

AAPG AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, AN INTERNATIONAL ORGANIZATION

# EXPLORER

SEPTEMBER 2007

**GEOPHYSICAL  
REVIEW**

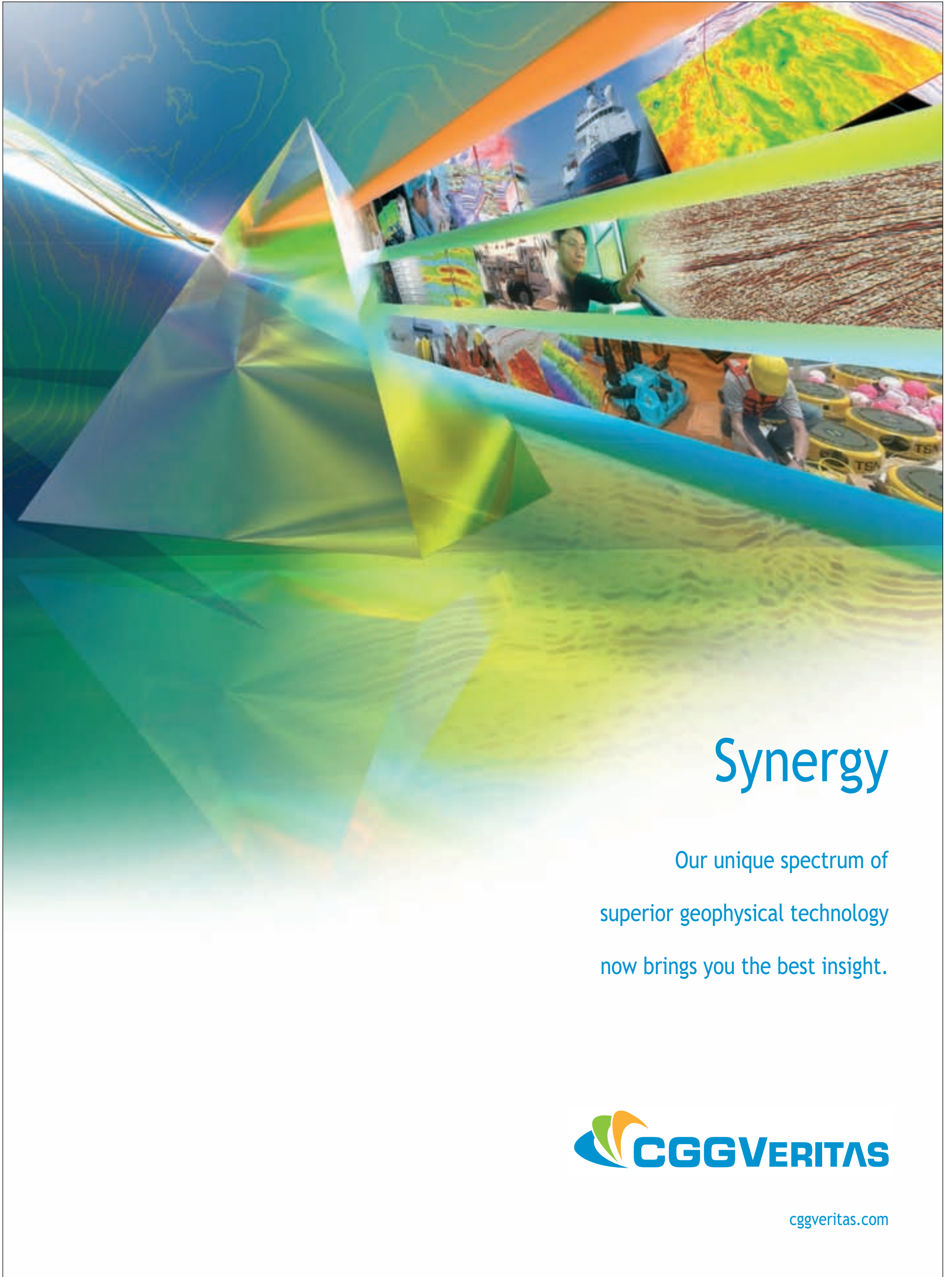


## One Way or the Other

Whatever it Takes...







# Synergy

Our unique spectrum of  
superior geophysical technology  
now brings you the best insight.



[cggveritas.com](http://cggveritas.com)

**On the cover:** For our annual Geophysical Review, two photos that capture the world of today's seismic crews. The camels standing in a line by their cables were snapped in Algeria; the vaguely similar trucks were on duty near Bakersfield, Calif. Photos by Global Geophysical Services.

## CONTENTS

- Think again: Starting your own successful company is rarely limited to having a good idea. **Entrepreneurship** requires more. 6
- Working for a living, big time: **Geophysical crews** all over the world are keeping real busy these days. 12
- Don't feel bad if you haven't grasped the uses and benefits of **geophysical tools in unconventional plays** – you're not alone. But here's something you need to know. 18
- Seismic. Cables. You can't have one without the other, right? Not exactly. Get ready for the "cableless world" – and realize that **seismic tools of the future** are having an impact now. 24
- The considerable hype about the **Canadian oil sands** action just keeps escalating – with good reason. 30
- When is drilling for oil and finding water a good thing? If you said "never," consider the Texas geologists who discovered getting into **hot water** isn't always bad. 34
- AAPG's **Distinguished Lecture** program wants to cover the world with talks that are serious, challenging and, sometimes, just plain fun. 44
- Sudden impact: The **Barnett Shale** play is generating wealth that goes far beyond the immediate oil industry. 46
- Meet America's top geologist: AAPG member **Mark Myers** talks about being director of the U.S. Geological Survey. 50

## REGULAR DEPARTMENTS

Geophysical Corner	54	www.Update	64
Washington Watch	55	Membership and Certification	67
Foundation Update	58	Readers' Forum	68
In Memory	59	Classified Ads	69
Regions and Sections	60	Director's Corner	70
Professional News Briefs	63	DEG Column	70
Meetings of Note	63		

## STAFF

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

<p><b>Communications Director</b> Larry Nation e-mail: lnation@aapg.org</p> <p><b>Managing Editor</b> Vern Stefanic e-mail: vstefan@aapg.org</p> <p><b>Editorial Assistant</b> Susie Moore e-mail: smoore@aapg.org</p>	<p><b>Correspondents</b> David Brown Louise S. Durham Barry Friedman Ken Milam</p> <p><b>Graphics/Production</b> Rusty Johnson e-mail: rjohnson@aapg.org</p>	<p><b>Advertising Coordinator</b> 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</p>
--	--	---

Vol. 28, No. 9

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 2007 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  
e-mail: returnsIL@imex.pb.com

## PRESIDENT'S COLUMN

# 'Climate' Cools With Revised Statements

By WILLARD "WILL" GREEN

What's the easiest way to enter a heated argument with your co-worker, neighbor or perhaps even your spouse? Just start talking about the range of possible reasons for the climate changes we have recorded in the past century.

In my memory no subject has drawn such heated discussion (e-mail, for current times) since the long-settled issue of continental drift.

AAPG members debated the probable causes for climate changes by e-mail and Web discussion for almost two years. The Executive Committee recognized that a number of members were not in agreement with our existing climate change position paper. Then-president Lee Billingsley appointed a very talented seven-member ad-hoc committee chaired by Jay Gregg in January 2007 with the charge of writing a proposed climate change statement.

We all owe that committee a vote of thanks for their many hours of deliberation.

The proposed statement was posted on our Web site and open for comments for 30 days. We received 93 responses that ranged from one end of the opinion spectrum to the other, with a number in the middle ground.

With the member comments in mind, the DPA Governmental Affairs Committee (Carl Smith, chair) and Lee Billingsley wrote a revised Climate Change Statement. This statement, with minor changes by the EC, was approved in mid-July and posted on the Web site on July 20, and printed in the August EXPLORER.

What a process! I invite each of you to log on and read the statement.

\* \* \*

But that's not the end.

The EC also approved a new standing committee called the Global Climate Change Solutions Committee. The committee will be composed of 12 members recommended to the president – three from each of the three Divisions, – with the chair from the Division of Environmental Geosciences – and three recommended by the EC.

The committee should be in place by the end of September.

The committee's main charge is to promote and facilitate various fields of geologic study that relate to global climate change and potential solutions. Means of accomplishing the charge (mission statement) are:

- ✓ Communicate timely information on the topic to members and the public.

The communication forums will ideally be the AAPG Web site, DEG's

*Environmental Geoscience* journal and possibly the EXPLORER.

- ✓ Provide technical content in the forms of technical programs at meetings, special publications and DEG journal articles.

- ✓ Recommend updates for AAPG's position paper to the Executive Committee.

- ✓ Monitor an ongoing AAPG Web forum on global climate change and potential solutions.

- ✓ Determine topics for FAQs and write the discussion with references.

Members will be notified when the Web forum is open.

\* \* \*

The DPA Governmental Affairs Committee has written and the Executive Committee has approved, with relatively minor editing, statements addressing 13 other issues. These statements are titled:

- ✓ Atlantic Outer Continental Shelf Resources
- ✓ Hydraulic Fracturing
- ✓ Preservation of Geological and Geophysical Data
- ✓ National Petroleum Reserve-Alaska Access
- ✓ Arctic National Wildlife Refuge Access
- ✓ United States National Energy Supply
- ✓ Tax Reform
- ✓ Natural Gas Supply Concerns
- ✓ Reformation of the Endangered Species Act
- ✓ Reformation of the Clean Water Act-Wetlands Access
- ✓ Offshore OCS Access
- ✓ Research and Development Needs
- ✓ Oil and Gas Workforce Needs in the 21st Century

All of these recently revised statements can be found on the AAPG Web site. To access the statements, click on "AAPG Short Cuts" at the top of the home page, then on "AAPG Statements" from the pull down menu. The Executive Committee will review all statements at least every three years.

Buona sera.



## AAPG Eyes Cape Town in 2008

AAPG will return to Africa for the 2008 International Conference and Exhibition, with the announcement of the Oct. 26-29 meeting in Cape Town, South Africa.

The theme is "African Energy – Global Impact." The general chair is Siphon Mkhize, and the vice chair is Jeff Aldrich. Both are with PetroSA.

AAPG last held its international meeting in Africa in 2002, in Cairo, Egypt.

Organizers are planning for a wide-ranging technical program, field trips to world-class deepwater sediment sites and other activities that will take advantage of South Africa's culture and geology.

Other details – including abstract deadline information – will be highlighted in an ad in the October EXPLORER, and ongoing updates will be available on www.aapg.org. □



# MultiClient Studies

Available today



**BrasilRound9**  
Nona Rodada de Licitações

## Petroleum System Assessment of All Brazilian Offshore Basins An Exclusive Summary

## 3D Petroleum System Modeling & Exploration Risk Assessment

- Pernambuco-Paraíba Basin
- Northern Espírito Santo Basin
- Southern Espírito Santo Basin
- Northern Campos Basin
- Cabo Frio Area- Southwest Campos
- Deep and Ultra Deep Water Campos Basin
- Northern Santos Basin
- Central Santos Basin
- Southern Santos Basin

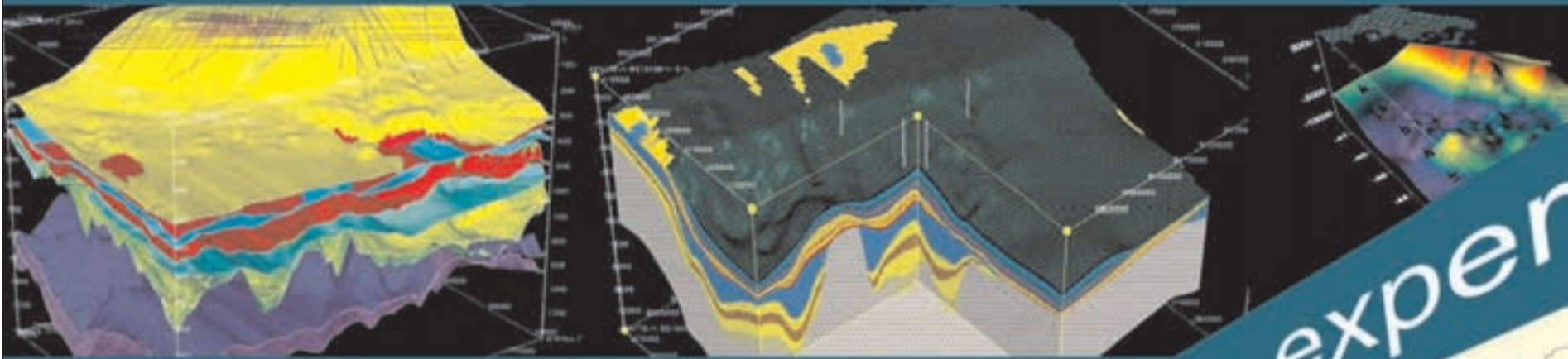
## Satellite Characterization Seeps U

- Pernambuco
- Sergipe-Alagoas
- Espírito Santo
- Santos Basin

## Braz

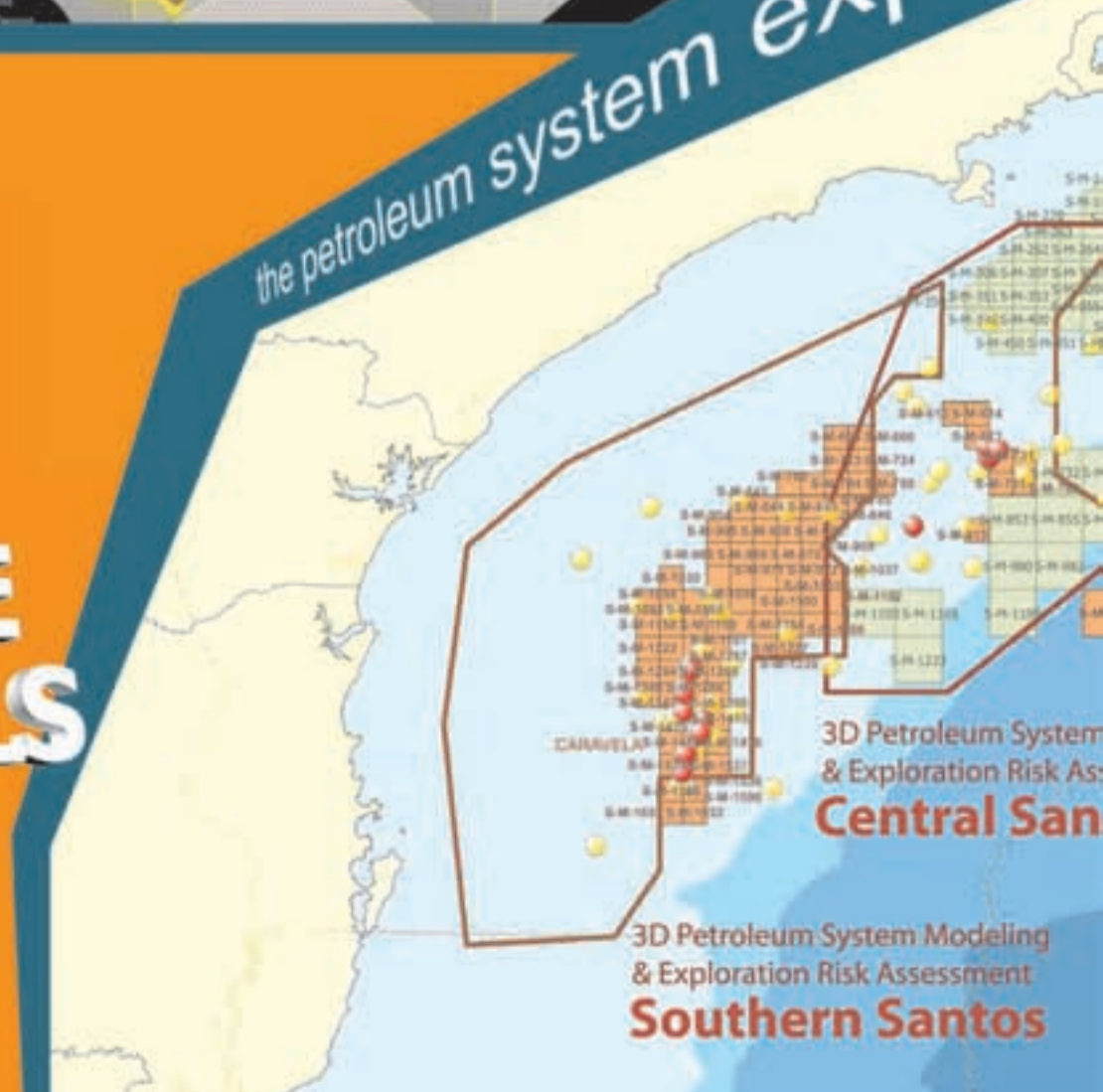
The most complete  
for exploration

see more at: [www.brazilround9.com](http://www.brazilround9.com)



**NO MORE DRY WELLS**

the petroleum system exper



3D Petroleum System Modeling & Exploration Risk Assessment  
**Central Santos**

3D Petroleum System Modeling & Exploration Risk Assessment  
**Southern Santos**



# The Detection and Characterization of Natural Oil Using RADARSAT-1 Data

to-Paraíba Basin  
goas Basin  
nto Basin  
in

## ilGeodata

prehensive Database  
on in Brazil  
razilgeodata.com.br

ts

3D Petroleum System Modeling & Exploration Risk Assessment  
**Northern Santos**



Modeling  
essment  
**Santos**



3D Petroleum System Modeling & Exploration Risk Assessment  
**Northern Espírito Santo Basin**

3D Petroleum System Modeling & Exploration Risk Assessment  
**Southern Espírito Santo Basin**

3D Petroleum System Modeling & Exploration Risk Assessment  
**Northern Campos**

3D Petroleum System Modeling & Exploration Risk Assessment  
**Cabo Frio Area Southwest Campos Basin**

**Contact**  
**Marcio Rocha Mello**  
✉ marcio@hrt.com.br  
☎ +55 21 2105-9700  
💻 www.hrt.com.br



*'Know Thyself' – and Don't Trip*

# Stepping Out? Step Out Smartly

By DAVID BROWN

*EXPLORER Correspondent*

You've finally decided to go independent, to start your own business.

And the best thing is, you have a great idea.

That could be your first mistake.

"Evidence pretty strongly suggests that entrepreneurs will spot an idea and fail to test that idea. An idea is not the same as an opportunity," said R. Duane Ireland.

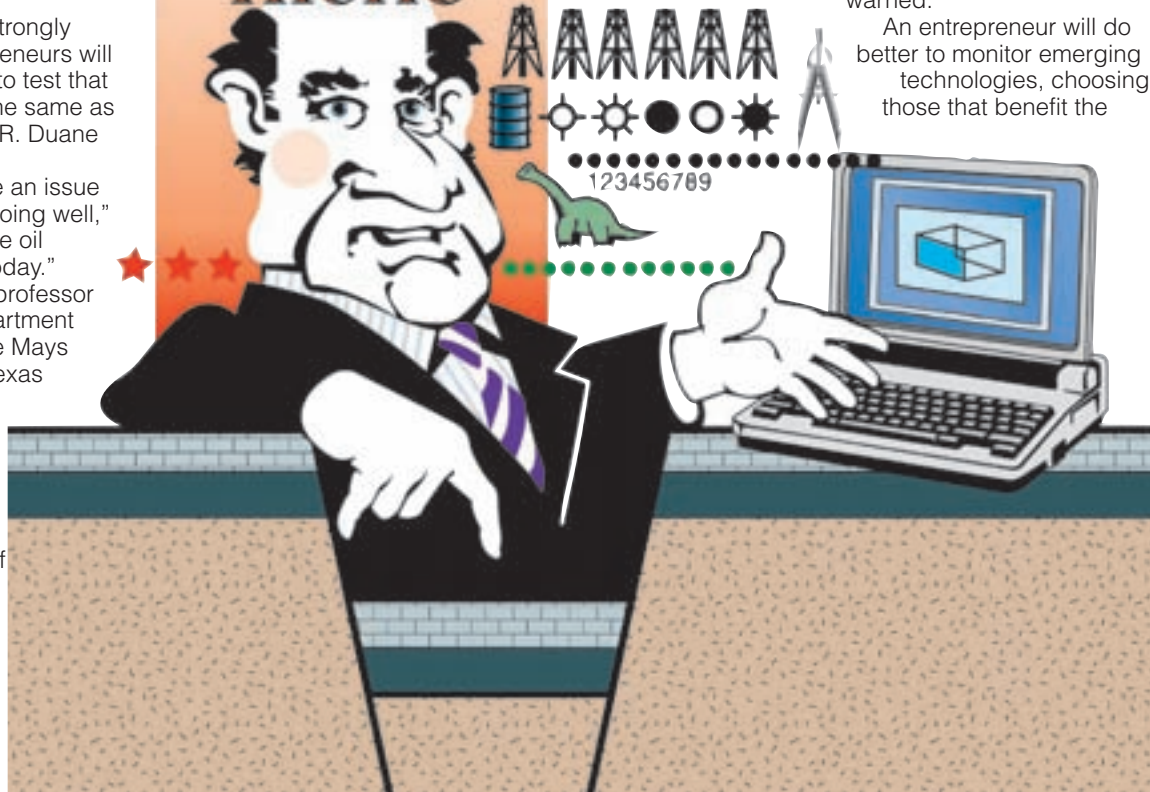
"That can really be an issue when an industry is doing well," he noted, "such as the oil and gas industry is today."

Ireland serves as professor and head of the Department of Management in the Mays Business School at Texas A&M University.

In addition to writing numerous papers and books on management and business start-ups, Ireland is co-author of the textbook *Entrepreneurship: Successfully Launching New Ventures* (second edition, 2007; Prentice Hall).

Maybe your

Welcome  
to my  
niche



company is going to be built around a new technology.

Start-ups can become infatuated with a specific technology but lose sight of profitable results.

"At the end of the day, technology is nice – but it's only important to the degree it can create value," Ireland warned.

An entrepreneur will do better to monitor emerging technologies, choosing those that benefit the

bottom line – and watching out for those that could threaten it, he advised.

"What are the new technologies out there that will impact my business? What can help me or what can hurt me?" Ireland said.

While investment money might be bountiful today, the oil industry is famous for its highly leveraged operations. Companies may take on far too much debt or financial obligation in good times, then struggle or fail in a downturn.

"The more leveraged you become, the more constrained the firm is. That can be a huge, gargantuan risk that can drag down a venture," Ireland said.

It's also one more pressure on a new business owner or operator, who might panic with a load of debt hanging overhead.

"Too much leverage representing too much risk," he said, "can cause entrepreneurs to make decisions too quickly."

## First, Look in a Mirror ...

G. Warfield "Skip" Hobbs is managing partner of Ammonite Resources in New Canaan, Conn. His company contracts with about 25 independent geologists and other consultants.

Hobbs said the consulting geologist should start with the saying, "Know thyself."

See **Entrepreneurs**, page 8

Midland Valley

## Structural Systems Analysis

**2D Move, 3D Move and 4D Move - the structural workbench**

**Model building  
validation,  
kinematics and  
scenario  
analysis.**

**Be in control of  
your structure.**

The structural geology experts  
[www.mve.com](http://www.mve.com)



# What is a breakthrough?



## Enhancing Collaboration

- Global networking combined with first mile wireless
- Industry innovation fueled by open development
- Software solutions with team process built in
- Collaboration wherever and whenever you need it

Schlumberger Information Solutions—Breakthrough Field-to-Office Collaboration

[www.slb.com/sis\\_breakthrough](http://www.slb.com/sis_breakthrough)



**Schlumberger**



## Entrepreneurs

from page 6

"Step one is, examine your skill set. What are you good at? What are you not good at? Do you want to be a consultant, or do you want to be an independent who generates prospects?"

"The other important thing is to prepare a business plan," he said. "What is my timeline here?" It takes much longer to establish yourself than most people anticipate."

A geologist going independent should have the full support of his or her family and at least two years of working capital in the bank, Hobbs advised.

It also helps to have a specialty.

"You have to be an expert in something until you get established," he said.



Ireland



Hobbs



Beaumont

"Identify where the trends are and put yourself there," he added. "Be on the leading edge. That's what the market is looking for, not old ideas in old areas."

Hobbs, an AAPG member and former president of the Division of Professional

Affairs, said he decided to start his own business in 1980, a boom time for the industry. He teamed up with Gareth Roberts, now president of Denbury Resources Inc.

But two years later their funding dried

up, oil prices crashed and Hobbs had to find a new direction. He began advising institutional investors with billions tied up in problematic oil and gas portfolios.

"In the 1980s I developed a tremendous business in workouts with these institutions," he said. "I found a niche where there was nobody in the Northeast, from Boston to Washington, offering that kind of geotechnical-financial expertise."

"The message is, 'Research the market. Find a niche,'" he noted.

Working with other experts can open new business opportunities: "If you have multi-talents, fine. If you don't, team up," Hobbs said.

Teaming up with consultants in Houston has helped him stay centered in the oil patch, all the way from Connecticut.

"You can do it from anywhere," Hobbs observed. "I have a virtual company. There are three of us working on a project right now. One of us is in Calgary, one of us is in Houston and I'm here. And the client is somewhere else."

### Virtual and Reality

The idea of "core competency" leads many start-ups to outsource all other functions. It's possible to build a virtual oil company – but be careful, Ireland cautioned.

"The more we outsource, the less is in our control," he said. "That's a real risk. The more control we lose, the greater our dependency on those to whom we have given that control."

"Your firm never wants to outsource to another firm what it can do exceptionally well," he added. "Sometimes entrepreneurial firms don't understand what it is they do well."

Ireland said three problems for the entrepreneur account for the failure of many new businesses:

- ✓ Not fully understanding the market's needs.
- ✓ Not recognizing the difference between cash flow and sales/income.
- ✓ Not being able to cope with the sheer magnitude of stress involved.

That stress shows up in a number of different ways and comes from several different directions. One challenge is the number of roles a new business owner must fill.

"One second I'm talking to a banker about capital," Ireland said, "the next minute I'm talking to someone in the field who has a serious production problem."

Also, moving from management in a large company to ownership in a start-up means giving up the company support network – even the support that used to come from above.

"There is no one else to turn to," Ireland noted. "I'm the boss. It's me."

### Great Expectations

Edward A. "Ted" Beaumont started a business as a consulting geologist – "It was something I always wanted to do," he said – then watched the price of oil dip toward \$8 a barrel in 1996.

"I kept going but I was thinking, 'What am I doing? Am I crazy?'" Beaumont recalled.

"A lot of guys who were like me who were consultants are no longer consultants. There are a few who have hung in there anyway," he added.

Beaumont, recently elected AAPG secretary, said things are "incredibly better" today. But it's still not easy for an independent.

"We're in an upswing, not a boom. People are still discriminating on what they want to take and what they'll drill. They don't want to drill wildcats," he said.

See **Niche**, page 10



## A WORLD OF OPPORTUNITIES, REVEALED.

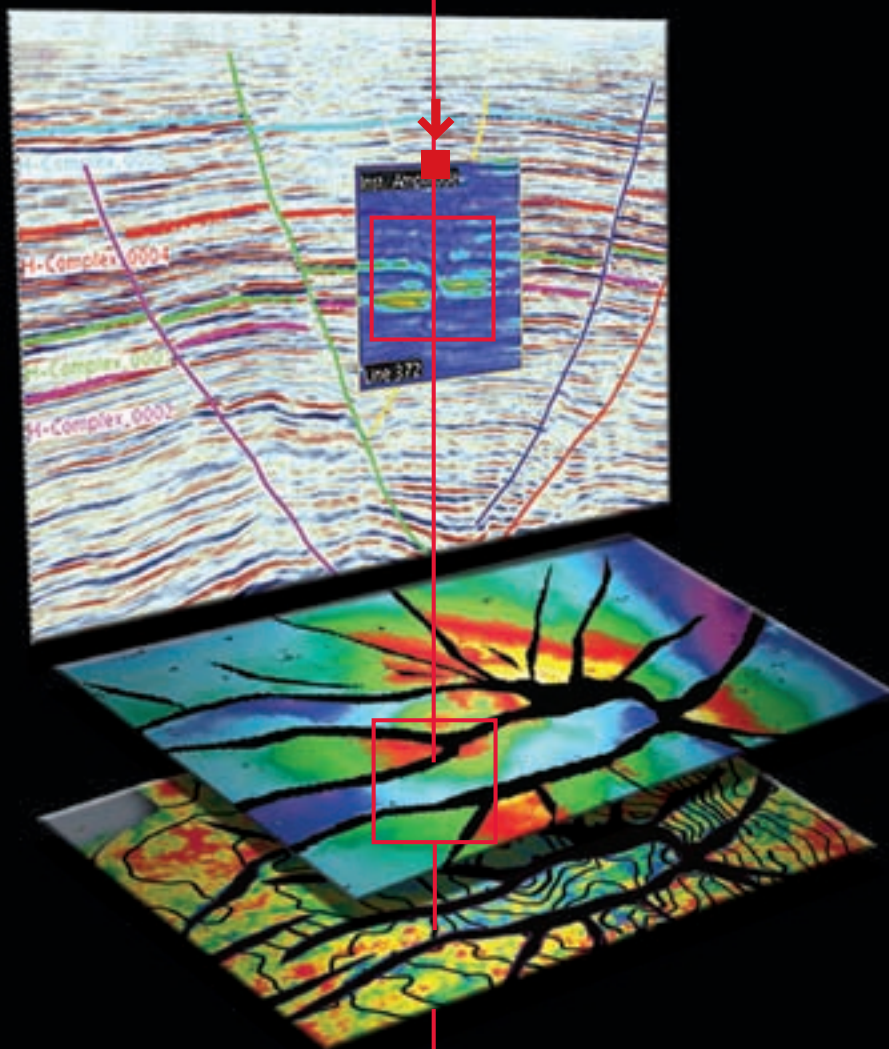
Imagine the ingenuity it would take to create and conduct seismic data acquisition programs in even the most difficult-to-access areas of the world, from British Columbia to Bangladesh. Imagine the depth of expertise necessary to identify and quantify potential opportunities, cost-efficiently apply innovative technologies and techniques, while overcoming the challenges posed by severe topography, ocean currents, tides or extreme weather. Now imagine it all being available at a single company, Geokinetics: a global leader dedicated to responding to your immediate needs and achieving your strategic goals. Our expanding array of specialists, methodology

and services makes us the provider of choice when you need 2D/3D seismic data acquired and/or processed from land, Transition Zones or shallow water regions anywhere on earth. With 20 experienced seismic crews who excel at transporting and operating sophisticated man- and heli-portable equipment in areas that would otherwise be inaccessible, we can go wherever your opportunities lead you. And bring back the seismic data that reveal those that are worth developing. Count on Geokinetics for whatever it takes to reveal the true potential of your next energy opportunity, no matter where in the world it may be.

INGENUITY. EXPANDING. WORLDWIDE. [WWW.GEOKINETICS.COM](http://WWW.GEOKINETICS.COM)







No matter how  
complex the  
reservoir, see it all.

**PowerView**® software.  
The ultimate tool for geological and geophysical  
interpretation and mapping workflows.  
Designed for the **DecisionSpace**® environment.

With its extraordinary, all encompassing "vision,"  
PowerView® software delivers synchronous geological  
and geophysical interpretation in a common workspace.  
Developed to address the challenges of today's upstream  
oil and gas business, PowerView technology enables  
multi-discipline asset teams to gain the best understanding  
of the reservoir in the least amount of time.

For complete details about PowerView technology, please  
visit us at [www.lgc.com](http://www.lgc.com).

*Unleash the energy.*™

Deeper knowledge. Broader understanding.™

**Landmark**

**HALLIBURTON**

© 2007 Landmark Graphics Corporation. All rights reserved.



## Candidates' Profiles Now Online

Biographies and individual information for the 2008-09 slate of AAPG officer candidates are now available online at the AAPG Web site.

The biographies and responses to the topic "Why I Chose to be a Candidate for AAPG Office" also will be inserted in an upcoming EXPLORER.

The president-elect winner will serve as AAPG president in 2009-10. The terms for both vice president-sections and treasurer are two years.

Ballots will be available in spring 2008.

A complete list of AAPG rules and guidelines governing the campaign – for candidates and supporters – can be found online at [www.aapg.org/business/candidates/rules.cfm](http://www.aapg.org/business/candidates/rules.cfm).

The candidate slate is:

### President-Elect

- ☐ John C. Lorenz, Geoflight LLC, Edgewood, N.M.
- ☐ Ronald A. Nelson, Broken N Consulting, Cat Spring, Texas.

### Vice President-Sections

- ☐ David H. Hawk, Energy Analysis and Answers/Consultant, Boise, Idaho.
- ☐ W.C. "Rusty" Riese, BP Americas, Katy, Texas.

### Treasurer

- ☐ Edith C. Allison, U.S. Department of Energy, Washington, D.C.
- ☐ Kay L. Pitts, Aera Energy LLC, Bakersfield, Calif. ☐

## Niche

from page 8

To get established, a consulting geologist has to develop a reputation for specialized expertise, Beaumont noted. That can be in a geographical area or a technical area.

"If it's seismic interpretation, that's good. If it's log interpretation, it's good. Find an area you can be a specialist in," he said.

The solo geologist also needs the patience and determination to see a project to completion, according to Beaumont.

"It's not like there's a smooth transition from when you get an idea to when the well is drilled. It sort of goes in spurts," he observed.

"The bottom line is, you've got to get

a well drilled. All those other things don't matter until you can get the well drilled," he said.

Ireland compared the operational choices for an entrepreneur to the difference between exploration and exploitation.

Some exploration has to get done in order for exploitation to take place down the line.

And the entrepreneur must deal with "that constant tension between doing things today to produce profit, yet knowing the things I'm doing today are not what I will need to be doing tomorrow," he said.

In addition to the stress of operations, an entrepreneur has to secure the money and the people to make a company successful. That can be a problem in the oil industry today, when capable and experienced people are in short supply.

"I would make certain that I have commitments from the human capital that's needed to make the business work," Ireland said.

### Staying Alive

In choosing a business path, an entrepreneur should play to his or her own strengths, Ireland agreed.

"The probability of entrepreneurial success increases when you are engaging in a business that's grounded in a skill set in which you are deeply involved," he said.

And an entrepreneur has to be prepared for the two most traumatic things that can happen to a business.

The first is failure.

The second is a great deal of success.

The challenge of success, of managing a rapidly growing company, has confounded more than its share of aspiring entrepreneurs.

"There are so many entrepreneurs that can grow the business to a certain level, but lack the skills to take it to the next level," Ireland said.

Finally, the independent geologist has to be prepared to go on for many years when success seems just out of reach. In three words:

Hang in there.

"It takes persistence. My kids laugh at me for my sayings, but 'If at first you don't succeed, try, try again,'" Hobbs said.

"Some people get lucky right off the bat. That could happen," Beaumont commented, "but most people I've talked to were doing it for a long time before the luck hit." ☐

## Ecuador School Joins List of AAPG Student Chapters

AAPG Student Chapter membership recently increased with the first student membership from Ecuador.

The international chapter, Escuela Superior Politecnica del Litoral, was added in August, bringing the Student Chapter total to 160 (80 domestic, 80 international).

Membership in the Student Chapter program was largely domestic in the early days after the program's inception, but recent statistics are showing the results of global outreach.

"It shows the growth in international membership," said Mike Mlynek, AAPG member services assistant manager, "and that AAPG truly is an international organization."

To find out how you can have a Student Chapter on your campus visit [www.aapg.org/member/student](http://www.aapg.org/member/student).

– SUSIE MOORE

The next force has arrived  
...completing the picture

BlueQube

Completing the picture

new  
methodology

proven  
technology

BlueQube is a multi-disciplinary approach  
to solving gaps in your geological picture.  
For more information visit [www.arkex.com](http://www.arkex.com)

ARKEX



Strong Solutions. **TODAY and TOMORROW.**

Feel the strength of having one of the most impressive interpretation packages on the market.

Use our flexible suite of products to interpret projects of any size. Be empowered by our state of the art software with the adaptability to operate on machines which contain 64-bit multi-core processors or on basic laptops ready for the road. Our versatile licensing allows for single or network usage. Network users enjoy the flexibility of sharing projects simultaneously and of setting up remote access. Let SMT meet your growing geological, geophysical, and engineering needs with our constant enhancement of current tools and integration of innovative new products to take you smoothly from Seismic through Simulation.

Enjoy the power of a superior product with a staff prepared to keep you on the cutting edge of tools and technology.



Contact SMT for a free evaluation of our products!



Seismic Micro-Technology, Inc.  
[www.seismicmicro.com](http://www.seismicmicro.com)

**E&P BASED. Software FOCUSED.**

North America: +1 713 464 6188 Europe: +44 (0)20 8240 6524 Asia: +65 6220 1089

©2007 All Rights Reserved. Seismic Micro-Technology, Inc.



*Seismic Backlog*

# Channels Count, Along With Crews

By LOUISE S. DURHAM  
*EXPLORER Correspondent*

Commodity prices continue to hold fairly steady, and the industry is running on all cylinders, so it comes as no surprise that seismic crews are working diligently worldwide.

In fact, the July 15 issue of World Geophysical News (WGN) notes working crews on the global scale tally 277 compared to 260 one year ago.

Existing crews number 375, so 98 remained available as of the published date.

The breakdown of activity worldwide shows the heaviest concentration in the United States, which hosts 25 percent of the active crews.

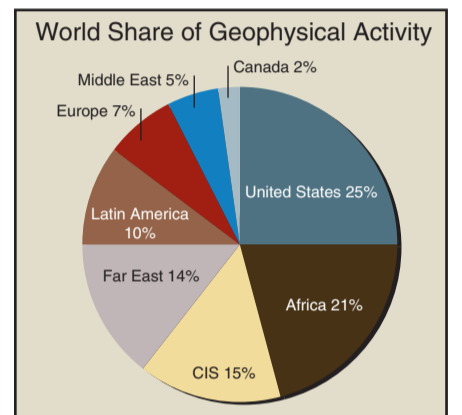
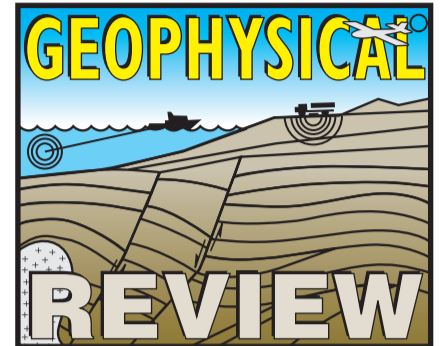
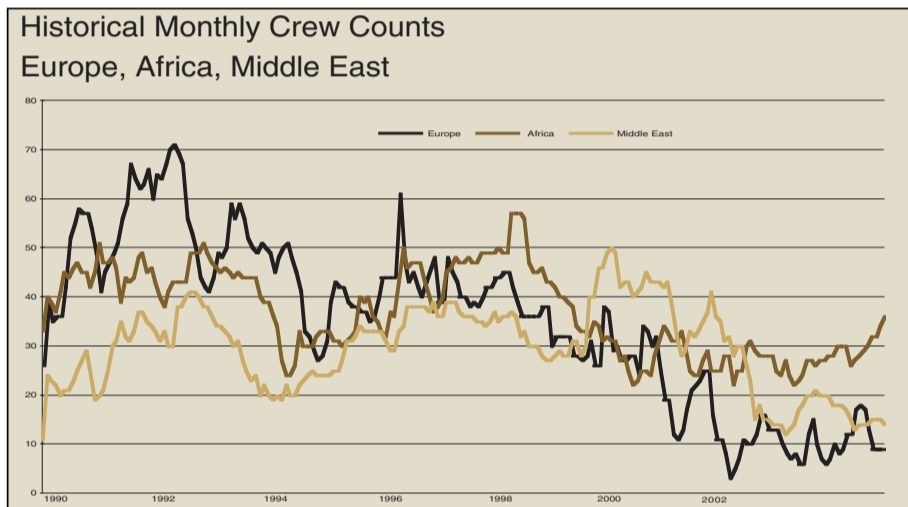
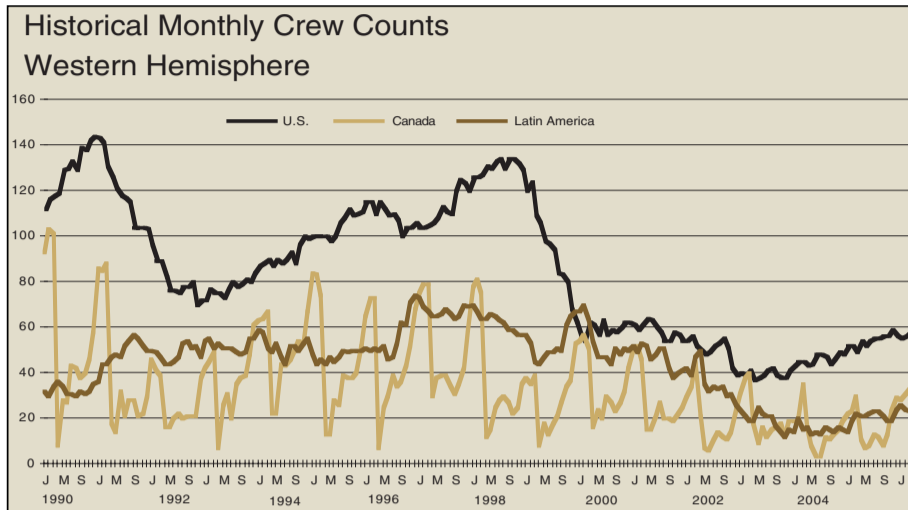
Running a close second to the domestic crew count is Africa (21 percent), which is followed by:

- ✓ CIS: 15 percent.
- ✓ Far East: 14 percent.
- ✓ Latin America: 15 percent.
- ✓ Europe: 7 percent.
- ✓ Middle East: 5 percent.
- ✓ Canada: 2 percent.

WGN breaks the global numbers down further into 212 crews working onshore and 65 offshore.

On the domestic scene, Texas boasts the most activity, with 26 crews working and none available.

See **Activity**, page 14



Data for charts provided by IHS

Where the action is: A quick look at today's geophysical world.

**B**enefit from the knowledge gained through our highly successful North American joint industry project focused on tight gas sands. Core Laboratories is now offering the industry's most comprehensive evaluation of tight gas sands for projects worldwide.

