



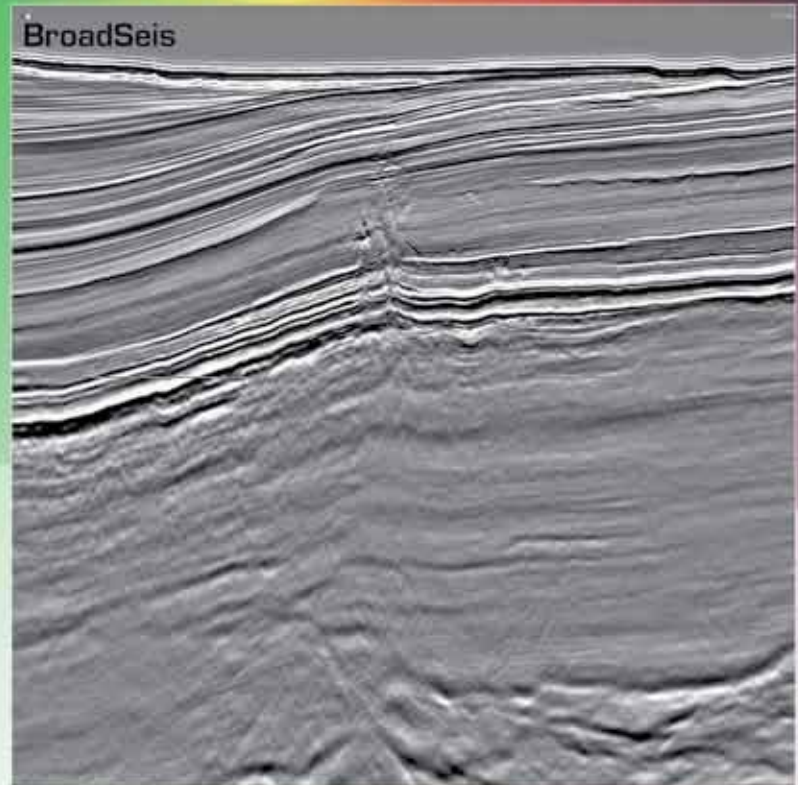
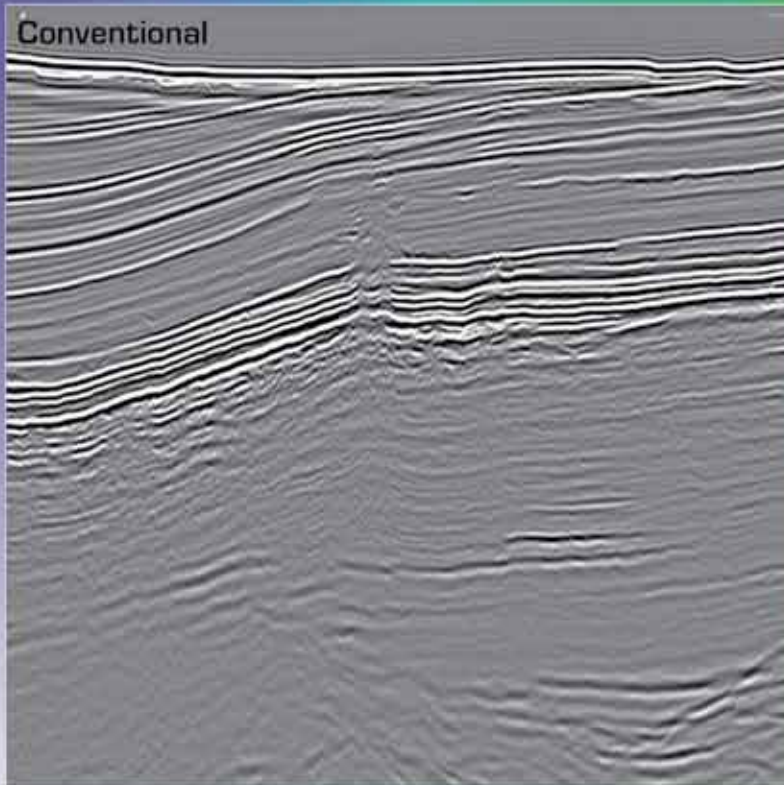
Vision Quest

Award-winning explorer saw
big potential in the big country

See page 4

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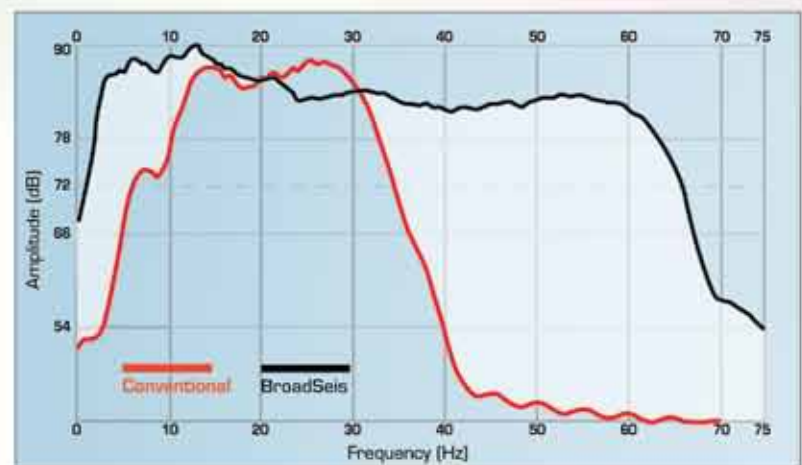
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PRESIDENT'S COLUMN

A Year With An Eye on the Future

By DAVID G. RENSINK

My year of presidential service began with the Macondo blowout and ends with the search for a new AAPG executive director. In between these benchmarks was an eventful year.

We began this year with about a half-dozen goals, and I think we have fulfilled most of them.

First, this has been a good year financially. Thanks to successful conferences in Calgary and Houston, we should have an operating net profit for this fiscal year.

AAPG is a not-for-profit organization, but that does not mean we do not want to show a profit periodically to balance those years when we close the year with a loss. On balance, AAPG spends every dollar that comes in the door.

We have tried to provide you with some new member services. We launched *Search and Discovery Digest*, and we opened up Datapages to individual subscriptions. If you are not receiving *Search and Discovery Digest*, you need to update your email address in your member profile.

We re-invigorated an analysis of our programs to determine if they are meeting our expected contributions to the membership – and if they are cost-effective.

Cost effectiveness not only relates to the outlay of funds, but also to the time requirements of our staff. We have twice as many programs today as we did 10 years ago, and we have virtually the same staff level. Clearly, human resources in the form of staff time is a premium asset for AAPG.

The first program to suffer under this



RENSINK

We need to have a long-term view of what AAPG can and should be in the future.

analysis is the Petroleum Technology Transfer Council (PTTC). PTTC is an asset to small producers. Unfortunately, PTTC depends primarily on government funding to support its programs.

That is a difficult business model to sustain in this economic environment.

In addition, the Department of Energy has strongly suggested that PTTC's programs should concentrate on the environment and safety. These are definitely laudable areas of focus for our industry, but they are not primary focus areas for AAPG.

The long-term viability of AAPG is not only dependent upon our financial stability; it is also dependent on our ability to anticipate changes to our business environment and on our ability to react to them in a positive manner.

That is the impetus behind the "AAPG in 2035" campaign.

We need to have a long-term view of what AAPG can and should be in the future. What affects the petroleum industry affects AAPG. The changes in the demographics of the industry will be mirrored within AAPG. We need to be in a position to take full advantage of those changes.

Officers Announced for 2011-12

Edward A. "Ted" Beaumont, senior geologist with SM Energy in Tulsa, Okla., has been voted president-elect by the AAPG membership for the 2011-12 term and will serve as AAPG president in 2012-13.

Also elected were:

□ Vice President-Regions – **Stuart D. Harker**, Circle Oil Plc., Finchampstead, England.

□ Secretary – **Denise M. Cox**, Storm Energy, Panama City, Fla.

Both the vice president-Regions and secretary will serve for two years.

The newly elected officers will begin their duties on July 1, serving an Executive Committee headed by **Paul Weimer**, professor, Bruce D. Benson Endowed Chair, University of Colorado, Boulder, Colo.

Others on the committee are **Marvin D. Brittenham**, Encana Oil & Gas (USA), Denver, vice president-Sections; **James S. McGhay**, Mid-Con Energy, Tulsa, treasurer; and **Stephen E. Laubach**, Bureau of Economic Geology, Austin, Texas, AAPG elected editor.

Also new on the committee will be **Jeffrey W. Lund**, Corridor Resources, Houston, who will assume the chair of the House of Delegates.

It has been a distinct pleasure to be associated with and to lead this year's executive committee.

I particularly want to express my appreciation for having been able to spend the last two years on the Executive Committee with **Alfredo Guzmán**, vice president – Regions, and **Bill Houston**, secretary. My longtime friend and former classmate, **David Hawk**, soon to be past chair of the House of Delegates, will be joining me on the Advisory Council next year.

At this point, all I can say is thank you for the opportunity to have been your president.

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ON THE COVER:

AAPG Explorer of the Year Doug Strickland would get excited when he talked about the exploration potential of previously untouched parts of Montana – and perhaps with very good reason. Others might see the beauty of the purple mountains' majesty, but Strickland saw the beauty in a subsurface that he found challenging and exciting. And possibly, prolific. See story on page 4. Cover photo of Montana's Pine Butte and adjoining photo courtesy of Sam Beebe/ECOTRUST.



Photos courtesy of John Stachowiak

The Pioneer 41 rig at Newfield's Buffalo Jump 1-28H location in Glacier County, Montana – an area that AAPG Explorer of the Year Doug Strickland saw as having a huge potential.

Strickland had vision for Alberta Bakken

Explorer Was Working Thrustbelt Idea

By DAVID BROWN, EXPLORER Correspondent

Doug Strickland dreamed big when his work led to discovery of the Covenant oil field in central Utah.

He still imagined the biggest plays when he passed away on May 4.

Strickland had received AAPG's Outstanding Explorer Award in April at the association's Annual Convention and Exhibition in Houston.

At the meeting in Houston, Strickland excitedly told the EXPLORER he was working on "something big" – and said he'd be able to talk more about it after the meeting.

An accomplished and renowned exploration geologist, Strickland was honored for his efforts in the central Utah Hingeline play. The Covenant field was the first major discovery in the area, an unexpected find that drew nationwide attention.

Strickland's greatest strength as a geologist may have been his ability to visualize overthrust plays.

In an interview just two weeks before his death, Strickland talked about his recent work in northwest Montana.

His company, Red Rock Resources LLC of Oklahoma City, holds lease acreage in the emerging Alberta Basin Bakken Shale play east of Glacier National Park.

He described the play as the familiar Bakken shale-clastic-shale sequence with oil in the middle member – but without as much thickness as the Bakken in North Dakota and northeastern Montana.

The Glacier County play is somewhat shallower and less expensive to develop, Strickland said, and he foresaw a rewarding venture.

No Need to Ask

It wasn't what he was after.

Strickland grew excited about the possibility of a major gas field lurking to the west of the new Bakken play.

"I've been working in this part of Montana for 25 years. One of the largest prospects I believe I've ever mapped is in the western portion of the Blackfoot Reservation," he said.

He described a trend that started in Canada and extended south into the Glacier mountain front.

"Across the border, there are three major fields within six miles of the United States," he said. "There's a swath in there that looks very prospective."



STRICKLAND

"Doug was a true wildcatter who never shied away from adventurous, promising projects."



The Capstar 321 rig during wireline logging operations on the Sacred Pipe 1-21H well (you can see the logging truck on the right), also in Glacier County, Montana.

Death Claims Explorer Awardee

Douglas K. Strickland, who in April received the AAPG Explorer of the Year Award at the annual meeting in Houston, died unexpectedly at his home May 4 after an illness. He was 58.

The Oklahoma City consultant received the award for being principle discoverer of the Covenant Field in Sevier County, Utah, the initial discovery within the central Utah Overthrust Belt in 2004, and subsequently Utah's Providence Field. The fields comprise a 100-million-barrel province in an area the U.S. Geological Survey had deemed without any petroleum potential, and which is 200 miles from the nearest production.

Strickland joined Chevron after earning a doctorate at the University of Kansas,

previously receiving a bachelor's degree from the University of Southern Colorado and master's from the University of Wisconsin-Milwaukee. He was working the Rockies' Overthrust Belt for Chevron when he joined W.R. Grace and made discoveries in Oklahoma, North Dakota and California as well as the Madden Deep well in the Wyoming Overthrust.

He continued finding oil and gas as an independent and joined with Wolverine Gas & Oil to get his central Utah prospects drilled.

Strickland had taught AAPG's Creativity in Exploration course with E.A. "Ted" Beaumont for several years and was planning another presentation of the course in June.

As an early entrant in the Alberta Basin Bakken play, Red Rock Resources was able to acquire acreage at an attractive price in one of the most promising areas for oil production.

Should an explorer concentrate on the lucrative money-maker with a proven play concept, or go after the technically challenging, unknown, potential elephant?

That's a question you don't bother to ask a true exploration geologist.

"There is a resource play out there, and companies like resource plays. They've mostly ignored the thrustbelt," Strickland said, commenting on the industry's lack of interest in the Glacier mountain front.

"Companies have been leery of the risk and the exploration costs," he noted. "Northwest Montana is very remote."

'A True Wildcatter'

After Wolverine's discovery of the Covenant Field in Utah, Strickland founded Jayden Consulting LLC.

Through that company, he met and began working the Rockies with Jennifer DeHaan from Idaho.

DeHaan, Strickland's partner in Red Rock Resources, said the Montana overthrust project was "dear to his heart."

"The mountain front was a prospect that Doug had worked on for 25 years," she said. "In some form or capacity, it will go forward."


Strickland was the lead geologist for Red Rock and its partners in the Bakken play, and they now will have to discuss future plans for northwest Montana, according to DeHaan.

"Doug was a true wildcatter who never shied away from adventurous, promising projects," she said. "I was blessed to have been able to work with him on a daily basis and enjoy his genius."

A geologist with insight into the complexities of thrustbelt exploration, Strickland felt the Montana mountain front held important and overlooked potential.

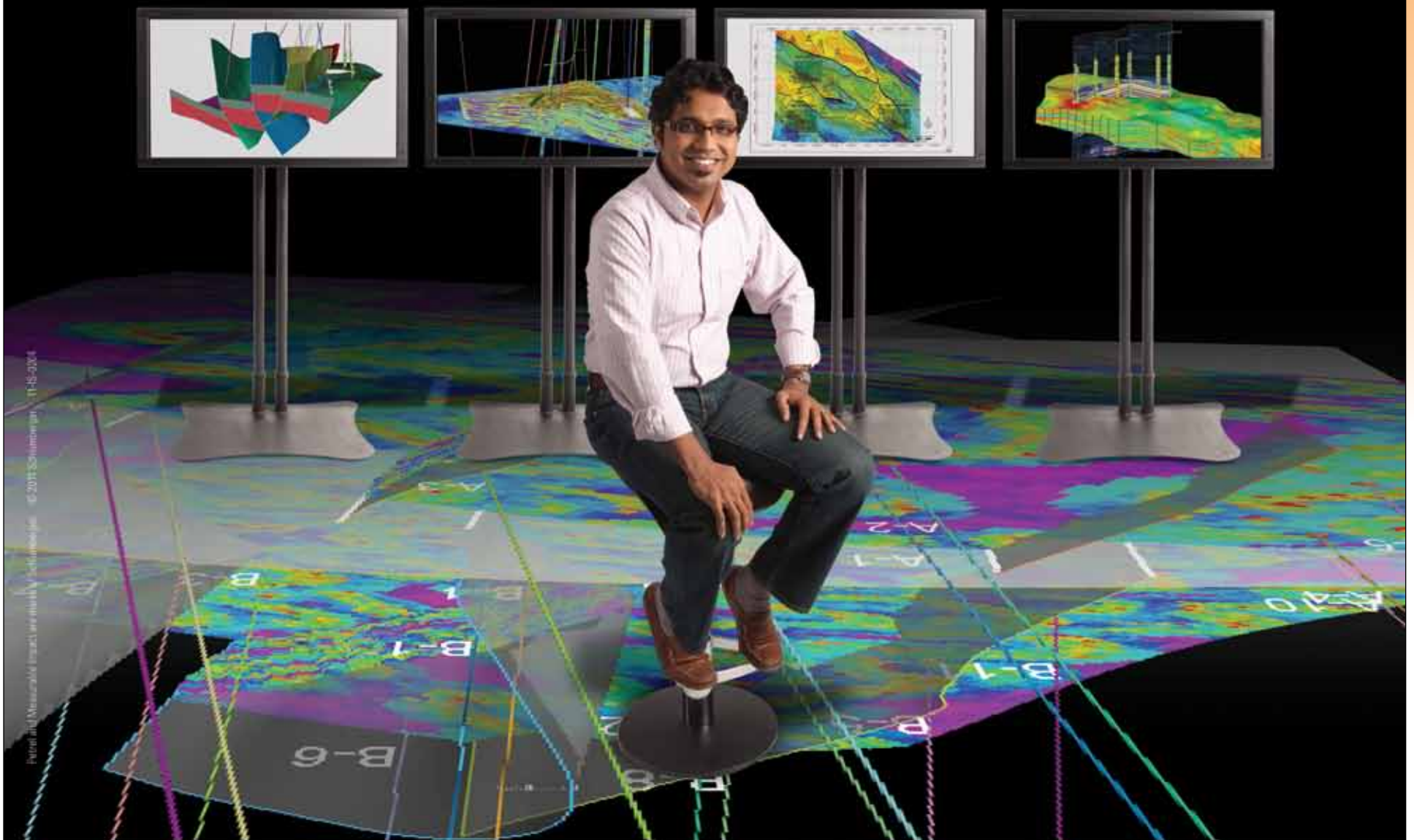
"It's very difficult for people to understand the geometry of the thrusting, much less what the prospect looks like," Strickland said.

"What's neat about this area is that you're just six miles from world-class production – it's six miles across the border," he added.

He left envisioning another, world-class exploration discovery. 

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An analog to existing Devonian

Western Montana Bakken in Play

By DAVID BROWN, EXPLORER Correspondent

A significant new Bakken Shale oil play has finally warmed up in northwest Montana.

After a brutal winter that all but stopped move-in and exploration activities, operators have gone back to work completing their initial test programs.

The potential play area includes Glacier, Toole, Pondera and Teton counties in Montana and extends across the border into Canada, where the Bakken equivalent is known as the Exshaw.

Across the state from the North Dakota-Montana Bakken play in the Williston Basin,



RICHMOND

the new Alberta Basin exploration area is seen as an analog to existing Devonian shale oil production.

Estimates of the total resource in place vary from 10 to 15 million barrels of oil equivalent per square mile.

Play depths range from 4,000 to 7,500 feet in the most active exploration region, stretching from the western thrustbelt to the

Sweetgrass Arch on the east.

Estimates of the total resource in place vary from 10 to 15 million barrels of oil equivalent per square mile.

Rosetta Resources Inc., Newfield Exploration Co. and Anschutz Exploration Co. dominated early leasing, but more than a dozen smaller U.S. independents and Canadian junior oils have taken neighboring positions.

"Most of the activity is on the Blackfoot Indian Reservation, which makes it a little bit difficult" to get information, said Tom Richmond, division administrator for the Montana Board of Oil and Gas in Billings.

Almost all drilling so far has been vertical, light, and very tight in terms of disclosure, Richmond noted. He said companies have six months from completion before they must begin releasing well results.

Both Newfield and Anschutz have drilled horizontal wells on the Montana side of the Southern Alberta Basin, Richmond said. He described the Anschutz well as something of an offset to a much earlier discovery.

"There's a Greenhorn Shale well that's been producing just outside of Glacier National Park for 35 years," he said. "It's our only Greenhorn well."

Testing Continues

Like its eastern counterpart, the Alberta Basin Bakken has attractive shale oil features. It also offers multiple prospective zones, including the Nisku, Bakken-Three Forks and Lodgepole formations, as well as other secondary targets.

Good pipeline transportation exists in the area, thanks in part to the presence of the once prolific Cut Bank oil and gas field in addition to Canadian production.

Operators plan to evaluate the western Bakken play based on their vertical test or pilot programs. No meaningful production picture will emerge until more wells have been horizontally drilled and fractured.

Rosetta Resources has a 300,000-acre lease position in northwest Montana, where it had two rigs under contract and was completing an 11-well vertical drilling program.

At the beginning of April, the company had drilled eight vertical delineation wells with operations under way on its ninth and tenth vertical wells. An additional vertical well was planned for the second quarter of 2011.

Based on encouraging results, Rosetta said it also will spud the first of three planned horizontal wells in the second quarter.

Newfield Exploration had drilled seven vertical wells and completed and placed on production two horizontal wells. It announced that all of its Alberta Bakken wells to date encountered oil.

Newfield has 280,000 net acres in the play in Glacier County.

"We recently completed our second horizontal well and are preparing to drill our eighth vertical well. We continue to test multiple perspective horizons across our acreage," said Lee Boothby, Newfield president.

