the UK Continental Shelf, is a subsidiary of the TOTAL Group whose activities span some 130 countries around the world. Employing around 600 staff in its headquarters in Aberdeen, its portfolio includes operatorship of the Alwyn Area fields, the high pressure/high temperature Elgin/Franklin fields and the St Fergus Gas Terminal, together with a number of interests in non-operated fields.

To find out more about TOTAL please visit our website at www.total.com



The Urquhart Partnership, 8 North Silver Street, Aberdeen AB10 1RL
e-mail: total@upwebsite.com www.upwebsite.com





VEBA OIL OPERATIONS, LIBYA
EXPLORATION STAFF

Veba Oil Operations is one of the major oil production companies of the Libyan oil industry. They are currently seeking accomplished petroleum explorationists to augment the operations of their Exploration Department based at their head offices in the Mediterranean City of Tripoli. Applications are invited for the following positions.

SENIOR STAFF GEOLOGIST [INTERPRETATION]

Will be expected to locate commercial accumulations of oil/gas and provide expertise in maximising the effectiveness of the department's exploration programmes. A highly technically proficient geoscientist is sought with at least 12 years' background in subsurface geology/stratigraphy, wellsite/log analysis and geophysical data interpretation especially seismic.

STAFF GEOLOGIST

Will develop drillable prospects within the Company's extensive Libyan concessions and undertake geological studies to evaluate the potential of new exploration areas. A minimum of 8-10 specifically applicable oil company experience is necessary including a sound background in geophysics and seismic interpretation.

SENIOR STAFF GEOPHYSICIST

Will be required to evaluate and interpret geophysical/seismic data together with geological evidence in order to generate wildcat drilling prospects and also provide expertise in locating appraisal and development wells. At least 10 years' solid background in 2D-3D seismic interpretation and prospect generation is sought. Knowledge of Charisma workstations ["Geoquest"], CPS-3 mapping software and seismic trace inversion is obligatory.

SEISMIC DATA PROCESSING SPECIALIST

Carries out 2D-3D data processing quality control for all company seismic projects, organises preparation of tenders and contracts and plans test programme for processing parameters. Also evaluates and recommends optimal data gathering/processing techniques for geophysical acquisition programmes. A minimum of 5 years' 2D-3D process experience and good knowledge of seismic data acquisition is essential.

These positions are based living and working in Tripoli. Veba Oil offer long term, married status, staff contracts with: £sterling salaries paid net of local taxes/free furnished accommodation/paid annual leave with airfares provided to point of origin/free medical insurance [BUPA].

Please send a full CV to: Peter Nicholls, Recruitment Administrator,
Jawaby Oil Service, 15-17 Lodge Road, St Johns Wood, London NW8 7JA, UK.
Fax: 020 7314 6136. Email: pnicholls@jawaby.co.uk.
Reference must be quoted in the subject area of email applications. Reference: VB32A.



Assistant Professor in Petroleum Geoscience

The Department of Geology and Geophysics at the University of Calgary invites applications for a full-time tenure track position in Petroleum Geoscience at the rank of assistant professor. This position will begin July 1, 2005. Applicants must have a PhD degree in petroleum-related geoscience and be enthusiastic about contributing to teaching, research and university service.

The successful candidate will have expertise in some or all of the following: sedimentology, sequence stratigraphy, reservoir characterization, subsurface mapping, play assessment, basin analysis, and petrophysics. Duties will include developing and teaching undergraduate and graduate courses in the areas of expertise. Supervision of graduate students and development of an independent research program, that complements the existing petroleum-related research groups at the University of Calgary, are also expected. The successful applicant will join other members of the department in collaborative research and pursue the development of strong ties with the petroleum industry through the initiatives of the Institute for Sustainable Energy, Environment and Economy (ISEEE) and the Geoscience Professional Development Centre (GPDC). Further information about the department, ISEEE, and GPDC is available at www.geo.ucalgary.ca.

The closing date for applications is **January 15, 2005**. Applicants should submit a curriculum vitae, list of publications, statement of research interests and teaching philosophy, and the names, mailing addresses and email addresses of at least three referees, to: **Dr. L.R. Lines**, Head, Department of Geology and Geophysics, University of Calgary, 2500 University Drive N.W., Calgary, AB T2N 1N4 Canada. Fax: (403) 284-0074. Email: lrines@ucalgary.ca.

All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority. The University of Calgary respects, appreciates and encourages diversity.