**Reduce Risk and Increase Success**

- ▲ Access to the Largest Tight Gas Sands Database in the Industry
- ▲ Detailed Core-Based Reservoir Characterization
- ▲ Rock-log Calibration and Petrophysical Modeling
- ▲ 3-D Fracture Design and Completions
- ▲ Fracture Production Forecasting
- ▲ Real Time Monitoring
- ▲ Post-Frac Evaluation

# TIGHT GAS SANDS

Fracture Stimulation Optimization  
Joint Industry Project



**INTEGRATED RESERVOIR SOLUTIONS DIVISION**

**UNITED STATES**

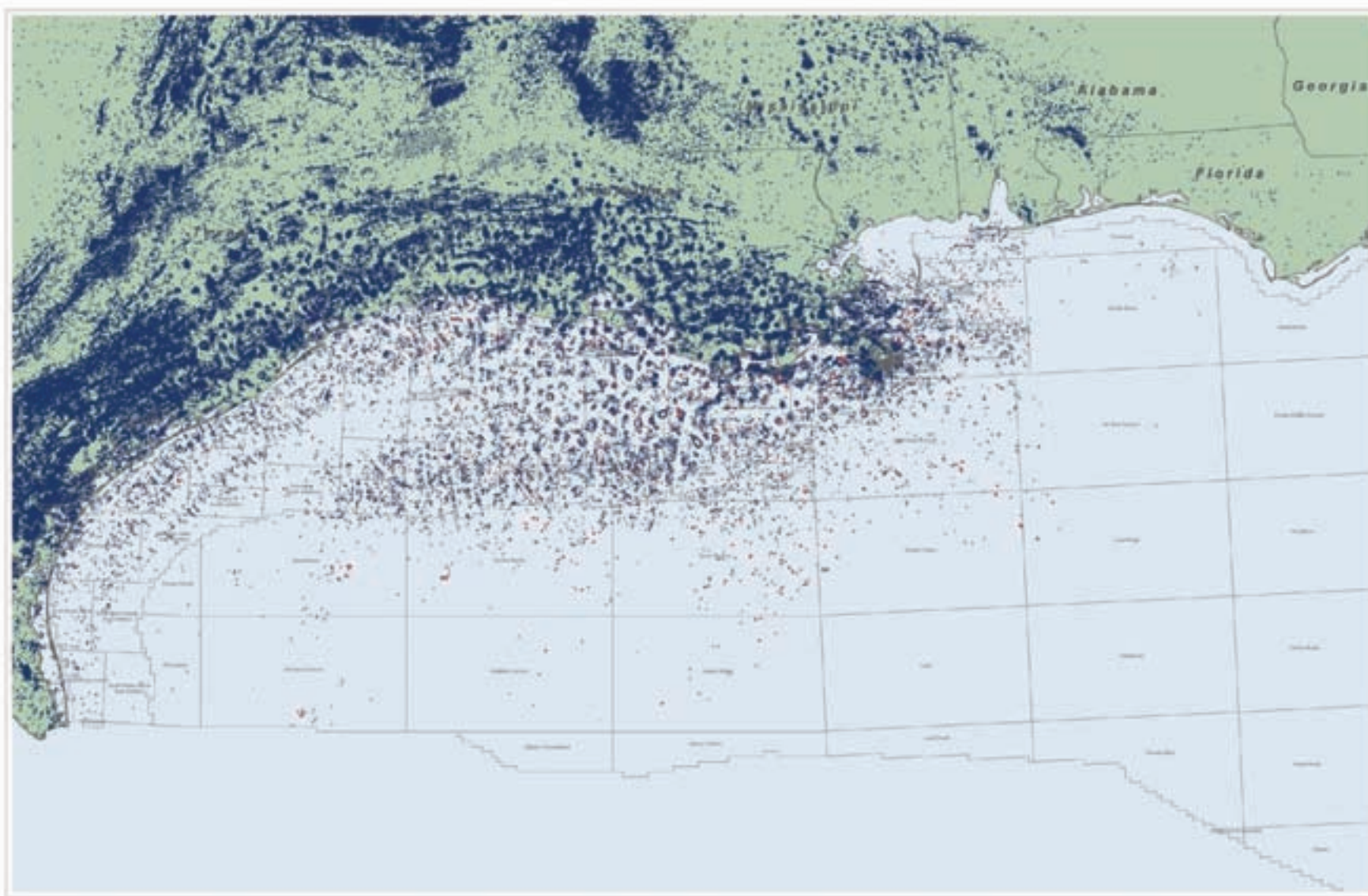
Tel: +1-713-328-2673

**UNITED KINGDOM**

Tel: +44-173-785-2390

[www.corelab.com/IRS/studies/tgs](http://www.corelab.com/IRS/studies/tgs)  
email: [tgs@corelab.com](mailto:tgs@corelab.com)





# WORKSTATION READY DIGITAL WELL LOG DATA

Complete New Release and Historical Collection

Visit us at the SEG Booth #1115



TGS has the Gulf of Mexico's most comprehensive set of well log data, and now that collection is available in the Workstation Ready digital LAS format. Standardized, complete and quality controlled, Workstation Ready logs are ready for immediate project use and simplified data management, plus, each well includes the raw LAS data for in-house petrophysical processing. Only TGS is able to offer all new release wells immediately deliverable on the morning of their release date directly to your desktop using the powerful but simple to use search tool LOG-LINE Plus!® Discounts for volume pricing or seismic bundles are now available. For more information, visit us online or contact your account representative. 1.888.LOG.LINE



[www.tgsnopec.com](http://www.tgsnopec.com)



**Activity**

from page 12

**Full Speed Ahead**

A caveat: There are crew counts, and there are crew counts.

Today, it's more about "channel count" – which has increased dramatically from years.

In fact, it's imperative to look at both channel count and crew count to fully understand where the industry really is today, according to Jim White, executive vice president of Geokinetics (an amalgam of the former Trace Energy, Quantum, Grant Geophysical and GDC).

"In 1977, there were 944 seismic crews working in North America alone," White said. "Today, it's more like 80 – but if you look at the channel count, you have an increase of 2,000 percent in the number of channels, so the amount of channels on a crew far exceeds that of years past."

The seismic contractors may not be openly popping corks on the bubbly, but they're plenty happy.

The backlog is strong as ever at onshore and shallow water player Geokinetics, according to White. He noted they're seeing a steady flow of bids coming in worldwide.

Enthusiasm is rife most everywhere.

"We're going full throttle shooting spec data

See **Loyalty**, page 16

**State Crew Counts**

	Seismic July 15, 2007			Working	
	Work	Avail	Total	Month Ago	Year Ago
Alaska	0	1	1	0	1
Arkansas - North	3	0	3	3	2
Arkansas - South	1	0	1	0	0
California	1	0	1	1	1
Colorado	2	0	2	2	1
Gulf of Mexico	10	0	10	10	9
Kansas	9	0	9	7	6
Louisiana - North	1	0	1	1	1
Louisiana - South	1	0	1	1	1
Michigan	1	0	1	1	1
Mississippi	0	0	0	0	0
Montana	3	0	3	3	2
Nebraska - West	1	0	1	2	2
New Mexico - Southeast	0	0	0	1	0
New York	1	0	1	2	0
North Dakota	1	1	2	0	1
Oklahoma	8	0	8	8	7
Pennsylvania	0	1	1	0	0
Texas - East	3	0	3	2	8
Texas - West	10	0	10	10	11
Texas Gulf Coast	12	0	12	12	8
Texas Panhandle	1	0	1	2	0
Utah	0	0	0	0	2
Wyoming	0	0	0	0	2
<b>Totals</b>	<b>69</b>	<b>3</b>	<b>72</b>	<b>68</b>	<b>66</b>

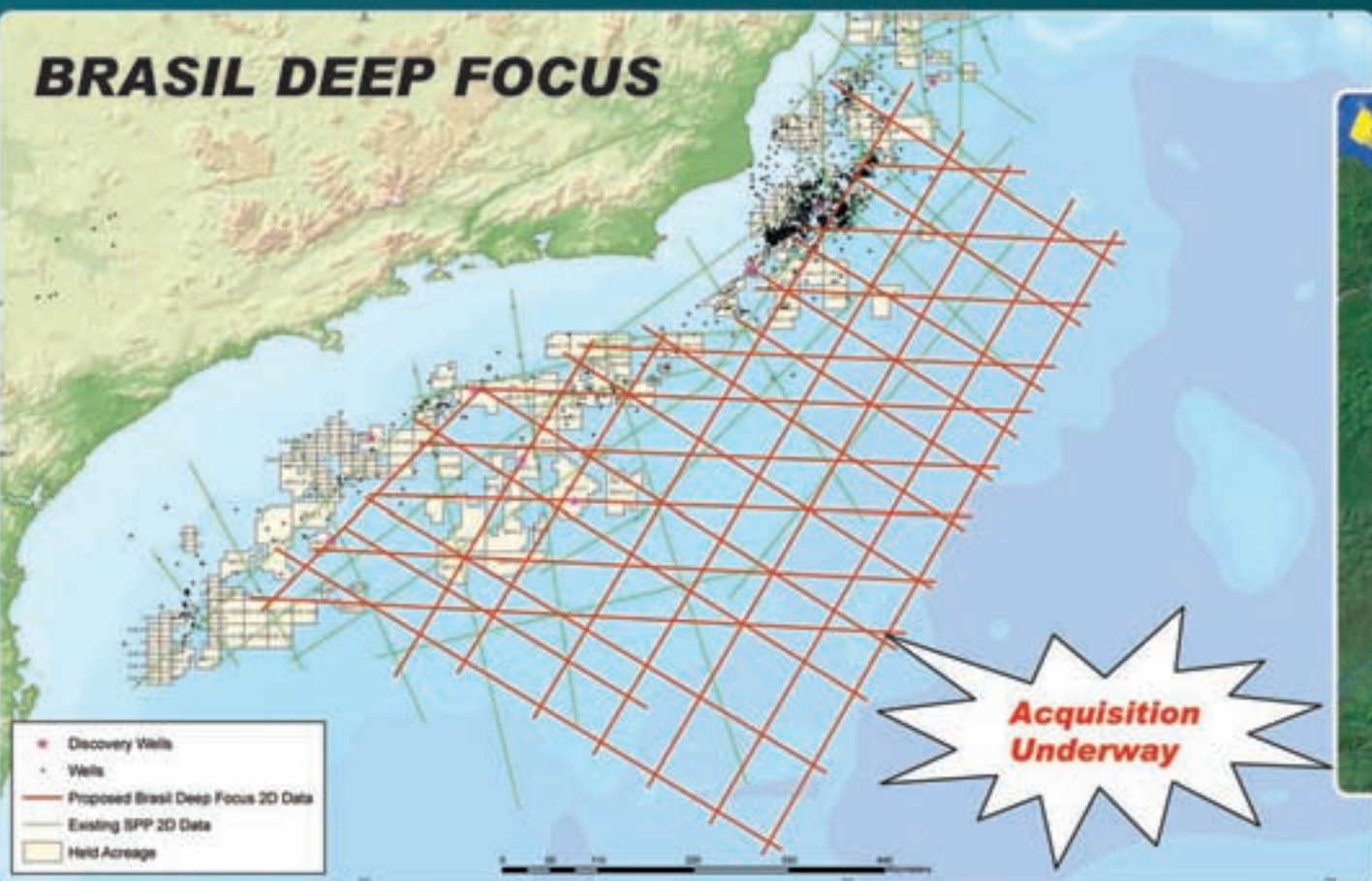

**Seismic Breakdown by State**

	Dynamite			Vibroseis			Other		
	Work	Avail	Total	Work	Avail	Total	Work	Avail	Total
Alaska	0	1	1	0	0	0	0	0	0
Arkansas - North	3	0	3	0	0	0	0	0	0
Arkansas - South	0	0	0	1	0	1	0	0	0
California	1	0	1	0	0	0	0	0	0
Colorado	0	0	0	2	0	2	0	0	0
Gulf of Mexico	0	0	0	0	0	0	10	0	10
Kansas	2	0	2	7	0	7	0	0	0
Louisiana - North	0	0	0	1	0	1	0	0	0
Louisiana - South	0	0	0	1	0	1	0	0	0
Michigan	1	0	1	0	0	0	0	0	0
Montana	0	0	0	2	0	2	1	0	1
Nebraska - West	0	0	0	1	0	1	0	0	0
New York	0	0	0	1	0	1	0	0	0
North Dakota	0	1	1	1	0	1	0	0	0
Oklahoma	3	0	3	4	0	4	1	0	1
Pennsylvania	0	0	0	0	0	0	0	1	1
Texas - East	1	0	1	2	0	2	0	0	0
Texas - West	1	0	1	9	0	9	0	0	0
Texas Gulf Coast	2	0	2	10	0	10	0	0	0
Texas Panhandle	0	0	0	1	0	1	0	0	0
<b>Totals</b>	<b>14</b>	<b>2</b>	<b>16</b>	<b>43</b>	<b>0</b>	<b>43</b>	<b>12</b>	<b>1</b>	<b>13</b>

**U.S. 3-D vs. 2-D  
Survey Summary**

	4-D	3-D	2-D	Unknown	Total
Arkansas - North	0	3	0	0	3
Arkansas - South	0	1	0	0	1
California	0	1	0	0	1
Colorado	0	1	1	0	2
Gulf of Mexico	1	6	3	0	10
Kansas	0	8	1	0	9
Louisiana - North	0	1	0	0	1
Louisiana - South	0	1	0	0	1
Michigan	0	1	0	0	1
Montana	0	3	0	0	3
Nebraska - West	0	1	0	0	1
New York	0	1	0	0	1
North Dakota	0	1	0	0	1
Oklahoma	0	8	0	0	8
Texas - East	0	3	0	0	3
Texas - West	0	10	0	0	10
Texas Gulf Coast	0	12	0	0	12
Texas Panhandle	0	1	0	0	1
<b>Totals</b>	<b>1</b>	<b>63</b>	<b>5</b>	<b>0</b>	<b>69</b>

When its a question of Brasil seismic...

Acquisition Underway

**BRASIL DEEP FOCUS**

- Discovery Wells
- Wells
- Proposed Brasil Deep Focus 2D Data
- Existing SPP 2D Data
- Held Acreage

15,000 km regional well-tie

New 10,000m long offset data

Kirchhoff PSTM & Wave Equation PSDM

Gravity & Magnetics

Rachel Masters  
713-369-5872  
rmasters@fugro.com

Kenneth Mohn  
713-369-5859  
kmohn@fugro.com

Evando Bartholazzi  
+55 21 3861-5200  
evando.bartholazzi@fugro-br.com

Mike Whitehead  
713-369-5862  
mwhitehead@fugro.com

...Ask Fugro

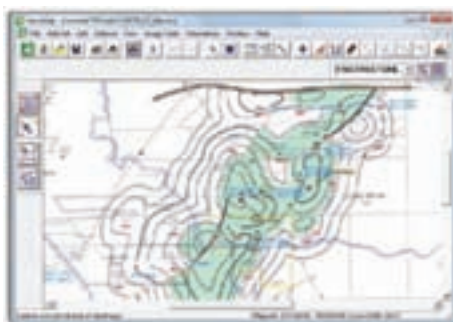




## Announcing a new NeuraMap... now with Volumetrics and Reserves

The best just got better. NeuraMap, the oil and gas industry's application for automated map digitizing, now includes volumetrics and reserves. Calculate timely and reliable recoverable reserves with NeuraMap.

This much-anticipated version has an even better, more intuitive interface, stronger editing capabilities, and updated features based on extensive user input. With NeuraMap's automated digitizing, you can integrate paper maps into your interpretation workflow, and calculate valuable map information from the digital data.



NeuraMap can use a full range of map types to calculate volumetrics and reserves, all based on industry accepted methods and employing the latest technologies. Custom reports can be incorporated into your studies or presentations.

- Volumetric and reserve calculations with reports in text or html
- Automated digitizing of contours, well symbols and shot points
- On-screen quality control with interactive editing
- Merge and print multiple datasets

Call 1.281.240.2525 to get additional information on the new NeuraMap. Or, visit our web site: [www.neuralog.com/neuramap](http://www.neuralog.com/neuramap). You'll be glad you did.

# Neuralog

*Turning Paper Into Petroleum*

© Neuralog, Inc. • 1.281.240.2525 • [www.neuralog.com](http://www.neuralog.com)



### 3-D vs. 2-D Survey Summary

	4-D	3-D	2-D	Unknown	Total
Africa	0	28	20	0	48
Canada	0	3	3	0	6
CIS	0	3	35	0	38
Europe	0	5	4	0	9
Far East	0	7	12	2	21
Middle East	0	5	8	0	13
Latin America	0	12	6	0	18
<b>Sub-Totals</b>	<b>0</b>	<b>63</b>	<b>88</b>	<b>2</b>	<b>153</b>
Africa Offshore	0	8	2	0	10
CIS Offshore	0	1	2	0	3
Europe Offshore	0	8	3	0	11
Far East Offshore	0	13	6	0	19
Middle East Offshore	0	1	1	0	2
Latin America Offshore	0	8	2	0	10
<b>Sub-Totals</b>	<b>0</b>	<b>39</b>	<b>16</b>	<b>0</b>	<b>55</b>
<b>Totals</b>	<b>0</b>	<b>102</b>	<b>104</b>	<b>2</b>	<b>208</b>

### United States Crew Counts

	Seismic			Working	
	July 15, 2007			Month	Year
	Work	Avail	Total	Ago	Ago
West Coast Region	1	0	1	1	1
Alaska	0	1	1	0	1
Rockies Region	7	1	8	7	10
Mid-Continent	21	0	21	20	15
Southwest Region	10	0	10	11	11
Gulf Coast Region	13	0	13	13	9
Ark-La-Tex	5	0	5	3	9
Southeastern Region	0	0	0	0	0
Michigan Basin	1	0	1	1	1
Appalachian Basin/Northeast	1	1	2	2	0
Offshore	10	0	10	10	9
<b>Totals</b>	<b>69</b>	<b>3</b>	<b>72</b>	<b>68</b>	<b>66</b>

### World Region Crew Counts\*

	Seismic			Working	
	July 15, 2007			Month	Year
	Work	Avail	Total	Ago	Ago
Africa	58	4	62	56	36
Canada	6	32	38	11	18
CIS	41	9	50	41	44
Europe	20	16	36	20	20
Far East	40	15	55	40	37
Middle East	15	11	26	18	16
Latin America	28	8	36	28	23
United States	69	3	72	68	66
<b>Totals</b>	<b>277</b>	<b>98</b>	<b>375</b>	<b>282</b>	<b>260</b>

\* Counts for CIS, China and India are estimates based on partial data.



### Weatherford gives you surprising capabilities and flexibility to tailor a more efficient approach to your wireline needs.

It may be news to you that Weatherford offers worldwide a full suite of wireline tools, imaging services and the industry's broadest array of conveyance options. Here's more news:

#### More flexibility for job-matched economy.

Flexibility in technology, conveyance, imaging and geoscience options enables us to provide the most efficient answer to your specific operational and budgetary objectives. You don't pay for more technology than you need.

#### EarthView imaging flexibility.

View your wellbore and formation in multiple ways in any application—including coalbed-methane and heavy-oil wells. Our geoscience experts can interpret images while drilling or post-drilling.

#### Conveyance flexibility for any contingency.

Our unique Compact™ system gives you standard triple- or quad-combo logs with or without wireline. Running in memory mode, the tools can be conveyed in many ways, including well shuttle and thru-drillpipe—in holes from 2-3/4 to 36 in.

#### More options. More service.

Get a job-matched approach from Weatherford. Don't pay for technology overkill. Visit us at [weatherford.com](http://weatherford.com), or contact an authorized Weatherford representative.

Our business is built **All Around You.**

Drilling | **Evaluation** | Completion | Production | Intervention



## Loyalty

from page 14

as we did last year," said Steve Mitchell, vice president and division manager at Fairfield Industries. "Our plans are to maintain the existing levels on our spec data base as well as the increased activity in the nodal market, which has us going strong as ever – in fact, we're extremely pleased with the interest and activity in the nodal market.

"We see this continuing into the foreseeable future," Mitchell noted, "but we always keep an eye on commodity prices."

#### Leaders of the Pack

Contractors have their work cut out for them when it comes to holding onto experienced crew members during these times of personnel shortages in the industry.

It helps to maintain rigorous in-house training programs, which is becoming a trend among the companies.

"We have a tremendous in-house training program, and we've been able to maintain our own crew members," Mitchell said. "Our competitors are all doing this, too, so people don't take crews away."

Global Geophysical Services, which is launching 4-5 new crews a year, has its own special way of attracting and holding onto crew members.

It's all about owning a piece of the company.

Global has private equity and cash investors, but the employees own a large piece of the firm and control the board of directors.

"There's a fixed pie out there in terms of the number of seasoned professionals," said Richard Degner, president of Global. "As an industry, we're competing for the experienced seasoned ones.

"We've been able to muster a disproportionately large amount of interest from those available folks in our industry to join our firm," Degner said, "because of our ownership structure."

This breeds loyalty, which can be a powerful tool.

"Every crew has 20 to 30 seismic professionals, and when those folks own a piece of the action, it affects their behavior in a wonderful way in terms of organizational performance," Degner noted. "They care an extra amount because they have ownership in it – it's their company." □



# Your favorite software solution and critical data unite

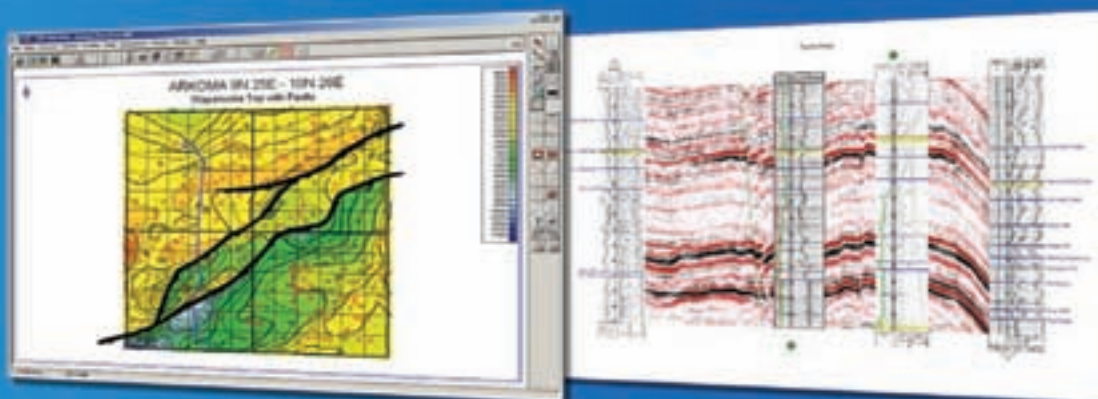
## IHS delivers on its integration promise

**PETRA® Enerdeq Direct Connect** makes it easy to create and automatically refresh projects with the latest IHS data.

**PETRA's flexibility and ease of use** supports a variety of workflows from mergers & acquisitions to exploration and exploitation around the world.

[Download a trial version at ihs.com/energy/petra](http://ihs.com/energy/petra)

Spend more time making decisions and less time managing data.





*Trick Is to Get Correct – and Enough – Data*

# Tools Take Unconventional Turns

By DAVID BROWN  
*EXPLORER Correspondent*

The use of geophysical tools has become common in exploiting unconventional resources.

Today, operators can assess play areas and fracture systems with:

- ✓ Multi-component 3-D seismic.
- ✓ Microseismic monitoring to image the results of fracture stimulation using downhole or surface located geophones.
- ✓ Tiltmeter readings to detect small changes over time caused by subsurface activity.

Unfortunately, geoscientists have fallen behind in understanding the uses and benefits of geophysical tools in unconventional plays.

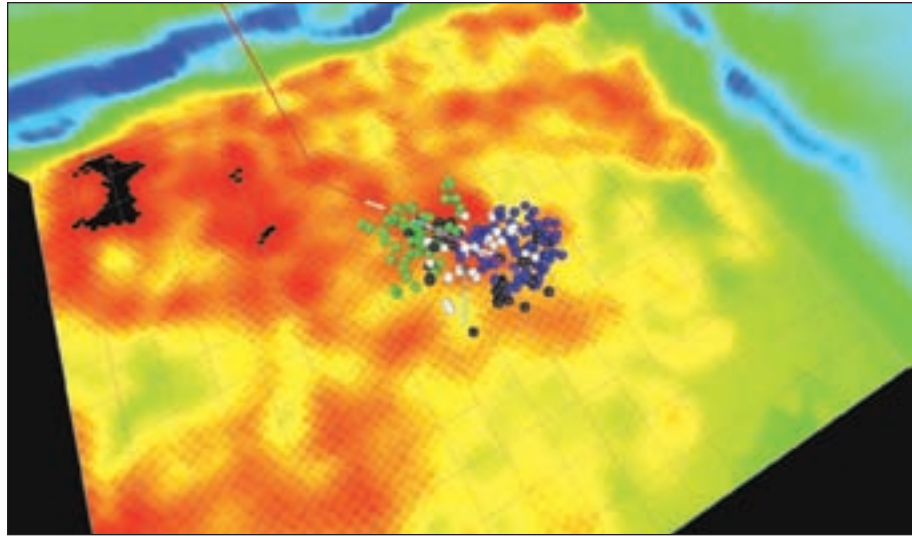
And that includes geophysicists.

"One thing that's interesting to me as a geophysicist is that the geophysical community is just catching up. It's new technology that's really been driven in the past by engineers," said Shawn Maxwell, chief geophysicist in Calgary, Canada, for Pinnacle Technologies Inc.

The petroleum geologist can contribute essential interpretation when these tools image the subsurface. Petrophysics, geomechanics and stratigraphy all come into play.

"If we see a hydraulic fracture hitting a barrier that might be associated with a fault, then the geologists tend to get more involved in interpreting those aspects," Maxwell said.

In one well-known example, hydraulic fracturing of wells in an unconventional



*Graphics courtesy of MicroSeismic Inc.*

Oblique view of the microseismic events associated with the first four stages of a seven stage Fort Worth Basin frac job. Each color represents a different stage.

resource play caused rupturing into a natural fracture system. That system communicated with a water-bearing zone. Consequently, the fraced wells began to water up.

Solid knowledge of the geological setting can contribute to understanding both natural and induced fractures in an unconventional resource.

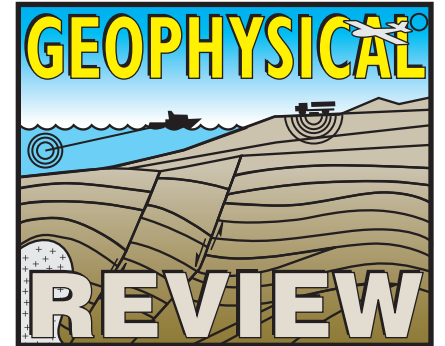
Many operators already use 3-D seismic for initial evaluation. Bob Hardage said he "preaches to anybody who will listen" about the advantages of

multi-component seismic.

"We look at unconventional resources, which tend to be fracture-dominated systems, from the viewpoint of both P-wave and shear waves," he said. "You really have to use multi-component seismic to do an optimal analysis of unconventional resources."

#### The Cost of Value

Hardage is a senior research scientist with the Bureau of Economic Geology at



the University of Texas at Austin and heads up a geophysics lab studying multicomponent seismic applications. He's also editor of and frequent contributor to the EXPLORER's popular "Geophysical Corner."

Three-component (3C) seismic uses geophones that have three orthogonal sensors that enable detection of both compressional (P) waves and shear (S) waves, as well as the direction of propagation.

Nine-component (9C) seismic requires that three orthogonal source vectors be created at each source station; yields a three-by-three matrix of orientation combinations; and captures all possible S-wave modes.

"There are certain rock properties where shear waves shine and do things that P-waves just won't do," Hardage said. "Fracture-dominated systems are

See **Unconventionals**, page 20

Do I have all the data needed to update my 3D earth model?

Answer in a few days

Answer Now

AnswersWhileDrilling.com



INTEQ



**HD3D<sup>®</sup>**

**PGS NORTH AMERICA. SUPERIOR IN ANY TERRAIN.**



Unrivalled experience operating high channel count land crews in North America's geographically diverse terrain.

**PGS. Clearly Onshore.**



PGS Core Values

North America Sales  
281-509-8200  
onshoresales@pgs.com

A Clearer Image  
[www.pgs.com](http://www.pgs.com)





## Unconventionals

from page 18

one of those things."

Analyzing the geophysical aspects of unconventional resources begins with a good petrophysical model, according to Hardage.

"It requires very careful rock physics modeling," he said. "What we're really trying to model is to get our hands on enough data to understand the reflectivity of all P- and S-wave models."

Hardage estimated that 3C seismic provides about 50 percent more information than traditional seismic, and 9C seismic about twice as much.

Because of the higher cost of 3-D/9C seismic, however, operators may choose 3-D/3C.

"What we're trying to do in our research is to develop the technology that will bring down the cost a little bit," he said.

Operators also should consider reprocessing and reinterpreting relevant, existing seismic, such as vertical seismic profile (VSP) data.

"VSP technology is quite valuable," Hardage continued. "VSP data have been acquired with 3C geophones for many years. You can use VSP to get a beautiful picture of fracture orientation."

"I find out again and again people have very valuable VSP data without even knowing the data are in the company archives," he added.

Structural plays might not require the detailed seismic information needed for stratigraphic plays, but unconventional resource plays tend to be stratigraphic in nature, Hardage noted.

"More and more we're seeing geological requirements in which you



Hardage

*"More and more we're seeing geological requirements in which you have to understand stratigraphy. It's really difficult to dismiss the advantages you get from multi-component seismic."*

have to understand both P and S seismic stratigraphy," he said. "It's really difficult to dismiss the advantages you get from multi-component seismic."

### Needed: Geological Input

The hottest current topic in geophysics related to unconventional resources is probably microseismic monitoring.

Microseismic is sometimes called "passive seismic" because it does not capture data from a specifically provided sound or energy pulse. Instead, it relies on natural or secondary energy sources.

(See "Low Frequency, But High Hopes," June 2007 EXPLORER.)

Hydraulic fracturing produces microseisms, or mini-earthquakes, around the well bore and to distances of 1,500 feet or more. The location of these events can be determined using downhole 3C geophones to detect discreet acoustic wave arrivals, or by "beam forming" (stacking) the output from a surface-located 1C geophone array.

In unconventional resources, "microseismic is right now predominantly used for fracture monitoring. It has been viewed primarily as a tool for completions and reservoir engineers," said Chris Neale, vice president of business development for MicroSeismic Inc.

in Houston.

But the geoscientist's input into interpretation is essential because "what really makes these plays work is understanding the geomechanics of the surrounding rock and how the completions strategy interacts with the rock," he noted.

"For instance, there are certain kinds of rocks that produce a louder acoustic 'bang' than others when fractured," he said.

The petroleum geologist can explain microseismic results in terms of rock properties and the geological setting. Neale described variances in microseismic in adjacent wells that required a geological explanation.

"Stacked fluvial tight gas sands, where there is almost no correlation between wells, even when they are close together, creates complex and unpredictable fracture patterns as the induced fracs follow three dimensional pathways within the sand bodies" he explained.

"In the Delaware Basin, we may see very high amplitude events in one well and very low amplitude events in the other. There can be significant changes in rock properties even (when wells are) within thousands of feet of each other," he said.

Because interpretation is so

important, companies often assign a geologist as well as a completion engineer to a microseismic project, according to Neale.

"The real underlying issue is that the geological understanding of what microseismic is actually telling you is critical, maybe even more so than the engineering side," he said.

"I think that's the piece that's missing right now," he added. "There's not enough geological, geomechanical input into what we're seeing."

### Tiltmeters' Precision

Tiltmeter fracture mapping in unconventional resources also has gained wide acceptance by the industry.

"We're seeing a large uptake of the technology," Maxwell said. "People have started to look at coalbed methane recently to try to figure out how to best stimulate the fracture set in a coal."

Most tiltmeters today work on the same principle as a carpenter's level or bubble-level, with extremely precise measurement by electrodes.

Tiltmeters downhole and on the surface can be used to measure the tilt induced by hydraulic fracturing.

"I don't know if heavy oil counts as an unconventional, but we also do a lot of work in that area," Maxwell said.

"In these thermal deposits, we quite often put an array of tiltmeters on surface and look at the surface uplift. As you inject steam even at relatively large depths, the rock is heated up and expands and you get the surface rise," he noted.

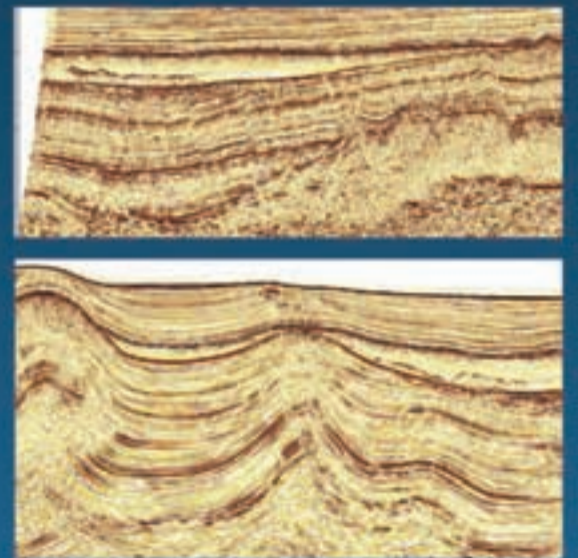
Tiltmetering can be used for hydraulic fracture imaging even at depths of 10,000 feet, according to Maxwell.

"When you're creating a hydraulic

See **Downhole**, page 22

## Available data for the 1<sup>st</sup> Syrian Offshore Licensing Round

The Ministry of Petroleum and Mineral Resources and the Syrian Petroleum Company (SPC) invite international oil companies to submit bids to explore for oil and gas over 4 open blocks, covering an area of 5,000 sq.km. offshore Syria. The selected blocks cover several petroleum basins and a significant number of features believed to have a high degree of prospectivity. The closing date for submitting bids is September 27th 2007.



### Wavefield Inseis' MC2D Survey Offshore Syria

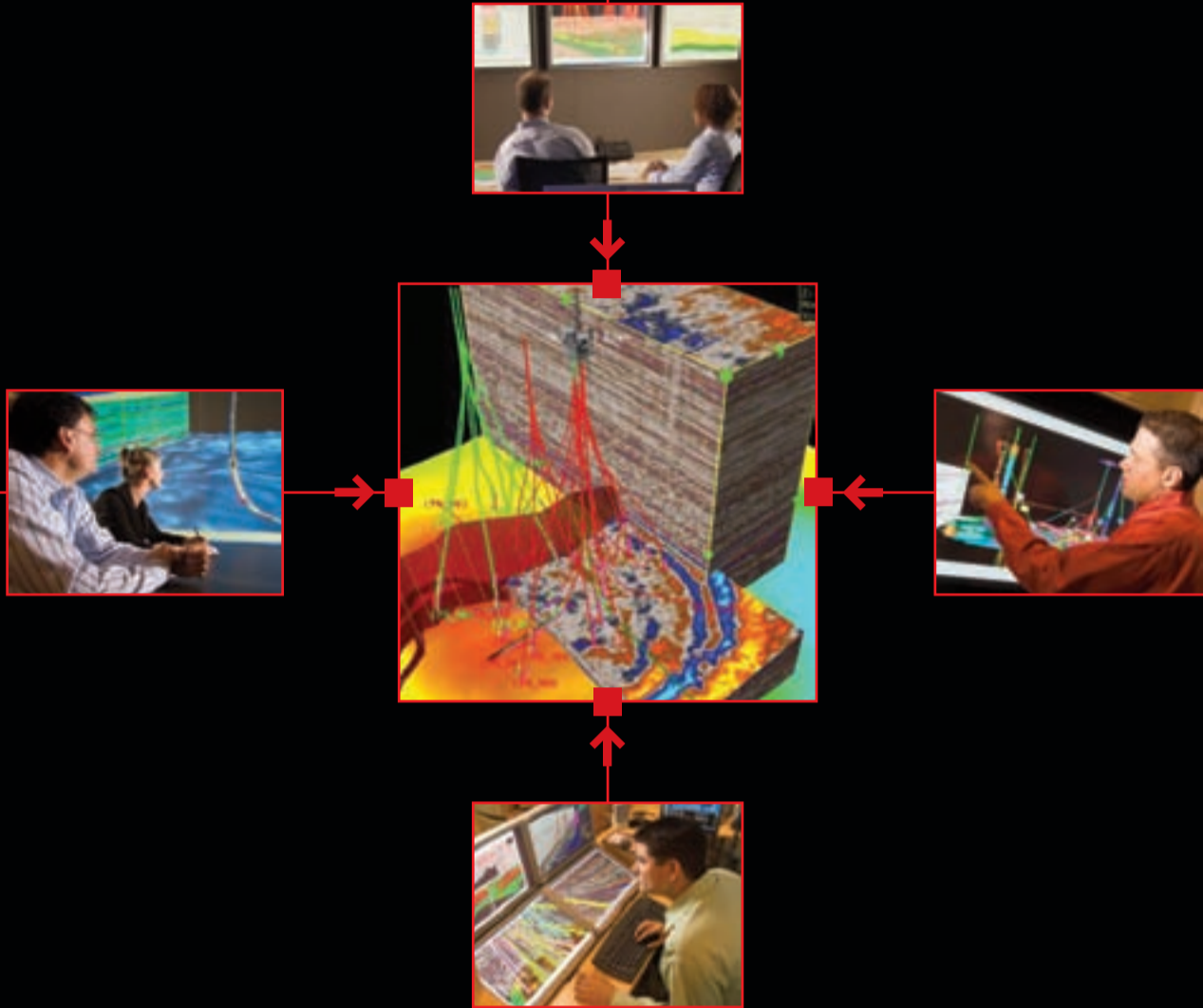
- 5,000 km of regional data
- The only recognised official dataset for the 1st Syrian Offshore Licensing Round
- Interpretation report is available

info@wavefield-inseis.com  
www.wavefield-inseis.com/syria

Meet us at AAPG in Athens, booth no. 222







See how a single  
project-centric  
data store  
changes everything.

Greater data accuracy,  
far less data management.

Building on the **OpenWorks**<sup>®</sup> system's reputation as the industry's leading G&G project database, the breakthrough OpenWorks R5000 version eliminates common database limitations and encourages better collaboration and data quality. With the new concept of interpretation projects, the result is greatly enhanced accuracy, security and efficiency. This, plus cartographic conversion-on-the-fly to minimize data duplication and reduce data management.

Seeing is believing. For more about the OpenWorks R5000 database, please visit us at [www.halliburton.com/landmark](http://www.halliburton.com/landmark).

*Unleash the energy.*<sup>™</sup>

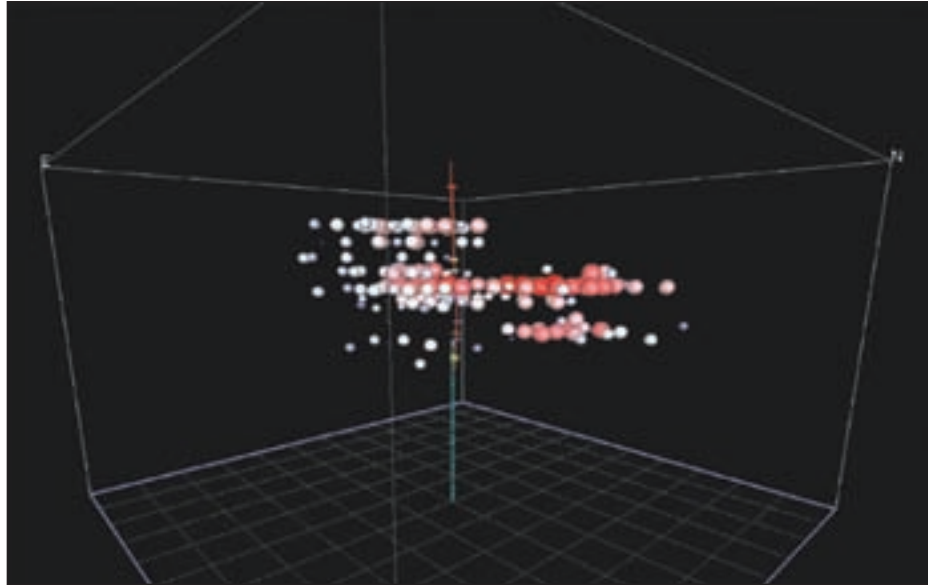
Deeper knowledge. Broader understanding.<sup>™</sup>

**Landmark**

**HALLIBURTON**

© 2007 Landmark Graphics Corporation. All rights reserved.





Frac monitoring of a deep Delaware Basin well. The stimulation design allowed for good containment of the frac within the Barnett Shale.



Neale

## Downhole

from page 20

fracture you're pushing the rock to create the void space for that fracture, and the tiltmeters are so precise you can pick up the very small associated surface uplift," he said.

"If you're fracturing a shale, the tiltmeters can be used to determine the

*"Where the real value of this is in the future is in using microseismic as a reservoir monitoring tool."*

azimuth of the fracture that's being created. You also can determine, for instance, if you are creating a vertical fracture as opposed to a horizontal fracture," he added.

Hydraulic fracture imaging can be used on every well in an unconventional play, or the operator may decide to map only selected wells.

"In the Barnett it seems to be going more toward mapping every well. In other areas, some clients like to use it on test pilots (wells) to figure out what's happening and to get the frac design down," Maxwell said.

### 'A Very New Science'

With either microseismic or tiltmeter, a time-series of images can be produced to show the spread of fracturing. Downhole geophones are used for essentially real-time imaging in microseismic.

"We typically produce a little 'movie' of the fracture with time, and it's surprising how much complexity there is in the creation of the fracture," Maxwell said.

A major concern in current fracture imaging is how to broaden the application of the technology to more of the nearly 25,000 wells fractured in the United States every year. Downhole monitoring traditionally has required an observation wellbore with 2,000 feet of the stimulated well. New plays typically have a limited number of older wells that can serve this purpose.

In response, several service companies are developing stimulated-well geophone arrays for downhole monitoring.

Also, surface-based monitoring obviates the need for an observation well if surface access is available.

The other consideration is cost, with fracture imaging jobs usually ranging from \$75,000 to over \$300,000, depending on complexity and location.

"Longer term, the microseismic service providers must find methods of data acquisition that will reduce overall cost, allowing for a broader application of the monitoring technology," Neale said.

Applications in heavier oil deposits and methane hydrates represent a new frontier for unconventional resource geophysics. Hardage's lab already is looking at mapping hydrates offshore.

"You're not going to be able to turn your back on it," he said.

"When Mother Nature makes these hydrates, the gas molecules are compacted so closely that the energy density is 42 percent of LNG," he noted.

For microseismic, the next big step might be in continuous, "passive listening," 4-D reservoir applications, according to Neale.

"Where the real value of this is in the future is in using microseismic as a reservoir monitoring tool," he observed.

"Fracture monitoring is accepted and relatively well understood," he said. "Long-term microseismic reservoir monitoring has the potential to produce much higher increases in added reserves, but it's a very new science that will require a true multi-disciplinary approach." □

**Other seismic companies have inexplicably put some of the most talented and experienced industry professionals out to pasture.**

**We're proud to say they now wear the Global brand.**

**Global Geophysical Services, Inc.**

When your exploration program demands the best in the business.

1-713-972-9200 Houston, Texas [www.globalgeophysical.com](http://www.globalgeophysical.com)

**Any Size Job, Anywhere on the Planet**



## Brazil 9th Round Data

Pará Maranhão Basin

Campos/Espírito Santo Basin

Santos Basin

**BRAZIL**

Pará Maranhão Basin

Campos/Espírito Santo Basin

Santos Basin

Round 9 Blocks

Data Coverage

Visit our website at:  
[www.arkgeo.com](http://www.arkgeo.com)

Contact us:  
email: [lyndsey.smith@arkgeo.com](mailto:lyndsey.smith@arkgeo.com)  
tel: +44 (0)1908 613960  
fax: +44 (0)1908 518355

Are you looking for gravity and magnetic data?



*A Wireless Future?*

# Cables Can Tangle Seismic Plans

By LOUISE S. DURHAM  
*EXPLORER Correspondent*

It's a tough job, but somebody has to do it.

We're talking land seismic acquisition, a challenging task for the first seismic crews who ventured into the field early in the last century, and one that remains challenging today.

To conduct surveys, seismic crew members traipse around in some plenty treacherous and unwelcoming territory, e.g. dense jungles, hot deserts with their infamous sandstorms, bayous and swamps teeming with unfriendly varmints, freezing winds in mountainous areas – you get the picture.

The survey effort becomes even more daunting given the need to transport heavy cables and other equipment into such hostile areas, move this gear around during the shooting program and maintain it in working order.

Yet after the dearth of seismic data demand only a few years back – especially onshore – complaints are few and far between.

The welcome high activity level is only part of the good news.

The equipment manufacturing companies have begun to introduce more efficient, lightweight acquisition systems that are easier to operate and to maintain.

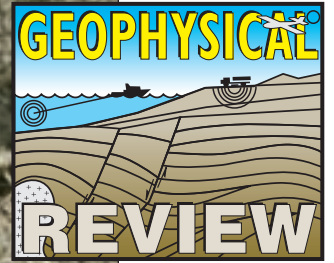
In fact, "cableless" has become the operative word, with some folks

See **Future**, page 26



That was then ...