"As we have said time and again, we're executing on our assessment plans, testing multiple formations," he added, "and do not plan to discuss results until we have a better understanding of our acreage and its potential." □

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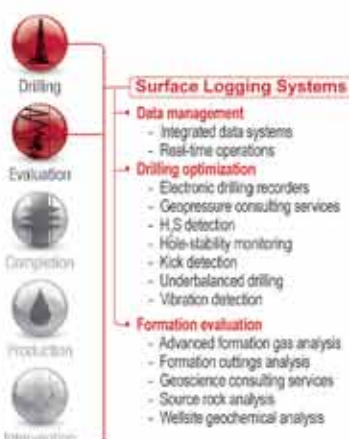
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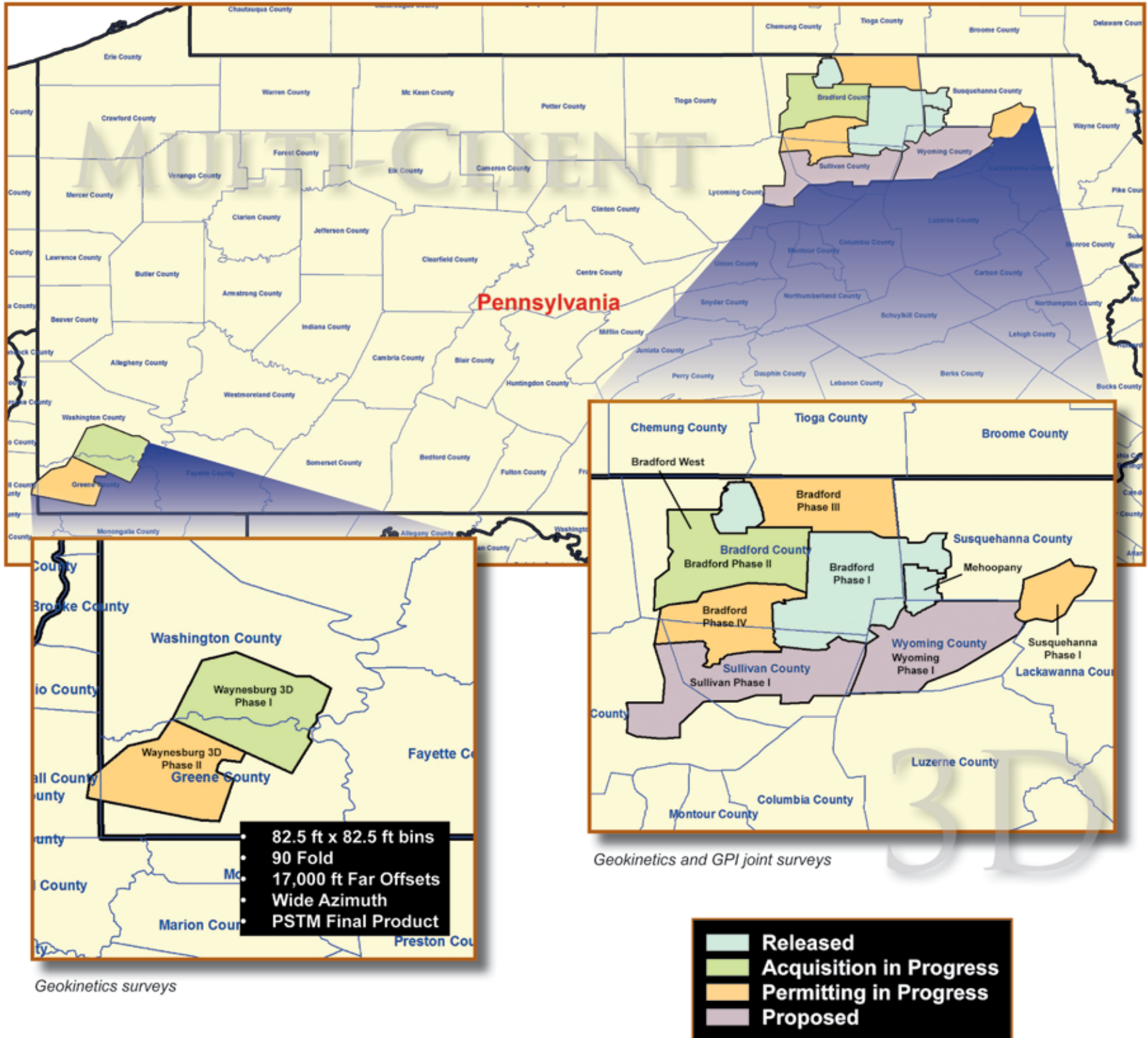


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New plays cropping up

Sprawling Niobrara Has Multiple Models

By LOUISE S. DURHAM, EXPLORER Correspondent

Oil and liquids-rich gas deposits are hot targets today among prospectors and operators – and the action in the self-sourced Niobrara shale play in the Rocky Mountain region is about as fired up as it can be.

There's plenty of area to explore, given that the Niobrara is present all across New Mexico, Colorado, Wyoming, Kansas, Montana and North and South Dakota, according to Denver-based AAPG Honorary Member Randy Ray.

He noted the Niobrara is part of the Cretaceous seaway that covered the entire middle of the United States.

It's a shale, but not a shale.

"The Niobrara petroleum system is a major petroleum system in the Rocky Mountain region, consisting of really rich source rocks with total organic content between 3 and 8 percent in areas, and the reservoir rock primarily being limestone or chalk intervals," said AAPG past president and Honorary Member Steve Sonnenberg, professor and Boettcher Chair in petroleum geology in the Department of Geology and Geological Engineering at Colorado School of Mines, Denver.

"The formation demonstrates facies changes that range from limestone and chalk in the eastern end to calcareous shale in the middle and eventually transitioning to sandstone further west," he said. "Depth and thickness are highly variable."

Source bed plays are highly dependent on an array of technologies, including:



SONNENBERG

"Understanding the regional stress field is most important, but local faults and folds have impact on fracture orientation also."

- ▶ Source rock evaluation.
 - ▶ Normal surface and subsurface mapping.
 - ▶ Resistivity mapping.
 - ▶ Lineament discrimination.
 - ▶ 3-D, 3-C seismic imaging.
 - ▶ Borehole fracture mapping.
 - ▶ Surface geochemistry (microseeps).
 - ▶ Horizontal drilling.
 - ▶ Microseismic.
 - ▶ Multi-stage hydraulic fracturing.
- Horizontal drilling itself is not new in the Niobrara, but going lateral in combo with multi-stage fracking has only recently become *de rigueur* – and as this technology becomes more commonplace, players will have much better insight into how the play will develop.

Plenty of Models

Probably the busiest of the busy areas today is the Denver (DJ) Basin in southeast Wyoming and northeast Colorado, where many wells are being drilled.

The basin extends into western Kansas

and Nebraska.

"In the deeper parts of the Denver Basin, the Niobrara porosities and permeabilities are low, less than 10 percent and less than 0.1 md, respectively," Sonnenberg said.

Natural fractures are important in enhancing the reservoir and have been related to multiple origins: wrench faulting, salt dissolution, local structures, pore pressure, listric faulting and regional stresses.

"Temperature gradients affect production type in the deep basin area," he noted. "High temperature gradients are associated with gas and condensate production (e.g., Wattenberg field) and lower gradients with oil production with associated gas (e.g., Silo field).

"Resistivity mapping in the chalks has been used in the past as an indicator of hydrocarbons presence and source bed maturity," he added.

Owing to the number of causes of fracturing, Sonnenberg cautioned to not get locked into one model.

"Understanding the regional stress field is most important, but local faults and folds have impact on fracture orientation also, so you need to understand the different kinds of models out there," he emphasized.

"I think there will be multiple models to make the Niobrara work."

Silo Success

Currently, there's significant interest and activity in the Silo Field in extreme southeastern Wyoming in the Denver Basin's northern area. It has produced since the 1980s, with the first horizontal well drilled in 1990.

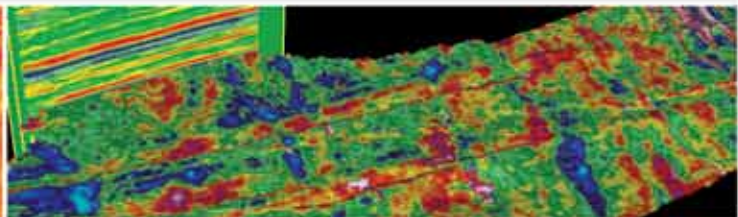
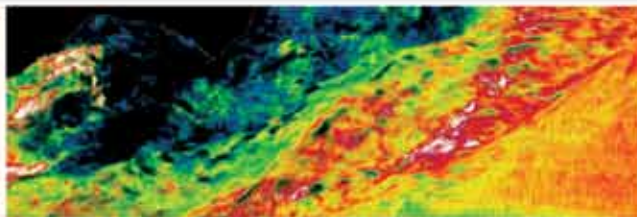
A salt dissolution edge runs through the area trending north 70 degrees west, so the horizontal wells are drilled northeast-southwest to encounter the maximum number of open fracture systems trending to the northwest.

Depth of the Niobrara at Silo is 7,500 to 8,500 feet, and well costs are in the \$5 to \$6 million range, depending on the number of frack stages. Laterals generally are about 5,000 feet, but Sonnenberg said some operators are considering 10,000 feet – like the Bakken.

The B interval of the Niobrara is the favored target in the basin (the B₂ in particular) as well as in the Powder River Basin. Sonnenberg noted that the Niobrara's A, C and basal Fort Hays intervals also

[See Niobrara, page 10](#)

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Niobrara
from page 8

have potential, with the Fort Hays being less extensive aerially.

Silo has kicked out 10.4 million barrels of oil and considerable gas during its long productive history. The consensus is that horizontal wells using multi-stage fracking could greatly increase the production numbers.

Among the current activity, a number of new locations are showing significant production around the margins of the Silo field.

"This is normal for these unconventional systems that typically have diffuse, or fuzzy, field boundaries that can be enlarged," Sonnenberg emphasized

Attractive Activity

It appears to be that there's a new play everywhere you look these days.

"The Greenhorn under the Niobrara is another potential play," Sonnenberg said. It's a limestone-chalk unit sitting on top of the Graneros shale, which is organic rich. The Greenhorn is the reservoir but could be source rock also.

"Together, those should make an attractive target for horizontal drilling and multi-stage completion," he commented.

It is significant that there are two large multi-client 3-D surveys being implemented in the Denver Basin:

- ▶ Global Geophysical Services is shooting an 800-square mile 3-D in greater southeastern Wyoming.


- ▶ To the south in northeastern Colorado, a partnership comprised of Geophysical Pursuit and Geokinetics is acquiring seismic

data over a 1,000-square mile area, with plans to acquire more.

"Those are going to help unravel the structural history of the basin, the causes of the fractures, the orientation of the fracturing systems," Sonnenberg said. "There will be lots of new learning from these large shoots."

CGG reportedly has proposed a multi-client shoot, and several operators have implemented proprietary surveys.

"There's significant potential in many Rocky Mountain basins, and we should see a lot of wells being drilled in the next three to 10 years," Sonnenberg predicted.

"The good news about the Niobrara is the kerogen associated with it is Type II and will give both gas and oil," he said. "When you get into the deeper part of the basins where it's more thermal cracked, you still have a big liquids component, lots of condensate and it's still very attractive." 

Registration Opens for 3P

The technical program is now in place and registration is open for AAPG's second Polar Petroleum Potential Conference and Exhibition – popularly known as the 3P Arctic meeting.

This year's conference will be held Aug. 30-Sept. 2 at the World Trade and Convention Centre, Halifax, Nova Scotia.

3P Arctic offers papers, posters, short courses and field trips, all focused on the latest data, perspectives and experiences involved in Arctic exploration and potential.

The technical session themes include:

- ▶ Baffin Bay-West Greenland.
- ▶ Barents Sea and Northeast Greenland.

- ▶ Cenozoic Uplift of Arctic Margins and Implications for Petroleum Potential.

- ▶ North Atlantic Conjugate Margins and the Arctic Connection.

- ▶ Arctic Petroleum Systems.

- ▶ Canadian Arctic Basins.

- ▶ Alaska and Beaufort-Mackenzie Basins and Fold-thrust Belts of the Western Arctic.

- ▶ ECORD – European Consortium for Ocean Research Drilling.

- ▶ Siberian Arctic: Laptev, East Siberian, and Russian Chukchi Seas.

- ▶ Evolving Tectonic Interpretations and Models – Including Insights from New Seismic and Potential Fields Data.

- ▶ Appraisal of Arctic Petroleum Resources.

- ▶ Geophysical Innovations and Evolving Technologies.

To register or for more information go online to www.3pArctic.com.

Niobrara Gets Consortial Study

Excitement abounds among the folks drilling – and even just observing – the oil and gas condensate-rich Niobrara play in the Rocky Mountain region.

This is one mighty complex formation, what with all the fracturing, folding, faulting, abnormal pressures, etc., etc.

The industry-sponsored Niobrara Consortium, assembled under the leadership of Steve Sonnenberg, is structured to help understand what makes these rocks tick, so to speak.

The Consortium will no doubt go a long way toward unraveling the complexities and somewhat daunting drilling and production challenges

indigenous to the multi-interval self-sourced formation.

Consortium sponsors run the gamut from major companies to relatively small independents.

The research effort will involve a combination of outcrop and subsurface study. It will include a number of student participants, with many of them already at work.

Sonnenberg is directing the project with assistance from Colorado School of Mines geology professors Rick Sarg and John Humphrey, along with geology professor Matt Pranter at University of Colorado.

All are AAPG members; Sarg also

has been an AAPG editor (Memoir 81) and Distinguished Lecturer.

"We currently have about 30 companies in the study, and we expect the number to increase," Sonnenberg said. "Also, I have about nine students, with several more joining the team this fall."

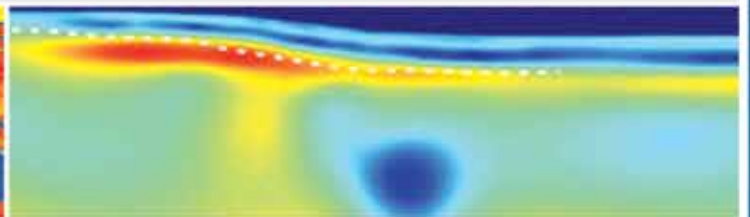
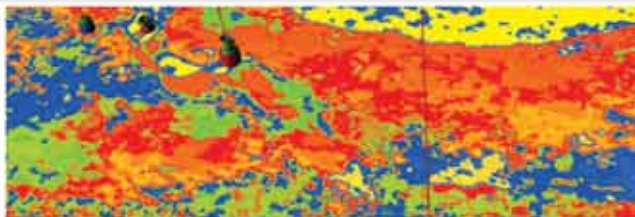
He noted the topics to be addressed:

Member companies are contributing cores, analyses, 3-D data sets and more. Sonnenberg anticipates that the final product will be very comprehensive and interdisciplinary, ranging from geophysics to geology to petroleum engineering.

– LOUISE S. DURHAM

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Niobrara to Star at RMS

The potential of Wyoming's Niobrara shale play will be in the spotlight during this year's AAPG Rocky Mountain Section meeting, set June 25-29 in Cheyenne, Wyo.

The meeting's theme is "Energy on the Rocks," and while the technical sessions will offer a varied program, the relatively new focus on the Niobrara will be featured.

The Niobrara focus will include a field trip, core workshop and a plenary session that offers papers on such topics as:

- ▶ Exploration and development history.
- ▶ Facies and stratigraphy.
- ▶ Models for accumulation and preservation of organic matter.
- ▶ Kerogen type and thermal maturity

trends across the Rocky Mountain region.

- ▶ Mapping wireline log properties.

Also, meeting organizers have planned a public session addressing Niobrara exploration and production concerns, addressing questions on geology, land, water and governmental regulations that surround Niobrara oil and gas development.

Other technical sessions will address:

- ▶ CO₂ EOR and sequestration.
 - ▶ EMD sessions on geothermal, uranium and coal.
 - ▶ Evaluation of unconventional plays.
 - ▶ Rocky Mountain structure.
 - ▶ Stratigraphy and sedimentology.
- To register or for detailed information, go online to rms-aapg.org/2011_meeting.

Resource Depletion Alarm Sounded

By DIANE FREEMAN, EXPLORER Correspondent

Colorado's state geologist warned the world is depleting its natural resources as the United States and growing economies scramble for precious metals, oil and gas.

"We're depleting natural resources all over the world, said Vince Matthews, director of the Colorado Geological Survey and the state's geologist, who spoke recently at the annual 3-D Seismic Symposium in Denver.

Matthews' talk was filled with warnings, including his assessment that the United States has a failed mineral policy – and

how those factors have and will continue to impact commodities in the Rocky Mountain region.

"The supply of conventional fuels like coal, uranium, oil and natural gas that provide 94 percent of the nation's energy will become much more difficult for America to obtain during the next decade because of increased global competition for scarce supplies," he said.

Also, Matthews said the world is depleting its natural resources at an exponential rate. In fact, a total of 50 percent of all copper mined and 50 percent of all oil consumed has taken place since 1985.

"Americans will suffer from natural resource driven inflation," he continued. "We may see increasing shortages of critical raw materials ... Conflict may arise with multi-national corporations operating in America."

The result – and the need – he said, is that the United States must begin a realistic education effort about the existing state of global natural resources and look at viable options to deal with looming shortages.



MATTHEWS

Outside Influences

Most of the world's economies are increasing their use of energy and minerals and are therefore contributing to the situation, but Matthews said China's unparalleled economic growth is a major driver in the increased consumption of natural resources.

In fact, China's need for a continuing supply of natural resources threatens America's future ability to obtain the raw materials it needs, he added.

"The pressure to develop America's remaining natural resources will probably increase dramatically as global supplies tighten," he said.

For example, Matthews said that between 1990 to 2009 electricity growth increased by 70 percent worldwide, and over half of that – some 56 percent – came just from the United States, China and India.

China also is now the number one copper consumer in the world (the United States is the second largest consumer), and it ranks number three in copper production.

"Copper is important to solar technologies and other alternative energies, like wind," Matthews said.

Meanwhile, the price of copper increased a staggering 457 percent from 2003-08. Although the price dropped, it recently has come roaring back.

In fact, spot prices of minerals and mineral fuels escalated more than the price of crude oil between 2003-08, he said.

Matthews also warned about the impact of coal-buying strategies involving China and India, where "they had to build a new deep water port to bring it in."

Just two years ago the price of coal was \$17 a ton. At present the average price of coal in Colorado is \$48 a ton.

Together, the United States and China consume 62 percent of the world's coal.

"The problem is these U.S. reserves are being bought as fast as they can," he said. "We'll wake up one day and find that we don't own them anymore." ■



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Geothermal Potential Touted

By BARRY FRIEDMAN, EXPLORER Correspondent

Seemingly endless images and slogans, from both industry supporters and critics, remind us almost daily that the public conversation about energy these days is about the future.

But no future conversation about energy is complete without talk of geothermal energy, says AAPG member Paul Morgan, a senior geothermal geologist with the Colorado Geological Survey.

"What makes this a practical consideration to pursue at the present time," Morgan says, "is state energy portfolios."

Morgan, who presented the paper "New Horizons for Geothermal Energy in Sedimentary Basins in Colorado" at the recent AAPG Annual Convention and Exhibition in Houston, has conducted geothermal studies in Cyprus and Kenya, but today he mentions by example the case of Colorado, which is planning for 20 percent alternative energy by 2020.

But that will take some doing – both for the state and, ultimately, the nation.

"Wind and solar are coming on line," Morgan said, "but there is only so much of these intermittent resources that can be absorbed by the grid."

And that's why geothermal, to him, is so promising: Once it's up and running, he maintains, it's *really* up and running.

"Geothermal is very desirable because it is 24/7/365," he said. "Geothermal is a heavy investment up front, but it is easily competitive once on-line."

By comparison, other alternative energy



MORGAN

"Geothermal is very desirable because it is 24/7/365 ... (it) is a heavy investment up front, but it is easily competitive once on-line."

sources, such as solar and wind, are and will continue to be heavily subsidized, even after they're operational.

Moreover, his excitement is enhanced by what's on the horizon: the huge potential in sedimentary basins, which may offer hundreds of square miles of resources.

Being able to tap more energy from more areas could mean more energy for the nation's supply of frost-free refrigerators and George Foreman grills.

Slow Starts

In fact, such projects in Europe have demonstrated the feasibility of generating electricity from these low-temperature fields. Iceland, Morgan noted, because of its concentration of volcanoes, produces 24 percent of its energy needs already from these traditional sources. Specifically, geothermal heating meets the heating and hot water requirements of approximately 87 percent of all buildings in Iceland.

Where, then, are we in America in terms

of the development of geothermal – both from traditional and sedimentary basins?

"Nationally, geothermal is on an upswing, together with other alternative energy resources," he said, "but since it has been producing on a significant scale in the United States since the 1950s its recent growth is not proportionately as rapid as solar and wind."

Still, of late, there has been increased growth due to a review by the Bureau of Land Management, which clarified the process for geothermal leasing on land owned by it and U.S. Forest Service. In that review, much of the western states region experienced a renewed interest.

"Since the earlier exploration, technology has changed – so lower temperature resources are of interest for electricity generation."

The process is slow.

Morgan points to 2009 and 2010 where the funding opportunities mostly focused on exploration and development techniques, rather than specific on-the-ground

geothermal projects. One project, however, was National Geothermal Data System.

"Almost all states are compiling geothermal data for this project," he said.

Hydrofracking Concerns

No talk about geothermal, however, is complete without discussion of its environmental impact.

"There are two basic environmental issues – induced earthquakes and water contamination associated with hydrofracking."

To the first, he admits; to the second, not so much.

"Induced earthquakes have definitely occurred during the deep injection of fluids at high pressure, especially into crystalline basement rocks," he said. "I think that the Rocky Mountain arsenal near Denver was the first observation of induced earthquakes, with one magnitude 5.0 event and many smaller events associated with waste disposal in a 12,000 foot well. High-pressure fluid injection in the foothills of the Alps near Basel, Switzerland, recently induced a few magnitude 3 earthquakes in an attempt to hydrofrack crystalline rocks for an EGS system."