To see all University of Calgary academic positions, please visit www.ucalgary.ca/hr/career



www.ucalgary.ca

Imperial College
London

**GET AHEAD,
STAY AHEAD**



DEPARTMENT OF
EARTH SCIENCE AND ENGINEERING

Masters in Petroleum Geoscience

An exceptional one-year course with strong links to industry

This course provides the skills needed for the modern oil industry. Its unique collaborative links with a sister MSc in Petroleum Engineering allows the course to cover the full spectrum of hydrocarbon exploration and production activities.

Emphasis on technical and transferable skills for industry

The course teaches current petroleum industry methods and practices, utilising state-of-the-art industry software and hardware.

Course topics: •2D/3D seismic acquisition, processing and interpretation •basin analysis •sequence stratigraphy •modelling of petroleum systems •prospect/play evaluation •reservoir characterization and modelling •development geology •petrophysical evaluation •risk assessment •petroleum economics. Students develop transferable skills including communication (oral, written and aural), team work, decision making and time and project management.

Highlights

•fieldtrips to basin and reservoir analogues in the UK and USA •team projects in field development (integrating Petroleum Geoscience and Petroleum Engineering) and play/prospect evaluation •independent research projects.

Dedicated experienced staff and facilities

A network of Unix workstations with 2D/3D seismic packages, extensive PC systems/ comprehensive suite of industry standard software and analytical research laboratories

A great place to study

Imperial College has long been a leader and innovator in advanced education in the Earth Sciences, including petroleum related courses, since 1911.

London is an international centre for the oil and gas industry and provides access to numerous professional bodies (PESGB, SPE, AAPG, etc) for petroleum geoscientists and engineers.

Who should apply?

The minimum entrance qualification is normally an upper-second class honours degree in earth science or a related subject from a UK university, or its equivalent from an overseas academic institution. We also encourage professionals with other qualifications and a minimum of three years relevant industrial experience, to apply.

Employment opportunities

Imperial College has an excellent reputation and a strong track record for employability, with many graduates working in major oil companies, allied service industries and consultancies.

NERC and industrial studentships are available

For further information and how to apply, contact:

Ms. S.K. Luther, Course Administrator, Dept of Earth Science and Engineering, Imperial College London, South Kensington campus, London SW7 2AZ. Tel: +44 (0)20 7594 6445; Fax: +44 (0)20 7594 7444; Email: s.luther@imperial.ac.uk

Visit the website: <http://www.es.eimperial.ac.uk>



American Geological Institute
William L. Fisher Congressional
Geoscience Fellowship

The American Geological Institute is pleased to announce the William L. Fisher Congressional Geoscience Fellowship. The successful candidate will spend 12-16 months (starting September 2005) in Washington working as a staff member for a member of Congress or congressional committee. The fellowship is a unique opportunity to gain first-hand experience with the legislative process and contribute to the effective and timely use of geoscientific knowledge on environmental, resource, natural hazards, and science policy issues.

Minimum requirements are a master's degree with at least three years of post-degree work experience or a Ph.D. at the time of appointment. The fellowship carries an annual stipend of up to \$49,000. Support for the fellowship is provided by a newly established endowment through the AGI Foundation honoring William L. Fisher.

All application materials must be postmarked by Feb. 1, 2005.

For details on the fellowship and application procedures visit the AGI website www.agiweb.org/gap/csf
AGI is an equal-opportunity employer.



DIRECTOR'S CORNER

Build a Foundation on Which to Build

By RICK FRITZ

There is a Chinese proverb that states, "A wise man does not lay up treasure – the more he gives, the more he has."

The success of any professional association is the degree of giving provided by its membership. People sometimes assume that the staff does most of the work, but it is the staff's mission to facilitate the opportunities and work donated by members. Success is truly a joint venture.

Giving, of course, takes two forms – time and money. Giving usually is associated with money, but giving "time" is one of the most valuable gifts that members can provide. Several months ago I wrote in this space about the importance and opportunity for members to give their time to the Association, and Pat Gratton, the AAPG president, has discussed this in his monthly columns.

AAPG has many opportunities to serve and we always are looking for members to work on committees or other special projects. The Publications Committee, for example, has need of new submittals for special publications. This is a great opportunity for members and fulfills AAPG's mission of "disseminating information."

If you have any questions or wish to submit your name for a committee or special project, please contact me by phone at 888-945-2274, extension 639, or by e-mail to rfritz@aapg.org.