Photo courtesy of Chevron



... and this is now. Seismic crews in the 1930s faced remote locations that meant difficult work. Today, geophysical crews can rely on plenty of technological advances (right); however, the wave of the future (no pun intended) may be found in cable-free land nodes (above), where a single channel P-wave sensor provides continuous recording from a single point receiver station.



Photos courtesy of Fairfield Industries

## Introducing UBA™ UNLIMITED BASEMAP ACCESS



**Unlimited access to the most accurate  
Base Map data on the planet.**

Now the Industry Cartographic Standard\*



[www.whitestar.com](http://www.whitestar.com)

**CALL 1-800-736-6277**

\*ESRI SDE database now supported

777 South Wadsworth Blvd., Suite 4-250 Lakewood, CO 80226



# Geoscientists

## redefine stamina

It takes a special type of person to find energy. Someone who is ready to break new ground in the industry – as well as their career. A person with determination.

Knowledge. And the will to use that intelligence to change things for the better.

If you're ready to do whatever it takes to find new sources of energy for the world, make ConocoPhillips your source for personal power.

Together, we will achieve great things.

To learn more, visit [conocophillips.com](http://conocophillips.com).

Apply online by clicking the Careers tab.

  
**ConocoPhillips**

[conocophillips.com/careers](http://conocophillips.com/careers)

EOE.



# WANT TO SEE BETTER RESULTS IN SUBSALT DRILLING?

**95 subsalt wells. \$2,000,000 in research.  
One invaluable database.**

The best way to avoid the unpredictability of drilling below salt is to have firsthand knowledge before you start. And now you do. Thanks to the data and best practices developed from our Subsalt Joint Industry Project, the subsalt environment is more predictable and the potential for discovering the Gulf of Mexico's largest field is much improved. Be part of the success curve. Learn more at our two-day workshop in October by joining our project today. Go to [www.knowsys.com/services/jip.aspx](http://www.knowsys.com/services/jip.aspx) to find out how.



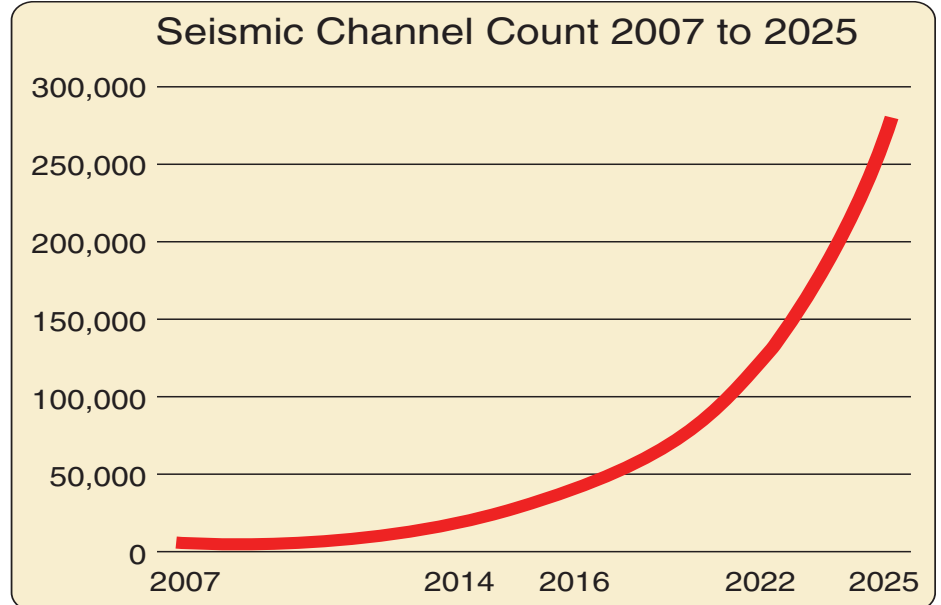
**Knowledge Systems**

More knowledge. Fewer surprises.

[www.knowsys.com](http://www.knowsys.com)

Houston London Perth

©2007 Knowledge Systems, Inc.



Data from Robert Heath, "Let It Flow, Flow of Ideas, Hydrocarbons and Business"

The information age on steroids: Seismic channel count growth projected into the future – from 5,000+ channels to nearly 300,000 channels. Some forecasters have even predicted 1,000,000 channel count crews.

## Future

from page 24

predicting the next generation systems will be even more progressive, i.e., completely cable-free – think self contained, autonomous nodes, which already have proven successful in acquiring data in deepwater environments, such as the BP-operated Atlantis Field in the Gulf of Mexico.

"Land seismic exploration today is entering a transitional period similar to 20-something years ago when recording methods began the migration from 2-D to 3-D surveys," said Scott Labaume, director of sales and marketing at Fairfield Industries.

"We're on the cusp of a shift from orthogonal line and swath surveys to freeform nodal surveys."

### Concepts vs. the Real World

Labauume noted the modus operandi for today's seismic industry is for survey design, systems and software to accommodate grid geometries, which call for parallel lines of equally spaced receivers deployed in geometric arrays alongside another geometric array of parallel lines of equally spaced sources.

Of course, reality has a way of intruding in the best laid plans.

"Where the real world meets the artificial Euclidian geometry of the surveys, we use innovative operational techniques and intricate software routines to 'correct' the differences between our ideal survey and the real world it encounters," said Dennis Freed, technical marketing manager at Fairfield.

"What has evolved from this form of seismic acquisition is an array of available systems requiring an analog cable to connect multiple external sensors to a remote unit in order for that unit to amplify, filter and digitize the acquired analog signal," Freed said. "Then there's an external cable and often a series of connectors used to transfer the analog signals sensed by the external sensors to each remote unit."

"Many systems also require an external cable to transmit the acquired digitized seismic data to a central recorder," Freed added, "and some systems use this same external cable to provide power to the remote units."

This complex configuration can create one giant continuous headache for the seismic crew.

It's not uncommon for crew members to spend six-plus hours per day trouble

shooting both the sensors and cables/connectors for leakage and continuity problems. These components can all be damaged by a variety of sources, both natural and cultural.

### Paying the Price

The bottom line is that cables, sensors and such can eat a big hole in the budget for a seismic shoot – directly in terms of actual dollar outlay and indirectly via inefficiency.

Freed presented some estimated costs for a sample survey where a 4,000 channel land crew might easily spend as much as \$1.75 million for new cables and sensors and then incur annual estimated maintenance costs between \$200,000 and \$400,000 to maintain these components in operational condition.

Over a three-year period that includes initial costs along with maintenance and replacement costs, crew expenditures could reach amounts that range from \$4.1 to \$4.7 million for cables, connectors and sensors alone.

After three or so years of use, the cables and sensors likely would have to be replaced. Even if they're not damaged by the forces of nature or by critters (including the human kind), pinhole leaks can develop over time creating leakage and degrading the seismic signal.

The spread cables alone for fielding a 4,050 channel crew with a station spacing of 110 feet (plus 10 percent) would stretch out 490,050 feet, or 92 miles, according to Freed. He noted this doesn't include any cross line cables that many systems would require.

It is noteworthy that survey costs are governed in large part by survey location, as well as by any unusual or unique aspects of a shoot.

### Who Needs Cables?

The quest to eliminate or, at the very least, reduce the number of cables used in land surveys already has resulted in availability of an increasing array of cableless systems, e.g., Ultra from Ascend Geo, FireFly from I-O, UniTE from Sercel.

These cableless systems do not require cables to interconnect the individual acquisition modules. However, they do have cables to interconnect one piece of equipment to another and/or use a string of geophones as their sensors, according to Freed.

Autonomous nodes, on the other

See **No Cables**, page 28





**HIGH-PERFORMANCE IMAGING.**



Just how serious an explorer are you? TGS brings you high-performance imaging solutions so clear, so fast, and so powerful you can almost hear the engines roar. And that's on top of signature global, multi-client datasets so well processed they blow the competition away. Plus, unique algorithms, exclusive technology, and a team of precision specialists behind the scenes. TGS gives you it all, in one sleek, turbocharged package.

**Cruise on over to SEG Booth 1115 and 1146 for a personal demonstration.**



Geophysical Products



Geological Products



Imaging Services

[www.tgsnopec.com](http://www.tgsnopec.com)

NORWAY +47 66 76 99 00 | USA +1 713 860 2100 | UK +44 (0) 1234 272122 | AUSTRALIA +61 8 9480 0000 | RUSSIA +7 495 959 8117



## No Cables

from page 26

hand, are self-contained sensors (the sensing element typically is a geophone) with batteries and a highly accurate clock, making these systems entirely cable-free.

"We've tried to get away from cables on land a number of times," said Mark Foster, land seismic R&D program manager at BP. "Today, there are a number of minimal-cable systems out there, and they all have their place. I think the technology is reliable enough today, we can get rid of cables."

Dave Monk, director of geophysics at Apache, concurs.

"The wave of the future is cableless systems, whether minimal cables like some of the systems available today,

*"The wave of the future is cableless systems, whether minimal cables like some of the systems available today, or no cables."*

or no cables."

A major driving force in the move away from cables centers on the ever-increasing number of recording channels used in seismic surveys.

"If you look at how many recording channels we typically use on a land acquisition system, the trend is it's doubled every three and a half years," Monk said. "On a land program today, you may have 20,000 channels, so in six to seven years you're looking at 100,000

channels – the trend line is solid.

"I don't believe we're going to have 100,000 channels connected with cable," Monk added. "It won't be manageable."

"Most systems out there now will be capable of operating with 100,000 channels," Monk added, "but no one has built 100,000 channels of any system yet."

Reducing or eliminating cable spreads leads to reduced equipment

weight, resulting in more flexibility to place the detectors – especially important in rugged terrain, environmental hot spots and urban locales – plus the lighter gear will be much easier to move around.

### Quality Control

Taking the relatively simple and inexpensive cable-free node-type route to acquisition creates a step change not only in the number of units that can be deployed but also in the quality of the data acquired, according to Foster.

For those folks who may balk at the idea of deploying a node-type system because they must wait to see the data after retrieval of the unit rather than viewing it in real time – such as with some of the high tech cableless systems on the market – Foster has some reassuring words.

"When you have a small, lightweight set of equipment that's very flexible and inexpensive (compared to cable), you can deploy the units in such large numbers," he said. "I believe we're getting to a state where the level of technology is such that these systems can be reliable enough and deployed in such quantity that even if you get a small percentage of failures the redundancy makes up for that."

"The advantage of going to this relatively inexpensive, almost disposable type of cable-free system is that each channel will be relatively low cost," Foster noted. "We want to be able to deploy huge numbers of these that allow us to either go in to an exploration type environment very efficiently," he said, "or acquire very high density – both in offset and azimuth – in the production environment."

A big issue with node systems centers on how long the nodes can be live, according to Foster. He noted this is a combination of battery life and managing the power the systems draw on the battery.

Freed succinctly summarized Fairfield's view of the next generation land seismic data acquisition system:

- ✓ Fully self-contained node units (free from any external connectors or cables).
- ✓ Must meet or exceed the analog specifications of current systems.
- ✓ Capable of remaining independently on site where initially deployed until time to be retrieved by crew – troubleshooting would be a chore of the past.
- ✓ Must be capable of not less than 288 continuous hours of independent autonomous operation.
- ✓ Must have highest possible reliability with a failure rate of equal to or less than 1.5 percent during a single deployment (for a 10,000 channel system, this would require a reliability rate of less than six unit failures per day.)
- ✓ Coupling of the node to the earth must meet or exceed the coupling capabilities of a current geophone. □

### Chesapeake Provides Funds for High School Chair of Geophysics

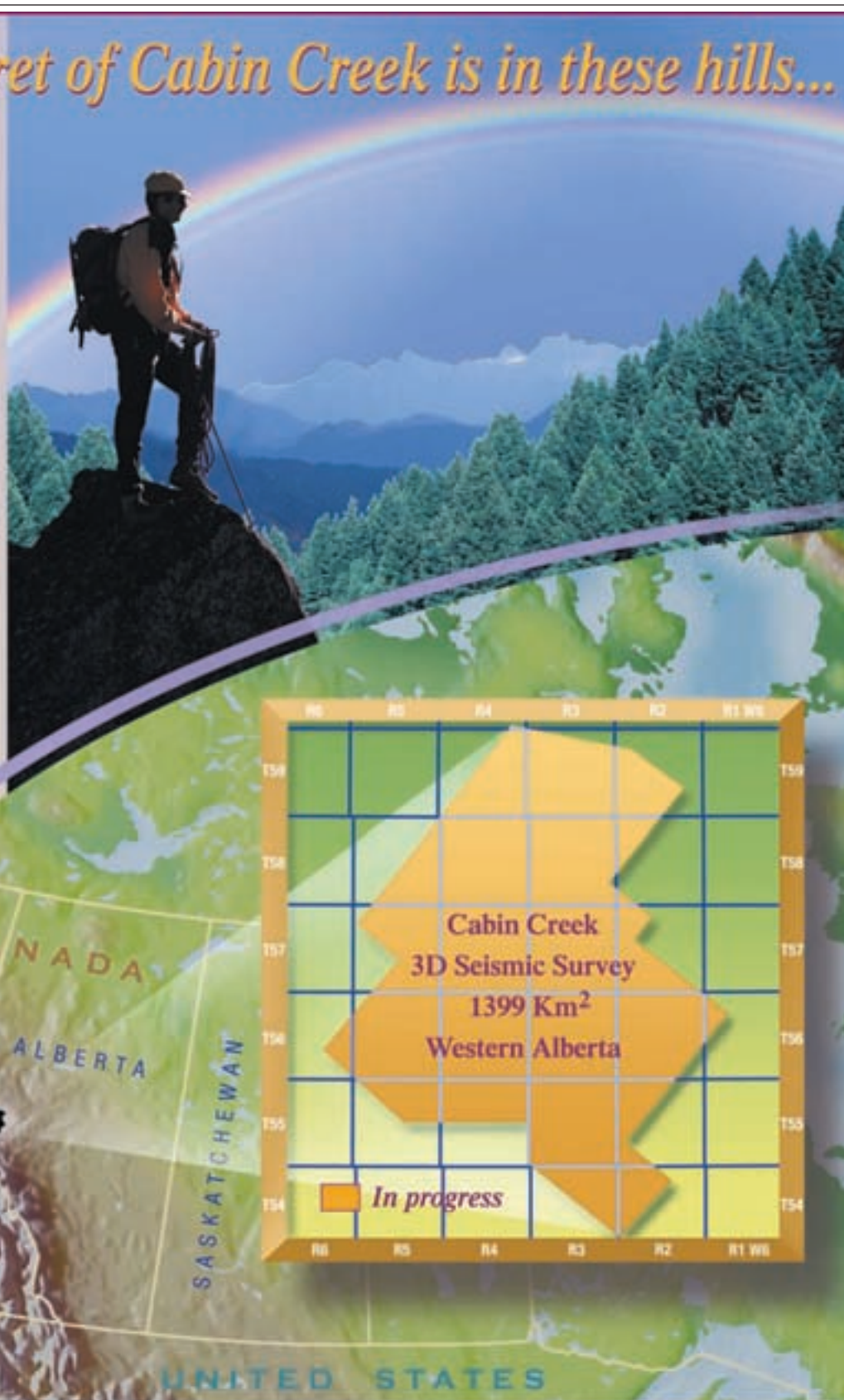
A \$500,000 contribution by Chesapeake Energy Corp. has funded a "chair of geophysics" at an Oklahoma City public high school, the first endowed faculty chair at a public high school in the state.

The Chesapeake Geophysics Chair was established at the Oklahoma School of Science and Mathematics, a two-year residential public high school for academically gifted math and science students. □

## The Big Secret of Cabin Creek is in these hills...

Bridge the Western Alberta gap between the complex Foothills play and the Deep Basin with JEBCO's new Cabin Creek 3D Seismic Survey. Using state-of-the-art long offset, wide azimuth acquisition techniques, this latest JEBCO survey represents the best data ever acquired in this region. Who knows what secrets are buried between these prolific trends...?

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 discover the secret of Cabin Creek!



For more information, contact: JEBCO Seismic, L.P.  
2450 Fondren, Suite 112 / Houston, Texas 77063  
Phone: (713) 975-0202 Fax: (713) 975-9293 E-mail: jebco@jebcoseis.com



[www.jebcoseis.com](http://www.jebcoseis.com)

*New Ideas for New Frontiers*



# Join Team El Paso



**Drilling Engineers • Landmen • Geologists • Geophysicists • Geo Techs**  
**Reservoir Engineers • Production Engineers • Engineering Techs**

As a professional, you have a choice in where you work. We'd like to invite you to consider El Paso Corporation as a career option. As the nation's largest natural gas pipeline company and one of the country's largest independent exploration and production companies, we're actively building new energy infrastructure across the United States. We combine the stability of a company grounded on a \$32-billion asset base with billions of dollars of identified growth opportunities.

**El Paso Exploration & Production Company** is one of North America's largest independent natural gas producers. We operate in high-quality basins across the United States—from the Gulf of Mexico to the slopes of the Rocky Mountains—and in prolific basins offshore Brazil. We have a five-year drilling inventory and extensive natural gas and oil reserves. This year we expect to deliver even more growth.

El Paso Corporation takes a proactive approach to employee health and welfare. We believe that's the right thing to do.

We're pleased to offer a competitive health and wellness benefits package that includes:

- Medical, dental, and vision insurance
- Fitness centers
- Life insurance, AD&D, and long-term disability insurance
- Extended illness bank

We also know the value of compensation:

- Paying competitive salaries
- Providing incentive pay based on your performance
- Matching your contributions to a 401(k) program
- Making quarterly contributions to a company-sponsored pension plan

## Interested?

Visit our website at [elpaso.com/careers](http://elpaso.com/careers)  
El Paso Exploration & Production is located in  
Houston, TX; Denver, CO; and Corpus Christi, TX.



El Paso Corporation is an Equal Opportunity and Affirmative Action Employer, M/F/D/V



*Coal's Cousin Attracting Players*

# Price Puts Oil Sands in Spotlight

By LOUISE S. DURHAM  
*EXPLORER Correspondent*

The considerable hype about the Canadian oil sands action just keeps escalating – and with good reason.

It's understandable given what's there, just waiting to be recovered by the operators.

We're talking 174 billion barrels of reserves, qualifying this resource as second only to Saudi Arabia in the ranks of global oil reserves.

Not surprisingly, companies worldwide are scrambling to get a piece of the action.

The latest big-name entry into this hot play is Marathon Oil Corp., which recently announced that it's acquiring Calgary-based Western Oil Sands.

A short list of the many other notable players includes:

- ✓ Statoil, which purchased Canada's North American Oil Sands Corp.
- ✓ Shell Canada and Royal Dutch Shell, which purchased Calgary-based BlackRock Ventures.
- ✓ Total, which purchased Deer Creek.
- ✓ China National Petroleum Corp., which recently acquired rights to explore in the oil sands.

**Counting the Costs**

Canada's oil sands are found in the province of Alberta, where they occur in three principal areas – the Athabasca, Peace River and Cold Lake regions – and encompass about 140,200 square

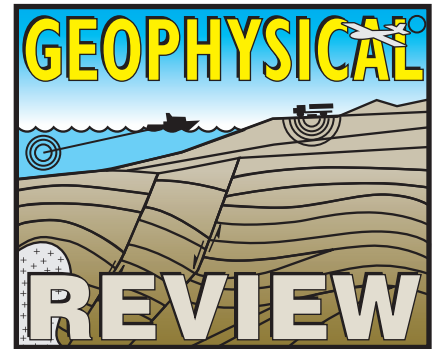


*Photo courtesy of Conquest Seismic Services*

Canada's oil sands continue to be a major play, and geophysical crews are helping to define and exploit the potential. Typical deployment there uses a single vibrator per source point to eliminate source array and meet high spatial resolution needs.

kilometers. The Canadian Association of Petroleum Producers (CAPP) noted that in 2005 industry investment in the Alberta oil sands reached approximately \$10 billion.

Oil sands activity actually dates back many years – back when \$70-plus oil was unheard-of. Suncor Energy, in fact, pioneered the world's first commercially successful oil sands operation in 1967,



according to Brad Bellows, spokesperson for Suncor.

But this is no ordinary resource, and economic recovery on a large scale is possible only when oil is bringing in a minimum of \$40 per barrel, according to some industry analysts.

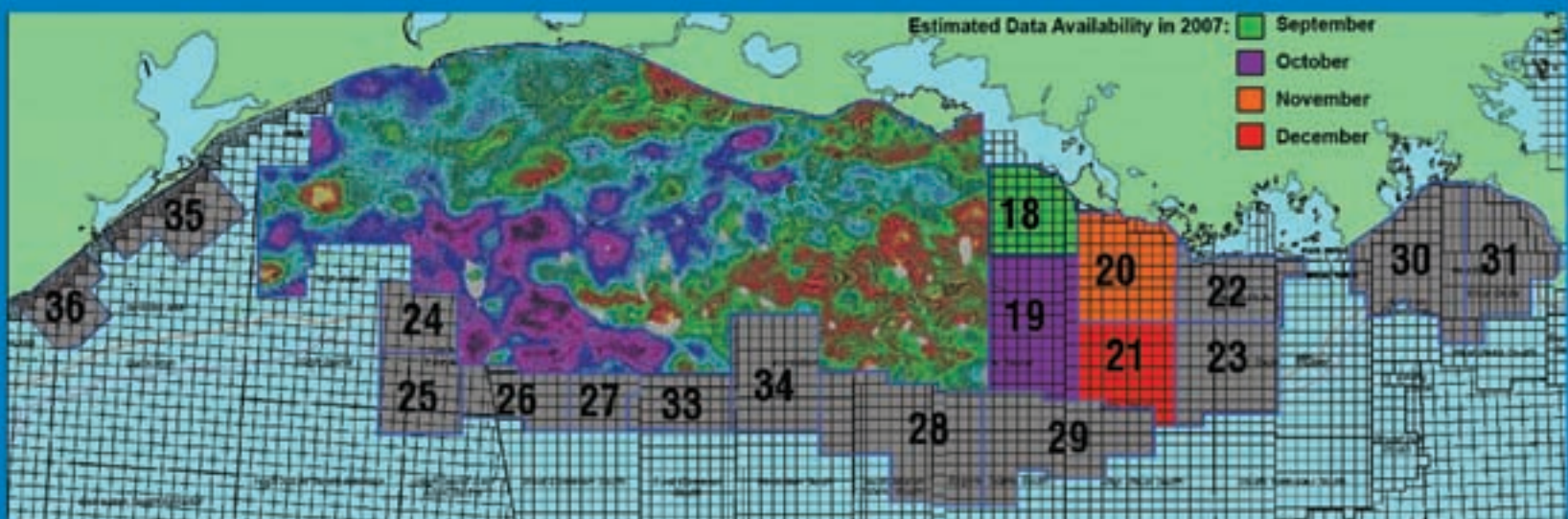
The thick, heavy oil found in the oil sands is actually bitumen, which essentially is a semi-solid hydrocarbon so viscous it might best be dubbed a first cousin to coal. It is recovered either by pit mining or by underground in-situ (in-place) techniques.

"About a fifth of the resource is recoverable by mining because it's close to the surface," said Greg Stringham, CAPP vice president. "The cutoff is 200 feet, so above that it's economical to remove the dirt, put it into an adjacent pit and then reclaim it afterwards.

"If it's greater than 200 feet – where

continued on next page

## More depth



Fairfield continues to expand its Kirchhoff Prestack Depth Migrated GOM data base.

- Offsets of 20,000 and 30,000 feet, imaged to 40,000 and 50,000 feet
- Full fold depth migrated gathers (60 & 90 fold) using AVO preserved processing
- Full offset stacks & corridor stacks available

Houston 281/275-7500

New Orleans 504/525-6400



continued from previous page

80 percent of the resource is – then you can recover it through more conventional drilling techniques known as in-situ,” Stringham said. “At the current production level, the split is pretty close to 50-50.

“In-situ technology is relatively new, even though some has been around since 1964,” he noted. “But in-situ is just starting to take off, so more oil is coming from mining right now.”

**SAGD: Drilling Two-by-Two**

Canada’s largest in-situ bitumen recovery project is found at Cold Lake, according to the Alberta Department of Energy. The sands are heated using steam injection to bring the bitumen to the surface where it’s diluted with condensate to be shipped via pipeline.

Longtime oil sands player EnCana has been honing its skills with the now-commonplace in-situ technique known as steam-assisted-gravity-drainage (SAGD) for a number of years – and has some substantial production to show for it.

“Our two prime projects are Foster Creek and Christina Lake,” said Alan Boras, manager of media relations at EnCana. “From these, we produce in the neighborhood of 50,000 to 60,000 barrels a day on a gross basis.

“Foster Creek was a pilot project dating back to 1997 and became commercial in 2001,” Boras said. “So essentially we’ve been working on steam-assisted-gravity-drainage for a decade.”

The SAGD process entails drilling horizontal wells in pairs, parallel to one another and about 17 feet apart. Steam

## Turning ‘Cold Molasses’ Into Gold

By LOUISE S. DURHAM  
*EXPLORER Correspondent*

The all-out action in Canada’s oil sands shows no sign of abating.

But oil sands are a whole different breed of cat from other types of oil deposits, and recovering the oil and converting it into something of value to meet consumer and industrial needs is no ordinary oil field operation.

The Canadian oil sands, often referred to as tar sands, are actually deposits of bitumen, which is a thick, gooey type of crude oil – it’s been compared to cold molasses at room temperature.

Considerable upgrading is required before it can be refined to produce a useable fuel.

The Alberta Department of Energy (ADOE) defines bitumen in the technical sense as a “tar-like mixture of petroleum hydrocarbons with a density greater than 960 kilograms per cubic meter; light crude oil, by comparison, has a density as low as 793 kilograms per cubic meter.”

In fact, the heavy, viscous oil must

be heated or diluted with lighter hydrocarbons before it can even flow through pipelines, according to the ADOE.

**The Process**

Canada’s oil sands, which are located in the province of Alberta, account for one of the two largest sources of bitumen in the world, according to the ADOE. The other is Venezuela.

Depending on depth of the resource, either open pit mining or in-situ (in-place) techniques are used to recover the bitumen. To produce one barrel of oil via mining, two tons of oil sands must be dug out, moved and processed and then returned to the open pit for reclamation.

Equipment such as cranes and dump trucks that are required for the mining procedure are bigger than big. In fact, the huge trucks that transport the sand to be processed reportedly weigh in at 360 tons when empty.

Once the oil sands are mined, they

are broken up by crushers and sent to an extraction plant where the bitumen is separated out to be moved to the upgrading facility. Following the upgrading procedure, the bitumen ultimately is converted into diesel fuel and synthetic crude, which is transported by pipeline to refineries to be converted into a number of products, including gasoline, jet fuel and home heating oils.

In-situ recovery techniques are used where the sands are buried deeper than 200 feet, which applies to about 80 percent of the resource, according to Greg Stringham, vice president of the Canadian Association of Petroleum Producers.

The in-situ methods include cyclic steam stimulation and steam-assisted-gravity-drainage, which entail thermal injection via vertical or horizontal wells, solvent injection and CO<sub>2</sub> methods, depending on the in-situ techniques being used.

The bitumen separation occurs in the ground, so it’s sent directly to the upgrading facility by pipeline. □

is injected into the upper well to warm the bitumen and make it less viscous so it can drain to the lower production wellbore.

Boras noted that research and development into SAGD in Alberta dates back to the 1980s with government and industry cooperative arrangements.

The two EnCana fields are located to the south of the remote town of Fort McMurray. This now-bustling community has become a magnet for oil workers worldwide, including folks from

Venezuela who have extensive expertise in that country’s high profile heavy oil action.

**Seismic Activity**

As might be expected in such a hot play, the geophysical companies are a visible presence in the oil sands action.

For the most part, however, there’s only a narrow window of time when seismic data acquisition is possible.

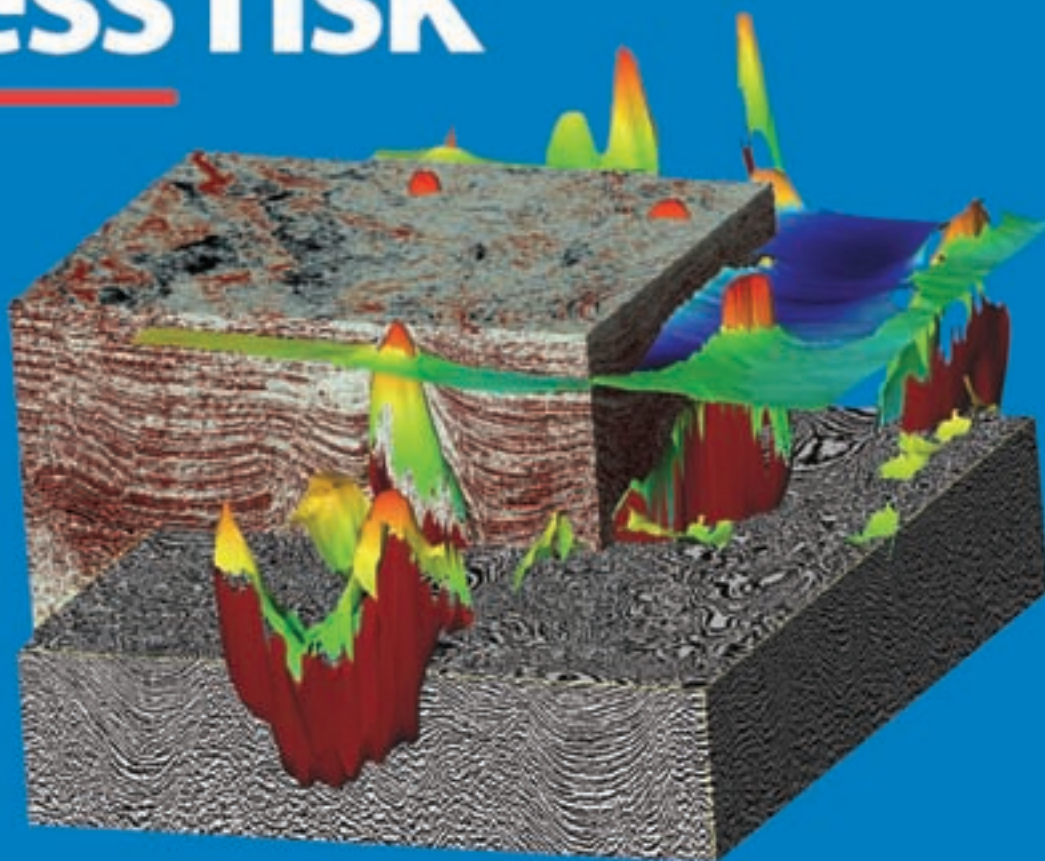
“Typically, oil sands work must be

done on frozen ground,” said Gary James, director of marketing and business development at Conquest Seismic Services. “This is because most of the surface in the oil sands is what they call muskeg, which is like a swamp. It’s a swampy, mossy surface that’s thick but wet, so most of the work is in the frozen winter.”

Conquest had six crews working in the oil sands last winter season. James

See **Oil Sands**, next page

# Less risk



It’s just that simple.

The **more** accurate focusing and spatial positioning of depth migration makes better sense of amplitudes and lithology indicators; and, ultimately, a better well location with **less risk** of unwelcome, costly drilling surprises.

www.fairfield.com



Proud to be an American company



## Oil Sands

from previous page

said they're optimistic for the same this season and maybe still one more.

For oil sands work, the company makes the most of its Envio-Vibe (a mini-vibrator), which is designed for high production and high resolution seismic prospecting in an environmentally sensitive manner. It's particularly applicable for low impact, shallow target exploration.

"The oil sands play is a shallow play requiring high spatial resolution," James said. "Our crews are providing the ability to get higher spatial resolution with shorter distances between receiver points and source points.

"We've found that where we can use the mini-vibes, we can provide that at a lower cost than having to do dynamite," James said, "because we don't have to drill holes and load dynamite. Also, we get earlier access, because with a hole for dynamite you need very hard frozen ground, but with the vibrators we can go in earlier – with a narrow time window,



A closer view of operations at the Christina Lake heavy oil operation in Canada; (left) an insulated pipe and emergency shut-down valve for the field's SAGD operation in northeast Alberta, which is constantly being checked (right) for potential snags.



*Photos courtesy of EnCana*

An aerial view of the Foster Creek's heavy oil in-situ oil sands SAGD (steam-assisted gravity-drainage) operations.



that's important."

Helicopter survey projects provide a way to circumvent the frozen ground requirement – but they're more costly.

In fact, Conquest will kick off a helicopter job early in the fall because the client needs the data early on.

"To do this, the ground must be high enough," James said. "You can't be down in a wet bog."

### Full Speed Ahead

Participants in the current frenetic oil sands action don't envision a slowdown.

"We anticipate an increase in oil sands activity industry-wide," said Boras. He noted that price is a major contributor (whether positive or negative) to the growth pattern of this activity.

"We've had a confluence of advancing technology, which has continued to make the operations more efficient, alongside rising prices," he said, "in order to access this unconventional resource."

Stringham is equally optimistic.

"What we're seeing is this will grow from about 1.3 million barrels a day now, up to three and a half or four million barrels a day by 2020," he said. "It's one of the strongest growing areas in the world.

"While we have the second largest resources in the world," Stringham said, "we're only about the eighth largest producer in the world. And between ourselves and the United States, we're kind of the very few who are non-OPEC members.

"We hope with this growth that we'll see between now and 2017, that we'll probably be up with the United States as being maybe the third largest producer in the world, after Saudi Arabia and Russia." □

OpenTect is free for R&D, education or evaluation only  
Commercial users pay a modest annual maintenance fee

[www.opendtect.org](http://www.opendtect.org)

  
**OpenTect**  
The Open Interpretation Environment

**Join the movement**

**The future is Open-Source**

OpenTect is a complete seismic interpretation software system in an open source environment. It enables you to process, visualize and interpret multi-volume seismic data using attributes and modern visualization techniques. For more advanced work commercial plugins are available.





**HALLIBURTON WIRELINE AND PERFORATING SERVICES**



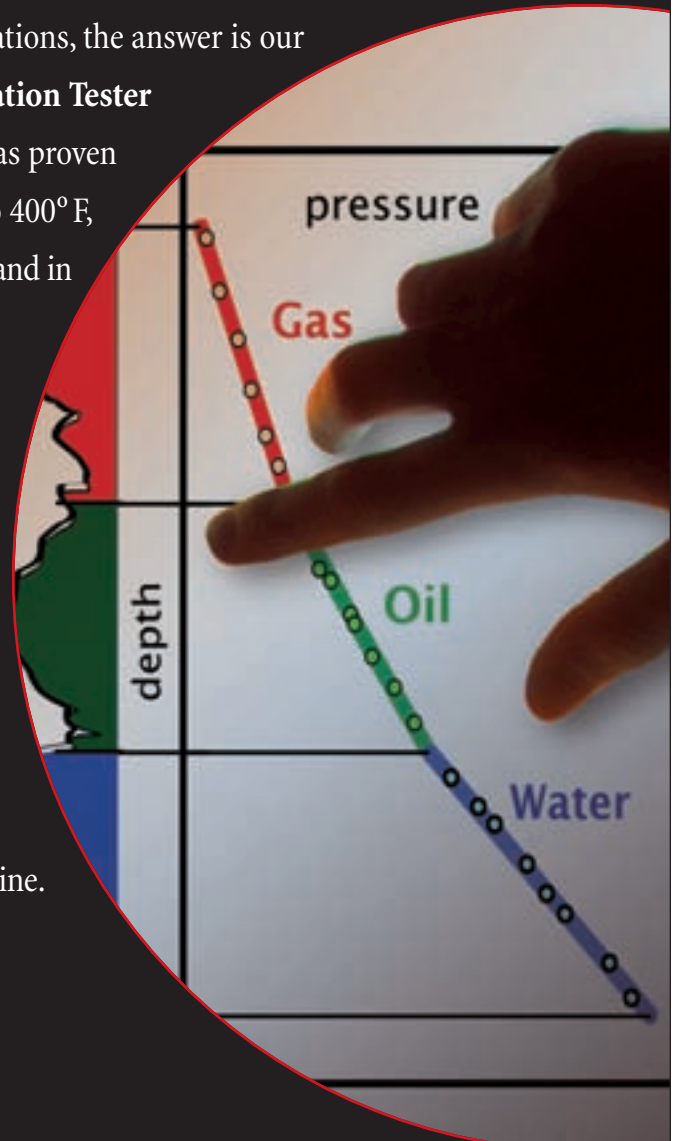
**For rock-solid reliability — miles underground — get the service that consistently delivers samples in *any* environment.**

Halliburton delivers everything you need for optimal wireline formation testing and sampling. Our complete line of services includes the **Reservoir Description Tool (RDT™)** service which, with its modular configuration, means job flexibility and time savings.

And for extremely hot situations, the answer is our **Hostile Sequential Formation Tester (HSFT™)** tool. This tool has proven itself in temperatures up to 400° F, pressures up to 25,000 PSI and in boreholes as small as 4 inches in diameter.

Before you get in too deep, look into Halliburton **Wireline and Perforating Services**—the leader in reliability and service excellence. For more information, please visit [www.halliburton.com/wireline](http://www.halliburton.com/wireline).

*Unleash the energy.™*



**HALLIBURTON**



*New Future for Depleted Wells*

# Bypassed Thermal Energy Has Value

Editor's note: Richard Erdlac will present two talks on geothermal potential at the Gulf Coast Association of Geological Societies' annual meeting, which will be held Oct. 21-23 in Corpus Christi, Texas.

Both papers will be presented on Tuesday, Oct. 23. They are:

✓ "A New Future for Deep Depleted Wells – Geothermal Energy from Sedimentary Basins," at 2:45 p.m.

✓ "Resource Assessment Status Report on Geothermal Energy Within Deep Sedimentary Basins in Texas," at 3:15 p.m. His co-authors are Linda Armour, Robert Lee, Susan Snyder, Mike Sorensen, Mike Matteucci and Jordan Horton.

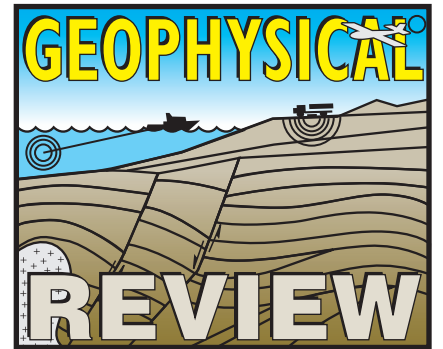
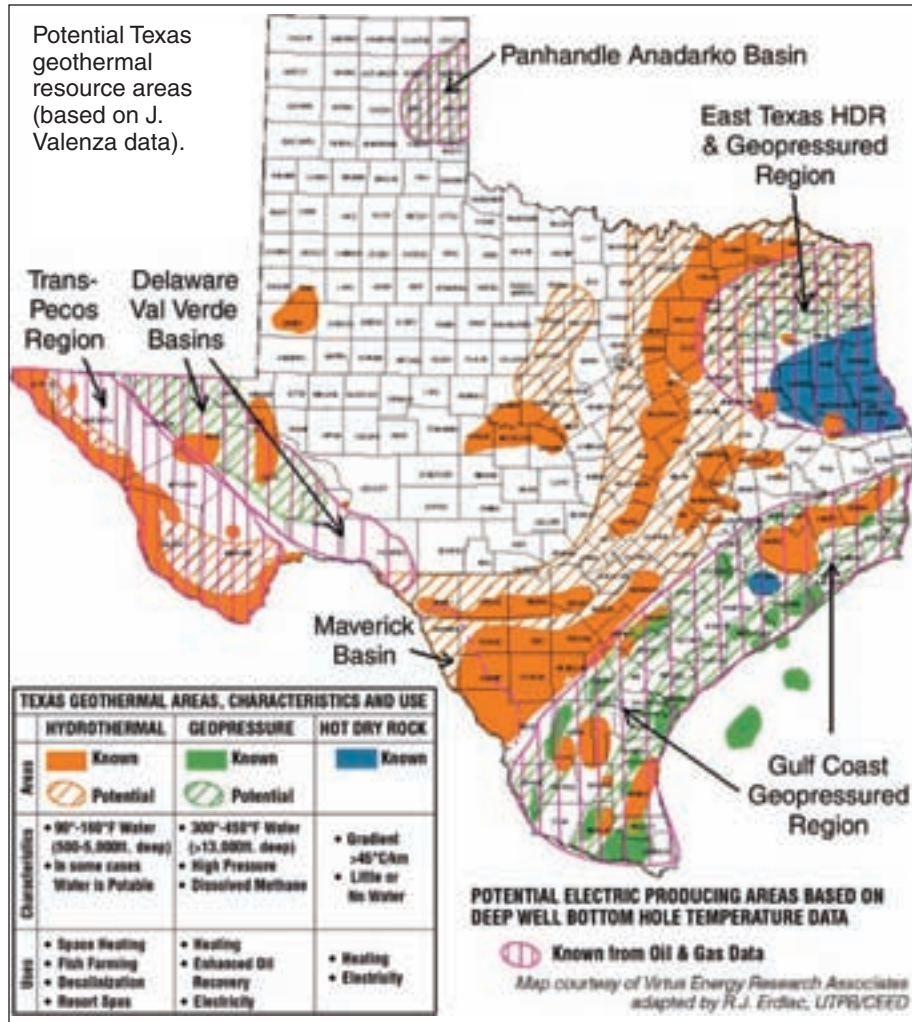
By LOUISE S. DURHAM  
*EXPLORER Correspondent*

Tapping into formation water rather than hydrocarbons when drilling a well is guaranteed to disappoint even the most stoic prospector – but, perhaps, unnecessarily.

In fact, a water "discovery" has the potential to open the door to a whole new opportunity in sedimentary basins in many areas – including the state of Texas.

Many thousands of wells already drilled in the Lone Star state are deep enough to encounter temperatures more than 250 degrees F, and sometimes exceeding 400 degrees F, at varying depths and in different geographic areas.

The extremely hot brine existing at these depths essentially is a sleeping



heat energy giant boasting thousands of exajoules to be used for power generation, according to AAPG member Richard Erdlac, director of geothermal research and commercialization at Energy America Geothermal in Midland, Texas.

To put this in perspective: One exajoule per year, as defined in a report released by Lawrence Berkeley Laboratory scientists, is equivalent to 470,000 barrels of oil per day.

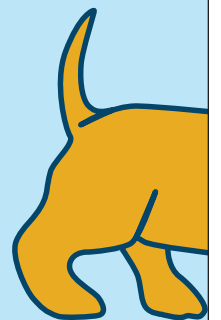
**The Price is Right?**

It is noteworthy that investigations to evaluate Texas heat reserves and resource value suggest that a Texas geothermal industry could rival the existing Texas oil and gas industry in economic value, Erdlac noted.

"I looked at some of the work done in

See **Texas Geothermal**, page 38

• RESPONDING TO CUSTOMER NEEDS •  
• truly unconventional™ • advanced services • stability • potential •  
UNCONVENTIONAL REVOLUTION • PARTNERSHIP • QUALITY •



**"Unleash your reservoir potential"**

• advanced services • trusted advisor • commitment • honest •  
SEAM PRIOTIZATION • RETURN ON INVESTMENT • CGC DATA  
• solution provider • reservoir characterization • consulting •  
CERTAINTY • QUALITY SERVICE • ADVANCED SERVICES • DATA  
• risk management • seam prioritization • development guide •  
EFFICIENT • INTEGRATED PRODUCTS • BOTTOM LINE • CGC

[www.welldog.com](http://www.welldog.com)

307.721.8875 Sales ext. 1



PGS.  
Clearly New Data.

blocks of new data

PGS announces its largest new data offering for this year's lease sales. **1,350 blocks of new data** which is clearly imaged with pre-stack depth migration. This is an excellent opportunity to review our clearer images, your most important tool in your lease sale evaluations.