"However, there is no record of significant seismicity being recorded during hydrofracking operations or geothermal operations outside zones of known

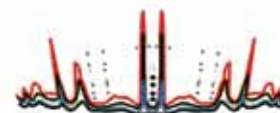
See [Geothermal](#), page 16

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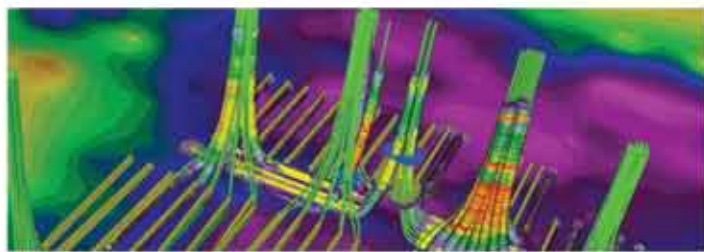
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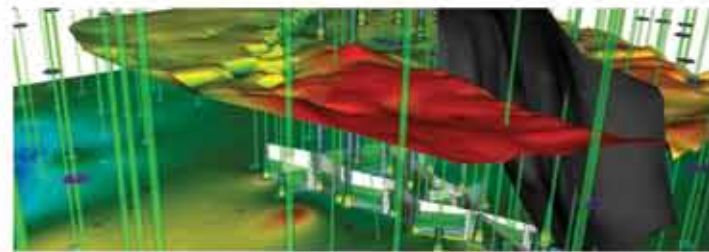
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¹ Welling & Company Geological & Geophysical Software Study, 2009



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Abstracts Now Accepted for Long Beach ACE

Abstracts are now being sought and can be submitted online for the 2012 AAPG Annual Convention and Exhibition, which will be held April 22-25 in Long Beach, Calif.

The ACE theme is "Directing the Future of E&P – Starring Creative Ideas and New Technology," and the technical program will comprise 11 themes:

- ▶ Active Oil and Gas Fields: Development and Production – Production, development geoscience and multidisciplinary studies applied to both mature and new fields worldwide.
- ▶ Emerging Frontiers – Recent discoveries, emerging exploration plays and technology breakthroughs.
- ▶ Siliclastics Reservoirs: Exploration

and Characterization – Current trends and concepts of siliciclastic reservoir deposition and characterization.

▶ Carbonates and Evaporites: Exploration and Characterization – Current knowledge and research into carbonate reservoirs and evaporates.

▶ Unconventional Resources – Where we are and what's ahead for unconventional resources.

▶ Basin Analysis and Petroleum Systems – Concepts dealing with basin-scale petroleum systems and geo-histories.

▶ Alternative Energy – Looking beyond conventional and unconventional resources.

▶ Environmental and Energy Research – The relationship between environment and

energy, from safety and oil spill response to CO₂ capture and sequestration.

▶ Structural Geology and Neotectonics – State-of-the-art thinking and research into structural geology and tectonics.

▶ Geophysics and Seismology – Technology and recent advances in geophysics, with special emphasis on geology and geophysics integration.

▶ Geoscience Principles and Applications.

▶ AAPG and SEPM Student Poster sessions.

The abstract submittal deadline is Sept. 22. Submit online at aapg.org/longbeach2012.

Exhibition and sponsorship opportunities also are available online, or contact convene@aapg.org for more information.

Geothermal from page 14

seismicity," he said.

And the point, he adds, is that when found in sedimentary basins, there is no possibility of geothermal exploration causing such seismic activity.

"The type of geothermal system described does not operate by the injection of high pressure fluids, especially if run under pressure," he said. "In terms of aquifer contamination during hydrofracturing, these operations would be carried out at great depths compared to aquifer depths."

And there's proof.

"In these hydrocarbon fields tens of thousand of wells have already been hydrofractured with no aquifer contamination," he said. "There is no reason why contamination should start now."

In Colorado, specifically, there is due diligence on this very issue.

"Geothermal wells are permitted by the Division of Water Resources in Colorado, but plans for all wells projected to be over 2,500 feet in depth and/or 212 degrees Fahrenheit in temperature must also be approved by the Oil and Gas Conservation Commission, and are subject to the same rigorous standards as oil and gas."

Is any of this producing dividends, though?

Sort of.

"In Colorado we have a long history of direct use of geothermal resources, but no geothermal electricity production to date," he said.

Morgan says that is because much of the hydrocarbon production in Colorado is from low-permeability formations.

"In terms of extracting heat, therefore, the hydrocarbon-producing horizons are unlikely to be good candidates," he said. "The alternative is to either find good natural aquifers above or below the hydrocarbon units, or to create artificial fracture aquifers through hydrofracturing."

Raton's Potential

And he has found a place: Colorado's Raton Basin.

"The Raton Basin would be the location for initial experiments because it is a hot basin, and 300 degrees Fahrenheit is attained at perhaps two-thirds the depth of most other basins in Colorado."

He says if electricity generation is successful in the Raton Basin, a large portion of the Denver, San Luis, San Juan and Piceance basins probably would also be suitable for power generation.

"In these basins, power would be generated from depths of 10,000 to 12,000 feet, or shallower if the temperature can be dropped below 300 degrees. Most other basins in the Mid-continent and Gulf Coast region also become prospective at these depths or a little deeper.

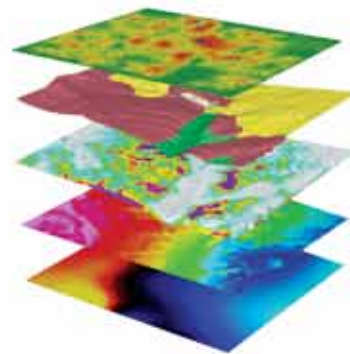
"The Colorado Geological Survey (CGS) has been compiling geothermal data and publishing it in reports since the early 1970s," he continued. "The more recently formed Colorado Governor's Energy Office has obtained some funding to give grants to municipalities, companies and individuals to develop geothermal in the state. CGS is providing scientific support for a number of geothermal prospects for geothermal electricity production, including the Raton Basin.

"If sedimentary basin geothermal can be developed," he says in conclusion, "a lot of the uncertainty of geothermal should be removed." ■

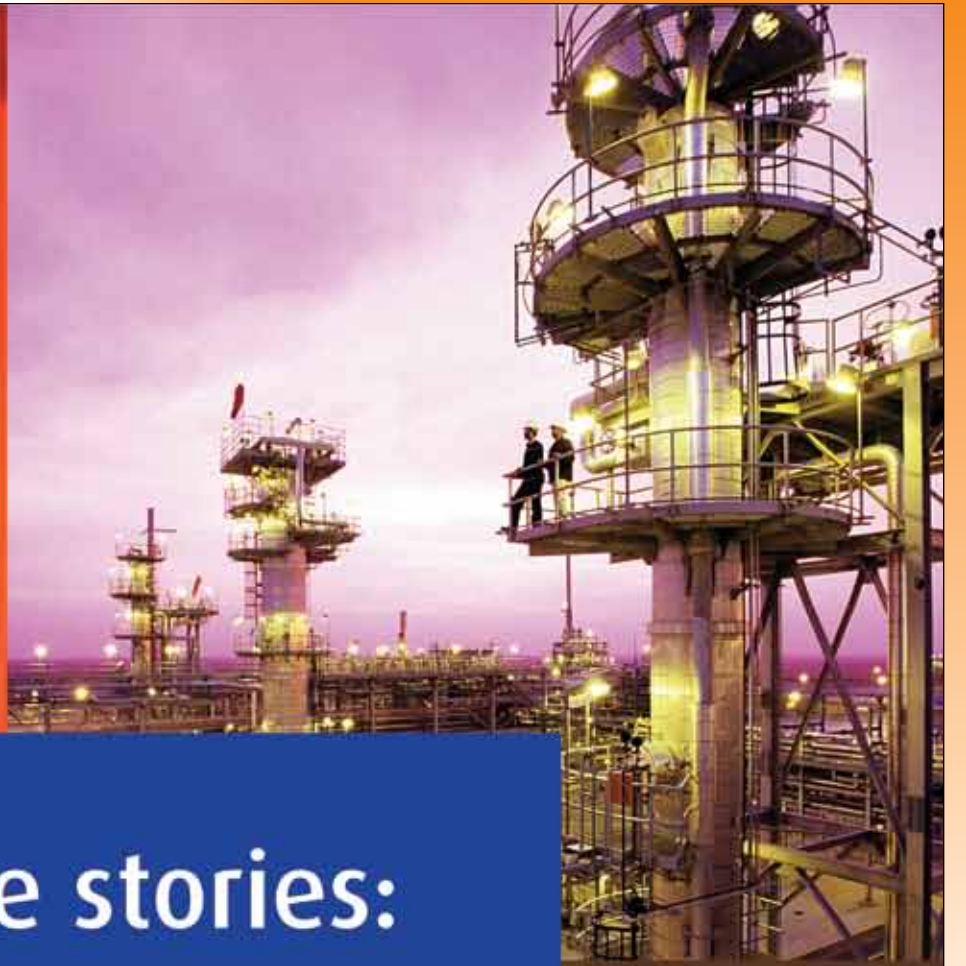


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AAPG member Rasoul Sorkhabi is a research professor at the University of Utah's Energy and Geoscience Institute and is co-author of "Geological Excursions Around Miri, Sarawak" (Ecomedia, Malaysia, 2010). His previous Historical Highlights article appeared in the March 2011 EXPLORER.

HISTORICAL HIGHLIGHTS

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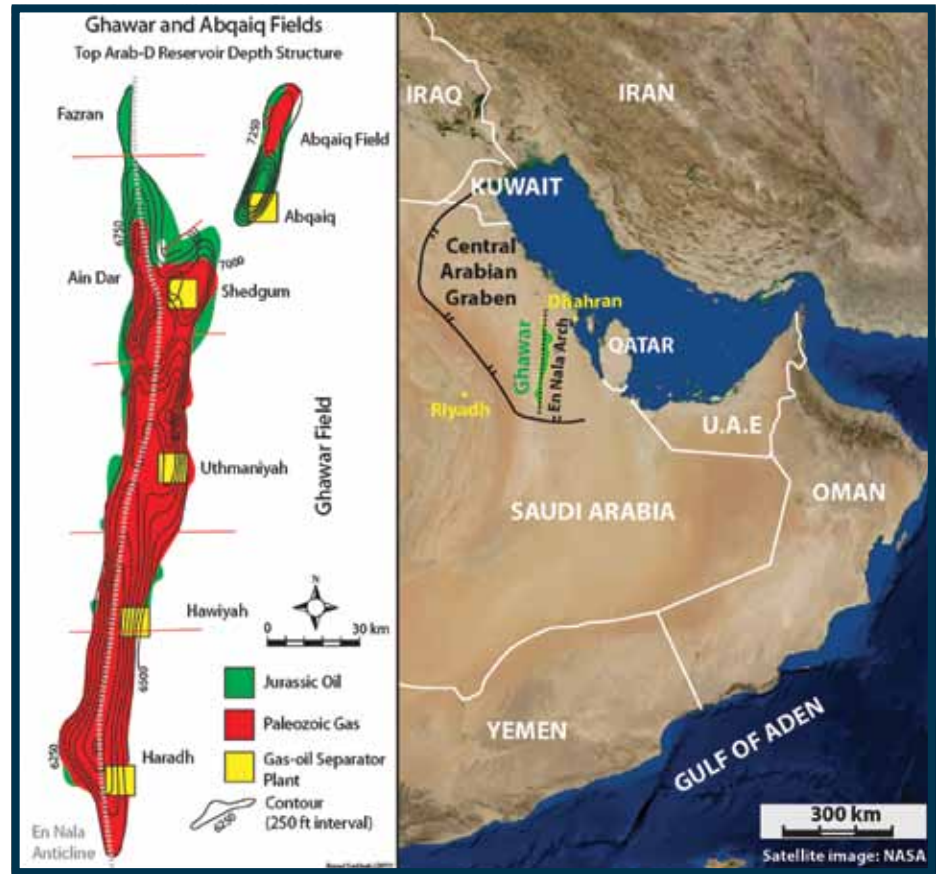
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Finding Ghawar

Elephant Hid in Desert

By RASOUL SORKHABI

The history of oil in the Middle East is essentially a story of giant oil fields (each containing over 500 million barrels).

Of the 932 known giants that researchers at the University of Texas in Austin have mapped, over 200 are located in the Persian Gulf region, which accounts for about 2 percent of Earth's land area – and the "Elephant of All Elephants" (AAPG EXPLORER, January 2005) is Saudi Arabia's Ghawar field.



STEINEKE

Discovered in 1948, Ghawar started to produce oil in 1951 – 60 years ago – but today it remains the world's richest and most productive oil field.

first spotted topographic indications of the En Nala anticline on which Ghawar sits.

In 1940, Ernie Berg, a young Aramco geologist who was mapping areas near the Abqaiq field, noted that the Wadi Sahaba, a seasonal river valley in the Haradh area, took a sudden bend from its east-west direction toward the south.

Berg related this wadi diversion to a north-south trending subsurface anticline. Steineke, his boss, supported the idea.

Shallow structural-stratigraphic drillings in the desert (a technique Steineke had developed to map the subsurface geology and collect pre-Neogene information) confirmed the existence of what came to be called the En Nala ("the Slippers") anticline.

* * *

After World War II, exploration resumed on the Arabian Peninsula, and the information from shallow drillings were supplemented with gravity and magnetic surveys. The En Nala anticline was thus better imaged.

This "whale back" structure, about 280 kilometers long and 30 kilometers wide on average, contains six major structural culminations; from north to south, they are Fazran, Ain Dar, Shedgum, Uthmaniyah, Haradh and Hawiyah.

In 1948 Aramco drilled a test well at Ain Dar, which hit oil in June, marking the first post-war discovery in the kingdom. In a letter dated July 6, 1948, S.V. Campbell, an Aramco manager, reported the good news to the Saudi finance minister Shaikh Abdullah Sulaiman:

See Ghawar, page 20

Today the oil industry in Saudi Arabia is in full control of a state-run company, Saudi Aramco. The company's origin, however – as well as the history of oil discovery in the kingdom – dates back to the Arabian American Oil Company (Aramco).

The first oil field discovered in Saudi Arabia was not Ghawar but Dammam, in March 1938, followed by Abu Hadriyah (March 1940) and Abqaiq (December 1940). These fields are located in the Eastern Al Hasa region where pioneering mapping began by American geologists in the early 1930s.

The legendary Max Steineke and Tom Kock, both AAPG members with California Arabian Standard Oil Co. (Socal) in 1935

Historical Highlights is an ongoing EXPLORER series that celebrates the "eureka" moments of petroleum geology through stories that emphasize the anecdotes, the good yarns and the human interest side of our E&P profession. If you have such a story – and who doesn't? – and you'd like to share it with your fellow AAPG members, contact Hans Krause at aapg.hopg@yahoo.com.

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GHAWAR'S MAGNIFICENT FIVE

	Ain Dar #1	Haradh #1	Uthmaniyah #1	Shedgum #1	Hawiyah #1
Discovery	1948	1949	1951	1952	1953
Onstream	1951	1964	1956	1954	1966
Initial Rate barrels/day	15,600	6,400	11,300	12,400	4,800
Enhanced recovery	1999 water	1990 acid	1964 water	1968 acid	1977 acid
Production (million bl) to 2008	152	24	20	98	51
Production barrels/day in 2008	2,100	2,300	None	3,700	4,600

Data source: Saudi Aramco Dimensions Journal, Fall 2008

Ghawar
from page 18

"In a 20-minute test at 6,685 to 6,746 feet, gas in the Ain Dar well rose to the surface in six minutes and oil rose to the surface in 11 minutes."

More wildcats on the anticline, Haradh No. 1 (February 1949), Uthmaniyah No. 1 (April 1951), Shedgum No. 1 (August 1952) and Hawiyah No. 1 (1953) all discovered light crude (32-36° API) from the Upper Jurassic carbonate reservoir (the 100-meter Arab-D member) at depths of 2,000-2,330 meters.

By 1953, the geologists recognized that all these prospects were actually parts of a single field; they named it Ghawar, after the wide pastoral landscape that local Bedouins called Al Ghawar.

The northernmost part of the supergiant, Fazran, was discovered in 1957. By then 129 wells were producing 0.6 million barrels of oil per day. Except for Uthmaniyah No. 1, all the other discovery wells at Ghawar still produce oil.

The first detailed report about Ghawar by the Aramco geologists was presented at the AAPG convention in Los Angeles in March 1958 and published in AAPG BULLETIN in February 1959 – a report that, amazingly, remains the cornerstone of our knowledge of this field.

* * *

In the 1970s, deeper drillings in the Ghawar field discovered enormous volumes of natural gas from the Permian carbonates of the Khuf Formation.

Public knowledge about the world's largest field ironically remains scanty. This has led to speculative debates about Ghawar's peak production and near-future demise – for example, Matthew Simmon's 2006 book *Twilight in the Desert*.

AAPG member Abdul Kader M. Al-Afifi, a senior geologist with Saudi Aramco, reported in his 2004 AAPG Distinguished Lecture that Ghawar produced 4.6-5.2 MMBopd from 1993 through 2003.

The Ghawar anticline is draped over a basement horst, which initially grew during the Carboniferous Hercynian deformation and was reactivated episodically, particularly during the late Cretaceous. The Paleozoic section was eroded significantly by the Hercynian unconformity.

The asymmetrical structure, which is steeper on the western flank, becomes more complex at depth where it comprises several en echelon horst blocks. Bounding reverse faults have throws as much as 3,000 feet at the Silurian level, but they die out in the Triassic section, according to Afifi, who is past president of the AAPG Middle East Region.

Afifi also noted there appears to be a minor component of right lateral strike slip.

The producing oil reservoir at Ghawar is the late Jurassic Arab-D limestone, which is about 280 feet thick and occurs 6,000-7,000 feet beneath the surface. Growth of the structure during Arab-D deposition localized grain-dominated shoals in the north, upgrading the quality of the reservoir, which improves upward as it progresses from lime mudstone to skeletal oolitic grainstone.

Fracture density increases going deeper in the section, enhancing permeability in the finer-grained mudstones.

The oil was sourced from Jurassic organic-rich lime mudstones.

Overall, 50-60 percent of Saudi oil production has historically come from Ghawar. The field's highest production was 5.7 MMBopd in 1981. Water cut (ratio of water to total liquid production) in the field was about 35 percent in 2003. Gas production was about eight billion cubic feet per day, out of which two billion was associated gas and six billion non-associated gas.

The International Energy Agency has placed Ghawar's ultimate oil reserves at 140 billion barrels, including 66 billion barrels already produced and 74 billion barrels remaining oil.

How accurate these estimates are remains to be seen – but to put these figures in context, consider that the proven U.S. oil reserves currently stand at about 22.3 billion barrels.

It is apt to end this essay with a note on Steineke, a Stanford graduate and Aramco's chief geologist, who contributed so much for the early oil discoveries in Saudi Arabia. He died in 1952, one year after Ghawar came onstream. □

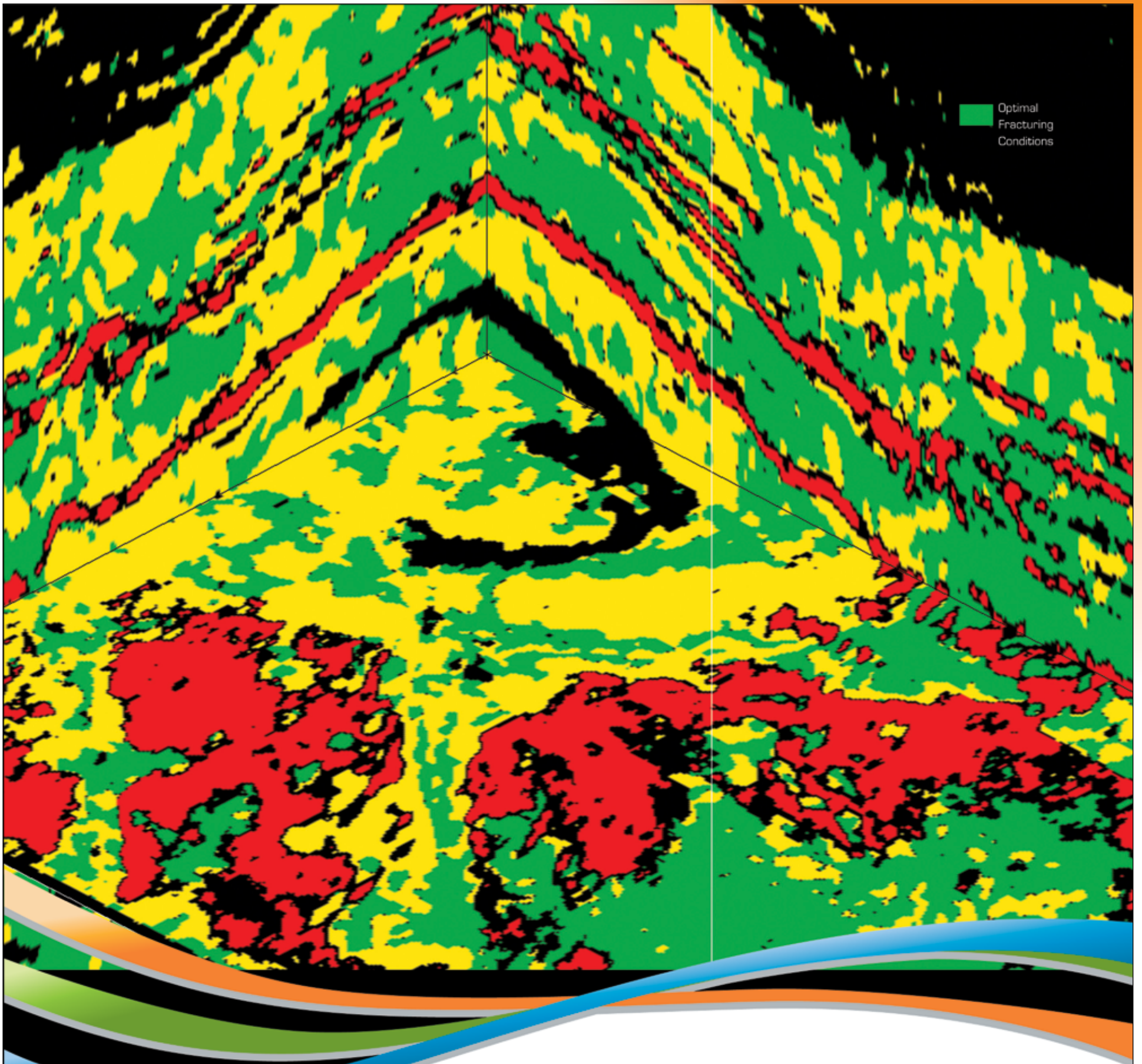


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Attitude costs millions of jobs, \$1 trillion

Public Is Going BANANAs

By COURTNEY CHADNEY, EXPLORER Correspondent

America is suffering from BANANA Syndrome. That was the message of Karen Harbert, president and chief executive officer of the U.S. Chamber of Commerce's Institute for 21st Century Energy, who addressed the realities of America's energy situation at the DPA/PROWESS joint luncheon during the recent AAPG annual Convention and Exhibition.