* * *

Monetary giving also is key to the development of the Association.

When most think about monetary giving we typically think of the AAPG Foundation, and that is good. The money that individuals and corporations have provided to the Foundation provides basic support for programs that support the "public good," but also support member goals for the overall geologic community. Programs such as the Grants-In-Aid for students and our Distinguished Lecturers are the direct result of the generosity of AAPG members through the Foundation.

However, one of the "gems" provided by the Foundation is often forgotten or missed by members – the Foundation Library, which was established in 1978.

The Foundation Library is managed by two librarians, Mary Kay Grosvald and Karen Piquene, and they have an extensive library at their disposal – plus complete electronic research capabilities, including GeoRef and Datapages. As a result Mary Kay and Karen provide complete

research services.

Any member can call or e-mail the Foundation librarians and request research on a particular field, trend or subject. For example, the librarians recently have made numerous complete searches for members on the Barnett Shale. Each member receives a free service and only pays for direct fees, such as search access cost, copying and postage.

This is truly a bargain and a great service to the public and AAPG members.

I encourage you to contact the Foundation Library the next time you need information. You can reach them at 888-945-2274, extension 620, or by e-mail to library@aapg.org.

* * *

As I said at the beginning, the success of the Association is dependent on the generosity of its members. But consider this – the growth of the Association is limited by the level of that generosity.

In other words, the more members give, the more AAPG can give back.

As requested by his family, memorial contributions for Michel T. Halbouty may be made to the AAPG Foundation Michel T. Halbouty Grant. Recipients of this grant are graduate students pursuing geoscience careers at Texas A&M University.

The Halbouty Grant was one of the first named grants established by the AAPG Foundation, which was initiated by Halbouty in 1966.

Contributions may be forwarded to the AAPG Foundation, Attention: Diane Keim, P.O. Box 979, Tulsa, Okla. 74101-0979, or may be made by telephone – (918) 584-2555, or fax – (918) 560-2642.

During the past five years AAPG has been in the process of building new and improved member benefits. To continue this trend, we need new members to volunteer to help on committees and special projects. Also we need more members to give monetarily to projects in which they are interested.

In recent years, giving to the AAPG Foundation has declined primarily due to economic conditions. We ask all members to consider the opportunities to give to one or more of the projects supported by the Foundation. For example, you can support the Foundation Library by giving to the fund established with a gift annuity by Daniel A. Busch, former AAPG president and Sidney Powers medalist.

The end of the calendar year is a good time to consider this opportunity. Please go to <http://foundation.aapg.org> to find out more about the Foundation; or call Diane Keim at 888-945-2274, extension 674, and or e-mail dkeim@aapg.org for more information.

AAPG appreciates the past giving of time and money by AAPG members. I hope all members have a happy holiday season, and we thank you in advance for your support in the coming New Year.



Compliance Makes Good Stories

DEG a Venue to Showcase Efforts

By KENNETH D. VOGEL
DEG President

Our previous EXPLORER column (September) stated that the Division of Environmental Geosciences (DEG) now stands poised at a critical crossroads in its history.

The article summarized the excitement surrounding the DEG, the new look and content of *Environmental Geosciences* (EG) and, in particular, the vital role that environmental issues play in all aspects of the petroleum and energy minerals industry.

We reminded you that DEG's mission to AAPG was to aid, educate, communicate, promote and showcase environmental issues for our members. In this light, and with the ever-increasing importance of environmental issues in our industry, the question was asked, "Why is DEG membership declining?"

* * *

In this column I'd like to briefly focus on how AAPG/DEG members and their companies can benefit from and utilize DEG to showcase the multitude of environmental success stories they spend so much time, money and effort striving so diligently to achieve.

Unfortunately, very few AAPG member companies utilize the DEG and this awesome journal as a platform for showcasing the "green" side of our industry.

As a former environmental geologist for a major petroleum company, and now as an environmental consultant to Fortune

Even though environmental compliance is foundational to a successful energy and minerals industry, most environmental professionals labor in relative obscurity...

500 companies, I know that some managers and lawyers may get nervous about what might be perceived as "airing dirty laundry" when it comes to publicizing environmental compliance. However, it is important to realize that the majority of any company's portfolio of environmental projects is fully disclosable public information, having been submitted and filed with any number of different regulatory agencies or commissions.