**Western Lease Sale Area**

- » Keathley Canyon: **DW-VI\***, **DW-X\*** and **Crystal WATS**

**Central Lease Sale Area**

**South Additions:**

- » West/East Cameron: **FlexR-XI**, *in progress*
- » Vermilion: **FlexR-VIII**
- » Eugene Island: **FlexR-VIII ext.**
- » Ship Shoal/South Timbalier: **FlexR-XII**, *in progress*

**Deepwater:**

- » Ewing Bank/Mississippi Canyon: **FlexR-IX**
- » Garden Banks/Keathley Canyon: **Crystal WATS**
- » Green Canyon/Walker Ridge: **DW-III**

\* marketed by GPI

Please take a moment to review our coverage at:  
[www.pgs.com/new\\_GoM\\_Data](http://www.pgs.com/new_GoM_Data)

For further information please contact your PGS account manager.

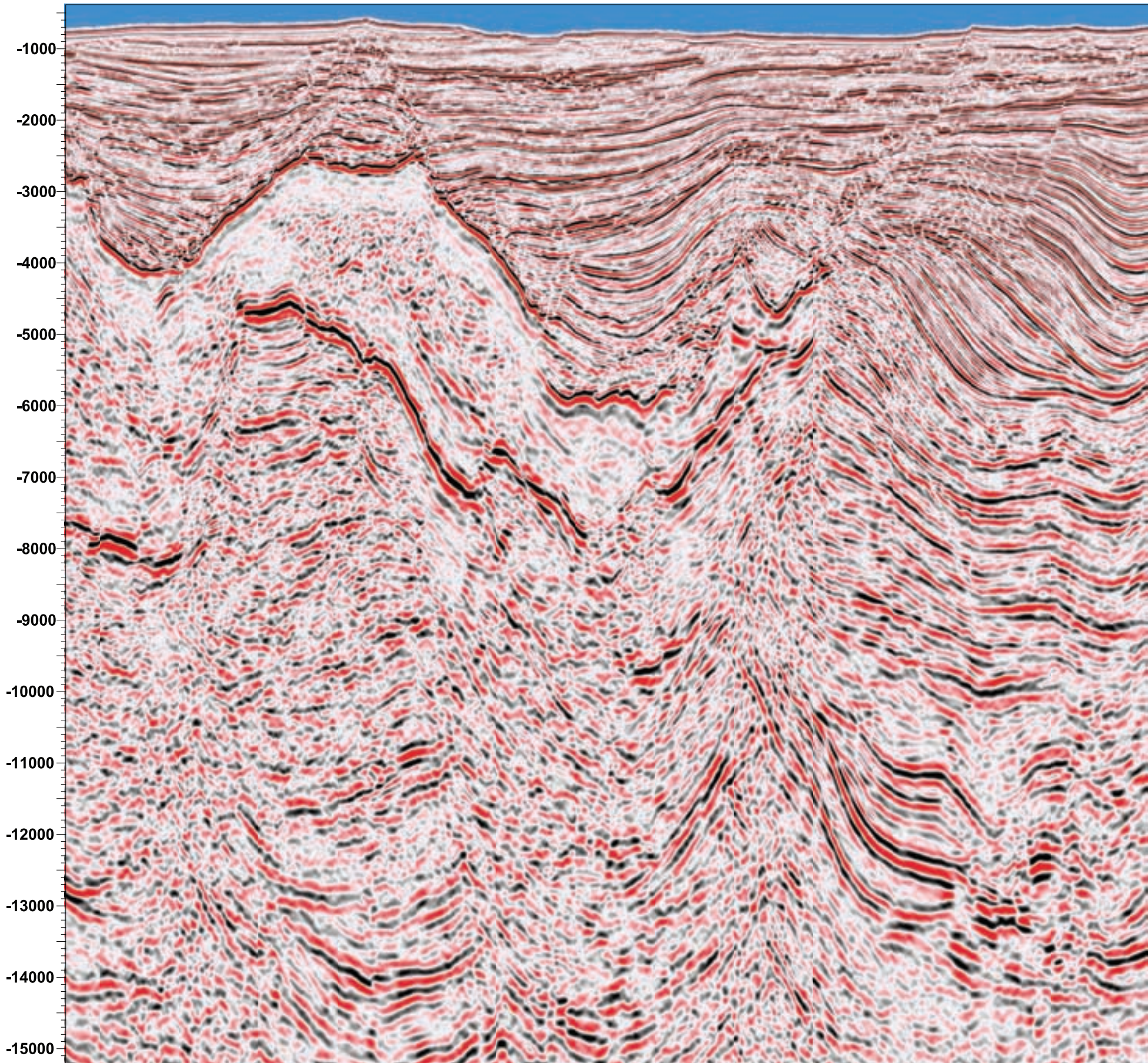
Houston  
Tel: 1-281-509-8000  
Fax: 1-281-509-8087  
Email: [goinfo@pgs.com](mailto:goinfo@pgs.com)

**A Clearer Image**  
[www.pgs.com](http://www.pgs.com)





# 3D PSDM READY FOR THE LEASE SALE



Over 600 blocks of recently acquired Ocean Bottom Cable and Very Long Offset streamer data processed through 3D Wave Equation Pre Stack Depth Migration is available for the October 2007 lease sale. Contact your TGS representative to review this data and all available products.



Geophysical  
Products



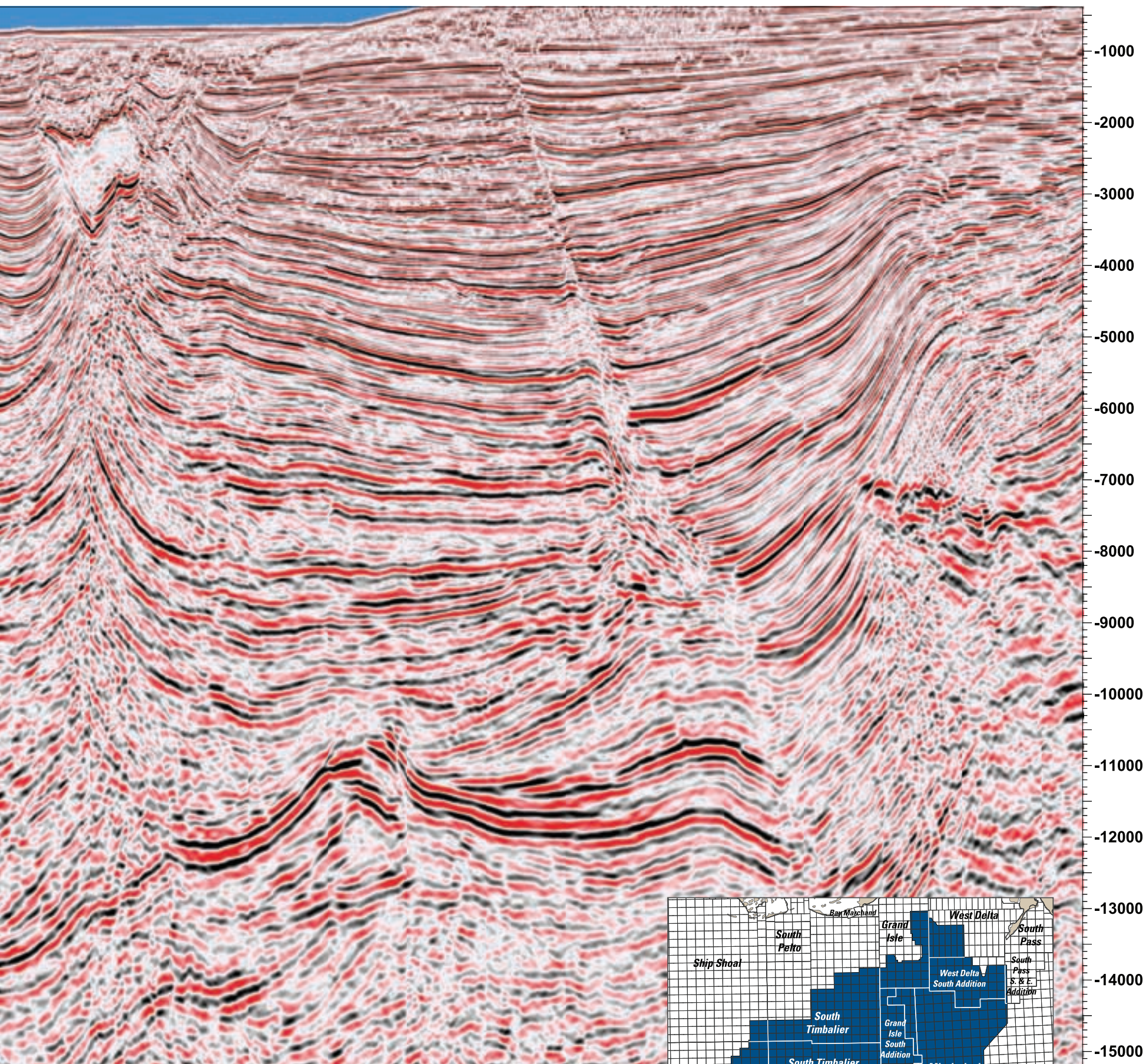
Geological  
Products



Imaging  
Services



LE . . . . . ARE YOU?

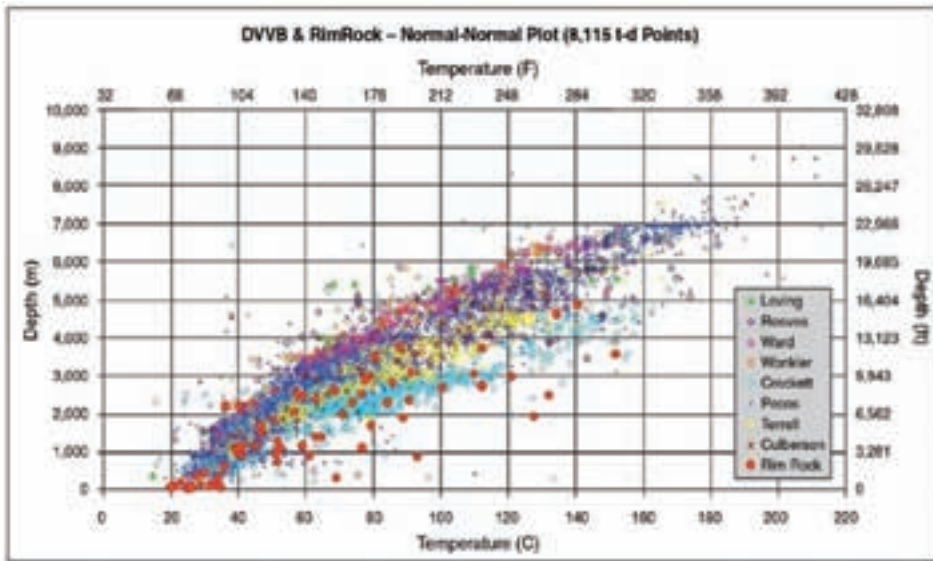


Visit us at the SEG Booth #1115 and #1146

[www.tgsnopec.com](http://www.tgsnopec.com)

NORWAY +47 66 76 99 00 • USA +1 713 860 2100 • UK +44 (0) 1234 272122 • AUSTRALIA +61 8 9480 0000





Plot of the Trans-Pecos "Rim Rock" temperature-depth (t-d) data (orange circles) on top of Delaware-Val Verde Basin (DVVB) data. Graph is plotted in Celsius versus meters.

## Texas Geothermal from page 36

the '70s (via the U.S. Department of Energy) and looked at the potential amount of resource being talked about back then," Erdlac said. "When I started doing the numbers, assuming a value of the resource at a little over five cents a kilowatt hour, I was getting billions of dollars on a yearly basis, consistently year after year.

"When I did this, oil was \$43 a barrel and gas a little over \$5 per Mcf, and that's obviously changed," Erdlac added. "But oil and gas in Texas is getting less and less in volume each year, even if the price goes up."

Just as operators often re-enter abandoned wells to go after new oil and gas zones, they could just as well re-

enter them to produce hot water and then extract the heat to generate power.

"For the oil and gas industry to continue treating hot water as waste is equivalent to flaring natural gas as once was the custom in the industry," Erdlac said. "No one wanted it, and now it has value."

He noted it's the same thing with thermal energy, but thermal has a distinctive plus in that it's renewable – you extract the water, and additional quantities move into the formation.

Also, the deeper the water resides in the earth, the hotter it gets.

### Some Like It Hot

It's common to think of geothermal energy in terms of steam, but the resource isn't always in vapor form. When producing extremely hot water, a variety of processes can be used to extract the heat at the surface.

It is noteworthy that sedimentary basins are oil and gas country, and the geothermal industry is unaccustomed to dealing with these types of systems. Yet focusing only on traditional geothermal areas limits the future growth of this resource.

Partnering with oil and gas companies would bring expertise and data that standalone geothermal operators would have to develop internally at their own expense.

Joining together also would benefit the oil and gas concern, which likely could produce what ordinarily would be uneconomic amounts of hydrocarbons, with the geothermal side of the operation providing the needed economic boost to make the project viable.

Erdlac noted that the Massachusetts Institute of Technology released a study early this year acknowledging the huge potential for geothermal energy, which can be compared to fossil fuels when it comes to power generation capacity.

"Once a power plant gets going, it's going for long periods of time," Erdlac noted. "It has a high capacity factor – that may mean it's in operation maybe 98 percent of the year and going 24/7."

"Geothermal has a 90, 95, 98 percent capacity factor – it's on par with nuclear, natural gas, coal-fired power plants."

Erdlac is convinced that the time has come to actively pursue this power source in Texas.

"There's a huge amount of thermal energy in Texas," he noted, "and the oil and gas industry has tapped into it and said, 'Well, we can't use it.'"

"The thing is, it's still there and being replenished over time, so it's very advantageous to go after it." □

When it's a question of highest data quality...

... Ask Fugro

GEO CELTIC, a new generation seismic vessel with safe and reliable operations.

Efficient acquisition using 12 streamers and dual 4500 cu inch sources.

State of the art equipment ensures the highest possible data quality.



Safe • Reliable • Efficient



Interested?

Contact Fugro-Geoteam AS.

Fugro-Geoteam AS, Hoffveien 1C, PO Box 490 Skøyen, N-0213 Oslo, Norway  
Tel +47 22 13 46 00 Fax +47 22 13 46 46 Web: www.fugro.no

NO OTHER COMPANY CAN PROVIDE THE SAME COMPREHENSIVE RANGE OF GEOTECHNICAL, SURVEY AND GEOSCIENCE SERVICES.



## Geothermal Posters Invited

Interested in geothermal energy?

A poster session on the subject has been proposed for the next AAPG Annual Convention in San Antonio, which will be held April 20-23.

The session will be chaired by Richard Erdlac, director of geothermal research and commercialization at Energy America Geothermal in Midland, Texas, and Dave Blackwell, of Southern Methodist University in Dallas.

Organizers are waiting to see the results of the meeting's call for papers before releasing additional session details.

Abstracts for the San Antonio meeting should be submitted online at [www.aapg.org/sanantonio](http://www.aapg.org/sanantonio), and are due Sept. 27. □



# The best way to get experience is to actually have one.

## AAPG's 2<sup>nd</sup> Annual Fall Education Conference Houston, September 10-14, 2007 Exploration in Stratigraphic Traps

### Courses will include:

- Sequence Stratigraphy for Petroleum Exploration
- Deep-Water Sands—Integrated Stratigraphic Analysis
- Carbonate Depositional Systems, Diagenesis and Porosity Development
- Quick Guide to Carbonate Well Log Analysis
- Seismic Imaging of Carbonate Reservoirs
- Seismic Interpretation in the Exploration Domain
- Understanding Seismic Anisotropy in Exploration and Exploitation
- 3D Seismic Attributes for Prospect Identification and Reservoir Characterization
- AVO/Seismic Lithology
- Evaluating Seals & Pay
- Risk Analysis in Stratigraphic Traps
- Geochemical Exploration for Strat Traps

HOSTED BY THE NORRIS CONFERENCE CENTER  
9999 RICHMOND AVE., SUITE 102  
HOUSTON, TX 77042  
713-780-9300; FAX: 713-780-9490  
SPECIAL AAPG GROUP RATES AT NEARBY HOTELS!

Tuition for the week is only \$1295 for AAPG Members  
or \$1395 for Non-members\*  
or \$325/day for individual courses

\*(price increases to \$1395/1495 respectively after August 13, 2007)



For more info or to enroll call +1 918 560-2650 or visit <http://www.aapg.org/aug/>

**More science than you can shake a pick at.**



*'You're Never Going to Find a Perfect Site'*

# Yucca Still A Pending Waste Tomb

By KEN MILAM

*EXPLORER Correspondent*

It's been eons in the making, features a cast of thousands and cost in the billions.

It is Yucca Mountain, the proposed geologic repository in Nevada for high-level radioactive waste.

Few would argue that, geologically, it is among the most studied pieces of real estate on the planet.

Much of the most significant research from the last 20 years has been gathered in *The Geology and Climatology of Yucca Mountain and Vicinity, Southern Nevada and California*, published this spring by the Geological Society of America.

The study was conducted by the U.S. Geological Survey and U.S. Department of Energy National Laboratories. It covers the mountain's tectonic setting and detailed structural geology and stratigraphy, plus the climate history and potential climate change that could affect the site's ability to keep radioactive waste safely contained.

While the ultimate decision of whether the repository ever becomes reality rests in the political realm, the proposal is sound geologically, said John Stuckless, who co-edited the book with Robert A. Levich. Stuckless has worked on the USGS Yucca Mountain Project since 1986.

"You're never going to find a 'perfect' site," Stuckless said, but "from an earth science perspective," the plan will work, he said.

Quick to state that the USGS never

endorsed the project, Stuckless said years of research indicates nuclear waste stored at the site never would be transported accidentally to the surface or into the water table.

## History

A series of large volcanic eruptions formed Yucca Mountain 11 million to 15 million years ago, Stuckless said. It consists of layers of ignimbrite, or welded tuff and semi-welded and non-welded tuff. The repository zone is densely welded tuff 1,000 feet below the surface and 1,000 feet above the water table, Stuckless said.

Bounded by two normal faults, the formation tilts to the east.

"If anything, being in a unsaturated zone was an advantage," he said, "because the waste has to be retrievable for 300 years."

It's also supposed to remain safely entombed for up to a million years, according to the legislation dealing with the site.

Chances of seismic or volcanic disruption of the region are considered extremely unlikely, researchers say.

That leaves as the main concern the cracks and fissures that could provide a pathway for radioactive waste to find its way into the water table.

To address those concerns, the mountain has been scrutinized at

See **Yucca**, page 43



Photos courtesy of Department of Energy

Nevada's Yucca Mountain, looking west, with volcanic cones in background and Solitario Canyon in the foreground.

Yucca Mountain is a ridge line in south-central Nevada, about 100 miles northwest of Las Vegas. It is in a remote desert area on federally protected land inside the secure boundaries of the Nevada Test Site.

The proposed facility lies 1,000 feet below the surface and 1,000 feet above the water table. The main tunnel is U-shaped, five miles long and 25 feet wide.

Alcoves branching from the tunnel are used to stage experiments. Waste would be stored in smaller tunnels perpendicular to the main tunnel, which are yet to be drilled.

Waste would be sealed in multilayer stainless steel and nickel alloy containers covered by titanium drip shields.



More than \$7 billion has been spent so far on the project. Total cost is expected to range from \$50 billion to \$100 billion.

— KEN MILAM



## Excellence That Runs Deep

SCA - The Upstream Petroleum Experts

### The Upstream Consulting Leader

Let the experts at SCA assist you in meeting your ever changing human resource requirements for technical generalists and specialist.

We can quickly provide the consultants you need in various areas of expertise, including:

**Geologists**                      **Petroleum Engineers**  
**Geophysicists**                **Reservoir Engineers**  
**Petrophysicists**               **Production Engineers**  
**Geoscience Techs**           **Engineering Techs**  
**and Other Specialists**

**SCA has the capability to meet your global demand for manpower requirements with proven long/short term professional consultants you can rely upon, TODAY!!!**



SCA is authorized by IACET to award Continuing Education Units (CEUs).

Visit our website [www.scacompanies.com](http://www.scacompanies.com) for a complete list and schedule of public courses and to register online TODAY!

### SCA's Training Solutions for the Petroleum Industry

#### September 2007

- 11 - 12 **Multiple Bischke Plot Analysis - Application of LogBust™**  
Houston 2 day course, instructor Mr. J. Brewton
- 13 - 14 **Quick Look Techniques for Prospect Evaluation**  
Houston 2 day course, instructor Mr. J. Brewton
- 17 - 21 **Principles of 3-D Seismic Interpretation**  
Houston 5 day course, instructor Dr. M. Thapar

#### October, 2007

- 8 **Geopressure & Pore Pressure Prediction Fundamentals**  
Houston 1 day course, instructor Dr. S. Shaker
- 9 - 11 **Geopressure: Analysis, Application, Appraisal & Risk Assessment**  
Houston 3 day course, instructor Dr. S. Shaker
- 8 - 12 **Principles of 3-D Seismic Interpretation**  
Kuala Lumpur 5 day course, instructor Dr. Mangat Thapar
- 15 **Chimneys for Seal & Charge Risk Assessment**  
Houston 1 day course, instructor Mr. D. Connelly
- 17 - 19 **Basics of the Petroleum Industry**  
Houston 3 day course, instructor Mr. H. Miller
- 22 - 26 **Development Geophysics**  
Houston 5 day course, instructor Dr. T. Wittick
- 29 - Nov. 2 **Descriptive Lithology Analysis of Cuttings and Cores**  
Houston 5 day course, instructor Mr. R. Merrill
- 29 - Nov. 2 **Applied Subsurface Geological Mapping**  
Dallas 5 day course, instructor Mr. S. Agah

#### November, 2007

- 5 - 9 **Principles of 3-D Seismic Interpretation**  
London 5 day course, instructor Dr. Mangat Thapar
- 12 - 16 **Integration of Log and Seismic Data**  
Houston 5 day course, instructor Dr. T. Wittick
- 26 - 30 **Geophysics for Geologists and Engineers**  
Houston 5 day course, instructor Dr. T. Wittick

## Subsurface Consultants & Associates, LLC.

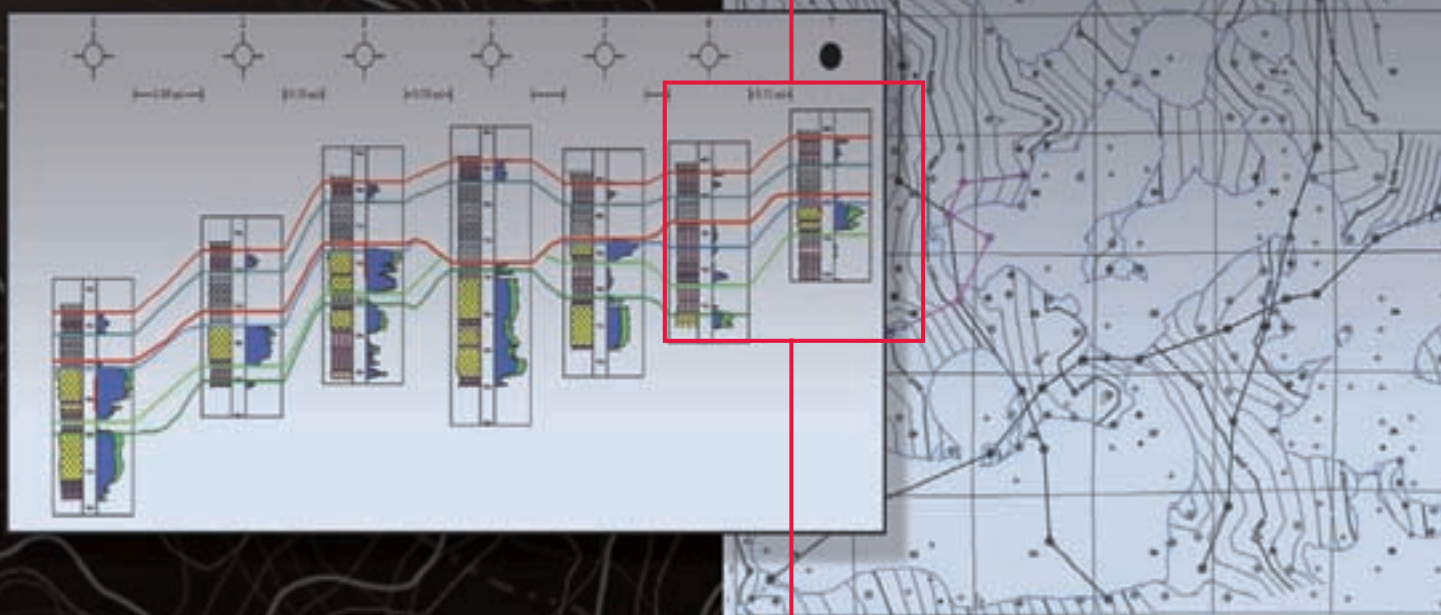
10255 Richmond Ave., Suite 300 - Houston, Texas 77042

Phone: +1.713.789.2444 Fax: +1.713.789.4449 [www.scacompanies.com](http://www.scacompanies.com)

General Inquiries: [info@scacompanies.com](mailto:info@scacompanies.com)

Training Course Registration & Information: [training@scacompanies.com](mailto:training@scacompanies.com) - Consulting & Direct-Hire Services: [consulting@scacompanies.com](mailto:consulting@scacompanies.com)





**With GeoGraphix,<sup>®</sup>  
framing it all just got  
a whole lot easier.**

**The Discovery™ FrameBuilder™ module.**  
As the industry's most advanced structural and stratigraphic interpretation and mapping solution, it streamlines prospect development.

The FrameBuilder™ module is a major addition to the GeoGraphix Discovery™ suite of advanced exploration and production technologies. Providing an exciting breakthrough in cross-sectional interpretation and mapping, this new subsurface interpretation model works with the Discovery smartSECTION® cross-section tool to leverage multisurface constraints and advanced surface topology in 3-D sequence stratigraphy and structural modeling.

For accelerating the speed and accuracy of prospect and resource assessments, it doesn't get more advanced than the GeoGraphix Discovery Framebuilder 3-D module. To learn more, visit us at [www.geographix.com](http://www.geographix.com).

*Unleash the energy.™*

**HALLIBURTON**





### MULTIPLE HIRES IN ENERGY—SCIENCE, ENVIRONMENT, AND POLICY RESEARCH

The Jackson School is building a premier education and research program in Energy—Science, Environment and Policy Research. We seek scientists at the forefront of their disciplines attracted to challenging areas of scholarship that require collaboration across disciplines and programs. We seek to address compelling questions within the broad theme of determining how we can create an energy future that is sustainable and environmentally and economically robust. These questions include, but are not limited to:

- How can we integrate classically separated disciplines (geomechanics, geochemistry, tectonics, stratigraphy, petrophysics, geophysical imaging, regional/basin scale studies) to advance interrelationships at the forefront of energy and environmental science?
- How do fluid-rock interactions and the interplay between mechanical and chemical processes influence fluid flow and storage in the subsurface?
- How can we improve identification and recovery of energy resources by comprehensive integration of information at all scales, integrated numerical modeling, and innovative automated and continuous monitoring?
- Can we solve the compelling environmental issues associated with the extraction and use of fossil fuel energy sources, including water and land use, and carbon sequestration?
- Can we develop energy policies founded on solid scientific and engineering information and innovative approaches that will simultaneously promote environmental stewardship and energy security?

Over the next three years we will hire six or more faculty and scientists who complement our existing strengths. We are interested in a wide variety of research areas ranging from rock/fluid systems, subsurface sensing, tectono-stratigraphy, carbon management, energy economics and policy, basin-scale analysis and modeling, and resource and reserve geoinformatics. We also encourage applications from innovative scientists in other areas related to energy—science, environment and policy.

Opportunities exist at any level, and can be within or in combination with any Jackson School Unit—the Department of Geological Sciences, the Bureau of Economic Geology, or the Institute for Geophysics. The schedule of appointment is also negotiable.



### MULTIPLE HIRES IN EARTH SURFACE AND HYDROLOGIC PROCESSES

The Jackson School is building a premier education and research program in Earth Surface and Hydrologic Processes. We seek outstanding scientists at the forefront of their disciplines who are attracted to challenging areas of scholarship that require collaboration across disciplines and programs. We seek to address compelling questions in surface and hydrologic processes within the broad theme of determining how surface and hydrologic processes are influenced by their dynamic setting at the interface of the lithosphere, atmosphere, hydrosphere, and biosphere. These questions include:

- How do climate, ice sheets, and tectonics interact to define the distribution and character of sea level change?
- How do coastal zone geology, biology, biogeochemistry, and hydrology respond to surficial processes, particularly to sea level change?
- What are the impacts of climate variability/change and land use change on water, nutrient, and sediment cycles?
- What is the integrated result of the interplay between tectonic deformation, climate change, and biota on the Earth's surface and on the supply, distribution, and storage of sediments?
- What are the physical, chemical, ecological processes and social forces that will determine the sustainability of our water resources?

Over the next three years, we will hire six or more faculty and scientists who complement our existing strengths. We are interested in a range of research areas from quantitative geomorphology to hydrologic-biologic interactions to societal impacts and resource sustainability, and capabilities ranging from modeling landscape dynamics to remote sensing, shallow environmental geophysics, aerogeophysics, and monitoring groundwater and coastal systems. We also encourage innovative scientists in other areas related to surface and hydrologic processes to apply. Opportunities exist at any level and within any Jackson School Unit—the Department of Geological Sciences, the Bureau of Economic Geology, or the Institute for Geophysics. The schedule of appointment is also negotiable.

Ph.D. is minimum requirement for application. Send inquiries and applications (cover letter, CV, list of publications, list of references, statements of teaching and/or research interests) to: Office of the Dean / Jackson School of Geosciences, The University of Texas at Austin / PO Box B, University Station / Austin, TX 78713. The University of Texas at Austin is an Affirmative Action/Equal Opportunity Employer

THE UNIVERSITY OF TEXAS AT AUSTIN

**JACKSON**  
SCHOOL OF GEOSCIENCES

CHANGING THE WORLD OF GEOSCIENCES



A whole lotta' (test) shaking going on: Specialized trucks vibrate the ground to simulate natural seismic activity at Yucca Mountain.

## World Seeking Waste Solutions

BY LARRY NATION

*AAPG Communications Director*

There currently are no facilities for permanent disposal of high-level radioactive waste, according to the World Nuclear Association (WNA), and nuclear countries are wrestling with the conundrum.

Since decay is the only way radioactive wastes finally become harmless – and that can take hundreds of thousands of years – the wastes must be stored in a way that provides adequate protection for very long times.

Presently in the United States, spent fuel is being stored in large water-cooled pools and dry storage casks at nuclear power plants. Also, U.S. defense-related transuranic radioactive waste is stored about 3,000 feet deep in a bedded salt-deposit located in the Chihuahuan Desert, outside Carlsbad, N.M.

Existing high-level wastes from reprocessing are presently stored at West Valley, N.Y.; Hanford, Wash.; Idaho Falls, Idaho; and Savannah River, S.C. Liquid high-level wastes are stored in large underground tanks of either stainless steel or carbon steel, depending on whether they are acid or alkaline.

Some of the liquid waste has been solidified into glass, ceramic slag, salt cake and sludge.

\* \* \*

Here is a roundup of other countries' plans:

✓ **Russia's** policy is to close the fuel cycle as far as possible and utilize recycled uranium, and eventually also to use plutonium in mixed oxide, or MOX fuel, an alternative to low enriched uranium fuel used in the light water reactors.

The WNA reports that its achievements in doing this are limited.

At present the used fuel is stored (mostly at reactor sites) and not reprocessed. No waste repository is yet available, though site selection is proceeding in granite on the Kola Peninsula.

In Europe some spent fuel is generally stored at reactor sites, similarly awaiting disposal, according to the WNA.

✓ **France** has more than 30 years of experience transporting and

reprocessing radioactive waste and reprocessing at La Hague and at the Marcoule facility on the Rhone River near the southern city of Orange.

Spent nuclear fuel and high-level radioactive waste are shipped by rail within France; trucks carry the materials over short distances. Five ships transport the material inter-coastally. Spent nuclear fuel arrives at La Hague by train in specially designed rail cars, as railway traffic.

A 15-year study that culminated in a 2006 report called for more study in the Bure area for a permanent high-level waste geologic disposal site, with a decision by 2015 and commissioning by 2025.

In 2002, France stored 978,000 cubic meters of waste. In 2020, the annual amount is expected to be 1.9 million cubic meters, according to the Commissariat à l'Énergie Atomique.

✓ **Belgium, Germany, the Netherlands, Switzerland and Japan** also send, or have sent in the past, spent nuclear fuel to France or to Sellafield in the United Kingdom for reprocessing. The recovered materials are returned to the owner and the separated wastes are vitrified, sealed into stainless steel canisters and either stored or returned. Eventually they too will go to geological disposal.

✓ **Sweden** has centralized spent fuel storage near Oskarshamn and will encapsulate spent fuel there for geological disposal by about 2015.

Sweden currently is carrying out additional research to reach a decision between the Östhammar and Oskarshamn sites for a permanent disposal solution.

✓ **Finland**, which formerly sent its waste to Russia for handling, has two long-term disposal sites for lower-level waste and is constructing a third. At the end of 2004, the sites held 5,400 cubic meters of waste.

✓ **In Canada**, the Nuclear Waste Management Organization said earlier this year that a final repository probably would be in Ontario, Quebec, New Brunswick or Saskatchewan, and host localities would need to volunteer for the role.

The search for a site was expected to begin in 2009. □



## Yucca

from page 40

resolutions up to 1-to-250, Stuckless said.

"Every fracture larger than a meter has been recorded," he said. "We have a 750,000-year record of history on one fault."

Findings presented in the book are the results of "fairly standard geological techniques," Stuckless said.

"The larger problem is that we've never really studied unsaturated zones ... what happens there," he added.

A second volume, expected to be ready by year's end, focuses on hydrology and geochemistry and will include more of the new technologies applied to the study.

### How 'Bout This Weather?

If the geological premise for the project is sound, what other factors could conceivably pose risks?

Climate change is one possibility that has been researched.

The region has experienced much wetter climates in the past, and could again, but most of the geologic research indicates slight chance of nuclear waste seeping into the water table.

Climatology examined in the book's final chapter does little to weaken the case for Yucca Mountain as a storage facility, but could be significant in terms of the global warming debate, said Mike Campbell, chairman of AAPG's Energy Minerals Division's Uranium Committee.

While many believe man's influence on global climate would be short-lived, some researchers postulate that the burning of fossil fuels could have profound effects arching over geological time periods, Campbell said.

Astronomical and orbital predictions support the notion that Earth already should be entering its next ice age.

Some of the Yucca Mountain researchers, however, say it is possible that humans' impact on climate could last up to 50,000 years and delay the glacial maximum for 100,000 years, he said.

Such predictions may heat up the global warming debate, but climate change should have little effect on the geology of Yucca Mountain.

"I believe the plan is a good one," Campbell said, "especially after reading this material."

### Further On Down the Road

Over the decades since it was first proposed, the Yucca Mountain study "has kept a lot of people employed – thousands," Stuckless said.

When USGS suggested the former nuclear testing site in 1976, it already had been the subject of 900 man-years of study, he said.

Besides geoscientists, the project involves a large engineering component, biospheric researchers and others, he said.

As an example of how much study has been devoted to the site, Stuckless noted that one chapter in the book lists more than 100 references going back some 20 years.

The prime contractor for the project, Bechtel SAIC, a consortium of government contractors, Bechtel Corp. and Science Applications International Corp., employs 1,300 people.

The DOE is expected to submit an application for a license to operate the facility next year. March 31, 2017, is the target date for opening the facility and when it would begin accepting waste.

If the project opens, utilities and defense facilities would begin shipping

waste to the central depository from more than 120 local storage sites around the nation.

With the emphasis on storage rather than disposal, the nuclear industry may begin recycling the waste.

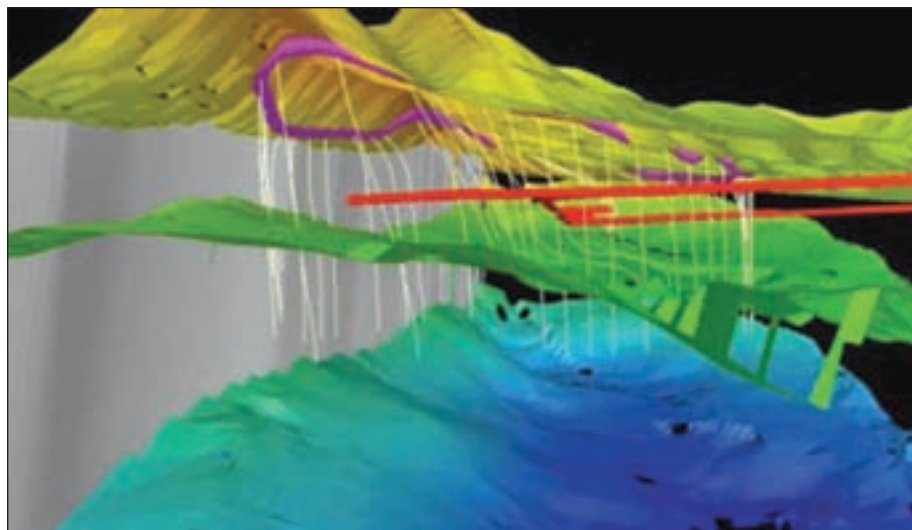
"I predict that within 20 years, it will be a natural resource again," Campbell said.

"Transportation on highways will be a concern, but so much engineering has gone into the containers the risk is minimal," Campbell said.

"We'll see a period of well-meaning people lying across roads (to block shipments), but that will pass," he said.

If any waste did leak from its man-made and geological tomb, the hazard would be slight, he said.

"Even if it did get out somehow, you'd fence off the area for 680 years," Campbell added, "but it wouldn't float in the air like Chernobyl." □



In 1997, the Lawrence Berkeley National Laboratory Visualization Group collaborated with scientists from LBNL's earth sciences division to create a visualization showing the Yucca Mountain storage facility. This visualization integrates divergent types of data, and will be used to ask "what if" questions pertaining to site water flow.

DIRECT CONNECT  
AT YOUR  
FINGERTIPS!

**Warning:**  
Product may cause extreme risk reduction.

**SPECIAL COLLECTOR'S EDITION**

# The Mapping Guru

**Tim Nguyen**  
A.K.A. THE OIL FINDER

With The Mapping Guru, you'll draw conclusions that are legendary. You'll have the power of direct connect – access to SMT, OpenWorks, GeoFrame, Petra, ArcSDE and more. You'll get precision results, extraordinary output, layers of astounding insight. You'll uncover exploration opportunities with the master's touch unveiling the stroke of genius within you.

THE ULTIMATE OIL MASTERPIECE

THE FINEST OF ARTS

MASTER'S TOUCH PAINT BRUSH

THE ULTIMATE OIL MASTERPIECE

LEARN MORE AT [WWW.PETROSYSGURU.COM/OILFINDER](http://WWW.PETROSYSGURU.COM/OILFINDER)

PRODUCT OF AUSTRALIA ©2007 PETROSYS, INC.

545-987-8051

**Unearth A Masterpiece.**

Petrosys > Australia/Asia +61-8-8227-2799 > Americas 1-888-PETROSYS > Europe +44-141-420-6555 > [www.petrosys.com.au](http://www.petrosys.com.au)





Engelder



Giles



Johnson



Johnston



Karner



Olson



Peacock



Skelton

## Some Serious, Some Fun

# Diverse Topics Spice DL Season

By VERN STEFANIC  
EXPLORER Managing Editor

New faces, new topics, continuation of a new program and new energy.

That's the word about this year's AAPG Distinguished Lecture program, the Association's flagship initiative for spreading the latest in science, technology and professional information.

This year's DL program, funded in part by the AAPG Foundation, will offer 14 lecturers – nine domestic and five international. It is the largest slate of speakers in the program's history.

And in addition to those tours, AAPG this year offers an expanded Distinguished Instructor slate, featuring two instructors – one domestic and one international (see story, page 45).

It's all part of a concentrated effort to make information and expertise available to as many geoscience groups as possible, around the world.

AAPG's DL program was developed to expose students, young geologists, college faculty members and members of

geological societies to current information, research and thinking.

Last season's domestic speakers appeared at 60 universities and societies, reaching about 3,200 people. The international speakers made 44 stops in the Middle East, eastern/central Asia and Asia/Pacific, reaching about 1,850 people.

This year's program offers speakers from both industry and academia, with topics that range from timely subjects like geologic-based evidence of climate change, to Canadian oil sands, to fractured reservoir characterization.

Among the new topics this year: Hippos in London and "craquelure in masterpieces of the Louvre." Really.

Something familiar about this year's lineup is the continuation of the intersociety lecturer effort – a cooperative program that presents an opportunity for cross-discipline lectures.

This year's AAPG/SEG Intersociety Lecturer, sixth in the series, is on the international roster: AAPG member Don Lawton, holder of the chair in exploration

geophysics at the University of Calgary, Canada.

His topic is "Anisotropic Depth Imaging and Interpretation in Thrust-Belt Exploration."

In keeping with the annually alternating logistical responsibilities for the intersociety lecturer, Lawton's tour will be coordinated by AAPG.

And as also in past years, support for several specific tours comes directly from the AAPG Foundation's Distinguished Lecture Fund. They are:

□ The Allan P. Bennison Distinguished Lecturer – An international lecturer who makes a U.S. tour, funded by contributions from the late Allan Bennison, a long-time Tulsa geologist.

This year's Bennison lecturer will be Peter Skelton, reader in palaeobiology at the Open University, London, England. He'll tour the western part of North America in early December and eastern North America in mid-March, offering two topics:

✓ "Rudist Evolution, Ecology and Environments."

✓ "The Episodic History of Cretaceous Carbonate Platforms: An Aptian Case Study."

□ The J. Ben Carsey Distinguished Lecturer – A domestic tour, provided by contributions from J. Ben Carsey Jr. of Houston, to establish a named lecturer in memory of his father, who served as AAPG president in 1967-68.

This year's Carsey lecturer is Garry Karner, senior research associate, new play concepts, for ExxonMobil Upstream Research Co., Houston. He'll tour eastern North America in late November and early December, and western North America in late March and early April, offering two topics:

✓ "Depth-Dependent Lithospheric Extension: Supporting Evidence, Structural and Depositional Characteristics, and General Applicability."

continued on next page

Ever since the deep-water Z3000 Node collected its first data, they've been queueing up to see what all the fuss is about.

Call Fairfield, and we'll arrange to take you down there. Then we can show you how Z3000 Nodes are changing the way you'll view seismic. Call us on 281 275 7500 or view more on Z3000 at [fairfield.com](http://fairfield.com)

New Z Technology

 **FAIRFIELD INDUSTRIES**

Changing the way you'll view seismic



# Instructor Program Expands for Second Season

*One for Domestic Audiences, One for International*

AAPG's Distinguished Instructor program, entering its second season, will expand to two instructors – one for domestic groups, and one for international.

The Distinguished Instructor program is intended to complement the Distinguished Lecture series. DI instructors, who serve two-year stints in the program, offer half-day, full-day and/or two-day short courses as opposed to one-hour lectures.

Their itinerary is based on requests received at headquarters in Tulsa.

This year's instructors are:



Abreu



Bohacs

□ **Vitor Abreu**, last year's inaugural instructor, is back for a second year, offering a course on "Sequence Stratigraphy for Petroleum Exploration."

He is with ExxonMobil Exploration in Houston.

His international itinerary to date includes:

- ✓ Nov. 9-10 – Associação Brasileira de Geólogos de Petróleo, Rio de Janeiro, Brazil.
- ✓ Nov. 13-14 – Geological Society of Peru, Lima.
- ✓ Nov. 16-17 – Geological Society of Trinidad and Tobago, West Indies.