HARBERT

"If we are not able to overcome BANANA, we simply won't be able to meet our long-term energy challenges, such as rising demand."

BANANA Syndrome, you ask? It used to be NIMBY (Not In My Backyard), Harbert said, but BANANA is now a more accurate description:

Build Absolutely Nothing Anywhere Near Anything.

"It is a plague that is pervasive across

the country," Harbert said, "and it is severely hampering our ability to tackle energy challenges."

She said the hundreds of projects 21st Century Energy have found stalled, mostly due to legal challenges and bureaucratic delays, is unsettling.

"These delays are costing our economy over \$1 trillion, as well as millions of jobs annually," Harbert said.

Traditional energy projects are on the list, but so are more progressive efforts; for example, 40 percent of the stalled efforts were renewable energy projects, like the Cape Wind Project, an offshore wind farm in Massachusetts that has been delayed for a decade.

"We need policy makers to recognize this problem," she said, "and step in and start streamlining the process to build new projects."

Finding 'The Cure'

Harbert, like others who spoke in Houston during the AAPG convention, observed that the United States has been keeping 85 percent of our offshore resources under lock for decades as we have become dependent on foreign oil imports – costing us around \$400 billion a year.

"This strategy makes no sense," she said. "We have been in the midst of a difficult recession, and now high gasoline prices are placing more pressure on our economy. Exploring for domestic energy would put thousands to work and create millions for our economy."

Harbert told the luncheon crowd that producing more domestic oil would give America more energy security and economic wellbeing.

"If we are not able to overcome BANANA, we simply won't be able to meet our long-term energy challenges, such as rising demand," she said.


Areas like, electricity transmission, have been in need of revision for decades, she explained.

"Siting and building new transmission lines will be necessary for us to meet our future energy needs," she said, "and take advantage of renewable energy sources and electric vehicles."

Yet opposition has halted these projects, too, leaving the country destined for a not-so-distant future of "rolling blackouts and electricity rationing."

Harbert suggested eight steps toward "a cure:"

- ▶ The country needs to increase domestic oil and gas production.
- ▶ It should maximize its energy efficiency.
- ▶ Citizens should recognize the role for nuclear energy and clean coal, and not be intimidated by them.
- ▶ Citizens should be looking for alternative transportation fuels – but look out for supply chains that would cause us to be more dependent on foreign help than we already are.
- ▶ The country desperately needs to increase renewable sources of energy.
- ▶ Get beyond the "NOPE" (Not On Planet Earth) mentality.
- ▶ The government needs to provide financing for technology innovations.
- ▶ Invest in education for our future problem solvers.

"In order to stay ahead of the curve (we) must develop that next-generation of problem solvers," Harbert said, "which is why it is so important to invest in education." 



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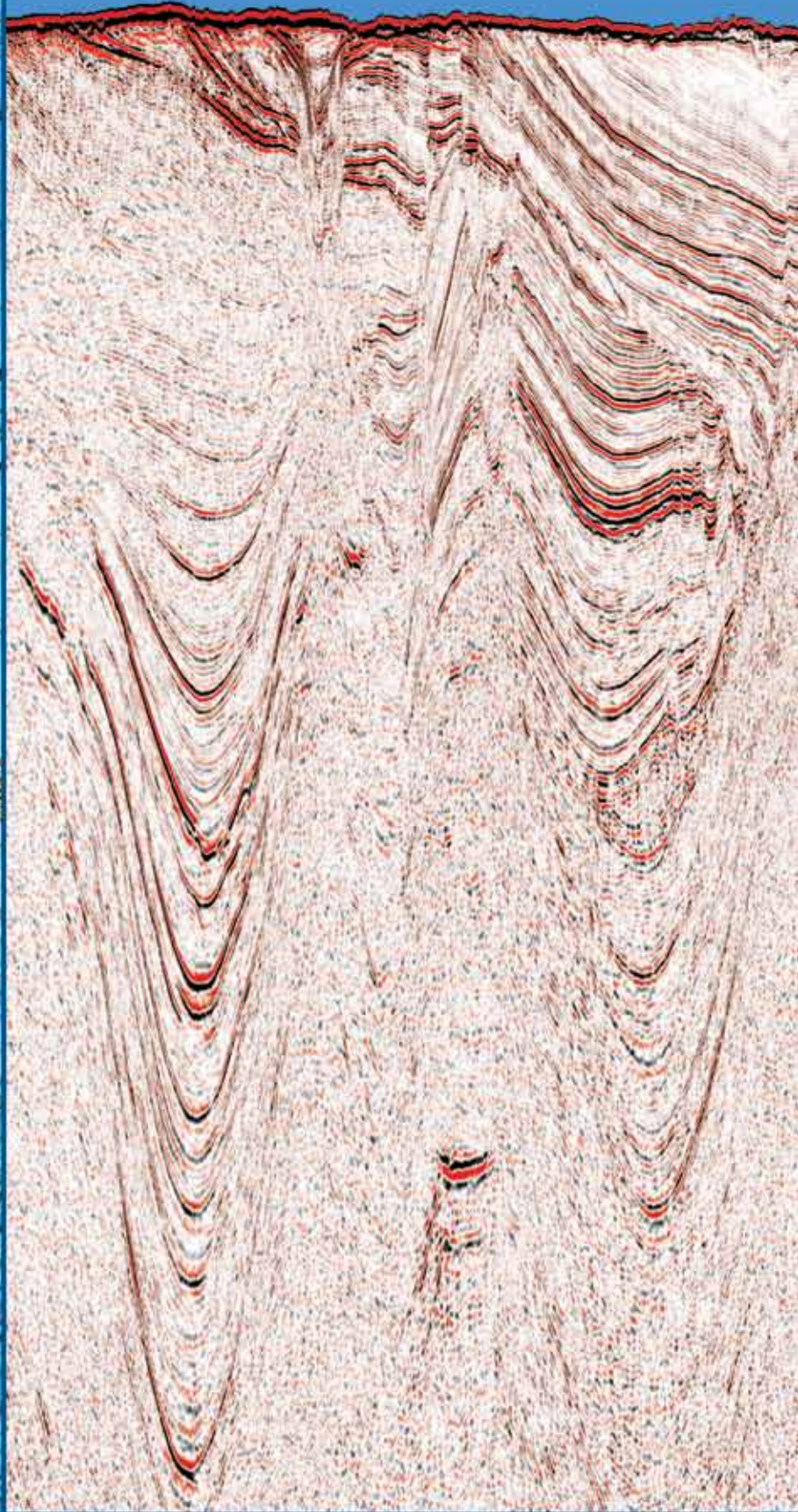
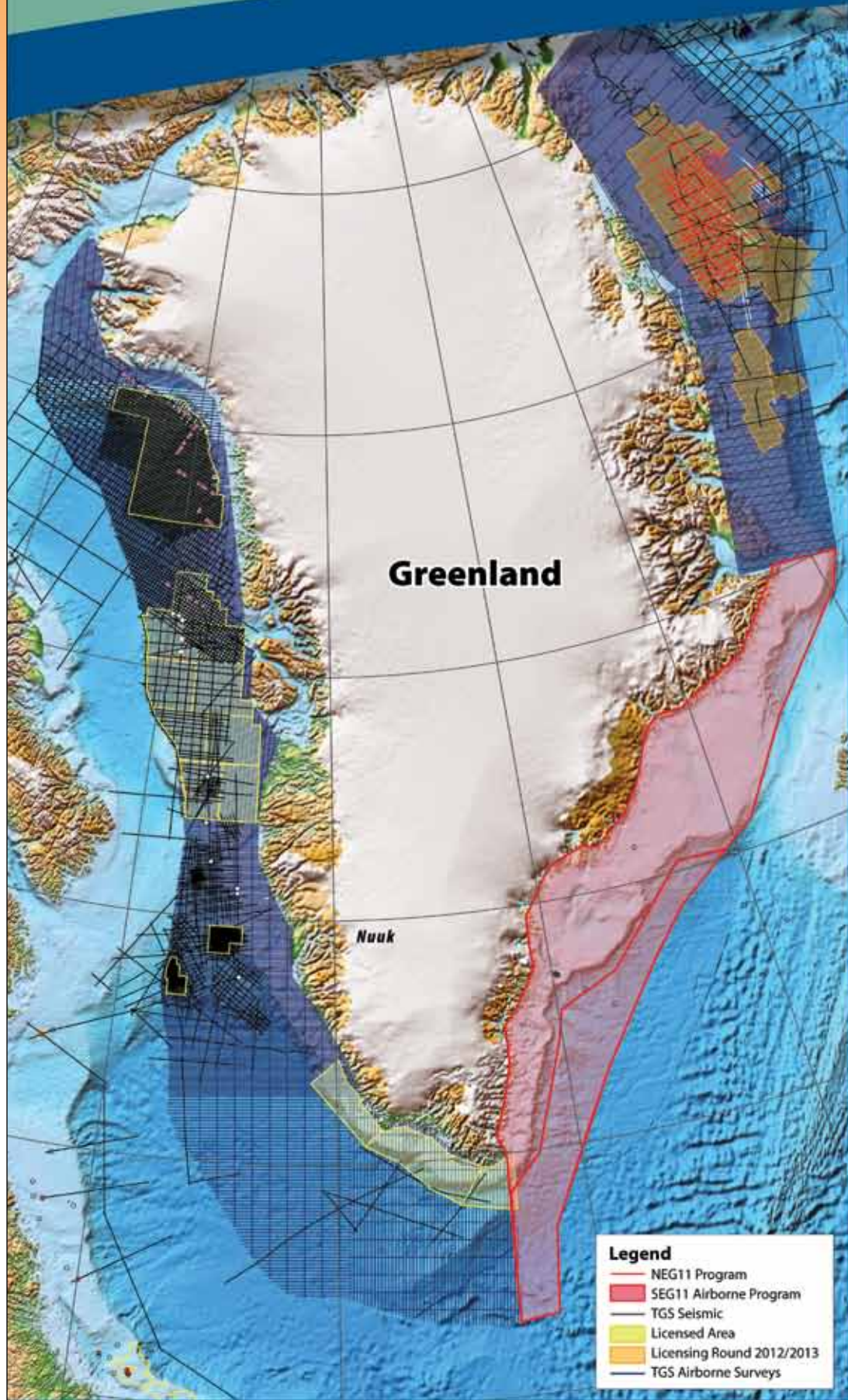
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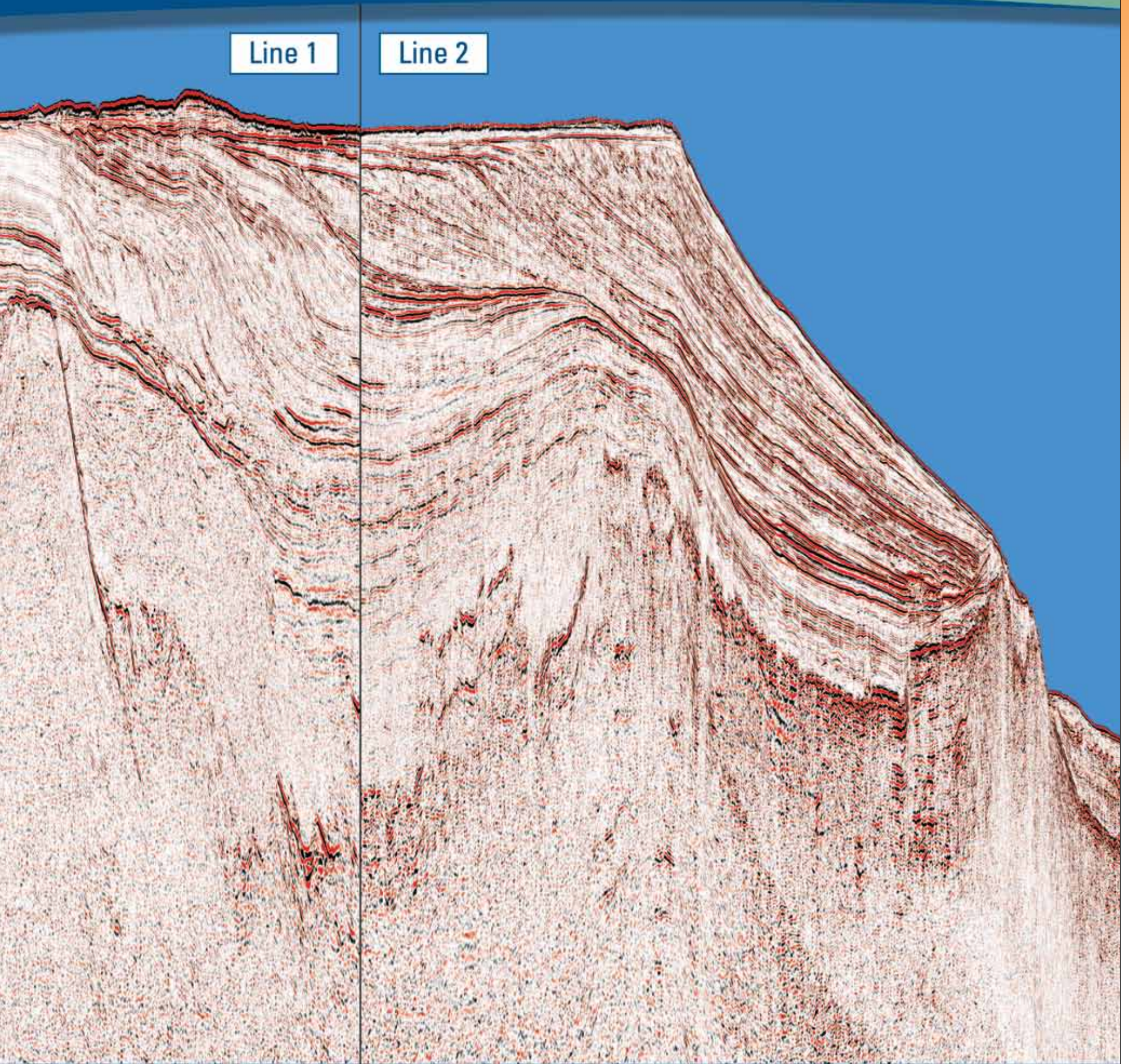
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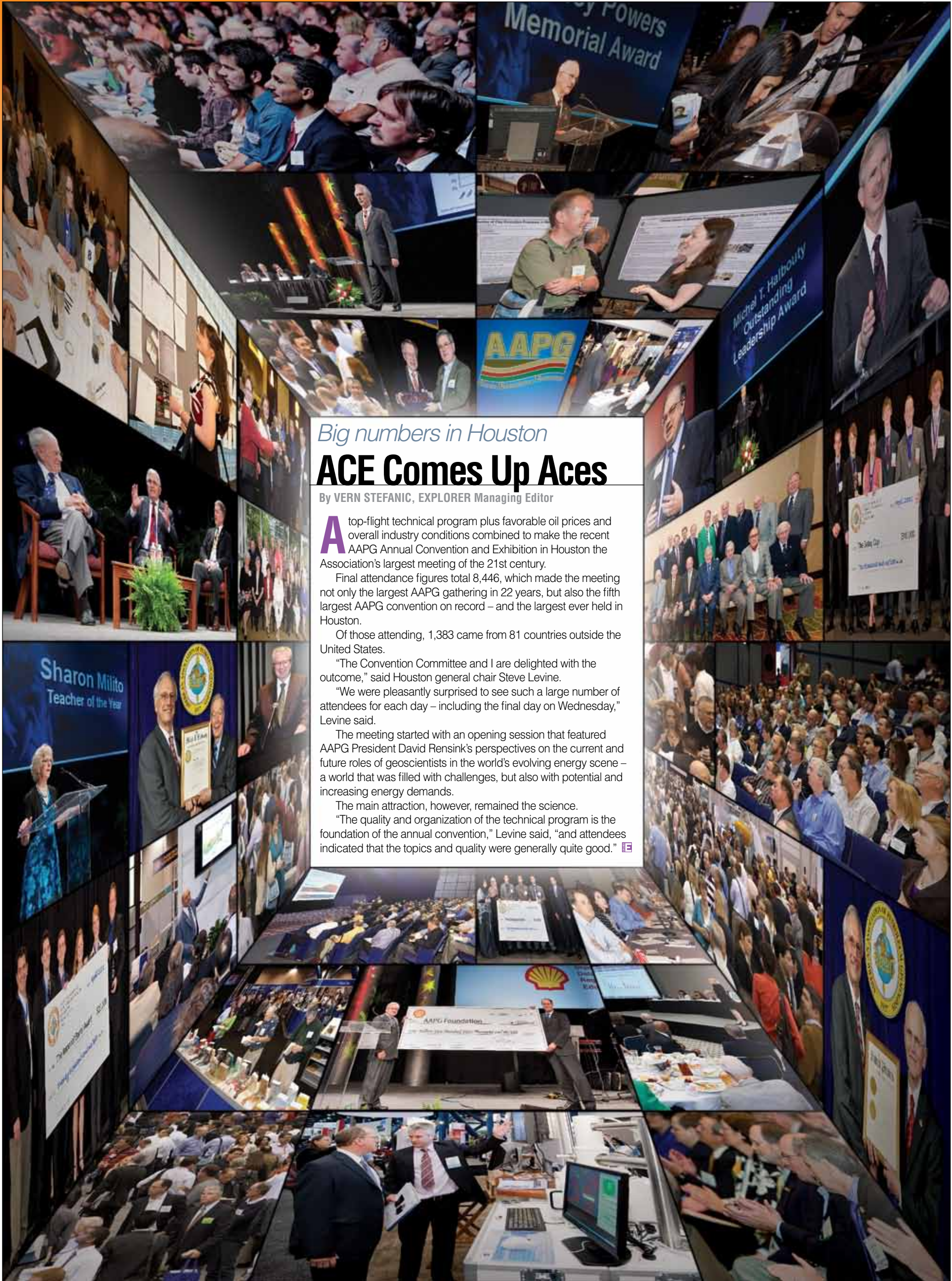
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Big numbers in Houston

ACE Comes Up Aces

By VERN STEFANIC, EXPLORER Managing Editor

A top-flight technical program plus favorable oil prices and overall industry conditions combined to make the recent AAPG Annual Convention and Exhibition in Houston the Association's largest meeting of the 21st century.

Final attendance figures total 8,446, which made the meeting not only the largest AAPG gathering in 22 years, but also the fifth largest AAPG convention on record – and the largest ever held in Houston.


Of those attending, 1,383 came from 81 countries outside the United States.

"The Convention Committee and I are delighted with the outcome," said Houston general chair Steve Levine.

"We were pleasantly surprised to see such a large number of attendees for each day – including the final day on Wednesday," Levine said.

The meeting started with an opening session that featured AAPG President David Rensink's perspectives on the current and future roles of geoscientists in the world's evolving energy scene – a world that was filled with challenges, but also with potential and increasing energy demands.

The main attraction, however, remained the science.

"The quality and organization of the technical program is the foundation of the annual convention," Levine said, "and attendees indicated that the topics and quality were generally quite good." 

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* Image represents surface and subsurface locations of selected source rock geochemical data from the Neflex Petroleum Systems Module

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'...the world needs positive thinking...'

Explorers Encouraged

By LOUISE S. DURHAM, EXPLORER Correspondent

There's no doubt that an array of technology innovations have played a key role in advancing exploration activity and successes.

But often, the most essential element here escapes attention.

"Fundamentally, the human brain is the most powerful tool in exploration," said David Lawrence, vice president of Shell Upstream Americas Exploration and Commercial.

Lawrence, an AAPG member, Pratt Award winner and previous AAPG Distinguished Lecturer, made his remarks

during his presentation as the designated Michel T. Halbouty speaker at the 2011 AAPG Annual Convention in Houston.

His topic was "The Next Era of Exploration," and his talk was both a celebration and encouragement of what's needed for success.

"Given the global energy challenge, the world needs positive thinking like explorers – the ability to see things as they can be," he said.

"We need to set our sights on energy policies to enable rather than hurt," Lawrence emphasized. "Right now, we're mired in a regulatory abyss.

"Keeping operations safe is a key objective, and not stalling or cancelling any more development."



LAWRENCE

One source of anticipated increased energy demand is population and economic growth in developing countries. China, Brazil and India have a GDP growth about 10 percent per annum, with China in the lead. Lawrence

said China's gas consumption is expected to triple in 10 years.

He noted that the needed energy mix for the future needs will include not only fossil fuel but biofuels, solar, wind and nuclear and others as well.

"There are one and a half billion people in the world who have no access to electricity, and more than one billion with no clean drinking water," he said. "Energy is the key vital, essential ingredient to lift people out of a life of poverty.

"At the same time," he commented, "we must tackle greenhouse gas emissions."

Fossil Fuels: Still Needed

While noting that over time cleaner energy sources will meet a growing share of demand, he emphasized that fossil fuels will still carry the majority of global demand for decades.

"There are significant and insurmountable technical and financial constraints to deploy alternative sources quickly on a mass scale," Lawrence emphasized. "The energy industry is very different from others, requiring decades and many billions of dollars to get to market."

As an example, he noted the first commercial LNG plant came on stream in 1964 in Algeria. More than four decades later LNG's share of the global energy mix is a mere 2 percent.

Lawrence predicted that by mid-century, under the most optimistic scenarios, fossil fuels will still supply over one-half of the world's energy. Stating that he is experienced in working on alternatives and supports them, they present a challenge. It's a matter of size, scale and choices.