Both onshore and offshore, from seismic acquisition to well permitting, from drilling to abandonment, from mine development planning to land reclamation, from exploration to production, from refining to transport, from historical operations to yesterday's accidental release, from waste reduction to prevention, AAPG member companies expend considerable effort and capital complying with environmental regulations and requirements. Even though environmental compliance is foundational to a successful energy and minerals industry, most environmental professionals labor in relative obscurity, quietly paving the way for the core business ventures they support. Only

rarely are environmental issues publicized – and most such cases are negatively portrayed.

So why not publicize all the myriad successes we as an industry, we as a company and/or we as environmental professionals achieve in the environmental arena?

Indeed, EG is a respected and highly effective mechanism by which to receive positive press and due credit for all of the time, money and effort you and your company spends protecting the environment and meeting regulatory requirements.

The individual environmental professional, the company and the energy industry all benefit from these types of positive stories!

Take credit where credit is due!

* * *

I'd like to invite you to submit your company's environmental success stories for publication and for technical session presentation at sectional, annual and international meetings. Manuscripts may be submitted online at



<http://deg.aapg.org/journal.cfm>. Let's make the EG journal and DEG technical sessions the default communication platforms for all AAPG member companies to showcase their environmental success stories!

I personally encourage and challenge each of you to actively promote and champion DEG membership and support within your company and amongst your professional colleagues and peers – talk to your friends, co-workers, supervisors and managers!

It is plain to see that 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.

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.

DEG is for everyone in AAPG! Come GROW with us! □



Kick it up a notch!

SPICE SM

A Stratigraphic
Transform

EXCLUSIVELY AVAILABLE FROM FAIRFIELD INDUSTRIES

SPICE = SPectral Imaging of Correlative Events SM

Get more stratigraphic detail
from your seismic data!

A process which shows:

- Structure
- Stratigraphy
- Bed-form Boundaries



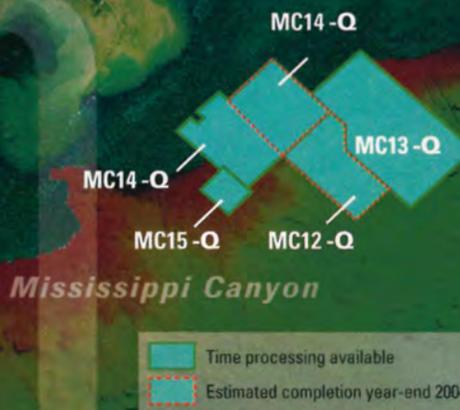
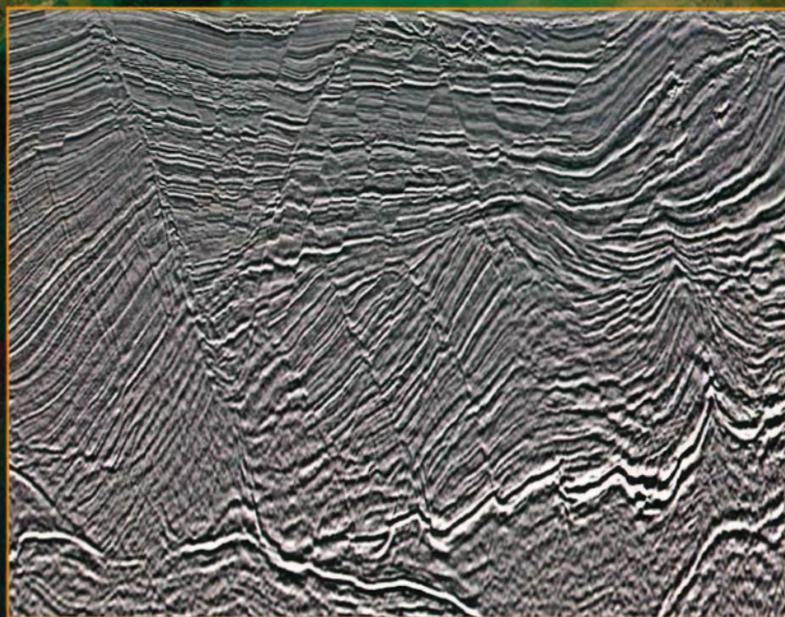
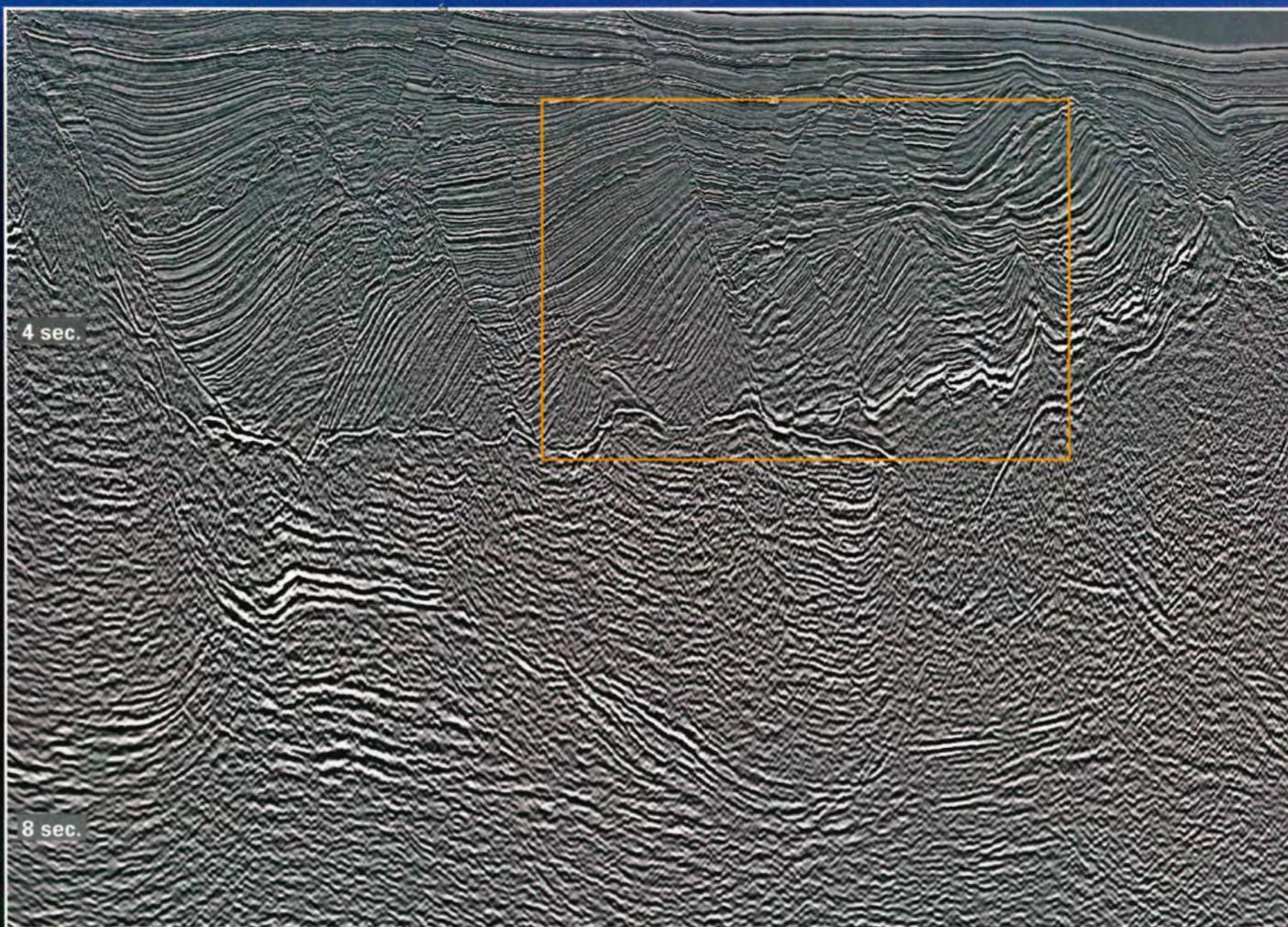
What can SPICE do for you? Contact us for a full technical briefing.

Houston Denver www.fairfield.com (800) 231-9809 (281) 275-7500 dataprocessing@fairfield.com



Make this your new resolution

Q-Marine – raising the bar from shallow to subsalt imaging.*



Houston +1 713 689 1000 Calgary +1 403 509 4666 Corpus Christi +1 361 879 4069 Dallas +1 972 490 9832 Denver +1 303 629 9250 Midland +1 432 571 4600 New Orleans +1 504 523 6781
Oklahoma City +1 405 947 4700 email multiclient@westerngeco.com www.westerngeco.com A Schlumberger/Baker Hughes Company

Resolution. Reliability. Repeatability.
See what  can do for you.

*Mark of WesternGeco