□ **Kevin M. Bohacs**, senior hydrocarbon systems analyst for ExxonMobil Upstream Research Co., Houston, is the domestic instructor.

His topic is "Sequence-Stratigraphic Analysis of Shales: Key to Paleoclimate Archives, Subsurface Fluid Flow and Hydrocarbon Source, Reservoir and Seal."

His course will be "a hands-on workshop on the expression and correlation of depositional sequences in seismic, well-log, core and outcrop data using Paleozoic, Mesozoic and Cenozoic examples."

For information on the Distinguished Instructor program – or to request an instructor – contact Karen Dotts, at [kdotts@aapg.org](mailto:kdotts@aapg.org). □

continued from previous page

✓ "Accuracy of Eustatic Amplitude Estimates: Challenges in Flexurally Backstripping Continental Margins."

□ The Haas-Pratt Distinguished Lecturer – A domestic tour provided by contributions from the late Merrill W. Haas, in honor of famed geologist (and Haas' mentor) Wallace Pratt. The funding is granted for emphasis on a specific case history application of geology in a discovery.

This year's Haas-Pratt lecture will be given by **Mike Peacock**,

exploration/development geoscience manager, Imperial Oil, Calgary, Canada. He'll tour western North America in late November and early December, and eastern North America in February.

His lecture is titled "Athabasca Oil Sands: Understanding the Oil Sands from the Regional Scale to the Project Scale – A Case History."

□ The Roy M. Huffington Distinguished Lecturer – An international tour provided by contributions from the Huffington family in honor of the oilman-geologist.

The Huffington lecturer – whose current tour of Australia and New Zealand ends in September – is **Peter McCabe**, with CSIRO in Sydney, Australia. He has offered three topics:

- ✓ "Distribution of the World's Oil and Gas Source Rocks in Space and Time – Perspectives for Exploration in Frontier Basins."
- ✓ "World Oil and Gas Resources – How Much is Left and Where Will It Be Found?"
- ✓ "Deltaic Systems and Super-Systems – Controls on Petroleum Accumulation."

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

□ **Mike Blum**, a professor in the department of geology and geophysics at Louisiana State University, Baton Rouge. His tour of eastern North America will be Sept. 17-28, and his western North American tour will be in late February and early March.

He offers two talks:

✓ "Subsidence and Sea-Level Changes Along the Northern Gulf of Mexico: Response of Mississippi River to the Last Glacial Cycle, and the Flexural Ups and Downs of Mississippi Delta."

✓ "Signatures of Climate and Sea-Level Change in the Gulf of Mexico River Systems Over the Last Glacial-Interglacial Cycle: A Source-to-Sink View Ups and Downs of Mississippi Delta."

□ **Terry Engelder**, a professor at Pennsylvania State University, University Park, Pa. He'll offer two talks:

See **Lecturers**, page 62

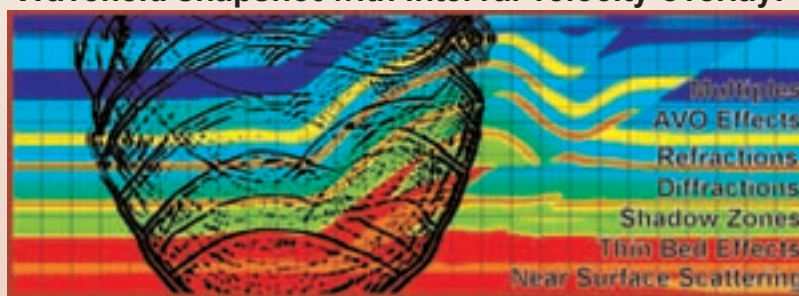


*Because seismic data is so imperfect,  
you need a tool that shows how geology and artifacts will really appear in your image*

## No-Compromise 3D Seismic Modeling Software

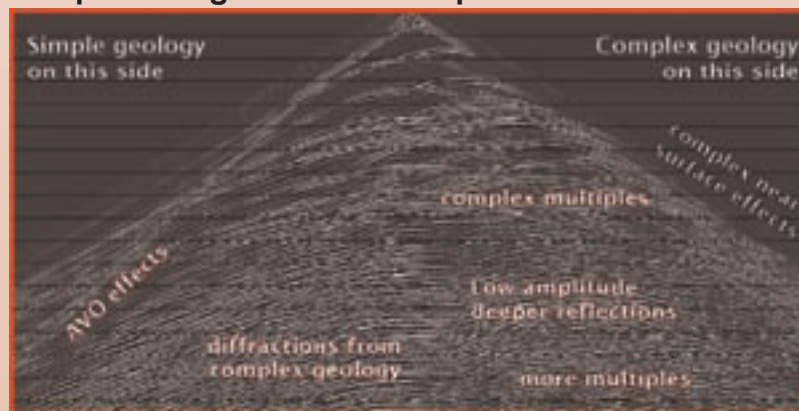
- Acquisition justification and planning
- Interpretation confirmation
- Reservoir characterization analysis

Wavefield snapshot with interval velocity overlay:



Produce a fully realistic 3D seismic survey for a fraction of the cost of a real survey. **Go from model to migrated image in 1 week!**

Sample shot gather from snapshot above:



Realistic Seismic Modeling is playing a larger role because:

- 1) 20x algorithm cost reduction
- 2) **Geologic objectives** are becoming more **subtle**.
- 3) New acquisition hardware provides for **significant opportunities**.
- 4) The potential **impact** of modeling has recently been **demonstrated**.

*The realism is essential for reliable results*

See examples of modeling impacting acquisition, interpretation, and reservoirs at:

[www.tierrageo.com](http://www.tierrageo.com)

Visit us at SEG convention booth #3409



# CALL FOR ABSTRACTS

Submission deadline  
**September 27**



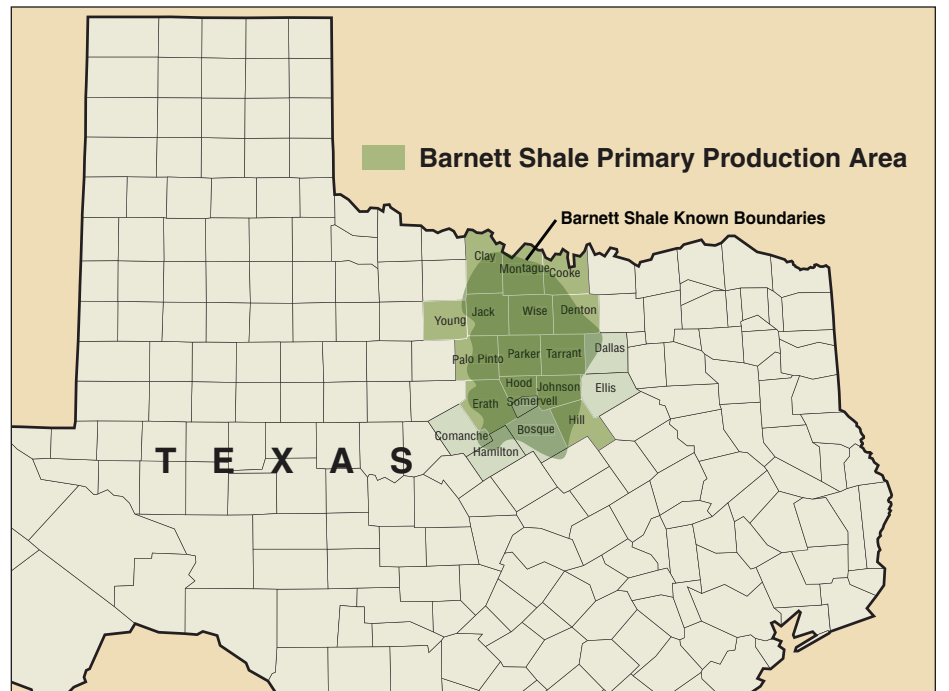
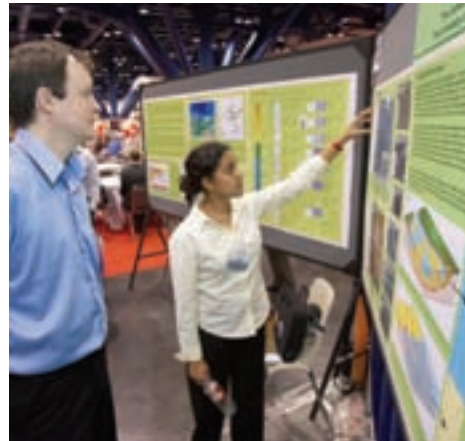
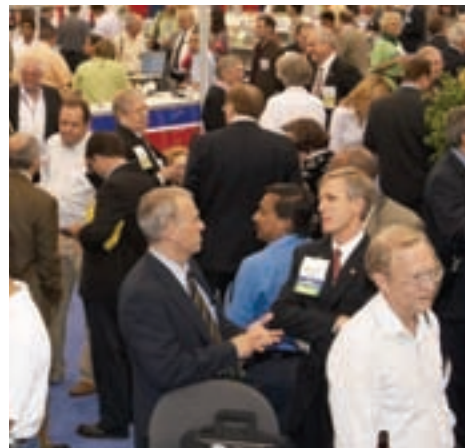
According to the 2007 Annual Convention survey of attendees, the number one reason geoscientists attend is to acquire answers, ideas and to address specific needs from the technical sessions.

Plan now to be one of the experts who contribute to the world-class technical program in San Antonio.

**Submit your abstract now!**  
[www.aapg.org/sanantonio](http://www.aapg.org/sanantonio)



Abstracts are subject to review and acceptance by the Technical Program Committee.



Graphics courtesy of the Perryman Group

## Locals Reaping Benefits

# Hot Barnett Play Creating Wealth

By LOUISE S. DURHAM  
*EXPLORER Correspondent*

The Barnett Shale natural gas play has become so prolific it appears to have taken on a life of its own.

Indeed, there's speculation aplenty it may become even bigger than the generations-old, giant Hugoton gas field in Kansas.

What's especially unique about the Barnett play is that a major piece of the action is in a highly urbanized area. In fact, there are close to 500 wells within the Fort Worth city limits, and predictions are this number will double by 2010, according to noted economist M. Ray Perryman, CEO of The Perryman Group (TPG), a Waco, Texas-based economic and research analysis company.

If this prompts you to envision a drilling rig stationed at each street corner in downtown Fort Worth as well as smack-dab in the middle of a homeowner's flowerbeds, forget it.

Thanks to horizontal drilling technology, wells can be drilled at a considerable distance from the target reservoir with the unseen horizontal leg traversing the subsurface to the pinpointed location to tap into the natural gas.

An added plus: Multiple wellbores can be drilled from a single pad, further reducing the footprint.

About 177 companies have operations in the Barnett Shale, and operators

continue to expand the play to the south and west, with varying results, meaning the real action remains in the general Fort Worth Basin region – in fact, 14 counties in north and central Texas hosted 99 percent of the drilling in 2006.

Overall, Perryman noted, thousands of wells are producing hundreds of billions of cubic feet of natural gas annually from the Barnett.

### Drill Here! Drill Here!

Given the urban nature of the bulk of the activity, it is noteworthy that an array of area chambers of commerce joined with a sizeable number of industry participants to host a recent Barnett Shale Expo in Fort Worth. The objective of the free event was to involve and educate the public concerning the numerous aspects of the play.

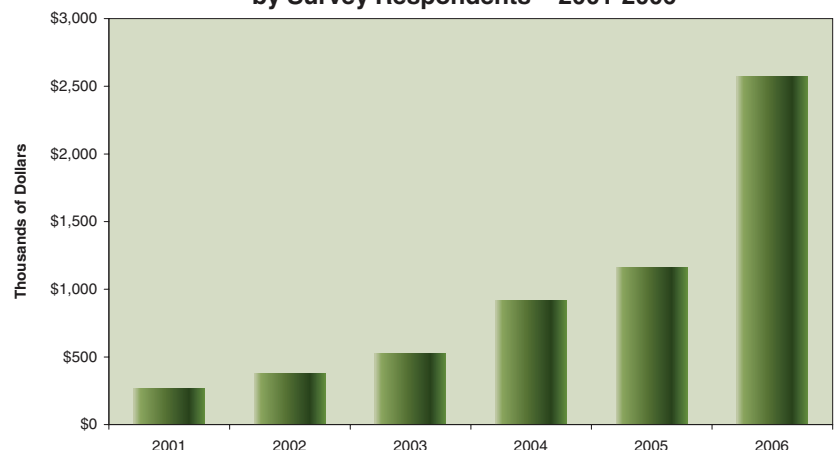
Both the citizenry and the local government bodies are reaping humongous benefits from the Barnett, according to a recently completed study conducted by TPG and commissioned by the Fort Worth Chamber of Commerce.

Perryman presented the results at the Expo.

The numbers are eye-popping enough that even a hard-core NIMBY (not in my backyard) might be convinced to rethink

continued on next page

**Charitable Contributions to the Fort Worth Area by Survey Respondents – 2001-2006**



Note: Selected companies include: XTO Energy Inc., Quicksilver Resources Inc., Dale Operating Company, EnCana Oil & Gas (USA), and Chesapeake Operating Inc.



continued from previous page

before voicing the usual emphatic "No!" to oil and gas drilling in certain other domestic areas, despite their potential to yield badly needed "homegrown" hydrocarbon supplies.

When summing all major categories of stimulus associated with the Barnett Shale, the result is a whopping \$5.164 billion in annual output and about 55,385 permanent jobs, according to Perryman.

Not surprisingly, the bulk of the impacts stemming from the Barnett activity are spawned by exploration and drilling. Perryman noted the typical annual impact of activity over the next 10 years is expected to include more than \$7 billion in output and 64,375 jobs in the Barnett Shale region.

The projected average annual impact of Barnett activity overall may well be more than 108,000 jobs and \$10.4 billion in output per year through 2015, according to Perryman. Given that many industry observers predict activity in the play will continue for another 20 to 30 years, or even much longer, the math tends to become mind-boggling.

**A Populist Play**

It is noteworthy that this play is not a scenario where the rich get richer, and all others must continue making do as always. In fact, the fallout in terms of financial impact and improved quality of life reaches citizens across the socioeconomic spectrum.

Myriad factors make this possible:

- ✓ Property taxes paid on oil and gas properties and enhanced retail sales and real estate development are the two primary sources of income impacting local taxing entities.
- ✓ Cities, school districts and others receive royalties and bonus payments.
- ✓ Severance taxes collected by the state of Texas in 2006 tallied \$165.4 million.
- ✓ Permitting and other fees are paid to local governing bodies.
- ✓ Other kinds of levies include hotel/motel occupancy taxes.
- ✓ Companies involved in exploration and development in the Barnett are donating millions of dollars to local charities.

Varying organizations have benefited outright from the play, including:

- ✓ The American Cancer Society – sold mineral rights to donated land for about \$5 million.
- ✓ Area Girl Scouts – leased mineral rights to drill beneath a summer camp.
- ✓ A local church – received a signing bonus of \$21,000 to allow drilling under its property.

**Affordable Tradeoffs?**

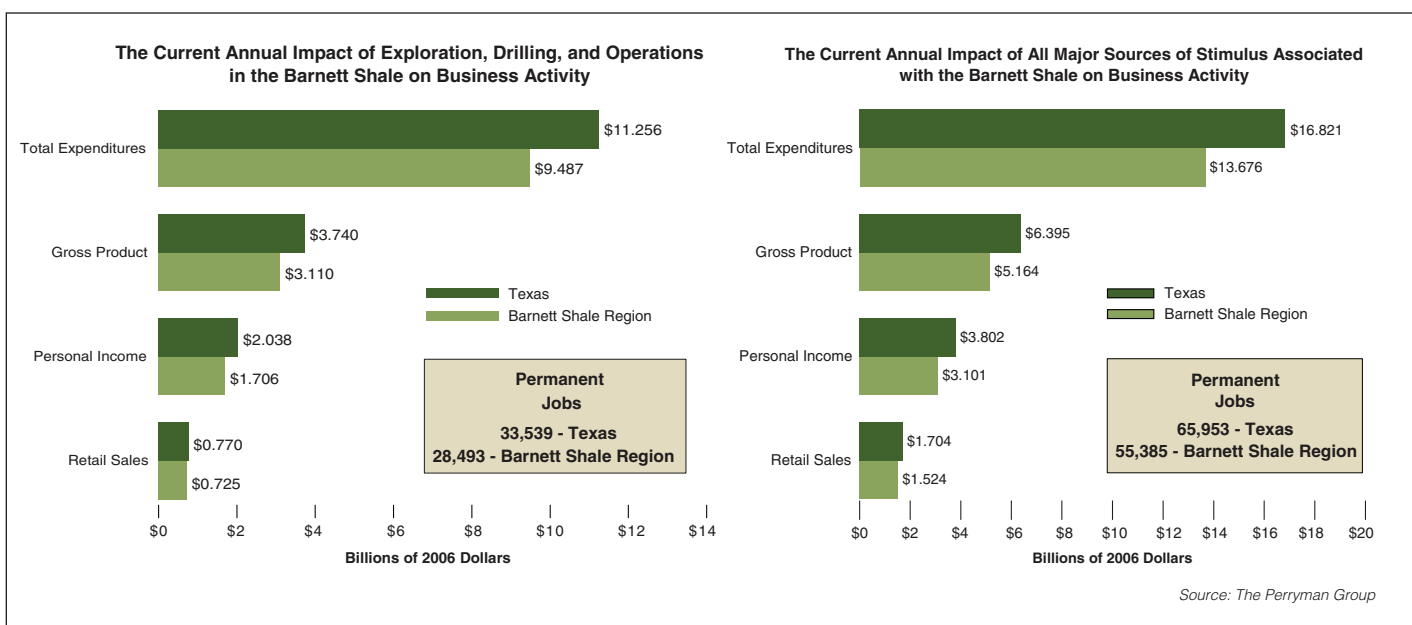
Perryman noted TPG estimated the overall direct and indirect fiscal contribution (excluding royalty and lease payments to public entities) of Barnett Shale activity totaled about \$718.6 million in 2006. This included \$490.9 million in state revenues and \$227.7 million to local governments.

The aggregate amount is expected to exceed \$1 billion per annum in the future.

Not surprisingly, this financial bonanza comes with some trade offs – after all, drilling activity is accompanied by its own considerable baggage, so to speak.

Increased truck traffic, noise and water usage go hand-in-hand with oil and gas drilling, and the Barnett is no exception – and these issues can pose particular challenges when the action occurs in urban areas.

Perryman reported, however, these downside elements are, in most instances, being dealt with to minimize any lasting effects. □



**Precise Data.**

**Unlock the Potential of Your Reservoir.**

Today's reservoirs are more challenging than ever. To unlock their potential requires absolutely precise data. OMNI Laboratories has established higher standards, more thorough protocols, and meticulous quality control measures to ensure unsurpassed accuracy. Plus, we have assembled the finest scientists in the field to provide superior interpretation and analysis. When precise data is paramount, choose OMNI Laboratories.

**At OMNI, We've Got the Answers.**

13 LOCATIONS IN THE U.S., CANADA AND SOUTH AMERICA • HEADQUARTERS: HOUSTON, TX • 832-237-4000 • WWW.OMNILABS.COM



# Barnett Shale Play Can Be Complex

*Their Success Doesn't Ensure Yours*

By LOUISE S. DURHAM  
*EXPLORER Correspondent*

Operators big and small continue to grab attention for their efforts in the high-profile Barnett Shale play in the Fort Worth Basin.

Sometimes overlooked in all the Barnett buzz, however, is the fact that myriad crucial operations are required to turn the operators' drilling targets into actual wells and – ideally – successful producers.

It's not easy.

*(Editor's note: Randy LaFollette will present the paper "The Barnett Shale Play of North Texas – Points to Ponder in 2007," on Oct. 9 at the Rocky Mountain Section's annual meeting in Songbird, Utah.*

*LaFollette's talk is part of the EMD session on "Shale Gas Secrets – Lessons from Other North American Shale Gas Plays.")*

This play has a lengthy track record for experimentation, success and also failure, among the 6,500-plus vertical, deviated or horizontal tests or producers drilled since the initial Mitchell Energy well in 1981, according to Randy LaFollette, manager of geoscience technology at Houston-based BJ Services.

"From the standpoint of a service company, we're trying to sort through what the issues are, what really drives production results in the Barnett – there's no simple, one-size-fits-all recipe for success," LaFollette said.

"There's a certain basic reservoir quality that's there in terms of gas-in-place and deliverability – and these are two hugely different things," he noted. "The hard part is to try to deconvolve the effects of reservoir quality from the effects of stimulation treatment – and from everything that happens from the time the drill bit penetrates the top of the formation to present day.

"There are many fuzzy relationships, many non-linear relationships involved," LaFollette noted, "so it becomes much more complex than trying to sort out what works and what doesn't on a spreadsheet.

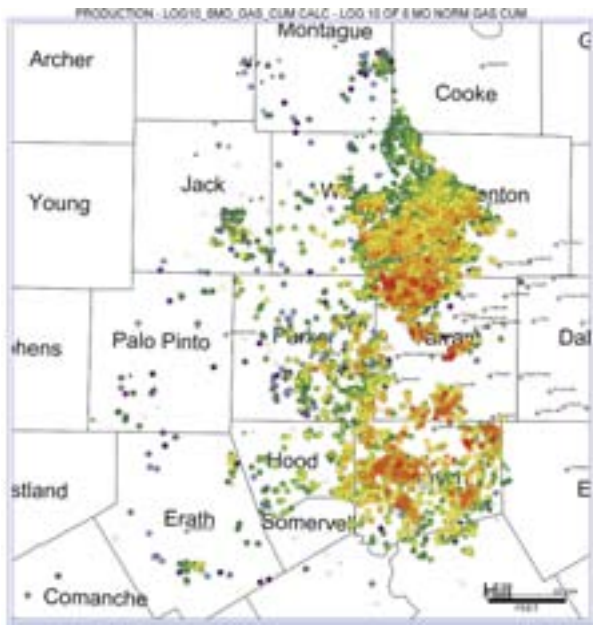
"We've been in the Barnett for a long time," he said, "and it's an ongoing study."

### New Technologies Emerging

Barnett production patterns analyzed using GIS methods show clear evidence of sweet and not-so-sweet spots, according to LaFollette.

He also noted GIS has opened eyes in the engineering community where the engineers have been posting more stimulation treatment data on maps along with production results and

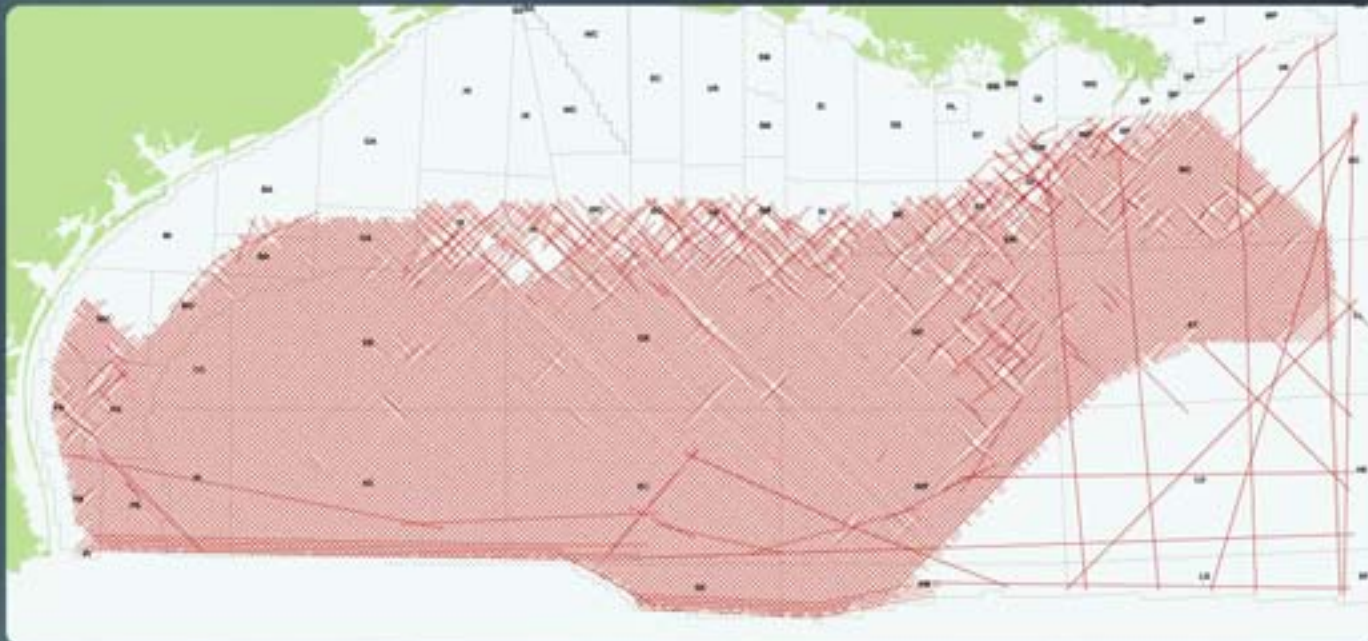
continued on next page



Bubble map showing log 10 of six-month normalized cumulative production in Barnett wells across the North Texas Barnett play. Production results vary by many fold, and production variation from well to well is often significant.

Graphics courtesy of Randy LaFollette

## Gulf of Mexico: In Depth & In Focus



**Deep Focus Acquisition Complete**

**All PSTM & PSDM Available**

New 10,000 meter Long Offset Data,  
PSTM, Wave Equation & Kirchhoff PSDM,  
AVO, Gravity, and Magnetics

Kenneth Mohn  
713-369-5859  
kmohn@fugro.com

Mike Whitehead  
713-369-5862  
mwhitehead@fugro.com

Rachel Masters  
713-369-5872  
rmasters@fugro.com

Serge Merland  
713-369-5861  
smerland@fugro.com

Marvin Taylor  
713-369-5864  
marvintaylor@fugro.com

www.fugro.com/geoscience/devprod/nonexcl.asp





**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



continued from previous page

reservoir quality information when available.

BJ currently is studying the combo of GIS with other data mining techniques, e.g., automated computer algorithms or neural network technology.

Slick water fracs and horizontal drilling have been key to the Barnett play's success overall.

Going forward, a couple of other technologies that have the potential to become increasingly beneficial are simultaneous fracturing of horizontal wells (simo-fracs) and ultra-lightweight proppants.

✓ The basic blueprint for simo-fracs entails taking two horizontal wells that are in close proximity and roughly parallel to one another and then fracing each at once.

Simo-fracs initially entailed dual fracs, one in each of the two closely spaced horizontals. Today, however, there are tri-fracs (often dubbed trifectas) and even quad-fracs being applied.

"Given such low matrix permeability of the shale reservoir, a gas molecule in the lifetime of a well may only be able to move through the matrix on the order of feet," LaFollette said. "You need to provide very closely spaced fracs to have a very nearby, high permeability pathway for the gas molecule to migrate and move into the wellbore."

The theory behind simo-fracs is they may increase the density of the hydraulic fracture network, or increase the amount of surface area being created from the frac job, LaFollette noted.

"You can envision it to be like a sheet of auto glass and smacking it with a hammer," he said. "It cracks in a complex fashion, and this is probably what hydraulic fractures in the Barnett look like."

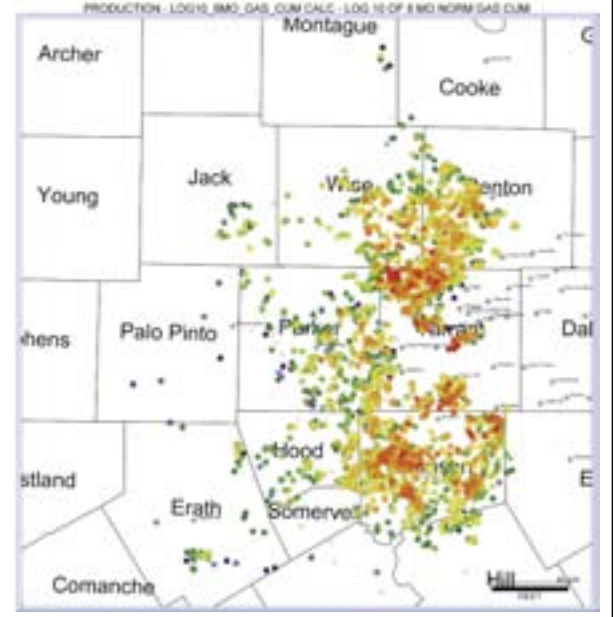
✓ Regarding the value of ultra-lightweight proppants in the Barnett, the jury is still out.

"When they first came out, they weren't capable of handling some of the frac pressures in the Barnett," LaFollette said.

"It's not known if the ultra-lightweights are going to take off and prove beneficial in the Barnett because we're just getting to the point with the strength of the ultra-light-weights where they can handle the Barnett closure stress range." □



Left: The best vertical Barnett wells tend to be clustered into fairly small parts of the play geographically. Outside these areas, Barnett gas production from vertical wells decreases markedly, with few exceptions.



Right: Comparison with vertical wells (left) demonstrates the impact of horizontal well technology on expanding the Barnett play out of the main area of vertical well successes.



**Driven by data.**

**Built on science.**

### RMS Meeting Set in Snowbird

"Exploration, Discovery, Success" is the theme for this year's Rocky Mountain Section annual meeting – a "Rocky Mountain Rendezvous" – set Oct. 6-9 at Snowbird, Utah.

In addition to the exhibits hall and technical program featuring the best in Rocky Mountain science, technology and recent exploration developments, the meeting offers:

✓ A public forum on "Energy Development on Public Lands."  
✓ Prospect booths and interview rooms.

✓ An All Convention Luncheon on Monday, Oct. 8, featuring Charles B. "Chuck" Stanley, executive vice president of Questar Corp., on "Natural Gas in the Rockies – The Challenges and Opportunities of Resource Development on Public Lands."

To register or for more information, go online to [www.utahgeology.org/rms-aapg.htm](http://www.utahgeology.org/rms-aapg.htm).

### Schlumberger Geomechanics

The right geomechanics plan is driven by **all available data** to identify, predict, and prevent costly events. It is built on a well-defined, fit-for-purpose mechanical earth model that optimizes your reservoir and brings value to the asset throughout the life of the field.

Schlumberger has been a leading provider of integrated geomechanics technology and services for more than 30 years, with an extensive track record of successful projects worldwide. For more information on our case studies around the world go to [www.slb.com/geomechanics](http://www.slb.com/geomechanics).

[www.slb.com/geomechanics](http://www.slb.com/geomechanics)

**Schlumberger**



## Meet Mark Myers

## USGS Head Faces the Challenges

By BARRY FRIEDMAN  
EXPLORER Correspondent

U.S. Geological Survey Director Mark Myers, an AAPG member who was nominated by President Bush and confirmed by the Senate in 2006, heads up an entity that has more than 10,000 scientists, technicians and support staff.

The Survey, which has a budget of more than \$1 billion, is located in nearly 400 offices in every state and in several foreign countries and partners with 2,000 agencies of state, local and tribal government, the academic community, other federal allies, non-governmental organizations, and the private sector.

Myers' predecessor was Charles G. "Chip" Groat, now director of the Center for International Energy and Environmental Policy at the University of Texas at Austin and is president of the AAPG Division of Environmental Geosciences.

The USGS is known for its field investigations, direct observations of natural science processes and phenomena, and monitoring and data collection.

Before coming to the Survey, Myers served as survey chief for field programs in the MacKenzie Delta (Arco, 1985), and Alaska's Cook Inlet (State of Alaska/USGS, 1997) and North Slope (Arco, 1999). He also served as sedimentologist for 13 other North Slope field programs.

Past president and board member of the Alaska Geological Society, Myers is an AAPG certified petroleum geologist as well as a certified professional geologist

*"The USGS is a scientific research organization that provides information to decision-makers at all levels of government so they can address and resolve complex natural resource problems."*

with the American Institute of Professional Geologists and a licensed geologist with the State of Alaska.

And it was during his time as director of Alaska's Division of Oil and Gas that he received some notoriety for resigning his position when he thought a gas pipeline deal that then-Gov. Frank Murkowski was pushing would short-change the state.

While he wouldn't talk about it for this interview, he said in his resignation letter, "Staying in this position would require me to compromise my values as to what is right, both legally and ethically, and what is in the interests of the state. I cannot continue as director and watch silently as the state's interests are undermined by creating barriers for the new oil and gas participants that are so vital to the economic future of our state."

It is a testament to his ability to build coalitions that Murkowski supported his appointment to the USGS.

In his confirmation hearings, Myers addressed the sensitive subject of

scientific independence, while underscoring the independence of the USGS.

"It's incredibly important that the science is unbiased, that it is peer reviewed and objective," he said. "That's the way it needs to be so the Survey can deliver objective information."

The EXPLORER asked Myers recently for his take on a range of issues, from research to funding to the tricky areas of politics and science. While careful not to address the contentious issue of whether or not the work of scientists has been muffled or distorted by the Bush Administration on issues that run counter to its political objectives, he does affirm the independence of both the USGS and his commitment to it.

EXPLORER: Why (how?) did your joining the USGS come about? Had you worked closely with the USGS during your time in Alaska?

MYERS: As a state geologist, I was no



Myers

stranger to the work of the USGS and always held its work in the highest esteem, both in terms of the breadth and scope of the science and the unbiased information it provided.

I had been involved in joint field research projects with USGS scientists on the North Slope and Cook Inlet regions of Alaska. As a resource manager in Alaska, I often faced a balancing act in trying to reconcile both sides of issues. USGS data was critical in the decision-making process and an invaluable resource because of its objectivity and reliability.

You've been a member of AAPG since 1979; what do you think should be the ideal relationship between the USGS and AAPG? How can each organization best help the other?

Yes, I have been a member since 1979, serving as a member of their House of Delegates prior to joining USGS. I hold AAPG in the highest regard and value their mission to foster scientific research, advance the science of geology, and promote new technology. It is a premier geoscience organization that not only provides wonderful opportunities for

continued on next page

# EGI

## BASIN ANALYST (3 positions)

- Sedimentology/Sequence Stratigraphy
- Structure and Tectonics
- Geochemistry and Petroleum Systems

THE  
UNIVERSITY  
OF UTAH

**T**he Energy & Geoscience Institute (EGI) at the University of Utah is seeking entrepreneurial senior and junior level individuals with a strong petroleum industry background to develop, conduct, and participate in multi-disciplinary research programs on behalf of our Corporate Associates listed below.

**Job requirements** for these positions include a Ph.D. in a relevant discipline or equivalent and industry/work experience. These positions will require both domestic and international travel and presentation ability. Preference given to those with previous international experience and demonstrated ability to work cross-culturally; foreign languages are a plus. The University is an Equal Opportunity/Affirmative Action Employer.

### EGI Corporate Associates –

Anadarko	ConocoPhillips	LUKOIL
Anzon Energy	Devon	Lundin Group
Apache	DNO	Maersk Oil
Benchmark	El Paso	Marathon
BG	EnCana	Mitsui
BHP Billiton	Eni	Murphy Oil
BP	E.ON Ruhrgas	Nations Petroleum
BPC Ltd.	Frontera	Newfield
Centrica	Gaz de France	Nexen
Chevron	Hess	Nippon Oil
Cobalt International	Hunt Oil	

### ■ to apply –

please email a cover letter and CV to Dr. Raymond A. Levey, Director ([director@egi.utah.edu](mailto:director@egi.utah.edu))

**Candidates for these positions** should have a broad geological background related to hydrocarbon exploration in conventional or unconventional reservoirs and a specialization in one of the subject areas above. Basin analysts will cooperate with EGI scientists on a variety of projects, and are expected to develop an independent research program. Strong preference will be given to individuals with proven funding records and active, transferable programs. We seek candidates who can integrate with our core strengths in petroleum geochemistry, bio- and chronostratigraphy, structural geology, metocean analysis, geomatics, carbon engineering, and visualization. Applicants will also be expected to prepare and teach didactic course work, both in the classroom and in the field.



continued from previous page

current and future geoscientists, but it also helps to educate the general public on issues related to energy resources.

We have a synergistic relationship – both organizations bring a national and international perspective to the critical issues around energy.

The strength of USGS is its ability to provide unbiased technically accurate information on energy resources, particularly with respect to quantifying undiscovered resources on a regional, national and international scale.

We have a long-standing tradition for developing methodologies of doing natural and international assessments for undiscovered and technically recoverable resources.

**You once worked for Arco; can you compare/contrast the experiences of working in the private sector vs. government?**

There are similarities in large organizations whether they are government or private sector. However, the goal in the private sector is to bring profit back to the shareholders, while in government our goal is to serve the public.

To be successful, a large scientific organization such as the USGS must employ advanced technology as well as have a strong research component. The USGS is a scientific research organization that provides information to decision-makers at all levels of government so they can address and resolve complex natural resource problems.

Additionally, as a federal research agency with a non-advocacy role, USGS processes require a level of transparency and peer review of science different than that of a large corporation.

**In thinking about becoming USGS director, what kind of preparation did you experience prior to being nominated for the post?**

I actually spent very little time preparing.

Even though the process of nomination is a long one, the initial interview stage was very short. For a job that is so broad – such as this – it's just kind of "come as you are." I did do a lot of soul searching – thinking about whether I was the best person for this job and could serve this country well. I wanted to make sure that I made a positive contribution to the organization.

I also had conversations with my family to get their feelings on such a move, as it would certainly be a significant change in lifestyle moving from Alaska to Washington, D.C.

**How are you defining your duties/role as director of the USGS?**

In my mind the duties or role of the director is very clear – to be a leader in moving the organization forward and better positioning the organization for the future as well as ensuring that the USGS continues to live up to its promise of providing sound science for citizens and decision makers.

**What are your top priorities for yourself, and for the Survey?**

My top priorities are to chart a course for USGS where it can thrive in the future.

We have a long history of providing unbiased scientific research and information to decision makers, and I believe that need will only increase as our nation continues to address issues related to climate change, natural hazards, energy resources, water quality and availability, human health and ecosystem conservation.

In an effort to focus on societal challenges related to those areas we have crafted a USGS Science Strategy for the

coming decade that defines challenges within these areas and opportunities where USGS science can serve the nation's pressing needs; unites all of our capabilities; takes advantage of our strengths and our unique position as non-regulatory federal science agency with national scale and responsibilities; and will help us to focus our science capabilities to meet the challenges of the 21st century.

**As the new head of the USGS, you will be in charge of funding for various projects. Where will you be receiving your input to make those decisions? How does that process work?**

As director it's my responsibility to ensure that the USGS stays fiscally and scientifically healthy. I work very closely with my executive leadership team, program managers and senior scientists from across the organization to define priority areas and opportunities to serve the nation's pressing needs. I also work



closely with other Department of the Interior and administration officials to ensure that our goals and science planning are complimentary and in support of their mission and goals.

And of course, ultimately, Congress will have the final say on USGS's budget.

**USGS data is often cited as various experts, geological and otherwise, wrestle with the question of "peak oil." What is your position on "peak oil?"**

The USGS doesn't take a position on this issue.

There is certainly a need to better understand the true endowment of conventional and unconventional resources to understand when and where peaks might occur, but one needs to take a number of things into consideration when discussing or projecting peak oil, such as economics, markets, transportation and energy efficiency.

**What role can you and the Survey play?**

The USGS role is in understanding and

See **Myers**, next page

## Focusing on Gas?



### GasView



Now there is a better method for identifying gas and measuring gas saturation in cased holes. Baker Atlas is proud to introduce the GasView<sup>SM</sup> service, a high-resolution measurement and analysis service that produces an exceptionally clear picture of reservoir gas.

Using Baker Atlas' RPM<sup>SM</sup> pulsed neutron system, the GasView service can be used to measure reservoir gas in virtually any well. Applications range from identifying by-passed pay in wells nearing abandonment to openhole log replacement for new wells.

Contact your Baker Atlas representative today to learn how the GasView service can help you produce more gas with greater efficiency.



The BEST Choice

For more information, visit our website [www.bakerhughes.com](http://www.bakerhughes.com)  
© 2007 Baker Hughes Incorporated.





Myers in a geologist's setting.

## Myers from previous page

assessing geologically based energy resources, both conventional and unconventional, characterizing those resources and understanding where they occur globally.

### What challenges do you face with/because of the current USGS budget?

We need to be able to prioritize our science activities and ensure that we are providing science that is relevant to the needs of the nation.

We also need to continue enhancing our collaboration and partnership efforts with others in order to enhance the use and value of our science.

In light of the budgetary and political

arena, how would you describe morale at the USGS? Does it feel it has the support and faith of Congress and the current administration?

Overall I believe the morale of employees is good. Our employees are among the most talented and dedicated professionals to be found in any organization. They are very proud of their outstanding history of public service and scientific advances.

While we have been faced with declining budgets over the past several years, the USGS continues to be a leader in collecting, monitoring, analyzing and providing scientific information and understanding about our nation's landscape, natural resources and the natural hazards that threaten us.

### Do you see the USGS's expertise and perceptions of the U.S. and global energy picture as making an impact?

The USGS provides critical science

information on energy resources, both domestic and internationally. One of our strengths is our ability to provide unbiased, peer-reviewed information and make it broadly available to everyone.

### What is the best thing that government can do to enhance and invigorate the scientific work that USGS does?

The high quality scientific research that USGS conducts can't be done in the short-term, but requires long-term continuity. We need to look into the future now and start planning from both a budgetary and work force perspective.

The key to any successful organization is its work force, and we must ensure we have the ability to hire the best and the brightest in order to continue to conduct the high quality scientific research needed to address the societal issues of the future.

USGS has an aging work force and recruitment is a challenge for us. We need to have the ability to work collaboratively with other geoscience organizations such as the American Geological Institute and AAPG to educate and recruit future scientists.

### The USGS is, in a sense, where the country goes for its earth science education. What do you think is the most important scientific horizon out there and, by the same token, the least understood?

There is hardly a field of science today that does not have exciting and enormously promising research areas. Just by way of example:

- ✓ Research at the USGS involving seismic imaging, tomography, interferometry, laser altimetry and GPS positioning is helping to interpret structure and dynamic processes from deep within Earth to its surface.

- ✓ PCR-based DNA fingerprinting is helping to understand and, in some cases, restore genetically diverse habitats.

- ✓ Satellite, broadband transmission of real-time discharge from our nationwide stream gage network is allowing our scientists to develop mapping methods that deliver on-line flood maps – including time of arrival, depth and extent of flooding – before a storm hits.

The new areas of fruitful study in the earth sciences is near limitless. However, because Earth itself is made up of countless interconnected and dynamic systems, it requires a kind of broad focus to begin to understand it.

As I see it, the ability to look for and find linkages, to establish relevant connections is the important scientific horizon out there and, by the same token, the least understood by way of the required research need and level of complexity. Debates engendered by issues over a range from global climate change, water availability and quality, species and habitat preservation or energy resources availability, must be informed by a "systems" approach and understanding.

This is not an easy task, for, historically, science disciplines have extended a great deal of knowledge through division and abstraction. "Isolation and abstraction" is still an important way by which most disciplines extend their knowledge, but they have their limitations. Recent research in earth systems has shown, quite poignantly, that when one tries to pick out anything by itself, it is found "hitched" to everything else.

To be involved in cutting-edge science today requires viewing Earth as a synergistic physical system of interrelated phenomena, governed by complex processes involving the geosphere, atmosphere, hydrosphere and biosphere. It centers on relevant interactions of chemical, physical, biological and

continued on next page

# AUSTRALIA'S MOST AMBITIOUS OIL AND GAS PROGRAM NEEDS THE WORLD'S MOST CAPABLE GEOSCIENTISTS

## Exploration & Field Development Geoscientists

Santos is an Australian-based oil and gas exploration and production company pursuing an ambitious growth strategy that provides exciting opportunities to advance your career.

If you're a highly motivated geologist or geophysicist with superior capabilities in exploration or field development who would like to be an integral part of our international oil and gas program, you could be just who we're looking for.