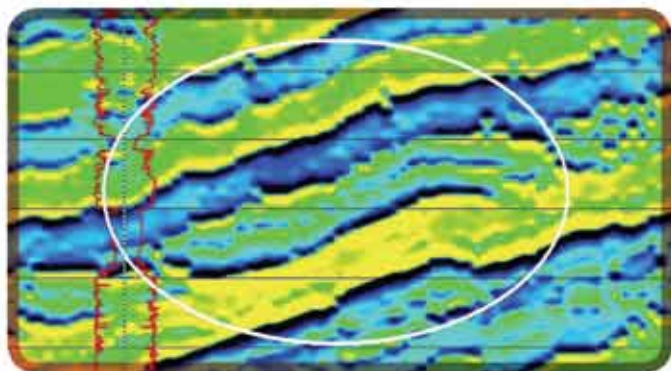
"A single Mars platform delivers more energy than all the wind power currently in the United States," he said. "It would take a wind farm covering one million acres to generate the energy from that one platform, so we need to keep things in perspective as we move forward.

"It will take all forms of energy to meet the energy needs." ■

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Mother Nature Helping Cleanup

By LOUISE S. DURHAM, EXPLORER Correspondent

Ed Overton, internationally renowned chemist and toxicologist, was a mighty popular guy during the aftermath of the Macondo oil spill debacle in the Gulf of Mexico.

The professor emeritus of the department of environmental sciences at Louisiana State University in Baton Rouge, La., not only understands the scientific aspects of the spill, he has the ability to explain the complex details and concepts in layman's terms to the media and the public in general.

Speaking at the DEG luncheon at the recent AAPG Annual Convention and Exhibition in Houston, the affable Overton presented a number of observations about the spill.

► He noted that all of the oil in the environment is being degraded. Some of it is even being converted into excess biomass, which is part of the food chain – just more of it now than the natural environment expected to see.



OVERTON

"We must be very careful about remedial activity associated with oil spills because in a marshy environment this activity could cause more damage," Overton said. "Sometimes the best answer is to let Mother Nature handle it rather than saying humans caused it."

"I'm reasonably optimistic because of the makeup of the oil," Overton said. "The oil was not as toxic as some projected; this was not the worst case of toxicity makeup."

► He noted that once in the environment, oil is subjected to weathering, dissolution, degradation and sedimentation, and these all have one thing in common: they change the composition of the oil as it comes out of the ground.

Because the light oil from the Macondo was released far offshore, the toxicity damage would be muted. The deepwater environment itself is fairly acclimated to oil, given the thousands of natural oil seeps migrating upward from the subsurface.

► Overton said he doesn't think there is any evidence that fresh oil came onshore, noting that it would have been weathered.

► He commented that the oil that wasn't dispersed would take about four hours to get to the surface.

"A lot of the oil was in different physical forms as it got to the surface. There was black oil, emulsified oil – a lot of looks and colors, and in some forms, it doesn't look like oil."

He mentioned also that this particular oil contained gas, which caused it to blow out at high pressure.

► Overton emphasized that by the end of last July there was no visible oil offshore in the Gulf.

The bottom line is the spill put an estimated 10,000 miles in harm's way, yet only 1,100 miles were impacted –

with just 550 acres heavily impacted.

The amazingly small 10 percent impact overall, he said, can be attributed to the combination of light oil, its meandering path with no strong currents to carry it ashore and the massive amount of offshore dispersants.

Overton emphasized that the Louisiana marshes are a sick area to begin with. He noted, however, that numerous fresh green sprouts can be seen in many places inside the marsh.

► The overall damage from the spill is still being estimated.

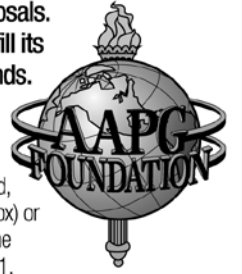
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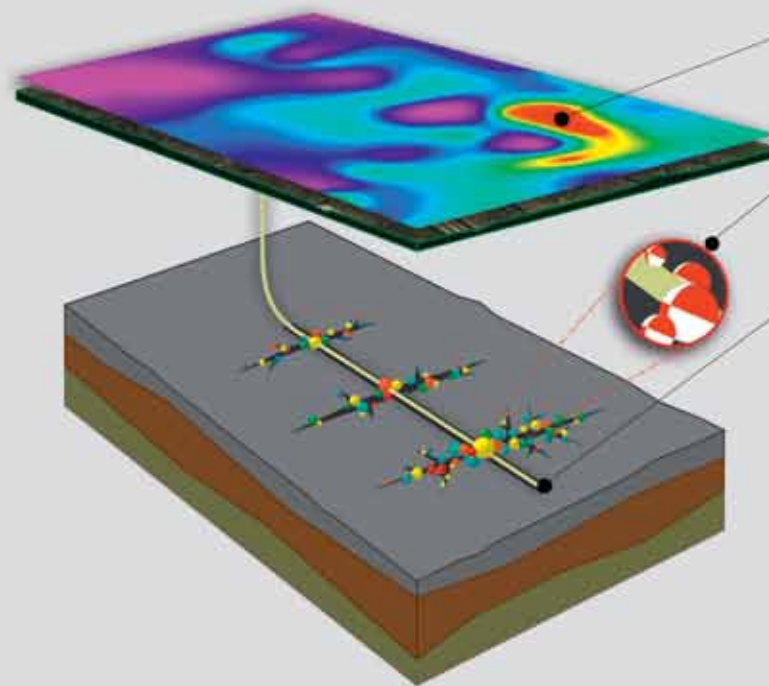
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WASHINGTON WATCH

Spill Restoration Projects Advance

By DAVID CURTISS, GEO-DC Director

BP made headlines in late April by pledging \$1 billion for restoration projects along the Gulf Coast.

The Natural Resource Trustees for the Deepwater Horizon oil spill announced the agreement, which was facilitated by the U.S. Justice Department. The Trustees include the states of Alabama, Florida, Louisiana, Mississippi and Texas. They also include the Department of Interior and the National Oceanic and Atmospheric Administration (NOAA), the federal agencies responsible for cleanup and restoration.

It has been 14 months since the explosion aboard Deepwater Horizon and



CURTISS

“We believe the early restoration projects to be funded through this agreement represent the best way forward in restoring the Gulf.”

massive oil spill from the Macondo well. The well was capped in July and permanently sealed in September. Since then Gulf Coast communities have been working to recover

and restore the region, both economically and environmentally.

Assessing the oil spill's impact on the Gulf Coast's natural resources is the

objective of a Natural Resources Damage Assessment (NRDA) being conducted by the Trustees under auspices of the Oil Spill Pollution Act of 1990. Their goal, according to NOAA, is to:

▶ “Return injured natural resources and services to the condition they would have been in if the incident had not occurred.”

▶ “Recover compensation for interim losses of such natural resources and services through the restoration, rehabilitation, replacement or acquisition of equivalent natural resources or services.”

Typically, the assessment is completed before any transfer of funds. But the process can be a long one. And BP decided to make these funds available now to accelerate recovery along the Gulf coast.

“BP believes early restoration will result in identified improvements to wildlife habitat and related recreational uses in the Gulf, and our voluntary commitment to that process is the best way to get restoration projects moving as soon as possible,” said Lamar McKay, chairman and president of BP America Inc., in a written statement.

“Our voluntary agreement to accelerate restoration projects builds upon the cooperative approach BP has taken toward working with Gulf communities and regulators since the accident, and in assessing the potential injury to natural resources,” McKay continued. “We hope to work in partnership with the Trustee Council to address injured resources in the Gulf as soon as possible.”

“We believe the early restoration projects to be funded through this agreement represent the best way forward in restoring the Gulf.”

The Trustees agreed.

“This milestone agreement will allow us to jump-start restoration projects that will bring Gulf Coast marshes, wetlands and wildlife habitat back to health after the damage they suffered as a result of the Deepwater Horizon spill,” said Interior Secretary Ken Salazar. “This agreement accelerates our work on Gulf Coast restoration and in no way limits the ability of all the Natural Resource Trustees from seeking full damages from those who are responsible as the NRDA process moves forward.”

NOAA Administrator Jane Lubchenco added, “One year after the largest oil spill in our history we take a major step forward in the recovery of the Gulf of Mexico, for the environment and for the people who depend on it for their livelihood and enjoyment. Today's agreement is a down payment on our promise to restore and protect the Gulf.”

The Trustees will each select and implement \$100 million worth of projects. The remaining \$300 million will be allocated by DOI and NOAA based on project proposals submitted by the Trustee states.

* * *

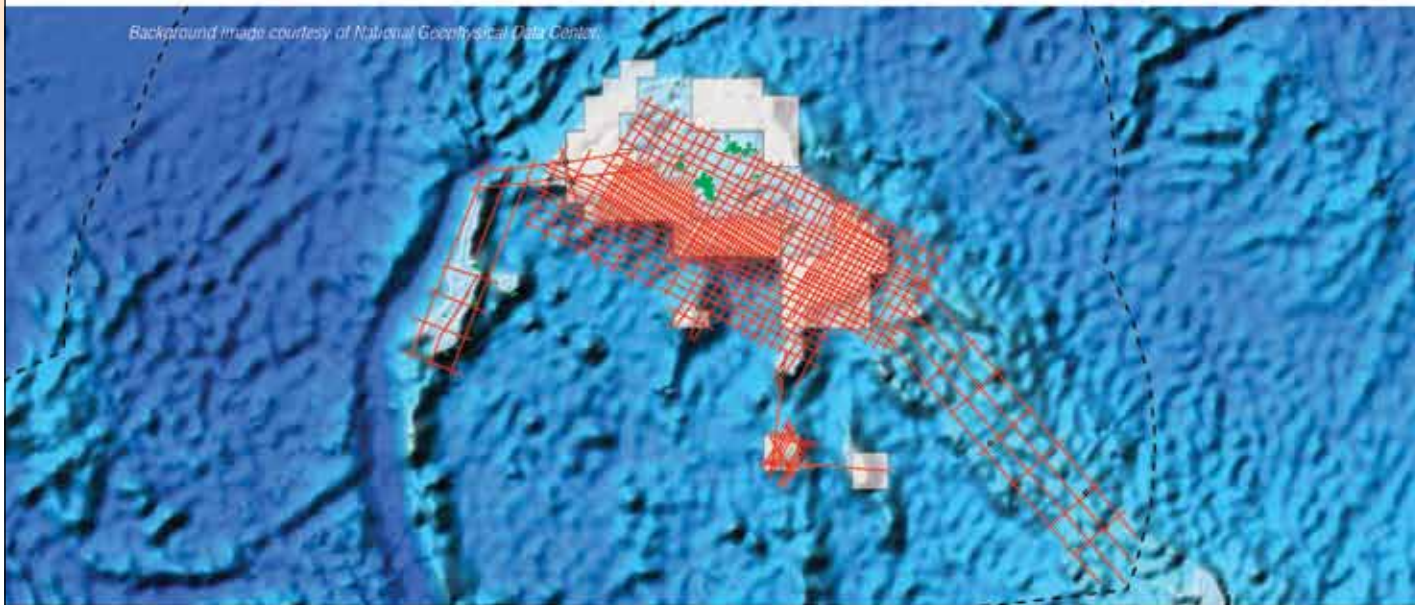
Just a few days after this agreement, the Gulf of Mexico Research Initiative announced the details of its program in a request for proposals.

Established by BP in May 2010 with a \$500 million commitment over 10 years, the focus is the study of the environmental and public health impact of the oil spill on the Gulf of Mexico.

See Washington, page 33

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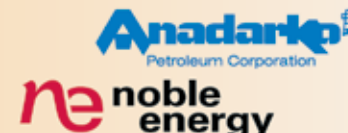


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S-Waves on Crack? Not So Much

By BOB HARDAGE

This month we continue our series on S waves and fractures by taking a look at another laboratory measurement that illustrates an important behavior of S waves that propagate in fractured media.

Experimental work done by Xu and King (1989) are presented as figure 1.

In this lab experiment, P, S₁ (fast-S) and S₂ (slow-S) modes propagate through a test sample before and after the sample was cracked to create a series of internal fracture planes.

Wave transit times through the sample were measured to determine the effect of cracks on the velocity of each wave mode.

For both the cracked and uncracked samples, transit time measurements were made for a series of confining pressure conditions varying from 1.4 MPa to almost 21 MPa. P-wave travel time behavior is described on the top panel of the figure; S₁ and S₂ travel times are summarized on panels b and c, respectively.

On each data panel, the transit time for uncracked rock is marked as A. Point B indicates the travel time through the cracked sample.

The travel times for P and S₁ modes exhibit little pressure dependence over the applied pressure range for either cracked or uncracked media.

There is a noticeable decrease in



HARDAGE

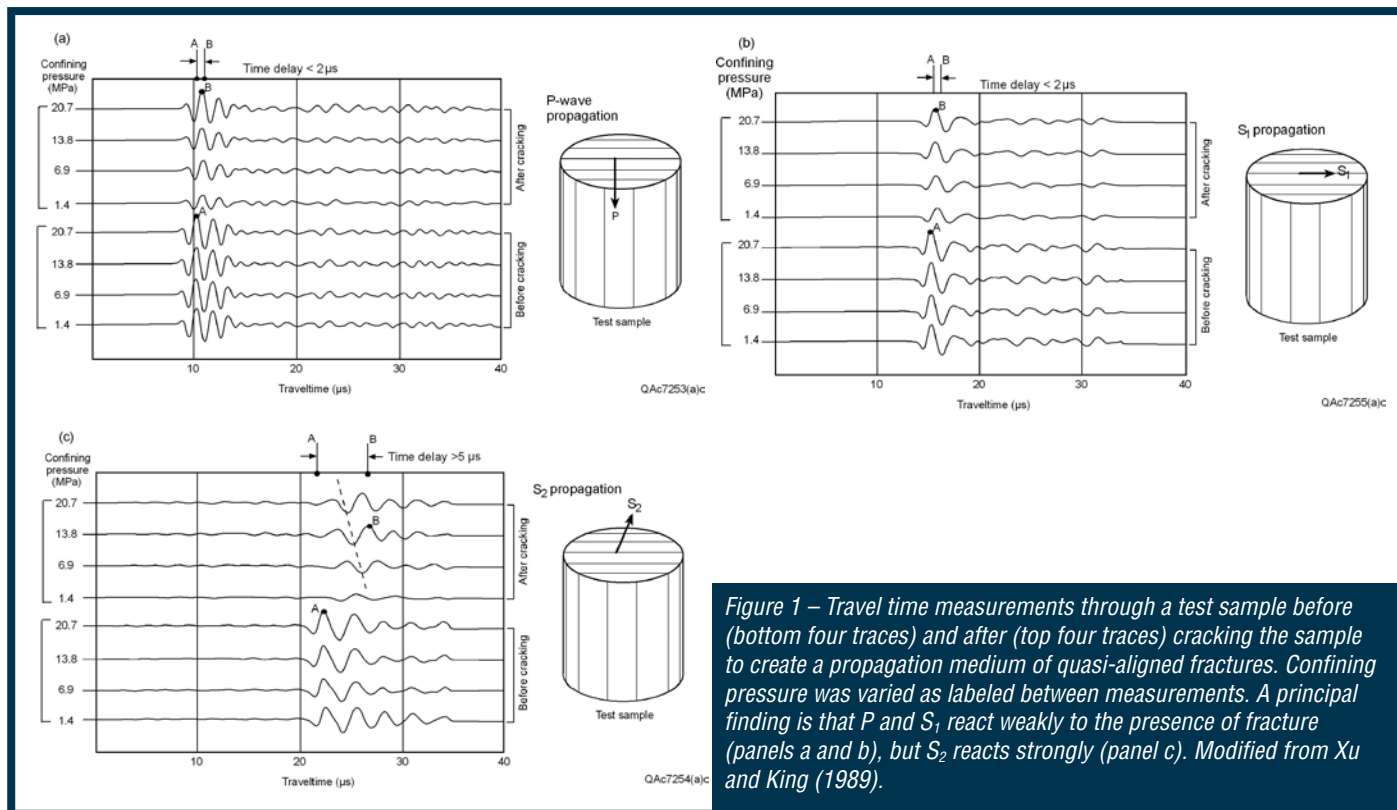


Figure 1 – Travel time measurements through a test sample before (bottom four traces) and after (top four traces) cracking the sample to create a propagation medium of quasi-aligned fractures. Confining pressure was varied as labeled between measurements. A principal finding is that P and S₁ react weakly to the presence of fracture (panels a and b), but S₂ reacts strongly (panel c). Modified from Xu and King (1989).

transit time for the S₂ mode as confining pressure is increased. This behavior is indicated by the dashed line drawn across the S₂ waveforms on panel c.

The wave physics confirmed by this test is that P and S₁ velocities decrease by only a small amount – often

a negligible amount – when a seismic propagation medium changes from non-fractured rock to a medium with aligned-fractures. The observed delay in transit time through the small test sample is less than 2 μs for each of these wave modes when fractures are present.

In contrast, the delay in travel time for the S₂ modes exceeds 5 μs – more than twice the transit-time delays of the P and S₁ modes. Data point B for the S₂ mode propagating in the

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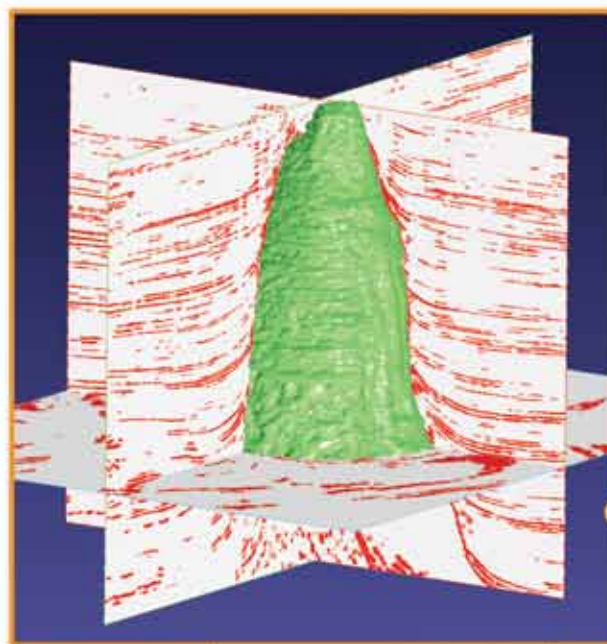
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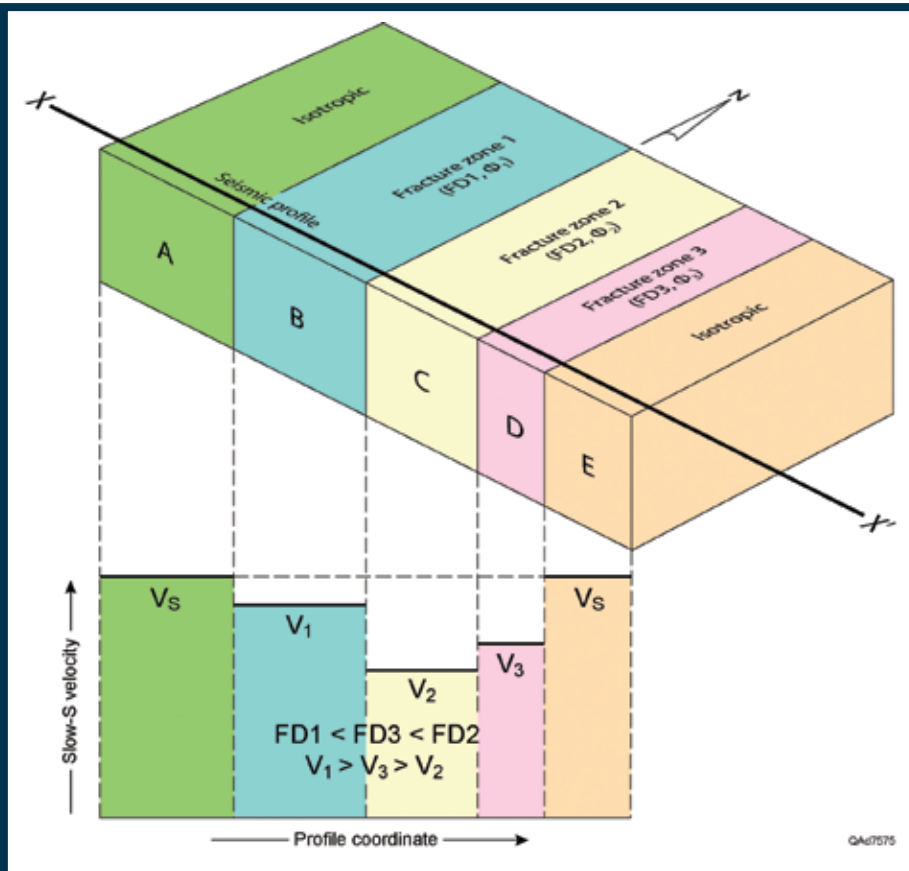


Figure 2 – Relationship between slow-S velocity (S_2) and fracture density (FD). As fracture density increases, S_2 velocity decreases. In contrast, fast-S velocity S_1 and P-wave velocity V_P do not change, or change by only minor amounts across blocks A through E. In isotropic blocks A and E, there is no S-wave splitting and only one S-wave velocity V_S . In all blocks (A through E), fast-S velocity = V_S , the velocity in the non-fractured rock. Mineralogy, porosity and pore fluid do not change across the profile. The only Earth properties that vary from block to block are fracture density and orientation.

Continued from previous page

cracked rock is arbitrarily selected from the waveform observed at the mid-pressure range used in the test.

* * *

Physical measurements of S-wave transit time through fractured media – such as those documented on figure 1 – establish the relationship between slow-S velocity and fracture density illustrated on figure 2. This model simulates a seismic profile traversing an Earth system consisting of blocks of anisotropic rock bounded by blocks of isotropic rock.

Anisotropic conditions in blocks B, C and D are caused by aligned fractures that have different fracture density (FD) and fracture azimuth (Φ) from block to block.

When this Earth system is illuminated with an elastic wavefield, slow-S velocity has the generalized behavior diagrammed below the Earth model. As fracture density FD increases, slow-S velocity S_2 velocity decreases.

The magnitude by which S_2 decreases is a qualitative, not quantitative, indicator of fracture density. S_2 velocity behavior can be used to predict fracture

density in a quantitative manner only if fracture density can be independently determined at several calibration points across seismic image space – and establishing such calibration is difficult.

Restricting the use of S_2 velocity behavior to that of only a qualitative predictor of fracture density is still important and valuable for understanding fracture distribution across areas imaged with multicomponent seismic data. Variations in fracture azimuth Φ affect only the polarization direction of the slow-S mode, not the magnitude of S_2 velocity.

* * *

Fast-S velocity in a fractured medium is approximately the same as it is in an unfractured sample of that same medium (figure 1b). S_1 velocity may decrease by a small amount if fracture density is sufficient to alter bulk density; otherwise, it is reasonably correct to assume S_1 has the same magnitude in fractured rock as it has in non-fractured sections of the same rock.

Next month: The principles established by the laboratory experiments discussed here and in the previous two articles are translated into exploration practice.

Washington from page 30

Its first funded projects were to study the interactions crude oil in the water column had with the chemical dispersants used to combat the spill.

Now, however, the initiative is looking to fund broader research, looking at the effects and impact of petroleum in marine environments.

Rita Colwell, a professor at the University of Maryland and former director of the National Science Foundation, chairs

the 23-person research board, which will make the scientific and funding decisions. The board has identified five themes for the research effort.

Due to the multi-disciplinary nature of these research problems, the board has elected to fund research consortia rather than individual researchers. It will use NSF standards in its peer-reviewed proposal evaluation, and the research results will be made publicly available in peer-reviewed scientific journals.

“Today is a significant milestone,” Colwell said, “in our efforts to understand the effects of the Deepwater Horizon incident on the Gulf of Mexico.”



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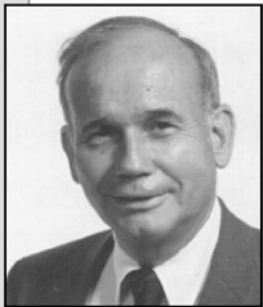
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Bob Cowdery

“I support the Foundation efforts, particularly their work in K-12 and also their providing scholarships to those students enrolled in Geology. I believe this nation is looking at a shortage of Geoscientists and any help that individuals and organizations may provide is definitely needed.”



To give to the AAPG Foundation, go online to <http://foundation.aapg.org/donate.cfm> or mail to P.O. Box 979, Tulsa, OK 74101. Questions? Call 1-888-945-2274 Ext. 644.

FOUNDATION UPDATE

Foundation Names Trustees

BY NATALIE ADAMS, AAPG Foundation Manager

Two longtime AAPG supporters have been added to the AAPG Foundation Board of Trustees, the group responsible for oversight of Foundation activities.

Joining the board are:

□ Paul Strunk, from Corpus Christi and past AAPG treasurer, Texas, who joins the board for a two-year term. He has been a Foundation Trustee Associate since 1994.

□ Ray Thomasson, from Denver and

past AAPG president, who joins the board for a three-year term. He has been a Trustee Associate since 1995.

They are replacing William Barrett and Marlan Downey, respectively, as board members.

Also announced, John J. Amoruso was re-elected to the board for another three-year term, and two Trustee Associates were added to the Members of the Corporation, both for four-year terms. They are:

□ Ed Heath, from Durango, Colo., who has been a Trustee Associate since 1995.

□ Don Lewis, from Lafayette, Calif., who has been a Trustee Associate since 1997.

They replace Marta Weeks-Wulf and Lou Bortz.

Re-elected to the Members of the Corporation were Scotty Holland, of Houston, and Robert Gunn, of Wichita Falls, Texas.

The Foundation gratefully



STRUNK



THOMASSON

acknowledges those who have served and continue to serve on these boards.

For information on joining the Trustee Associates, visit foundation.aapg.org/trusteeassociates.cfm.

* * *

In other action taken by the Foundation Board of Trustees during its recent meeting in Houston:

► They approved the Newly Released Publications Program.

Donors now can make a contribution into an endowment fund that will enable one or more universities of the donor's choosing to annually receive a set of publications as determined by the Foundation and the Publications department.

This "set" will have an approximate value of \$530. A contribution of \$13,250 is required to establish the subscription.

This concept was introduced by Larry Funkhouser, who also provided funds for the first three universities to benefit from the program – Oberlin, Stanford and Worcester (Massachusetts).

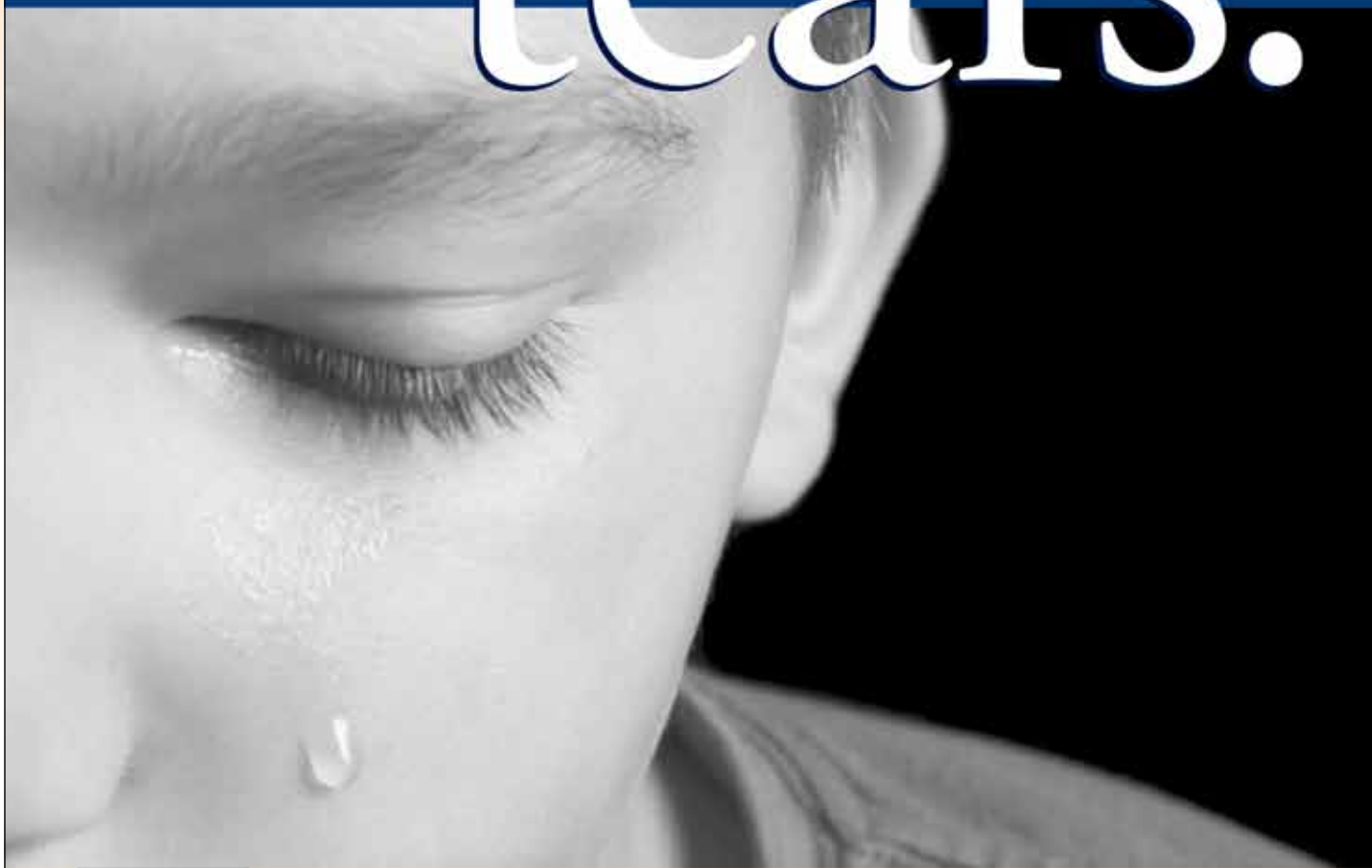
Contact the Foundation to sponsor the university of your choosing.

► They approved \$32,500 for the Santa Barbara Museum of Natural History for the digitization of maps in the Dibblee collection.

These geological maps are of central and southern California as researched by Thomas W. Dibblee Jr. during his lifetime of fieldwork.

A remaining \$32,500 is required to complete the project (which totaled 200 maps). Your contributions to the AAPG Foundation designated to this project can

WE CAN'T STOP THE
tears.



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Dealing with the financial impact of your death could be tough on your family. That's why the GeoCare Benefits Group 10-Year Level Term Life Insurance Plan can be so important to your family's financial plan. Your benefits and your premiums stay the same for the initial 10-year term. Plus, you can cover your spouse for a benefit equal to yours, up to \$1 million—a great benefit for two income families. Help protect your family's financial future with affordable group coverage you can plan around—AAPG's GeoCare Benefits Group 10-Year Level Term Life Insurance Plan.

Help Give Your Family Hope with AAPG's GeoCare Benefits Group 10-Year Level Term Life Plan. Call 1-800-337-3140 for More Information or Visit Us Online at www.geocarebenefits.com.



GeoCare Benefits 10-Year Level Term Life Insurance Plan, P. O. Box 189, Santa Barbara, CA 93102-0189, E-Mail: geocarebenefits@agja.com. The GeoCare Benefits Group 10-Year Level Term Life Plan is underwritten by New York Life Insurance Company, 51 Madison Ave., New York, NY 10010 under Policy Form GMR-G29195/FACE. All coverage is subject to approval by New York Life.

Continued on next page



Continued from previous page

help the museum achieve this goal.

► They approved \$35,000 to fund AGI's Earth Science Week 2011.

The Foundation has been a proud supporter of this endeavor since its inception in 1998.

* * *

A new member also has been added to the Foundation Trustee Associates. He is **John Dolson**, of Coconut Grove, Fla.

* * *

A check of our records showed that 39 individuals and companies have donated boxes of journals, periodicals and other publications to the Foundation for the Publications Pipeline program.

These materials are packaged and shipped to universities in many countries abroad at no cost to the libraries that request them.

Contact the Foundation if you have materials to donate.

* * *

Our "Meeting Challenges ... Assuring Success" campaign has raised \$33,928,895 and will continue through 2011 with a goal of raising \$35 million.

Please make a contribution to help the AAPG Foundation reach the goal.

Give online at foundation.aapg.org/donate.cfm, or mail to AAPG Foundation, P.O. Box 979, Tulsa, Okla. 74101.

Credit card donations may be made by calling 1-888-945-2274, ext. 644.

* * *

Finally, the AAPG Foundation annual report is available online at the Foundation website.

If you are committed to supporting the Foundation's mission through a bequest or other planned gift, please contact our office at foundation@AAPG.org, or call 1-888-945-2274, ext. 644.

Foundation (General)

- Natalie Adams
In honor of Floyd Miller
- Martin L. Bregman
- Janet S. Brister
- Philippe Demeur
- Peter U. Diebold
- John C. Dolson
- William E. Gipson
In memory of Thomas D. Barrow
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In memory of Penni Caughey
- Robert S. Williams
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- William O. Williams

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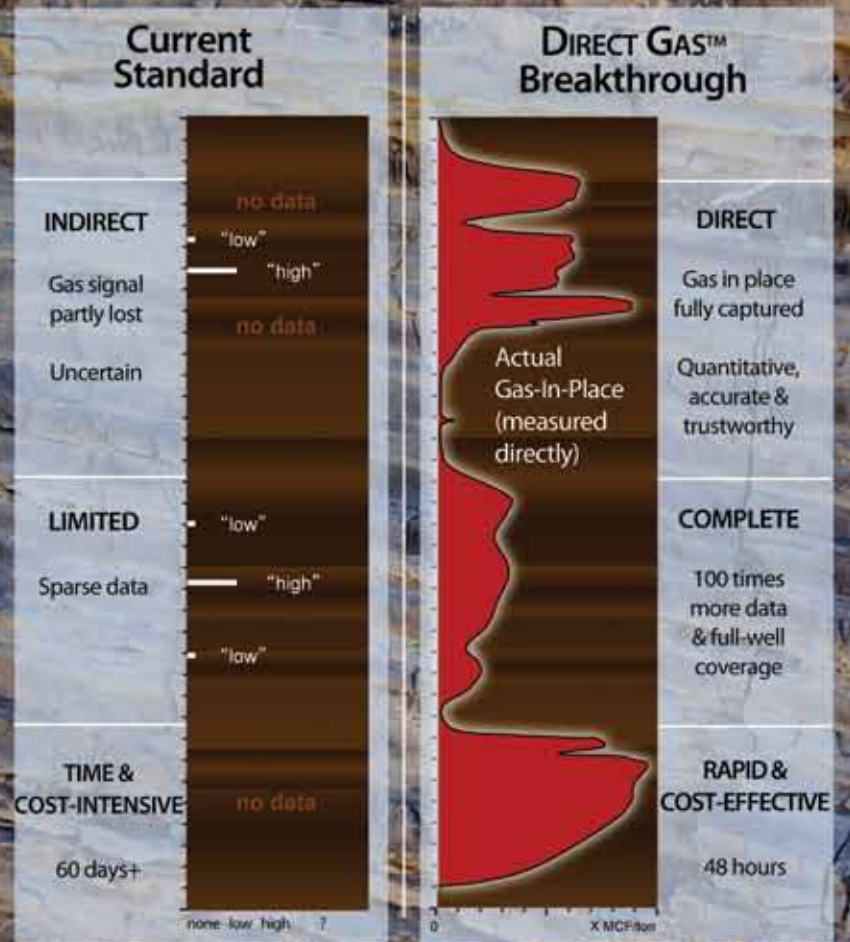
- Terri Duncan
- Ronald L. Hart
- Bryan Haws

Thanks to Our Longtime Donors

In checking our records we discovered that the following members have been loyal contributors to the Foundation for many years. We'd like to take this opportunity to acknowledge their dedication for the number of consecutive years they have donated:

- | | | |
|--------------------------|------------------------|------------------------|
| Paul Dudley – 31 | Terry Hollrah – 16 | Michael Strickler – 13 |
| James Gibbs – 31 | Henry Dean – 15 | Martha Broussard – 12 |
| Thomas Fitzgerald – 28 | Jerome Namy – 15 | William Watson – 11 |
| George Bole – 25 | Herbert Brewer – 14 | Jeffrey Rayner – 10 |
| Lawrence Funkhouser – 25 | Daniel Smith – 14 | |
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| Kenneth Masters – 17 | Michael Forrest – 13 | |
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| Edward Heath – 16 | Richard Stallings – 13 | |

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Team Effort Results in Barrel Award

By BARRY FRIEDMAN, EXPLORER Correspondent

The Tower," as it is known at the University of Texas at Austin, isn't bathed in orange very often.

In fact, only during graduation exercises, national championships and any win over Texas A&M does the school aim large flood lights at the famous (and at times infamous) building to announce how exponentially proud it is of itself.

On Friday, April 29, though, it was shining throughout Austin, and it had nothing to do with football, commencement or any humiliation the Longhorns exacted on the Aggies.

It was all about geology, for UT's geology students had won the prestigious AAPG Imperial Barrel Award, beating out 12 teams from around the world.

The international competition, involving the world's leading universities in petroleum geosciences, is hosted annually by AAPG and designed to give students an opportunity to use real technology on datasets, receive feedback from an industry panel, have the opportunity to impress potential employers in the audience and win cash awards for their schools.

As all participants know, it isn't always easy getting there.

AAPG member Christopher K. Zahm, a research associate at the Bureau of Economic Geology at the university and the



ZAHM



They are the champions: The University of Texas IBA team members Michael Fairbanks, Erin Miller, Justin Fitch, Ashley Bens and Ben Siks, in front of the iconic "Tower."

faculty adviser for the UT team, said before he could take a team to the competition he had to find one qualified to go.

"The UT AAPG Student Chapter," he said, "hosts a dinner at the beginning of the fall semester where we invite students to enroll in the spring class."

This class, Petroleum Basin Evaluation, is not a required course for graduation, which is the first obstacle he faces in fielding a team.

The second? The competition is tough and time-consuming.

"Students are warned of the commitment," he said. "Few have been involved in something that takes this much

focus and energy."

Once the class is established, Zahm – like any baseball coach – starts looking to set his lineup.

"We have in-class presentations and I try to have active exchange during lectures to help identify top students," he said.

"Personalities are an important factor because the students have to work together for several weeks under high stress."

Getting Down to Business

Five students eventually were chosen, and once the topic arrived from AAPG (involving exploration of Alaska's North

Aleutian), the team did, in fact, work for several hours per day, three weeks before the competition – and gave up their spring break to prepare for the finals.

The exploration target that the team studied and prepared for dealt with an area three miles offshore that originally were slated for exploration to Shell in the 1980s. The tracts were among those placed in moratorium after the Exxon Valdez disaster in Prince William Sound.

The UT IBA team was asked, essentially, what would it do if the tracts were open?

The students were given publicly available seismic data, donated by the Alaska Division of Oil and Gas, on limited onshore and offshore wells and asked to develop an exploration strategy for the basin if the moratorium were lifted.

"We spent the first week loading data into the necessary software to visualize seismic data and well logs," Zahm said.

Next came interpreting the data with the intent of mapping out the area's structural and stratigraphic architecture; identifying the petroleum system elements with the basin (e.g., quantity and quality of source rock, migration pathways, trapping mechanisms, seal capacity and reservoir quality); and tying the well logs and seismic data together.

"Basically," Zahm said, "we do the same thing any petroleum exploration company would do in the same situation."

Continued on next page

AAPG GEOSCIENCES TECHNOLOGY WORKSHOPS

Focused Workshops to

Resource Plays in Tight Unconventional Reservoirs: Multi-Disciplinary Technological Challenges and Solutions

12-14 June 2011 • Banff, AB, Canada

Recent drilling successes from the Horn River and other Western Canadian gas and oil resource plays have captured the attention of operators and investors from around the world. The estimated volumes of resource in place, together with new pipeline projects and the planned Kitimat LNG export terminal, will soon open this area to Asia Pacific export markets. New opportunities, market access, and the urgent need to meet both North American and global energy demands require industry professionals to quickly master an understanding of resource plays in western Canada and the north-central United States. In just two and one-half days, GTW Canada offers case studies and interdisciplinary discussions to deliver practical, cutting-edge knowledge. Even more, the unique GTW format of small group discussion among geologists, geophysicists, engineers and service companies, promises to foster business partnerships

Unconventional Resources: Basics, Challenges and Opportunities for New Frontier Plays

26-28 June 2011 • Buenos Aires, Argentina

Argentina is emerging as a Latin America Region leader in shale gas potential. Since 2008 when the Argentine government initiated price incentives to companies investing in unconventional gas production, investors and international operators have been picking up substantial acreage in the Neuquen Basin. Recent government-endorsed price deals ranging from \$4.5 to \$6 per million Btu provide the economics needed to make unconventional gas plays in the basin very attractive.

Co-hosted by the AAPG Latin America Region and the Asociación Argentina de Geólogos y Geofísicos Petroleros (AAGGP), this interdisciplinary workshop will start with the basics of unconventional resource plays, including play evaluation. Later sessions will delve deeper into issues of shale gas and tight gas exploration and production, with case studies from the Neuquen. Analogies from unconventional plays in Canada and USA will offer lessons learned. Presentations on completion techniques and development strategies for unconventional resources will round out the workshop program.

Following each session, all GTW participants will participate in small group discussion called an IPOD analysis (Issues, Problems, Opportunities, Directions). The process results in a unique exchange of ideas, experiences, and opportunities for future collaboration.

INFORM – DISCUSS – LEARN – SHARE • THE AAPG GTW EXPERIENCE

For information on these AAPG GTWs, please log on to our website at <http://www.aapg.org/gtw>.

IBA, poster winners announced

Student Chapters Grab ACE Spotlight

Graduate students representing the **University of Texas at Austin** won first place in this year's AAPG Imperial Barrel Award contest – and students from the same school also took the top three student poster awards.

The IBA finals, which involved 12 teams representing each AAPG Section and Region, were held in Houston right before the start of the recent AAPG Annual Convention and Exhibition.

AAPG's IBA program is an annual basin/prospect evaluation competition for geoscience graduate students from universities around the world. The teams compete to win scholarship funds dedicated to graduate student petroleum geoscience education.

Each IBA team can have up to five student team members. This year's regional-level competition attracted 87

teams.

By winning the finals, the UT team received a trophy, individual medals and a \$20,000 prize for their petroleum geoscience department.

Finishing second (Selley Cup winners) was the team from the **University of Southampton**, England, representing the European Region, which earned individual medals and \$10,000 in scholarship funds for the department.

Finishing third (Stoneley Medal winners) was the team from **Sultan Qaboos University**, from Muscat, Oman, representing the Middle East Region. They received individual medals and \$5,000 for their department.

The remaining nine finalists each earned \$1,000 in scholarship funds for their respective schools, plus individual medals for themselves as IBA finals participants.

The finals teams were (alphabetical order):

- ▶ African Region – Cairo University.
- ▶ Asia-Pacific Region – Chulalongkorn University.
- ▶ Canada Region – University of Calgary.
- ▶ Eastern Section – Indiana University.
- ▶ Latin America Region – Universidad Nacional de Colombia, Sede Bogotá.
- ▶ Mid-Continent Section – University of Nebraska-Lincoln.
- ▶ Pacific Section – San Diego State University.
- ▶ Rocky Mountain Section – Utah State University.
- ▶ Southwest Section – University of Texas at El Paso.

The student poster awards, sponsored by Shell Oil, went to:

- ▶ First place: Henry Campos, Jackson School of Geosciences, University of Texas

at Austin.

- ▶ Second place: Kurtus Woolf, University of Texas at Austin.
- ▶ Third place: Rocio Bernal-Olaya, Jackson School of Geosciences, University of Texas at Austin.
- ▶ Fourth place: Greg Baniak, University of Alberta.