Successful candidates will benefit from working with a medium-sized company where you are recognised for your technical and leadership skills. You will make decisions that shape Santos' exploration and field

development programs and you'll be involved in high-impact projects from start to finish.

Santos has a strong business position to deliver growth, with an extensive Asian footprint and exciting opportunities in Indonesia, Vietnam, India and Kyrgyzstan. And over the next five years we expect to drill 1000 oil wells in central Australia.

Working in Adelaide means you'll be able to enjoy a rewarding career, a state-of-the-art new workplace and an enviable lifestyle.

Take the next step in your career and apply online at [www.santos.com](http://www.santos.com)



continued from previous page

dynamical processes that extend over a huge range of spatial scales from micron to planetary size, and over time scales of milliseconds to billions of years.

The Earth system approach is the critical framework and important scientific horizon from which to pose disciplinary and interdisciplinary questions in relationship to the important needs of humankind.

**Under a new USGS policy, a USGS employee must submit scientific documents for a peer review before publication – a review that may involve scientists either inside or outside the agency and must consider what the directive calls, “potential high visibility products or policy-sensitive issues.” Your opinion?**

Peer review is not new. In fact, it is the bedrock of processes in any credible science organization, as it ensures scientific conclusions or findings are robust, independent and objective. The USGS has had such processes in place for many years. As with any science enterprise, policies are periodically reviewed and updated to keep pace with changes in the organization.

Our recently revised policy has been developed by scientists and science managers – not political appointees. Research supervisors are charged with ensuring all USGS scientists have addressed peer comments and are in compliance with USGS policies and those of the federal government.

The new policy standardizes the peer review processes between our various disciplines. This standardization was necessary for the interdisciplinary science publications that are increasingly more critical to furthering scientific understanding of complex systems.

**In the past year, when you consider the debate over tsunami prediction and preparedness, global warming and avian influenza, to name a few examples, give the USGS a report card on how it handled those and other challenges.**

The USGS has been a major contributor to understanding the issues you’ve mentioned here as well as many others. USGS has an extensive and well-regarded history in studying climate change and its impacts.

Many within the climate science community rely on our unique ability to provide essential ground-truthing across multiple scientific disciplines in a wide variety of spatial and temporal scales. Many of our scientists are conducting monitoring and research that provide insight to global climate change issues such as the monitoring of:

- ✓ Streamflow and ground-water levels in order to access drought, flooding and water use.
- ✓ Thawing permafrost in the sub-arctic and arctic regions of Alaska.
- ✓ Migration of plant communities
- proliferation of invasive species in response to climate change.
- ✓ Changes in snowpack and stream runoff.
- ✓ Retreat of alpine glaciers.
- ✓ Coastal wetland change related to subsidence and sea-level rise.
- ✓ The interplay between land use, land-cover change and climate.
- ✓ The changing distribution of and impact of human and animal diseases.

We are engaged with other scientists from around the world through international committees and working groups such as the International Panel on Climate Change to address the scientific issues related to global climate change.

We also have been a key player in the monitoring and surveillance of avian influenza in wild migratory birds.

**How does the future look for the USGS?**

The future of USGS looks very promising, as the need for our scientific data and information and understanding have never been greater. Our strength lies in our ability to bring a multidisciplinary approach to tackling some of the challenges this nation faces in the future.

We are optimistic that our Strategic Science plan – our 10-year science vision – will enhance our ability to conduct interdisciplinary and interagency research and result in USGS making significant contributions toward helping the economy remain strong and the environment healthy, while helping to retain the present quality of life in the United States. □

For the complete text of the Myers’ interview, visit the AAPG Web site.



## Myers Set as Luncheon Speaker For Mid-Continent Annual Convention

Mark Myers, director of the U.S. Geological Survey, will be the All-Convention Luncheon speaker for this year’s annual convention of the AAPG Mid-Continent Section.

The meeting will be Sept. 8-11 at the Airport Hilton Hotel and Convention Center in Wichita, Kan. The theme is “New Ideas – More Oil and Gas.”

Exploring that theme will be 52 papers and 15 posters that reflect the state-of-art developments on everything from shale gas to multi-component 4-D seismic in sandstone reservoirs. They will be complemented by a sold-out exhibits area.

New this year for the Mid-Continent is an emphasis on student

participation, first with no registration fees, and second via a job fair for students, which will be held on Monday and Tuesday, Sept. 10-11.

Other meeting activities will include:

- ✓ A field trip to the “Oread Group in Eastern Kansas.”
- ✓ A field trip to a “Kansas Underground Salt Museum.”
- ✓ A short course on “3-D for Geologists.”

Myers, an AAPG member, is Alaska’s former state geologist and head of Alaska’s Geological Survey. He is the 14th director for the USGS since its inception in 1879.

For registration or more information, go online to [www.aapg.org](http://www.aapg.org). □

# DOING THE NATION A WORLD OF GOOD



AMERICA IS BLESSED WITH A WEALTH OF NEW AND PROLIFIC ONSHORE NATURAL GAS FIELDS. AS THE NATION’S #1 DRILLER OF CLEAN-BURNING NATURAL GAS WELLS, CHESAPEAKE TAKES PRIDE IN PROTECTING AIR QUALITY AND PRESERVING THE LAND WHERE WE DRILL. THAT’S OUR MISSION IN AMERICA TODAY AND THE PROMISE WE MAKE TO FUTURE GENERATIONS. IT’S HOW CHESAPEAKE DOES THE NATION A WORLD OF GOOD. IT’S HOW WE ALL WIN.



NYSE: CHK • [chkenergy.com](http://chkenergy.com)



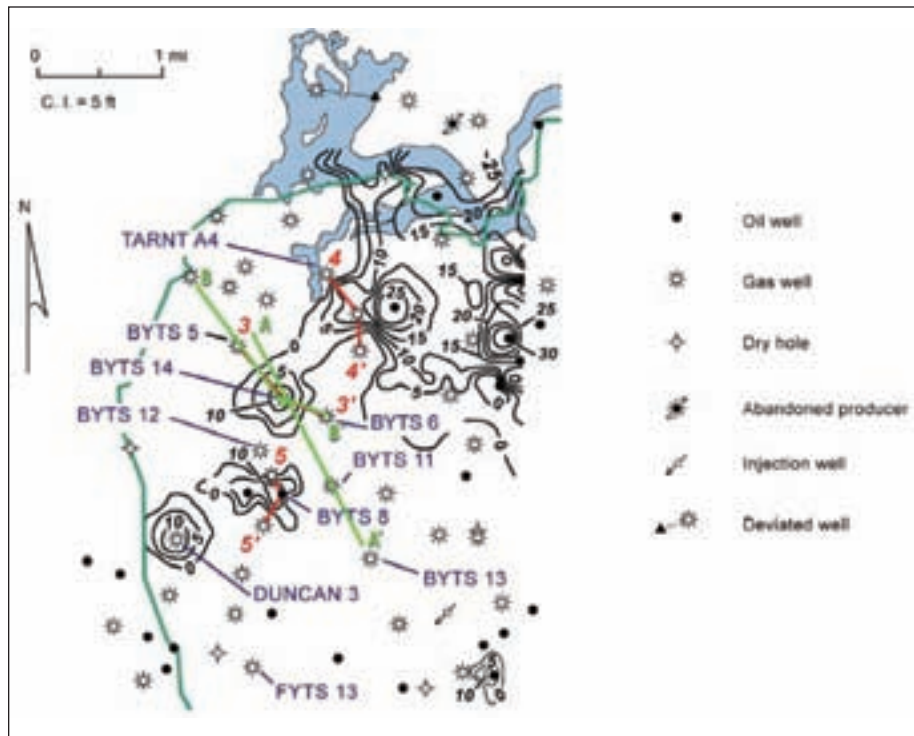


Figure 1 – Map of a targeted thin Caddo sandstone drilling target developed from an interpretation of well logs.

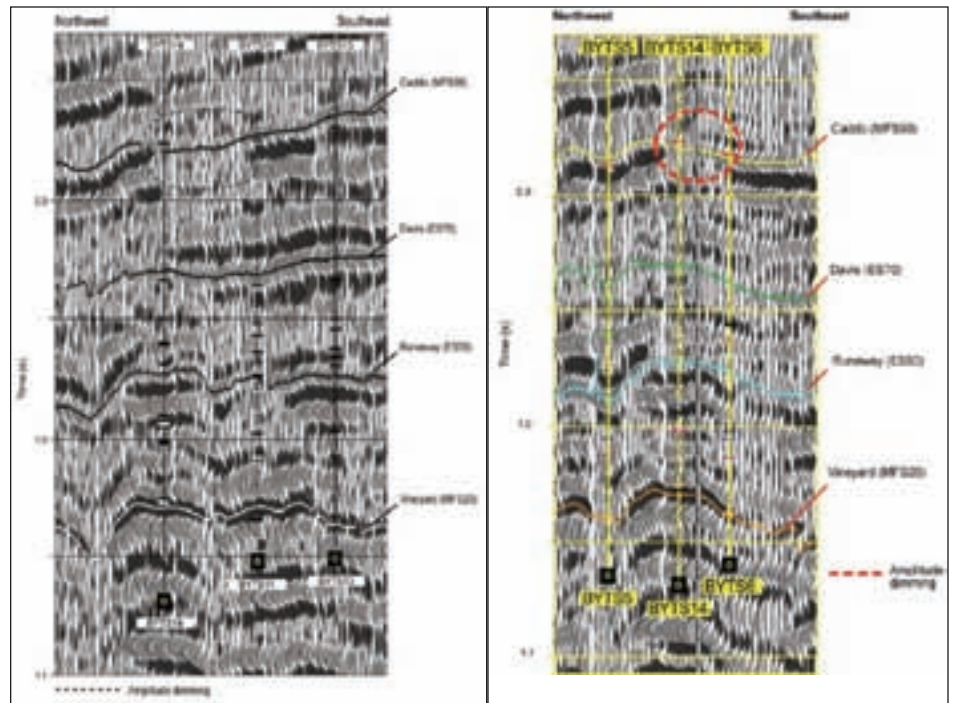


Figure 2 – Seismic sections along profile AA' (left) and profile BB' (right) shown on the map in figure 1. The top of the Caddo interval is identified on each profile. The circled area on each section shows where the sandstone trend crosses the line of profile.

## GEOPHYSICAL CORNER

# No Reflection Signal Can Be Good

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

By BOB HARDAGE

As seismic interpreters, most of us – including the author – have developed the mindset that robust reflection events are what we first try to associate with drilling targets.

For thin-bed units, reflection amplitude increases as net pay increases within the target interval. Thin-bed interpreters conclude that “strong reflection events are good.”

In a sand-shale sequence, gas reservoirs produce P-wave bright spots. In this type of geology, interpreters focus on the boldest reflection signals to define drilling targets.

Depending on the nature of the seismic impedance contrasts in the type of geology that is being interpreted, there are exceptions to these two examples that drilling targets are associated with reasonably prominent reflection events. However, the association between robust reflection responses and drilling targets is successfully applied across many prospects and in several depositional environments.

In this article, we look at the opposite principle and describe a drilling target for which the correct mindset is: “Drill where there is no reflection signal.”

\* \* \*

The target in this example is a thin Caddo sandstone positioned at the top of the Bend Conglomerate interval in the Fort Worth Basin.

Distribution of the sandstone is shown in map view in figure 1.

This map, based on the interpretation of well logs acquired in the labeled wells, indicates that the sandstone is distributed along a southwest-to-northeast channel-like trend. Local operators consider this particular sandstone to be an attractive

drilling target, even though the average thickness is only five meters (16 feet).

At this location, the Caddo is interpreted to have been deposited in a deltaic environment that had a low accommodation space. Incised channels similar in size and shape to the trend shown in this map are therefore not unexpected features.

Two profiles (AA' and BB') are shown that traverse the sandstone trend and connect key calibration wells. Seismic responses along these profiles are exhibited in figure 2. The interpreted Caddo horizon is shown on the seismic sections; the circled area on each profile identifies the intersection with the sandstone trend.

Outside the circled areas, the Caddo

reflection is robust because a thin carbonate layer extends across this local area and creates a significant P-wave impedance contrast with the overlying shale. Inside each circled area, the Caddo reflection is absent, or minimal, because there is no significant P-wave impedance contrast between the sandstone that infilled the erosional channel and its sealing shale.

To position a well that will penetrate this particular sand, an interpreter has to adopt the attitude that “no reflection signal is good.”

To illustrate this principle, the average reflection trough amplitude calculated in a narrow 30-ms window immediately below the top of the Caddo horizon is displayed as figure 3. The

low-amplitude, southwest-to-northeast response labeled *channel-fill response range* on the color bar identifies the targeted incised channel that downcut through the thin carbonate layer and then infilled with sand.

This no-reflection trend is the drilling target.

\* \* \*

The wells shown in these figures were drilled before the 3-D seismic data were acquired.

Note the situation for the BYTS14 and BYTS11 wells. BYTS14 touched the edge of the incised channel and produced; BYTS11 was an ever-so-close near miss (figures 2 and 3). □

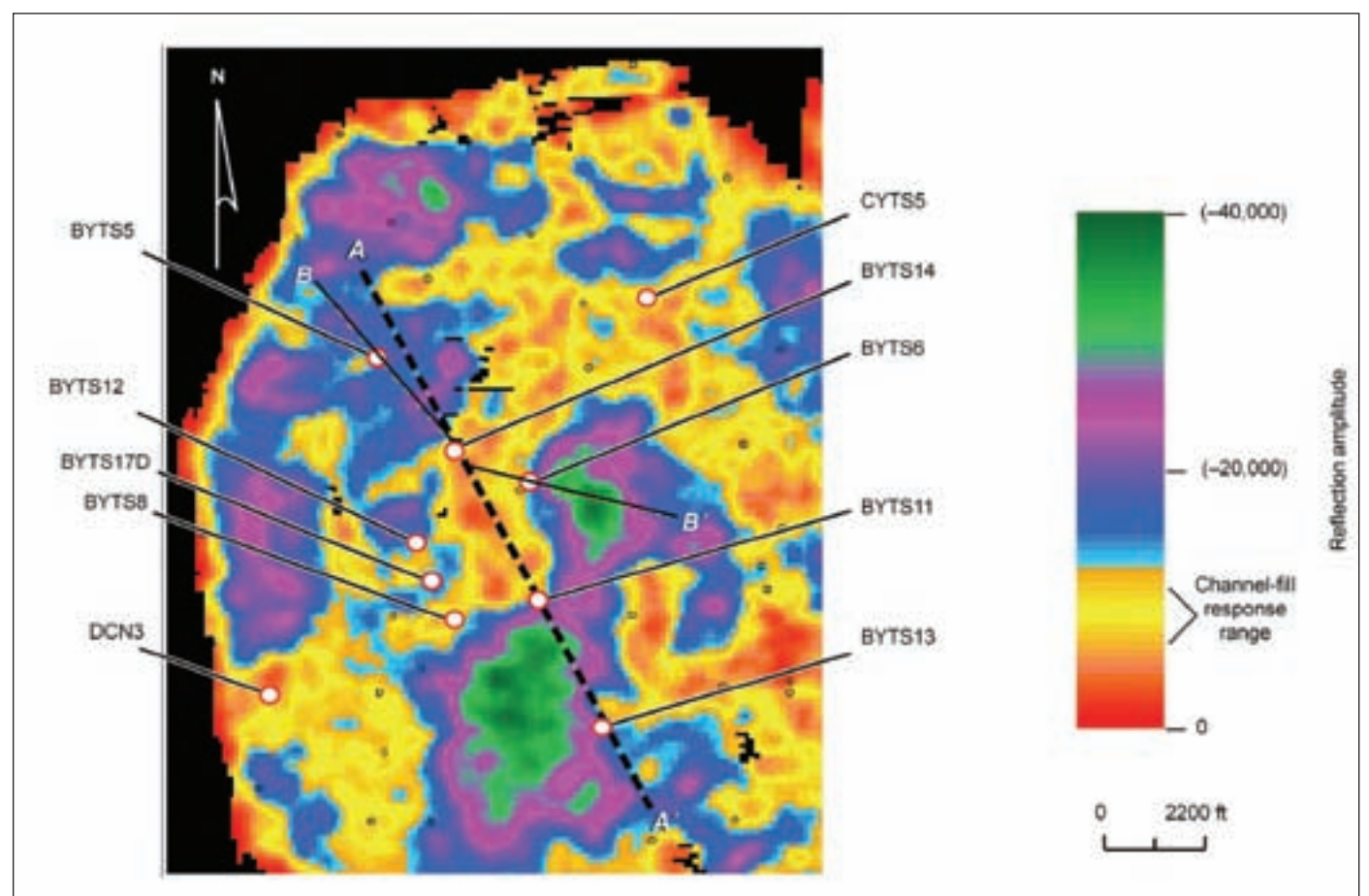


Figure 3 – Map of average negative amplitude in a thin 30-ms window immediately below the Caddo horizon defined in figure 2. The trend of weak reflection signal, labeled Channel-fill response range, is the drilling target.







“Salt diapirs” AND Hudec

Search

**Nearly 1,000,000 documents.  
Twenty complete collections.  
One easy-to-use interface.**

Visit <http://payperview.datapages.com/> to sample the breadth and depth of the Datapages archives.  
Corporate subscriptions start at \$500. Tax-deductible, in perpetuity alma mater subscriptions also available.

Participating publishers and societies are as follows:

AAPG Bulletin  
 AAPG Special Publications  
 Ardmore Geological Society  
 Canadian Society of Petroleum Geologists  
 East Texas Geological Society  
 Fort Worth Geological Society  
 Gulf Coast Association of Geological Societies  
 Houston Geological Society Bulletin  
 Houston Geological Society Special Publications  
 Indonesia Petroleum Association  
 Journal of Petroleum Geology  
 Kansas Geological Society  
 Lafayette Geological Society  
 New Orleans Geological Society  
 Pacific Section AAPG Special Publications  
 Petroleum Abstracts Discovery Database  
 Oklahoma City Geological Society  
 Society of Sedimentary Geology JSR  
 Tulsa Geological Society  
 Wyoming Geological Society

Coming soon:

Circum-Pacific Council for Mineral and Energy Resources and  
 the Geological Society of Trinidad and Tobago.

  
**Datapages, Inc.**



+1 918 560-9430 for a free 30-day trial or try us out at <http://payperview.datapages.com/>

**More science than you can shake a pick at.**



Starts Sept. 10

## Education Conference Slated for Houston

There's still time to sign-up for an AAPG education event that has become a can't-miss opportunity to sharpen your skills and knowledge.

The AAPG-SEG Fall Education Conference, built on the theme "stratigraphic traps," will be held Sept. 10-14 at the Norris Conference Center in Houston.

The conference will offer 12 subjects in four concurrent sessions: education tools, carbonates, deepwater clastics and seismic evaluation.

Courses may be purchased individually, and the five-day badges can be transferred to a colleague to take advantage of the classes.

Those classes are:

✓ Sequence Stratigraphy for Petroleum Exploration (taught by AAPG Distinguished Lecturer Vitor Abreu).

✓ Deepwater Sands, Integrated Stratigraphic Analysis – A Workshop Using Multiple Data Sets (John Armentrout).

✓ Carbonate Depositional Systems, Diagenesis and Porosity Development (Art Saller).

✓ Quick Guide to Carbonate Well Log Analysis (George Asquith).

✓ Seismic Imaging of Carbonate Reservoirs (Rick Sarg).

✓ Seismic Interpretation in the Exploration Domain (Don Herron and Tim Smith).

✓ Understanding Seismic Anisotropy in Exploration and Exploitation (Leon Thomsen).

✓ 3-D Seismic Attributes for Prospect Identification and Reservoir Characterization (Kurt Marfurt).

✓ AVO: Seismic Lithology (Mike Graul and Fred Hilterman).

✓ Evaluating Seals and Pay (William Almon).

✓ Risk Analysis in Stratigraphic Traps (Jim MacKay and Robert Otis).

✓ Geochemical Exploration for Stratigraphic Traps and Other Subtle Traps: Methods and Case Histories (Deet Schumacher).

To enroll, or for more information, call (888) 338-3387; or go online to [www.aapg.org/fallconference/](http://www.aapg.org/fallconference/). □

## Reservoir Management Software

### RESERVIEW™

- Determine reservoir compartmentalization inexpensively using oil chemistry
- Use data to optimize placement of development wells
- Use data to determine proper placement of water flood injection wells
- Reduce data evaluation time from days to hours

### OILUNMIXER™

Allocate commingled production using the natural chemistry of the commingled oil

- Determine the relative production of up to 8 pay zones in a given well.
- Assess the contribution of multiple fields to commingled pipeline streams.

Reduce costs by 95% as compared to Production Logging Tools

- Lower cost, allows frequent monitoring and more immediate response.
- Identify changes in zone behavior near real time.
- No need to stop or interrupt production.
- Can be used even on pumping wells.
- Works regardless of well deviation.

Details: [www.ChromEdge.com](http://www.ChromEdge.com)  
Contact: Rick Schrynmeeckers  
281-681-8811  
[RickS@info-logio-us.com](mailto:RickS@info-logio-us.com)

## Washington

from page 55

work force, climate, energy security, research and development needs, data preservation and other issues of interest to members.

The revised and new statements can be accessed on the AAPG Web site at <http://dpa.aapg.org/gac/index.cfm>.

This conference provided a great opportunity for AAPG to engage state legislative officials and staff and provide those individuals with access to AAPG science-based publications and experts.

✓ NPC Study – The National Petroleum Council has issued its report in response to the Secretary of Energy's request to conduct a comprehensive study that would examine the future of oil and natural gas out to the year 2030 in the context of the global energy system.

I recommend that members take the time to read the 40-page executive summary published on the NPC Web site, at [www.npc.org](http://www.npc.org). The report encompasses findings on "peak oil," work force, geopolitical considerations and technology trends.

The full report and associated back up documents, which run to hundreds of pages of text and graphics, are available on the site as well. □

(Editor's note: Don Juckett, head of AAPG's Geoscience and Energy Office in Washington, D.C., can be contacted at [djuckett@aapg.org](mailto:djuckett@aapg.org); 1-703-575-8293.)



**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](http://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](mailto: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.





# FOUNDATION UPDATE

## Foundation (General)

Michael M. Adams  
Enrique Aguilera-Hernandez  
Eric Thomas Allison  
Grant L. Anderson  
Thomas Westley Angerman  
Titilope Feyi Ariyo  
*In memory of Ayokunie Oni*  
Seymour R. Baker  
Dorothea E. Baldwin  
*In memory of Rufus J. LeBlanc*

Alex Bambridge  
David Bruce Bannan  
A. Greer Barriault  
Richard A.J. Bartlett  
Richard Ted Bartlett  
Thomas A. Bay Jr.  
*In memory of Rufus J. LeBlanc*

Dixie L. Bear  
*In memory of Ted L. Bear*  
Andrew Bell  
William Alexander Bell  
Don Gehr Benson Jr.  
Mark P. Betts  
Lee Travis Billingsley  
Frank D. Bilotti  
Marc Blaizot  
James Brian Blankenship  
Jeremy Boak  
George Robert Bole  
*In memory of James O. Lewis*

William Howard Bowie  
Nicholas G.K. Boyd III  
Christopher Howard Bradley  
Richard Randall Bramlett  
Darinka Briggs  
*In honor of Louis Briggs Jr.*

Janet Sue Brister  
Timothy Scott Brown  
David Gerald Bryant  
I. Philip Buch  
James George Buchanan  
Tucker Burkhardt  
Brian S. Cabote  
Timothy Robert Carr  
Francis Cheng-Hsing Chang  
Steven L. Charbonneau  
Marilyn Taggi Cisar  
John L. Clanton

Robert Todd Clark  
Peggy Susie Clements  
James C. Cobb  
James Bruce Coffman  
Carlos Eduardo Convers Gomez  
David Richard Cook  
Timothy Mark Cordingley  
Douglas Lee Core  
Maurice G. Cox  
William W. Crump  
David Kingsley Curtiss  
Jeff L. Daniels  
George B. Davis III  
Carolyn S. De Vine  
J. Pieter A. Dietvorst  
Carl H. Dokter  
Douglas Alan Draves  
William F. Dula Jr.  
Craig Anthony Edmonds  
Richard A. Eisenberg  
Christopher Frank Elders  
Franklyn R. Engler  
*In memory of George O. Scott*

Truett E. Enloe  
Terence Brent Eschner  
Jerome A. Eyer  
Richard E. Faggioli  
James C. Farmer  
Garrasino Cesar Fernandez  
Andrea Fildani  
James J. Flanagan  
James W. Flannery  
Glenn Fletcher  
McLain Jay Forman  
Katherine C. Foster  
*In memory of Burdette A. Ogle*

Donald Wayland Frames  
Scot Innes Fraser  
Michael C. Friederich  
Larry P. Friend  
Gerard Olivier Fries  
David Leon Garner  
Boyd S. Getz  
Marco Antonio Gheno  
Melvyn Richard Giles  
Christopher Steven Gilliam  
William E. Gipson  
*In memory of Payton V. Anderson*  
John Patrick Gold

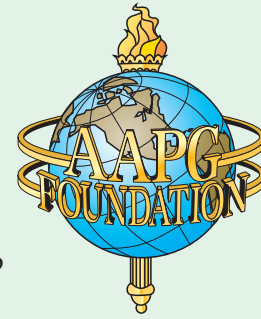
## Foundation Donors

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

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

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

The AAPG Foundation Trustees



Goldman Sachs Philanthropy Fund  
*Gift from Charles and Cathy Williamson*

Ernest Gomez  
Chirinos Perez Gonzab F.  
Alfonso Gonzalez  
Christopher James Gotcher  
Timothy C. Grant  
Scott W. Grasse  
Patrick John F. Gratton  
Sara Marie Gratton  
Stephen Thomas Grayson  
Mary Ann Gross  
John C. Guoynes  
George A. Hall  
Walter David Michael Hall  
Neil Wallace Hamilton  
Russell Royden Hamman  
James A. Hartman  
*In memory of Rufus J. LeBlanc*

Philip Thayer Hayes  
Clyde Leon Hebborn  
Robert Alexander Hefner IV  
Ross W. Hinton  
Roger Emerson Hively  
L. Edward Hollingsworth  
Simon Thomas Horan  
Alfredo Hosie  
Houston Geological Society  
*In memory of Rufus J. LeBlanc*

Dan Allen Hughes  
Dudley Joe Hughes  
Kingdon R. Hughes  
Moujahed Ibrahim Husseini  
R. Thomas Jacky  
Erin Williams Janes  
James Allen Johnston  
James Winston Jones  
Richard Anthony Jones  
Robert William Karlewicz  
John Michael Keating  
Edward Reed Kennedy  
Jeroen Antonius Kenter  
John Curtis Killinger  
Nualjun Kitvarayut  
Abdul Kohar  
Anthony Joseph Kolodziej  
Petr Kostelnicek  
Christopher Mark Kravits  
William Chris Lachmar  
Kenneth E. Lake  
Kenneth M. Landgren  
Stephen Douglas Levine  
Juan Jesus Leyva  
John F. Ligon  
Roy Oliver Lindseth  
Laurence Richard Lines  
Kevin James Lounsbury  
Barbara Luneau  
Frank Carlye Mabry III  
Juliano Magalhaes Macedo  
Thomas Mairs  
*In memory of Charles H. Hightower Jr.*

Joe A. Marek  
David F. Martineau  
Gregory L. Mason  
Barry C. McBride  
David Wilson McDonald  
Courtney McElmoyl  
Timothy Reed McHargue  
Clifton Daniel McLellan  
Charles Henri Mercanton  
Zenith Samuel Merritt  
Ruth Elin Midtbo  
Robert Calvin Milici  
Bruce Allen Miller  
Floyd Henry Miller Jr.  
Steven K. Miller  
Philippe Jean Montaggiioni  
Kirk Brannen Morgan  
Atip Muangsuwan  
Ricky Douglas Mullins

Stephen R. Narr  
Larry Nation  
Stephen Kenneth Newton  
Mark D. Nicholson  
Jeanie Marie Odum  
Olusola Olufemi Ogunkoya  
Nobuyuki Ogura  
David M. Orchard  
Lorenzo Osculati  
Edward Allen Paden  
David Brian Patterson  
Jonathan L. Payne  
Juan Ignacio Pelaez  
Monica Alves Pequeno  
Mark Edward Petersen  
Peter John Pickford  
Peter Philip Pickup  
Lewis Stan Pittman  
Ellyn May Ponton  
Spencer Scott Quam  
Donald James Rae  
Adriana Raileanu Sr.  
James Lee Reeves  
Fritz W. Reuter  
James Warner Roach  
Robert Thomas Ryder  
Dayna Jean Salter  
James Oliver Salveson  
Bernard Robert Sanger  
William Sassi  
Steven Schamel  
Thomas M. Schandle  
Stephen Murray Scott  
Barry Peter Setterfield  
Ezekiel Olasupo Shadiya  
John Charles Sherrill  
Joseph Edward Siegmund  
Adrian Thomas Smith  
George Taylor Smith  
Judith Terry Smith  
Stacy Alan Smith  
Dicky Eddy Soedigdjo  
Barbara Jeanne B. Solomon  
John Lee Stout  
Dennis Allan Taylor  
Joy Griffin Thomas  
Terry L. Thyer  
Donald Allan Twaddle  
James Ross Underwood Jr.  
Don A. Urbanec  
Barudzija Uros  
John H. Van Amringe  
*In memory of George Feister*  
Michael David Van Horn  
Lawrence B. Van Ingen  
Arthur M. Van Tyne  
*In honor of Linda Farrar and Bill Fisher*  
Harvey Dale Walker  
William B. Walker Jr.  
William Cruse Ward  
Mark Francis Weldon  
Kenneth Joseph Wells  
Keith R. Whaley  
Terry L. White  
John Thomas Williams  
Bruce A. Wilson  
John Stephen Wonfor  
Warren George Workman  
Changshu Yang  
Susan Wygant Young  
Martin Andreas Ziegler

Stephen R. Narr  
Larry Nation  
Stephen Kenneth Newton  
Mark D. Nicholson  
Jeanie Marie Odum  
Olusola Olufemi Ogunkoya  
Nobuyuki Ogura  
David M. Orchard  
Lorenzo Osculati  
Edward Allen Paden  
David Brian Patterson  
Jonathan L. Payne  
Juan Ignacio Pelaez  
Monica Alves Pequeno  
Mark Edward Petersen  
Peter John Pickford  
Peter Philip Pickup  
Lewis Stan Pittman  
Ellyn May Ponton  
Spencer Scott Quam  
Donald James Rae  
Adriana Raileanu Sr.  
James Lee Reeves  
Fritz W. Reuter  
James Warner Roach  
Robert Thomas Ryder  
Dayna Jean Salter  
James Oliver Salveson  
Bernard Robert Sanger  
William Sassi  
Steven Schamel  
Thomas M. Schandle  
Stephen Murray Scott  
Barry Peter Setterfield  
Ezekiel Olasupo Shadiya  
John Charles Sherrill  
Joseph Edward Siegmund  
Adrian Thomas Smith  
George Taylor Smith  
Judith Terry Smith  
Stacy Alan Smith  
Dicky Eddy Soedigdjo  
Barbara Jeanne B. Solomon  
John Lee Stout  
Dennis Allan Taylor  
Joy Griffin Thomas  
Terry L. Thyer  
Donald Allan Twaddle  
James Ross Underwood Jr.  
Don A. Urbanec  
Barudzija Uros  
John H. Van Amringe  
*In memory of George Feister*  
Michael David Van Horn  
Lawrence B. Van Ingen  
Arthur M. Van Tyne  
*In honor of Linda Farrar and Bill Fisher*  
Harvey Dale Walker  
William B. Walker Jr.  
William Cruse Ward  
Mark Francis Weldon  
Kenneth Joseph Wells  
Keith R. Whaley  
Terry L. White  
John Thomas Williams  
Bruce A. Wilson  
John Stephen Wonfor  
Warren George Workman  
Changshu Yang  
Susan Wygant Young  
Martin Andreas Ziegler

Stephen R. Narr  
Larry Nation  
Stephen Kenneth Newton  
Mark D. Nicholson  
Jeanie Marie Odum  
Olusola Olufemi Ogunkoya  
Nobuyuki Ogura  
David M. Orchard  
Lorenzo Osculati  
Edward Allen Paden  
David Brian Patterson  
Jonathan L. Payne  
Juan Ignacio Pelaez  
Monica Alves Pequeno  
Mark Edward Petersen  
Peter John Pickford  
Peter Philip Pickup  
Lewis Stan Pittman  
Ellyn May Ponton  
Spencer Scott Quam  
Donald James Rae  
Adriana Raileanu Sr.  
James Lee Reeves  
Fritz W. Reuter  
James Warner Roach  
Robert Thomas Ryder  
Dayna Jean Salter  
James Oliver Salveson  
Bernard Robert Sanger  
William Sassi  
Steven Schamel  
Thomas M. Schandle  
Stephen Murray Scott  
Barry Peter Setterfield  
Ezekiel Olasupo Shadiya  
John Charles Sherrill  
Joseph Edward Siegmund  
Adrian Thomas Smith  
George Taylor Smith  
Judith Terry Smith  
Stacy Alan Smith  
Dicky Eddy Soedigdjo  
Barbara Jeanne B. Solomon  
John Lee Stout  
Dennis Allan Taylor  
Joy Griffin Thomas  
Terry L. Thyer  
Donald Allan Twaddle  
James Ross Underwood Jr.  
Don A. Urbanec  
Barudzija Uros  
John H. Van Amringe  
*In memory of George Feister*  
Michael David Van Horn  
Lawrence B. Van Ingen  
Arthur M. Van Tyne  
*In honor of Linda Farrar and Bill Fisher*  
Harvey Dale Walker  
William B. Walker Jr.  
William Cruse Ward  
Mark Francis Weldon  
Kenneth Joseph Wells  
Keith R. Whaley  
Terry L. White  
John Thomas Williams  
Bruce A. Wilson  
John Stephen Wonfor  
Warren George Workman  
Changshu Yang  
Susan Wygant Young  
Martin Andreas Ziegler

Stephen R. Narr  
Larry Nation  
Stephen Kenneth Newton  
Mark D. Nicholson  
Jeanie Marie Odum  
Olusola Olufemi Ogunkoya  
Nobuyuki Ogura  
David M. Orchard  
Lorenzo Osculati  
Edward Allen Paden  
David Brian Patterson  
Jonathan L. Payne  
Juan Ignacio Pelaez  
Monica Alves Pequeno  
Mark Edward Petersen  
Peter John Pickford  
Peter Philip Pickup  
Lewis Stan Pittman  
Ellyn May Ponton  
Spencer Scott Quam  
Donald James Rae  
Adriana Raileanu Sr.  
James Lee Reeves  
Fritz W. Reuter  
James Warner Roach  
Robert Thomas Ryder  
Dayna Jean Salter  
James Oliver Salveson  
Bernard Robert Sanger  
William Sassi  
Steven Schamel  
Thomas M. Schandle  
Stephen Murray Scott  
Barry Peter Setterfield  
Ezekiel Olasupo Shadiya  
John Charles Sherrill  
Joseph Edward Siegmund  
Adrian Thomas Smith  
George Taylor Smith  
Judith Terry Smith  
Stacy Alan Smith  
Dicky Eddy Soedigdjo  
Barbara Jeanne B. Solomon  
John Lee Stout  
Dennis Allan Taylor  
Joy Griffin Thomas  
Terry L. Thyer  
Donald Allan Twaddle  
James Ross Underwood Jr.  
Don A. Urbanec  
Barudzija Uros  
John H. Van Amringe  
*In memory of George Feister*  
Michael David Van Horn  
Lawrence B. Van Ingen  
Arthur M. Van Tyne  
*In honor of Linda Farrar and Bill Fisher*  
Harvey Dale Walker  
William B. Walker Jr.  
William Cruse Ward  
Mark Francis Weldon  
Kenneth Joseph Wells  
Keith R. Whaley  
Terry L. White  
John Thomas Williams  
Bruce A. Wilson  
John Stephen Wonfor  
Warren George Workman  
Changshu Yang  
Susan Wygant Young  
Martin Andreas Ziegler

Stephen R. Narr  
Larry Nation  
Stephen Kenneth Newton  
Mark D. Nicholson  
Jeanie Marie Odum  
Olusola Olufemi Ogunkoya  
Nobuyuki Ogura  
David M. Orchard  
Lorenzo Osculati  
Edward Allen Paden  
David Brian Patterson  
Jonathan L. Payne  
Juan Ignacio Pelaez  
Monica Alves Pequeno  
Mark Edward Petersen  
Peter John Pickford  
Peter Philip Pickup  
Lewis Stan Pittman  
Ellyn May Ponton  
Spencer Scott Quam  
Donald James Rae  
Adriana Raileanu Sr.  
James Lee Reeves  
Fritz W. Reuter  
James Warner Roach  
Robert Thomas Ryder  
Dayna Jean Salter  
James Oliver Salveson  
Bernard Robert Sanger  
William Sassi  
Steven Schamel  
Thomas M. Schandle  
Stephen Murray Scott  
Barry Peter Setterfield  
Ezekiel Olasupo Shadiya  
John Charles Sherrill  
Joseph Edward Siegmund  
Adrian Thomas Smith  
George Taylor Smith  
Judith Terry Smith  
Stacy Alan Smith  
Dicky Eddy Soedigdjo  
Barbara Jeanne B. Solomon  
John Lee Stout  
Dennis Allan Taylor  
Joy Griffin Thomas  
Terry L. Thyer  
Donald Allan Twaddle  
James Ross Underwood Jr.  
Don A. Urbanec  
Barudzija Uros  
John H. Van Amringe  
*In memory of George Feister*  
Michael David Van Horn  
Lawrence B. Van Ingen  
Arthur M. Van Tyne  
*In honor of Linda Farrar and Bill Fisher*  
Harvey Dale Walker  
William B. Walker Jr.  
William Cruse Ward  
Mark Francis Weldon  
Kenneth Joseph Wells  
Keith R. Whaley  
Terry L. White  
John Thomas Williams  
Bruce A. Wilson  
John Stephen Wonfor  
Warren George Workman  
Changshu Yang  
Susan Wygant Young  
Martin Andreas Ziegler

Stephen R. Narr  
Larry Nation  
Stephen Kenneth Newton  
Mark D. Nicholson  
Jeanie Marie Odum  
Olusola Olufemi Ogunkoya  
Nobuyuki Ogura  
David M. Orchard  
Lorenzo Osculati  
Edward Allen Paden  
David Brian Patterson  
Jonathan L. Payne  
Juan Ignacio Pelaez  
Monica Alves Pequeno  
Mark Edward Petersen  
Peter John Pickford  
Peter Philip Pickup  
Lewis Stan Pittman  
Ellyn May Ponton  
Spencer Scott Quam  
Donald James Rae  
Adriana Raileanu Sr.  
James Lee Reeves  
Fritz W. Reuter  
James Warner Roach  
Robert Thomas Ryder  
Dayna Jean Salter  
James Oliver Salveson  
Bernard Robert Sanger  
William Sassi  
Steven Schamel  
Thomas M. Schandle  
Stephen Murray Scott  
Barry Peter Setterfield  
Ezekiel Olasupo Shadiya  
John Charles Sherrill  
Joseph Edward Siegmund  
Adrian Thomas Smith  
George Taylor Smith  
Judith Terry Smith  
Stacy Alan Smith  
Dicky Eddy Soedigdjo  
Barbara Jeanne B. Solomon  
John Lee Stout  
Dennis Allan Taylor  
Joy Griffin Thomas  
Terry L. Thyer  
Donald Allan Twaddle  
James Ross Underwood Jr.  
Don A. Urbanec  
Barudzija Uros  
John H. Van Amringe  
*In memory of George Feister*  
Michael David Van Horn  
Lawrence B. Van Ingen  
Arthur M. Van Tyne  
*In honor of Linda Farrar and Bill Fisher*  
Harvey Dale Walker  
William B. Walker Jr.  
William Cruse Ward  
Mark Francis Weldon  
Kenneth Joseph Wells  
Keith R. Whaley  
Terry L. White  
John Thomas Williams  
Bruce A. Wilson  
John Stephen Wonfor  
Warren George Workman  
Changshu Yang  
Susan Wygant Young  
Martin Andreas Ziegler

Stephen R. Narr  
Larry Nation  
Stephen Kenneth Newton  
Mark D. Nicholson  
Jeanie Marie Odum  
Olusola Olufemi Ogunkoya  
Nobuyuki Ogura  
David M. Orchard  
Lorenzo Osculati  
Edward Allen Paden  
David Brian Patterson  
Jonathan L. Payne  
Juan Ignacio Pelaez  
Monica Alves Pequeno  
Mark Edward Petersen  
Peter John Pickford  
Peter Philip Pickup  
Lewis Stan Pittman  
Ellyn May Ponton  
Spencer Scott Quam  
Donald James Rae  
Adriana Raileanu Sr.  
James Lee Reeves  
Fritz W. Reuter  
James Warner Roach  
Robert Thomas Ryder  
Dayna Jean Salter  
James Oliver Salveson  
Bernard Robert Sanger  
William Sassi  
Steven Schamel  
Thomas M. Schandle  
Stephen Murray Scott  
Barry Peter Setterfield  
Ezekiel Olasupo Shadiya  
John Charles Sherrill  
Joseph Edward Siegmund  
Adrian Thomas Smith  
George Taylor Smith  
Judith Terry Smith  
Stacy Alan Smith  
Dicky Eddy Soedigdjo  
Barbara Jeanne B. Solomon  
John Lee Stout  
Dennis Allan Taylor  
Joy Griffin Thomas  
Terry L. Thyer  
Donald Allan Twaddle  
James Ross Underwood Jr.  
Don A. Urbanec  
Barudzija Uros  
John H. Van Amringe  
*In memory of George Feister*  
Michael David Van Horn  
Lawrence B. Van Ingen  
Arthur M. Van Tyne  
*In honor of Linda Farrar and Bill Fisher*  
Harvey Dale Walker  
William B. Walker Jr.  
William Cruse Ward  
Mark Francis Weldon  
Kenneth Joseph Wells  
Keith R. Whaley  
Terry L. White  
John Thomas Williams  
Bruce A. Wilson  
John Stephen Wonfor  
Warren George Workman  
Changshu Yang  
Susan Wygant Young  
Martin Andreas Ziegler

### Awards Fund

**Robert Berg Outstanding Research Award**  
Changsu Ryu

### Best Student Paper and Poster Award

Doru Ionut Florea  
Steven George Henry  
James Michael Hostetler  
Awirut Sirimongkolkiti II  
Andrejs Karlis Svalbe

**Ziad Beydoun Memorial Award**  
Wafik B. Beydoun  
James Henry Cockings  
Joseph W. Hakkinen

**A.I. Levorsen Memorial Award**  
Robert Irving Levorsen  
Craig Wayne Reynolds

**Grover E. Murray Memorial Distinguished Educator Award**  
G. Randy Keller Jr.  
Martha Oliver Withjack

**J.C. Cam Sproule Memorial Award**  
Douglas James Carsted

**Continuing Education Fund**  
Alberto Hevia-Almendoz  
Michael John Coley  
Robert K. Park

**Digital Products Fund**  
Robert Stephen Agatston  
Paul J. English  
John Curtis Killinger  
Pascal Schoepfer  
John Thomas Williams

**Baylor University**  
John Wayne Shelton

**Colorado School of Mines**  
Stephen Paul Mitchell

**Indiana University, Bloomington**  
Steven Wilford Young

**Louisiana State University**  
Thomas Richard Loftin

**Oklahoma State University**  
Kenneth O. Daniel  
Torsten Scholz

**Rice University**  
Mark P. Betts  
Jeong Pan-Yeong

**Texas A&M University**  
Balazs Badics  
Gary Neil Polasek  
Philip Arthur Wilshire

**University of Calgary**  
Harry Roderick Wartens

**University of California, Berkeley**  
John H. and Colleen Silcox

**University of Iowa**  
Kenneth Michael Schwartz

**University of Kentucky**  
Rudy F. Vogt III

**University of Miami, Florida**  
Volker C. Vahrenkamp

**University of Michigan**  
Volker C. Vahrenkamp

**University of Texas**  
Mark P. Betts

**University of Wisconsin**  
Fred H. Behnken

**University of Wyoming**  
Donald Edward Lawson  
*In honor of Robert J. Weimer*

**Distinguished Lecture Fund**  
Tom L. Armstrong  
Nigel Edwin A. Johnson  
Tim A. Johnson  
David Robert Muerdter  
Volker C. Vahrenkamp  
John Thomas Williams

**Haas-Pratt Distinguished Lecture Fund**  
James Manning Ellis  
Maria Haas

**Dean A. McGee Distinguished Lecture Fund**  
Christopher Howard Bradley

**Grants-in-Aid Fund**  
Barry Robert Gager  
Gerard Julian Genik  
John Edward Gilcrease  
Howard Ross Gould  
*In memory of Rufus J. LeBlanc*

Leigh S. House  
Mary J. Kraus  
Naresh Kumar  
John Vincent Leone  
Matthew J. Pranter  
Donald E. Rehmer  
James Fredrick Swartz  
James Orland Underwood  
*In memory of Jack Blythe*  
John Thomas Williams

**Gustavus E. Archie Memorial Grant**  
Barry Robert Gager  
Matthew Reed Martin

**Gustavus E. Archie Memorial International Grant**  
Robert Weeden  
*In memory of Robert and Ramona Sneider*

**Don R. Boyd Memorial Grant**  
Charles Julius Franck

**Ike Crumbly – Minorities in Energy Grant**  
Douglas Charles Bleakly  
Robert Loren Countryman  
*In honor of Ike Crumbly*

**Herbert G. Davis and Shirley A. Davis Named Grant**  
Herbert G. Davis  
*In honor of Robert D. Gunn*

**Fred A. and Jean C. Dix Named Grant**  
James E. Briggs

**Norman H. Foster Memorial Grant**  
Brian Russell Frost

**Peter W. Gester Memorial Grant**  
Kenneth Clark Gester

**Robert K. Goldhammer Memorial Grant**  
Pierre De La Croix  
Jose Guadalupe Galicia  
Christoph Thomas Lehmann

**Merrill W. Haas Memorial Grant**  
Maria Haas  
*In memory of Merrill W. Haas*

**Michel T. Halbouty Memorial Grant**  
Charles A. and Linda Sternbach

**Bernold M. "Bruno" Hanson Memorial Environmental Grant**  
Douglas Charles Bleakly

**James E. Hooks Memorial Grant**  
Kathryn Hickmon Dando  
Mark Alan Dando  
Rosann F. Hooks

**Frank E. Kottowski Memorial Grant**  
G. Randy Keller Jr.  
Christopher Arthur Rautman

**R.E. McAdams Memorial Grant**  
Stuart Duff Kerr Jr.

**Ken Stanley Memorial Grant**  
John Thomas Eggert

**Suzanne Takken Memorial Grant**  
Frank L. Gouin

**Weimer Family Named Grant**  
Abdulkader M. Afifi  
Donald Edward Lawson  
*In memory of E.L. "Roy" Heisey*

**Sherman A. Wengerd Memorial Grant**  
Scott P. Cooper

**W. David Wiman Memorial Grant**  
Carlos E. Macellari

**James A. Hartman Student Fund**  
William Otis Williams  
*In memory of Richard K. O'Connell*

**K-12 Fund**  
Larry F. Adamson  
John Frank Bookout Jr.  
Charles Warren Campbell  
Scott E. Caswell  
George Thomas Chaney  
Gregory Quentin Doll  
Barry Robert Gager  
Gerard Cornelius Gaynor  
John Edward Gilcrease  
William E. Gipson  
*In memory of H.W. Hollingshead Jr.*  
Karl Gordon Henck  
Janet Marie Heppard  
Philip Duryea Heppard  
Paul Dennis Hess  
Julius Homer Johnson  
Olav Malvik  
Sandra Meyer  
David Gene Rensink  
Gene R. Robinson  
Erik D. Scott  
Donald D. Solter Jr.  
Rudy F. Vogt III  
Randolph G. White  
John Thomas Williams  
John Anderson Willott  
John Cochran Worley

**Public Service Fund**  
James A. Gibbs  
*In memory of Sam J. Cerny*

**Jack C. and Catherine I. Threet Public Service Fund**  
Jack C. Threet

**E.F. Reid Scouting Fund**  
Ronald L. Hart  
Bryan Haws  
Jeffrey M. Rayner  
David R. Spain

**Eugene F. Reid Dibblee Fund**  
Jeffrey M. Rayner

**Special Publications Fund**  
Win Meizarwin

**L. Austin Weeks Memorial Fund**  
Marta S. Weeks □



## FOUNDATION UPDATE

The story of Marta Sutton Weeks' dedicated and ongoing support of the AAPG Foundation has added a new chapter.