Other awards presented in Houston included the Jim Hartman Service to Students Award, which went to AAPG member **Charles "Chuck" Caughey**, and the AAPG Outstanding Student Chapter award, sponsored by Schlumberger, which went to **San Diego State** and **Gadjah Mada** universities.

Receiving honorable mention awards were the Student Chapters at the University of Bucharest, the University of Utah, the University of Padjadjaran and Stephen F. Austin State University. ☒

Continued from previous page

Win-Win Situation

In its IBA victory in Houston, the UT team was cited for its technical quality, clarity and originality of presentation. And while the school received \$20,000, Zahm said the money was only secondary.

"These students went from being competitive in the job market to being the top students in the Jackson School," he said. "They have proven that they can work

in an industry environment. They know how to translate the science of geology into a exploration prospect that has commerciality.

"They have a tremendous head start." An important contribution for the victory, Zahm says, was the AAPG mentors that worked with the students: Dave Nollsch, with Apache Corporation; Lisa "Rusty" Goetz, with Marathon; and John O'Leary, with BP.

"These three made several visits (here) to meet with the students," Zahm said. "They also made extremely helpful suggestions regarding the structure of our presentation.

The students developed a healthy respect for positive criticism and the team shares that success with the mentors."

"This pushed all of us to a new level, where we were forced to learn new methodology, and pull together new concepts and ideas into a cohesive story, all the while, functioning as a team," said team member Ashley Bens.

The students weren't the only ones who benefitted.

"I find the teaching experience to be very gratifying," Zahm said, "because I get to see

the students go through an important phase change in their learning—evolving from a student of geology to one that comprehends the impact of their study to the world economic stage."

As a side note, in its regional competition to reach the finals in Houston, UT bested IBA teams from the universities of Alabama, Auburn, LSU, Rice, Stephen F. Austin, Houston, New Orleans, and, how sweet this must have been, Texas A&M.

The tower no doubt had an extra glow this year. ☒

Enhance Your Career



U.S. Shale Plays

2-4 August 2011 • Fort Worth, Texas

At last count, there were at least 20 serious shale gas plays in the U.S. Which ones have performed well? Which ones seem to have the most potential? How do they differ from each other, and what commonalities that allow you to prospect for "sweet spots" and to design effective hydraulic fracturing programs? What do we now know about the geochemistry of some shale plays that leads us to find areas that produce both gas and condensate / light oil? What are some of the new breakthroughs in technology that can help you develop a more efficient program that increases your return on investment? Compare and contrast shale plays, along with other resource trends, to develop an exploration and production approach that works for you and your organizational objectives. We will present case studies on plays and overview technologies used in new ways to give you powerful new tools in your shale play development.

International Shale Plays

10 -11 October 2011 • Houston, Texas

Join us for two days of presentations and discussions focused on emerging shale plays in the international arena. Presentations will focus on the application of technology and geoscience to shale plays around the world.

Technologies and Geosciences Applied to Shale:

- Fractures / Micro-Seis in Shale Plays
- Importance of Pore Pressure in Shale Plays
- Reservoir Characterization: How to Integrate Multi-Disciplinary Information for Shale
- Optimizing Drilling / Sweet Spot Prediction and Detection
- Petrophysics for Shale Plays

Proposed Sessions:

- **Significant New Discoveries Worldwide / Case Studies
- **Europe and Middle East Shale Plays: Unique Aspects
- **Central and South American Shale: Rock Mechanics / Petrophysics / Geochemistry
- **Canadian Shale Plays: Integrated Geochemistry, Reservoir Characterization
- **Shale Plays in the Asia-Pacific Region: Applying Lessons Learned from Other Regions

Deepwater Reservoirs

24-25 January 2012 • Houston, Texas

AAPG is bringing together industry-recognized experts in geology, hydrogeology, geophysics and engineering to brainstorm about interdisciplinary methods to achieve more profitable, repeatable results in deepwater exploration. This two-day workshop is targeted at geoscientists and reservoir engineers who are actively involved in deepwater exploration, development, and technical studies. The goals of this third annual Deepwater GTW include providing a forum that showcases integrated studies of deepwater reservoirs, affording ample opportunity for dialogue and lively group discussions, and facilitating interdisciplinary innovation in these challenging environments.

Register online at www.aapg.org/gtw

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October 2-5, 2011



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WWW UPDATE

ACE Videos Online

BY JANET BRISTER, AAPG Website Editor

Have you considered how the Internet has transformed our communication? The expectation of information delivery for all of us is immediate – as in, right now!

Now, add to that demand the expectation of quality – color, animation, video or at least the audio – and, well, the bar just keeps getting higher and higher.

At this writing the AAPG Annual Convention and Exhibition remains a vivid memory for some, and already we've posted 15 video clips from the opening session and the All Convention Luncheon – probably the two most sought-after events for viewing.

For those who missed it, the opening session pre-show featured the popular "We Are AAPG" video, followed by the debut of "Sidney Powers Memorial Award 2011 ACE." These videos not only captured attention but built excitement leading into the ACE 2011 presentations.

By the time you read this article at least six of these videos will have been featured on the AAPG home page – plus there are a lot of new video clips on the AAPGWeb channel of YouTube for you to view.

So, go to <http://youtube.com/AAPGWeb> and take a peek.

For a complete list of AAPG videos you may also go to the AAPG Video Vault located at www.aapg.org/videos/.

Right Now!

Three of the technical sessions also were captured on video.

▶ The Discovery Thinking forum already is posted on SearchandDiscovery.net. Simply look under "Special Collections" to see these.

▶ Then keep your eye on Search and Discovery for two more sessions – "Seismic Reservoir Characterization" and "U.S. Active-Emerging Plays-Paleozoic Basins and Cretaceous of Rockies."

And coming soon ...

"For the first time we'll have e-posters containing audio explanations by authors along with visuals," said Mary Kay Grosvald, AAPG's Search and Discovery administrative editor. Watch the "New Articles" area of SearchandDiscovery.net for their availability.

I'm sure these posts will also be featured in the *Search and Discovery Digest* emailed quarterly to AAPG members. It features announcements and new articles posted to Search and Discovery and will help you stay on top of all the data they are adding.

If you have opted out of this digest but now would like to be added to the list, simply send an email to AAPG Member Services, at sd@AAPG.org, to make that request.

Immediately

The students attending the annual meeting had some assignments that involved video, too.

At the student reception Monday night student awards were given and recognitions made. The biggest, most anticipated award was for the Imperial Barrel Award.

The excitement of all this was captured on tape and will soon be shared on the AAPGWeb YouTube channel.

In the meantime several of the student attendees were busy interviewing AAPG members during the meeting. By the end of the June all of these videos will be available.

* * *

Congratulations to Bogdan Michka, AAPG web producer, for the quick turnaround of these AAPG videos. In two weeks he clipped and tweaked videos so the members of the AAPG may begin reviewing the events in Houston – and he'll probably be finished with the remainder of these before the end of this month.

Meanwhile, keep your eye on the web updates at blog.aapg.org/web for availability.

Good browsing!

Register by 28 July for 3P Arctic and save \$100!

Register now for 3P Arctic: The Polar Petroleum Potential Conference & Exhibition, to be held in Halifax, Nova Scotia (Canada) 30th August – 2nd September 2011. This is the second 3P Conference & Exhibition specifically focused on the petroleum geology and exploration of the Circum-Arctic basins, located within Russian, Norwegian, Greenlandic, Canadian and U.S. Alaskan onshore and offshore Arctic territories.

A technical program featuring more than 150 oral and poster presentations

- Baffin Bay – West Greenland
- Barents Sea and Northeast Greenland
- Cenozoic Uplift of Arctic Margins and Implications for Petroleum Potential
- North Atlantic Conjugate Margins and the Arctic Connection
- Arctic Petroleum Systems
- Canadian Arctic Basins
- Alaska and Beaufort-Mackenzie Basins and Fold-thrust Belts of the Western Arctic
- ECORD – European Consortium for Ocean Research Drilling
- Siberian Arctic: Laptev, East Siberian, and Russian Chukchi Seas
- Evolving Tectonic Interpretations and Models – Including Insights from New Seismic and Potential Fields Data
- Appraisal of Arctic Petroleum Resources
- Geophysical Innovations and Evolving Technologies for Arctic Data Collection, Processing & Interpretation

And 3 Field Trips

- Triassic dryland rivers and modern tidal flats: a field trip to the Cheverie Shore, Nova Scotia
- Petroleum-Pluton Parallels - granite magmas mimicking fracking processes, sedimentary structures and degassing activity
- The Coal-Age Galapagos: a field trip to the Joggins Fossil Cliffs, a UNESCO World Natural Heritage Site

An exhibition dedicated to companies working the Arctic:

AAPG / Astrium / Chemostrat / Dalmorneftegeophysica (DMNG)
FIT / ION Geophysical / IODP-ECORD / Kadme/Acona / NefTex / Petroleum Geo Services (PGS)
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Why pay more?	Register Now
On or before 28 July	After 28 July
AAPG Members US \$495	AAPG Members US \$595

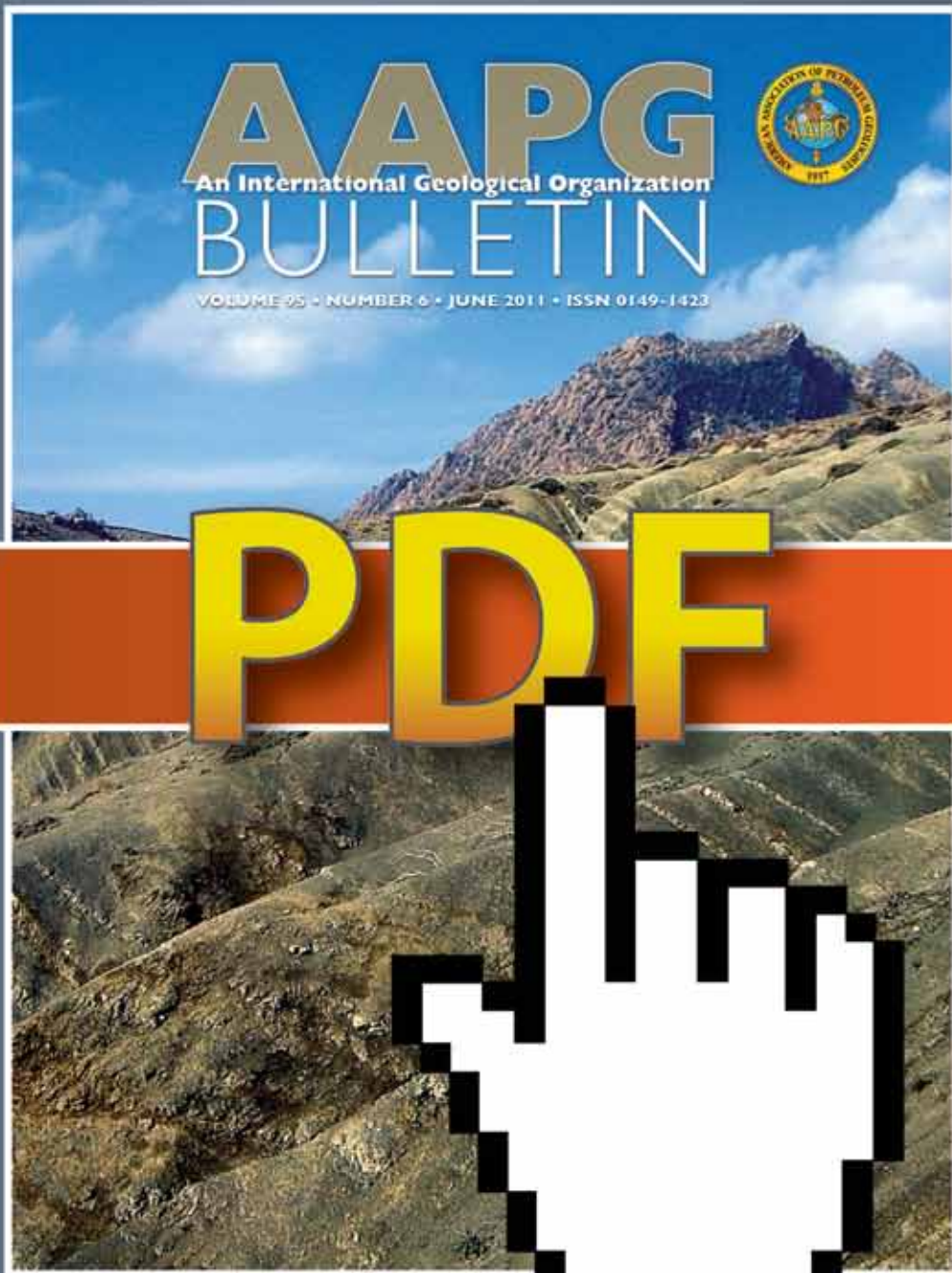


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Article highlights include:

Static connectivity analysis

Matthew J. Pranter and Nicholas K. Sommer



Field-scale architecture and static connectivity of fluvial sandstones of the lower Williams Fork Formation are studied through analysis of analog outcrop data and reservoir modeling to evaluate the sensitivity of fluvial sandstone-body connectivity to specific parameters.

A new software tool

Daniel Reif, Bernhard Grasmann, and Robert H. Faber



Late orogenic faulting can critically affect the whole petroleum system, including generation, migration, and preservation of hydrocarbons. The possibility of late orogenic tectonics should be examined thoroughly, especially when exploring for petroleum at deeper structural levels of thrust belts.

The importance of tectonic histories

Frank J. Picha



Late orogenic faulting can critically affect the whole petroleum system, including generation, migration, and preservation of hydrocarbons. The possibility of late orogenic tectonics should be examined thoroughly, especially when exploring for petroleum at deeper structural levels of thrust belts.

Seismic analysis and fluid flow

Katrine J. Andresen, Mads Huuse, Niels H. Schødt, Lene F. Clausen, and Lars Seidler



Fluid flow features observed in offshore Angola deposits typically occur in different stratigraphic intervals and could help decipher the fluid migration history of the region.

Controls on fluid flow include mature source-rock availability and distribution and evolution of salt structures.

The AAPG Bulletin is a technical journal that is recognized in the industry as the leading peer-reviewed publication for information on geoscience and the associated technology of the energy industry.

The link below takes you to the Members Only login page where, with a few key strokes, you can click on a link for the Bulletin Online, the current issue, or for the Bulletin Archives, all issues of the Bulletin to date. Online as searchable html and .pdf files, the current issue is always available by the first of every month.



Members may access the AAPG Bulletin online at: www.aapg.org/june_bulletin



Also, submit your next paper for consideration via www.aapg.org/bulletin

REGIONS&SECTIONS

Europe Region Busy

By JEREMY RICHARDSON, Director, AAPG European Region

For those of us in the AAPG European Region, 2011 began where 2010 left off – very busy.

► We were excited to run two short courses at the Paris VI University in France with some excellent presentations from Sylvie Leroy and Gianreto Manatschal on rift basin geology, and Jean-Luc Rudkiewicz and Eugenii Burov, presenting on basin modelling.

These courses, which ran at the end of January and were very well attended by both students and the industry, got our European Education Program 2011 off to a really good start.

Our thanks must also go to the university for the facilities they provided, and to AAPG member Francois Roure and Christian Gorini for their help behind the scenes, over a typically European cool winters couple of days!

We plan to run a similar event in January 2012, so please watch the AAPG Europe website for further details.

► In February we ran a course on "Resource Classification," comparing the United Nations Framework Classification system to the more widely known and used (in our industry) PMRS.

Over 50 delegates from the Industry attended the two-day conference, which was held at the Royal Society of Arts in central London.

► Two short courses then bookended our annual APPEX Conference and Exhibition in March – and the speakers for the short courses were the two candidates for AAPG president-elect, Ted Beaumont and John Dolson.

APPEX, under the chairmanship of Mike Lakin, was another great success, attracting over 550 delegates, more than 65 booths and an excellent conference program. The keynote speakers were past AAPG president Marlan Downey, Andrew Lodge from Premier Oil and Jens Olsen from TGS Nopec, and we opened to a packed auditorium.

The audience was very cosmopolitan and showed that APPEX has truly become the only international A&D forum of its caliber.

It is always nice to receive compliments and even nicer when those participants put it in writing:

✓ "As a financier of oil and gas, APPEX allows me to keep updated on the current 'hot' exploration plays and to initiate contacts with the people who may discover the next Mahogany," said Sebastien Renaud from BNP Paribas, France.

✓ Thorarinn Arnarson from the National Energy Authority of Iceland was equally ebullient, saying, "We received a number of important visitors to our booth and made good contacts. (APPEX is) the right place to be for introducing license rounds."

The dates for APPEX2012 are March 6-8, so please put it in your diary – and we welcome your participation as a speaker, attendee or exhibitor.

* * *

This brings us to one of the highlights of our year: the AAPG Imperial Barrel Awards.

Now in its fifth year, the annual competition is open to universities with a geoscience degree program – and this year the European Region had 17 teams enter the competition.

The university enters teams of five students and a faculty adviser, and they all are invited to Prague in the middle of March to make their presentations to a group of eight senior industry judges.



Big crowds and plenty of deals were once again part of the annual London APPEX.

Our thanks go to our judges, all of whom gave up their time to meet, encourage and judge our 17 teams. This year they were Bernie South from ExxonMobil; Luc Bolle from Baker Hughes; Jason Canning from BG Group; Steve Flack from Nexen; Stuart Lake from Hess; Steve Maddox from Maersk; Rod Nourse from Shell; and Alina Tulucan from OMV Petrom.

The winning European Region team was from the **University of Southampton**, with the **IFP School** from France coming second, and the **University of Lisbon** third – a fantastic competition with great camaraderie, professionalism and dedication coming from all our teams.

The Southampton team went on to the finals in Houston in April where they came second in another close contest (see related story on page 37).

You can see a video of the European competition at our website, europe.aapg.org/imperial-barrel-awards.

* * *

By the time you read this we will have completed our annual Education Week, held in May in Aberdeen, Scotland, participated in the Tutkovsky Lectures in Kiev, Ukraine, also in May, and offered a series of short courses and GTWs (see our website for latest details). Looking further ahead, we will be part of a joint conference and exhibition with the Moroccan Association of Petroleum Geologists in October.

* * *

Finally, this month **Dave Cook** is stepping down from his position as president of the AAPG European Region, to be succeeded by **Vlasta Dvorakova** for her three-year presidency. All those who have worked or come into contact with Dave respect his knowledge and professionalism, and we all thank him for what he has done for the AAPG European Region over the last three years.

We all wish him well – and insist he keep in contact, as his voice and encouragement will always be welcome.

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- Log Analysis of Shaly Sands—Asquith
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- Introductory Geochemistry for Shale-Gas and Tight Oil—Laughrey
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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.

Information included here comes from the AAPG membership department.

(Names of sponsors are placed in parentheses. Reinstatements indicated do not require sponsors.)

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

For Active Membership

California

Awramik, Stanley M., University of California, Santa Barbara, Santa Barbara (H.P. Buchheim, E.H. Gierlowski-Kordes, K. Bohacs); **Szantay, Adam W.**, Occidental Petroleum, Bakersfield (J. Ware, R.W. Johnson, D.R. DeFelice)

Louisiana

Ruberg, Daniel, Fugro Geoservices, Lafayette (G.K.P. Munson Jr., T.J. Bennett, C.G. Chaffin); **Wicks, Carol M.**, Louisiana State University, Baton Rouge (C.C. Christina, R.A. Denne, C.M. Scott)

North Dakota

Gosnold, William D., University of North Dakota, Grand Forks (B.J. Fossum, R.J. Erdlac Jr., R.D. LeFever)

Oklahoma

Giffin, Jon W., Chesapeake Energy, Edmond (B.Q. Winter, J.K. Schrantz, N. Terech); **Land, Gary**, RKI Exploration & Production, Oklahoma City (M.L. Huhnke, H.J. Lackey, M.A. Goss)

Pennsylvania

Boyer, David A., Texas Keystone, Pittsburgh (G.R. Wrightstone, E.G. Ober, D.A. Billman)

South Carolina

Blount, Gerald Clark, Savannah River Nuclear Solutions, Aiken (N.J. Fix, D.E. Wyatt Jr., M.G. Waddell)

Texas

Adams, Aaron J., Anadarko Petroleum,

The Woodlands (P.B. Gamwell, F. Rad, C.D. Behseresht); **Dallas, George Jackson**, Dallas Consulting, Houston (J.L. Forman, P. MacKenzie, R.W. Beardsley); **Green, Howard Wesley**, Fortune Production, San Angelo (B.R. Swartz, J.R. Ross, T.A. Augustin); **Habib, Halima Garba**, Afren Resources, Houston (M.B. Alibe, O.K. Ossai, K. Udonsi); **Hasner, Katja**, ExxonMobil, Houston (I.G. Johnson, I.A. Watson, T.A. Queffelec); **Hentz, Tucker F.**, Bureau of Economic Geology, Austin (W.A. Ambrose, S.W. Tinker, S.P. Dutton); **Kruszewski, Jason Michael**, Hess Corporation, Houston (A.S. Pepper, C.A. Fernandez, S.G. Crews); **Kuchinskiy, Vitaly**, Marathon Oil, Houston (R.A. Stone, R.H. Wilty Jr., E.J. Valek); **Landwer, Anca M.**, Kerns Petroleum,

Houston (W.R. Landwer, R.A. Parker, J.E. Wellborn); **Lane, Tim Richard**, BP America, Houston (reinstate); **Mosher, Sharon**, University of Texas, Austin (S.W. Tinker, R.J. Steel, W.L. Fisher); **Thomson, Ellen E.**, independent consultant, Spring (L.L. Warner, T.L. Beaubouef, J. Phillips); **Thomson, John McFarland**, ExxonMobil, The Woodlands (reinstate); **Troy, Joanna Kathleen**, ExxonMobil, Houston (I.G. Johnson, T.A. Queffelec, I.A. Watson); **Walshe, Paul**, Maersk Oil Houston, Houston (S.K. Towe, F.M. Budhijanto, S.M. Carlson)

Continued on next page

Students Get Membership Status Option

By VICKI BEIGHLE, Manager, AAPG Member Services

AAPG Student members who graduated this fiscal year (between July 1, 2010 and June 30, 2011) now can choose to retain "Student" status for an additional 24 months after graduation – and take advantage of the lower Student dues rate of \$10.

Those with a non-North America mailing address must also pay the \$10 mail surcharge.

This new option is being offered due to a bylaw change approved by the AAPG House of Delegates to help recent graduates with their transition to employment – and Active status.

Recent graduates taking advantage of this opportunity to extend their current Student status will be reclassified as a

"Student YP" (student/young professional).

An important note: All recent graduates choosing to continue as a Student member are personally responsible for remittance of the \$10 dues and mail surcharge. These dues cannot be paid by the Corporate Sponsorship program (currently funded by Chevron), because those funds are available only for those who actively/remain enrolled in school.

Additionally, publication options and other member benefits will remain the same as for all Student members (i.e. BULLETIN access limited to previous 24 months of issues vs. full access to BULLETIN archives for Associate/Active members). Also, Student members may not receive the BULLETIN in print – even if

they pay the additional fees offered to other dues classes and/or dues levels.

AAPG's goal remains for all qualified Student (and new Associate) members to apply for advancement to Active status as soon as they meet the experience requirement (one-year minimum, which can include work as an intern and/or teaching assistant).

In accordance with AAPG billing procedure, membership for graduating students automatically advances to the Associate level, and dues increase to the full rate of \$90 (mail surcharge increased to \$20).

For more information go to the website at aapg.org, or contact Member Services – at members@aapg.org, or (918) 584-2555.

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Egypt
Hemdan, Sherif Mohamed, British Gas BG Egypt, Cairo (A.M. Badran, M.H. Ayyad, M.A. Mohamed)

Germany
Hilgers, Christoph, RWTH Aachen University, Aachen (S.E. Laubach, P.A. Kukla, R. Littke)

India
Chatterjee, Barun, Indian Oil Corporation, New Delhi (S.S. Negi, A. Chattapadhya, R.S. Dirghangi)

Kazakhstan
Iltukov, Renat, Omy-Petrom S.A., Aktau (A. Sinelnikov, J.M. Anderson, J. Schmitz); Novikov, Alexey, Petrom OMY, Almaty (A. Sinelnikov, J. Schmitz, J. Anderson)

Netherlands
Weale, Megan, Shell, The Hague (K.D. Gerdes, P. Spaak, A.S. Van Der Molen)

Nigeria
Alabi, Olakunle Victor, Pan Ocean Oil (Nigeria), Lagos State (E.O. Olopade,

M.L. Afe, A.O. Lufadeju); Fasina, Babajide Oluwole, Department of Petroleum Resources, Lagos (E.M. Ogunjemiyo, B.A. Ogedengbe, N.C. Anyiam); Oyedola, Abayomi John, Nigerian National Petroleum Corporation, Benin, Edo State (B.I. Alkali, E.O. Olopade, A.T. Adelaja)

Russia
Murzin, Roman, Gazpromneft NTC, Saint Petersburg (S. Hafizov, V. Verzhbitsky, S.V. Malysheva)

South Korea
Jang, Heejeong, SK Innovation, Seoul (I. Ryu, H. Lee, D. Choi)

Spain
Blazquez Diaz, Esther, Cepsa E&P S.A., Madrid (J.N. Comet, S.Y. Larsson, F. Rodriguez Monreal)



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Certification

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

Petroleum Geologist

Utah
David Romney Keller, consultant, Jordan (M. Bengston, T. Jensen, R. Cook)

Nigeria
Adesegun J. Akinwale, Andora Technologies, Lagos (reinstatement)


Petroleum Geophysicist

Texas
Dennis P. Kucinskis, Kosmos Energy, Dallas (P. Gratton, D. McGuire, R. Manz)

IN MEMORY

- Donald Leroy Bieber, 88
Aurora, Colo., Nov. 2, 2010
- Edmund S. Hastings, 86
Gainesville, Fla., Feb. 4, 2011
- Hugh M. Hayes, 73
Granbury, Texas, July 16, 2010
- James Kueck Hays, 73
Tulsa, Feb. 8, 2011
- Monzell R. Louke, 85
Bend, Ore., March 11, 2011
- Glenn Ernest McKinley, 86
Tulsa, Nov. 22, 2010
- Matthew J. Parsley, 53
Midland, Texas, Aug. 31, 2010
- John Winton Pickering, 77
Houston, Feb. 28, 2011
- Isaac Field Roebuck Jr., 80
Dallas, April 15, 2011
- Richard Cameron Saunders, 59
Wellesley Hills, Mass.
April 10, 2011
- Douglas K. Strickland, 58
Oklahoma City, May 4, 2011
- Peter George Western, 60
Bangkok, Thailand, Dec. 18, 2010
- Michael Francis Yarussi, 58
Flower Mound, Texas
Oct. 31, 2010

(Editor's note: "In Memory" listings are based on information received from the AAPG membership department.)



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South Texas Eagle Ford Basin



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API	Operator	Lease	Wells	County	Top Depth (ft)	Bottom Depth (ft)
42918600000	HARBEL OIL & REFINING	BERNARD, WELLS D.	1-W	ATASCOSA	5436	7913
42918600100	HAZEL OIL & REFINING	MAX E COLSON HALEY	1	ATASCOSA	5420	5291
42918600200	COOKHEWITT, GUSLEY T	HEWITT, S W	1	ATASCOSA	7514	10234
42918600300	PAN AM PETRO CORP	R R BIRDWELL	4	ATASCOSA	4323	7022
42918600400	SHELL OIL CO	WYLLER, GERTHA H	1	ATASCOSA	5495	10103
42918600500	SHELL OIL ET AL	RUHMANN, J W	1	SEE	10470	12240
42918600600	SHELL OIL	ROBERTS, A S	1	SEE	10940	10000
42123001000	TEXAS EASTERN TRUNK LINES	BARRE SWS UNIT	1	DE WITT	10007	10010
42123002000	SHELL OIL	BROWN, COLE S	1	DE WITT	12720	10000
42123003000	ARCO OIL & GAS	ARCO HORROR	1	DE WITT	10030	1470
42143001000	MSF OIL CORP	BECKER	1	FRED	5540	4640
42143002000	ATA OIL PRODUCERS	YOUNG, J W HARTY	1	FRED	5530	5210
42143003000	FLAC-BERBERN OIL CO	WLOD	1	FRED	5540	5230

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Commentary

Don't Be Too Cautious

By BRUCE L. CUTRIGHT

Seismic exploration, remote sensing, geophysical surveys, head of exploration and production, upstream development manager – all of these terms and titles reflect that the energy industry exists and thrives on the frontier.

Indeed, we use every tool and information source we have to make intelligent decisions, but in the end it is the insight and intuition that is gained from many different and varied experiences that allow our profession to successfully lead companies and nations into the future by taking that “giant leap” into the unknown.

The theme of the recent AAPG Annual Convention and Exhibition was “Making the Next Giant Leap.” Many presentations focused on new exploration areas, new analysis methods or new production methods, but there also was a second theme in some of the talks that reflected the darker side of our business. This theme presented issues, for example, like:

- ▶ Why we can't drill in deep water?
- ▶ Why we can't develop tight formations with hydrofracking?
- ▶ Why we can't become energy independent?

If we allow these issues to go unchallenged, we become followers instead of leaders – and in order to lead, we must always seek alternatives to achieve our goals.

The All-Convention Luncheon featured presentations by three U.S. astronauts that, more clearly than any other example, illustrated the leadership of the U.S. space program during the Mercury, Gemini, Apollo and Shuttle space eras. In contrast, John Hofmeister's presentation at the EMD luncheon demonstrated how the U.S. government's lack of leadership in energy policy is destroying the U.S. economy and the future for the U.S. energy industry.

John's talk was essential for identifying the critical issues where we need leadership from both industry and government, and Scott Carpenter's, Jack Schmitt's and Jim Reilly's talks demonstrated what we can accomplish with clear goals and leadership!

So where will we lead next?

Deepwater and tight formations are obvious answers, as illustrated by the sessions on deepwater exploration and the session on “Challenges in Challenging Reservoirs,” chaired by P.H. Nelson.

The message from the geothermal session was that we can replace our stationary sources of power generation with geothermal power plants. What's more, all these deep hot reservoirs (below 12,000 feet) we have been extracting oil and gas from can transition into geothermal power production.

Also, apparently for an investment less than what Brazil is going to spend to bring the pre-salt reservoirs into production, we can retrieve enough platinum group metals and rare earth elements to pay off at least half of the national debt, provide fuels and life support materials for colonies on the moon and Mars, and establish permanent orbital space stations for refueling manned missions throughout the solar system.

Should we stay away from the deepwater resources – or from the moon or the asteroids – because they are too hard, or too expensive or too far to develop?

Of course not, as Charles Sternbach's and Ed Dolly's Forum on Discovery Thinking demonstrated; because when we focus our attention and leadership on worthy goals, we will find ways to meet the energy needs of society at costs that are acceptable and appropriate for the products we produce.

Never be afraid to lead, for we are the leaders of our industry – and never fail to lead because of timidity or fear.

It is easy to be a follower – all you have to do is leave your fate in the hands of someone else.

When we are leaders we define our fate and our future. ☐

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The Structure and Geomechanics Group currently seeks individuals with experience with 3D structural interpretation and analysis, fault seal, fracture characterization and hydraulic modeling, and computational geomechanics. All members of the group are expected to design and conduct leading-edge theoretical and integrated research, provide E&P support through technical service, and promote knowledge sharing via training courses, workshops and web-based methods. Required qualifications include a PhD in geoscience with a track record of scientific journal publication, demonstrated experience in field mapping and related analytical methods leading to 3D models and kinematic analysis, interpretation of crustal structure in reflection seismic data and a familiarity with structural styles, computational or physical/experimental study of rock mechanics and deformation, and fracture and fault characterization and impact on fluid flow.

Special priority will be given to candidates with experience in material science and engineering mechanics, reservoir fluid flow modeling, and the ability to write and/or interact with computer code for data and computational analysis. Three or more years of post-PhD experience in related academic or industrial sectors is ideal. Req. #00B4D.

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READERS' FORUM

Please?

Many readers and all my friends know I am hypercritical about projection slide/illustrations, especially those with small fonts and excessive information.

Having just attended the Houston ACE meeting I could not help but take notice of slide (PowerPoint) variability from session to session.

Especially noticeable were presentations given by employees of a major petroleum company. The slides all had the same format and logo, but most of the print was unreadable from the middle of the room (even with my new eye glasses). I'm sure they were impossible to read from the rear of the room without binoculars. In addition, it was impossible to read the numbers, dates etc., on the X and Y axis of graphs – and many contained multiple graphs. Only the THANK YOU at the end was easy to read.

After asking around I found it was company policy to use their in-house slide program. I would agree that those slides would be fine in a small room or around a conference table but they are unsuitable for a large room at an AAPG/SEPM convention.

Management should read the AAPG slide manual "Figuratively Speaking."
THANK YOU.

Gene Shinn
St. Petersburg, Fla.

Disappointment

It was very disappointing to read in Louise Durham's report, "Eastern GOM – Forbidden Fruit Again" (May EXPLORER), that permits for seismic acquisition in this region have been held in limbo for nearly a year. It seems that even non-invasive data-gathering activities are now subject to the drilling "permatorium."

The GOM has prospered as a proving ground of play concepts and development technologies – a legacy that should not be squandered now.

Samuel C. Schon
Providence, R.I.

Thanks for the Memories

I was a member of the Cairo University Imperial Barrel Award team, so I experienced all of what happened – but after reading the EXPLORER story about the events (May EXPLORER) I couldn't believe all the effort that had happened.

Thanks to the AAPG team in Nigeria and United States for making it all possible.

Hussein Ali Abdulaziz Abdulhafez
Cairo, Egypt

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The Association of Petroleum Geologists of Kazakhstan/APGK (Atyrau city) together with the Kazakh Institute of Oil and Gas (KING) holds the first International Scientific Geological Conference "AtyrauGeo-2011" dedicated to the 100th anniversary of the production of the first oil in Kazakhstan on September 5-6th, 2011. The Conference is held with support of the American Association of Petroleum Geologists (AAPG), RK Ministry of Oil and Gas, RK Committee of Geology and Subsurface Use (MINT), "KazEnergy" Association, National companies, E&P Kazmunaigas and Atyrau Regional Akimat. The given event is a part of the anniversary festivities which are scheduled to hold for September 3-4, 2011 in the city of Atyrau by «KazMunaygas Exploration & Production» company. The Conference will be held in one of the best hotels of the city "Renaissance Hotel Atyrau" located in the heart of the city.

Themes of the sessions of conference "AtyrauGeo-2011":
I-session – Specifics of structure of the pre-salt sequence in the south of the Precaspian basin.
II-session - New directions for exploration of oil and gas deposits in the post-salt sequence, reviving "the old Emba spirits".
III-session – Improvement of technique of search/exploration for new oil and gas fields.

Full information on the conference you may find on the website www.ongk.kz or by request at info@ongk.kz

Organizing Committee for the Conference "AtyrauGeo-2011"
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DEG – Making a Positive Difference

By MARY K. HARRIS, President, Division of Environmental Geosciences

This is my last EXPLORER column as DEG president before I hand the baton to Doug Peters and step into the role of the Division's "past president."

First and foremost, I would like to thank the DEG members who elected me and gave me this wonderful opportunity to serve the DEG. It has been an exciting year, and I have met lots of great people in AAPG.

When I took this office on July 1, I had a long list of what I wanted to accomplish. I quickly realized however, that I needed to concentrate on a short list, as one year would pass quickly. Indeed, it has flown by.

So as my term ends, I want to share some DEG highlights and accomplishments from this past year.

* * *

Recent activities focused on the AAPG Annual Convention and Exhibition in Houston, which was a big success for DEG. I would like to thank Craig Dingler and Tony Gorody for being the DEG vice chairs – both of them made sure that DEG had a great presence at the meeting.

Our luncheon was a sellout, and Ed Overton and his balanced discussion and perspective on the Gulf Coast oil spill were right on target (see story, page 29). If you were not able to be there and see Overton's talk, please visit the DEG website where the slides are posted.

After the luncheon we held a special forum on the Gulf Coast oil spill, which also was well attended and interesting. I hope



HARRIS



that DEG can publish a special issue on this topic in an upcoming Environmental Geosciences. Special thanks to Craig Dingler for arranging the forum.

Other highlights of the year include:

- ▶ A significant upgrade of the DEG website and development of a web portal. The DEG website is now mobile device-supported and has a DEG member that will be taking over daily maintenance. Check it often, because we plan on more changes.

- ▶ President-elect Doug Peters has been very active in updating the DEG committees, and soon will provide information on all the changes.

- ▶ Annual dues for Associate and Active members have been reduced from \$45 to \$25 per year, and student membership dues have been reduced to zero. We also offered a special one-time only discount rate at the DEG luncheon for \$15. Thanks to those of you who joined us at that time.

- ▶ Kristin Carter, editor-in-chief for the

Environmental Geosciences Journal, has streamlined the publication process, offering new ways to ensure a nine-month or less turnaround time on submitted manuscripts.

In addition, Environmental Geosciences will go completely digital as of July 1, and will be available via the DEG website. Not all of our members are elated with this change, but in the long run we believe you will appreciate our efforts to go green.

DEG members also will still receive an Environmental Geosciences CD annually.

Also, along with Special Issues editor James Drahovzal and managing editor Danielle Deemer, Kristin continues to develop special issues of Environmental Geosciences, covering such topics as geologic carbon sequestration, CO₂-enhanced oil recovery and, perhaps most notably, the Marcellus shale gas play.

In fact, there is an ongoing joint effort with the EMD to publish one or more special issues on water management and gas exploration issues associated with this shale gas play in the Appalachian Basin.

- ▶ Also in development is a digital, quarterly DEG newsletter that will be distributed via email and also available on the DEG website.

Deemer has spearheaded this effort, too, and we'll be working to publish the maiden version of this newsletter this summer.

- ▶ DEG will have a presence at the AAPG ICE 2011 meeting in Milan, Italy, with the acceptance of our Carbon

Sequestration short course. This course will provide an introduction to carbon sources, capture technologies, transportation, storage scenarios, the economics of carbon, capture and storage, and major current limitations. Capture systems will be discussed to provide a basic knowledge of technical and economic issues. The economics of compression and transport, and the general transport concentration standards for CO₂ also will be discussed.

* * *

As my term draws to a close I also would like to thank Norma Newby of the AAPG staff for all her invaluable help and support throughout the year. She has been great to work with and I know I leave DEG in good hands with her as our liaison with the DEG Executive Committee. You can always count on Norma to keep you pointed in the right direction.

In closing, I once again challenge every AAPG member to become an active DEG member – and help us educate the public on energy and environmental matters.

Being a DEG member will benefit you by keeping you abreast of the latest research – and that will help you provide value to both the petroleum industry and the environmental community at large.

Finally, I ask you to consider your impact on our earth. If we all make small changes in our daily lives, we can and will make a positive difference in our world. ☐

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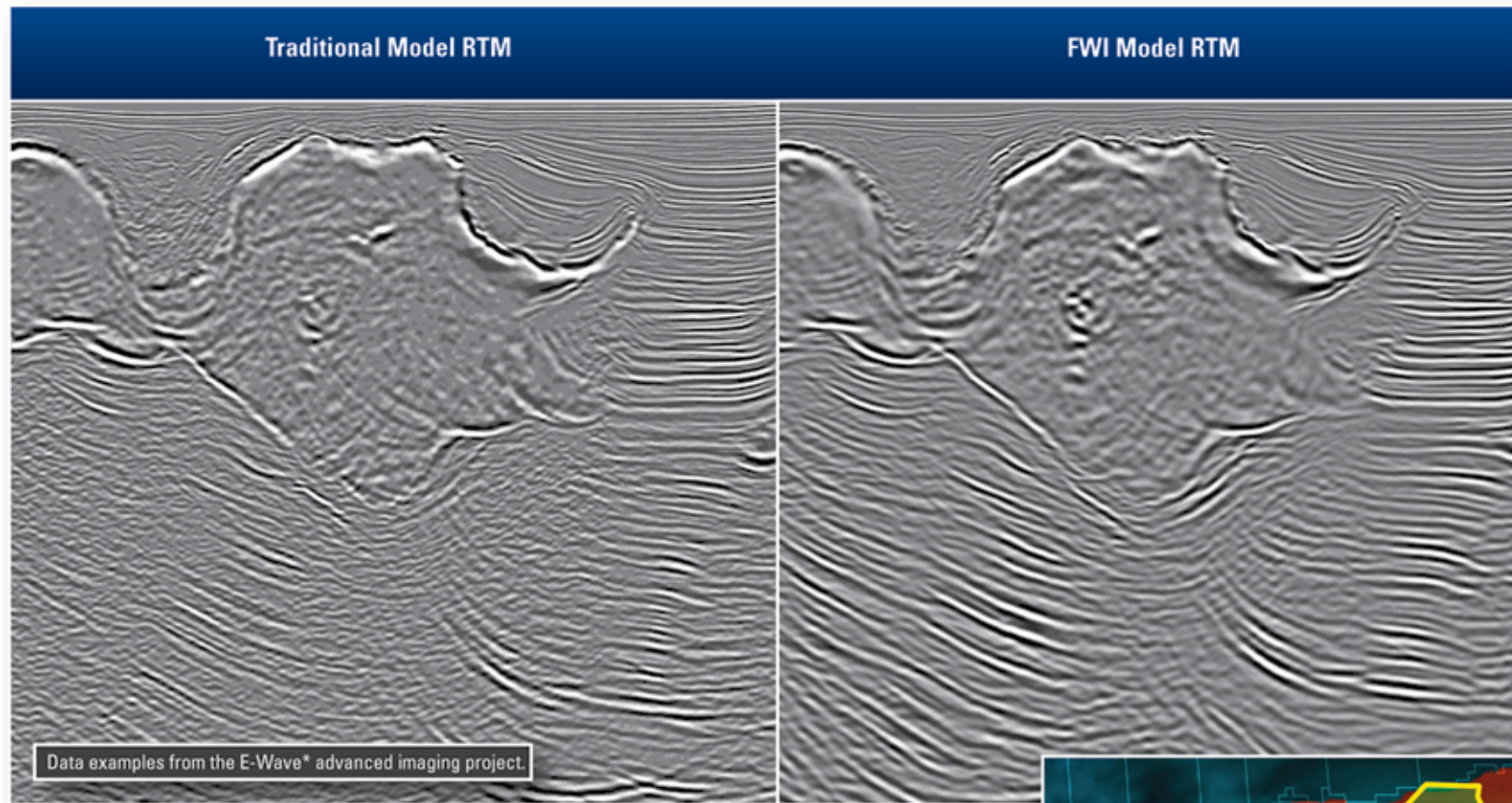


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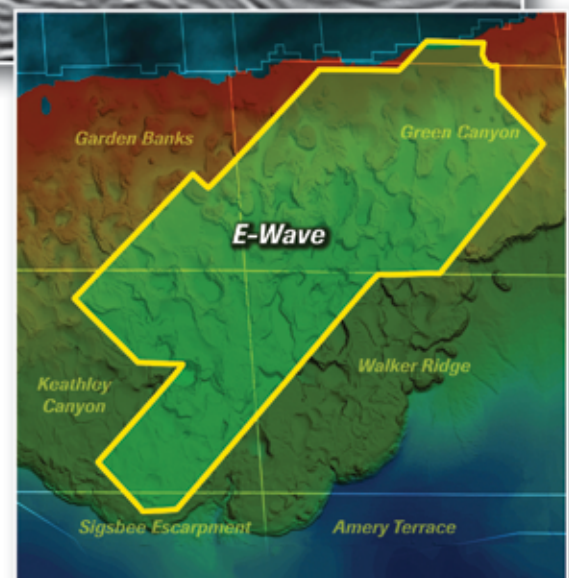


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