Mrs. Weeks, widow of Lewis Austin Weeks and a renaissance woman in her own right, has given \$500,000 to the Foundation's L. Austin Weeks Memorial Fund.

Rick Fritz, executive director of both AAPG and the AAPG Foundation, said that the money most likely will be used in support of educational outreach programs funded by the Foundation.

Mrs. Weeks, an ordained Episcopal priest who resides in Miami, Fla., is a strong believer in education and supports various programs in the sciences and humanities.

This past June she provided the funding for an AAPG Digital Products University Subscription at Columbia University in New York City, in memory of her late husband, Lewis Austin Weeks, who died in February 2005.

It was the fifth school to benefit from Weeks' support of the DPUS program since December 2005. The others are the University of Wisconsin (Madison), the University of Miami (Florida), the University of Utah and Beloit College.

And it was just a little over a year ago that Weeks announced an undesignated \$10 million bequest to the Foundation – the largest gift ever received by AAPG.

"The hope is that the gift is an impetus for the Foundation to set its



Weeks

goals high," she said at the time, "and that this be a prelude to new horizons and even greater achievements."

Her late husband was the son of Lewis Weeks, a successful geologist who was credited with developing Australia's Bass Strait and who began the family's legacy of philanthropy. It was a bequest from Lewis Weeks that in 1975 allowed building of the Weeks Tower at AAPG headquarters in Tulsa.

\* \* \*

Marta Weeks' gift wasn't the only act of generosity shown toward AAPG Foundation-backed education activities.

John Bookout, retired president of Shell Oil now residing in Houston, has provided a gift of \$50,000 to be used in support of K-12 education – specifically for a teacher training program that will involve a variety of earth sciences, including exploration for petroleum.



Bookout

Bookout received an AAPG Special Award in 1990 for "excellence in exploration leadership."

\* \* \*

In other Foundation news, another new member has been added to the Foundation Trustee Associates. He is:

□ William D. Armstrong, Armstrong Oil and Gas, Denver.

His joining brings the Trustee Associates group total to 265. □

## IN MEMORY

Gary Burrell Babcock, 69  
Littleton, Colo., June 15, 2007  
Robert Bourne Harrington, 80  
Midland, Texas, May 23, 2007  
Charles Henry Hightower Jr., 72  
Lafayette, La., May 25, 2007  
Philip A. Mundt, 79  
Lago Vista, Texas, May 6, 2007

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

AAPG - SEG  
Student Expo

Fall  
10th Annual AAPG/SEG  
Student  
Expo

Seeking a career or internship?  
Raise your **ADVANTAGE** by attending  
the **FALL STUDENT EXPO!**

**8-9 October 2007**  
**WESTIN GALLERIA • HOUSTON, TEXAS**

Opportunities to help you on your **ASCENT:**  
NETWORKING ■ ICE BREAKER ■ POSTER SESSION ■ INDUSTRY EXHIBITION  
INTERVIEWS ■ FIELD TRIPS ■ SPECIAL INTEREST CLASS ■ INTERVIEWING TIPS

More information and registration online at:  
**http://studentexpo.info**

**Robertson** **FUGRO**  
LCT Gravity & Magnetics

**FUGRO ROBERTSON INC.**  
LCT Interpretation Group

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

Tel: (713) 369-6100  
Fax: (713) 369-6110  
E-mail: infofri@fugro.com



## REGIONS AND SECTIONS

## Field Trips Offer Geology of Greece

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

News items, press releases and other information should be submitted to the *EXPLORER/Regions and Sections*, P.O. Box 979, Tulsa, Okla. 74101. Contact: Carol McGowen, AAPG's Regions and Sections manager, at 1-918-560-9403; or e-mail to [cmcgowen@aapg.org](mailto:cmcgowen@aapg.org).)

BY CAROL MCGOWEN

Regions and Sections Manager

The AAPG European Region will conduct five field trips for the upcoming European Region Energy Conference and Exhibition, which will be held Nov. 18-21 in Athens, Greece.

Three pre-conference trips and two post-conference trips are planned in geologically and historically rich areas – and in keeping with the conference theme and unique to Greece, the field trips will “Challenge Our Myths” by leading participants to sites where geology, history and ancient Greek culture coincide.

Participants can choose to explore:

- ✓ The structural geology of Western Greece.
- ✓ The Corinth rift and its giant Gilbert deltas.
- ✓ The carbonate reservoirs and evaporites of Zante Island and the Ionian Sea.
- ✓ The geology and ancient culture along the Corinth Canal.
- ✓ Ancient silver mines.



Photo courtesy of Vlasta Dvorakova

The beautiful temple at the Sanctuary of Poseidon at Cape Sounio offers a chance to experience exceptionally slender Doric columns – and a panoramic view of the Greek coast that ranks among the best in the world.

\* \* \*

According to Vlasta Dvorakova, the meeting's technical program chair as well as the European Region secretary/treasurer, key to the success of the field trips is the collaboration between European Region volunteers, local business sponsorship and support from AAPG Convention Department staff.

By taking responsibility to identify field trip opportunities, along with handling the field trip pricing and the bulk of the marketing, the Region will generate revenue for future activities.

Responsible for planning and promoting the field trips, the Region will benefit and retain any potential revenue from the field trips (and bear responsibility for any financial loss).

\* \* \*

All AAPG Regions are encouraged to explore this concept of locally organized field trips and to propose field trip ideas and opportunities to the organizing committee of any AAPG conference or event.

Region leaders will benefit by staying in close communication with the conference organizing committee, as the final approval of proposed field trips falls within the purview of this committee.

\* \* \*

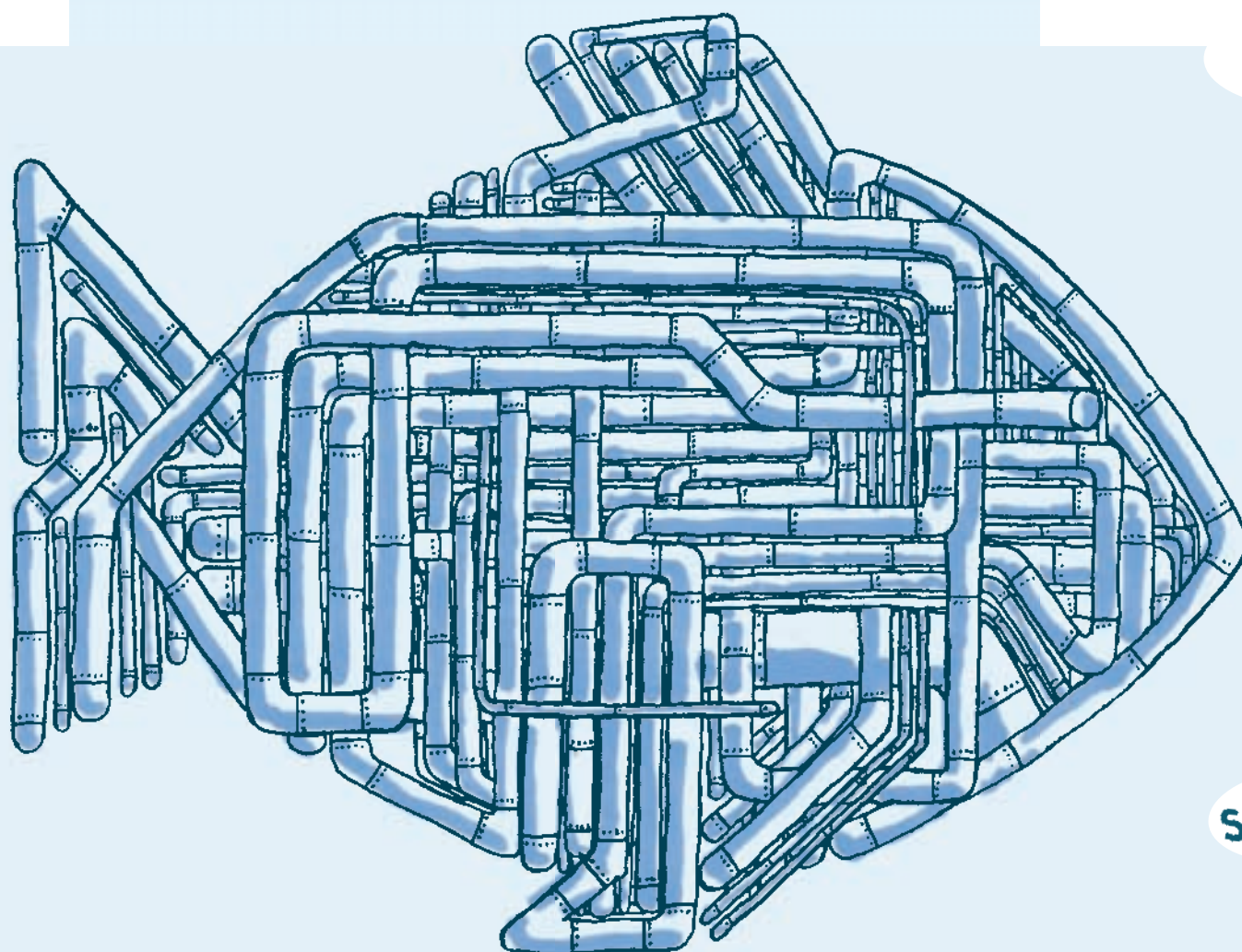
The Athens organizing committee relied on strong support and sponsorship from a local Greek business, Hellenic Petroleum SA.

Adding to the local flavor and input, Hellenic petroleum geologist Nikolas Roussos, along with Mary Ford, University of Nancy, France, serve as field trip co-chairs. Both Ph.D. geologists have extensive experience in Greece – Nikolas in petroleum geology and Mary in structural geology.

Together they selected the field trips to highlight aspects of well-known geology as well as cultural Greek heritage – and they have prepared the field trip guide books and will lead the tours.

Transportation to each site is by bus, followed by short walks to the field outcrops.

continued on next page



FACE.  
THE  
IN  
YOU  
STARING  
IS  
ANSWER  
RIGHT  
THE  
SOMETIMES



continued from previous page

Those trips are:

**1. The Silver Mines of Ancient Athens**

– The silver mines of the ancient city-state of Athens are located in the southeast part of the Attic peninsula, in the hilly Lavrion district 50 kilometers southeast of Athens. Classical literature and well-preserved remnants of ancient mining and processing plants, testify to the scale of the industry and its importance for the rise of Athens to imperial power.

The field trip includes stops at mines in the Lavrion Technological Cultural Park and the Poseidon Temple at Cape Sounion.

**2. Geology and Ancient Culture of Corinth, Along the Corinth Canal** – This one-day field trip in the area of Corinth, 70 kilometers from Athens, will visit the Corinth Canal, the fortress of Akrocorinthos and the Epidavros ancient theatre.

The field itinerary includes crossing the canal by boat to view the longest geological section at a global scale in a geologically recent and tectonically active environment. The canal excavation revealed faulted Pliocene and Quaternary marine and terrestrial sediments that testify several cycles of marine regression and transgression.

The Isthmus area cut by the canal is a typical horst formed by extensional faulting that has been active since the Pleistocene.

**3. The Corinth Rift and its Giant Gilbert Deltas** – The Gulf of Corinth is one of the fastest opening rifts in the world. The rift's tilted fault blocks are exceptionally well exposed on the Gulf's



Field trip locations for the Athens meeting (see story for trip details).

south side due to rapid uplift and deep incision by rivers. The clastic rift succession includes a series of spectacular giant Gilbert-type fan deltas that are used as analogs for reservoirs in the North Sea and elsewhere.

**4. Carbonate Reservoir Types and Evaporite Exposures on Zante Island, Ionian Sea** – A three-day field trip to Zante Island, Ionian Sea, where Herodotus first described the existing oil seeps in the 4th century B.C., will tour a carbonate platform with several discrete units that form potential reservoir rocks in Western Greece.

The chalky cliffs are reminiscent of the Dover or Yorkshire Wolds Chalk in England.

**5. Structural Geology of Western Greece's Fold and Thrust Belt** – This field trip provides an overview of the geology of the External Hellenides thrust-fold belt. Field trip participants will examine outcrops of the Poseidonian marls as well as the upper Cretaceous to Eocene fractured limestone, which constitutes the main reservoir rock of the Ionian zone. Oil seepages will be observed in different stratigraphic levels.

Furthermore, a structural model for the evolution of this area, where deep subsurface structures are present, will be discussed in comparison with regional seismic sections.

Visits to several archaeological sites also are planned, including the Oracle of Delphi, the site revered throughout the Greek world as the site of the "omphalos" stone, thought to be the center of the earth and the universe.

Field trip registration is open and additional details can be found at [www.aapg.org/athens/fieldtrips](http://www.aapg.org/athens/fieldtrips). □

## Sign Up Now, Save Big \$\$\$

Time is running out on your chance to save hundreds of dollars on your registration fee for the AAPG European Region Energy Conference and Exhibition in Athens, Greece.

Register by the first "early bird" deadline of Sept. 19 and save up to \$275 off the onsite member registration fee.

The historic conference – the first joint venture meeting between AAPG and the AAPG European Region – will be held Nov. 18-21 at the Megaron Athens International Conference Centre in the heart of Athens.

The meeting will feature a challenging and engaging technical program – 348 technical presentations

that include 228 oral papers in five concurrent sessions and 120 full-day posters – plus a full-fledged exhibits hall and a host of social events to guarantee a memorable experience for everyone.

The meeting's theme is "Challenge Our Myths," which will include three main areas: Regional, Technical and a Management Forum on "Energy Supply and Demand Perspective on Current Dynamics."

The official technical program and registration announcement is available online at [www.aapg.org/athens](http://www.aapg.org/athens).

For now, remember that time is money – register by Sept. 19 to save a lot of both. □

## IDEAS PEOPLE WANTED

### DOWNSTREAM PRODUCTION & MANUFACTURING ENGINEERS UNITED STATES LOCATIONS

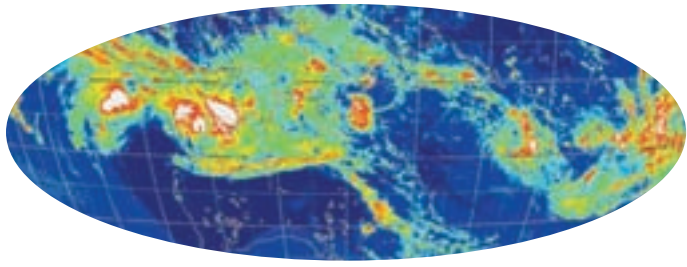
Ever asked yourself how fish swim in sub-zero waters without freezing? We did. That's how we came up with the idea for a new chemical that stops hydrate plugs forming in our deepwater pipes – based on a protein that engulfs ice crystals inside the fish's body.

Fresh thinking, innovation, even leaps of imagination are part of our daily lives at Shell. And right now we're looking for more people to join us, including **Chemical Engineers, Rotating Equipment Engineers, Project Engineers, Control Systems Engineers and Fixed Equipment Engineers**. Can you apply a creative mind to some of the world's biggest energy challenges? Search for jobs at [www.shell.com/careers/technical](http://www.shell.com/careers/technical) and quote reference FIS022F when you apply.

*Shell is an Equal Opportunity Employer.*







### MULTIPLE HIRES IN CLIMATE SYSTEMS SCIENCE

The Jackson School is building a premier education and research program in Climate System Science. We seek scientists at the forefront of their disciplines attracted to challenging areas of scholarship that require collaboration across disciplines and programs. We seek the expertise required to address fundamental questions associated with a changing Earth system, including:

- What processes control the rates of change and variability of the climate system, including the atmosphere, ocean, cryosphere, land surface, and biosphere?
- Can we improve our ability to anticipate these changes and determine the potential impacts on society?

Over the next three years, we will hire six or more faculty and scientists who complement our growing strengths. We will hire individuals who will enable us to build a comprehensive climate program and who will make fundamental advances in our understanding of the climate system. These areas include, but are not limited to:

- Improved modeling of the Earth system, specifically including ice sheets, the global carbon cycle, and interaction between the components of the Earth system
- Enhanced observation of the Earth system, including remote sensing of Earth-surface processes and components
- Greater capability to utilize geologic archives to understand climate change, including paleoclimatology, paleoceanography, and paleobiology
- Improved ability to link climate and hydrology, particularly at the basin-to-continent scale
- Increased strengths in atmospheric dynamics and physical oceanography
- Increased ability to understand variability and quantify uncertainties, including statistical climatology
- Greater capability to address societal impacts and vulnerability, including adaptation and mitigation

We encourage applications from innovative scientists in other areas that are related to climate system science. Opportunities exist at any level, can include cluster hires, and can be within or in combination with any Jackson School Unit—the Department of Geological Sciences, the Bureau of Economic Geology, or the Institute for Geophysics. The schedule of appointment is also negotiable.



### NEW HIRES IN GEOSCIENCE EDUCATION

The Jackson School of Geosciences seeks individuals attracted to the challenge of geoscience education at the university level. As leaders in geoscience pedagogy, candidates should excel as teachers and developers of courses set in field, laboratory, and lecture environments. The new hires may also contribute to the Jackson School's commitment to educate the wider community of the public and K-12 pre-college students.

We encourage applications from those with proven records of teaching and related experience at the college level. Candidates are expected to hold a PhD degree in the geosciences or a closely related field. Additional credentials may include experience in securing external funding, and a record of publications related to geoscience education.

Opportunities exist for appointments as Lecturer, Senior Lecturer, Adjunct Faculty, or tenure-track Faculty, depending upon credentials and interests. Appointments will be primarily within the Department of Geological Sciences, but may include affiliations with the Jackson School's main research units, the Bureau of Economic Geology or the Institute for Geophysics. The schedule of appointment is negotiable.

Ph.D. is minimum requirement for application. Send inquiries and applications (cover letter, CV, list of publications, list of references, statements of teaching and/or research interests) to: Randal Okumura, Office of the Dean / Jackson School of Geosciences, The University of Texas at Austin / PO Box B, University Station / Austin, TX 78713 or jobs@jsg.utexas.edu.

For more information on the school and its hiring program visit us online at [www.jsg.utexas.edu/hiring](http://www.jsg.utexas.edu/hiring).

THE UNIVERSITY OF TEXAS AT AUSTIN IS AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER

THE UNIVERSITY OF TEXAS AT AUSTIN

**JACKSON**  
SCHOOL OF GEOSCIENCES

CHANGING THE WORLD OF GEOSCIENCES

## Abstracts Due Sept. 27 For Annual Meeting

The abstract deadline month has arrived for the next AAPG Annual Convention and Exhibition, which will be held April 20-23 in San Antonio.

Specifically, abstracts must be submitted online by Sept. 27.

It's also time for exhibitors to reserve your place in what promises to be a large and exciting exhibits hall.

This year's convention theme is "Deliver the Conventional; Pursue the Unconventional," and members of the hosting South Texas Geological Society are preparing a program that addresses the challenges of unconventional plays – including shale gas, oil shale and coalbed methane.

The convention's technical program, which will involve forums as well as the usual paper and poster sessions, will be built around 12 areas. They are:

- ✓ Hydrocarbons from Shale and Coal.
- ✓ Deepwater Slope to Basin Systems.
- ✓ Structural Geology.



- ✓ Sedimentology and Stratigraphy.
- ✓ Reservoir Characterization and Modeling.
- ✓ Hydrocarbon Systems and Basin Analysis.
- ✓ New and Expanded Plays in North American and Global Basins.

- ✓ Geospatial Technology and Astrogeology.
- ✓ Environmental Concerns Related to Resource Development.
- ✓ Alternative Energy.
- ✓ Shaping Our Industry: People and Policy.
- ✓ Student Presentations.

For either exhibition space details contact Steph Benton at 1-918-560-2696; or e-mail to [sbenton@aapg.org](mailto:sbenton@aapg.org).

For sponsorship opportunity details contact Randa Reeder-Briggs at 1-918-560-2660; or e-mail [rreeder@aapg.org](mailto:rreeder@aapg.org).

To submit your abstract go online to [www.aapg.org](http://www.aapg.org) – and remember to do it by the Sept. 27 deadline. □

## Alton Brown Wins Levorsen Award For Southwest Section Presentation

Alton A. Brown, of Richardson, Texas, has won the A.I. Levorsen Memorial Award for presenting the best paper at the Southwest Section's annual meeting.

The meeting was held earlier this year in Wichita Falls, Texas.

Brown's winning paper was titled

"Exploration Concepts for Slope Stratigraphic Traps in Carbonate Strata: Lessons From McKittrick Canyon, Guadalupe Mountains."

He'll be recognized at the next Southwest Section annual meeting, set Feb. 24-27 in Abilene, Texas.

## Lecturers

from page 45

- ✓ "A Geologist's Guide to Explaining Natural Fracture Phenomena with Fracture Mechanics."

The other international lecturers are:

✓ "Craquelure in Masterpieces of the Louvre (Paris, France) as Analogue Models for Development of Joints in Fractured Reservoirs."

✓ "Acadian-Alleghanian Orogenesis as Revealed by Fracturing Within the Appalachian Foreland."

□ Katherine Giles, a professor at New Mexico State University, Las Cruces, N.M. She offers two talks:

✓ "Tracking the Migration of Salt Diapirs Using Halokinetic Sequence Stratigraphy."

✓ "Complex Feed Back Loops Controlling Heterozoan Reef Development on Salt Diapirs, La Popa Basin, Mexico."

□ Kirk Johnson, vice president of research and collections, Denver Museum of Nature and Science, Denver.

His talk is titled "Crocodiles in Greenland and Hippos in London: A Fossil-Fueled Tour of Past and Future Climates."

□ David Johnston, senior geophysical adviser, 4-D seismic applications, ExxonMobil Exploration Co., Houston.

His talk is titled "Four-D Seismic in the Deepwater – Challenges and Rewards."

□ Jon Olson, associate professor, department of petroleum and geostystems engineering, the University of Texas at Austin. He offers two talks:

✓ "Fractured Reservoir Characterization: From Diagenesis and Fracture Mechanics to Reservoir Permeability."

□ Jose Luis Massafferro, exploration adviser, Repsol/YPF Exploration and Production, Madrid (Spain) and Buenos Aires (Argentina) offices.

His talk is titled "Three-Dimensional Seismic Imaging of Carbonate Reservoirs and Systems."

□ Larry C. Peterson, associate dean and professor of marine geology and geophysics, Rosenstiel School of Marine and Atmospheric Science, University of Miami.

His talk is titled "Past Climate Clues from Anoxic Basin Sediments: Cariaco Basin (Venezuela) as a Tropical Climate Type Section."

□ John J. Walsh, lecturer and associate professor, Fault Analysis Group school of geological sciences, University College, Dublin, Ireland. He offers two talks:

✓ "The Growth of Fault Systems on Different Time Scales: Reconciling the Long-Term Growth and Earthquake Behavior of Normal Faults."

✓ "The Structure, Content and Growth of Fault Zones Within Sedimentary Sequences."

For more information on the tours or the program contact Karen Dotts in the education department at AAPG headquarters ([kdotts@aapg.org](mailto:kdotts@aapg.org)); go to the AAPG Distinguished Lecture Web pages; and watch for monthly updates in the EXPLORER. □



## PROFESSIONAL NEWS BRIEFS

**Dave Barrett**, to executive vice president, Stephens Production Co., Houston. Previously senior geophysicist, The Houston Exploration Co., Houston.

**Justin Bellamy**, to Permian growth coordinator, Pioneer Natural Resources, Irving, Texas. Previously senior geologist, Pioneer Natural Resources, Denver.

**Christopher H. Bradley**, to senior geologist, Vanco Energy, Houston. Previously senior staff geologist, Anadarko Petroleum, The Woodlands, Texas.

**Michael D. Burnett**, to chief executive officer, TameCAT, Norman, Okla. Previously associate, Fusion Petroleum Technologies, Norman, Okla.

**Paul D. Ching** has retired as vice president-technical, E&P research and development, Shell. Ching is currently living in Dallas.

**Tom Eggert**, to chief geologist, Occidental, Bogotá, Colombia. Previously senior geological adviser, Occidental, Houston.

**G.P. Ganesan**, to adviser-geology, Cairn Energy India, Gurgaon, India. Previously chief geologist, Oil and Natural Gas Corp., Dehradun, India.

**Jim Granath**, to independent consultant, Denver. Previously principal structural geologist, Midland Valley, Golden, Colo.

**John Hooper**, to chief executive officer, TameCAT, Norman, Okla. Previously general manager, Fusion Petroleum Technologies, Norman, Okla.

**Jeffrey Levine**, to chief technology officer, WellDog, Laramie, Wyo. Previously self-employed, Richardson, Texas.

**Ernie Mancini** has been selected by the University of Alabama to receive the Blackmon-Moody Outstanding Professor Award, a lifetime achievement honor, for 2007. Mancini, the immediate past AAPG editor, is at the University of Alabama, Tuscaloosa, Ala.

**Roger R. Maxwell**, to senior geologist, Waha Oil, Tripoli, Libya. Previously senior geologist, Justiss Oil, Jena, La.

**Mark Millard**, to geologist, Pioneer Natural Resources, Las Colinas, Texas. Previously graduate student, Baylor University, Waco, Texas.

**Kazuo Nakayama**, to managing executive officer, JAPEX, Tokyo, Japan. Previously with JGI, Tokyo, Japan.

**Vaughn Robison**, to exploration new ventures adviser, Chevron, Bangkok, Thailand. Previously area manager-global

exploration new ventures, Chevron, Houston.

**Philip Teas**, to vice president-exploration, Black Gold Energy, Jakarta, Indonesia. Previously geologist, Chevron, Jakarta, Indonesia.

**Douglas E. Thomas**, to consultant, Searsmont, Maine. Previously geophysical consultant, Saudi Aramco, Dhahran, Saudi Arabia.

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

## MEETINGS OF NOTE

(\* Denotes new or changed listing.)

### 2007 U.S. Meetings

Sept. 9-11, Mid-Continent Section, annual meeting, Wichita, Kan.

Sept. 16-18, Eastern Section, AAPG, annual meeting, Lexington, Ky.

Sept. 23-28, Society of Exploration Geophysicists, annual meeting, San Antonio.

Sept. 23-29, Association of Environmental and Engineering Geologists, annual meeting,

Universal City, Calif.

Oct. 6-9, Rocky Mountain Section, annual meeting, Snowbird, Utah.

Oct. 9-14, AAPG Foundation Trustee Associates, annual meeting, Maui, Hawaii.

Oct. 21-23, Gulf Coast Association of Geological Societies, annual meeting, Corpus Christi, Texas.

Oct. 28-31, Geological Society of America, annual meeting, Denver.

\* Nov. 11-14, Society of Petroleum Engineers, annual meeting, Anaheim, Calif.

### 2007 International Meetings

\* Oct. 30-Nov. 1, Asia Pacific Oil and Gas Conference (SPE), Jakarta, Indonesia.

Nov. 18-21, AAPG European Region, Athens, Greece.

Dec. 4-6, International Petroleum Technology Conference (AAPG, EAGE, SEG,

SPE), annual meeting, Dubai, U.A.E.

### 2008 U.S. Meetings

Feb. 7-8, NAPE-North American Prospect EXPO-AAPL, annual event, Houston.

April 20-23, AAPG Annual Convention, San Antonio.

Feb. 24-27, Southwest Section, AAPG, annual meeting, Abilene, Texas.

March 29-April 2, AAPG Pacific Section, annual meeting, Bakersfield, Calif. □



# AAPG and AAPG European Region Energy Conference and Exhibition

18-21 November • Athens, Greece

**Discover new plays, best practices and the latest technologies for successful exploration and development in the Circum-Mediterranean, Middle East and North Africa regions:**

- 348 plenaries, oral sessions and posters
- Sessions on carbonate and clastic reservoirs, structural geology and heavy oil
- Hot spots including the North Sea, Russia, the Caspian, Black Sea and West Africa
  - Exhibition highlighting comprehensive products and services
  - 10 pre- and post-conference courses and field trips
- 'Mythic' presentations at both the Opening Ceremony and Featured Speaker Luncheon

**Online registration is open!**

**Register at [www.aapg.org/athens](http://www.aapg.org/athens) by 19 September and save \$140 or more.**

*On-site and online registration will be open throughout the conference and exhibition.*

**Take advantage of special hotel rates through 15 October**

*(see website for details)*



**CHALLENGE OUR MYTHS**  
ENERGY CONFERENCE & EXHIBITION  
PRESENTED BY AAPG & AAPG EUROPEAN REGION





## WWW.UPDATE



## New Design Makes 'Looks' Simple

By JANET BRISTER  
Web Site Editor

For the casual viewer, the AAPG home page looks new – but don't be fooled. After weeks of research into other popular Web sites and experimentation that incorporated our members' own

unique demands, the page simply has been improved – much like a diamond in the rough? – by compression.

This "compression" enabled us to bring together all 100-plus links from the previous design into one screen view for most browser's windows – depending, of

course, on the user's computer screen and choice of default font size.

(Yes, you have a choice in that; check your "View" menu.)

Immediately, you'll notice that the long navigation bar on the left side of the page that many of you may remember has been

streamlined into an expanding navigation tool.

When you move your mouse over a topic listed, it expands to links within that topic.

continued on next page

### Attention Deepwater Explorers

#### Global Turbidite Field & Reservoir Database

**W**hen you are exploring in deepwater clastic systems and need to do a rapid analysis of global analogs, or prepare statistical summaries for input in play analysis software, this is the tool you need.

Originally developed by Steve Cossey of Cossey & Associates, Inc., this fully searchable database is packed with data and user-friendly features –

- more than 1,000 fields and reservoirs in 73 basins
- rapid statistical summaries for play areas
- porosity, permeability, water saturation
- production profiles
- absolute ages of reservoirs
- maps and cross sections
- seismic images and well logs
- updated regularly with new data

For more information visit our website – [turbidite.egi.utah.edu](http://turbidite.egi.utah.edu)

– the science to find energy –



**EGI**  
Energy & Geoscience Institute

**Cossey & Associates Inc.**  
geoconsulting

## What Should You be Doing With Geochemistry?

- Assessing charge risk
- Predicting charge type and volumes
- Predicting fluid properties
- Characterizing unconventional resource plays
- Identifying missed pay
- Assessing reservoir continuity
- Allocating commingled production

**OilTracers** LLC

[www.oiltracers.com](http://www.oiltracers.com)

USA 214-584-9169



continued from previous page

Also, that topic is a link to a home page that should clarify what you can expect to find in that area.

**Less is More**

As you proceed to the secondary pages you'll notice the left navigation bar changes to a tool that focuses on that topic.

For example, in the "About AAPG" area, not only do you learn about membership within AAPG but you'll find in its navigation tool all sorts of membership-related links.

This includes a pay dues link, recruit information, Section and Region as well as AAPG Foundation links.

The idea here is to keep pages shorter, quicker and easier to navigate.

Web studies have shown that people don't read Web pages. They scan them.

In making this transition we are catering to that habit – and that should result in return visits from all types of surfers.

**It's Everywhere**

On the top of every page is a breadcrumb trail of how you probably arrived at the page. This empowers you to "back out" of that spot or simply return to the AAPG home page.

Under the breadcrumb trail and header you'll find bands of links focusing on two audiences: members (gold) and the general public (gray).

The gold bar will help members find contact information, online services and assist the student membership.

Of course, the gray bar is for both members and the public, but it mainly should help site visitors quickly find educational courses and offerings, meeting information, books and publications for purchase as well as our major magazines.

As usual, the drop-down site short cuts menu remains available on every page, so at any time you may jump to any other point within the site.

Also, notice the footer at the bottom of each page.

Here you'll see the means to contact AAPG through the "Talk to Us" form, or find contacts for your staff and leadership. Plus, there are the site search tools, calendar and links or gateways to other sites of help to our membership.

The RSS feed remains available as well.

**More or less**

Many extremely long pages remain in need of being broken up into smaller screen views. However, as you stumble across the shorter screen sets, such as the Constitution and Bylaws, watch for a PDF of that screen set's material.

We've been told that there are some topics that many of you may want to print

in their entirety for a closer read. In these cases we have provided a PDF of the material on each of the screen views.

This way you don't have to print each screen, which will save you time and paper.

**Patience ....**

Not all pages are converted to this format as we are in the process of making this change, so you may still run into the previous design occasionally. For this we ask your patience – and thank you in advance.

Please continue to provide us feedback of all types. Some have already begun to weigh-in with their observations and the results are already being incorporated.

By the time the transition is complete we expect you to find your AAPG Web site to be a tool you can continue to depend upon.

*Good browsing!* ☐

**Eastern Section Annual Meeting Set for Sept. 16-18 in Lexington**

"Winning the Energy Trifecta" is the theme for this year's annual meeting of the AAPG Eastern Section, which will be held Sept. 16-18 in Lexington, Ky.

The meeting, set at the Lexington Convention Center, offers a two-day technical program, workshops and a variety of field trips to view geologically significant areas of Kentucky.

The meeting theme, organizers said, "reflects the triple challenges faced by the energy industry in exploring, developing and sustaining energy resources."

Meeting highlights will include:

- ✓ Training courses for Geographix™ and Petra™ geological software.
- ✓ Workshops on CO<sub>2</sub> enhanced oil

recovery and unconventional reservoir analysis.

✓ A "Devonian Shalebration," which is a special display of Devonian organic-rich shale cores from the Appalachian, Illinois and Michigan basins.

✓ A tour of Mammoth Cave, the world's longest known cave system, and a coal geology trip to southeastern Kentucky.

✓ Participation in a teachers' workshop will also be available at the Falls of the Ohio State Park near Louisville.

For registration or more information, go to [www.esaapg07.org](http://www.esaapg07.org). ☐

**How Can Petroleum Companies Make Better Decisions?**



Geographic information system (GIS) software by ESRI can help petroleum companies see information in new and innovative ways, resulting in better management decisions. GIS delivers business solutions through the spatial representation of data in land/lease management, exploration, production, transmission, facilities management, corporate financial, and environmental departments. By integrating spatial and tabular data through mapping, your company can better manage its assets and corporate information, which can directly affect its bottom line. ESRI is a full-service company with the experience necessary to help petroleum companies achieve success using GIS technology.

Call today to find out why the overwhelming majority of worldwide oil companies, service companies, and consultants have chosen ESRI® GIS products as one of their principal information management tools.



**ESRI—The GIS Company™**  
1-888-531-9226  
info@esri.com  
[www.esri.com/petroleum](http://www.esri.com/petroleum)

Join our Growing Petroleum Team  
[www.esri.com/petrocareers](http://www.esri.com/petrocareers)

**Shale Resource Databases and Reports**

USA: 30 basins  
Canada  
Europe

[www.humble-inc.com/shale-resources.html](http://www.humble-inc.com/shale-resources.html)

Copyright © 2007 ESRI. All rights reserved. ESRI, the ESRI globe logo, and ArcView are trademarks of ESRI, registered in the United States and certain other countries; registration is pending in the European Community. www.esri.com and www are service marks of ESRI. Other companies and products mentioned herein are trademarks or registered trademarks of their respective trademark owners.



## 56th ANNUAL AAPG ROCKY MOUNTAIN RENDEZVOUS



Rocky Mountain Section Meeting  
Snowbird, Utah  
October 7-9, 2007



**Early Registration Deadline:  
September 14, 2007**

Electronic registration at:  
[www.utahgeology.org/rms-aapg.htm](http://www.utahgeology.org/rms-aapg.htm)

### TECHNICAL PROGRAM

#### Oral, Poster, and CORE POSTER Sessions

- ◆ Rockies Oil and Gas Plays
- ◆ Advances in Sed/Strat
- ◆ Geophysical and Structural Advances
- ◆ Completion/Development Advances
- ◆ Shale Gas Resources
- ◆ Signature Core from the Rocky Mtn. Region

#### SHORT COURSES

**Oct. 6:** Depositional Environments, Diagenesis, and Hydrothermal Alteration in the Mississippian Leadville Formation, Paradox Basin, Utah.  
Instructors: D. Eby and T. Chidsey

**Oct. 7:** Geological Aspects of Shale Gas Exploration, Exploitation and Development.  
Instructor: R. Bereskin

Meeting website: [www.utahgeology.org/rms-aapg.htm](http://www.utahgeology.org/rms-aapg.htm)

#### FIELD TRIPS

**Oct. 6-7:** Structural Geology of the Central Utah Thrust Belt.  
Leaders: D. Schelling and J. Vrona

**Oct. 7:** Uplift and Evolution of the Central Wasatch Range, Utah.  
Leaders: Daniel Horns, W. Dinklage, M. Bunds

**Oct. 10-12:** Classic Geology and Reservoir Characterization Studies of Central Utah.  
Leaders: T. Morris, C. Morgan, S. Ritter, M. Eckels

## PETROLEUM GEOSCIENCE COLLABORATION CONFERENCE

21st - 22nd November 2007  
The Geological Society, Burlington House, London

CALL FOR PAPERS DEADLINE: 31st August 2007

This international conference presents state-of-the-art collaborative industry-academia research and addresses a range of geoscience topics. The conference aims to provide a forum for postgraduate research students to present their current work to potential future employers, whether directly affiliated with an industry sponsor or not. In turn, this conference provides an excellent opportunity for industry to inspire and meet the latest postgraduate output from academia from across the UK and internationally. The conference is aimed at attracting a wide audience from the geoscience community engaged in academia-industry collaborative research.

**Convenors:**  
**Bernie Vining** (Gaffney Cline Associates)  
**Adam Law** (Equipoise)  
**Chris Jackson** (Imperial University)  
**Richard Davies** (Durham University)  
**Dorthe Hansen** (Manchester university)  
**Andrew McAndrew** (Imperial University)  
**Howard Johnson** (British Geological Survey)  
**Jerry Chessell** (PESGB)  
**Steve Veal** (PESGB)  
**Elkie Lonnkvist** (Univ. Bristol)  
**Alick Leslie** (BGS)

**Suggested themes include but are not limited to:**  
 Petrophysics, reservoir geology and geological modelling  
 Clastic and carbonate sedimentology and stratigraphy  
 Structural geology and basin evolution  
 Application of seismic Interpretation in geological analysis  
 Methods and impact of knowledge transfer between Academia and Industry

**Seismic Interpretation workshop**  
 A one-day seismic interpretation workshop (affiliated with the British Sedimentological Research Group - BSRG) will be held at Imperial College the day before the conference on the 20th of November. Please email Chris Jackson (c.jackson@imperial.ac.uk) for further information.

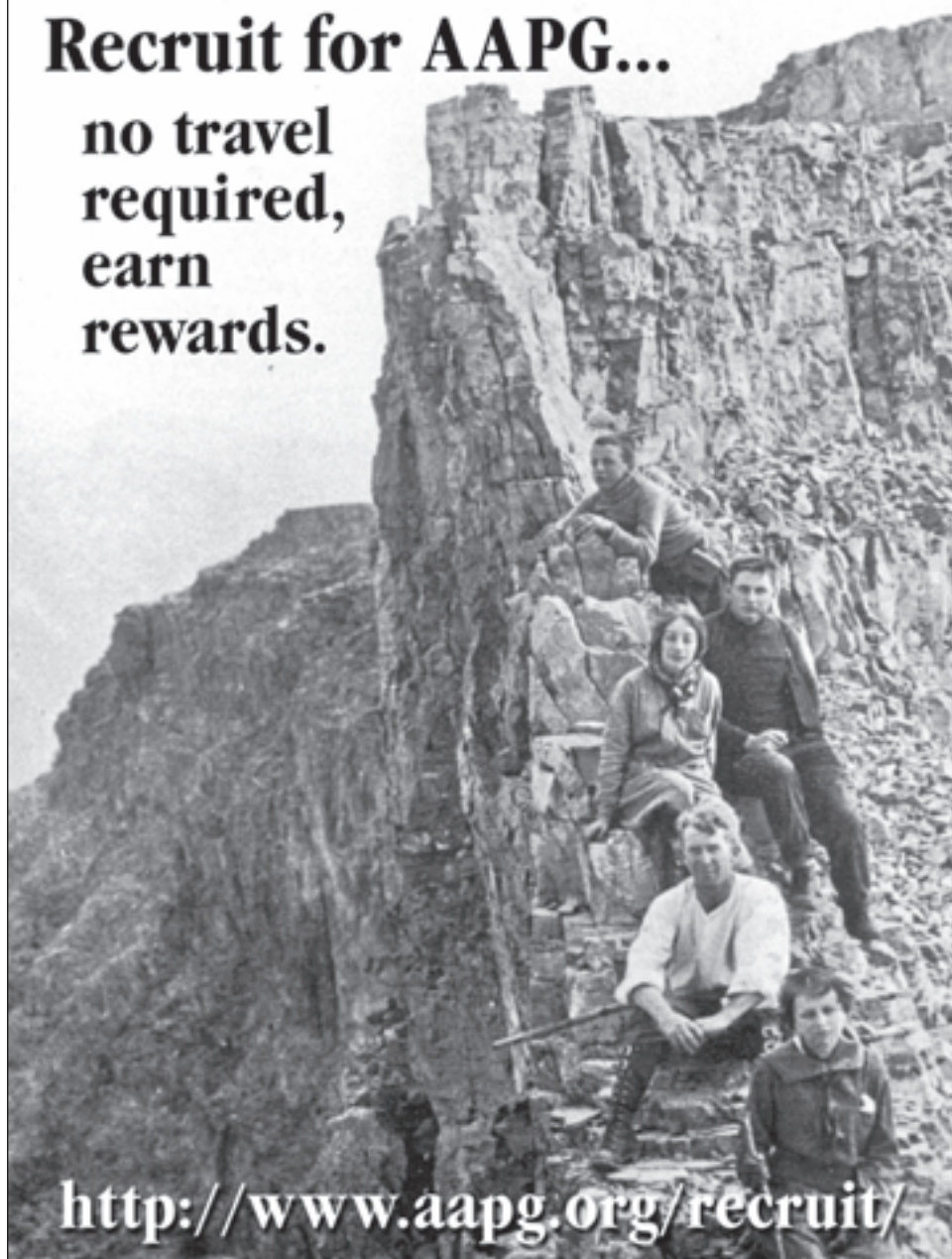
**500 words abstracts are to be submitted to a.mcandrew@imperial.ac.uk by 31st August 2007.**

For further details please contact Francesca Chapman, Events Co-ordinator:  
**+44 (0)20 7432 0980** or e-mail: [francesca.chapman@geolsoc.org.uk](mailto:francesca.chapman@geolsoc.org.uk)

*At the forefront of petroleum geoscience*  
[www.geolsoc.org.uk/petroleum](http://www.geolsoc.org.uk/petroleum)

## Recruit for AAPG...

**no travel  
required,  
earn  
rewards.**



<http://www.aapg.org/recruit/>

### THREE CHALLENGING PAPERS ON THE SAN ANDREAS FAULT RECENTLY PUBLISHED BY THE PACIFIC SECTION OF AAPG

**The Big Bend Segment of the San Andreas Fault:  
A Region Dominated by Lateral Shortening Rather than by Strike Slip  
by Robert H. Paschall**

#### Excerpts:

Between 1962 and 1997, nine authors and co-authors ascribed right lateral displacements on the San Andreas fault in its combined Big Bend and Southwestern Segments of 16, 116, 150, 210, 260, and 1000 kilometers. The time of initial displacement was assigned variously to four periods from Oligocene to Pleistocene. In no cases were earlier published opinions cited.

Thomas Dibblee, California's famed field geologist, said: "From field relations outlined above, it is evident that dextral displacement on the San Andreas fault zone within the late Miocene to Pleistocene sedimentary dill of the Imperial basin does not exceed 16 kilometers."

#### A Tale of Two Eocene Sands and

**My Life with the San Andreas Fault  
by Henry Walrond**

#### Excerpts:

Waltham Canyon west of Coalinga is the obvious site of the strait that connected the San Joaquin basin to the Pacific Ocean. There is no evidence of offset of the depocenter of Pliocene sediments that lie unconformably on marine Lower Miocene where the strait crosses the San Andreas fault.

Jack Clare, who engaged in extensive field and subsurface work, concluded that thick Lower and Middle Miocene sediments in the Caliente and Tumbolor ranges, juxtaposed across the San Andreas fault, show no indication of significant strike-slip displacement.

Send orders to: Chairman, Publications Committee  
 Pacific Section AAPG  
 P.O. Box 1072, Bakersfield CA 93302



# 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 nor certification, but places the names before the membership at large.

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

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

Membership applications are available at [www.aapg.org](http://www.aapg.org), or by contacting headquarters in Tulsa.

## Canada

**Brown, David Ernest**, Canada-Nova Scotia Offshore Petroleum Board, Halifax (J.R. Hogg, G.D. Wach, G. W. Hobbs)

## Germany

**Lampe, Carolyn**, Integrated Exploration Systems (IES), Cologne (K.E. Peters, L.B. Magoon, J. Wielens)

## Malaysia

**Kalukal, Francis Advent**, Schlumberger Oilfield Support Sdn Bhd, Kuala Lumpur (S.M. Hansen, T. Basu, J.O. Lagraba P.); **Malim, Edna P.**, Schlumberger, Kuala Lumpur (S.M. Hansen, J. Lagraba, Z. Safarkhanlou)

## Netherlands

**Rijkers, Richard**, Gaz de France, Zoetermeer (H. Graven, W.H. Asyee, R.A.G. Markgraaf)

## Nigeria

**Agunwoke, Godwin Oguguah**, Chevron, Lagos (V.A. Onyia, A.O. Ekun, K.A. Fabiyi)

## Pakistan

**Aziz, Mohammed Zahid**, BP Pakistan Exploration & Production, Islamabad (M.A. Hussain, M. Wasimuddin, A. Pervez)

## Saudi Arabia

**Liner, Christopher Lee**, Saudi Aramco, Dhahran (R.T. Liner, J.W. Tucker, H.W. Mueller)

## United Arab Emirates

**Ifeonu, Ifeanyichukwu Erasmus**, Dubai Petroleum, Dubai (D.A. Roxar, A.A. Carim, O.C. Iwobi)

## Certification

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

### Petroleum Geologist

#### Louisiana

**Voorhies, Coerte A. Jr.**, consultant, Lafayette (reinstatement)

#### Texas

**Hartz, David M.**, Scotia Waterous, Houston (C. Noll, F. BiFano, G. DePaul)

## For Active Membership

### Alabama

**Cromwell, David William**, Energen Resources, Birmingham (W.R. Green, D.L. Windle Jr., B.K. Cunningham)

### Colorado

**Watson, Jack E.**, Enduring Resources, Conifer (reinstatement)

### Texas

**Anderson, James Patrick**, Shell EPW-U, The Woodlands (reinstatement); **Combs, Deanna Marie**, Encore Acquisition, Fort Worth (S. Sabatka, R. Stillwell, B. Johnson); **Edwards, Simon L.**, Dominion E&P, Cypress (T.J. Jones, R.F. Carroll, G.B. Martinez); **McBride, Douglas Lester**, Morning Star Consultants, Kingwood (D. Tearpock, H. Miller, R. Harrell)

## Recruiting New Members – Easy and Rewarding

It's called the "RRR program." Recruit. Reward. Retain.

And it's all about making AAPG the best geoscience association in the world.

Here's an easy way to help AAPG: Recruit a new member.

Here's another easy way: Ask a former member to rejoin.

Here's the easiest yet: Just talk about why you're a member of the world's largest geoscience association.

Nothing works quite as well as personal contact when it comes to attracting new members to AAPG. AAPG's membership program was created to emphasize the importance of one-on-one recruiting and to recognize and reward the members who work toward this achievement.



Participation in the program is easy: Just sign your name in the recruiter's block on an Active application form and give it to a colleague who is not an Active AAPG member.

Each new member that you recruit is worth points for you in the "RRR program."

The more members you recruit, the more points you get; the more points you get, the better AAPG becomes. It's a win-win situation for all.

Details and more information on the RRR program can be found online at

[www.aapg.org/recruit/](http://www.aapg.org/recruit/).

You can have wonderful rewards, and you can help AAPG become even better.

Just start talking. □

## American Association of Petroleum Geologists

### 2008 Southwest Section Golden Anniversary Convention

February 24-27, 2008

Abilene, Texas

hosted by:



General Chair:

*Darrell Mauldin (dmauldin@fftam.com)*

To Present Papers contact:

*David Holley (dholley@suddenlink.net)*

Potential Exhibitors contact:

*Buford Salters (bsalters@vanoperating.com)*

Potential Sponsors contact:

*Don Christensen (christensen4@slb.com)*



*Field Trip: Pennsylvanian/Permian  
of the Eastern Shelf*

*Short Course: Petroleum  
Engineering for Geologists*



## UNIVERSITY OF WYOMING

## ENERGY-RELATED GEOPHYSICS - OPEN RANK

The Department of Geology and Geophysics at the University of Wyoming invites applications for a faculty position in the Department and in the newly created School of Energy Resources (SER) at the University of Wyoming, an institute dedicated to energy-related teaching and research in support of State, national, and international energy-related activities. This appointment may be made at any rank. The position can begin as soon as January 1, 2008.

We seek an individual who will establish a well-recognized, externally funded research program in geophysics, with a preference toward reflection seismology, petrophysics, or potential fields as applied to energy-related research. Applicants should complement and/or expand on departmental strengths in geophysics, structure geology and tectonics, sedimentology, and/or crustal studies. We seek a person with the ability to cooperate productively with other SER faculty in geology and geophysics, mathematics, chemical and petroleum engineering, economics, and other energy-related fields. The successful candidate will be involved in the undergraduate and graduate teaching mission of the Department of Geology and Geophysics. The SER is an ambitious, state-funded institute that seeks innovative researchers working on new approaches at the forefront of the expanding fields in energy research. Information about the School of Energy Resources is available at [uwyo.edu/SER](http://uwyo.edu/SER). Additional information on the Department Geology and Geophysics can be obtained at <http://home.gg.uwyo.edu/>.

Applications should include a statement of research and teaching interests and accomplishments, curriculum vitae, and the names and contact information for three individuals who can provide letters of evaluation. Review of completed applications will begin October 1, 2007; however, applications will be accepted until the position is filled. Send an electronic copy of your application to: Ms. Carol Pribyl at [cpribyl@uwyo.edu](mailto:cpribyl@uwyo.edu); if you have additional application materials to send, please direct them to the Geophysics Search Committee, Department of Geology and Geophysics, University of Wyoming, 1000 East University Avenue, Dept. 3006, Laramie, WY 82071-2000.

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

## READERS' FORUM

## Deepwater Outcrops

Regarding your story on the upcoming release of the AAPG deepwater atlas (August EXPLORER): This is a very nice work by the AAPG. The "Atlas of Deepwater Outcrops" will be useful for all those who are involved in the petroleum industry.

Companies all over are looking toward the deepwater petroleum resources, which are posing challenges to the industry because of their inaccessibility and the complexity of their mode of occurrence and host of the petroleum system. Gaining an understanding from the study of these diverse deepwater outcrop data will help to effectively design exploration programs.

This compendium definitely will be useful to the petroleum industry, which is struggling with the challenge of reserves depletion, smaller reserves and inadequate technology efficiency and their resolution.

Vinay K. Sahay  
Chandrapur, India

(Editor's note: AAPG Studies in Geology #56 *The Atlas of Deep-Water Outcrops* will be available in late September through the AAPG Bookstore.)

CO<sub>2</sub> Sequestration

Much ado about carbon dioxide centers on sequestering excess power plant emissions in underground storage or into existing depleting oil fields. Only passing mention is made of natural CO<sub>2</sub> being produced.

The 20 TCF McElmo Dome wasn't even named in your July article on the subject ("Corralling CO<sub>2</sub> A Win-Win for Oil," July EXPLORER).

Perhaps my personal stake in that field colors my perspective but, frankly, we have far more depleted oil fields that could benefit from CO<sub>2</sub> injection than we have CO<sub>2</sub> to inject. Speculation about the potential leakage of carbon dioxide should be easily assessed by examining the engineering aspects of fields like McElmo or Sheep Mountain.

Why not explore for carbon dioxide? Perhaps price is one problem. The

*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](mailto:forum@aapg.org). Letters may be edited or held due to space restrictions.*

McElmo field was initially developed by Shell with partners Mobil and Mountain Fuel. The promise was that CO<sub>2</sub> would be tied to the price of West Texas Intermediate at \$28 to equal CO<sub>2</sub> at \$1/MCF.

Today, the price is far less. There is no credible reason why. Production in existing San Andreas wells in west Texas has reportedly doubled – even tripled – with CO<sub>2</sub> injection.

Carbon dioxide is found in a number of places, occasionally associated with helium, an extremely valuable by-product. When I worked as a mudlogger the pH of drilling fluids dropped drastically while in the presence of carbon dioxide. CO<sub>2</sub> detectors were not much help, as the mud neutralized the gas. But if I suspected CO<sub>2</sub> I was usually able to identify potential zones just by looking at nearby scout ticket DST results and well logs suggesting a non-flammable gas was present.

Off the top of my head I can think of at least three areas where carbon dioxide appeared to have been present in wells I logged or examined. And if the price was right, it would be worth exploring.

If so much as 80 percent of the oil in place still remains in old fields, it looks like that carbon dioxide is badly undervalued by the market and sequestration might not provide the volumes that could be used.

Terrel Shields  
Siloam Springs, Ark.

(Editor's note: A follow-up article in the August EXPLORER, "CO<sub>2</sub> Answers Are As Elusive as CO<sub>2</sub>," page 14, addressed some of the points raised by Mr. Shields.) □



**McMoRAN EXPLORATION CO.**

**Houston Opportunities**

Due to our growth in the Gulf of Mexico, McMoRan is seeking the following disciplines for our Greenspoint office:

- ▲ Geologists
- ▲ Geophysicists
- ▲ Geological Support
- ▲ Geotechs

All of the above disciplines should have extensive Gulf of Mexico Shelf Experience.

To apply, please visit Career Opportunities at:  
[www.mcmoran.com](http://www.mcmoran.com)

## DEG

from page 70

Washington-directed efforts. As Congress and the executive agencies consider legislation and programs that deal with water resource priorities, AAPG-based input to ensure that energy needs, especially related to the

energy areas we deal with most directly, are included in the considerations.

Our credibility in this area will be strong, for we are an energy geoscience organization and we are recognized for expertise in energy systems.

DEG's track record in dealing with water systems adds to our portfolio of capabilities. □



**Energy Resources  
Faculty Position  
Rice University  
Department of Earth Science**

Houston is the energy capital of the world. The Earth Science department at Rice University anticipates an opening in Energy Resources and seeks an outstanding scientist at the junior level who will forge strong ties to the energy industry in one or more research areas, including basin analysis and stratigraphy, hydrocarbon systems, sedimentary processes, fluid flow in porous media, or carbon sequestration. We particularly encourage applications from and nominations of women and minorities.

Successful candidates are expected to drive active research programs, supervise graduate research and teach courses for undergraduate and graduate students. Details about the department and its facilities can be found at <http://earthscience.rice.edu>.

Applications received by November 1<sup>st</sup>, 2007 will receive fullest consideration. Please send a resume, research and teaching statements, and names of five or more references to:  
Search Committee Chair  
Earth Science Department, MS-126  
Rice University, PO Box 1892  
Houston, TX 77251-1892.

Rice is an equal opportunity affirmative action employer



# CLASSIFIED ADS

## POSITION AVAILABLE

### U.S. Geological Survey Mendenhall Postdoctoral Research Fellowship Program

The U.S. Geological Survey (USGS) invites applications for the Mendenhall Postdoctoral Research Fellowship Program for Fiscal Year 2009. The Mendenhall Program provides opportunities to conduct research in association with selected members of the USGS professional staff. Through this Program the USGS will acquire current expertise in science to assist in implementation of the science strategy of its programs. Fiscal Year 2009 begins in October 2008.

Opportunities for research are available in a wide range of topics. The postdoctoral fellowships are 2-year appointments. The closing date for applications is November 9, 2007. Appointments will start October 2008 or later, depending on availability of funds. A description of the program, research opportunities, and the application process are available at <http://geology.usgs.gov/postdoc>. The U.S. Geological Survey is an equal opportunity employer.

\*\*\*\*\*

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

#### Geologist

The USGS, Central Region Energy Resources Team, is soliciting interest from qualified individuals for a position of Energy Geologist in Lakewood, Colorado. This position will provide technical support to geologic studies of sedimentary basins in support of national and worldwide energy resource assessments. Candidates must be able to work as part of a multidisciplinary team of geologists, geochemists, geophysicists, and engineers. Excellent skills in writing and oral presentation of scientific findings are also required.

Applications (resume and application questions) for this vacancy must be received on-line via the USGS Online Automated Recruitment System (OARS) BEFORE midnight Eastern Time (Washington, D.C. time) on the closing date of this announcement. If you fail to submit a complete online resume, you will not be considered for this position. Requests for extensions will not be granted. If applying online poses a hardship for you, you must speak to someone in the Servicing

Personnel Office listed on this announcement PRIOR TO THE CLOSING DATE for assistance. Contact Jennifer Farrell at 303-236-9566 or [jfarrell@usgs.gov](mailto:jfarrell@usgs.gov).

The OARS system can be accessed at <http://www.usgs.gov/ohr/oars/>. The announcement number is: CR-2007-0587. The salary range is \$46,597-60,574, depending upon qualifications. The closing date is October 26, 2007.

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

\*\*\*\*\*

### U.S. Geological Survey (USGS) Positions Available Research Geologist

The USGS, Central Region Energy Resources Team, is soliciting interest from qualified individuals for two positions of Research Energy Geologists in Lakewood, Colorado. These positions will conduct fundamental geologic research to evaluate and characterize the geologic framework and occurrence of a variety of geologic energy resources, including conventional and unconventional oil and gas, coal, and uranium. The unconventional oil and gas applications may include oil shale, oil sands, basin-centered gas, shale gas, and coalbed methane. Candidates must be able to work as part of a multidisciplinary team of geologists, geochemists, geophysicists, and engineers. Excellent skills in writing and oral presentation of scientific findings are also required.

Applications (resume and application questions) for this vacancy must be received on-line via the USGS Online Automated Recruitment System (OARS) BEFORE midnight Eastern Time (Washington, D.C. time) on the closing date of this announcement. If you fail to submit a complete online resume, you will not be considered for this position. Requests for extensions will not be granted. If applying online poses a hardship for you, you must speak to someone in the Servicing Personnel Office listed on this announcement PRIOR TO THE CLOSING DATE for assistance. Contact Jennifer Farrell at 303-236-9566 or [jfarrell@usgs.gov](mailto:jfarrell@usgs.gov).

The OARS system can be accessed at <http://www.usgs.gov/ohr/oars/>. The announcement number is: CR-2007-0589. The salary range is \$67,572-\$87,847 depending upon qualifications. The closing date is October 26, 2007.

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

\*\*\*\*\*

**Humble Geochemical Services**, A Weatherford Company, is seeking to fill two positions in their Humble, TX office. The Senior Geochemist position requires the candidate be an organic geochemist and have a minimum of 10 years experience. The ideal candidate has experience writing detailed technical reports on conventional or unconventional petroleum systems. Basin modeling experience a plus. The Electro-Mechanical Engineer position requires a minimum of 5 years experience and the candidate must have analytical instrumentation experience. It is a senior engineering position doing design, development, and manufacturing assistance of analytical instrumentation used in the petroleum industry. Email confidential resume with cover letter to [HGResumes727@omnilabs.com](mailto:HGResumes727@omnilabs.com). No phone calls accepted.

\*\*\*\*\*

Growing Dallas based independent oil and gas company with large acreage position looking for both an Exploration Manager and a Senior Geologist with 15+ years experience generating oil and gas prospects in either the West Texas Permian Basin or in East Texas. Successful track record required. Experience using Petra and Kingdom software is helpful. Excellent medical and retirement benefits with competitive compensation package including bonus and equity incentives. Send resume with references to RGB, 12750 Merit Drive, Suite 990, Dallas, TX 75251-1210. All replies confidential

## FOR SALE

Mudlogging units with easy to learn software. Very reliable, full featured, portable units. Contact Automated Mudlogging Systems (303) 794-7470 [www.mudlogger.com](http://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](mailto:info@hannum.cc)

## MISCELLANEOUS

### SAMPLES TO RENT

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: (432) 682-2682 Fax: (432) 682-2718



## CLASSIFIED ADS

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

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.

## Associate or Full Professor, Petroleum Geology

As part of a large expansion of its petroleum geoscience teaching and research activities, the Department of Geoscience at the University of Calgary is seeking a petroleum geologist with significant industry experience. At this time, the department invites applications for a full-time tenure track position at the associate or full professor level to begin July 1, 2008.

Candidates require a PhD in a petroleum-related discipline of Geology. Appointments at the Associate Professor or Full Professor level will be considered for qualified candidates. Industry experience is essential for this position. The department requires industry experience and expertise for the successful delivery of the Bachelor of Science with a concentration in Petroleum Geology. Inclusion of material on the evaluation of hydrocarbon reservoirs is looked at as critical to in the success of this program and will help vault the program above others nationally and internationally. The successful applicant is expected to develop new curriculum in this area, undertake graduate student supervision, and develop a strong research program.

Successful research candidates will join other members of the department in collaborative research and in pursuing 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.ucalgary.ca/geoscience](http://www.ucalgary.ca/geoscience).

Applications will be reviewed as received. Selection of candidates is targeted for **December 2007**, however the position will remain open until a successful candidate is found. Applicants should submit a curriculum vitae, list of publications, statement of research interests and teaching philosophy, and arrange to have three reference letters forwarded to:

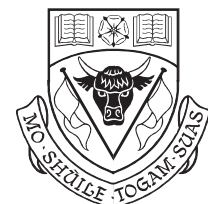
### Dr. D. Eaton, Head

Department of Geoscience  
University of Calgary, 2500 University Drive NW  
Calgary, Alberta, Canada T2N 1N4 Canada  
Email: [geojobs@ucalgary.ca](mailto:geojobs@ucalgary.ca)  
Fax: (403) 284-0074

*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/careers](http://www.ucalgary.ca/hr/careers).*



UNIVERSITY OF  
**CALGARY**



## DIRECTOR'S CORNER

## Putting the Best of Science Online

By RICK FRITZ

Once again we are approaching the time of the year when AAPG, its Sections, Regions and sister societies start their annual technical program presentations at meetings and conferences.

Each year you have the opportunity to hear some excellent talks and learn from great minds at poster sessions and other educational opportunities (see box).

Besides the annual Section meetings, the upcoming regional meeting in Athens Nov. 18-21 promises some excellent presentations. Of course, San Antonio next spring will be a premier event for AAPG. (See related stories on page 60 and 63.)

Unfortunately, most of this information is not published except in abstract form.

Fortunately, AAPG has established a mechanism to capture many of these presentations through our Datapages program and e-magazine *Search & Discovery* ([www.searchanddiscovery.net](http://www.searchanddiscovery.net)).

The *Search and Discovery* e-magazine is the brainchild of members John Shelton, Ted Beaumont and Ron Hart. Ten years ago they realized that AAPG was capturing only about 10 percent of the output of its paper and poster presenters.

*Search & Discovery* provides a place to rapidly publish abstracts, luncheon talks, classic company reports and much of the miscellaneous material that



Fritz

## Upcoming AAPG Meetings

**Mid-Continent Section**  
Sept. 8-11, Wichita, Kan.

**Eastern Section**  
Sept. 16-18, Lexington, Ky.

**Rocky Mountain Section**  
Oct. 6-9, Snowbird, Utah

**GCAGS**  
Oct. 21-23, Corpus Christi, Texas

**Europe Region/AAPG**  
Nov. 18-21, Athens, Greece

**Southwest Section**  
Feb. 20-27, 2008, Abilene, Texas

was missed by other, more formal publication media.

It's earned its place as an important part of AAPG's technical publications mix – and the numbers show that members approve.

\* \* \*

I encourage you right now, as you are reading my column, to go to [www.aapg.org](http://www.aapg.org) (if a computer is not available please use your visualization techniques for now).

First, please check out the new AAPG home page. Janet Brister, AAPG's Web site editor, has done a great job of redesigning the home page. Most members are finding it easier to navigate and use. Please let us know what you think about the new design.

On the lower right hand side of the AAPG homepage you will find a small blue box that says "*Search & Discovery*." Please note that this little blue box already has been "clicked" 650,000 times this calendar year!

When you click on the *Search & Discovery* blue box now you will see its main page. If you click on "New Articles"

you will see a list of current articles.

Note the articles that start with a "PS" superscript are poster sessions from this year's AAPG Annual Convention in Long Beach. How often have you seen a poster at a meeting and wish you could review it later? *Now you can!*

I encourage you to scan through the many posters on the site.

One of the first poster sessions listed is on the Covenant Field discovery, presented by Tom Chidsey and others. This is a good poster on a key discovery, and I encourage you to take a look.

There also are numerous articles that start with an "AV" superscript. These are oral sessions that you can listen to and watch the corresponding PowerPoint presentation.

There are several excellent talks. One of my favorite talks is by John D. Grace on plays in the Gulf of Mexico. All you have to do is click and listen. The PowerPoint will move automatically with the presentation.

Finally, I recommend you take time to browse the *Search & Discovery* site and familiarize yourself with its many offerings. Each year over four million

pages are downloaded, and this year *Search & Discovery* will have at least 10 million "hits" (bits of data presented), so you are in good company.

Although AAPG's *Search & Discovery* is growing both in content and users, there are still many presentations that can be placed on this site.

Each year we ask presenters for permission to use their oral and poster presentations. Each year we ask convention presenters for permission to use their oral and poster presentations on *Search & Discovery*.

It's easy to say yes, so please consider submitting your talk for posting when asked.

\* \* \*

One of the defining facets of AAPG's mission statement is dissemination of information. If you have a talk or poster you would like to send to the *Search & Discovery* editorial board, please contact site editor John Shelton at [jws@aapg.org](mailto:jws@aapg.org).

If you have seen an excellent presentation you would like to recommend, please let us know and we will ask the author or authors.

We live in an exciting time of access. AAPG is committed to making sure that you, our members, have information you can use at work and use in the development of your professional career.

## DEG Offers Experience and Expertise

## Energy and Water Need to Mix

By CHARLES G. "Chip" GROAT  
DEG President

It is not unusual to hear the pronouncement from a speaker at a meeting or conference dealing with resources that while energy supply is on everyone's mind, water supply is lurking as the greatest resource challenge facing much of the world's population.

It is a fact that, for many people, obtaining adequate supplies of potable water for domestic use or water for crops is a first-order concern with energy supply not even on their radar.

It also is true that there is scarcely a part of the developed world where issues of adequate quantities of water for all the competing uses are not emerging to rival the traditional focus on the quality of supplies. Growing cities compete with agriculture and dry areas seek to move water to them from wetter ones, creating winners and losers, and intensifying political debates.



Groat

The energy sector is dependent on water throughout its range of activities.

The largest uses are non-consumptive, principally in cooling thermoelectric facilities or generating hydroelectric power. Recent concerns about the use of fresh water for hydraulic fracturing of Barnett Shale reservoirs in Texas and its impact on supplies available for other uses, and about the amount of water required to produce corn-based ethanol, are examples of the expanding breadth of energy-related water supply issues.

As we move toward increased use of unconventional fossil fuels we will see water issues emerge, or re-emerge, as they have with coalbed methane and with the prospect of oil shale development.

As oil and gas fields mature and produce more water, we need to explore its use for energy-related and other purposes. The injection of carbon dioxide into saline aquifers to sequester it is currently raising questions about possible migration into fresh groundwater, possibly affecting porosity and permeability through chemical reactions.



The Division of Environmental Geosciences has devoted many pages of its journal *Environmental Geosciences* to energy-related water issues, primarily in the water quality area. DEG-sponsored technical sessions at annual and sectional AAPG meetings have similarly dealt with these matters.

As quantity issues become more widespread and prominent, both the AAPG divisions and the parent organization have increasing motivation to bring our expertise to bear. Members of both DEG and EMD have relevant capabilities.

Part of the discussion of AAPG's role in climate change centered around what we have and don't have in the way of

relevant expertise hence credibility. The same discussion is appropriate for the water supply area.

How can we bring our understandings of exploration, production, the subsurface and the energy resources being developed into position to inform discussions of water needs for energy and the importance of having this need adequately represented in debates about who gets available water supplies?

How can we bring the tools we use to understand the subsurface and fluids found there to better understand our least understood water resource, groundwater?

Just as climate change science provides AAPG and DEG with the opportunity to broaden the scope and relevance of our expertise, the water and energy scene provides the opportunity for us to add a dimension beyond those afforded by the traditional water organizations that have limited interest in the energy aspects.

\* \* \*

Increased activity in the energy-water area has important implications for our

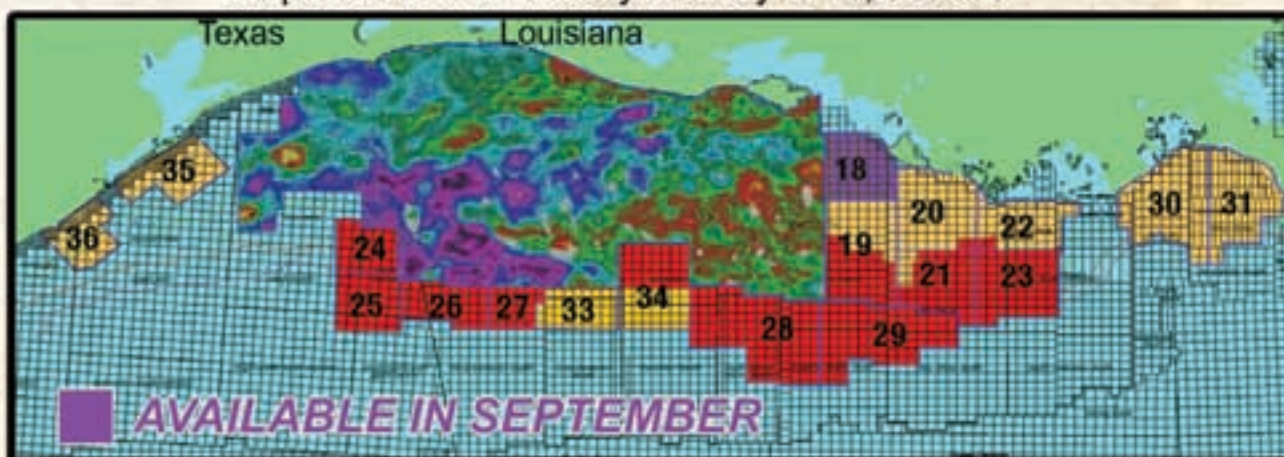
See **DEG**, page 68



# Drilling below 10,000 feet on the shelf? You need Fairfield's Depth Imaging!

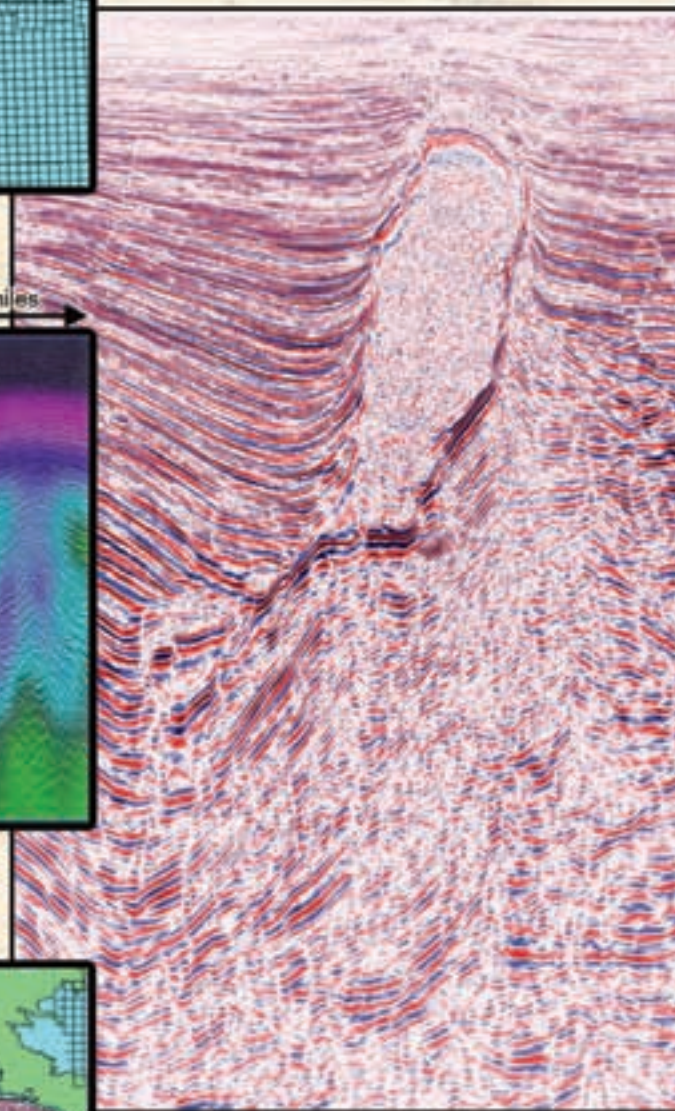
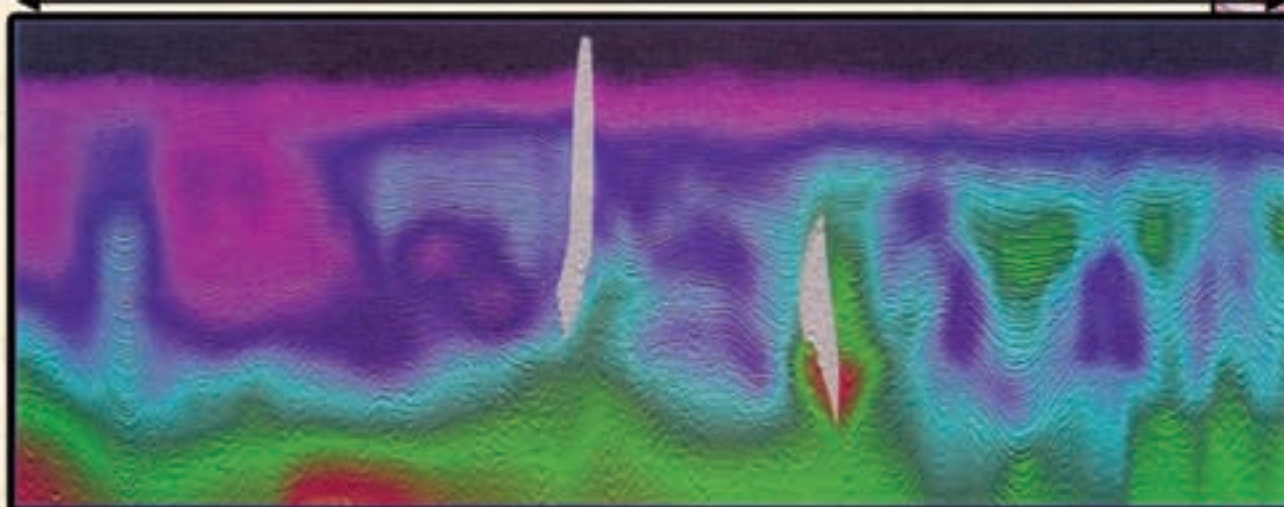
Houston Denver Ho Chi Minh City Jakarta www.fairfield.com (800) 231-9809 (281) 275-7500 dataprocessing@fairfield.com

**Kirchhoff Prestack Depth Migration**  
Depth Slice with Velocity Overlay at 11,000 feet

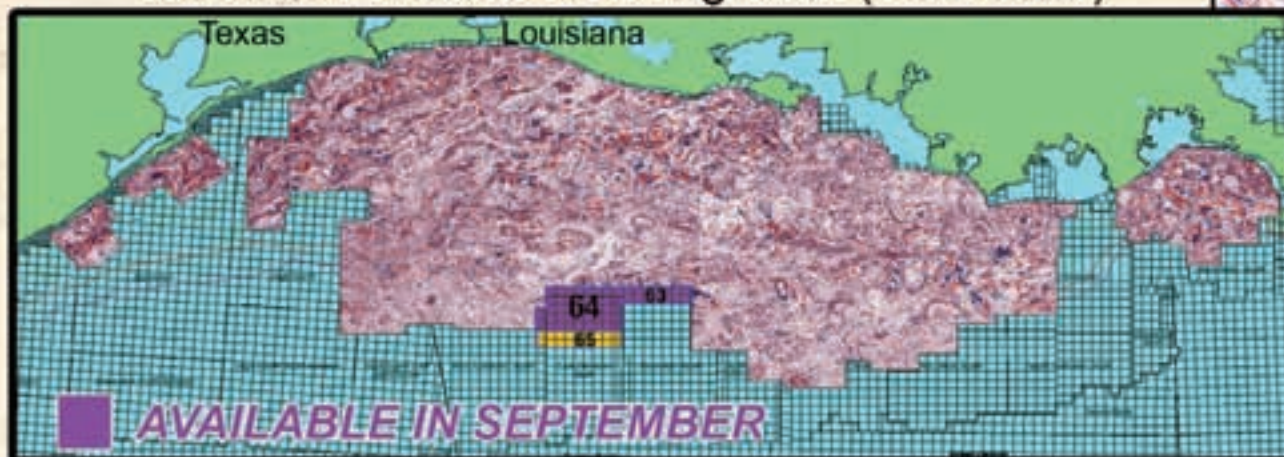


**Prestack Depth Coverage**  
1,375 OCS Blocks  
(28,500 square  
Kilometers)

**Depth XLine Stack with Migration Velocity Overlay** 100 miles



**Kirchhoff Prestack Time Migration (Time Slice)**



**Prestack Time Coverage**  
2,460 OCS Blocks  
(51,000 square  
Kilometers)

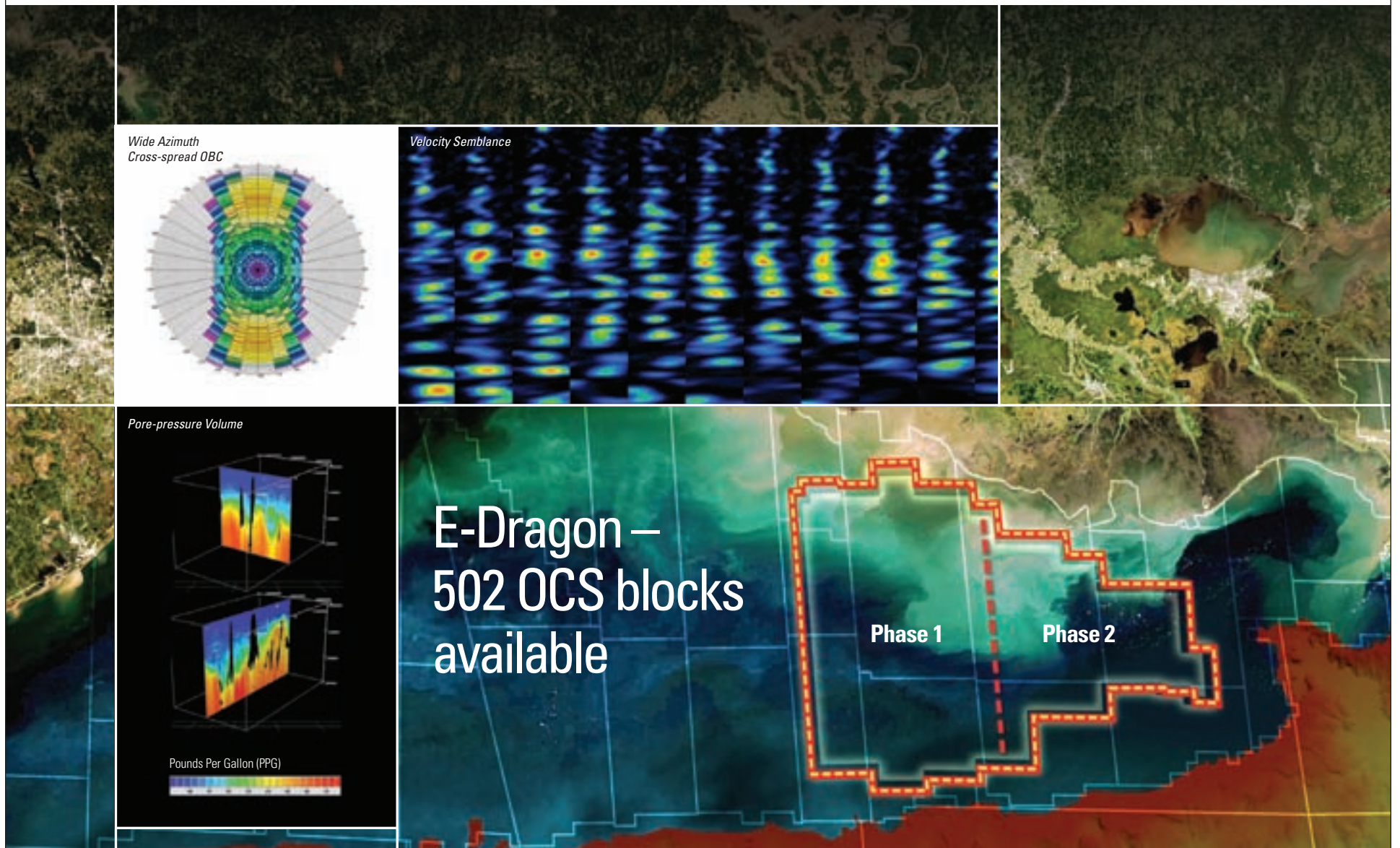
Accuracy in the Velocity Model handles ray path distortion and means:

1. Better Structural Image
2. Better AVO Analysis
3. Better Pore Pressure Analysis





# Beyond Seismic Solutions



## Take Geophysics Further for your Exploration, Exploitation and Engineering

Combining the seamless Schlumberger expertise of WesternGeco and Oilfield Services, we are taking the reprocessed E-Dragon Multiclient data set to a new level with the introduction of *Beyond Seismic Solutions*\* – incorporating well-calibrated seismic and derivative products to facilitate the generation of earth models.

Incorporating the latest advances in seismic and reservoir technology:

- Wide-azimuth Cross-spread OBC – improved imaging and illumination
- Velocity Fields – high fidelity, high accuracy tomographic velocities to 40,000 ft
- Seismic Calibration – validated with wellbore and checkshot data
- Answer Products – rock properties, lithology, fluid and pore-pressure volumes

*Beyond Seismic Solutions* – available in three complementary tiered products:

- Exploration Package
- Exploitation Package
- Engineering Package

To find out how *Beyond Seismic Solutions* can benefit you, and for further information please call +1 713 689 1000.

\*Mark of Schlumberger © 2007 Schlumberger 07-SE-157

## Multiclient<sup>E</sup>

[www.slb.com/beyondseismic](http://www.slb.com/beyondseismic)

